Agilent Technologies 8960 Series 10 Wireless Communications Test Set
Agilent Technologies E1962B cdma2000 Mobile Test Application

Reference Guide

cdma2000 Test Application Revision B.01

1000-1805

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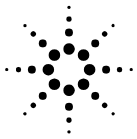
www.agilent.com/find/8960support/



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Agilent Technologies, Inc.
Learning Products Department
24001 E. Mission
Liberty Lake, WA 99019-9599
U.S.A.

Edition/Print Date

All Editions and Updates of this manual and their creation dates are listed below.

March 2001 E1962B Test Application Revision B.01

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

GENERAL

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

This product has been designed and tested in accordance with *IEC Publication 1010*, "Safety Requirements for Electronic Measuring Apparatus," and has been supplied in a safe condition. This instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

ENVIRONMENTAL CONDITIONS

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Ventilation Requirements: When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described under Safety Symbols.

GROUND THE INSTRUMENT

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

DO NOT REMOVE THE INSTRUMENT COVER

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

WARNING **The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

CAUTION The CAUTION sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Safety Symbols

Caution, refer to accompanying documents

Warning, risk of electric shock

Earth (ground) terminal

 Alternating current

Frame or chassis terminal

Standby (supply). Units with this symbol are not completely disconnected from ac mains when this switch is off.

Product Markings

CE - the CE mark is a registered trademark of the European Community. A CE mark accompanied by a year indicated the year the design was proven.

CSA - the CSA mark is a registered trademark of the Canadian Standards Association.

CERTIFICATION

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members

Agilent Technologies Warranty Statement for Commercial Products

Agilent Technologies 8960 Series 10 Wireless Communications Test Set
Agilent Technologies E1962B cdma2000 Mobile Test Application

Duration of Warranty: 1 year

1. Agilent Technologies warrants Agilent Technologies hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If Agilent Technologies receives notice of such defects during the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
2. Agilent Technologies warrants that Agilent Technologies software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If Agilent Technologies receives notice of such defects during the warranty period, Agilent Technologies will replace software media which does not execute its programming instructions due to such defects.
3. Agilent Technologies does not warrant that the operation of Agilent Technologies products will be uninterrupted or error free. If Agilent Technologies is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.
4. Agilent Technologies products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.
5. The warranty period begins on the date of delivery or on the date of installation if installed by Agilent Technologies. If customer schedules or delays Agilent Technologies installation more than 30 days after delivery, warranty begins on the 31st day from delivery.
6. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by Agilent Technologies, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.
7. TO THE EXTENT ALLOWED BY LOCAL LAW, THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTYOR CONDITION, WHETHER WRITTEN OR ORAL IS EXPRESSED OR IMPLIED AND AGILENT TECHNOLOGIES SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OR MERCHANTABILITY, SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE.
8. Agilent Technologies will be liable for damage to tangible property per incident up to the greater of $300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective Agilent Technologies product.

9. TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL AGILENT TECHNOLOGIES OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE.

   FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

ASSISTANCE

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products. For any assistance, contact your nearest Agilent Technologies Sales and Service Office.

Service and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your customer engineer through your local Agilent Technologies Service Center. You can find a list of local service representatives on the Web at:

http://www.agilent-tech.com/services/English/index.html

If you do not have access to the Internet, one of these centers can direct you to your nearest representative:

United States Test and Measurement Call Center
(Toll free in US)

(800) 452-4844

Europe

(31 20) 547 9900

Canada

(905) 206-4725

Japan Measurement Assistance Center

(81) 426 56 7832
(81) 426 56 7840 (FAX)

Latin America

(305) 267 4288 (FAX)

Australia/New Zealand

1 800 629 485 (Australia)
0800 738 378 (New Zealand)

Asia-Pacific

(852) 2599 7777
(852) 2506 9285 (FAX)

Regional Sales Offices

United States of America:
Agilent Technologies(tel) 1 800 452 4844
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026

Canada:
Agilent Technologies Canada Inc.(tel) 1 877 894 4414
2660 Matheson Blvd. E
Mississauga, Ontario
L4W 5M2

Europe:
Agilent Technologies(tel) (3120) 547 9999
European Marketing Organization
P.O. Box 999
1180 AZ Amstelveen
The Netherlands

Japan:
Agilent Technologies Japan Ltd.(tel) (81) 456-56-7832
Measurement Assistance Center(fax) (81) 426-56-7840
9-1 Takakura-Cho, Hachioji-Shi,
Tokyo 192-8510, Japan

Latin America:
Agilent Technologies(tel) (305) 267 4245
Latin America Region Headquarters(fax) (305) 267 4286
5200 Blue Lagoon Drive,
Suite #950
Miami, Florida 33126
U.S. A.

Australia/New Zealand:
Agilent Technologies Australia Pty Ltd.AustraliaNew Zealand
347 Burwood Highway(tel) 1 800 629 485 (tel) 0 800 738 378
Forest Hill, Victoria 3131(fax) (61 3) 9272 0749(fax) (64 4) 802 6881

Asia Pacific:
Agilent Technologies(tel) (852) 3197 7777
24/F, Cityplaza One,(fax) (852) 2506 9233
111 Kings Road,
Taikoo Shing, Hong Kong

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturer's Name:	**Agilent Technologies UK Ltd.**	**Agilent Technologies, Inc.**
Manufacturer's Address:	**Electronic Products & Solutions Group - Queensferry South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom**	**24001 E. Mission Avenue Liberty Lake Washington 99019-9599 USA**

Declares, that the product

Product Name: 8960 Series 10 Wireless Communications Test Set

Model Number: E5515B

Product Options: This declaration covers all options of the above product.

Conforms with the following European Directives:

The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998	Group 1 Class A [1]
	CISPR 11:1990 / EN 55011:1991	4kV CD, 8kV AD
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	0.5V signal lines, 1kV power lines
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	3V, 0.15-80 MHz
	IEC 61000-4-6:1996 / EN 61000-4-6:1996	1 cycle, 100%
	IEC 61000-4-11:1994 / EN 61000-4-11:1994	
Safety:	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada CSA C22.2 No. 1010.1:1992	

Supplemental Information:

[1] The product was tested in a typical configuration with Agilent Technologies test systems

14 December 2000

R M Evans

R.M. Evans / Quality Manager

14 December 2000

W V Roland

W.V.Roland / Reliability & Regulatory Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent, or distributor.
Authorized EU-representative: Agilent Technologies Deutschland GmbH, Herrenberger StraBe 130, D71034 Boblingen, Germany

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According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturer's Name:	**Agilent Technologies UK Ltd.**	**Agilent Technologies, Inc.**
Manufacturer's Address:	**Electronic Products & Solutions Group - Queensferry South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom**	**24001 E. Mission Avenue Liberty Lake Washington 99019-9599 USA**

Declares, that the product

Product Name: 8960 Series 10 Wireless Communications Test Set

Model Number: **E5515C**

Product Options: This declaration covers all options of the above product.

Conforms with the following European Directives:

The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326:1997/A1:1998	Group 1 Class A [1]
	CISPR 11:1990 / EN 55011:1991	4kV CD, 8kV AD
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	0.5kV signal lines, 1kV power lines
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	3V, 0.15-80 MHz
	IEC 61000-4-6:1996 / EN 61000-4-6:1996	
	IEC 61000-4-11:1994 / EN 61000-4-11:1994	1 cycle, 100%

Safety: IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995
Canada: CSA C22.2 No. 1010.1:1992

Supplemental Information:

[1] The product was tested in a typical configuration with Agilent Technologies test systems

01 May 2001

R.M. Evans / Quality Manager

01 May 2001

W.V.Roland / Reliability & Regulatory Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent, or distributor.
Authorized EU-representative: Agilent Technologies Deutschland GmbH, Herrenberger StraBe 130, D71034 Boblingen, Germany

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturer's Name:	**Agilent Technologies, Inc.**
Manufacturer's Address:	**24001 E. Mission Avenue** **Liberty Lake** **Washington** **99019-9599** **USA**

Declares, that the product

Product Name:	8960 Series 10 Wireless Communications Test Set
Model Number:	E5515T
Product Options:	This declaration covers all options of the above product.

Conforms with the following European Directives:

The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998	Group 1 Class A [1]
	CISPR 11:1990 / EN 55011:1991	4kV CD, 8kV AD
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	0.5V signal lines, 1kV power lines
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	3V, 0.15-80 MHz
	IEC 61000-4-6:1996 / EN 61000-4-6:1996	1 cycle, 100%
	IEC 61000-4-11:1994 / EN 61000-4-11:1994	
Safety:	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada CSA C22.2 No. 1010.1:1992	

Supplemental Information:

[1] The product was tested in a typical configuration with Agilent Technologies test systems

14 December 2000

W.V.Roland / Reliability & Regulatory Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent, or distributor.
Authorized EU-representative: Agilent Technologies Deutschland GmbH, Herrenberger StraBe 130, D71034 Boblingen, Germany

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB(A).

- Sound Pressure Lp < 70 dB(A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779:1991 (Type Test).

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel Lp < 70 dB(A).
- Am Arbeitsplatz.
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1 Measurements

Access Probe Power Measurement Description

How is an Access Probe Power measurement made?

The access probe power measurement is a channel power measurement (see “Channel Power Measurement Description”) triggered by a rise in RF power detected on the test set’s RF input. The power threshold is approximately -55 dBm/BW.

Access probe sequences are transmitted by the mobile station during registration or mobile station originated calls. Access probe sequences consist of a series of RF power “steps” which increase in power according to the step size setting until the maximum number of steps is reached or the call processing event completes, for example when the call connects.

When the test set is making access probe power measurements in the continuous trigger arm state, it will display the power level of the most recent access probe power measurement.

Considerations when making Access Probe Power measurements

IMPORTANT Access probe power measurements must not be left in Continuous Trigger Arm mode. Attempting any other measurements while in this state will result in 4 dashes (----).

The access probe measurement setup menu provides control over the following access probe parameters:

- Number of Steps in the access probe sequence (NUM_STEP in the standards).
- Power Step (PWR_STEP in the standards). This parameter specifies the step increase in transmit power between each access probe within an access probe sequence.
- Maximum Request Sequence (MAX_REQ_SEQ in the standards). This parameter specifies the maximum number of access probe sequences for an access channel request.

Changing the number of steps and step size will affect the power level displayed if more than one access probe is transmitted by the mobile station. However, the number of access probes transmitted depends on whether or not the test set responds by acknowledging the access request, thereby ending the access attempt. To prevent the test set from responding to the access probe request, turn the Call Limit Mode feature On (key F10 in Call Parms, 2 of 3 screen). For the GPIB command syntax, see “CALL:CONNected:LIMit[:STATe]” .

To measure only the first access probe and prevent triggering on subsequent access probes, set Trigger Arm in the Access Probe Power Setup menu to Single and press the START SINGLE hardkey.

When the mobile station registers, and access probe power measurement will likely be triggered. Registrations can occur on mobile station power-up, which is a function of the mobile station’s programming. Registrations may be requested by the test set at pre-determined time intervals, which will periodically cause the access probe power measurement to update. To control timer based registrations, access the Registration Parameters menu (see “C. Set registration parameters.”). For GPIB syntax information on timer-based registrations, see “CALL:REGister” .

Input Signal Requirements

See “Input Signal Requirements”

Related Topics

“CALL[:CELL]:APARameter”

“SETup:CAPPower”

“INITiate”

“FETCh:CAPPower”

“READ”

“ABORt”

“Channel Power Measurement Description”

“Test Adherence to Standards”

Channel Power Measurement Description

How is a Channel Power measurement made?

Channel power measurements are made by analyzing a digitized version of the input signal's downconverted IF using the test set's DSP (see "Block Diagram"). Triggering occurs on the test set's internal 20 ms frame clock. The measurement is cross-calibrated with the detected average power to determine the absolute power level.

Channel power measurements are limited to a 1.23 MHz bandwidth, and can be made on either power-gated or non-power-gated input signals.

Channel Power Measurement Calibration

Channel power measurements are calibrated using the "CALibration:CPOWer?" command. Refer to "CALibration Subsystem" for a description of channel power calibration.

Channel Power Measurement Speed

There are two channel power measurement speeds, fast and normal. See "SETup:CPOWer:MSPeed" for GPIB command syntax.

Normal channel power measurements, like average power measurements, analyze a 10 millisecond sample of the input signal, which is one-half of a CDMA frame. Since there is always at least one "on" power control group in each half-frame the test set is able to "search" for and measure power during at least one "on" period. Therefore, normal channel power measurements can be made when the mobile station is transmitting less than full data rate, or is in one of the echo service options (mobile station is gating its output power according to speech activity).

Fast channel power measurements do not perform the search for "on" power control groups. Fast channel power measurements only sample the input signal for 1.25 milliseconds, and are applicable only when the input signal power is not power-gated. An example of a condition which would result in the mobile station transmitting a non power-gated signal would be when the mobile station is in a loopback service option (on a call or not) and is transmitting full-rate data.

Input Signal Requirements

The channel power measurement meets or exceeds specifications when the following input signal requirements are met:

- The frequency of the signal being measured must be within the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and be within 100 kHz of the expected frequency.
- The average power level of the signal at the RF IN/OUT connector must be between -61 dBm to +37 dBm. The test set can autorange to a signal that is between +8 dBm to -20 dBm of the expected level (see "RFANalyzer:AUTO:POWer[:SELected]?").

Related Topics

"READ? Subsystem"

"SETup:CPOWer"

"INITiate"

"FETCh:CPOWer"

"Digital Average Power Measurement Description"

"Test Adherence to Standards"

Digital Average Power Measurement Description

How is a Digital Average Power measurement made?

Digital average power measurements are broadband power measurements made on the RF input before frequency downconversion (see "Block Diagram"). Digital average power measurements return the true rms power level of the input signal. Triggering is handled by internal mechanisms and autoranging is used. No external triggering is available.

The input waveform is detected by a peak detector with sufficient AM bandwidth to track the instantaneous power changes of a CDMA signal. Each measurement is made by analyzing a 10 millisecond period (one-half of a frame) of the detected waveform.

The test set's digital signal processor (DSP) determines the true rms value of the signal. If the input signal is power-gated, only the active power control groups will be measured.

This measurement uses autoranging based on the open loop power control response of the mobile station to set up the receiver signal path attenuation.

Digital Average Power measurement characteristics

The digital average power measurement has greater than 2 GHZ bandwidth. For this reason, significant signal energy outside the IS-2000 SR1 (1.25 MHz) signal bandwidth will increase the measured value.

This measurement can be made on signals that are power-gated or signals that are not power-gated. It is not necessary to specify whether the input signal is power-gated.

Input Signal Requirements

The digital average power measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz.
- The signal level into the test set's RF IN/OUT connector must be between +37 dBm and -30 dBm. The test set can autorange to a signal that is between +8 dBm to -20 dBm of the expected level (see "RFANalyzer:AUTO:POWer[:SELected]?").

Related Topics

"READ? Subsystem"
"SETup:DAPower"
"INITiate"
"FETCh:DAPower"
"Channel Power Measurement Description"
"Test Adherence to Standards"

Frame Error Rate Measurement Description

How is an FER (frame error rate) measurement made?

FER measurements are used to test the performance of a mobile station receiver.

During each FER measurement the test set sends a sequence of bits to the mobile station and the mobile station attempts to demodulate and re-transmit the same bits back to the test set. The test set keeps a running count of the measured frames and the number of frames that contained bit errors.

A call must be connected with a loopback service option selected (see "CALL[:CELL]:SOPTION") to perform frame error rate measurements.

Intermediate measurement results are periodically available on the front panel display, but are not available programmatically through the GPIB interface.

Confidence Level Description

Confidence level testing is a feature of FER measurements that applies statistical analysis to FER measurements so that pass/fail test results can be obtained in the shortest possible time. When confidence level is on, the FER measurement will keep track of the number of frames measured, the number of frame errors, and perform a statistical analysis of the probability that the value entered in the FER requirement field will (or will not) be exceeded.

The confidence level parameter is typically set at 95 percent. Each FER measurement will return a Pass result before the maximum frame count is reached if statistically there is a 95 percent probability that the percentage of frame errors would not exceed the FER requirement value if the measurement were allowed to reach the maximum frame count. The FER measurement will return a Fail result before the maximum frame count is reached if statistically there is a 95 percent probability that the percentage of frame errors counted would exceed the FER requirement if the measurement were allowed to reach the maximum frame count. If confidence level is off, or the number of frame errors counted did not result in a pass or a fail result, max frames will be returned and the measurement result will be the FER percentage.

Several hundred frames of data must be measured before confidence limit checking can begin. A speed-up feature, which is always active, allows the test set to end an FER measurement before reaching the minimum number of frames required to apply confidence limit checking. The speed-up feature calculates a maximum value of frame errors allowed before confidence limit checking begins, and ends the FER measurement with a fail indication if this limit is exceeded.

Input Signal Requirements

The FER measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see "RFANalyzer:AUTO:POWer[:SELected]?" to meet specifications.

Related Topics

“READ? Subsystem”

“SETup:CFERror”

“INITiate”

“FETCh:CFERror”

“Test Adherence to Standards”

Frequency Stability Measurement Description

How is a frequency stability measurement made?

The Frequency Stability measurement measures the transmitter frequency and frequency error of analog signals (including AMPS) with a 1 Hz resolution. Frequency Error is determined by comparing the frequency of the measured signal to the expected frequency. These parameters are determined by the receiver control settings (see “Manual Receiver Control Parameters” on page 118).

Operating Considerations

This measurement is not used for digital signals.

For the best accuracy, connect the timebase of the signal source with the test set’s timebase. See “10 MHZ REF IN” on page 460 and “10 MHZ REF OUT” on page 460.

Input Signal Requirements

The received signal’s frequency must be within the interval 293 MHz to 2.7 GHz and be within 200 kHz of the expected frequency. See “Measurement receiver frequency” on page 118.

The power level of the signal source must be between -30 to +43 dBM and be within 3 dB of the expected power. See “CW receiver power” on page 118.

If the received signal has FM, the modulation index must be no greater than three and the modulation frequency must be between 100 Hz and 15 kHz.

Worst Case Frequency Error

Frequency and Frequency Error measurement results are returned over GPIB in units of Hz. Worst Case Frequency Error, the greatest error measured during the total sample(s), is returned in units of ppm (parts per million). Worst Case Frequency error is only displayed on the test set’s display when multi-measurements are used, but is always available via GPIB (regardless of the multi-measurement state).

Triggering

Triggering is always immediate for this measurement. Trigger Delay and other trigger sources are not used.

Related Topics

“READ? Subsystem”
“SETup:FSTability”
“INITiate”
“FETCh:FSTability”
“Receiver Control”
“Test Adherence to Standards”

Waveform Quality/Code Domain Measurement Description

How is a Waveform Quality/Code Domain Power measurement made?

Each waveform waveform quality measurement returns a number of measurements which includes rho, the percentage of signal energy that correlates with a perfect IS-2000 signal after time offset and frequency error have been removed.

This measurement is designed to analyze signals that may be made up of multiple code channels, as in the case of radio configurations three and above. Any time a call is connected, waveform quality measurements can be made. Any combination of service option, radio configuration, or data rate can be measured.

Waveform quality measurements are made by sampling the down-converted input signal, then applying DSP (Digital Signal Processing) techniques to determine the original data input to the mobile station transmitter's Walsh spreading function for each channel. The DSP then generates a representation of what the "ideal" signal would be given the coding and data in use at the time of transmission. The ideal waveform is then compared with the waveform being measured to determine the waveform quality.

Table 1., "Waveform Quality/Code Domain Power measurement results," on page 40 lists the Waveform Quality/Code Domain Power measurements:

Table 1. Waveform Quality/Code Domain Power measurement results

Waveform Quality	Code Domain Power
Rho	Code Domain Power (I-Channel)
Frequency Error	Code Domain Power (Q-Channel)
Timing Error	Code Domain Power + Noise (I-Channel)
Carrier Feedthrough	Code Domain Power + Noise (Q-Channel)
Phase Error	
Magnitude Error	
Error Vector Magnitude (EVM)	

For more information about Code Domain Power measurements, refer to <link to product note>

Input Signal Requirements

The Waveform Quality measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see "RFANalyzer:AUTO:POWer[:SELected]?") to meet specifications.

Related Topics

"READ? Subsystem"

"SETup:WQUality"

"INITiate"

"FETCh:WQUality"

"Test Adherence to Standards"

Test Adherence to Standards

This document refers to the 3GPP2 C.S0011-A IS-2000 standard, a version of IS-98-D.

Standards Table

This table is organized by Standard number. For more information about the measurements, refer to the Measurements section.

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0 | OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1 | ON (continuous)).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON"`
`!Sets measurement to single trigger mode.`	

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0 | OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1 | ON (continuous)).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON"`
`!Sets measurement to single trigger mode.`	

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON"`
`!Sets measurement to single trigger mode.`	

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON"`
`!Sets measurement to single trigger mode.`	

Table 2. IS-98-D Standards

TIA/EIA-98-D	**E1962B**
3.1 Frequency Requirements	Supports Band Class 0-7
3.4.1 Demodulation of Forward Traffic Channel with AWGN	Yes
3.4.2 Demodulation of Forward Traffic Channel with Fading	Yes
3.5.1 Receiver Sensitivity and Dynamic Range	Yes
3.5.2 Single Tone Desensitization Tests 1 and 2	Yes, with external signal generator
3.5.3 Intermodulation Spurious Response Attenuation Tests 1 and 2	Yes, with external signal generator
3.5.4 Adjacent Channel Selectivity	Yes, with external CDMA generator
3.7.1 Supervision Paging Channel	Yes, but does not provide timing measurements

Table 2. IS-98-D Standards

TIA/EIA-98-D	E1962B
4.1 Transmit Frequency Accuracy	Uses the rho or EVM measurement method
4.3.1 Time Reference	Yes, with external fader and external timing measurement device.
4.3.2 Reverse Pilot Channel to Code Channel Time Tolerance	Yes
4.3.2 Reverse Pilot Channel to Code Channel Phase Tolerance	Yes
4.3.4 Waveform Quality and Frequency Accuracy	Uses the rho or EVM measurement method. The test set also measures multi-coded waveform quality, a non-standard but more useful measurement.
4.3.5 Code Domain Power	The test set measures multi-coded waveform quality, a non-standard but more useful measurement.
4.4.1 Range of Open Loop Power	Uses access probe power measurement. Enhanced Access Channel is not supported.
4.4.3 Access Probe Output Power	Yes
4.4.4 Range of Closed Loop Power Control	Yes, but does not make timing measurements. Test 2 not supported.
4.4.5 Maximum RF Output Power	Yes. Spurious emissions uses and external spectrum analyzer.
4.4.6 Minimum Controlled Output Power	Uses channel power measurement.
4.4.7 Standby Output Power and Gated Output Power	Yes. The test set provides call setup. HP859XE and HP 85725C are needed to make the measurement.
4.4.9 Code Channel to Reverse Pilot Output Power Accuracy	Yes, except Enhanced Access Channel Header, Enhanced Access Channel Data and Reverse Common Control Channel Data.
4.4.10 Reverse Pilot Channel Phase Discontinuity	Yes. The test set provides call setup. HP859XE and HP 85725C are needed to make the measurement.
4.5.1 Conducted Spurious Emissions	Yes. The test set provides call setup. HP859XE and HP 85725C are needed to make the measurement.

Measurement Related Configuration

Description

Amplitude offset is provided in order to compensate for loss or gain of the external network between the test set and the DUT, (device under test).

The test set allows you to select up to 20 different offsets at 20 different frequencies.

There are 5 non-volatile amplitude offset parameters that require your attention:

- RF IN/OUT Amplitude Offset State
- Frequency state 1 - 20
- Frequency 1 - 20
- Offset state 1-20
- Offset 1 - 20

NOTE Frequency and offset values must be set independently.

It is not necessary to use all 20 offsets or frequencies.

RF IN/OUT Amplitude Offset State

The RF IN/OUT Amplitude Offset State can be changed to On by setting any of the 20 offsets or frequencies to the On state. The RF IN/OUT Amplitude Offset State can also be turned On or Off independently of the frequency or offset state. When the RF IN/OUT Amplitude Offset State is On, the Offset indicator will appear in the Instrument Status Area of the test set display.

If the RF IN/OUT Amplitude Offset State is Off none of the amplitude offsets are active even if the states of the individual offsets are set to On.

Remote User To set the RF IN/OUT Amplitude Offset State to On:

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
                                        !Amplitude Offset State to On
```

Manual User In order to manually set the RF IN/OUT Amplitude Offset State, go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF IN/OUT Amplitude Offset State is the first parameter in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies or offsets are manually set to On, the RF IN/OUT Amplitude Offset State is also set to On.

Frequency 1 - 20

Up to 20 different RF offset frequencies can be defined by you to correct network loss or gain.

When operating at frequencies not specified in the RF IN/OUT Amplitude Offset frequency list, but between the lowest and highest frequencies in the list, the test set will use linear interpolation to define offset values.

When operating at frequencies above the highest frequency specified, or below the lowest frequency specified in the RF IN/OUT Amplitude Offset frequency list, the test set will use the offset of the closet associated frequency.

If you repeat a frequency entry, only the first entry along with its offset will be used by the test set, even though both of the repeated frequencies may be shown. If a frequency is repeated a warning will appear:

NOTE Duplicate RF IN/OUT Amplitude Offset Frequency. The first occurrence of duplicate is used.

Remote User If less than 20 frequencies are sent, the first positions of the RF IN/OUT Amplitude Offset Setup menu will fill in according to the number of frequencies sent. This means that if 6 frequencies are sent, Frequency 1 through Frequency 6 will reflect the values sent by you, and Frequency 7 through Frequency 20 will remain off.

Sending any new frequency values in subsequent commands will write over the original values and set the state to Off for any frequencies not set with the new command.

Sending a null list (no values) with the frequency command results in setting the state for Frequency 1 - 20 to Off .

There are two different commands that can be used to set the RF offset frequency.

- Frequency is set, and the frequency state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!A complex command that sets the up to 20 comma separated frequencies and sets the state to On
!for the frequencies, offsets, and RF IN/OUT Amplitude Offset State
```

- Frequencies are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ" !Sets up to 20 comma
                                                               !separated frequencies
```

Manual User Manual users may set the state or the value for any of the 20 frequencies from the RF IN/OUT Amplitude Offset Setup menu. Frequency values may be set in any order, i.e. set Frequency 1 and then skip to Frequency 20. The frequency state and value is individually controlled for manual users.

In order to manually set the RF offset frequencies go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offset frequencies 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies are manually set to On, the RF IN/OUT Amplitude Offset State and the associated offset state are also set to On.

Offset 1 - 20

Up to 20 different offset values can be defined by you to correct network loss or gain.

Duplicate offsets are allowed as long as they are associated with different frequencies.

Remote User Sending any new offset values in subsequent commands will write over the original values and set the state to Off for any offsets not set with the new command.

There are two different commands to set offsets.

- Offsets are set, and the offset state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets and sets the state to On for
!the frequencies, offsets and RFIN/OUT Amplitude Offset State
```

- Offsets are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23" !Sets up to 20 separated offset values
```

Manual User Manual users may set the state or the value for any of the 20 offsets from the RF IN/OUT Amplitude Offset Setup menu. Offset values may be set in any order, i.e. set Offset 1 and then skip to Offset 20. The offset state and value is individually controlled for manual users.

In order to manually set the RF offsets go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset gain, loss and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offsets 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 offsets are manually set to On, the RF IN/OUT Amplitude Offset State and the associated frequency state are also set to On.

Points

Remote users can query the test set to determine the number of offsets that are in the On state.

```
OUTPUT 714;"SYSTEM:CORRECTION:POINTS?" !Query returns the number of
                                       !frequencies that have their
                                       !offset states set to On
```

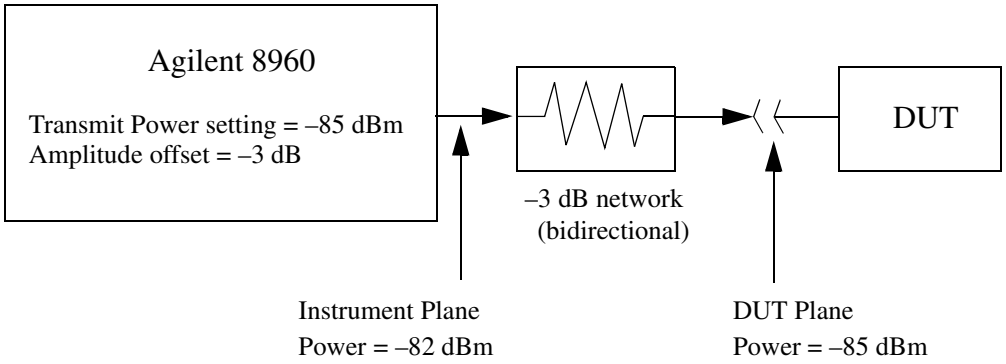
RF IN/OUT Amplitude Offset

The offset values allow the test set to represent the RF level at the DUT.

Transmitter Example When you set transmit power level, the test set uses the amplitude offset value to adjust the power so that the power at the DUT will match the transmit power setting.

With the test set's transmit power set to –85 dBm, the RFIN/OUT Amplitude Offset State set to On, and a –3 dB offset at some frequency. The power transmitted from the test set will be –82 dBm, the 3 dB loss in the network means that the DUT will be see –85 dBm.

Figure 1. Amplitude Offset Transmitter Example

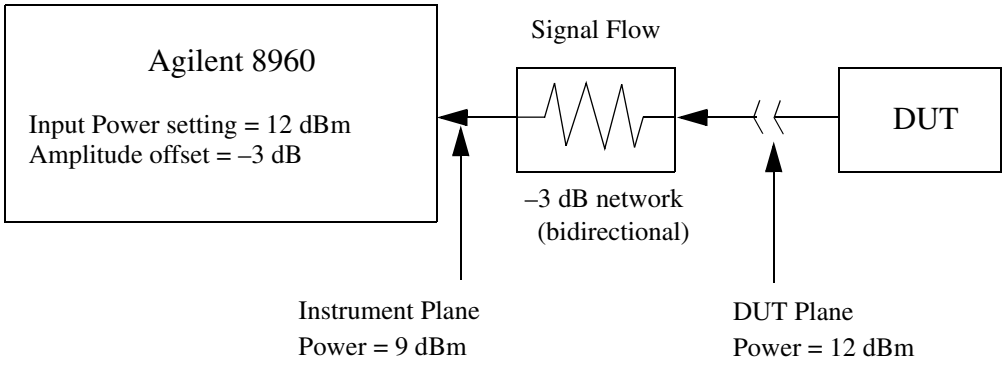


The transmit power setting reflects the power at the DUT plane.

Receiver Example The received power setting reflects the power at the DUT. This means the value displayed for received power does not change; however, the test set's hardware changes internally to expect a level that includes the offset.

With the test set's received power set to 12 dBm, the RF IN/OUT Amplitude Offset State set to On, and a –3 dB offset at some frequency. The received power displays 12 dBm to reflect the level at the DUT. The test set's internal hardware changes to receive 9 dBm, the power received at the test set's RF IN/OUT connector after the 3 dB loss in the network.

Figure 2. Amplitude Offset Receiver Example



The input power setting reflects the power at the DUT plane.

Related Topics

"SYSTem:CORRection"

2 Call Processing

Active Cell Operating Mode

Active cell mode is used to emulate an IS-2000 cell interacting with the mobile station (MS), and is the default operating mode.

Active Cell Features

The basic features provided by active cell operating mode are:

- Selection of radio configuration.
- Selection of service options (voice echo or data loopback).
- Call setup and disconnection, both mobile station originated and paging.
- Mobile station registrations.
- Hard handoffs between frequency bands and physical RF channels.
- Service option negotiation during access state or on traffic channels.
- Voice echoing through the mobile's earpiece.
- Automatic control of the test set's demodulation receiver.
- Mobile station reported information, such as mobile station parameters.
- Closed loop power control.

Setting the Test Set's Operating Mode to Active Cell Mode

The active cell operating mode is set using the following test set command:
OUTPUT 714;"CALL:OPERating:MODE CALL"

Related Topics

"Test Operating Mode" on page 51

"CW Operating Mode" on page 52

Test Operating Mode

When the test set is in test operating mode (as opposed to active cell operating mode) it is necessary for the mobile station under test to be capable of independently performing operations that normally occur through over-the-air signaling. This capability is referred to as test mode and is usually accomplished using commands which are sent to the mobile station from a system controller (usually a personal computer) through a proprietary digital interface. See <test mode paper>.

In test mode, the test set transmits all forward CDMA channels (Pilot, Sync and Paging) with full overhead messaging, however *no message or data exchange takes place with the mobile station*.

To make measurements on the reverse channel in test mode, the mobile station must first synchronize to the test set's forward pilot channel and demodulate the sync and paging channels. This is consistent with normal system acquisition procedures and results in the mobile station reaching the mobile station idle state. In active cell operating mode, the mobile station at this point would autonomously perform a power-up registration after entering the idle state. A call would then be initiated and the RF link would be established and maintained according to the applicable message protocol. However, in test mode the test set and mobile station are directed to the same FCH (fundamental channel) by the system controller or through manual user interfaces.

Since data is not looped back to the test set in test mode, the mobile station must count the frame errors and report FER (frame error rate) through the digital interface.

Forward CDMA channels available in test mode

In test mode, the test set can be configured to transmit a forward channel that emulates a base station operating in radio configuration (RC) 1, 2, 3, 4 or 5. The following channels are available, with power level control, depending on the selected radio configuration.

- Pilot
- Sync
- Paging (only transmits overhead messages)
- Quick Paging (with all on or all off indicators)
- Traffic or Fundamental
- 1 Supplemental (in radio configuration 3, 4 or 5)
- 1 OCNS (Orthogonal Channel Noise Simulator)
- 1 AWGN (Additive White Gaussian Noise)

Related Topics

- "CALL[:CELL]:OPERating"
- "How Do I Change Cell Information?"

CW Operating Mode

CW operating mode provides an unmodulated carrier of adjustable frequency and amplitude, manual adjustment of the measurement receiver and demodulation (uplink) receiver frequencies, and manual setting of the expected CW input power.

Note: Changing the operating mode affects manual receiver control parameters. See "Effects on Receiver Control When Changing Operating Mode" on page 119.

CW Test Mode Operation

When the test set's operating mode is set to CW:

- No over the air signaling is used.
- No demodulation or channel decoding is available.
- An unmodulated RF signal can be generated while analyzing another signal (at the same frequency or at a different frequency). No interaction exists between these controls.
- With the exception of mobile reported values, all test set measurements are accessible. Immediate triggering should be used for most measurements because no overhead signaling is occurring. Protocol triggering will time-out (if time-outs are enabled) or report an integrity indicator other than zero (0) and not provide valid results. RF Rise triggering may or may not work, depending on the type of signal being measured.
- Expected CW power, measurement receiver frequency, and uplink receiver frequency are available as manual settings only; no automatic control is provided.

CW Mode Operation

The following command examples show you how to control each function for CW operating mode:

1. Select CW operating mode:
   OUTPUT 714;"CALL:OPERating:MODE CW"
2. Set the cell power output level to be transmitted by the test set:
   OUTPUT 714;"CALL:POWer -45 DBM"
3. Set the RF generator frequency:
   OUTPUT 714;"CALL:RFGenerator:FREQuency 870 MHZ"
4. Set the expected CW power level to be received by the test set:
   OUTPUT 714;"RFANalyzer:CW:EXPected:POWer 23 DBM"
5. Set the measurement receiver frequency:
   OUTPUT 714;"RFANalyzer:MANual:MEASurement 870.030 MHZ"
6. Set the uplink (demodulation) receiver frequency. (Not typically used in CW operating mode):
   OUTPUT 714;"RFANalyzer:MANual:UPLink 870.030 MHZ"

Related Topics

"Active Cell Operating Mode" on page 50

"Test Operating Mode" on page 51

Configuring the F-FCH/Traffic Channel (Forward Fundamental/Traffic Channel)

June 15, 2001

The F-FCH (traffic) channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-FCH Parameters

- F-FCH level.
- F-FCH state.
- F-FCH Walsh code (call status state must be idle).
- F-FCH data rate (see "CALL:TRAFfic:DRATe")

GPIB Examples:

Setting the F-FCH level and state (complex command)

```
OUTPUT 714;"CALL:FCH -10 DB"
```

would set the F-FCH state to on and set the F-FCH power level to –10 dBm. See "CALL:FCHannel[:SLEVel][:SELected]" .

Setting the F-FCH Walsh code

```
OUTPUT 714;"CALL:FCH:WALSH CODE14"
```

would set the F-FCH Walsh code to 14. See "CALL:FCHannel:WALSh" .

Operating Considerations

The terms traffic and fundamental channels are used interchangeably within IS-2000. Commands that control parameters for either code channel control both. For instance, setting the data rate using the "CALL:TRAFfic" commands set the data rate for the fundamental channel.

When changing F-FCH Walsh codes, the call processing state must be idle.

If the data rate is changed while an echo service option is selected, the data rate value will be stored for use when a loopback service option is selected.

Parameters can be queried from the test set regardless of the state of the test set.

Related Topics

"CALL:FCHannel"

"CALL:TRAFfic"

"How Do I Change Call Parameters?"

Configuring the F-Paging Channel (F-PCH)

The F-Paging channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-Paging Parameters

- F-Paging level.
- F-Paging state.
- F-Paging data rate.
- F-Paging IMSI type.
- F-Paging IMSI MCC (mobile country code).
- F-Paging IMSI MNC (mobile network code).
- F-Paging IMSI MSIN (mobile station identification number).
- F-Paging maximum slot cycle index.

Fixed F-Paging Parameters

The F-Paging Walsh code is fixed at code channel number 1.

GPIB Examples:

Setting the F-Paging state and level (complex command)

```
OUTPUT 714;"CALL:PAG -12 DB"
```

would set the F-Paging state on and set the level to –12 dB. See “CALL:PAGing[:SLEVel][:SELected]” .

Setting the F-Paging data rate

```
OUTPUT 714;"CALL:PAGING:DRATE HALF"
```

would set the F-Paging data rate to half-rate. See “CALL:PAGing:DRATe” .

Operating Considerations

The Walsh code number for the F-Paging channel is fixed at code 1 from the 64 Walsh code set.

The test set will page the mobile station in slotted mode unless the mobile station has registered as non-slotted. The test set will use the lesser value of “CALL:MS:REPorted:SCINdex?” , a mobile station reported parameter, or “CALL:PAGing:SCINdex[:MAXimum]” , a settable paging channel parameter, for slotted mode paging.

The test set will automatically update the F-Paging mobile station phone number whenever a new MIN1 and MIN2 or MSIN are received from the mobile station.

Related Topics

“CALL:PAGing”

“Configuring the F-QPCH (Forward Quick Paging Channel)”

Configuring the F-SCH (Forward Supplemental Channel)

The F-SCH channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-SCH Parameters

- F-SCH level.
- F-SCH state.
- F-SCH data rate
- F-SCH encoder type (convolutional or turbo)

Fixed F-SCH Parameters

The F-SCH Walsh code is fixed at code channel number 3.

When the F-SCH data rate is below 19.2 kbps, the forward channel convolutional encoder will be selected regardless of the encoder setting.

GPIB Examples:

Setting the F-SCH level and state (complex command)

```
OUTPUT 714;"CALL:SCH -15.6 DB"
```

would set the F-SCH state on and set the level to –15.6 dB. See “CALL:SCHannel[:SLEVel][:SELected]” .

Setting the F-SCH data rate

```
OUTPUT 714;"CALL:SCH:DRATE:RCONFIG3 BPS38400"
```

would set the F-SCH data rate for forward channel radio configuration 3 to 38400. See “CALL:SCHannel:DRATe:RCONfig3” .

Operating Considerations

The F-SCH is available only when the operating mode is set to IS-2000 Test.

The F-SCH channel in forward channel radio configurations 1 and 2 is supported only when operating mode is set to IS-2000 Test.

Related Topics

“CALL:SCHannel”

Configuring the F-Pilot Channel (Forward PICH)

The F-Pilot parameters are configured using the following call processing subsystem functions and commands.

Settable F-Pilot Parameters

- F-Pilot level.
- F-Pilot state.
- PN Offset

Fixed F-Pilot Parameters

- F-Pilot Walsh code is fixed at code channel number 0.

GPIB Examples:

Setting the F-Pilot Level

```
OUTPUT 714;"CALL:PIL -8 DB"
```

would set the F-Pilot state on and set the level to –8 dB. See “CALL:PILOT[:SLEVel][:SELected]” .

Querying the F-Pilot Level

```
OUTPUT 714;"CALL:PIL:LEVel?"
```

would query the last setting that was made to the F-Pilot level. See “CALL:PILOT:LEVel[:SELected]” .

Operating Considerations

The Walsh code number for the F-Pilot channel is fixed at code 0 of the Walsh 64 set.

Related Topics

“CALL:PILot”

Configuring the F-OCNS (Forward Orthogonal Channel Noise Simulator)

The F-OCNS channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-OCNS Parameters

- F-OCNS Walsh code.

Fixed F-OCNS Parameters

- F-OCNS level (calculated value based on summation of all other code channels)
- OCNS_CCI_SUPPORTED is fixed at 0.
- NUM_OCNS is fixed at 1.
- F-OCNS Walsh code is fixed at code channel number 80.

GPIB Examples:

Setting F-OCNS Walsh code

```
OUTPUT 714;"CALL:OCNSOURCE:WALSH CODE5"
```

would set the F-OCNS Walsh code to 10. See “CALL:OCNSource:WALSh[:SELected]” .

Querying F-OCNS level

```
OUTPUT 714;"CALL:OCNSOURCE:LEVEL?"
```

would query the last F-OCNS calculation. See “CALL:OCNSource:LEVel[:SELected]?” .

Operating Considerations

F-OCNS is a read-only value.

The F-OCNS value is calculated to provide a summing value that results in a total code channel value equalling 100% of cell power. If the current desired code channel levels do not allow for a valid OCNS calculation an error message will be displayed.

Related Topics

“CALL:OCNSource”

Configuring the F-QPCH (Forward Quick Paging Channel)

The quick paging channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-QPCH Parameters

- QPCH Level (relative to pilot channel power).
- QPCH Level (relative to cell power).
- QPCH State (on or off).
- QPCH Indicator bits (applied only when the test set's operating mode is IS-2000 test mode. (See "CALL:D2KTest:QPCHannel:INDicator[:PAGing]" .)

Fixed F-QPCH Parameters

- QPCH_RATE is fixed at 9600 bps
- QPCH_CCI_SUPPORTED is fixed at 0.
- NUM_QPCH is fixed at 1.
- The F-QPCH Walsh code is fixed at code channel number 80.

GPIB Examples:

Setting F-QPCH Level (relative to pilot channel level)

```
OUTPUT 714;"CALL:QPCH:RTP -3 DB"
```

would set the F-QPCH state on and set the level, relative to the forward channel pilot, to –3 dB. See "CALL:QPCHannel[:SLEVel]:RTPilot[:SELected]" .

Querying F-QPCH Level (relative to cell power level)

```
OUTPUT 714;"CALL:QPCH:LEVel?"
```

would query the last F-QPCH relative to cell power level setting. See "CALL:QPCHannel:LEVel[:RTCell][:SELected]?" .

Operating Considerations

The Walsh code number for the QPCH channel is fixed at code 80 from the Walsh 128 set.

When the QPCH state is on, the test set will send out slotted quick pages (single mode) regardless of the mobile station's ability to support quick paging. If the mobile station does not support quick paging, the presence of quick pages should not affect its ability to respond to normal pages.

The QPCH relative to pilot level is sent to the mobile station in the Extended System Parameters message to allow mobile stations to adjust their expected receiver power level.

When the state of the QPCH is on (see "CALL:QPCHannel:STATe"), OCNS (see "Configuring the F-OCNS (Forward Orthogonal Channel Noise Simulator)") is calculated based on the channel power when QPCH is present in the signal. When the QPCH state is off, the output power is not fully calibrated.

Related Topics

"CALL:QPCHannel"

Configuring the F-Sync Channel (Forward SYNC)

The F-Sync channel parameters are configured using the following call processing subsystem functions and commands.

Settable F-Sync Parameters

- F-Sync level.
- F-Sync state.

Fixed F-Sync Parameters

The F-Sync Walsh code is fixed at code channel number 32.

GPIB Examples:

Setting the F-Sync state and level (complex command)

```
OUTPUT 714;"CALL:SYNC -16 DB"
```

would set the F-Sync state on and set the level to –16 dB. See “CALL:SYNC[:SLEVel][:SELected]” .

Querying the F-Sync Level

```
OUTPUT 714;"CALL:SYNC:LEVel?"
```

would query the last setting that was made to the F-PICH level. See “CALL:PILOT:LEVel[:SELected]” .

Related Topics

“CALL:SYNC”

Programming: Getting Started Guide for cdma2000 Mobile Test

Introduction

The Getting Started Guide is organized around the basic set of tasks a control program normally performs when testing a mobile station in a manufacturing environment.

Conventions used in this Getting Started Guide

Throughout this Getting Started Guide the term “test set” refers to an Agilent Technologies 8960 Series 10 wireless communications test set with the E1962B cdma2000 mobile test application installed.

The variable `A` used in the steps of the Getting Started Guide refers to the test set’s GPIB address.

How to use this Getting Started Guide

The most effective way to use this Getting Started Guide is with the Programming Flowchart included in the front inside pocket of this guide and the 8960 User Documentation. This documentation is found in two locations:

- the 8960 Family Support Site (updated frequently) on the Internet, or
- the User Documentation CD-ROM shipped with your test application.

Each step on the Programming Flowchart is illustrated with example program code in this guide. Using this Getting Started Guide, the Programming Flowchart, and the on-line information about 8960 programming, you will be able to generate a control program to perform fundamental mobile station manufacturing tests.

Useful on-line links

Go to the 8960 Family Support Site on either the CD-ROM or the Internet. The CD-ROM should self-launch to its home page. The URL for the website is:

http://www.agilent.com/find/8960support/

Navigate to the Programming page for this test application. The illustrations on the back of the Programming Flowchart show you how to navigate to this page.

The following links are under the heading Getting Started on the Programming page:

- Programming: Getting Started Guide
  - — This online version of this guide contains links to more detailed information about each step which may be useful as you develop your control program.
- Control Program Examples
  - — These examples are for you to download. You may want to use these as templates for your own control program or to execute.
  - — The control program explained in the Getting Started Guide is also available here for you to download. It is a fully functional control program.

About the Programming Examples Presented in this Guide

Programming Language:

Programming examples presented in this guide are written in the HP BASIC , also known as RMB or Rocky Mountain BASIC, and C programming languages. The use of HP BASIC is not an endorsement of the HP BASIC product.

Line Numbers

All of the programming examples in the guide with line numbers are sections from a control program example available on-line for you to download.

Code that is not part of the download control program example does not have line numbers. This code may represent an alternate method of performing the task or may illustrate a feature not used by the control program example.

Syntax used in Programming Examples:

The programming examples use the shortened form of the command syntax to minimize GPIB bus transactions. The shortened form of a command is defined by use of capital letters in the command syntax. For the command syntax:

```
RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO?
```

the shortened form would be:

```
RFAN:CONT:MEAS:FREQ:AUTO?
```

The programming examples do not include optional nodes. Optional nodes in the command syntax are defined by enclosing the node inside the [ ] brackets. For example, the command syntax:

```
CALL[:CELL]:POWer[:SAMPlitude] -80dBm
```

appears in the programming examples as:

```
CALL:POW -80dBm
```

Programming examples make extensive use of compound commands using the ; and the ;: separators. Refer to the on-line information for the definition and use of these command separators.

Complex Commands

Complex commands are used to configure the state and assign values to parameters simultaneously. Complex commands can be used to save programming steps and minimize GPIB bus transactions.

The syntax below turns the state of the parameter on.

OUTPUT Test_set;"SET:CPOW:TIM:STAT ON"

The syntax below is used to assign a value to the parameter.

OUTPUT Test_set;"SET:CPOW:TIM:TIME 10 S"

Both of the above actions can be accomplished with one syntax command:

OUTPUT Test_set;"SET:CPOW:TIM:STIM 10 S"

The command above sets the parameter state to ON and the value of the parameter to 10 seconds. Note that in this example the optional command mnemonic :STIMe has been included to clarify that this complex command was used to set both the state and the value.

This command can be shortened further by removing the optional command mnemonic :STIMe, as shown below.

OUTPUT Test_set;"SET:CPOW:TIM 10 S"

This is the format that will be used throughout this guide.

Establishing an Active Link with the Mobile Station

Making a Mobile Station Originated Call

See “MS initiated connection” on page 76

Making a Base Station Originated Call

See “Test Set initiated connection” on page 76

Related Topics

“How Do I Set Up a Call?” on page 445

Performing a Handoff

Making a Handoff

See “Perform a Handoff (Handover) in Active Cell Mode” on page 103

Related Topics

“How Do I Perform a Handoff?” on page 451

“How Do I Change Cell Information?” on page 447

Performing a Registration

Registering a Mobile Station

Registering a mobile station can be performed when the mobile station has found service with the test set's base station emulator in active cell operating mode. When a registration has completed, the Mobile Station Information window will display the registration data received from the mobile station.

The test set has the capability to initiate two types of registrations. One is a zone-basesd registration, also referred to as "forced" registration. The other type is timer-based registrations, a feature which provides a setting for the time interval between registrations. See "CALL:REGister" on page 259.

Many mobile stations will also perform a registration upon being powered on. This usually only takes a few seconds, and is currently not controlled by the test set.

Related Topics

"How Do I Change Cell Information?" on page 447

3 Programming

Step 1: Set up the Test Set

This step explains how to:

- "Fully Preset the Test Set"
- "Turn on the GPIB Debugger"
- "Set Test Set's Operating Mode"

Fully Preset the Test Set

To set up the test set, you begin by sending the *RST command along with a global timeout. The *RST command is used to perform a full reset of the test set, returning it to a known state.

```
100   A=714 ! E5515C GPIB Address
110   ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine in Step 7
120   OUTPUT A;"*RST
```

Turn on the GPIB Debugger

Another useful tool that you may want to turn on at this time is the system command GPIB debugger. When on, error messages appear on the test set's screen when the test set receives an unknown GPIB command. The message contains information about what type of error was caused and indicates where in the syntax the error occurred. Troubleshooting, like locating and fixing typing errors for example, becomes easier using the GPIB command debugger.

```
130   OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON
```

NOTE The GPIB debugger assists you when debugging code. This command should be taken out of your code once development is completed because it slows program execution.

Set Test Set's Operating Mode

The command below can be used to set the test set's operating mode to active cell. This means call processing will be used to maintain a link between the test set and the mobile station.

```
140   OUTPUT A;"CALL:OPER:MODE CALL"
```

There is also a test mode operating mode available. It is applicable when the mobile station is being operated without over-the-air signalling.

Step 2: Configure Test Set and Mobile Station Parameters

Configure the Test Set Parameters

The programming example below illustrates several cell configurations.

```
150   OUTPUT A;"CALL:BAND:DIG2000 USC" ! Active band is US Cellular
160   OUTPUT A;"CALL:CHAN:DIG2000:USC 29" ! Channel is 29
170   OUTPUT A;"CALL:POW:DIG2000 -50" ! Cell power is -50 dBm
180   OUTPUT A;"CALL:SID 65535" ! System ID is 65535
190   OUTPUT A;"CALL:RCON F3R3" ! Radio config is forward link 4, reverse link 3
200   OUTPUT A;"CALL:SOPT:RCON3 SO2" ! Service option is 2 on radio config 3
210   OUTPUT A;"CALL:PROT:DIG2000 PREV6" ! Protocol standard is IS-2000
220   OUTPUT A;"CALL:D2KT:ESN:HEX '00000000'" ! ESN assignment (must use single quotes
```

Configure the Generated Code Channels

Specifications to the setup of the generated code channels may be necessary. The commands below configure many of the available settable parameters.

```
230   OUTPUT A;"CALL:FCH -10" ! F-FCH on and set to -10 dB
240   OUTPUT A;"CALL:FCH:WALS CODE14" ! F-FCH assigned to Walsh code 14
250   OUTPUT A;"CALL:OCNS:WALS CODE5" ! OCNS assigned to Walsh code 5
260   OUTPUT A;"CALL:PAG -12" ! F-Paging on and set to -12 dB
270   OUTPUT A;"CALL:PAG:DRAT HALF" ! F-Paging data rate set to half rate
280   OUTPUT A;"CALL:PIL -8" ! F-Pilot set to -8 dB
290   OUTPUT A;"CALL:QPCH:RTP -3" ! F-QPCH on and set to -3 dB
300   OUTPUT A;"CALL:SCH -15.6" ! F-SCH on and set to -15.6 dB
310   OUTPUT A;"CALL:SCH:DRAT:RCON1 BPS38400" F-SCH data rate set to 38.4k for RC3
320   OUTPUT A;"CALL:SYNC -16" ! F-Sync on and set to -16 dB
```

Configure the Mobile Station Parameters

There are no mobile station parameters configured in this program example.

Step 3: Set Measurement Parameters

This step gives an example of how you can configure measurement parameters. For more information about measurement parameters, refer to the additional details about this step available on the Internet.

```
330   ! Setup E1962B digital average power
340   OUTPUT A;"SET:DAP:CONT OFF" ! Single measurement
350   OUTPUT A;"SET:DAP:TIM 3" ! Timeout set to 3 secs
360   OUTPUT A;"SET:DAP:COUN 5" ! 5 measurement average
370   ! Setup E1962B channel power
380   OUTPUT A;"SET:CPOW:CONT ON" ! Continuous measurement
390   OUTPUT A;"SET:CPOW:TIM 3"
400   OUTPUT A;"SET:CPOW:COUN 5"
410   OUTPUT A;"SET:CPOW:MSP FAST" ! Channel power sampling set to fast
420   ! Setup E1962B waveform quality
430   OUTPUT A;"SET:WQU:CONT ON"
440   OUTPUT A;"SET:WQU:TIM 10"
450   OUTPUT A;"SET:WQU:COUN 3"
460   OUTPUT A;"SET:WQU:CDP:IQIN:LIM -30" ! Sets dB limit for inactive code channels
470   ! Setup E1962B handoff waveform quality
480   OUTPUT A;"SET:HWQ:TIM 5"
```

Step 4: Make a connection

Select an example

The mobile station (MS) must be connected with the test set in order to perform measurements. The origination of this connection can either be the mobile station or the test set. Use one of two sections of code below to fit your testing need.

MS initiated connection

The following code queries the test set for the connection status and then stops the program if a connection is not established within fifteen seconds of arming the state change detector. This gives adequate time for the MS to connect with the test set.

```
490   PRINT "Make a call from the Mobile Station"
500   WHILE MS_State=0 ! This while loop checks for an established call
510     OUTPUT A;"CALL:CONN:TIM 15"
520     OUTPUT A;"CALL:CONN:ARM" ! State change detector armed
530     OUTPUT A;"CALL:CONN:STAT?"
540     ENTER A;MS_State
550   END WHILE
560   PRINT "Connection established, test in progress"o
```

Test Set initiated connection

In this case, there is no need to use atimeout or arm the state change detector. These two functions occur automatically when attempting a test set originated call.

```
570   PRINT "Attempting connection from test set..."
580   WHILE TS_State=0 ! This while loop checks for an established call
590     OUTPUT A;"CALL:ORIG"
600     OUTPUT A;"CALL:ORIG:DONE?"
610     ENTER A;TS_State
620   END WHILE
630   PRINT "Connection established, test in progress"
```

Step 5: INITiate and FETCh Measurements

INITiate measurements and FETCh results

In a typical control program, many measurements are run concurrently. The code below is an example of how you might choose to organize your program to efficiently run and time concurrent measurements. Refer to the additional details about this step available on the Internet for more information about the different measurement results that are available and how to fetch them.

```
640   Simul_start=TIMEDATE
650   OUTPUT A;"INIT:DAP;CPOW;WQU"
660   LOOP
670     OUTPUT A;"INIT:DONE?"
680     ENTER A;measdone$
690       SELECT measdone$
700         CASE "DAP"
710           OUTPUT A;"FETC:DAP?"
720           ENTER A;"dap_integ,avgpow"
730           IF dap_integ=0 THEN
740             PRINT "Average power = ";avgpow;" dBm"
750           ELSE
760             PRINT "Integrity error for average power = ",dap_integ
770           END IF
780         CASE "CPOW"
790           OUTPUT A;"FETC:CPOW?"
800           ENTER A;cpow_integ,chpow
810           IF cpow_integ=0 THEN
820             PRINT  "Channel power = ";chpow;" dBm"
830           ELSE
840             PRINT "Integrity error for channel power = ",cpow_integ
850           END IF
860         CASE "WQU"
870           OUTPUT A;"FETC:WQU:INT?"
880           ENTER A;wq_int
890           OUTPUT A;"FETC:WQU:RHO?"
900           ENTER A;rho
910           OUTPUT A;"FETC:WQU:CDP:IQN;IQIN?"
920           ENTER A;noise_res,iqin_res
930           IF wq_int=O THEN
940             PRINT "Waveform quality multi-code rho = ",rho
950             IF noise_res=0 THEN
960               PRINT "Noise level OK"
970             ELSE
980               PRINT "Noise level FAILS!"
990             END IF
1000  IF iqin_res=0 THEN
1010                PRINT "Inactive code channels OK"
1020              ELSE
1030                PRINT "Inactive code channels FAIL!"
1040              END IF
```

```
1050            ELSE
1060            PRINT "Integrity error for waveform quality = ",wq_int
1070          END IF
1080      END SELECT
1090    EXIT IF measdone$="NONE"
1100  END LOOP
1110    Simul_end=TIMEDATE
1120  PRINT
1130  PRINT "Concurrent measurement time = ";Simul_end-Simul_start
1140  Hand_start=TIMEDATE
1150  OUTPUT A;"INIT:HWQ"! Handoff automatically occurs
1160  WAIT 5
1170  OUTPUT A;"FETC:HWQ:INT?"
1180  ENTER A;hwq_int
1190  OUTPUT A;"FETC:HWQ:RHO?"
1200  ENTER A;hwq_rho
1210    IF hwq_int=0 THEN
1220      PRINT "Handoff waveform qualuty multi-code rho = ",hwq_rho
1230    ELSE
1340      PRINT "Integrity error for handoff waveform quality = ",hwq_int
1350    END IF
1360  Hand_end=TIMEDATE
1370  PRINT
1380  PRINT "Handoff measurement time = ";Hand_end-Hand_start
1390  PRINT
1400  PRINT "TOTAL TEST TIME =";Hand_end-Simul_start
```

Step 6: Reconfigure Test Set and Mobile Station Connection Parameters

Reconfigure the Channel, Band, and Power Level

The example below contains the code appropriate for testing at a new power level, and then handing the call off to a different band and channel.

```
1410  OUTPUT A;"CALL:POW:DIG2000 -72"
1420  OUTPUT A;"CALL:SET:BAND:DIG2000 USPC" ! Handoff active band to US PCS
1430  OUTPUT A;"CALL:SET:CHAN 384" ! Channel is 384
1440  OUTPUT A;"CALL:HAND" ! Execute handoff
1450  WAIT 2
1460  OUTPUT A;"CALL:STAT:STAT?"
1470  ENTER A;hand_stat$
1480  IF hand_stat$<>"CONN"
1490    PRINT "Handoff unsuccessful"
1500    GOTO 1390
1510  ELSE IF hand_stat$="CONN"
1610    PRINT "Handoff successful"
1620  END IF
1630  OUTPUT A;"SET:DAP:CONT ON" ! Set average power measurement to continuous
```

Reconfigure the MS

There are no MS parameters reconfigured in this program example.

Step 7: End the Connection

End the Connection

The CALL:END command ends the mobile connection. A CALL:DCON:STAT? query is used to ensure the connection has ended.

```
1640  PRINT "End call"
1650  PRINT
1660  OUTPUT A;"CALL:END"
1670  OUTPUT A;"CALL:CONN:STAT?" ! Queries status of connection
1680  ENTER A;State
1690  IF State=1
1700    PRINT "Mobile did not disconnect"
1710  ELSE IF State=0
1720    PRINT "Mobile successfully disconnected"
1730  END IF
1740  Timeout:    SUB Timeout ! Global timeout handler (from Step 1)
1750              PRINT "Program timed out"
1760              CLEAR 7
1770              CLEAR 714
1780              SUBEND
1790  OUTPUT A;"SYST:PRES3" ! Partial reset; retains test set configuration
1800  END
```

Step 1: Set Up the Test Set

The following information provides additional details on Step 1 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you initialize the test set and set up the general operating conditions.

Contents

- "Initialize the Test Set"
- "Set Up General Operating Conditions"

Initialize the Test Set

- Fully Preset the Test Set

  It is important to get the test set to a known state before each production session.

  Sending the *RST command fully presets the test set, which ends all call processing and measurement processes and restores all values to defaults.

- Clear the Error Queue

  Before each production session, it is useful to clear the error queue of any old messages. That way, you know that any messages logged are relevant to the current production session.

  Sending the *CLS command clears the error queue.

Set Up General Operating Conditions

- Turn Debugger On

  While developing your code, it is very useful to enable the GPIB debugger using the SYST:COMM:GPIB:DEB ON command. When the debugger is on, the test set alerts you when you send an incorrect command, and it also tells you which symbol or letter in the command is incorrect.

NOTE You should turn the debugger off once you have finished development and your code is stable.

- Set Operating Mode

  The test set contains a base station emulator (BSE), whose primary purpose is to provide enough call processing to allow parametric measurements of a mobile station's RF signal.

  An important characteristic of the test set's base station emulator is its operating mode. The operating mode sets the way in which the base station emulator interacts with the mobile station.

  Active cell mode is used when emulating a normal cell. Active cell mode allows active signaling between the mobile station and BSE. The mobile station camps to the BSE signal, and an actual call is established.

  In test mode, the mobile station synchronizes to the BSE signal and transmits an appropriate signal which the test set analyzes.

The test set's operating mode is set using the following command:

Command to Set the Test Set's Operating Mode

Command	Example
CALL:OPER:MODE <operating mode>	CALL:OPER:MODE CELL

- Set Amplitude Offsets

  To achieve accurate measurement results, it is important to account for losses in the cabling and fixturing between the mobile station and test set. You must determine what the losses are for your test setup and then specify the appropriate frequency-dependent amplitude offset values.

  You can specify amplitude offsets for up to 20 frequencies using the following commands:

Commands to Set Amplitude Offsets

Command	Example
SYST:CORR:FREQ <freq1>, <freq2>, <freq3>	SYST:CORR:FREQ 800MHz, 1800MHz, 1900MHz
SYST:CORR[:SGAin] <offset1>, <offset2>, <offset3>	SYST:CORR -0.7, -1.0, -1.2

- Set Display Mode

  To achieve a slightly faster test execution speed, you can disable the front panel display on the test set using the DISP:MODE FAST command.

Step 2: Configure Test Set and Mobile Station Parameters

The following information provides additional details on Step 2 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you configure the parameters that allow a connection to be made between the test set and mobile station. This mainly involves setting up channels and power levels.

Contents

- "Set Up Channels"
- "Set Cell Power"
- "Set Mobile Station Transmit Power"
- "Set Up Additional Connection Parameters"

Set Up Channels

Setting up channels involves specifying the channel associated with every band and channel type (for example, analog or digital), and then setting the active band and channel type.

- Specify Channel Numbers

  All of the test set's test applications can test in more than one frequency band (for example, US Cellular, US PCS, or Korean PCS). To produce the most efficient code, you should configure the channel information for each band in advance. Then, to move to a new band during testing, you only need to send the command to change bands. You do not need to also specify the channel of the new band. This reduces test time.

  To set up the channel number for the various bands, use one of the following commands (depending upon which test application you are using):

Commands to Set the Channel for a Band

Command	Example
CALL:<channel mnemonic>:<band mnemonic> <num value>	CALL:TCH:EGSM 124
CALL:SET:<channel type mnemonic>:<band mnemonic> <num value>	CALL:SET:DTC:PCS 777
CALL:CHAN:<channel type mnemonic>:<band mnemonic> <num value>	CALL:CHAN:DIG2000:K PCS 384

This practice also applies to test applications which test both analog and digital channel types. In this case you should specify the channel for the analog and digital channel types in advance. Then, switching between them requires only one command to initiate the change, and not an additional change to specify the channel of the new channel type.

If you specify channels in advance as described, the only time you need to specify a channel during testing is if you move to a new channel within the same band and channel type.

- Set Active Band and Mode

  Once you have specified the channel information for each band and channel type, you must set the active band using one of the following commands (depending upon which test application you are using):

Commands to Set the Active Band

Command	Example
CALL:<channel mnemonic>:BAND <band mnemonic>	CALL:TCH:BAND EGSM
CALL:SET:<channel type mnemonic>:BAND <band mnemonic>	CALL:SET:DTC:BAND PCS
CALL:BAND:<channel mnemonic> <band mnemonic>	CALL:BAND:DIG2000 KPCS

If the test application you are using supports testing of both analog and digital channel types, then you must also set the channel type using the following command:

Command to Set the Active Channel Type

Command	Example
CALL:<channel mnemonic>:TYPE <channel type mnemonic>	CALL:TCH:TYPE DTC

- Active Cell and Test Mode Considerations

  The function of the CALL commands differ depending upon whether you are in active cell or test mode.

  In active cell mode, when you use the CALL commands to set the channel numbers, the test set's output frequency and receiver frequency are set. A message is also sent to the mobile station to set its frequency.

  However, in test mode, since the BSE does not send call processing information to the mobile station, the CALL commands only configure the test set's output frequency and receiver frequency. You need to also send the appropriate test mode commands to the mobile station to set it to the correct frequency.

  In test mode, instead of using the CALL commands to configure the test set's frequencies, you may prefer to manually control the RF generator and RF analyzer using the CALL:RFG and RFAN commands, respectively. In either case, you must still send the appropriate test mode commands to the mobile station to move it to the proper frequency.

Set Cell Power

To set the output power of the test set, use the following command:

Command to Set Cell Power

Command	Example
CALL:POW <num value>	CALL:POW -75

- Active Cell and Test Mode Considerations

  You can use the CALL:POW command to set the cell power in both active cell and test mode. However, in test mode you may prefer to manually control the output power of the test set using the CALL:RFG commands.

Set Mobile Station Transmit Power

In active cell mode, use one of the following commands to set the mobile station transmit power level (depending upon which test application you are using):

Commands to Set Mobile Station Transmit Power

Command	Example
CALL:MS:TXL:<band mnemonic> <num value>	CALL:MS:TXL:DCS <num value>
CALL:SET:MS:<channel type mnemonic>:TXL:<band mnemonic> <num value>	CALL:SET:MS:DIG:TXL:PCS <num value>
CALL:<channel mnemonic>:MS:TXL:<band mnemonic>:BURS <num value>	CALL:PDTCH:MS:TXL:DCS: BURS <num value>

In addition to setting the mobile station transmit level, these commands also automatically configure the test set's receiver at the expected input level, whether in active cell or test mode. However, in test mode, you must also send the appropriate test mode commands to the mobile station to command it to output at the correct level. This is due to the fact that the BSE is not transmitting call processing commands to the mobile station.

- Manually Setting Expected Power

  Sending the CALL commands in Table , "Commands to Set Mobile Station Transmit Power," automatically sets the expected input level of the test set's receiver. However, there is another option for setting the receiver's input level in both active cell and test mode. It is often beneficial to manually set the expected input power level using the RFAN commands, rather than using the CALL commands.

  When you set the expected power manually, you tell the test set exactly what power level to expect. Whereas the CALL commands simply tell the test set the range of input level to expect, based on the definition of the mobile station power level (for example, an AMPS/136 mobile station transmitting at power level 3 has an output level in the range of +20 dBm to +26 dBm).

Set Up Additional Connection Parameters

Depending upon the test application you are using, there may be other connection parameters to specify, such as timeslot, timing advance, vocoder, or data rates and types.

In active cell mode, you may also choose to set up network parameters, such as base station identifier numbers (for example, SID) and color codes.

All of these parameters are configured using the CALL subsystem.

Step 3: Set Measurement Parameters

The following information provides additional details on Step 3 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you set up the conditions under which the measurements operate. You do this by configuring measurement parameters.

Contents

- "Measurement Parameters Overview"
- "Generic Measurement Parameters"
- "Measurement-Specific Measurement Parameters"

Measurement Parameters Overview

There are two different types of measurement parameters:

- Generic Measurement Parameters
- Measurement-Specific Measurement Parameters

The SETup subsystem is used to configure measurement parameters. Each individual measurement parameter can be set and queried using the associated SETup subsystem command. The general hierarchy of the SETup subsystem command structure is as follows:

```
SETup:<measurement mnemonic>:<measurement parameter> <parameter setting/value>
```

NOTE Not all measurements use all measurement parameters. Refer to the GPIB syntax listing for the detailed list of measurement parameters for individual measurements.

Generic Measurement Parameters

There are three types of generic measurement parameters:

- Measurement Count (used by most measurements)
  Measurement Count State
  Measurement Count Number
- Measurement Timeout (used by all measurements)
  Measurement Timeout State
  Measurement Timeout Time
- Measurement Trigger (used by most measurements)
  Trigger Arm (used by all measurements)
  Trigger Source (not applicable to analog measurements)
  Trigger Delay (not applicable to analog measurements)

Measurement Count Parameters

The measurement count parameters control measurement averaging. The STATe command turns averaging on or off, and the NUMBer command determines the number of averages. The SNUMber command is a complex command which allows you to turn averaging on and set the number of averages in one command.

Statistical Measurement Results Parameters

Parameter	Command Syntax
Measurement Count State	`SETup:<meas-mnemonic>:COUNt:STATe <ON|1|OFF|0>`
Measurement Count Number	`SETup:<meas-mnemonic>:COUNt:NUMBer <numeric value>`
Measurement Count Number and State	`SETup:<meas-mnemonic>:COUNt[:SNUMber] <numeric value>`

Example 1. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:COUN 10"
```

sets the multi-measurement count state to ON and set the number of averages to 10 for the digital transmit power measurement.

Measurement Timeout Parameters Measurement timeout parameters control the maximum time that a measurement executes. TIMe sets the amount of time and STATe determines if the timeout is in use. The STIMe command is a complex command which enables you to set both parameters in one command.

Measurement Timeout Parameters

Parameters	Command Syntax
Measurement Timeout Time and State	SETup:<meas-mnemonic>:TIMeout[:STIMe] <numeric value>[<suffix>]
Measurement Timeout State	SETup:<meas-mnemonic>:TIMeout:STATe <ON|1|OFF|0>
Measurement Timeout Time	SETup:<meas-mnemonic>:TIMeout:TIME <numeric value>[<suffix>]

Example 2. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TIM 10"
```

sets the measurement timeout state to ON and set the measurement timeout time to 10 seconds for the digital transmit power measurement.

Measurement Trigger Parameters There are three measurement trigger parameters. They control the arming of a measurement, the source of the trigger, and the trigger's delay.

- The trigger arm parameter determines whether the test set makes one measurement and then stops (single), or automatically re-arms upon completion of one measurement and repeats the process (continuous). The recommended setting when writing a control program is single (CONTinuous OFF).
- The trigger source parameter selects the source of the measurement trigger signal. The recommended Trigger Source setting when writing a control program is AUTO.

NOTE Trigger source is always IMMediate for analog measurements and cannot be changed by the user.

- The trigger delay parameter controls the delay between the trigger event (the point in time at which the trigger signal is received) and the start of sampling. Negative values indicate that the sampling should occur prior to the trigger event.

NOTE Trigger delay is not applicable to analog measurements.

Measurement Trigger Parameters

Parameter	Command Syntax
Trigger Arm	SETup:<meas-mnemonic>:CONTinuous <ON|1|OFF|0>
Trigger Source	SETup:<meas-mnemonic>:TRIGger:SOURce <AUTO|IMMediate|PROTocol|RISE>
Trigger Delay	SETup:<meas-mnemonic>:TRIGger:DELay <numeric value>[<suffix>]

NOTE You can set the Trigger Arm for all measurements to single (CONTinuous OFF) using the following command syntax:

```
SETup[:ALL]:CONTinuous:OFF
```

Example 3. Programming Example:

```
OUTPUT Test_set;"SET:CONT:OFF"
```

sets the trigger arm to single for all measurements.

Example 4. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
```

sets the trigger source to AUTO for the digital transmit power measurement.

Example 5. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TRIG:DEL 10 US"
```

sets the trigger delay to 10 microseconds for the digital transmit power measurement.

Measurement-Specific Measurement Parameters

Measurement-specific measurement parameters set up operating conditions for a specific measurement. For example:

- Setting the channel power measurement speed in IS-2000
- Setting ORFS frequency offsets in GPRS
- Setting number of bits for the FBER measurement in GSM

Refer to the GPIB syntax listing for the detailed list of measurement parameters for individual measurements.

Example 6. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:MSP FAST"
```

sets the IS-2000 channel power measurement speed to fast.

Example 7. Programming Example:

```
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ 400 KHZ"
```

sets the first ORFS offset to 400 kHz.

Example 8. Programming Example:

```
OUTPUT Test_set;"SET:FBER:COUN 10000"
```

sets the number of fast BER bits to test to 10,000 bits.

Example 9. Program Example Setting Both Generic and Measurement-Specific Measurement Parameters

```
! Set trigger arm to single for all measurements:
!
OUTPUT Test_set;"SET:CONT:OFF"
!
! ************************************************
! Configure Modulation Accuracy Measurement:
!
OUTPUT Test_set;"SET:MACC:COUN 5"
! Example of using a complex command to set both the
! measurement count state and number at the same time.
!
OUTPUT Test_set;"SET:MACC:TRIG:SOUR AUTO"
! Sets trigger source to auto.
!
OUTPUT Test_set;"SET:MACC:TIM 15"
! Sets timeout state to ON and time to 15 sec.
!
OUTPUT Test_set;"SET:MACC:EVM10:STAT ON"
! Turns the EVM10 State ON
!
! ************************************************
! Configure Digital TX Power Measurement:
!
OUTPUT Test_set;"SET:DTXP:COUN 5"
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:DTXP:TIM 5"
!
! ************************************************
! Configure Frequency Stability Measurement:
!
OUTPUT Test_set;"SET:FST:COUN 3"
OUTPUT Test_set;"SET:FST:TIM 10"
!
! ************************************************
! Configure Analog TX Power Measurement:
!
OUTPUT Test_set;"SET:ATXP:COUN 5"
OUTPUT Test_set;"SET:ATXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:ATXP:TIM 15"
```

Step 4: Make Connection

The following information provides additional details on Step 4 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you make a connection between the mobile station and test set. How you do this depends upon whether you are in active cell or test mode. In active cell mode you establish a phone call between the test set and mobile station. In test mode, you command the mobile station to synchronize to the test set's signal and begin transmitting back an appropriate signal.

Contents

- "Establish a Call in Active Cell Mode"
- "Make a Test Mode Connection"

Establish a Call in Active Cell Mode

To test a mobile station in active cell mode, you must first establish a call between the test set and mobile station. Your control program must issue the commands necessary to initiate the call connection process, either to the test set (for a base station originated call) or to the mobile station (for a mobile station originated call). Your control program must then determine when the call has successfully connected so that it can proceed to testing. The control program must also determine if the call has not been successfully connected so that it can take appropriate action.

Call States At any instant in time a call can be in a stable state such as the idle or the connected state, or in one of many transitory states such as alerting, handoff, registering, releasing or paging. These are referred to as transitory states because the amount of time which the call can spend in any of these states is limited by the mobile station's protocol. The call is not allowed to stay in a transitory state indefinitely.

NOTE If repeat paging or repeat registration are on, it is possible for the call process to stay in one of the transitory states beyond the time specified by the mobile station's protocol timers.

Call Connection Synchronization Commands The test set has a set of commands designed specifically for call connection and release synchronization.

Call Connection Synchronization Commands

Synchronization Command	Command Syntax
Call-Connected-State Query	CALL:CONNected[:STATe]?
Call-State-Change Detector Arm	CALL:CONNected:ARM[:IMMediate]
Call-State-Change Detector Timeout	CALL:CONNected:TIMeout

- Call-Connected-State Query

  The CALL:CONN? query allows the control program to determine if a call is in the connected state or in the idle state.

  Responses Returned by the CALL:CONN? Query

Response	Meaning
1	The call is in the connected state.
0	The call is in the idle state.

  If the call is in one of the transitory states, the query waits until the call reaches the idle state or connected state before returning a value.

- Call-State-Change Detector Arm Command

  The test set has a call-state-change detector which can be used to temporarily hold the response to a CALL:CONN? query until the call state has moved from idle to connected or vice versa.

  Without the call-state-change detector, the CALL:CONN? query only hangs if the call is in a transitory state. Otherwise, it immediately returns a 1 or 0. Therefore, if a call connection process is started and the CALL:CONN? query is sent before the call state has transitioned from idle to one of the transitory states, the query immediately returns a 0. This indicates that the call is in the idle state (and therefore that the connection attempt failed). In reality, the call likely connected, but not until after the CALL:CONN? query immediately returned a 0.

  When the call-state-change detector is armed during a connection attempt, if the CALL:CONN? query is sent while the call state is still idle, the query waits until the state changes to connected, and then returns a 1.

  The CALL:CONNected:ARM[:IMMediate] command is used to arm this call-state-change detector.

- Call-State-Change Detector Timeout Command

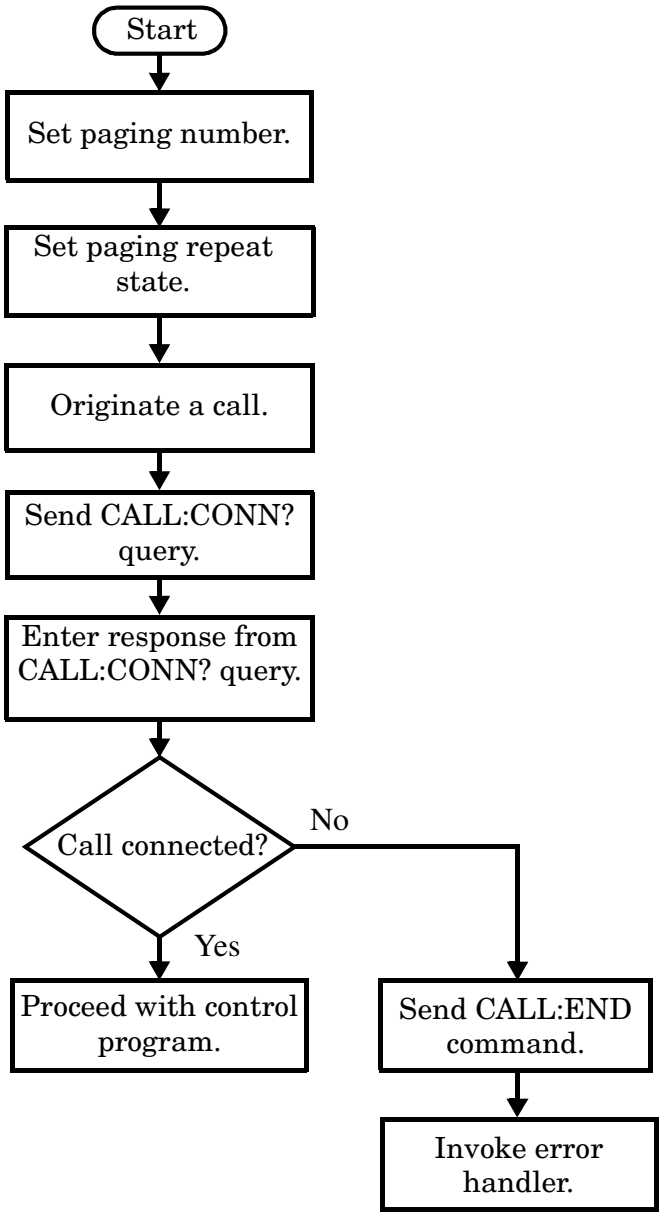
  If the call-state-change detector is armed and a call connection is attempted but the call state never changes from the idle state, the CALL:CONN? query hangs the bus. This easily happens if the mobile is badly broken, the mobile is not connected to the test set, or no one pushes the send button on the mobile.

  The CALL:CONNected:TIMeout command is used to set the timeout value for the call-state-change detector.

  The timeout timer is started whenever the call-state-change detector is armed, and should be set to the maximum amount of time the control program should wait between arming the detector and the beginning of the connection process (when the call state moves from the idle state). If the timer expires before the call state has moved from the idle or connected state, the call-state-change detector is disarmed, which releases the CALL:CONN? query if it is currently hanging.

Process for Making a Base Station Originated Call

Figure 3. Process for Making a Base Station Originated Call

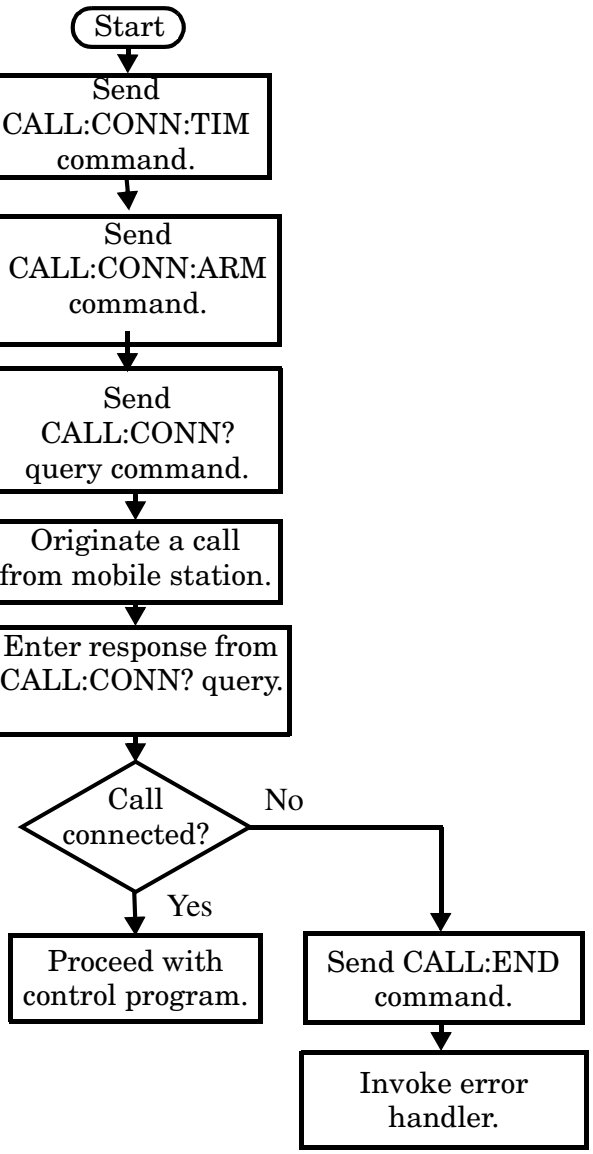


NOTE It is not necessary for you to send the CALL:CONN:TIM and CALL:CONN:ARM commands as they are automatically sent by the test set during a base station originated call or base station release.

Example 10. Programming Example

```
OUTPUT Test_set;"CALL:PAG:PNUM '0000574016'"! Set paging number
OUTPUT Test_set;"CALL:PAG:REP ON" ! Set paging repeat state
OUTPUT Test_set;"CALL:ORIG" ! Start a base station originated call
OUTPUT Test_set;"CALL:CONN?"  ! Hanging GPIB query
ENTER Test_set;Call_connected      ! Program hangs here until
                                   ! origination passes or fails
IF NOT Call_connected THEN
   OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected so proceed with control program
```

Process for Making a Mobile Station Originated Call Figure 4. Process for Making a Mobile Station Originated Call



NOTE The test set cannot originate a call from the mobile station. You must physically dial a number on the mobile station and press send, or send commands to a test bus built into the mobile station. For mobile station originated calls where the call is originated by physically dialing a number (as opposed to using a test bus) ensure that the call-state-change detector timeout time is long enough to allow the number to be dialed.

Example 11. Programming Example

```
OUTPUT Test_set;"CALL:CONN:TIM 10"          ! Set timeout time to 10 seconds
OUTPUT Test_set;"CALL:CONN:ARM"             ! Arm the change detector
DISP "Initiate a call from the mobile"
OUTPUT Test_set;"CALL:CONN?"           ! Initiate a call connected state query
ENTER Test_set;Call_connected               ! Program hangs here until
                                            ! origination passes or fails

IF NOT Call_connected THEN
   OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected.  Proceed with the control program.
```

Make a Test Mode Connection

To make a connection between the test set and mobile station in test mode, you must send the appropriate test mode commands to the mobile station to command it to synchronize to the test set's signal and begin transmitting.

You may also want to make a quick power measurement to ensure that the connection has been made.

Step 5: INITiate and FETCh Measurements

The following information provides additional details on Step 5 of the Programming Flowchart. This information is applicable to all test applications.

Description

This step involves making measurements on the mobile station.

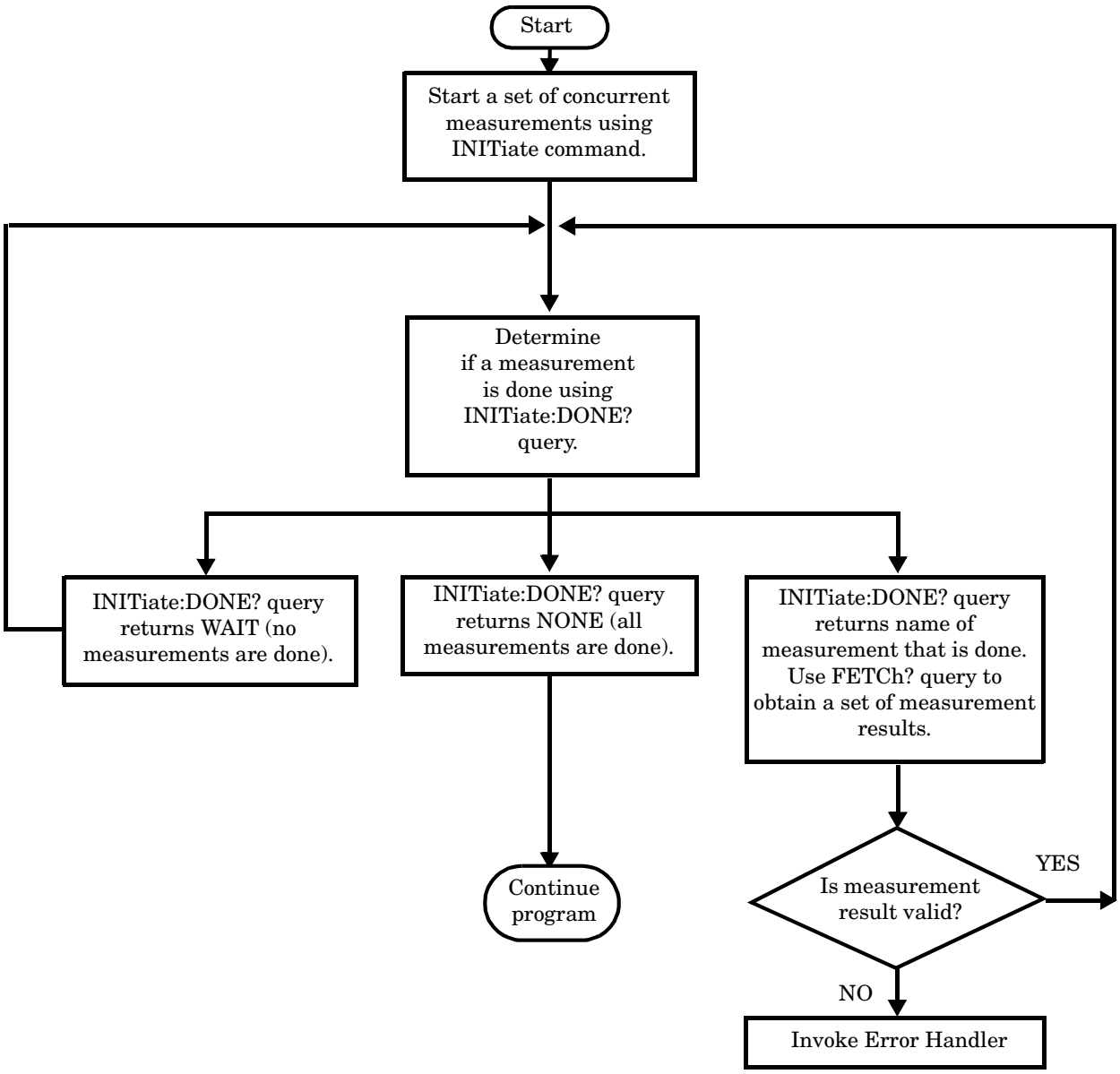
The test set has multiple signal paths and processors, which means you can make measurements concurrently and reduce test time. Making concurrent measurements involves starting a group of measurements, fetching the results of the measurements as they complete, and then verifying that the results are valid.

Contents

- "Concurrent Measurement Process"
- "Alternative Measurement Process"

Concurrent Measurement Process

Figure 5. Process for Making Concurrent Measurements



Start a Set of Concurrent Measurements The INITiate command is used to start measurements. Each individual measurement can be started using the INITiate command. For starting measurements, the syntax of the INITiate command is as follows:

```
INITiate:<measurement mnemonic>[:ON]
```

More than one measurement can be started using a single INITiate command. For example:

```
OUTPUT Test_set;"INIT:TXP;PFER"
```

starts the transmit power measurement and the phase and frequency error measurement. These measurements then run concurrently.

Determine if a Measurement Is Done Use the INITiate:DONE? query command to determine which measurement has completed.

This command is a query only and returns only one response per query. The responses returned and their meanings are shown in the following table:

Table 3. Responses Returned from INITiate:DONE? Query

Response String	Meaning
<MEASUREMENT1 mnemonic>	MEASUREMENT1 is done.
<MEASUREMENT2 mnemonic>	MEASUREMENT2 is done.
WAIT	There are one or more measurements that are in progress, but none of those measurements are done yet.
NONE	No measurements are in progress.

Once a measurement is reported as being complete via the INITiate:DONE? query it is removed from the done list (it is not reported again). To use the INITiate:DONE? query properly, your control program should immediately fetch a measurement's results once it is reported as being complete.

Obtain a Set of Measurement Results In order to minimize bus traffic and reduce test time, the test set's measurements are designed to return multiple measured values in response to a single measurement request.

For example, if a transmit power measurement with averaging is initiated there are five measurement results available. These are:

1. Measurement integrity value
2. Average value
3. Minimum value
4. Maximum value
5. Standard deviation value

The test set can return the measurement results in a variety of formats to suit your needs using the FETCh? subsystem. The general structure of the FETCh? command is as follows:

```
FETCh:<measurement mnemonic>:<result format>?
```

For example, the transmitter power measurement results can be returned as:

Example FETCh? Result Formats

Command	Results Returned
FETC:TXP?	Measurement integrity and average value
FETC:TXP:POW:ALL?	Minimum, maximum, average and standard deviation values
FETC:TXP:POW:AVER?	Average value only
FETC:TXP:POW:MIN?	Minimum value only
FETC:TXP:POW:MAX?	Maximum value only
FETC:TXP:POW:SDEV?	Standard deviation value only
FETC:TXP:INT?	Measurement integrity value only

Example 12. Concurrent Measurement Process Programming Example

```
! Start a Set of Concurrent Measurements:
!
OUTPUT Test_set;"INIT:TXP;PFER"
!
! Determine if a Measurement Is Done:
!
LOOP
  OUTPUT Test_set;"INIT:DONE?"
  ENTER Test_set;Meas_done$
!
! Obtain a Set of Measurement Results:
!
  SELECT Meas_done$
    CASE "TXP"
      OUTPUT Test_set;"FETC:TXP:POW?"
      ENTER Test_set;Avg_tx_power
    CASE "PFER"
      OUTPUT Test_set;"FETC:PFER:RMS?"
      ENTER Test_set;Max_rms_phas_er
  END SELECT
EXIT IF Meas_done$="NONE"
END LOOP
```

Validate Measurement Results Validating measurement results is extremely important. The test set returns a result if it is capable of making a measurement, even if this result is obtained under adverse conditions.

The measurement integrity indicator is a measurement result and therefore is queried using the FETCh subsystem. A value of 0 indicates that the measurement is valid. A value other than 0 indicates that an error occurred during the measurement process.

Example Integrity Indicators

Value Returned	Description (message also appears on test set)
0	Normal
1	No Result Available
2	Measurement Timeout
5	Over Range
6	Under Range

Example 13. Programming Example

```
OUTPUT Test_set;"FETC:DTXP?"
ENTER Test_set;Integrity,Avg_dig_pow
IF Integrity=0 THEN
   PRINT "AVG DIG POW= ";Avg_dig_pow
ELSE
   PRINT "DTXP Measurement Error"
   PRINT "DTXP Measurement Integrity is ";Integrity
END IF
```

Alternative Measurement Process

You may choose to test in a sequential way rather than use the concurrent measurement process.

For instance, instead of using the INIT:DONE? query to determine when a measurement is complete, you may choose to initiate a set of measurements and then simply fetch them sequentially.

Example 14. Programming Example

```
OUTPUT Test_set; "INIT:DTXP;MACC"
OUTPUT Test_set; "FETC:DTXP:POW?"
ENTER Test_set;Avg_dig_pow
OUTPUT Test_set; "FETC:MACC:EVM[1]?"
ENTER Test_set;Max_EVM1
```

In this example, the test set starts both measurements at the same time. However, if the MACC measurement finishes first, the results are not fetched until the DTXP measurement finishes. Therefore, this process requires that you understand the order in which measurements will complete in order to optimize your testing speed.

Step 6: Reconfigure Test Set and Mobile Station Connection Parameters

The following information provides additional details on Step 6 of the Programming Flowchart. This information is applicable to all test applications.

Description

After performing a set of measurements on the mobile station using the configuration established in step 2, you may want to change this configuration and test the mobile station again. This step involves changing testing conditions such as channel, mobile station transmit power level, or cell power.

Contents

- "Change Channels"
- "Change Other Connection Parameters"

Change Channels

In a manufacturing environment it is common to test a mobile station on more than one channel. Some or all of the tests may be performed on multiple channels, to verify the mobile station's performance in a range of operating frequencies.

Perform a Handoff (Handover) in Active Cell Mode

If you are operating in active cell mode, to change channels you perform a handoff (handover) to the new channel. The control program sends the commands to initiate the handoff (handover), and then determines whether the transition was successfully completed. This is accomplished using the CALL:STATus? query.

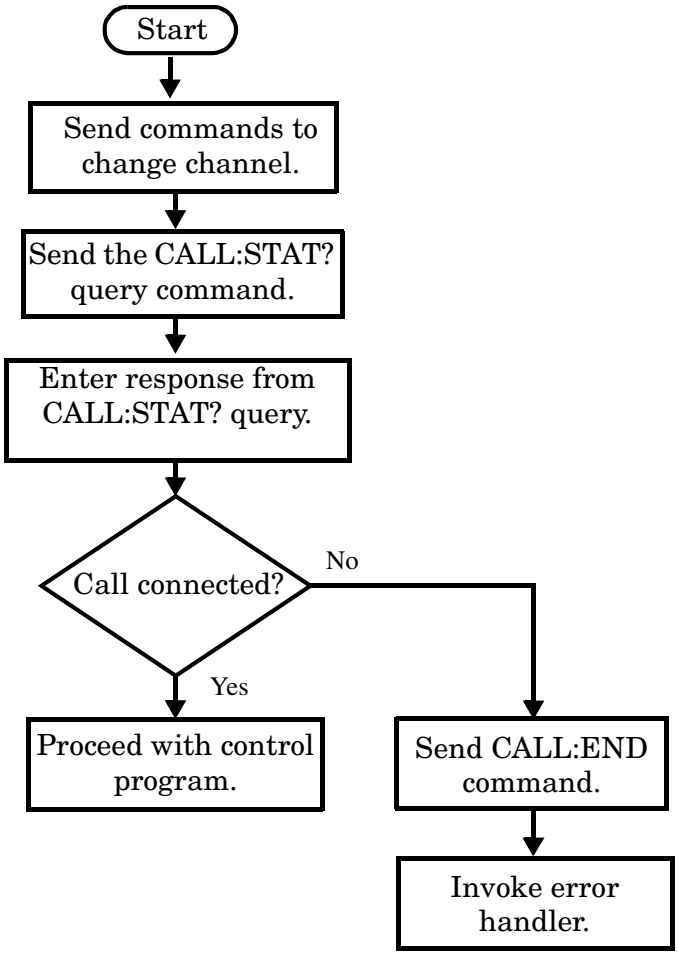
The CALL:STATus? query immediately returns the state of the call at the time the query is received.

Example Responses Returned from the CALL:STAT? Query

Response	Meaning
IDLE	The call is in the Idle state
ALER	The call is in the Alerting transitory state.
HAND	The call is in the Handoff transitory state.
PAG	The call is in the Paging transitory state.
CONN	The call is in the Connected state.

After issuing the commands to perform a handoff (handover), you should send the CALL:STAT? query to verify that the call is still connected before resuming testing.

Figure 6. Process for Performing a Handoff (Handover)



Test Mode Considerations In test mode, you can either change the test set's frequencies by using the handoff (handover) commands, or directly control the RF generator and RF analyzer.

In either case, you must also send the appropriate test mode commands to the mobile station to move it to the new channel.

Change Other Connection Parameters

You may also choose to change the mobile station transmit power level or cell power, or other connection parameters such as timeslot or timing advance.

Step 7: End Connection

The following information provides additional details on Step 7 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you release the call (in active cell mode) or end the mobile station transmission (in test mode).

Contents

- "Release the Call in Active Cell Mode"
- "End the Mobile Station Test Mode Transmission"
- "Partially Preset the Test Set"

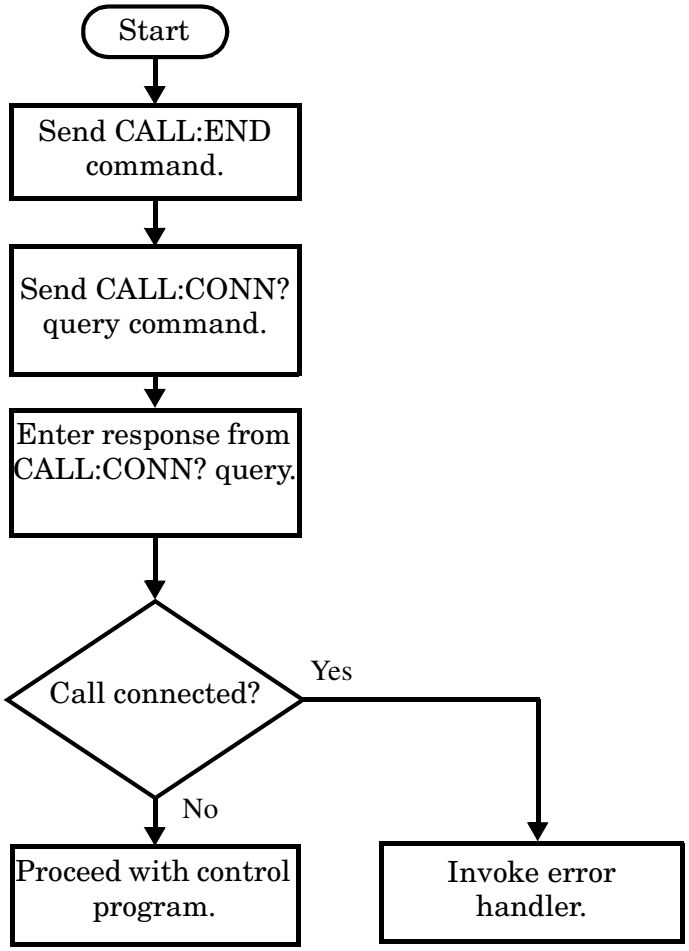
Release the Call in Active Cell Mode

In active cell mode, you can release the call with the mobile station in one of two ways:

- Release from the Base Station
- Release from the Mobile Station

Releasing an Active Call from the Base Station

Figure 7. Process for Releasing an Active Call from the Base Station

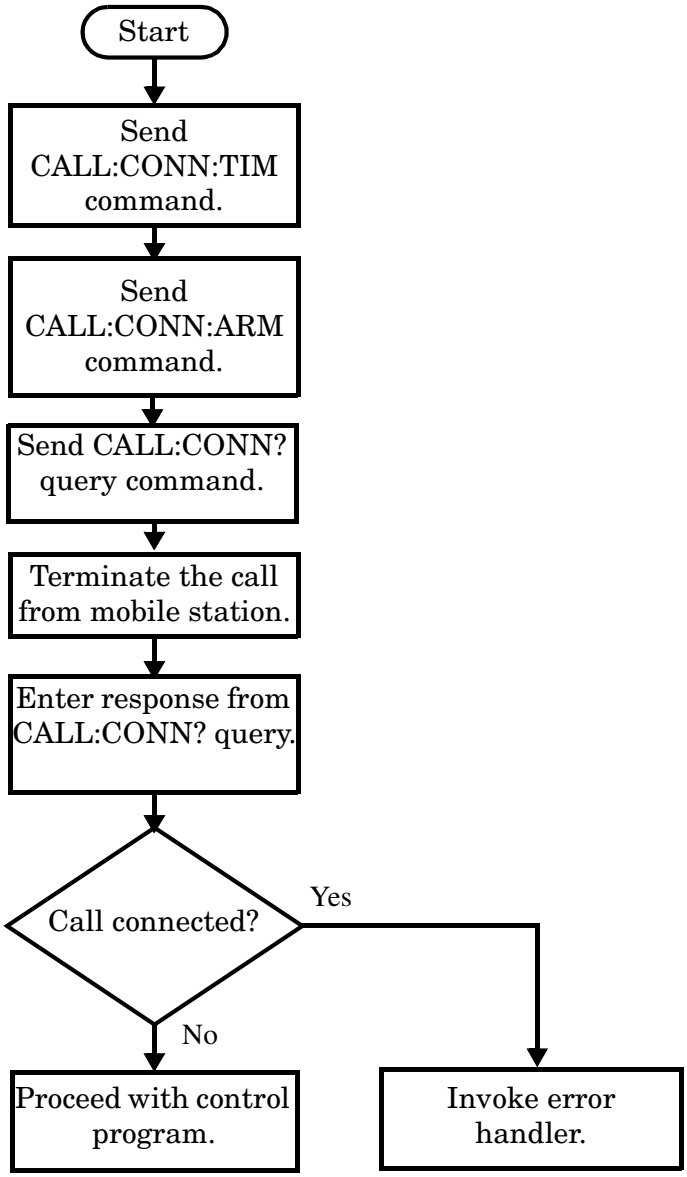


Example 15. Programming Example

```
OUTPUT Test_set;"CALL:END"        ! Initiate a base station release.
OUTPUT Test_set;"CALL:CONN?"  ! Send call connected state query.
ENTER Test_set;Call_connected     ! Program hangs here until state
                                  ! change or timer expires.
IF Call_connected THEN            ! Check if disconnection successful
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

Releasing an Active Call from the Mobile Station

Figure 8. Process for Terminating an Active Call from the Mobile Station



NOTE The test set cannot initiate a call disconnection from the mobile station. You must manually push the end button on the mobile station or send commands to a test bus built into the mobile station. For a mobile station release where the call is terminated by physically pushing a button on the phone (as opposed to using a test bus) ensure that the call-state-change-detector timeout time is long enough to allow the end button to be pushed.

Example 16. Programming Example

```
OUTPUT Test_set;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.
OUTPUT Test_set;"CALL:CONN:ARM"   !Arm the change detector.
```

```
DISP "Terminate the call from the mobile station."
OUTPUT Test_set;"CALL:CONN?" !Initiate call connected state query.
ENTER Test_set;Call_connected     !Program hangs here until state
                                  !change or timer expires.
IF Call_connected THEN            !Check if disconnection successful.
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

End the Mobile Station Test Mode Transmission

In test mode, you must send the necessary test mode commands to end the mobile station transmission.

Partially Preset the Test Set

At this point, it is good practice to partially preset the test set by sending the SYST:PRES3 command. This command stops all measurement and call processing processes, but does not reset all values to default.

Programming an Access Probe Power Measurement

This section provides an example of how to make an access probe power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure access probe power is as follows:

1. Turn call limit on (see "CALL:CONNected:LIMit[:STATe]" on page 202).
2. Set up initial power, step size, number of steps, and the maximum number of access probes for requests and responses (see "CALL[:CELL]:APARameter" on page 187).
3. Turn the access probe power measurement timeout timer on using the "SETup:CAPPower:TIMeout:STATe" command. If the timeout timer is not turned on, and an access probe is not received, the measurement will hang on the FETCh? command indefinitely.
4. Turn on the mobile station and perform a registration (wait for power-on or send "CALL:REGister[:IMMediate]").
5. Turn off timer-based registration (see "CALL:REGister:TIMer:STATe").
6. Initiate the access probe power measurement using the "INITiate:<measurement mnemonic>[:ON]" on page 323. The <measurement mnemonic> for access probe power measurements is CAPP.
7. Perform a page or mobile station originated call. Wait for the mobile station to finish transmitting the desired number of access probes.
8. Use the "FETCh:CAPPower[:ALL]?" command to obtain the measurement results.

IMPORTANT If the trigger arm state was set to continuous, return it to single before attempting a different measurement or attempting any call processing procedure.

Programming Example

Not available at the time of this printing. See <>

Returned Values

This query returns an integrity indicator followed by a channel power measurement result (if results are available).

Related Topics

"Access Probe Power Measurement Description" on page 32

"Access Probe Power Troubleshooting" on page 467

"Control Program Example" on page 1

Programming a Channel Power Measurement

This section provides an example of how to make a channel power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see "Step 4: Make a connection" on page 76.

The basic procedure to measure digital average power is as follows:

1. Make a call.
2. Configure the digital average power setup parameters using the "SETup:CPOWer" subsystem.
3. Start the digital average power measurement using the "INITiate" subsystem.
4. Use the "INITiate:DONE?" command to determine when the FER measurement has finished.
5. Use the "FETCh:CPOWer" command to obtain the measurement results.

Programming Example

Not available at the time of this printing.

Returned Values

This query returns an integrity indicator followed by a channel power measurement result (if results are available).

Related Topics

"Channel Power Measurement Description" on page 34

"Channel Power Measurement Troubleshooting" on page 468

"Control Program Example" on page 1

"CALibration Subsystem" on page 180

Programming a Digital Average Power Measurement

This section provides an example of how to make a digital average power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see "Step 4: Make a connection" on page 76.

The basic procedure to measure digital average power is as follows:

1. Make a call.
2. Configure the digital average power setup parameters using the "SETup:DAPower" subsystem.
3. Start the digital average power measurement using the "INITiate" subsystem.
4. Use the "INITiate:DONE?" command to determine when the FER measurement has finished.
5. Use the "FETCh:DAPower" command to obtain the measurement results.

Programming Example

Not available at the time of this printing.

Returned Values

This program returns an integrity indicator followed by a digital average power measurement result (if results are available).

Related Topics

"Digital Average Power Measurement Description" on page 36

"Digital Average Power Troubleshooting" on page 470

"Control Program Example" on page 1

Programming an FER (Frame Error Rate) Measurement

This section provides an example of how to make an FER measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see "Step 4: Make a connection" on page 76.

The basic procedure to test Loopback BER is as follows:

1. Make a SO (service option) 2, 9, or 55 call (see "CALL[:CELL]:SOPTION" on page 275).
2. Configure the Loopback FER Setup parameters using the "SETup:CFERror" subsystem.
3. Start the FER measurement using the "INITiate" subsystem.
4. Use the "INITiate:DONE?" command to determine when the FER measurement has finished.
5. Use the "FETCh:CFERror" command to obtain the measurement results.

Programming Example

Not available at the time of this printing.

Returned Values

This program returns up to 5 results in the following order: integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames tested.

Related Topics

"Frame Error Rate Measurement Description" on page 37

"Frame Error Rate Measurement Troubleshooting" on page 472

"Control Program Example" on page 1

Programming a Frequency Stability Measurement

This section provides an example of how to make analog frequency stability measurements via GPIB.

The following program example assumes that a signal within the measurements range is connected to the RF IN/OUT connector (see "Input Signal Requirements" on page 39).

The basic procedure to test Frequency Stability is as follows:

1. Enter the expected power (see "RFANalyzer:CW:EXPected:POWer").
2. Enter the expected frequency (see "RFANalyzer:MANual:MEASurement[:MFRequency]").
3. Define the Frequency Stability Setup parameters as desired for measurement timeout and multi-measurements (see "SETup:FSTability" on page 356).
4. Use the "INITiate" command to start the measurement.
5. Use the "FETCh:FSTability" command to obtain the measurement results.

Programming Example

```
10  !Set the expected frequency and power.
20  OUTPUT 714;"SETup:FSTability:CONTinuous OFF" !Set the frequency stability
30                                                !measurement to single trigger mode.
40  OUTPUT 714;"SETup:FSTability:TIMeout 1 S" !Set a timeout value of 1 second
50                                          !in case the measurement cannot be made.
60  OUTPUT 714;"SETup:FSTability:COUNt 5" !Set multi-measurements to 5.
70  OUTPUT 714;"INITiate:FSTability" !Start the measurement.
80  OUTPUT 714;"FETCh:FSTability?" !Query the returned integrity indicator and the
90         !Worst Case Frequency Error and average Frequency measurements.
100 ENTER 714;Integrity,Freq_error,Frequency  !Enter the returned values into variables.
110 IF Integrity=0 THEN  !See if the integrity value = 0 (valid measurement).
120 ELSE
130 PRINT "Measurement problem; check for signal level over/under range condition."
140 END IF
150 END
```

Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement integrity indicator; 0 means a successful measurement with no errors.
- `Freq_error` returns the worst case frequency error in parts per million (PPM). Frequency returns the average frequency.

Related Topics

“Frequency Stability Measurement Description” on page 39

“Frequency Stability Measurement Troubleshooting” on page 471

“Control Program Example” on page 1

Programming a Waveform Quality/Code Domain Measurement

This section provides an example of how to make a waveform quality measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see "Step 4: Make a connection" on page 76.

The basic procedure to measure waveform quality is as follows:

1. Make a call.
2. Configure the waveform quality and code domain power measurement setup parameters using the "SETup:WQUality" subsystem.
3. Start the digital average power measurement using the "INITiate" subsystem.
4. Use the "INITiate:DONE?" command to determine when the FER measurement has finished.
5. Use the "FETCh:WQUality" command to obtain waveform quality measurement results.
6. Use the "FETCh:WQUality" command to obtain code domain power measurement results.

Programming Example

Not available at the time of this printing.

Returned Values

This program returns:

- Waveform quality measurement results in the following order;integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, and error vector magnitude (EVM)
- Code domain power measurement pass/fail results

measurement results in the following order;integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, and error vector magnitude (EVM)

Related Topics

"Waveform Quality/Code Domain Measurement Description" on page 40

"Waveform Quality Measurement Troubleshooting" on page 473

"Control Program Example" on page 1

Preset Descriptions

Description

The test set is capable of accepting several different preset commands.

At no time during a preset operation, does transmit power exceed the last user setting of the transmit power. The input power is not set to any value lower than the last user setting of the input power. This is to avoid power spikes on the output and possible receiver damage on the input during transitions associated with preset operations.

Partial Preset

behaves

```
OUTPUT 714;"SYSTEM:PRESET3" !Command for a partial preset when user in
                            !remote operation.
```

SYSTEM:PRESET3 is the recommended command for a partial preset operation. The SYSTEM:PRESET[1] command is not recommended for use at this time.

Full Preset

A full preset requires you to select new measurements and configure their parameters. If measurement parameters do not need to be changed, use a partial preset to save time.

Example

```
OUTPUT 714;"*RST" !Recommended command for a full preset, sets trigger arm to single.

OUTPUT 714;"SYSTEM:PRESET2" !Command for a full preset, sets trigger arm to continuous.
```

The *RST common command is the recommended command for a full preset operation.

*RST gives the same results as partial preset with the exception of Trigger Arm and the measurement parameters.

NOTE Transmit power is not set to OFF during a full preset, transmit power is set to the default value.

Table 4. Full Preset Behavior

Function	Full Preset Result
Trigger Arm	Continuous (manual operation full preset or SYSTEM:PRESET2 command)

Table 4. Full Preset Behavior

Function	Full Preset Result
Trigger Arm	Single (remote operation full preset, *RST command)
Measurement Parameters	all set to defaults
Maskable Message Display State	On (manual operation full preset)
Maskable Message Display State	Off (remote operation full preset)

Status Preset

The STATUS:PRESET command sets the status system as defined in “SCPI 1995 Volume 2: Command Reference” section 20.7. All of the enable registers are set to 0, all PTR registers are set to 1, and all NTR registers are set to 0.

Example

```
OUTPUT 714;”STATUS:PRESET” !Presets the STATus subsystem.
```

Related Topics

“SYSTem:PRESet”

Receiver Control

The test set normally sets all receiver parameters automatically using call control settings. You may want to control the test set's receiver parameters manually rather than allowing the test set to control them. This ability is referred to as manual receiver control. Refer to the "Block Diagram" on page 504 for a description of the "Signal Downconversion" paths. These paths, the measurement downconverter and the demodulation downconverter can be manually adjusted to different input frequencies.

Manual vs. Automatic Receiver Control

- Auto mode is the default for all operating modes except CW (which defaults to manual mode). The receiver's expected power and frequency settings are set automatically according to the call control settings you specify (Channel number, Cell Band, Rvs Power Ctrl, Cell Power, and others).
- Manual mode allows you to override some or all of the automatic settings by first selecting the manual mode for the setting and then specifying the desired value. You can set the receiver's expected power by pressing the Call Parms, More key until 3 of 3 is displayed, and selecting Manual in the Rcve Power Ctrl field. A full or partial preset of the test set, including cycling power, returns the test set back to auto mode.

Manual Receiver Control Parameters

The following parameters manually control the test set's receiver:

- Digital receiver power (Rcvr Power Ctrl)
- CW receiver power
- Measurement receiver frequency (Meas Frequency)
- Demodulation receiver frequency

Digital receiver power

For all operating modes except for CW, the expected power from the mobile station is set manually using the "RFANalyzer:MANual:POWer[:SELected]" command.

CW receiver power

For CW operating mode, the expected power from the mobile station is set manually using the "RFANalyzer:CW:EXPected:POWer" commands.

Measurement receiver frequency

Measurement receiver frequency commands are used to manually tune the test set's measurement downconverter input signal path (see "Block Diagram").

The commands are:

- "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" (to turn manual mode on/off)
- "RFANalyzer:MANual:MEASurement[:MFRequency]" (to specify a frequency and turn manual mode on)
- "RFANalyzer:MANual:MEASurement:FREQuency" (to specify a frequency)

Demodulation receiver frequency

Demodulation receiver frequency commands are used to manually tune the test set's demodulation downconverter input signal path (see "Block Diagram"). The demodulation downconverter signal path is part of the function that demodulates information from the mobile station's reverse channel transmissions. The commands are:

- "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO" (to turn manual mode on/off)
- "RFANalyzer:MANual:UPLink[:MFRequency]" (to specify a frequency and turn manual mode on)
- "RFANalyzer:MANual:UPLink:FREQuency" (to specify a frequency)

NOTE Manual control of the demodulation receiver frequency is rarely needed. Use the measurement receiver when manual receiver frequency control is required.

Effects on Receiver Control When Changing Operating Mode

After selecting the operating mode and setting one or more receiver controls to manual, the receiver control settings remain as you set them until you change operating mode. Changing operating mode causes some or all receiver parameters to return to automatic control.

Related Topics

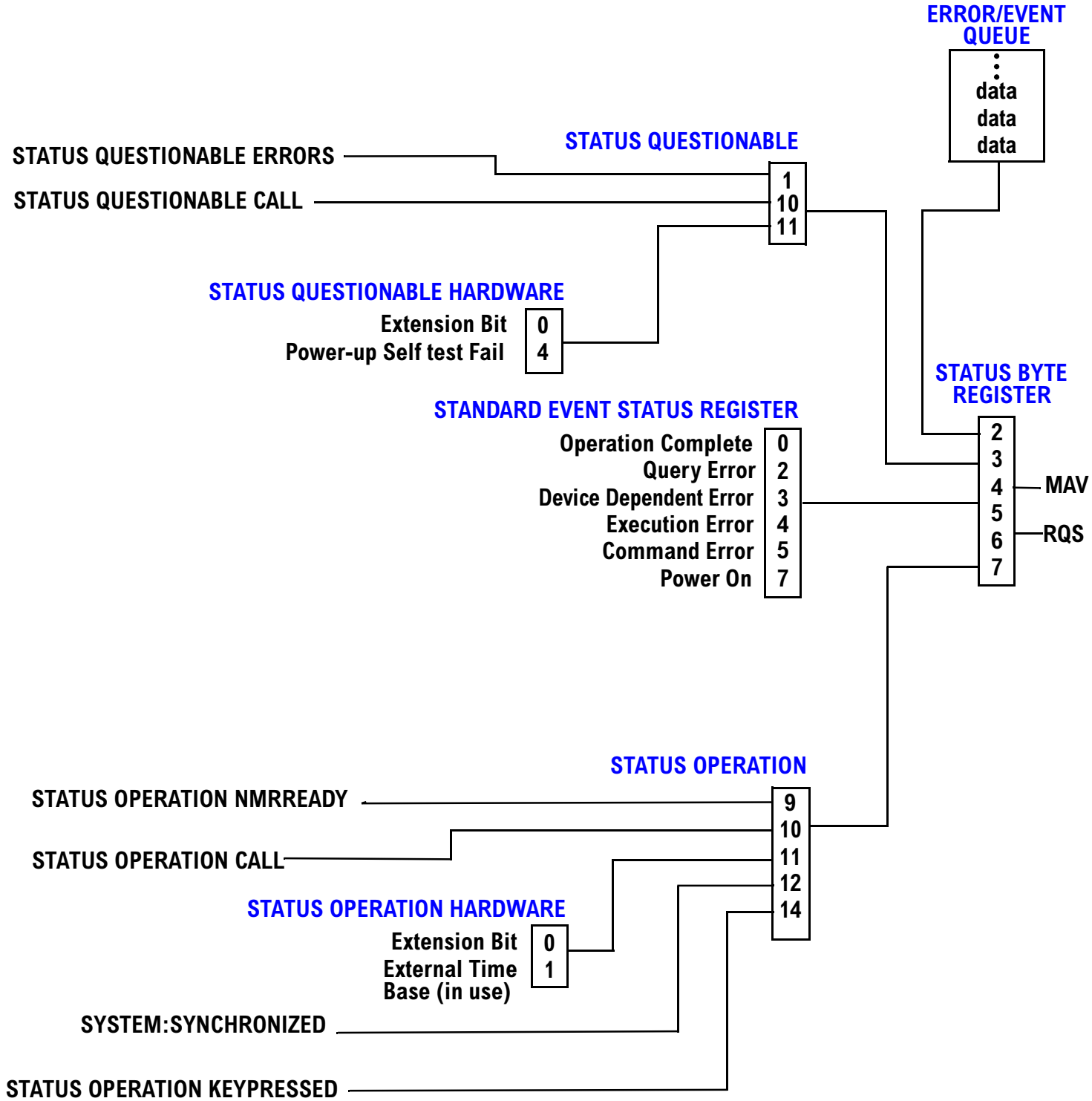
"RFANalyzer"

Status Subsystem Overview

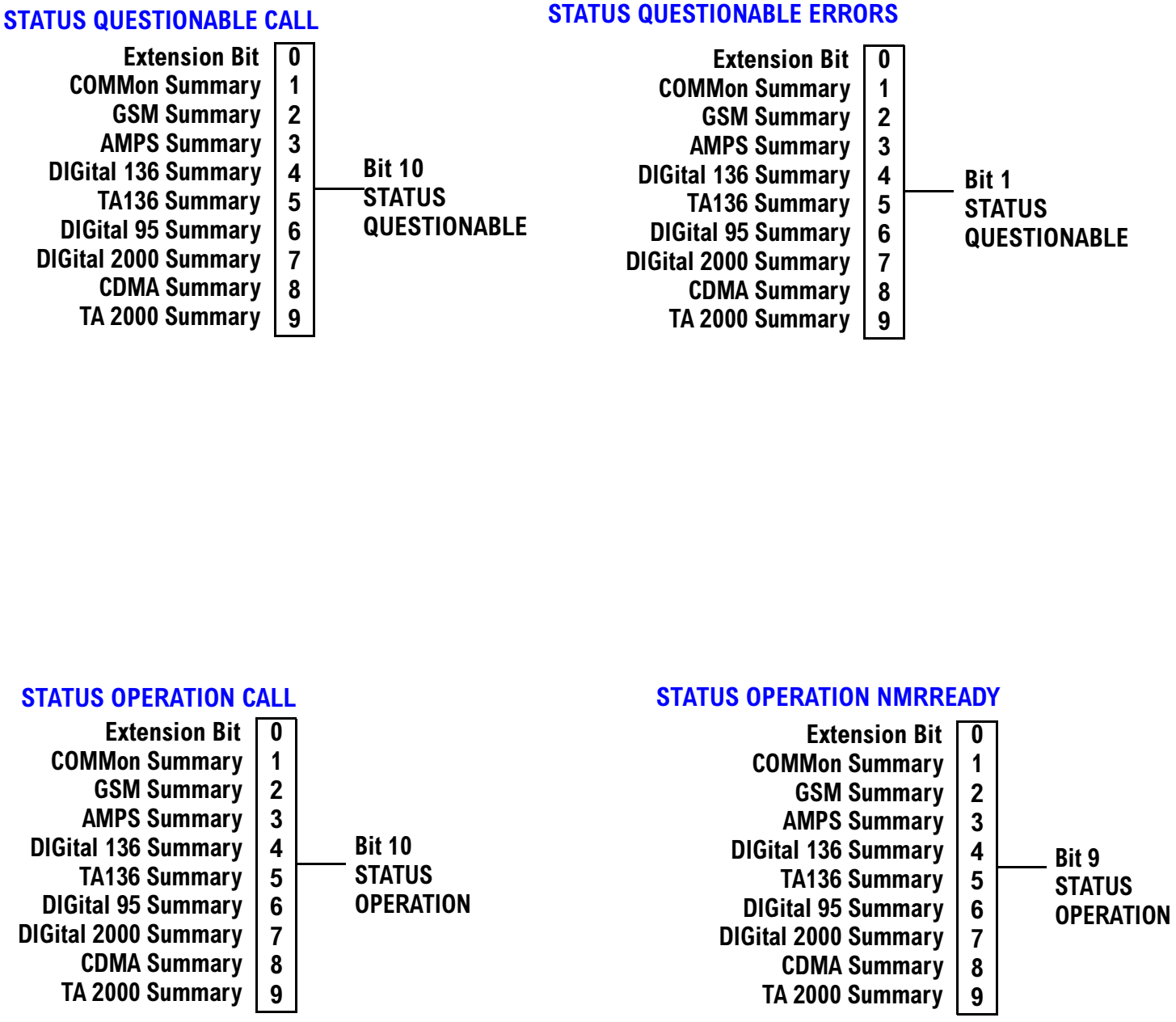
The following pages present an overview of the entire status subsystem, including test applications which may or may not be loaded in your test set.

Description

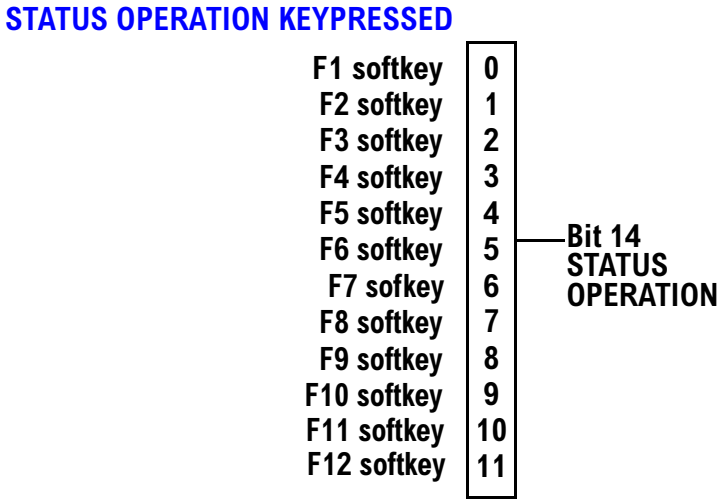
Overview of STATus Reporting Structure



Status Reporting Structure For STATus QUEStionable and STATus OPERation

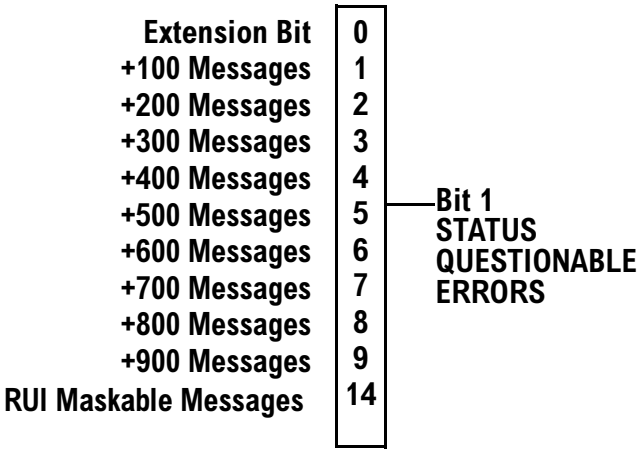


Status Reporting Structure For STATus OPERation KEYPressed Register

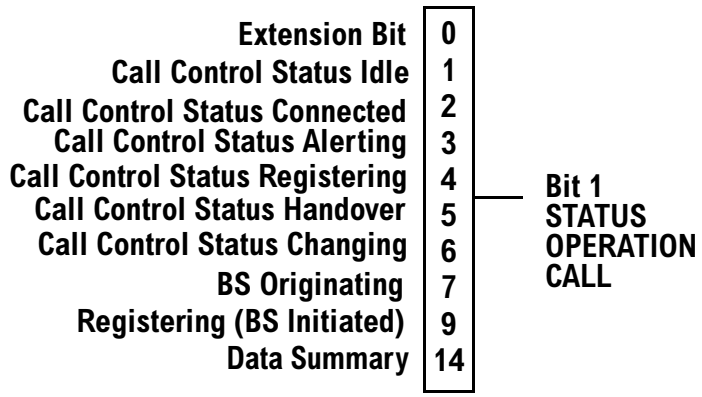


Status Reporting Structures For The COMMon Registers

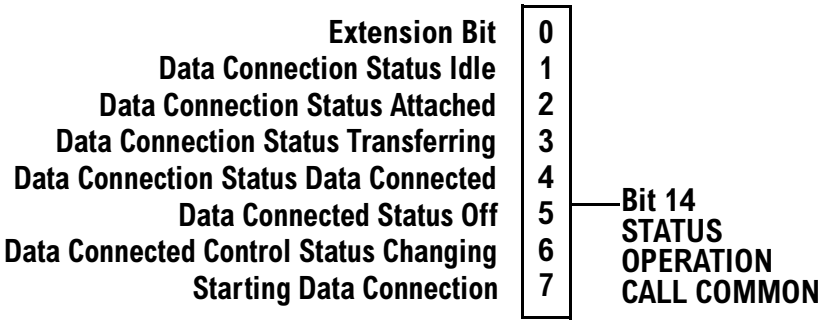
STATUS QUESTIONABLE ERRORS COMMON



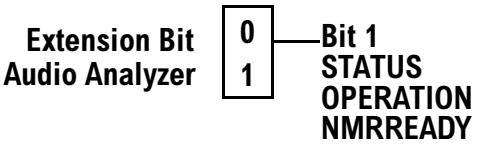
STATUS OPERATION CALL COMMON



STATUS OPERATION CALL COMMON DATA

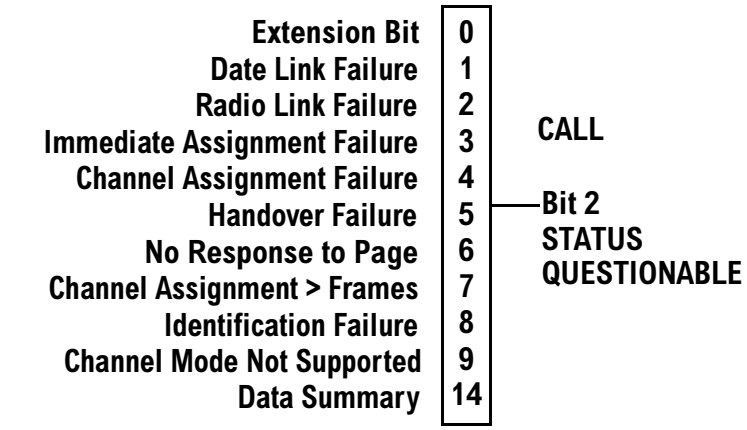


STATUS OPERATION NMRREADY COMMON

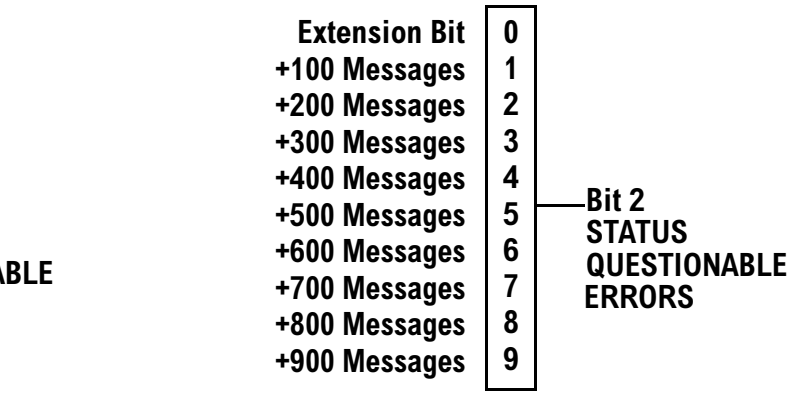


Status Reporting Structure For The GSM Test Application

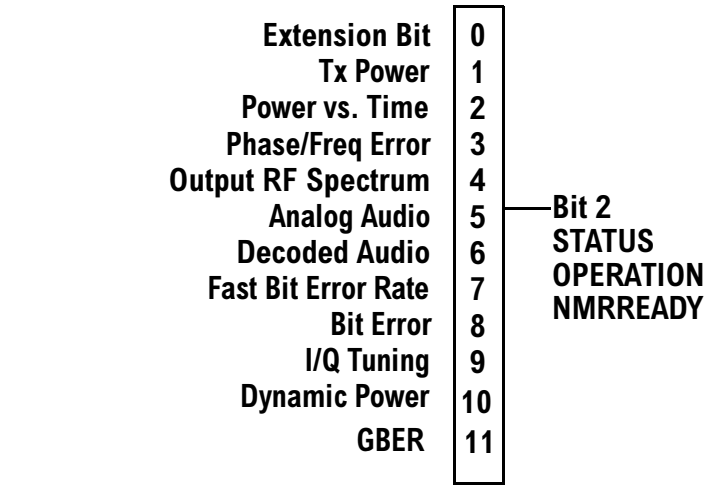
STATUS QUESTIONABLE CALL GSM



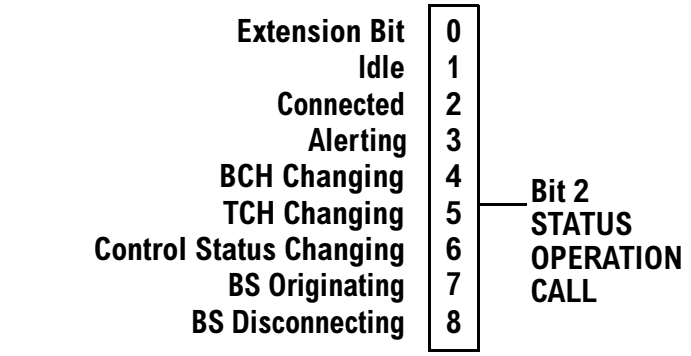
STATUS QUESTIONABLE ERRORS GSM



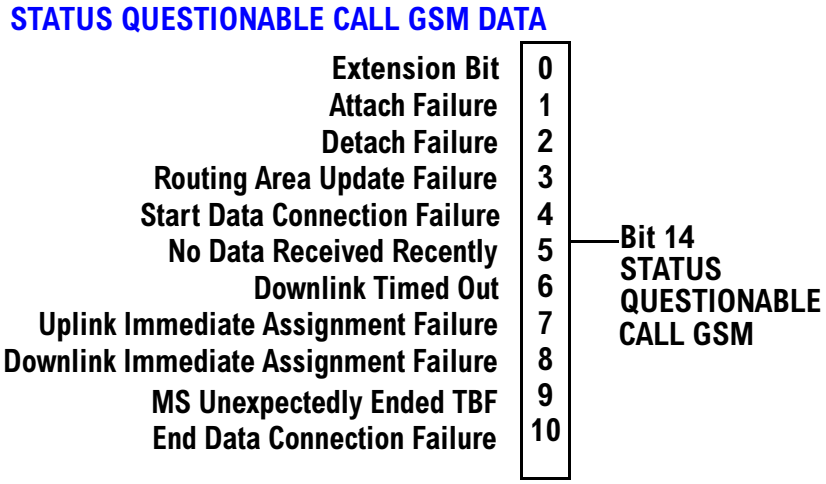
STATUS OPERATION NMRREADY GSM



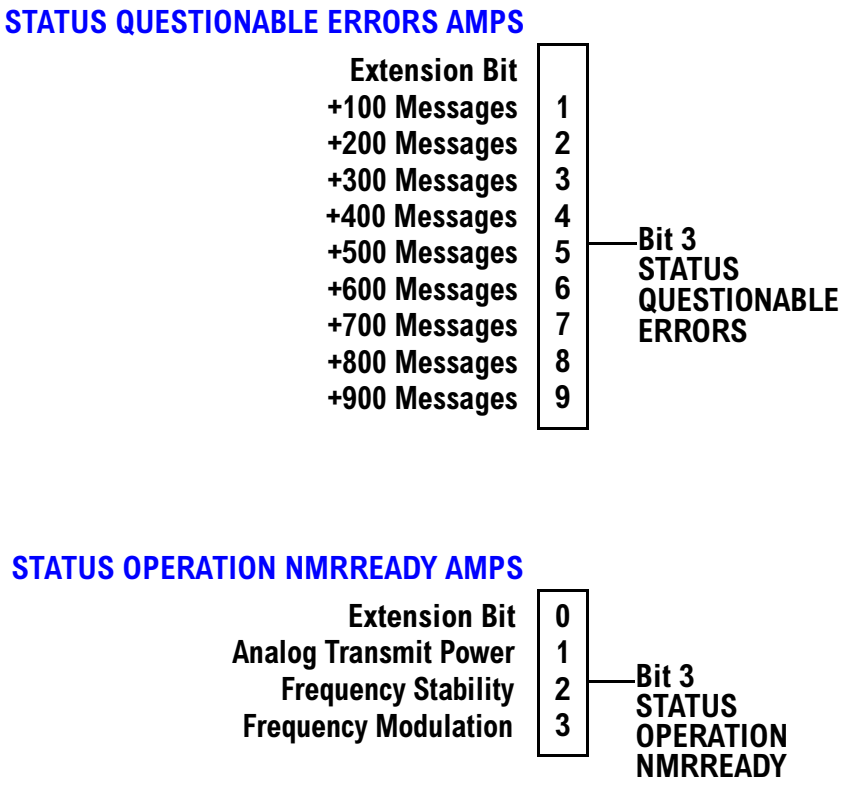
STATUS OPERATION CALL GSM



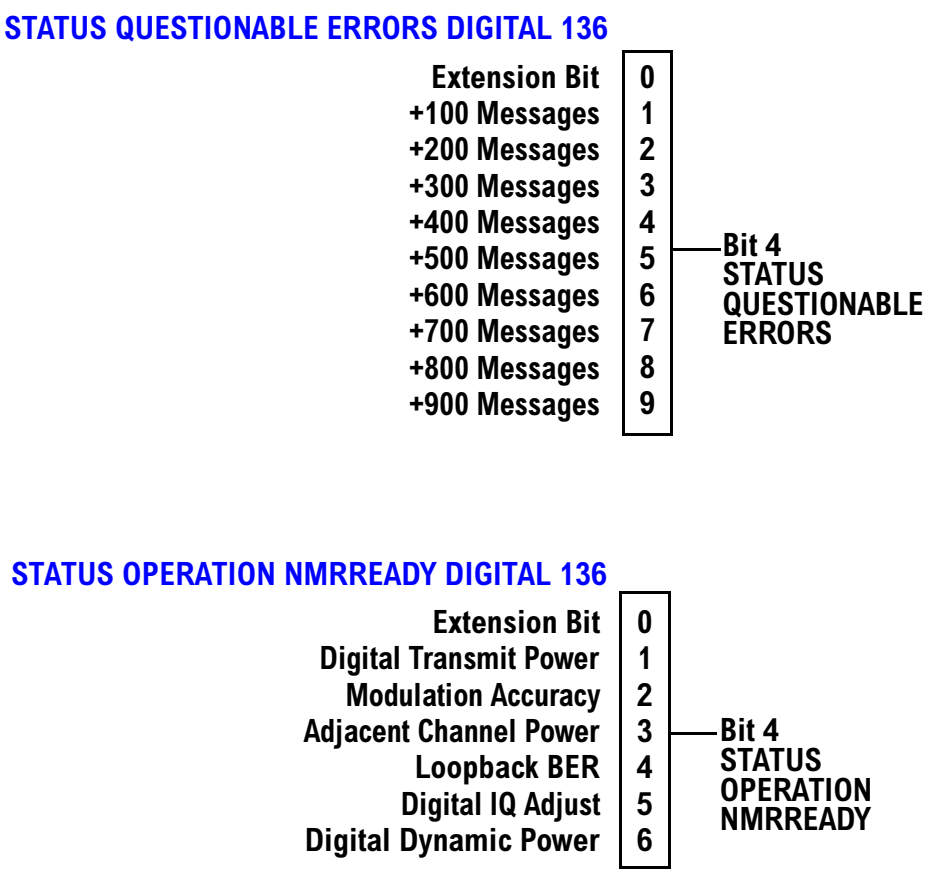
Status Reporting Structure For STATus QUEStionable CALL GSM DATA Register



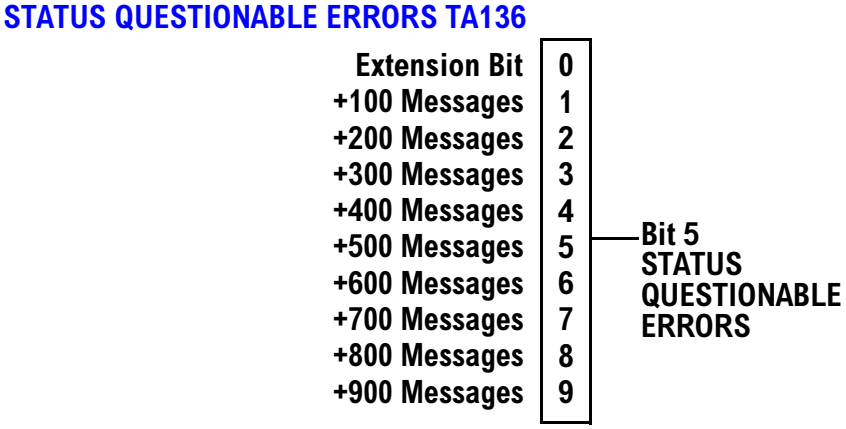
Status Reporting Structure For The AMPS Registers



Status Reporting Structure For The DIGital136 Registers

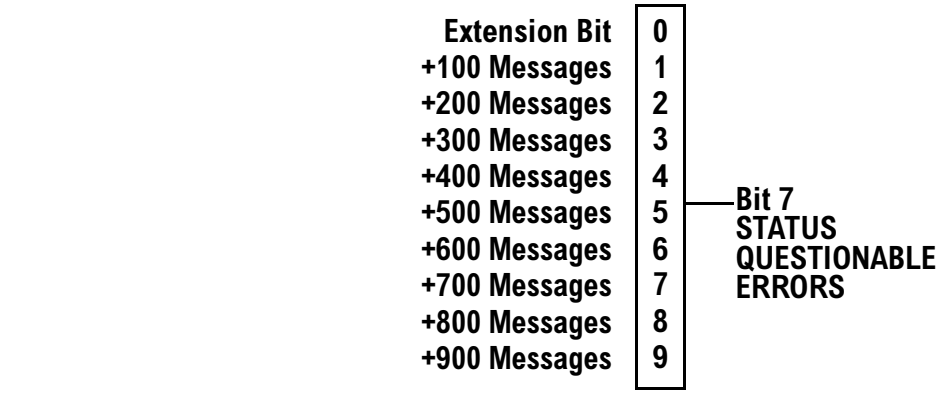


Status Reporting Structures For The TA136 Registers

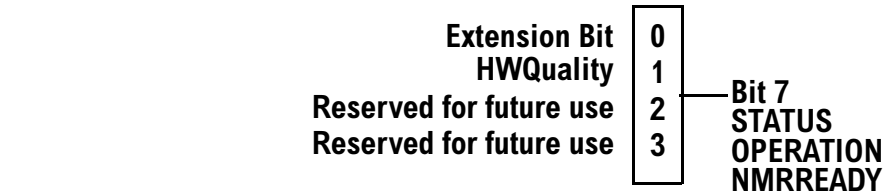


Status Reporting Structure For The DIGital 2000 Registers

STATUS QUESTIONABLE ERRORS DIGITAL 2000

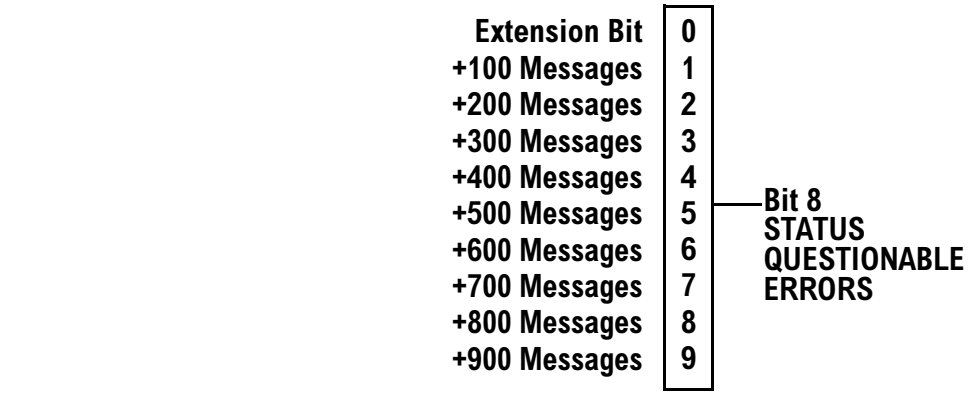


STATUS OPERATION NMRREADY DIGITAL 2000

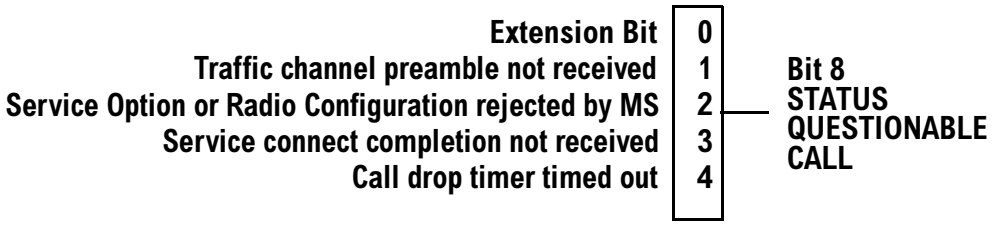


Status Reporting Structure For The CDMA Registers

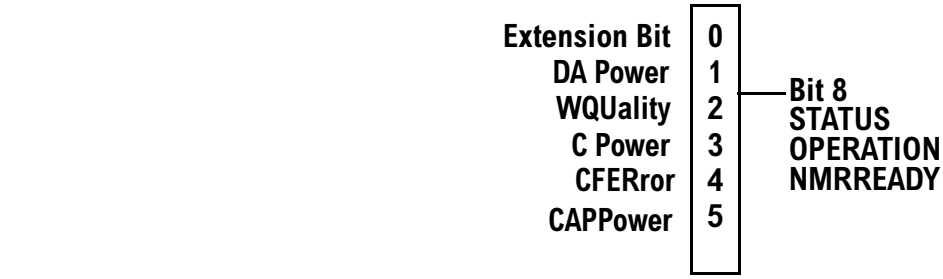
STATUS QUESTIONABLE ERRORS CDMA



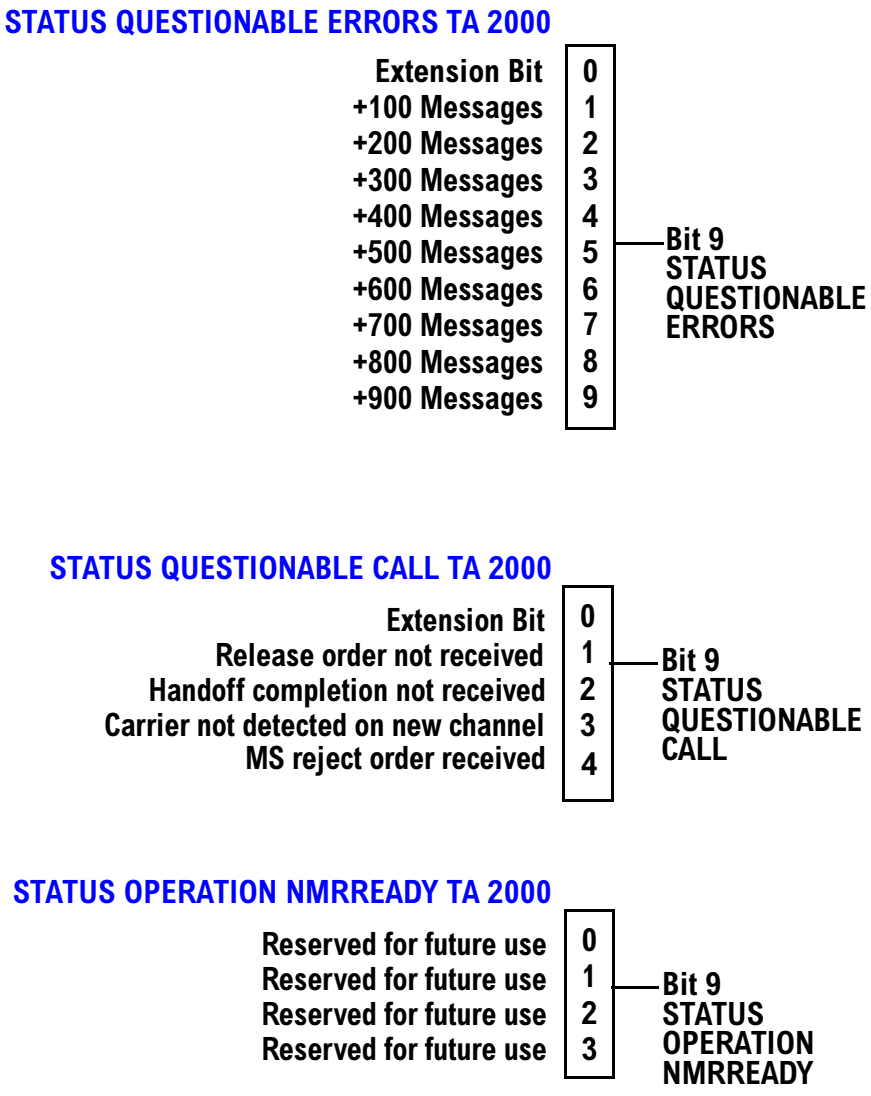
STATUS QUESTIONABLE CALL CDMA



STATUS OPERATION NMRREADY CDMA

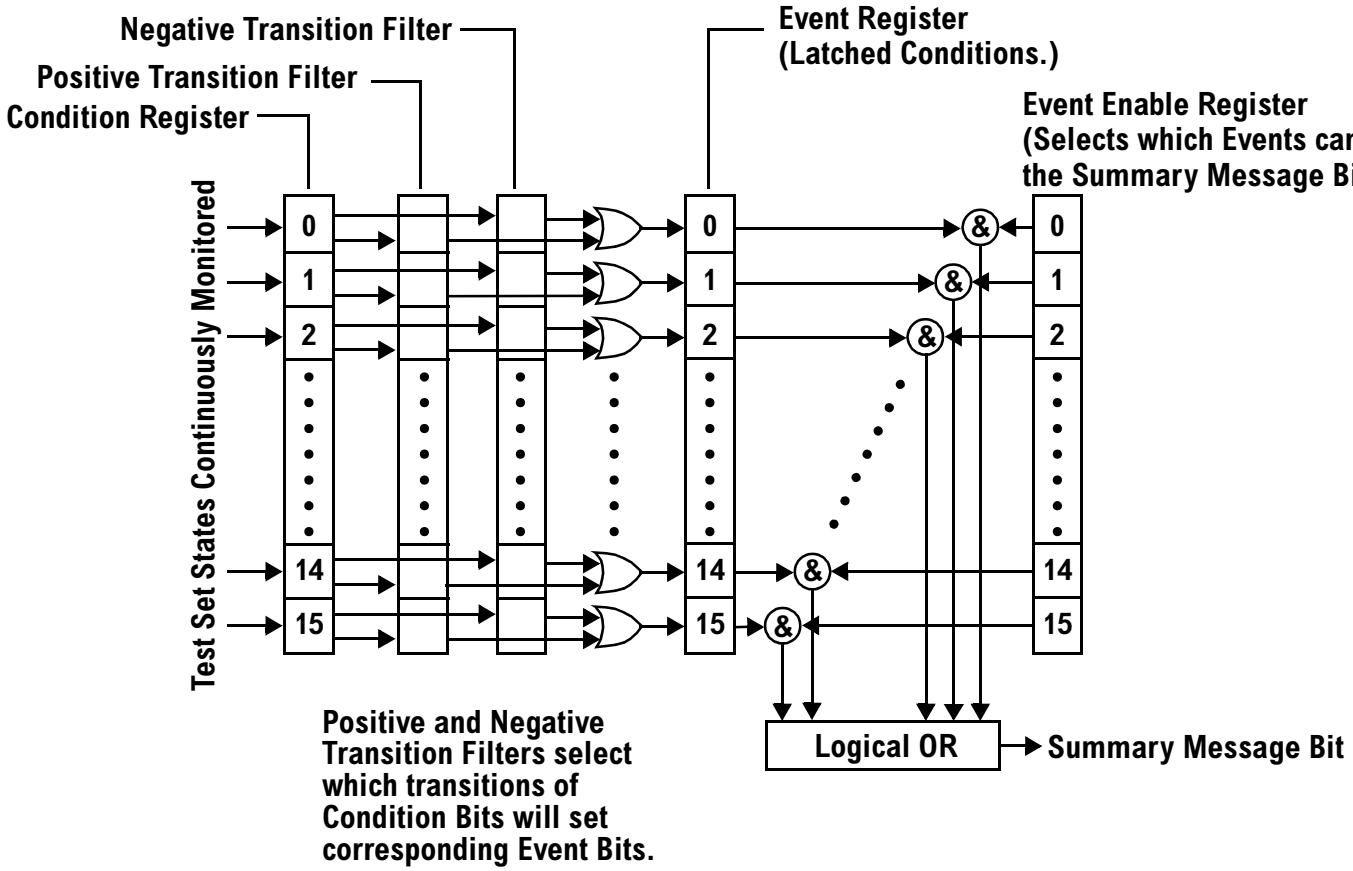


Status Reporting Structure For The TA 2000 Registers



Status Data Structure - Register Model

The generalized status register model consists of a Condition Register, Transition Filters, an Event Register, an Enable Register, and a Summary Message Bit.



Condition Register

A condition is a test set state that is either TRUE or FALSE (a GPIB command error has occurred or a GPIB command error has not occurred). Each bit in a Condition Register is assigned to a particular test set state. A Condition Register continuously monitors the hardware and firmware states assigned to it. There is no latching or buffering of any bits in a Condition Register; it is updated in real time. Condition Registers are read-only. Condition Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Transition Filters In the test set, the Transition Filters are implemented as two registers: a 16-bit positive transition (PTR) register and a 16-bit negative transition (NTR) register.

For each bit in the Condition Register, a Transition Filter bit determines the state transitions which will set a corresponding bit in the Event Register. Transition Filters may be set to pass positive transitions (PTR), negative transitions (NTR) or either (PTR or NTR). A positive transition refers to a condition bit which has changed from 0 to 1. A negative transition refers to a condition bit which has changed from 1 to 0.

A positive transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the positive transition filter is set to 1. A positive transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the positive transition filter is set to 0.

A negative transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the negative transition filter is set to 1. A negative transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the negative transition filter is set to 0. Either transition (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 1. No transitions (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 0.

Transition Filters are read-write.

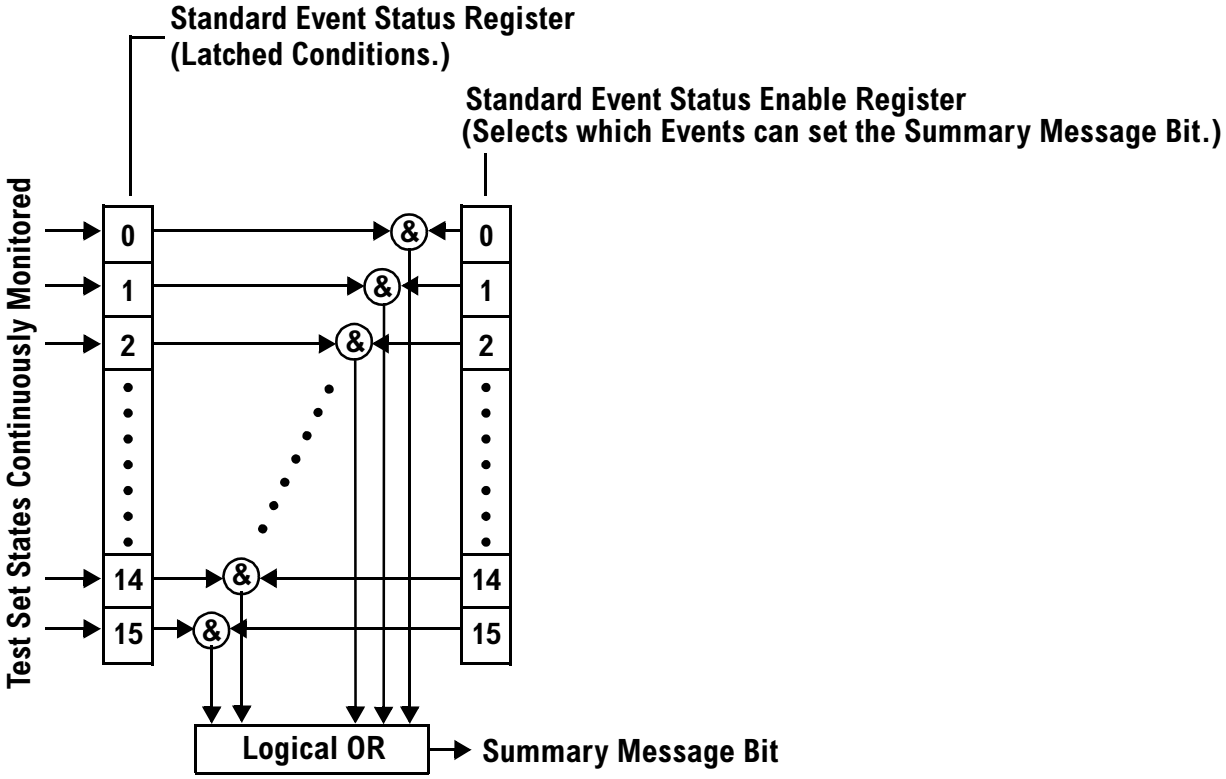
Transition Filters are unaffected by a *CLS (clear status) command.

Transitions Filters are set to pass positive transitions (all 16 bits of the PTR register are set to 1 and all 16 bits of the NTR register are set to 0) at power on or after receiving the *RST (reset) command.

Event Register The Event Register captures bit-state transitions in the Condition Register as defined by the Transition Filters. Each bit in the Event Register corresponds to a bit in the Condition Register. Bits in the Event Register are latched, and, once set, they remain set until cleared by a query of the Event Register or a *CLS (clear status) command. This guarantees that the application can't miss a bit-state transition in the Condition Register. There is no buffering; so while an event bit is set, subsequent transitions in the Condition Register corresponding to that bit are ignored. Event Registers are read-only. Event Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Event Enable Register The Event Enable Register defines which bits in the Event Register will be used to generate the Summary Message. Each bit in the Enable Register has a corresponding bit in the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By using the enable bits the application program can direct the test set to set the Summary Message to the 1 or TRUE state for a single event or an inclusive OR of any group of events. Enable Registers are read-write. Enable Registers in the test set are 16 bits long and may contain unused bits which correspond to unused bits in the associated Event Register. All unused bits return a zero value when read and are ignored when written to. Enable Registers are unaffected by a *CLS (clear status) command or queries.

Standard Event Status Register Model

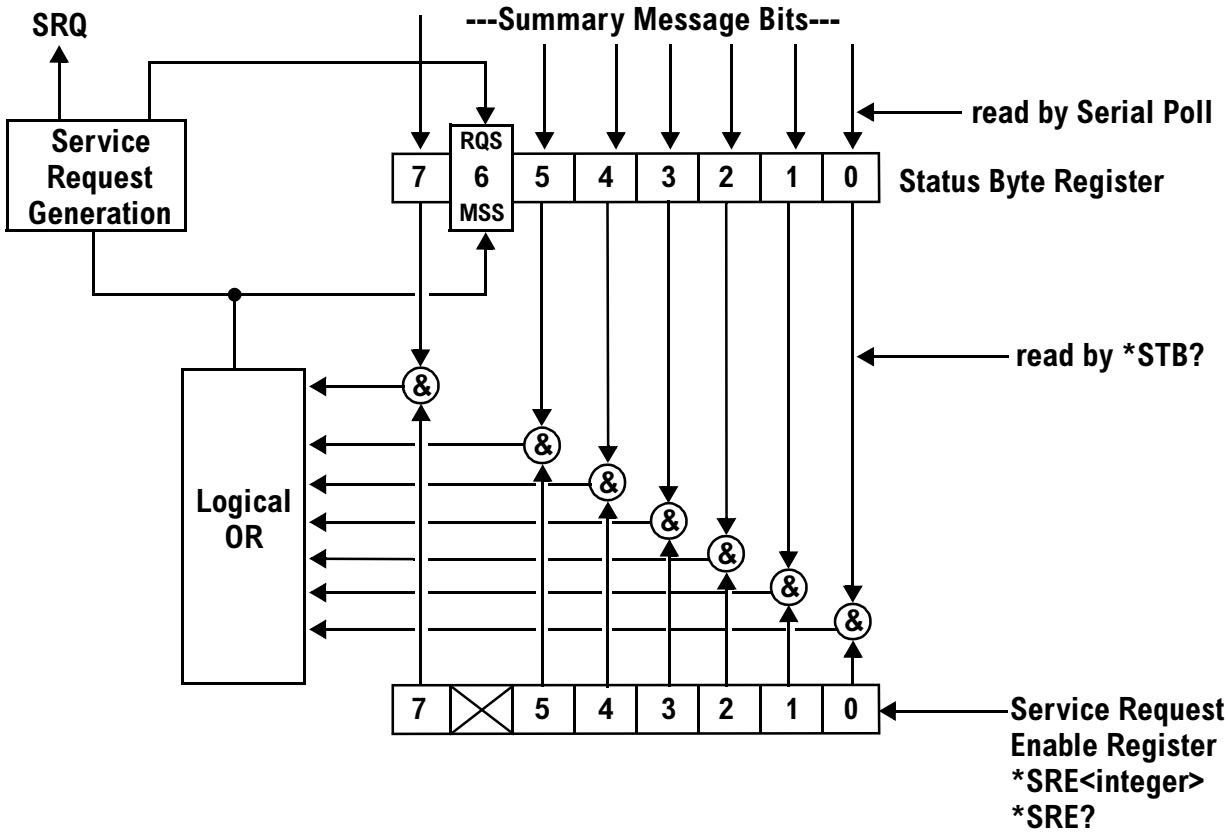


Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By use of the enable bits, the application program can direct the test set to set the Summary Message to the 1, or TRUE, state for a single event or an inclusive OR of any group of events.

The Summary Message is TRUE, logic 1, if the register contains some information and an enabled event in the Event Register is set TRUE.

The Summary Message is FALSE, logic 0, if the queue is empty and no enabled events are TRUE. Registers can be cleared by reading all the information from the queue. Registers can also be cleared using the *CLS (clear status) command.

Service Request Enabling Register Model



Status Bye Register The Status Byte Register is an 8 bit register that provides single bit summary messages, each summary message summarizes and overlaying status data structure. Summary messages always track the current status of the associated status data structure. Service request enabling determines if one or more of the summary messages will generate a message. Device status reporting is defined in IEEE 488.2-1992, 11.1.

The Status Byte Register contains the STB and RQS (or MSS) messages from the test set. The Status Bute Register can be read with either a serial poll or the *STB? common query. The value for bit 6 is dependent on which method used.

When reading with a serial poll the status byte and the RQS message are returned as a single data byte. The RQS message indicates if the SRQ is TRUE. The Status Byte Register is not affected by a serial poll, the RQS is set to FALSE when polled.

The *STB? query allows you to read the status byte and the MSS. The response represents the sum of the binary weighted values of the Status Byte Register from bit 0-5 and 7.

The Master Summary Status (MSS) message from bit 6 indicates when there is at least one reason for requesting service.

The Message Available (MAV) summary message from bit 4 is TRUE when there is a message is in the output queue.

The Status Byte Register is cleared with the *CLS common command. The output queue and the MAV are not affected by the *CLS command.

Service Request Enable Register The Service Request Enable Register is an 8 bit register that enables corresponding summary messages in the Status Byte Register. Enabling the service request with the *SRE command allows you to choose which bits in the Status Byte Register will trigger a service request.

The Service Request Enable Register is read with the *SRE? query. The returned value is the sum of the binary weighted values of the Service Request Enable Register, with a range of 0 through 63 or 128 through 191.

The value of the unused bit 6 will always be zero.

Related Topics

"STATus Subsystem" on page 365

Statistical Measurement Results

Description

Most measurements have a setup window that provides for the entry of a multi-measurement count value. This specifies how many measurements the test set will perform to obtain a set of values from which to calculate the following statistical measurement results:

- Average (arithmetic mean) of measurement set
- Minimum value from measurement set
- Maximum value from measurement set
- Standard Deviation of measurement set

Operating Considerations

The advantages of using the multi-measurement feature to obtain statistical measurement data include: reduced time associated with GPIB bus traffic, and reduced time configuring hardware. This is because the number of measurements specified in the multi-measurement count value are performed during one measurement cycle.

Programming Example

```
OUTPUT 714;"SETUP:DAPOWER:COUNt 10" !Enters a Digital Average Power count
                                     !of 10, and turns the Digital Average Power
                                     !multi-measurement state on.
```

Related Topics

"Measurement Progress Report"

Timeouts

Description

The primary use of measurement timeouts is to regain control of the test set's GPIB in cases where the bus could potentially "hang."

The time normally required for a measurement to complete may vary greatly depending on the individual measurement, its settings, it's multiple measurement count value, and so forth. Because of this, you may need to set the timeout longer than the default for measurements where a large number of multiple measurements are requested or where measurement triggers may be infrequent.

Be careful when setting a timeout that is shorter than the default. It is possible to specify a timeout that is so short the measurement does not even have a chance to begin. Measurement timeouts should always be at least several seconds long.

Timeout units default to S (seconds). The seconds suffix is an optional part of the command. If you want MS (milliseconds), US (microseconds) or NS (nanoseconds), you must specify these units in the suffix.

Timeout Values

All measurements in the CDMA 2000 Mobile Test application default to a timeout value of 10 seconds, except FER. The FER measurement timeout default is 200 seconds.

Related Topics

"Integrity Indicator"

"SETup Subsystem"

Triggering of Measurements

Trigger Source Choices

For CDMA 2000, the trigger source choices are limited to:

- "RF Rise Trigger Source:"
- "Immediate Trigger Source:"

The RF Rise trigger source is used only for access probe measurements, and the Immediate trigger source is used for all other measurements. No user control is provided for trigger sources.

Description

Trigger Source Description

A measurement trigger causes hardware (for example, a sampler) to capture data which is used by a measurement algorithm to produce a measurement result. Not all of the trigger source choices are available in every measurement, or every test application.

RF Rise Trigger Source: When RF rise triggering is selected, a measurement dependent threshold is used to define the trigger point on the envelope of the signal being measured. The envelope amplitude must fall below this threshold and remain there for a measurement-dependent period of time before the trigger is armed. After the trigger is armed, a trigger will occur as the envelope amplitude increases and passes through the threshold.

Protocol Trigger Source: When protocol triggering is selected, a data capture is triggered by a protocol generated signal. The test set's protocol engine knows when the DUT's signal should be present and generates a trigger signal for use by the measurement to trigger the data capture.

External Trigger Source: When external triggering is selected, the user supplies an external trigger signal via the rear panel TRIG IN connector in order to trigger data capture. The trigger will occur on the rising edge of this signal.

Immediate Trigger Source: When immediate triggering selected, the trigger occurs as soon as any pre-trigger samples required by the measurement algorithm are taken. Data capture is triggered when the measurement is initiated.

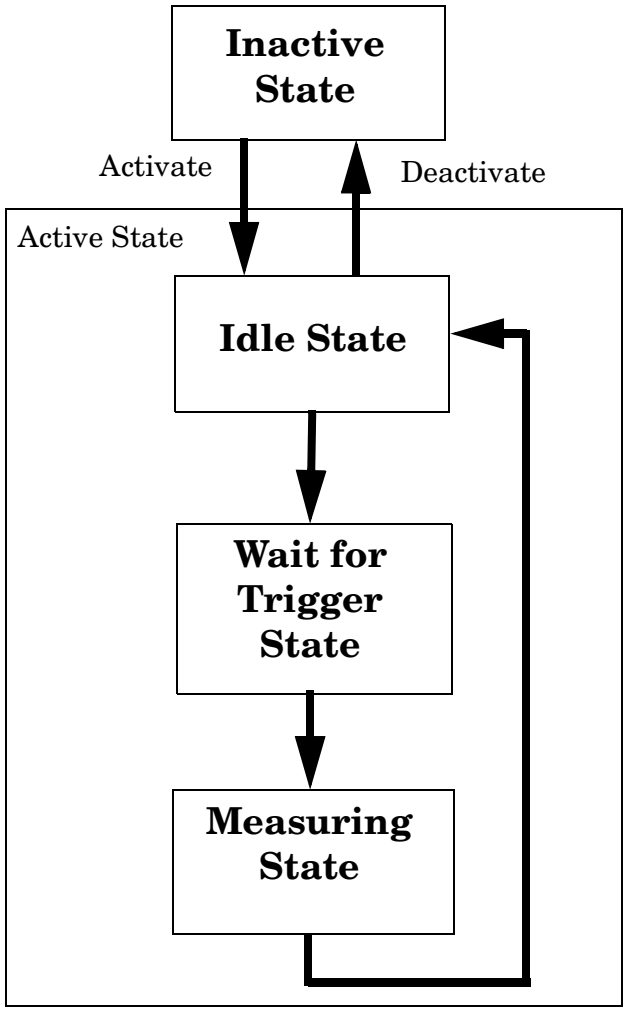
Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice for most users.

Triggering Process Description

The triggering process controls the present and future states of the test set during the measurement cycle. Triggers are set up using the SETup commands and can be set up when a measurement is in the inactive state. A measurement is activated (selected) with an INITiate command. If a measurement is initiated while in its measurement cycle, it will terminate that measurement and restart it. The active state is not a single state but a collection of any state other than the inactive state. Deactivating (de-selecting) the measurement is accomplished through an INITiate:<MEAS>:OFF command.

Manually, a measurement is activated by selecting it from the Measurement Selection menu. A measurement is inactivated by pressing the Measurement Selection key, scrolling to measurement in the Measurement Selection menu, and then pressing F4 (Close Measurement).

Figure 9. The Test Set's Measurement States



Measurement States

The following examples describe states of the test set under various conditions. Refer to Figure 9. on page 141.

Example 17. Inactive State

If the test set has just been powered on, or any form of preset has been performed, then the measurement state is inactive.

Example 18. Wait for Trigger State

If a measurement has been initiated with the INITiate command but has not been triggered, or a measurement has been selected from the Measurement Selection menu but has not been triggered, then the measurement state is wait for trigger.

Example 19. Measuring and Idle States (Trigger Arm Single)

If the trigger arm is set to single, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. After results are available, the state transitions to idle (awaiting another INITiate).

Example 20. Measuring State (Trigger Arm Continuous)

If the trigger arm is set to continuous, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. The measurement is continually triggered until the measurement is deactivated. When the measurement is deactivated (INITiate:<MEAS>:OFF. or Close Measurement), it becomes inactive.

Trigger Arm (Single or Continuous) Description

Trigger arm determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).

NOTE When operating the test set remotely, trigger arm must be set to single, this causes the measurement cycle to transition to the idle state but remain active.

Pressing the Start Single key on the front panel will cause all currently active measurements with trigger arm set to single to arm and make the measurement.

Pressing Shift, Start Single (Stop) causes all measurements with trigger arm set to single to abort the measurement.

It is unnecessary to arm a measurement if trigger arm is set to continuous it will continue to cycle in the measuring state.

Table 5. Trigger Arm Default Settings

Action	Trigger Arm Default Setting
Power up of test set	Continuous
Manual Full Preset	Continuous
*RST (Remote) Full Preset	Single
Partial Preset	No change

Trigger Delay Description

Trigger delay controls the delay time between the trigger and the start of sampling. Resolution is 1 nanosecond per measurement and the units are in seconds. A negative value indicates the sampling should occur prior to the trigger. The default is zero seconds which is preferred for most measurements.

Related Topics

"Integrity Indicator"

Integrity Indicator

Description

The test set can evaluate its own performance and make a determination as to the validity of a measurement result. The test set evaluates the conditions surrounding a measurement and reports to the user its evaluation of these conditions in a parameter called the measurement integrity indicator. A measurement integrity indicator value is returned for every completed measurement. It is recommended that the user take advantage of this feature in every measurement.

The returned value defines whether or not a problem was encountered by the measurement process. It is not, however, guaranteed to be the only or root cause of the measurement problem. This is because some of the conditions surrounding a measurement may interact, and the test set may have insufficient information to determine the root cause of the measurement problem. However, in most cases, the value returned is the most likely cause of the problem.

Not all of the integrity indicator values are available for each measurement or test application, if a value doesn't apply it will not be available.

Example: Questionable Result for PGSM (15) and Questionable Result Due To Channel Mode (16) are GSM only integrity indicator values.

NOTE Measurement synchronization must be set to midamble in order for GSM measurements to return integrity indicator (8, 9, 11).

Table 6.

Integrity Indicator Number	Integrity Indicator Message
0	Normal: Indicates the measurement completed successfully without error and the result is accurate.
1	No Result Available: Indicates that there is no measurement result and returns NAN (not a number).
2	Measurement Timeout: Indicates that a measurement has timed out. The measurement timeout state must be set to ON.
3	Hardware Not Installed: Indicates that a piece of hardware is not installed in the test set, or the hardware has failed in a way which leads the instrument controller to believe it isn't installed.
4	Hardware Error: Indicates that a hardware failure has occurred. These include failures such as a phase lock loop out-of-lock, defective DSP samplers, or power detectors that can not be calibrated.
5	Over Range: Indicates that the input signal is over range. The amplitude of the device-under test's (DUT's) signal is causing the voltage at a DSP sampler to be above its maximum input level or the frequency is too high or the voltage measured is beyond the maximum voltmeter range, either positive or negative.

Table 6.

Integrity Indicator Number	Integrity Indicator Message
6	Under Range: Indicates that the input signal is under range. The amplitude of the DUT's signal is not high enough for the DSP sampler to produce accurate results with the measurement algorithm.
7	Burst Short: Indicates that the burst duration is too short, or part of the burst was not sampled due to improper triggering.
8	Trigger Early or Fall Early: Indicates that the DUT's burst amplitude fell prematurely or, due to an early trigger (early relative to a transmitted burst) the measurement sampling operation terminated before the falling edge of the burst.
9	Trigger Late or Rise Late: Indicates that either the rising edge of the DUT's burst was late or, due to a late trigger (late relative to a transmitted burst) the measurement sampling operation didn't start until after the rising edge of the transmitted burst.
10	Signal Too Noisy: Indicates that the measurement algorithm has found the signal measured to be too noisy to provide accurate results.
11	Sync Not Found: Indicates that the midamble was not found therefore the measurement was not synchronized.
12	Oven Out of Range: Indicates that a temperature controlled oven (other than the internal timebase oven) is outside of its operating range. The power meter's oven is checked and its condition reported with this value. (The internal timebase generates a temporary error message (out of lock) that is sent to the system error queue and the display. This is not an integrity indicator value, it is an error message.)
13	Unidentified Error: Indicates errors which are not covered by the other integrity values. Examples include: parameter errors, algorithm memory errors (too many measurements), measurements unavailable (unable to control), autorange unable to converge, default calibration data used.
14	PCM Full Scale Warning: Indicates that the PCM signal has reached plus or minus full scale. The measurement made will be accurate on the PCM signal but would typically indicate an overdriven or oscillating element in the DUT.
15	Questionable Result for PGSM: Indicates that the user attempted to make an FBER measurement in a phase 1 system. FBER is only possible in a phase 2 GSM system. This indicator is available only when the selected broadcast band is PGSM.
16	Questionable Result Due To Channel Mode: Indicates that the channel mode was set to Enhanced Full Rate Speech while a Decoded Audio measurement was active. Decoded Audio is not supported for EFR Speech.

Table 6.

Integrity Indicator Number	Integrity Indicator Message
17	Can not Correlate: Indicates that the test sets internally generated reference signal does not correlate with the received signal. Some conditions that could cause this integrity indicator result include the following: • an input signal that is corrupted • the input signal is extremely distorted • the input signal is off by more than 10 ms. • the frequency of the input signal deviates more than allowed • something is wrong with the long-code mask coming from the mobile ID
18	Frequency Out Of Range: Indicates that a Channel Power Measurement was attempted at a frequency for which there is no calibration data. The test set display will indicate 4 dashes.
19	Uncalibrated Due To Temperature: Indicates that the current temperature of the test set is different than the calibration data temperature by more than ±10 degrees C, when attempting a Channel Power Measurement.
20	Potential Receiver Saturation: Indicates that an input signal immediately prior to the measured input was high enough to potentially saturate the receiver hardware.
21	Parameter Error: Indicates that a measurement setup parameter has been set in a way that gives invalid measurement results.
22	Unsupported Configuration: Indicates that some parameter, other than a measurement setup parameter has been set so that it causes an invalid measurement result. Typically this would be a base station emulator parameter.
23	Call Processing Operation Failed: Indicates that a call processing operation, (base station emulator) needed in the course of making the measurement could not complete.

Example Program

```
10  OUTPUT 714;"INITiate:DAPower" !Start Digital Average measurement
20  OUTPUT 714;"FETCH:DAPower?" !Request measurement results.
30  ENTER 714;Integrity,Tx_power !Read measurement results.
40  IF Integrity = 0 THEN !Permits measurement to be printed if integrity indicator
50                        !indicates a successful measurement
60  PRINT "Analog TX Power =";Tx_power!if 0 then measurement was successful
70  ELSE
80  PRINT "Measurement integrity questionable, integrity value = ";Integrity !If
90                                                                          !integrity
100                                                                         !not zero
110                                                                         !then print
120                                                                         !integrity
130                                                                         !value.
140 END IF
150 END
```

Related Topics

"Reading Error Messages"

Measurement Progress Report

Description

The measurement progress report is a query of how far along a multi-measurement cycle has progressed. When the multi-measurement count is greater than one, the measurement progress report will indicate the number of measurements that have completed. The returned value will be the last update and not the actual number, because the value is updated periodically and not for each multi-measurement cycle. Every measurement has the measurement progress report available.

Example

```
OUTPUT 714;"FETCH:DAPOWER:ICOUNT?" !Returns the approximate number of
                                   !multi-measurement cycles completed during a
                                   !multi-measurement count cycle
```

Related Topics

"Statistical Measurement Results"

Concurrent Measurements

Description

A number of measurements can be initiated (with the INITiate command) while other measurements are being made, and the test set will perform as many operations simultaneously as its architecture allows. This technique is referred to as concurrency. Performing measurements concurrently can greatly improve test throughput.

Operating Considerations

The test set has three parallel signal paths to improve measurement throughput.

- Demodulation downconverter path.
- Measurement downconverter path.
- Power detector path.

Since measurements are DSP (digital signal processor) based, and there are four A/D converters available to digitize or “sample” the input signal for analysis by the DSP, the test set will always have the capability to perform one transmitter measurement, one receiver measurement, and maintain the radio link concurrently. The test set’s ability to perform multiple transmitter, or multiple receiver tests concurrently will depend on the availability of resources within the test set and availability of the signal to be tested.

Related Topics

“Block Diagram”

Invalid Measurement Results

Description

Invalid measurement results are returned by the test set when conditions such as signal level are not within the present measurement range. Three different invalid measurement results are provided in order to help you understand the condition that caused the invalid result.

- 9.9E+37 = INFinity (Infinity)
- -9.9E+37 = NINF (Negative Infinity)
- 9.91E+37 = NAN (Not A Number)

9.9E+37 (INFinity)

9.9E+37 is returned by the test set when the measurement is out of range and results are far above the present measurement range.

-9.9E+37 (NINFinity)

-9.91E+37 is returned by the test set when the measurement is out of range and results are far below the present measurement range.

9.91E+37 (NAN)

9.91E+37 is returned by the test set when the measurement is out of range but it can not be determined if measurement results are far above, or far below the measurement range.

If a measurement exceeds its measurement timeout value before a valid result is determined, 9.91E+37 is returned.

FETCH? and READ? Invalid Results

When a FETCH? or READ? query is performed on a measurement with invalid results, the integrity indicator returns a value of 1, indicating No Result Available.

Manual Users Invalid Results

Manual users will generally see four dashes , “----” on the test set display. When the measurement timeout value has been exceeded, “Measurement Timeout” is displayed as well as the four dashes.

Dealing With Semicolon Separated Response Data Lists

Description

In accordance with IEEE 488.2-1992 Section 8.4.1 the test set uses the semicolon (;) as the response message unit separator (RMUS). The RMUS separates sequential response message unit elements from one another when multiple response message unit elements are sent in a response message. This condition would occur when combining multiple queries into a single GPIB transaction.

Query Response Data Types Used By Test Set

The test set can return the following data types in response to queries:

- character data (char): ASCII characters A-Z (65-90 decimal), underscore (95 decimal), digits (48-57 decimal).
- string data: ASCII characters enclosed in quotes (for example, “5551212” or “PGSM”)
- numeric response data (nr1): numeric data in the form +/- dddddddd
- numeric response data (nr3): numeric data in the form +/- ddd.ddd E +/- dddd

Semicolon Separated Response Data Lists Containing Mixed Data Types

Problems can occur when trying to enter semicolon separated response data lists containing mixed data types.

For example: If the following command string is sent to the test set, the test set will respond by constructing a response message which contains multiple response message unit elements (that is, one response message unit element for each query item contained in the command string). Some response message unit elements are string data type, some are character data type and some are nr3 data type.

```
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
```

An example response message generated by the test set in response to the above OUTPUT statement would be:

“001012345678901”;+4.00000000E+000;PHAS1;”PGSM”;”5551212”;9.91E37;9.91E37;9.91E37

Constructing the following data entry statement will account for multiple responses from the query:

```
ENTER 714;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,Lac
```

In the Basic programming environment the above ENTER statement will fail with an ‘Insufficient data for ENTER’ error. Some programming languages, Basic for example, cannot use the semicolon character as a data item terminator for string variables. In this example Basic will attempt to enter data into Imsi$ until it sees a LF (line feed) data item terminator. The test set does not send the LF until all the data has been sent. Consequently when Basic sees the LF it terminates entry of data into Imsi$ and starts to look for data to enter into Pcl. Since the test set is no longer sending any data the error message ‘Insufficient data for ENTER’ is generated.

One possible workaround is to enter all the data into a single string variable, replace all semicolons with line feeds and then enter the data from the string into the individual data items. For example:

```
DIM Response$[500]
!
!
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
ENTER 714;Response$
Semicolon=POS(Response$,";")
WHILE Semicolon
Response$[Semicolon,Semicolon]=CHR$(10)
Semicolon=POS(Response$,";")
END WHILE
ENTER Response$;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,La
```

Semicolon Separated Response Data Lists Containing Only Numeric Data Types

Semicolon separated response data lists containing only numeric data types do not present the types of problem associated with semicolon separated response data lists containing mixed data types. The number building routines in most languages will use any non-numeric character (that is, anything other than +/- 0123456789 E .) as the data item terminator. Consequently when the number building routines encounter the semicolon the data item is terminated. The following example illustrates this:

```
OUTPUT 714;"FETCH:TXP:INT?;POW:MIN?;MAX?"
ENTER 714;Integrity,Min_power,Max_power
```

Measurement Event Synchronization

Description

Measurement event synchronization saves time by controlling the communication between the controller, the test set, and the mobile station, so that no device does something before it is supposed to (which can cause errors or do something well after it could have). Because some measurements can run concurrently, it is necessary that the control program know when individual measurement results are available.

Measurement event synchronization is accomplished using the INITiate subsystem's command INITiate:DONE? or the STATus:OPERation:NMRReady status registers.

INITiate:DONE?

The INITiate:DONE? query returns a string that indicates what, if any, measurements are ready to be fetched. This query should be used inside a loop, checking each measurement that was initiated. See "INITiate" on page 322 for more details about this query.

The INITiate:DONE? query returns at least one of the following indicators for each pass through the loop:

- "CPOW" - The channel power measurement results are available.
- "DAP" - The digital average power measurement results are available.
- "WQU" - The waveform quality measurement results are available
- "WAIT" - There are one or more measurements which are in the measuring state which are not excluded from the query. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 325. When WAIT is returned at least one measurement is not ready to be fetched yet.
- "NONE" - There are no measurements currently in the measuring state. This assumes no measurements have been excluded. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 325. This would indicate that all measurements results are available or none have been initiated.

Programming Example

The following example assumes that the mobile is transmitting on a digital traffic channel and no measurements other than digital TX power (DTXP) and digital modulation accuracy (MACC) are being triggered. See "Transition Filters" on page 134.

```
10  OUTPUT 714;"SETup:DAPower:CONTinuous OFF" !Sets digital average power
20                                           !trigger mode to single.
30  OUTPUT 714;"SETUP:WQUality:CONTinuous OFF" !Sets wavrform quality
40                                        !trigger mode to single.
50  OUTPUT 714;"INITiate:DAPower;WQUality" !Begin digital average power and
60                                       !waveform quality measurements.
70  REPEAT
80  OUTPUT 714;"INITiate:DONE?" !Queries the test set for measurements
90                              !that are done
100 ENTER 714;Meas_done$ !String value representing DONE measurements,
110                      ! NONE if no measurements are done.
120 SELECT Meas_done$ !This variable will be set to WAIT until measurements
130                   !are DONE.
140 CASE "DAP" !Characters must be upper case.
150 OUTPUT 714;"FETCH:DAPower?" !If this case is selected,
160             !digital average power is FETCHed.
170 ENTER 714;Integrity,Dapower_meas
180 PRINT "Digital Average Power is ";Dapower_meas
190 CASE "WQU" !Characters must be uppercase.
200 OUTPUT 714;"FETCH:WQUality:RHO?" !If this case is selected,
210             !the rho measurement is FETCHed.
220 ENTER 714;rho_meas
230 PRINT "Rho is ";rho_meas
240 END SELECT
250 UNTIL Meas_done$="NONE"   !When all triggered measurements have completed,
260                           !the INITiate:DONE? query returns NONE.
270 END
```

Operating Considerations

Only one indicator is returned per query.

To ensure that when a measurement completes it will remain in a state that qualifies it as DONE, use the SETup subsystem to set all active measurements to single (CONTinous:OFF) trigger mode.

Call Processing State Synchronization

Call Processing State Query

The CALL:STATUS:STATE query returns the current call processing state.

This is a list of all possible values for this test application.

- “IDLE”

  Idle is returned when the test set is not on a call.

- “PAG”

  Paging is returned when the test set is in the process of paging the MS.

- “CALL”

  Call is returned when an alert message is sent to the MS during a call setup due to a page.

- “CONN”

  Connected is returned when the test set and the MS are connected on a call.

- “APR”

  Access probe is returned when the test set has received an access probe.

- “REL”

  Releasing is returned when the test set is in the process of releasing the MS from a call using over the air signalling as part of a MS or BS originated release procedure.

- “HAND”

  Handoff is returned when the test set is in the process of handing off the MS.

- “REG”

  Registering is returned when the test set is in the process of performing a registration with the MS.

The following command returns the current state of a call:

```
OUTPUT 714;"CALL:STATUS:STATE?"
```

See the “Instrument Status Area” on page 462for call processing state information.

Description

Connected/Idle Query

This query will determine if a call is connected or disconnected by returning an integer value. The value indicates if the call state is idle or connected, not if any call state change has occurred.

Query returns one of the following:

- 0 = idle
- 1 = connected

If the call is in the setup request, proceeding, alerting, or disconnecting state, this command will not return a value until the call status proceeds to either connected or idle.

```
OUTPUT 714;"CALL:CONNECTED:STATE?"
```

Example 21. Base Station Originated Call - Using the Connected/Idle Query

The following example illustrates the use of the connected/idle query for a base station originated call. This code originates a call, then waits for the connected/idle query to return a result.

Note that this code does not include the CALL:CONNECTED:TIME (timeout timer) or the CALL:CONNECTED:ARM (change detector arm) commands. These commands are unnecessary since the change detector is armed automatically by the CALL:ORIGINATE command, and the timeout timer value is never applicable since a base station originated call guarantees a state change.

```
10    OUTPUT 714;"CALL:ORIGINATE" ! Begin the BS originated call.
20    OUTPUT 714;"CALL:CONNECTED:STATE?" ! The connect/idle query.
30    ENTER 714;Call_connected ! Program will hang here until state
40                             ! change or protocol timer expires.
50    !************************************************************
60    ! If mobile is not set to auto-answer, answer the call.
70    !************************************************************
80    IF NOT Call_connected THEN
90      DISP "CALL NOT CONNECTED."
100   ELSE
110     DISP "CALL IS CONNECTED."
120   END IF
130   END
```

Call State Change Detector

This feature provides a method for holding off the "Connected/Idle Query" results until a change in call processing states is detected. Arming the call state change detector is useful only for mobile station originated calls or disconnects only. It is armed automatically when call processing functions originating from the test set are requested.

The call state change detector becomes *disarmed* when any of the following conditions have been met:

- the call processing state has changed to either connected or idle

  or...

- the attempt to connect or disconnect a call has failed, and one of the test set's Fixed Timers has timed out

  or...

- no call processing state changes occurred within the time period specified by the "Call State Change Detector Timeout" .

The following command arms the call state change detector:

```
OUTPUT 714;"CALL:CONNECTED:ARM[:IMMEDIATE]"
```

Example 22. Mobile Station Originated Call - Arming the Change Detector

The following example illustrates the use of the call state change detector along with the connected/idle query to synchronize a controlling application with a call processing state change during a mobile station originated call.

When the CALL:CONNECTED:ARM command is received by the test set, the detector becomes armed and configures the test set to hold off on returning a result for the CALL:CONNECTED:STATE? query until the detector is disarmed by one of the three events described above.

```
10    OUTPUT 714;"CALL:CONNECTED:TIMEOUT 10S" ! Sets the time out
20                                            ! time to 10 seconds.
30    OUTPUT 714;"CALL:CONNECTED:ARM" ! Arm the change detector.
40    DISP "Make a mobile station orginated call. Continue when done."
50    PAUSE
60    OUTPUT 714;"CALL:CONNECTED:STATE?" ! The connected/idle query.
70    ENTER 714;Call_connected
80    IF Call_connected=1 THEN
90      DISP "Call is connected."
100     WAIT 2
110   ELSE
120     DISP "Call is not connected."
130     WAIT 2
140   END IF
150   END
```

Call State Change Detector Timeout If a state change does not occur, the user needs a way to control how long to wait for the change detector. The change detector is disarmed by the timeout timer. After a timeout, the connected/idle query will return a 1 for connected or a 0 for idle. The timeout timer is user settable, but the user setting is only applied during mobile station originated call processing operations. For base station originated call processing operations, the timeout timer is automatically set to 60 seconds by the test set.

Related Topics

“CALL:CONNected:TIMeout” on page 201

“CALL:CONNected:ARM[:IMMediate]” on page 200

“CALL:STATus[:STATe]?” on page 279

“Instrument Status Area” on page 462

Call Processing Event Synchronization

Description

Using the call processing subsystem overlapped command synchronization commands, you can query the test set to find out when an overlapped command operation is done (:DONE?, :OPC?), force the test set to not execute any more commands until an overlapped command operation has completed (:WAIT), or simply force an overlapped command to behave as a sequential command (:SEQ).

Pending Operation Flags

Associated with each overlapped command, the test set maintains a binary indicator known as a pending operation flag. A pending operation flag is set true when the operation started by the overlapped command is executing, and is set false when the operation is no longer executing.

NOTE In addition to the call processing subsystem overlapped commands, the test set also provides the measurement-related INITiate <measurement> overlapped commands.

Call Processing Subsystem Overlapped Command Synchronization Commands

Table 7. Overlapped Commands

Command	Purpose Of Command	Example

:DONE?	Returns a 0 if the associated command's pending operation flag is true, or a 1 if it is false.	`10 OUTPUT 714;"CALL:TCH 65"`
		`20 OUTPUT 714;"SETUP:TXP:CONT OFF"`
		`30 OUTPUT 714;"SETUP:PFER:CONT OFF"`
		`40 REPEAT`
		`50 OUTPUT 714;"CALL:TCH:DONE?"`
		`60 ENTER 714;Process_done`
		`70 UNTIL Process_done`
		`80 OUTPUT 714;INIT:TXP;PFER"`
		`90 END`
		The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :DONE? command is used to find out if the handover is finished

:SEQuential	Forces an overlapped command to execute in a sequential manner. No subsequent commands will be executed until the pending operation flag for this operation is false.	`OUTPUT 714;"CALL:TCH:SEQ 65"` The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and to not execute any more commands until the pending operation flag associated with the CALL:TCH command is false.

:WAIT	Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands.	`10 OUTPUT 714;"CALL:TCH 65"`
		`20 OUTPUT 714;"SETUP:TXP:CONT OFF"`
		`30 OUTPUT 714;"SETUP:PFER:CONT OFF"`
		`40 OUTPUT 714;"CALL:TCH:WAIT"`
		`50 OUTPUT 714;"INIT:TXP;PFER"`
		`60 END`
		The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :WAIT command is sent to prevent the test set from executing the INITiate command until the handover is finished.

Table 7. Overlapped Commands

Command	Purpose Of Command	Example

:OPComplete?	Places a 1 in the test set's output queue when the associated command's pending operation flag goes false. Controlling program hangs on this query until the 1 is retrieved.	`10 OUTPUT 714;"CALL:TCH 65"`
		`20 OUTPUT 714;"SETUP:TXP:CONT OFF"`
		`30 OUTPUT 714;"SETUP:PFER:CONT OFF"`
		`40 OUTPUT 714;"CALL:TCH:OPC?"`
		`50 ENTER 714;Op_complete`
		`60 OUTPUT 714;"INIT:TXP;PFER"`
		`70 END`
		The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :OPC? command is sent to hang program execution until a 1 is put in the test set's output queue, satisfying the ENTER statement and allowing program execution to continue with the INITiate command.

Operating Considerations

When using the call processing subsystem overlapped command synchronization commands, check the conditions that set the operation's pending operation flag (POF) false to avoid unexpected results.

Call Processing Subsystem Overlapped Commands

Table 8. Overlapped Commands

Call Processing Command	Purpose Of Command	Pending Operation Flag (POF) is false when
CALL:ORIGinate See "CALL:ORIGinate" .	Performs a base station call origination.	The call processing state leaves the Idle state (when the operating mode is active cell), or The test set has noted this parameter change (when the operating mode is test mode).
CALL:REGister See "CALL:REGister" .	Performs a zone-based (forced) registration.	The mobile station has responded to the registration.
CALL:CONNected:ARM[:IMMediate] See "CALL:CONNected[:STATe]" .	Arms the call control status change detector.	The call control status change detector has been disarmed. See "Connected/Idle Query" .

Related Topics

“Call Processing State Synchronization” on page 155

“Test System Synchronization Overview” on page 163

“Measurement Event Synchronization” on page 153

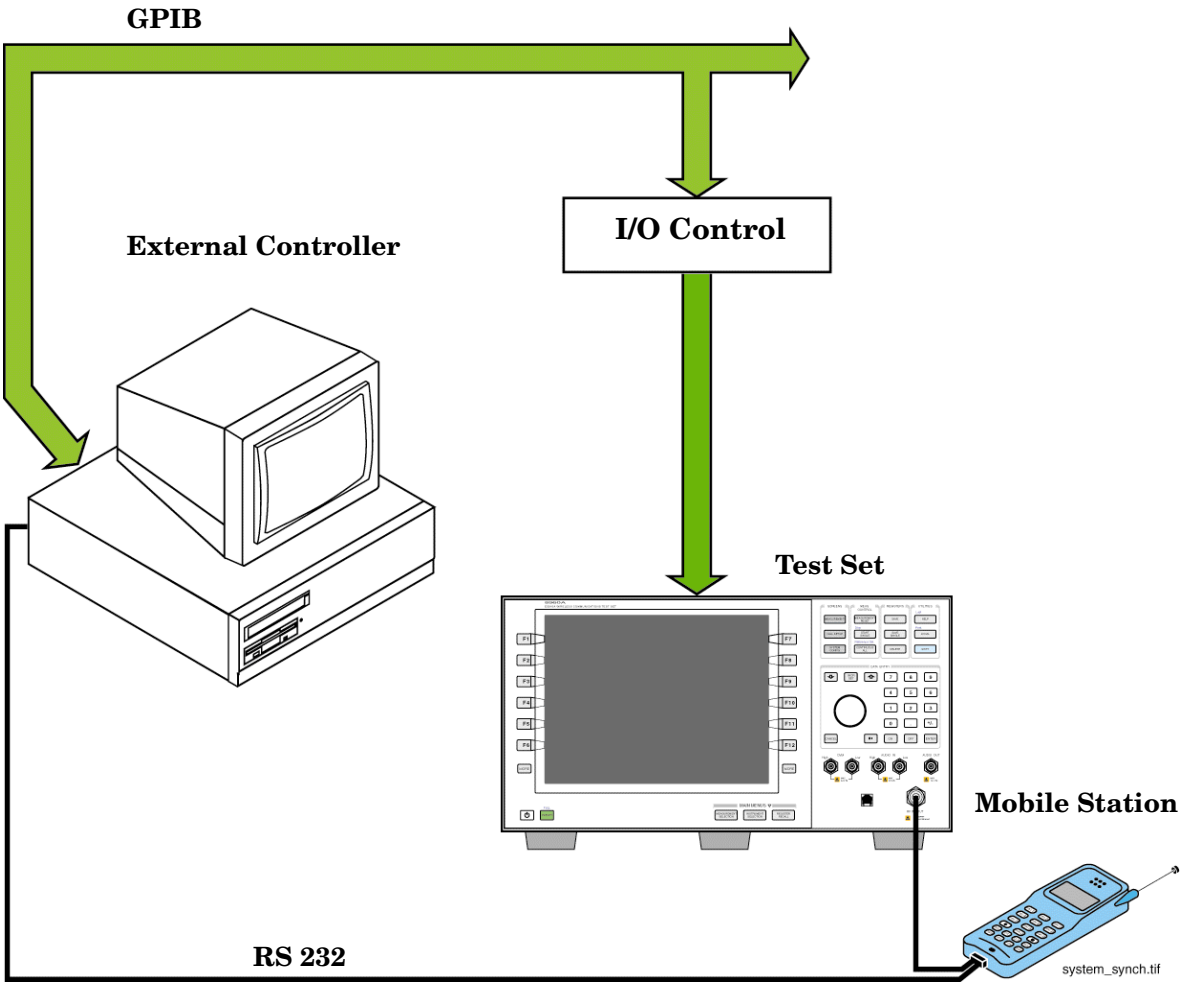
Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 10. Test System



Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set's GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Commands used for synchronization:

- "CALL:STATus[:STATe]?" on page 279
  This command queries the test set's current call processing state. This command supports synchronization method five. See "Call Processing State Query" on page 155.
- "CALL:STATus[:STATe]?" on page 279
  This command determines the connected/idle state of a call. A feature called the change detector provides the user with a way to hold off the response to this query until a call processing state transition has taken place. See "Connected/Idle Query" on page 156. This command supports synchronization method five.
- :DONE? and :OPC?
  These specialized commands can be appended to call processing overlapped commands to support synchronization method three. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 160.

- :WAIT
  This specialized command can be appended to call processing overlapped commands to support synchronization method two.
  See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 160.
- :SEQ
  This specialized command can be appended to call processing overlapped commands to support synchronization method one.
  See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 160.
- "INITiate:DONE?" on page 324
  This specialized command causes the test set to return a mnemonic indicating if a measurement is done. If not, the returned mnemonic will indicate if the measurement is still executing. This command supports synchronization method three.
  See "INITiate:DONE?" on page 324.
- STATUS:<register>
  Status bits in the register are provided to indicate the test set's call processing state. These bits support synchronization methods five and six.
  Status bits in the "STATus:OPERation:NMRReady Register Bit Assignments" on page 376 are provided to indicate when a measurement is ready to be fetched. These bits support synchronization method three and six.
  Many other status bits are provided in the GPIB status subsystem that are useful for synchronization. See "STATus Subsystem" on page 365.
- "SYSTem:SYNChronized" on page 436
  This specialized command puts a 1 in the test set's output queue, the test set responds to the query by sending a 1 to the external controller indicating that all prior sequential commands have completed, and all prior overlapped commands have at least begun execution. The condition bit is set then cleared. See "STATus:OPERation Register Bit Assignments" on page 371. This command supports synchronization four and six.
- "*OPC" on page 437, "*OPC?" on page 437, and "*WAI" on page 438 (not recommended)
  Note: These commands look at all of the test set's operations collectively. Because multiple processes are likely to be executing at the same time, it is recommended that the other commands above be used instead.

Related Topics

"Call Processing State Synchronization" on page 155

"Measurement Event Synchronization" on page 153

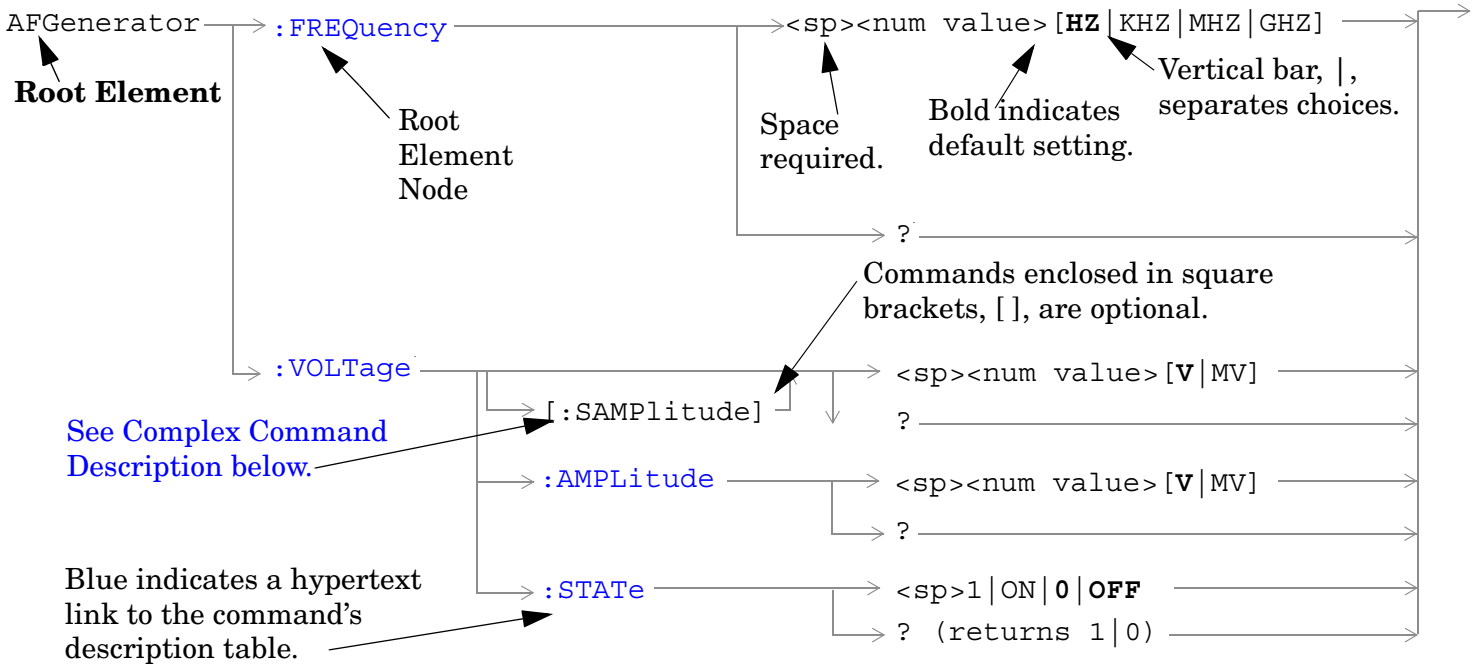
"Call Processing Event Synchronization" on page 159

"SYSTem:SYNChronized" on page 436

4 GPIB Commands

Diagram Conventions

Description



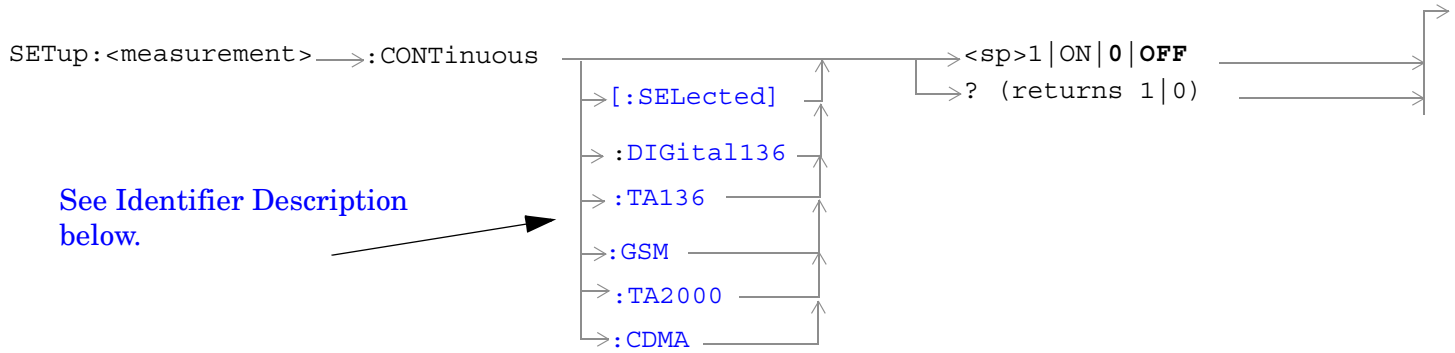


Diagram Description

Statement elements are connected by lines. Each line can be followed in only one direction, as indicated by the arrow at the end of the line. Any combination of statement elements that can be generated by starting at the **Root Element** and following the line the **direction of the arrow** is syntactically correct. The drawings show the proper use of spaces. Where spaces are required they are indicated by **<sp>**, otherwise no spaces are allowed between statement elements.

Complex Command Description

A complex command sets the state of the parameter to ON, and is used to set a value for that parameter. These parameters; amplitude, frequency, gain, number, time, and value can be used as a complex command. Refer to the specific command for the parameter that applies.

Identifier Description

Some test applications are able to test more than one radio format. There may be commands/queries that are shared by more than one radio format in the some of these test applications. Identifiers are used to specify the radio format for the command/query. The command/query is sent to the active radio format if you don't use an identifier. An identifier must be used when sending commands to the inactive radio format.

Developing Code

It is recommended that you set the Test Set's operating environment to debug. To set the Test Set debug mode to "ON" use the following syntax:

```
SYSTem:COMMunicate:GPIB:DEBug ON
```

Units-of-Measure

Amplitude (linear)	V
Frequency	Hz
Power (logarithmic)	dBm
Time	s

ABORt Subsystem

Description

The ABORt command causes a measurement cycle in progress to stop. If the measurement is not being continuously armed (trigger arm set to single) , the measurement will remain in the idle state after this event. If the measurement is being continuously armed (trigger arm set to continuous), a new measurement cycle will begin after ABORt. If an ABORt command is issued from any measurement state other than measuring, the command is ignored.

Other Commands that Execute an ABORt Action

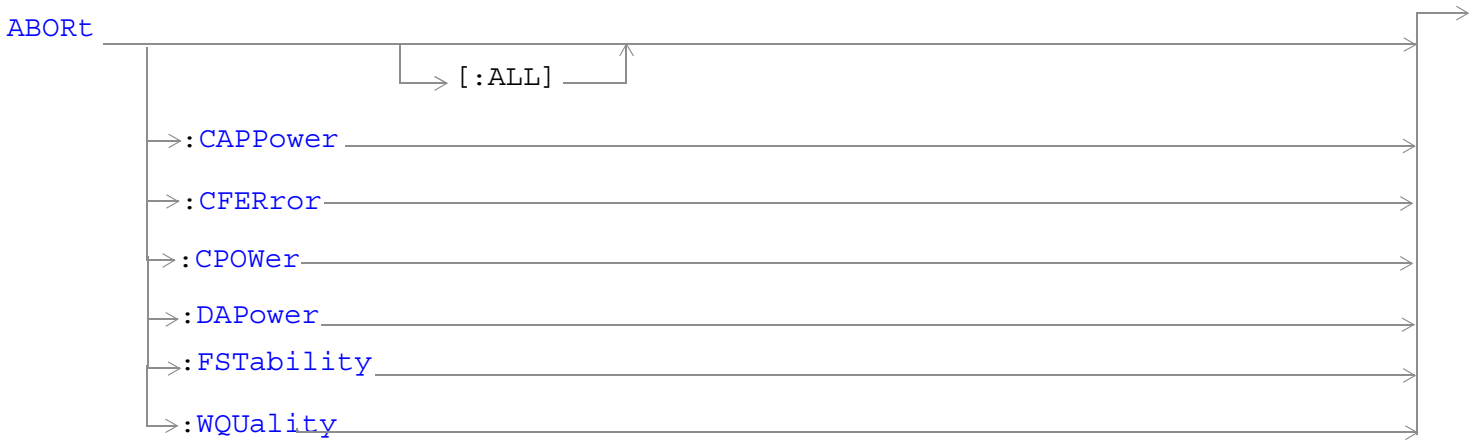
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

READ:<meas>? will execute an ABORt:<meas> action that aborts just one trigger sequence and then combines the INITiate and FETCh? commands.

Syntax Diagram and Command Descriptions

"ABORt"

ABORt



"Diagram Conventions" on page 171

ABORt[:ALL]

Function	Stops all measurements that are active. If the trigger arm is set to single, the measurements will go to the idle state. If the trigger arm is set to continuous, the measurements will re-arm and initiate again.
Setting	Range • CAPPower - Access Probe Power measurement • CPOWer - Channel Power measurement • CFERror - Frame Error Rate measurement • DAPower - Digital Average Power measurement • FSTability - Frequency Stability measurement • WQUality - Waveform Quality measurement
Programming Example `OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.`	

ABORt:<meas-mnemonic>

Function	Stops the selected measurement if it is active. If the trigger arm is set to single, the measurements will go to the idle state. If the trigger arm is set to continuous the measurements will re-arm and initiate again.
Setting	Range • CAPPower - Access Probe Power measurement • CFERror - Frame Error Rate measurement • CPOWer - Channel Power measurement • DAPower - Digital Average Power measurement • FSTability - Frequency Stability measurement • WQUality - Waveform Quality measurement
Programming Example `OUTPUT 714;"ABORT:WQUALITY" !Aborts the waveform quality/code domain power measurements.`	

AFGenerator Subsystem

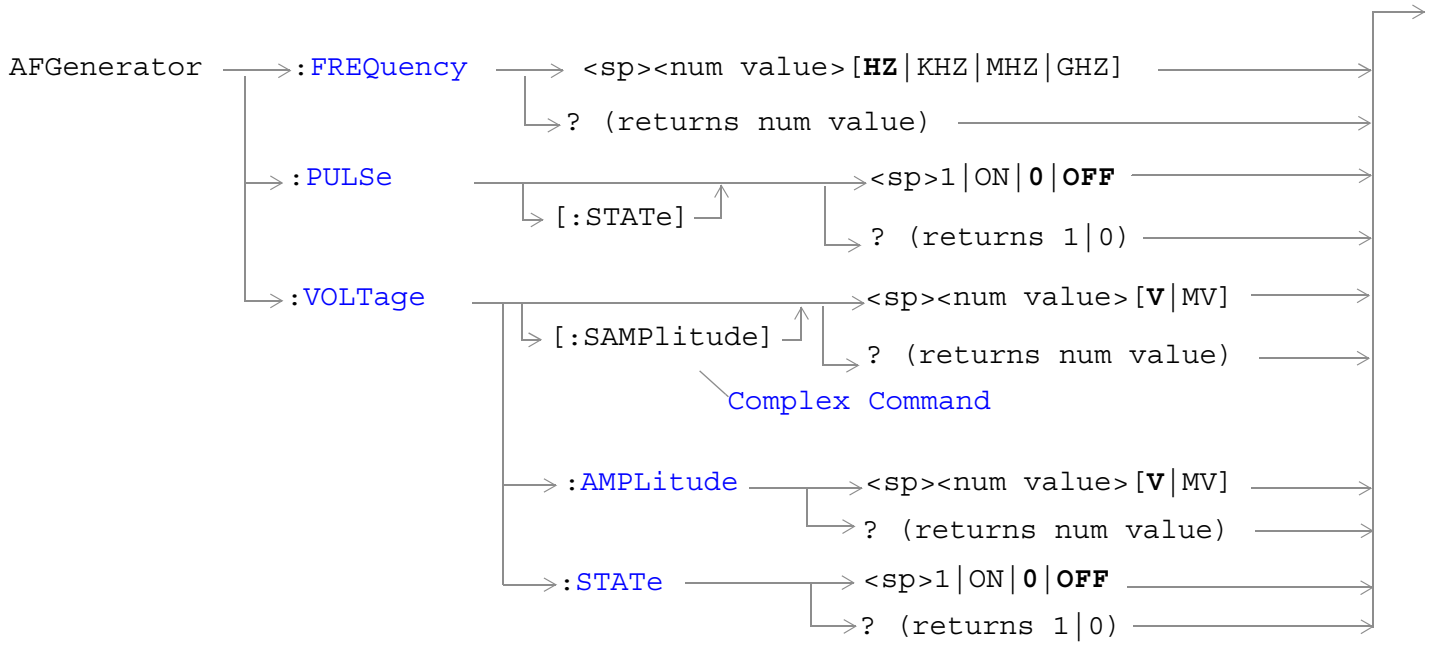
Description

The AFGenerator subsystem is used to control the audio source that is available at the Audio Output connector.

Syntax Diagram and Command Descriptions

"AFGenerator" on page 177

AFGenerator



"Diagram Conventions" on page 171

AFGenerator:FREQuency

Function	Sets/queries the frequency of the audio generator. The units (HZ|KHZ|MHZ|GHZ) are optional. If no units are specified, then units default to HZ.
Setting	Range: 1 Hz to 20 kHz Resolution:0 .1 HZ
Query	Range: 1 Hz to 20 kHz Resolution: 0.1 Hz
*RST setting	1 kHz
Programming Example `OUTPUT 714;"AFGENERATOR:FREQUENCY 1000" !Sets the audio generator frequency to 1000 Hz.`	

AFGenerator:PULSe[:STATe]

Function	Sets/queries the audio generator pulse state. The pulse state must be on when the test set's audio generator is used for audio stimulation during a decoded audio measurement. When the state is on, the audio signal from the test set is pulsed at a 10 Hz rate with a 50% duty cycle.
Setting	Range: 0 | OFF | 1 |ON
Query	Range: 0|1
*RST setting	0 (off)
Programming Example `OUTPUT 714;"AFGENERATOR:PULSE ON" !Sets the audio generator pulse to ON.`	

AFGenerator:VOLTage[:SAMPlitude]

Function	Sets /queries the amplitude of the audio generator in volts and turns the state to on. The units (V|mV) are optional. If no units are specified, then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V

Programming Example
`OUTPUT 714;"AFGENERATOR:VOLTAGE 2.1" !Sets the state to on and the output`
`!voltage to 2.1 volts.`	

AFGenerator:VOLTage:AMPlitude

Function	Sets/queries the amplitude for the audio generator when the audio generator state is on. The units (V|mV) are optional. If no units are specified, then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V

Programming Example
`OUTPUT 714;"AFGENERATOR:VOLTAGE:AMPLITUDE 1.414" !Sets the audio generator output`
`!voltage to 1.414 volts peak.`	

AFGenerator:VOLTage:STATe

Function	Sets/queries the audio generator state
Setting	0 | OFF | 1 |ON
Query	0|1
*RST setting	0 (off)
Programming Example `OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON.`	

CALibration Subsystem

Description

There are three calibrations that must be performed periodically on the test set:

- I/Q calibration

  This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

- Channel Power calibration

  This calibration generates calibration data for channel power measurements, access probe power measurements, and other test set functions.

NOTE Channel power calibration data is also used when performing test set functions other than channel power measurements. Waveform quality measurements are one such function.

  During calibration the internal temperature of the test set will be measured and calibration data will be generated that covers the measurement amplitude range of the available frequency bands. The test set will measure the internal temperature and compare it against the temperature measurement that was made when calibration data was generated.

  Channel Power calibration takes about two minutes.

  During Channel Power calibration no power should be applied to the front panel.

- Digital Average Power calibration

  Digital average power measurement calibration loops back a CDMA signal from within the test set to the average power meter to generate a table of calibration values.

  Digital Average Power measurement calibration takes about ten minutes.

  During Digital Average Power calibration no power should be applied to the front panel RF IN/OUT connector.

  Power must be cycled off then back on after this calibration routine has completed.

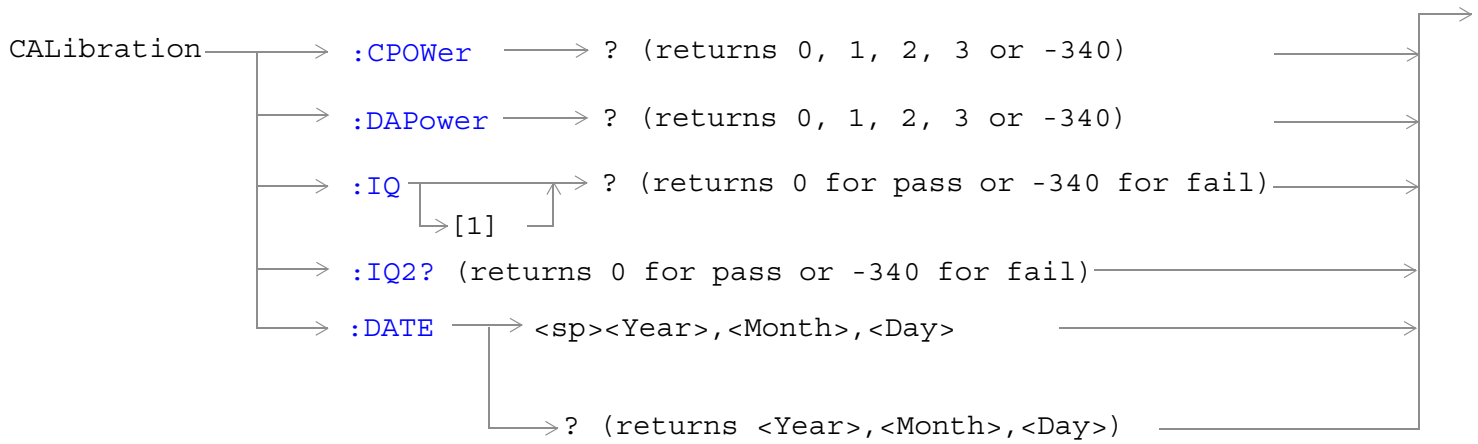
Remotely initiating any of the calibration routines is accomplished through the use of single query-only header. The test set returns a numeric value indicating the outcome of the calibration attempt.

Manually initiating the IQ calibration routines requires pressing the SYSTEM CONFIG hardkey, then pressing the 1 of 2 hardkey, then pressing the Service softkey. Manually initiating the channel power or digital average power calibrations is performed by selecting the measurement and pressing a softkey.

Syntax Diagram and Command Descriptions

"CALibration"

CALibration



"Diagram Conventions" on page 171

CALibration:CPOWer?

Function	Initiates IF level calibration used by access probe power and channel power measurements. No other GP-IB commands are processed until this calibration has completed.
Query	Range • 0 = Calibration passed • 1 = Channel power calibration failed due to temperature drift. Wait for temperature to stabilize. • 2 = Channel power calibration failed due to oven temperature out of range. • 3 = Channel power calibration failed due to loopback switch problem. • –340 = Calibration failed
Programming Example	
`OUTPUT 714;"CALIBRATION:CPOWer?"` `!Initiates the IF level calibration process and queries the pass/fail result.`	

CALibration:DAPower?

Function	Initiates digital average power measurement calibration. RF power must not be applied to the test set's front panel RF IN/OUT connector during calibration. Digital average power measurement calibration will take about 10 minutes. Power must be cycled when digital average power measurement calibration has completed. No other GP-IB commands are processed until this calibration has completed.
Query	Range • 0 = Calibration passed • 1 = Digital average power calibration failed due to temperature drift. Wait for temperature to stabilize. • 2 = Digital average power calibration failed due to oven temperature out of range. • 3 = Digital average power calibration failed due to loopback switch problem. • –340 = Calibration failed
Programming Example	
`OUTPUT 714;"CALIBRATION:DAPower?"` `!Initiates the digital average power measurement calibration process and queries the pass/fail result.`	

CALibration:IQ[:1]?

Function	Sets/queries the calibration of the IQ modulator for RF generator 1. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 1. • Returns a value indicating success or failure of calibration.
Query	Range • 0 = Pass • –340 = Fail

Programming Example
`OUTPUT 714;"CALIBRATION:IQ1?"`
`!Performs a calibration of the IQ modulator for RF generator 1 and returns 0 or -340`	

NOTE When the calibration is done the test set display will display:
IQ Calibration completed successfully for modulator 1.

CALibration:IQ2?

Function	Sets/queries the calibration of the IQ modulator for RF generator 2. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 2. • Returns a value indicating success or failure of calibration.
Query	Range • 0 = Pass • –340 = Fail

Programming Example
`OUTPUT 714;"CALIBRATION:IQ2?"`
`!Performs a calibration of the IQ modulator for RF generator 2 and returns 0 or -340`	

NOTE When the calibration is done the test set display will display:
IQ Calibration completed successfully for modulator 2.

CALibration:DATE

Function	Sets/queries the date of the last system calibration done to the test set; not the IQ calibration date. Returns a comma separated list YYYY,MM,DD in that order.
Setting	Sets the system calibration date. Range • Year = 0000 to 9999 • Month = 01 to 12 • Day = 01 to 31
Query	Returns the date when system calibration was performed. Range • Year = 0000 to 9999 • Month = 1 to 12 • Day = 1 to 31

Programming Example
`OUTPUT 714;"CALIBRATION:DATE 1999,01,04"`
`!Sets the date of the last system calibration year, month and day.`	

CALL Subsystem

Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes mobile station (MS) and Base Station (cell) functions.

Syntax Diagrams and Command Descriptions

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"CALL:AWGNoise:POWer" on page 191

"CALL:BAND" on page 195

"CALL:CHANnel" on page 196

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"CALL:CONNected[:STATe]" on page 199

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"CALL:MS:REPorted<BCL,BWT,OPER:MODE,EIRP>" on page 214

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"CALL[:CELL]:OPERating" on page 240

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"CALL:SETup:BAND" on page 269

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"CALL:MS:REPorted<MCC,MNC,MSIN>" on page 232

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"CALL:MS:REPorted:<RCON:ENH,REG,SCIN,SCL>" on page 235

"CALL[:CELL]:NIDentity" on page 237

"CALL:TOTal:POWer[:AMPLitude][:SELected]? " on page 290

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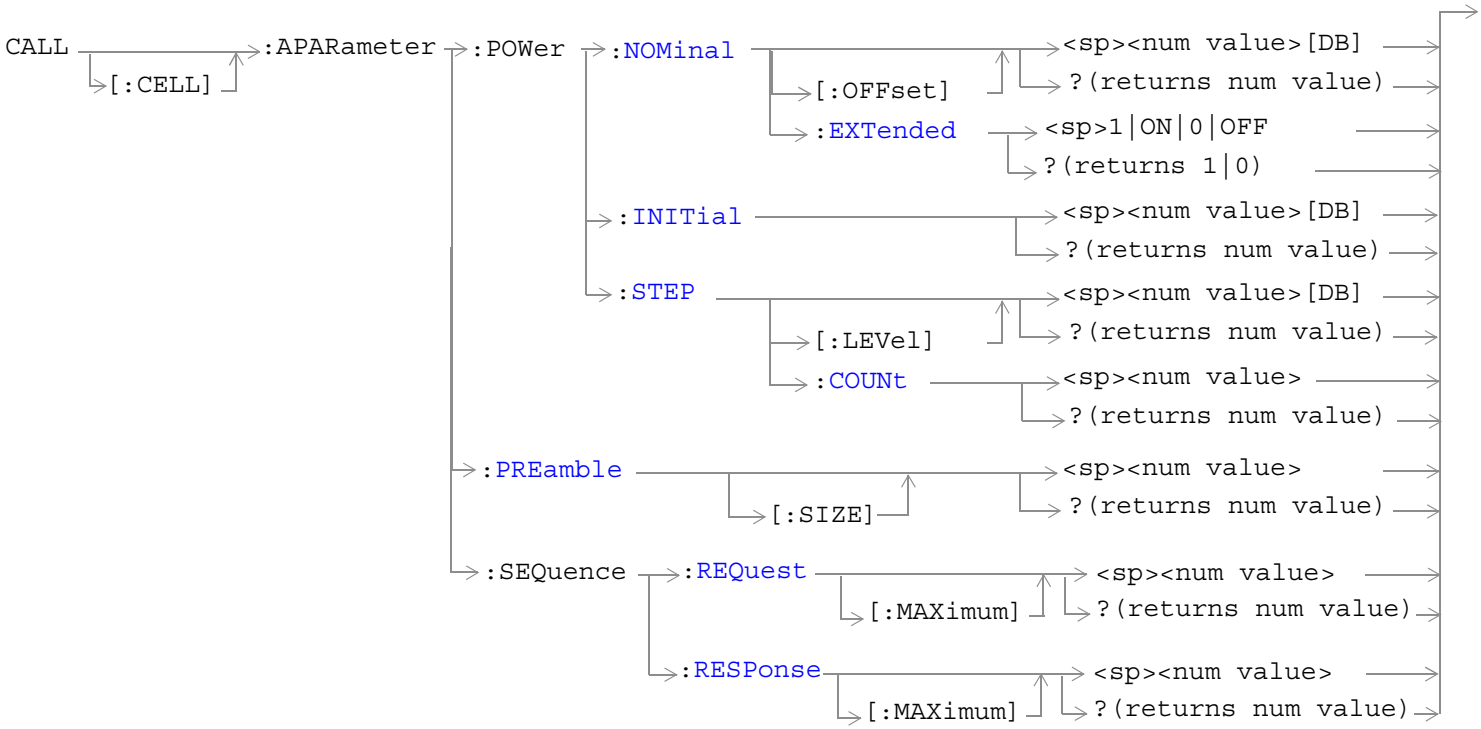
"CALL:TRIGger:TYPE" on page 293

CALL[:CELL]:APARameter



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CALL[:CELL]:APARameter:POWer:NOMinal[:OFFset]

Function	Sets/queries the nominal power offset. This offset value serves as a correction factor to the open loop power control equation.
Setting	Range: -8 to 7 dBm with nominal power extended set to 0 (false). See "CALL[:CELL]:APARameter:POWer:NOMinal:EXTended" . Resolution: integer
Query	Range: -8 to 7 dBm with nominal power extended set to 0 (false). See "CALL[:CELL]:APARameter:POWer:NOMinal:EXTended" . Resolution: integer
*RST Setting	0
Programming Example	

```
OUTPUT 714;"CALL:CELL:APARAMETER:POWER:NOMINAL:OFFSET -5"
!Sets the nomiinal power offset to -5 dB.
```

CALL[:CELL]:APARameter:POWer:NOMinal:EXTended

Function	Sets/queries extended nominal power. Setting this parameter to 1 (true) introduces a -16 dB offset to the open loop power control correction range. The extended nominal power range is from -24 dB to -9 dB inclusive. With this parameter set to 0 (false) the open loop power control correction range is -8 dB to 7 dB. See "CALL[:CELL]:APARameter:POWer:NOMinal[:OFFset]" .
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0
Programming Example	

```
OUTPUT 714;"CALL:CELL:APARAMETER:POWER:NOMINAL:EXTENDED ON"
```

CALL[:CELL]:APARameter:POWer:INITial

Function	Sets/queries the initial power correction the mobile station will apply to the open loop equation to adjust power during system access (when transmitting the initial access probe in an access probe sequence).
Setting	Range: -16 to 15 dB Resolution: 1 dB
Query	Range: -16 to 15 dB Resolution: 1 dB
*RST Setting	0

Programming Example
`OUTPUT 714;"CALL:CELL:APARAMETER:POWER:INITIAL -10"`
`!Sets the initial power to -10 dB.`	

CALL[:CELL]:APARameter:POWer:STEP[:LEVel]

Function	Sets/queries the step increase between each mobile station access probe during each access probe sequence.
Setting	Range: 0 to 7 dB per step Resolution: integer
Query	Range: 0 to 7 dB per step Resolution: integer
*RST Setting	3 dB

Programming Example
`OUTPUT 714;"CALL:CELL:APARAMETER:POWER:STEP 5"`
`!Sets the power step size to 5 dB per step.`	

CALL[:CELL]:APARameter:POWer:STEP:COUNt

Function	Sets/queries the maximum number of power level steps in a single access probe sequence.
Setting	Range: 0 to 7
Query	Range: 0 to 7
*RST Setting	3

Programming Example
`OUTPUT 714;"CALL:CELL:APARAMETER:POWER:STEP:COUNT 5"`
`!Sets the number of access probes in a single access probe sequence to 5.`	

CALL[:CELL]:APARameter:PREamble

Function	Sets/queries the access parameters message preamble length. The access channel preamble length is expressed in units of 20 millisecond frames.
Setting	Range: 0 to 15 Resolution: integer
Query	Range: 0 to 15 Resolution: integer
*RST Setting	10
Programming Example	

```
OUTPUT 714;"CALL:CELL:APARAMETER:PREAMBLE 5"
!Sets the preamble size to 5.
```

CALL[:CELL]:APARameter:SEQuence:REQuest[:MAXimum]

Function	Sets/queries the maximum number of access probes the mobile station will transmit per access channel request.
Setting	Range: 1 to 15 Resolution: integer
Query	Range: 1 to 15 Resolution: integer
*RST Setting	1
Programming Example	

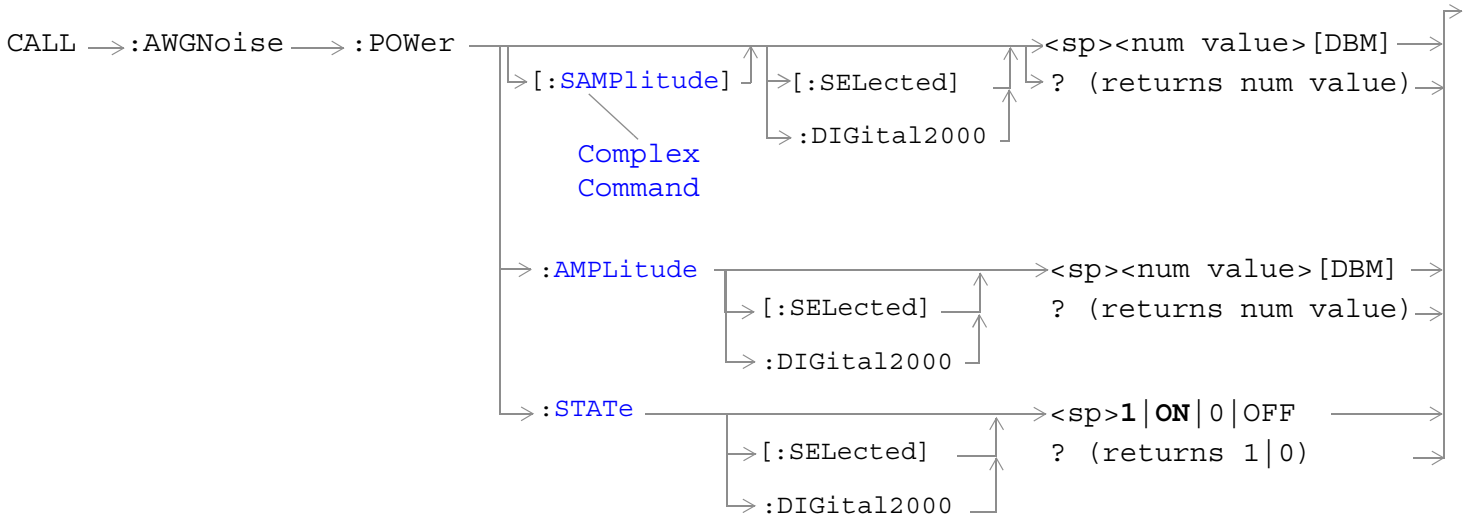
```
OUTPUT 714;"CALL:CELL:APARAMETER:SEQUENCE:REQUEST:MAXIMUM 5"
!Sets the maximum number of access probes the mobile station will transmit per access channel
!request to 5.
```

CALL[:CELL]:APARameter:SEQuence:RESPonse[:MAXimum]

Function	Sets/queries the maximum number of access probes the mobile station will transmit per access channel response.
Setting	Range: 1 to 15 Resolution: integer
Query	Range: 1 to 15 Resolution: integer
*RST Setting	1
Programming Example	

```
OUTPUT 714;"CALL:CELL:APARAMETER:SEQUENCE:RESPONSE:MAXIMUM 5"
!Sets the maximum number of access probes the mobile station will transmit per access channel
!response to 5.
```

CALL:AWGNoise:POWer



"Diagram Conventions" on page 171

CALL:AWGNoise:POWer[:SAMPlitude][:SELected]

Function	The setting form of this command performs two functions: (1) sets the additive white gaussian noise (AWGN) level and (2) turns the AWGN on/off state to on. The query form returns the AWGN power level or NAN. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -170 dBm/1.23 MHz to +35dBm/1.23 MHz, NAN Resolution: 0.01 dB
Query	Range: -170 dBm/1.23 MHz to +35 dBm/1.23 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:SAMPLITUDE -30" !Sets the AWGN power level to -30 dBM/1.23 MHz and turns the state on.`	

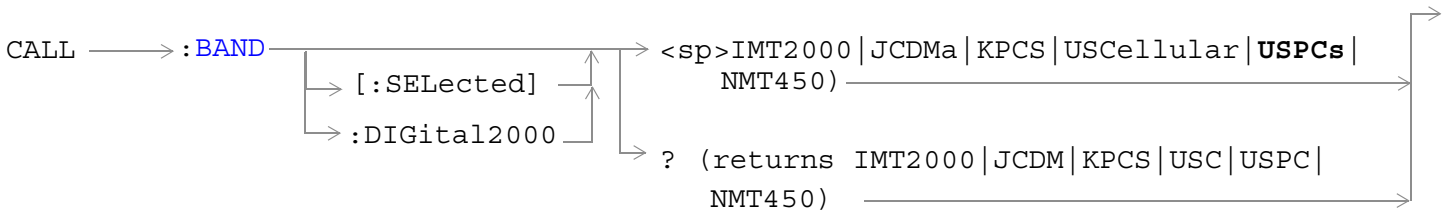
CALL:AWGNoise:POWer:AMPLitude[:SELected]

Function	Sets/queries the additive white gaussian noise (AWGN) level. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer[:AMPLitude][:SELected]?" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:AMPLITUDE -30" !Set the AWGN level to -30 dBM/1.25 MHz.`	

CALL:AWGNoise:POWer:STATe[:SELected]

Function	Sets/queries the additive white gaussian noise (AWGN) state. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer[:AMPLitude][:SELected]?" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	OFF
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:STATE:SELECTED ON" !Turns on AWGN.`	

CALL:BAND



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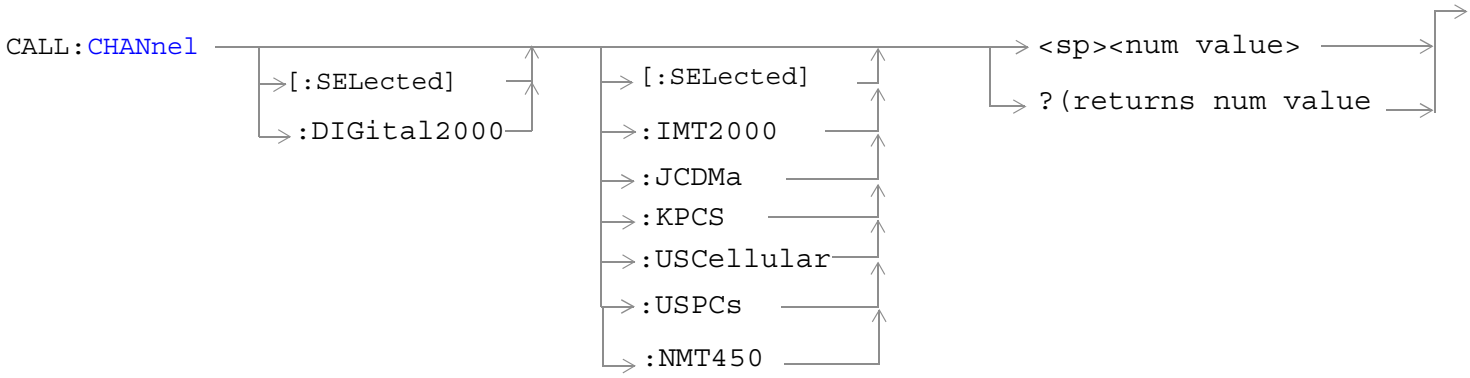
CALL:BAND:[:SELected]

Function	Sets/queries a frequency band for the system type specified by the command's system type parameter. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: IMT2000|JCDMa (Japan CDMA)|KPCS (Korean PCS)|USCellular (U.S. Cellular)|USPCs (U.S PCS)|NMT450
Query	Range: IMT2000|JCDMa (Japan CDMA)|KPCS (Korean PCS)|USCellular (U.S. Cellular)|USPCs (U.S PCS)|NMT450
*RST Setting	U. S. PCS
Programming Example `OUTPUT 714;"CALL:BAND KPCS" !Selects the Korean PCS cell band.`	

CALL:CHANnel



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CALL:CHANnel[:SELected][:SELected]

Function	Sets/queries the physical channel number for the system type and frequency band specified by command parameters. The first optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current system type. To set (make current) a system type, use the "CALL[:CELL]:SYSTem" commands. The second optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current cell band. Specifying a non-current band when setting a channel number will cause the test set to store the channel number for use when the specified band is made current. Also, specifying a non-current band when querying a channel number will return a stored channel number that is not the current channel the test set is transmitting. To set (make current) a frequency band or query the current frequency band, use the "CALL:BAND" command.
Setting	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199 • NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016
Query	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199 • NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016
*RST Setting	Channel 384 (IS-2000 system, US PCS band)

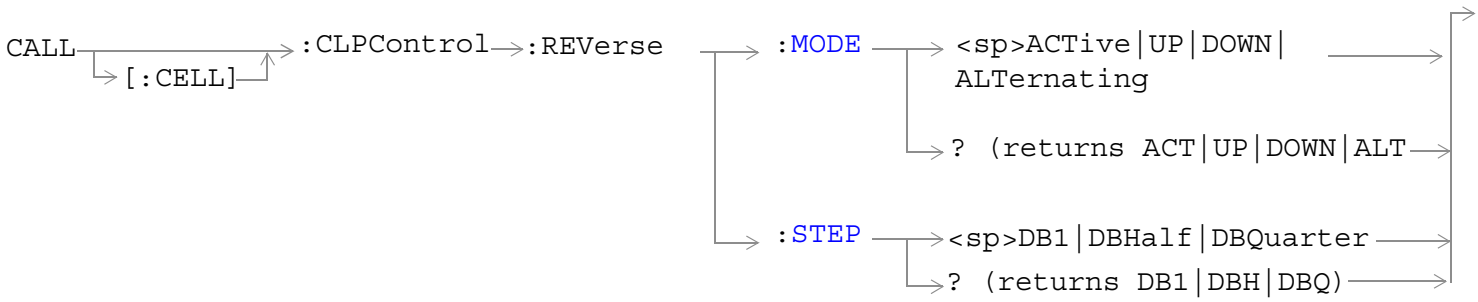
Programming Example

```
OUTPUT 714;"CALL:CHANNEL?"
!Queries the channel number of the currently selected system and band.

OUTPUT 714;"CALL:CHANNEL 384"
!Sets the channel number of the currently selected system and band.

OUTPUT 714;"CALL:CHANNEL:DIGital2000:KPCS 384"
!Sets the channel number for the Digital 2000 system and Korean PCS band to 384. If this system and
!band are not current the value 384 is stored and will be transmitted when Digital 2000 and Korean
!PCS are current.
```

CALL[:CELL]:CLPControl



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CALL[:CELL]:CLPControl:REVerse:MODE

Function	Sets/queries the reverse CDMA channel closed loop power control mode. When ACTive is selected, the test set will send power control bits that raise or lower the power level of the mobile station depending on the received signal strength of the reverse channel. When UP is selected, the test set sends all 0 (up) power control bits. When DOWN is selected, the test set sends all 1 (down) power control bits. When ALTernate is selected, the test set sends alternating up/down power control bits.
Setting	Range: ACTive | UP | DOWN | ALTernate
Query	Range: ACT | UP | DOWN | ALT
*RST Setting	ACTive

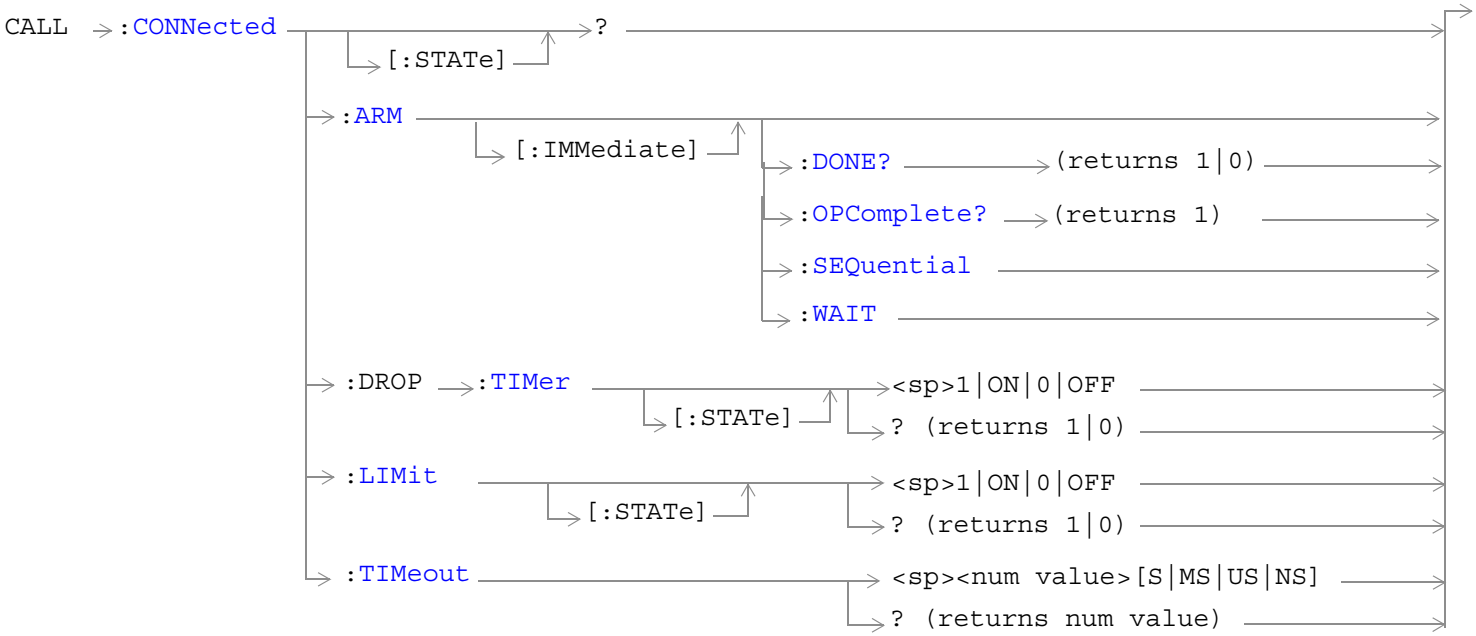
Programming Example
`OUTPUT 714;"CALL:CELL:CLPCONTROL:REVERSE:MODE ALTERNATING"`
`!Sets the closed loop power control mode to alternating up, down bits.`	

CALL[:CELL]:CLPControl:REVerse:STEP

Function	Sets/queries the reverse CDMA channel closed loop power control step size. This setting tells the mobile station how much to increase or decrease the power according to the power control bit.
Setting	Range: DB1 | DBHalf | DBQuarter
Query	Range: DB1 | DBH | DBQ
*RST Setting	DB1 (1 dB)

Programming Example
`OUTPUT 714;"CALL:CELL:CLPCONTROL:REVERSE:STEP DBQUARTER"`
`!Sets the closed loop power control step size to 0.25 dB.`	

CALL:CONNected[:STATe]



"Diagram Conventions" on page 171

CALL:CONNected[:STATe]

Function	Queries the connected/disconnected state of the call. A one is returned if the call is in the connected state. A zero is returned if the call is in the idle (disconnected) state. If the call is in any state other than connected or idle, the query will hang until the call state transitions to the connected or idle state. When used in conjunction with the CALL:CONNected:ARM and CALL:CONNected:TIMeout commands, the CALL:CONNected:STATe? command allows the control program to synchronize to call connection/disconnection. See "Connected/Idle Query" and "Call State Change Detector" .
Query	Range: 0|1
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:CONNECTED:STATE?" !returns 1 if call is connected, 0 if call is idle.`	

CALL:CONNected:ARM[:IMMediate]

Function	Sets (arms) the call-state-change detector. Arming this detector allows the control program to tell the test set that it is expecting a change in the state of a call, prior to initiating the state change. Once armed, the detector remains armed until there is a call state change to Idle or Connected from one of the transitory states, nor is it disarmed by any transitions from Idle to Idle or Connected to Connected. When used in conjunction with the CALL CONNected:STATe? and the CALL:CONNected: TIMeout commands, the CALL:CONNected:ARM command allows the control program to synchronize with call processing state changes. See "Call State Change Detector" .
Programming Example `OUTPUT 714;"CALL:CONNECTED:ARM:IMMEDIATE" !Arms the call-state-change detector.`	

CALL:CONNected:ARM:STATe?

Function	Queries the arm state of the call-state-change detector. This command never hangs and immediately returns a one if the detector is armed, or a zero if the detector is not armed. See "Call State Change Detector"
Query	Range: 1|0
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:CONN:ARM:STATE?" !Returns arm state of the call-state-change detector.`	

CALL:CONNected:TIMeout

Function	Sets/queries the maximum time the test set will wait for a hanging CALL:CONNected:STATe? query to complete. Default setting units are seconds. To set timeout time in units other than seconds, include an optional unit specifier in the command string. A timeout timer is started whenever the call-state-change detector becomes armed or gets rearmed when already armed. The duration of this timeout is set using the CALL:CONNected:TIMeout command and should be greater than the maximum amount of time the control program needs to wait between arming the call-state-change detector and the connect/disconnect operation starting. Once the process starts and the call state has moved to one of the transitory states, the protocol timers take over and prevent the call state from staying in a transitory state forever. See "Call Processing State Synchronization" .
Setting	Range: 0 to 100 seconds Resolution: 0.1 seconds
Query	Range: 0 to 100 seconds Resolution: 0.1 seconds
*RST Setting	10 seconds

Programming Example
 	
`OUTPUT 714;"CALL:CONNECTED:TIMEOUT 3"`
`!Sets the CALL:CONNected:STATe? query timeout time to 3 seconds.`
 	
`OUTPUT 714;"CALL:CONNECTED:TIMEOUT 500 MS"`
`!Sets the Sets the CALL:CONNected:STATe? query timeout time to 500 milliseconds.`	

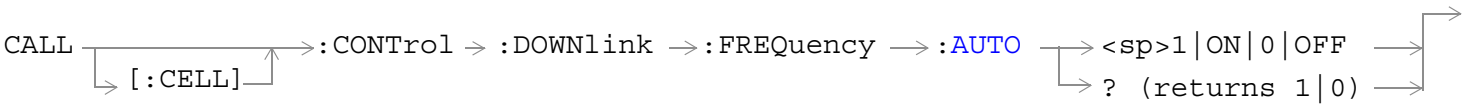
CALL:CONNected:DROP:TIMer[:STATe]

Function	Sets/queries the call drop rimer. The call drop timer indicates loss of reverse link. This timer also determines when the demodulation of the reverse link has been unsuccessful for a fixed period. The call drop timer is actually a counter that counts bad frames. The counter counts for 250 consecutive bad frames (which takes about 5 seconds). The counter is reset whenever a good frame is received.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:CONNECTED:DROP:TIMER:STATE 0"`	

CALL:CONNected:LIMit[:STATe]

Function	When call limit mode is on, the test set will not respond to the access probe for origination or page responses from the mobile. For either a base station page or mobile station origination, this command forces the mobile to repeatedly send access probes.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:CONNECTED:LIMIT 0"`	

CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO



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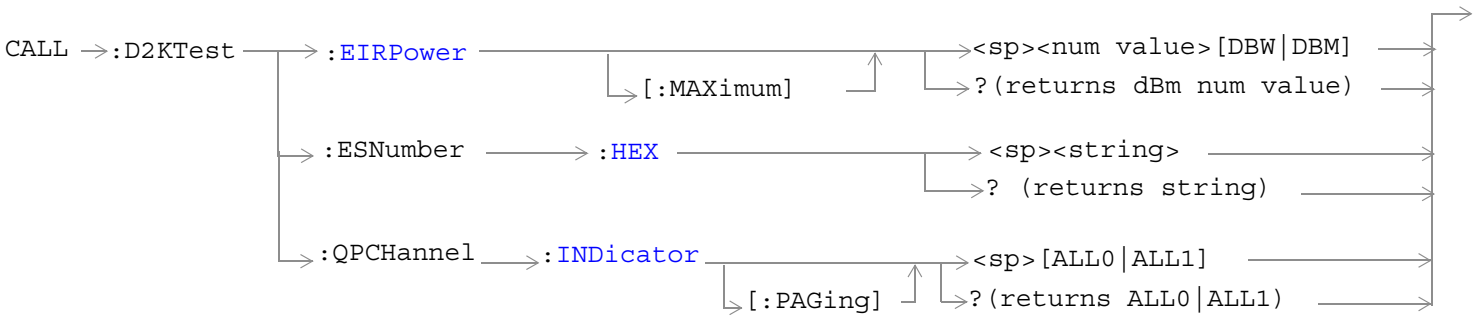
CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO

Function	Sets/queries whether the user or the base station emulator is in control of the RF generator's CDMA forward channel frequency setting. If set to on (1), the base station emulator is in control and the frequency will automatically be set by the test set. This is done by mapping the selected CDMA physical channel number to a frequency as defined in applicable standards. If set to off (0), the forward channel frequency is directly settable. Refer to "CALL[:CELL]:RFGenerator" to set the CDMA forward channel frequency.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (auto)

Programming Example
 	
`OUTPUT 714;"CALL:CELL:CONTROL:DOWNLINK:FREQUENCY:AUTO OFF"`
`!Enables manual frequency setting.`	

CALL:D2KTest



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CALL:D2KTest:EIRPower[:MAXimum]

Function	Sets/queries the test mode maximum EIRP (Effective Isotropic Radio Power). The test set will adjust its receiver power range expecting a normal open loop power control response from the mobile station. However, when cell power is lowered the expected power to the test set's receiver will not increase beyond max EIRP. If an amplitude offset is turned on (see "SYSTem:CORRection:[:SGAin]"), the test set will automatically adjust the max EIRP value to correct for path loss.
Setting	Range: -30 to +10 dBW Resolution: 1 dBW
Query	Range: -30 to +10 dBW Resolution: 1 dBW
*RST Setting	-7 dBW
Programming Example `OUTPUT 714;"CALL:D2KTEST:EIRPOWER:MAXIMUM -2" !Sets the mobile station max EIRP to -2 dBW.`	

CALL:D2KTest:ESNumber:HEX

Function	Sets/queries the test mode ESN (Electronic Serial Number).
Setting	Range: Up to eight characters containing alphanumerics 0123456789ABCDEF or NULL
Query	Range: String of up to eight characters containing alphanumerics 0123456789ABCDEF or NULL
*RST Setting	"00000000"
Programming Example `OUTPUT 714;"CALL:D2KTEST:ESNUMBER:HEX 'ABCD1234'" !Sets the mobile station's ESN to ABCD1234.`	

CALL:D2KTest:QPCHannel:INDicator[:PAGing]

Function	Sets/queries the QPCH (Quick Paging Channel) paging indicators. Setting this parameter to ALL1 will cause the slotted mode mobile station operating in the idle state to monitor the paging channel during each assigned slot. When this parameter is set to ALL0 the mobile station will not monitor the paging channel. Note: QPCH configuration change indicators are not settable. The test set will always transmit configuration change indicators as 0 bits.
Setting	Range: ALL0|ALL1
Query	Range: ALL0|ALL1
*RST Setting	ALL0
Programming Example `OUTPUT 714;"CALL:D2KTEST:QPCH:IND ALL0" !Sets the paging indicators to 0 (off).`	

CALL:END

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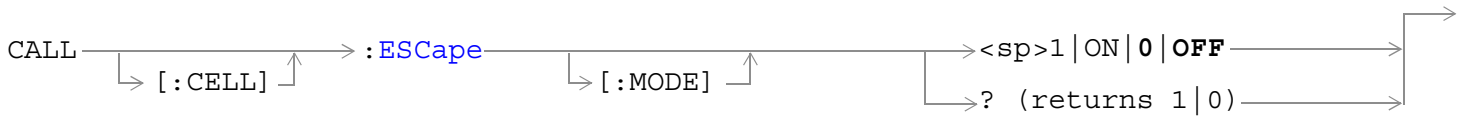
CALL:END

Function	Disconnects any calls or connections in progress. Aborts any outstanding registrations or base station pages in progress as well as mobile station originations.
Programming Example `OUTPUT 714;"CALL:END"`	

CALL[:CELL]:ESCape[:MODE]



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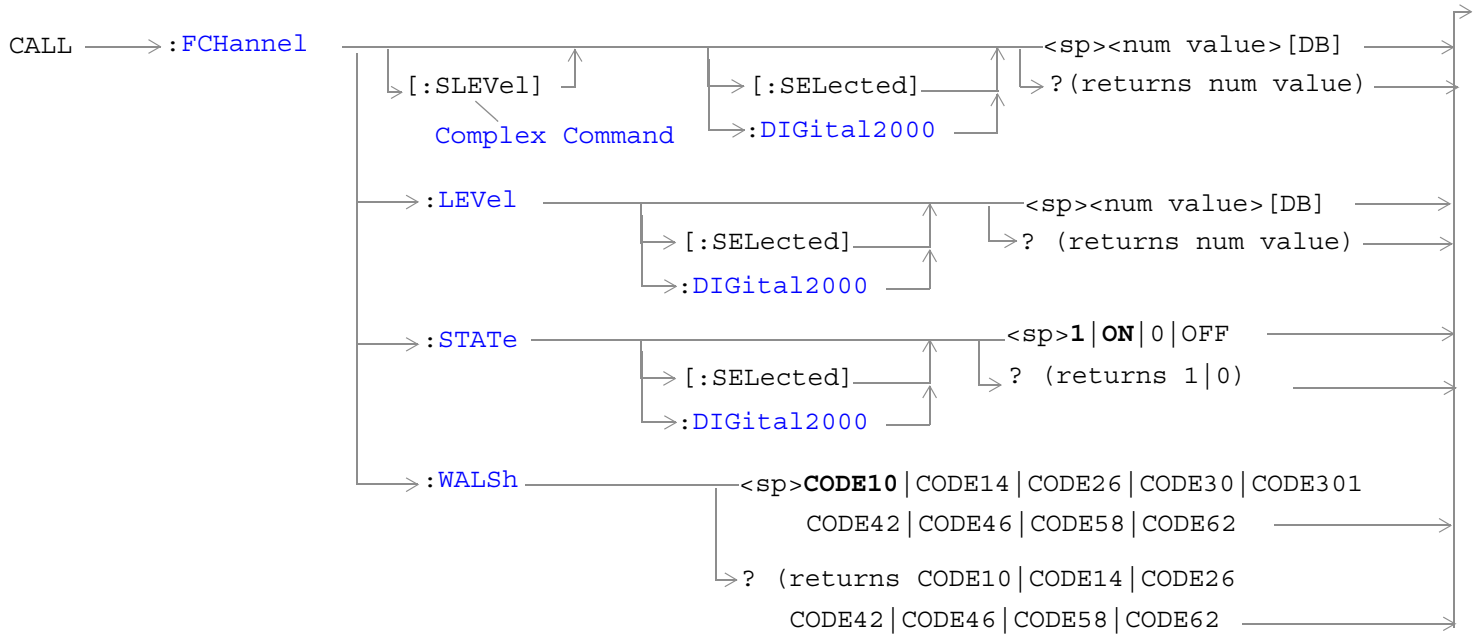
CALL[:CELL]:ESCape[:MODE]

Function	Sets/queries CDG escape mode. When escape mode is on, the test set is configured as a base station that sends (in its overhead messages) all 1's in the messaging fields used to signal mobile country code (MCC) and mobile network code (MNC). A mobile station that supports escape mode will respond by assuming MCC/MNC compatibility and perform registrations using only the mobile station identification number (MSIN).
Setting	Range: 1|ON|0|OFF
Query	Range: 0|1
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:CELL:ESCAPE:MODE 1" !Sets CDG escape mode on.`	

CALL:FCHannel



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CALL:FCHannel[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward fundamental channel (FCH) level, and (2) turns the FCH state to ON. The query form of this command returns the FCH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB

Programming Example
`OUTPUT 714;"CALL:FCHANNEL:SLEVEL:DIGITAL2000 -10 dB"`
`!Sets the forward fundamental channel (FCH) state to ON and sets the level to -10 dB.`	

CALL:FCHannel:LEVel[:SELected]

Function	Sets/queries the level of the forward fundamental channel (FCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
Programming Example `OUTPUT 714;"CALL:FCHANNEL:LEVEL:SELECTED -10 dB"`	

CALL:FCHannel:STATe[:SELected]

Function	Sets/queries the on/off state of the forward fundamental channel (FCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON

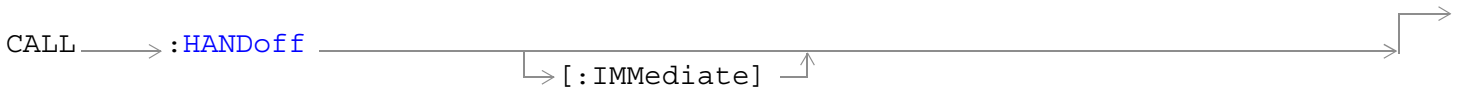
Programming Example
`OUTPUT 714;"CALL:FCHANNEL:STATE:DIGITAL2000 OFF"`
`!Turns off the forward fundamental channel.`	

CALL:FCHannel:WALSh

Function	Sets/queries the Walsh code used for the forward fundamental channel. The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.
Setting	Range: CODE10|CODE14|CODE26|CODE30|CODE42|CODE46|CODE58|CODE62
Query	Range: CODE10|CODE14|CODE26|CODE30|CODE42|CODE46|CODE58|CODE62
*RST Setting	CODE10

Programming Example
`OUTPUT 714;"CALL:FCHANNEL:WALSH CODE14"`
`!Sets the forward fundamental channel walsh code to 14.`	

CALL:HANDoff



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CALL:HANDoff[:IMMediate]

Function	Initiates a handoff to: • the handoff system type selected by the "CALL:SETup:SYSTem" command. • the handoff frequency band selected by the "CALL:SETup:BAND" command. • the handoff physical channel selected by the "CALL:SETup:CHANnel" command. A handoff will occur within the current system if the current cell system type (see "CALL[:CELL]:SYSTem") is the same as the current handoff system type (see "CALL:SETup:SYSTem").
Programming Example `OUTPUT 714;"CALL:HANDOFF:IMMEDIATE" !initiates a handoff.`	

CALL[:CELL]:MCCode

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CALL[:CELL]:MCCode

Function	Sets/queries the mobile country code (MCC). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see "CALL[:CELL]:ESCape[:MODE]" command description), this parameter is not used.
Setting	Range: 0 to 999
Query	Range: 0 to 999
*RST Setting	310
Programming Example `OUTPUT 714;"CALL:CELL:MCCODE 310" !Sets the mobile country code to 310.`	

CALL[:CELL]:MNCode

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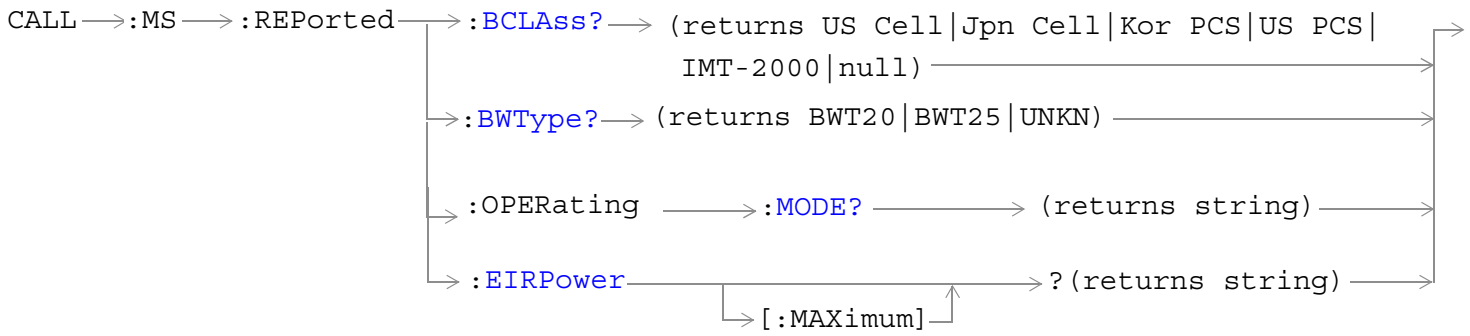
CALL[:CELL]:MNCode

Function	Sets/queries the mobile network code (MNC, also referred to as IMSI_11_12 or cell network code). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see the "CALL[:CELL]:ESCape[:MODE]" command description), this parameter is not used.
Setting	Range: 0 to 99
Query	Range: 0 to 99
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:CELL:MNCODE 10" !Sets the mobile network code to 10.`	

CALL:MS:REPorted<BCL,BWT,OPER:MODE,EIRP>



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CALL:MS:REPorted:BCLass?

Function	This query returns up to three concatenated mobile station reported frequency band classes (frequency bands supported by the mobile station). Each band that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last band is sent. The last band in the string will not have an appended comma and a space. The return values for "CALL:MS:REPorted:OPERating:MODE?" and "CALL:MS:REPorted:EIRPower[:MAXimum]?" will consist of an operating mode and a maximum EIRP for each band returned by this command. Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP (if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.
Query	Range: US Cell, Jpn Cell, Kor PCS, US PCS, IMT-2000, null
*RST Setting	Null

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:BCLASS?"
!when sent to a mobile station supporting US cellular and US PCS bands, returnw the string:
!"<sp>US<sp>Cell,<sp><sp><sp>US<sp>PCS".
!Note: string is 16 characters (8 per band) plus a comma and space separating the two bands.
```

CALL:MS:REPorted:OPERating:MODE?

Function	This query returns up to three concatenated mobile station reported operating modes. Each operating mode that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last band is sent. The last band in the string will not have an appended comma and a space. Each operating mode that is included in the returned string will correspond, by its position in the string, with the position of each band class in the string returned by the command "CALL:MS:REPorted:BCLass?" . Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP (if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.
Query	Range: DualMode | CDMA | Analog | N-Analog | W-Analog | Null
*RST Setting	Null

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:OPER:MODE? !when sent to a mobile station supporting US cellular and
US PCS bands, might return something similar to the following string:
"<sp><sp>Analog,<sp><sp><sp><sp><sp>CDMA".
Note that this string consists of 16 characters (8 for each band) plus a comma and space separating
the two operating mode.
```

CALL:MS:REPorted:EIRPower[:MAXimum]?

Function	This query returns, in units of dBW, up to three concatenated mobile station reported maximum EIRP (effective isotropic radiated power). Each maximum EIRP value that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last maximum EIRP value is sent. The last maximum EIRP value in the string will not have an appended comma and a space. Each maximum EIRP value that is included in the returned string will correspond, by its position in the string, with the position of each band class in the string returned by the command "CALL:MS:REPorted:BCLass?" . Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP (if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.
Query	Range: -xx, null (where xx is a numeric value)
*RST Setting	Null

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:EIRP?" !when sent to a mobile station supporting US cellular (analog
operating mode) and US PCS (CDMA operating mode) bands, might return something similar to the
following string:

"<null substring>,<sp>-50<sp><sp><sp><sp><sp>".

Note that this string consists of a leading comma and space denoting a null substring, followed by
the maximum EIRP for the second band, US PCS (CDMA operating mode).
```

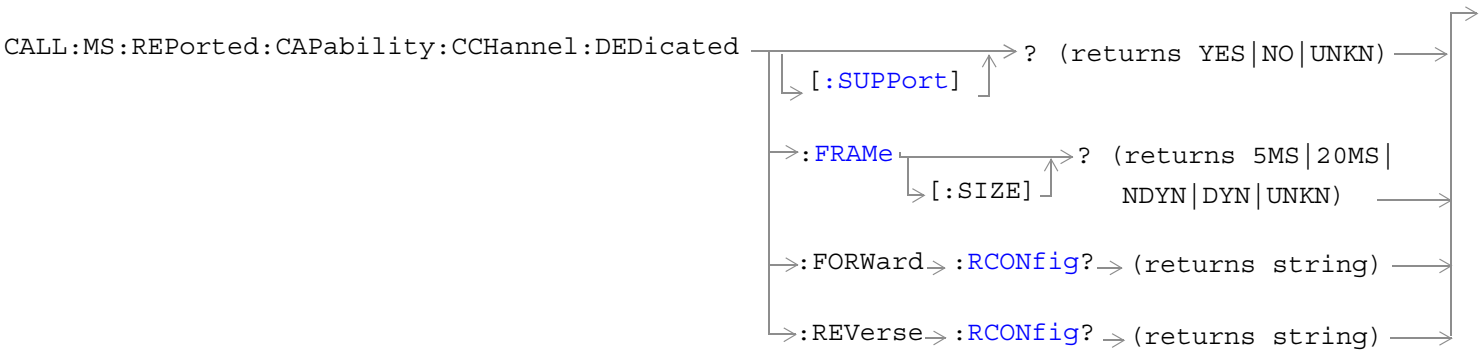
CALL:MS:REPorted:BWType?

Function	Queries station class mark bandwidth support.
Query	Range: BWT20|BWT25|UNKN
*RST Setting	UNKN

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:BWTYPE?"
```

CALL:MS:REPorted:CAPability:CCHannel:DEDicated



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CALL:MS:REPorted:CAPability:CCHannel:DEDicated[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a dedicated control channel (DCCH), as reported by the mobile station.
Query	Range: YES | NO | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:SUPPPORT?"`	

CALL:MS:REPorted:CAPability:CCHannel:DEDicated:FRAMe[:SIZE]?

Function	This query only command returns the mobile station's capability to support different frame sizes on the dedicated control channel (DCCH), as reported by the mobile station. Returned values are 5 millisecond only, 20 milliseconds only, 5 or 20 milliseconds not dynamic, 5 or 20 milliseconds dynamic, or unknown.
Query	Range: 5MS | 20MS | NDYN | DYN | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:FRAME:SIZE?"`	

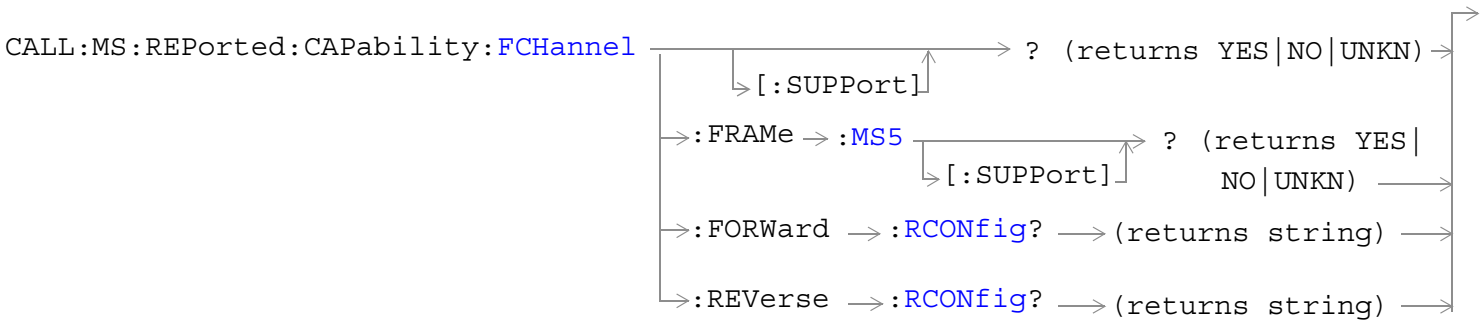
CALL:MS:REPorted:CAPability:CCHannel:DEDicated:FORWard:RCONfig?

Function	This query only command returns the mobile station's capability to support forward dedicated control channels, as reported by the mobile station. This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3 | 4 | 5 | null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:FORWARD:RCONFIG?"`	

CALL:MS:REPorted:CAPability:CCHannel:DEDicated:REVerse:RCONfig?

Function	This query only command returns the mobile station's capability to support reverse dedicated control channels, as reported by the mobile station. This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3 | 4 | 5 | null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:REVERSE:RCONFIG?"`	

CALL:MS:REPorted:CAPability:FCHannel



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CALL:MS:REPorted:CAPability:FCHannel[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a fundamental channel, as reported by the mobile station.
Query	Range: YES|NO|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:FCHANNEL?"`	

CALL:MS:REPorted:CAPability:FCHannel:FRAMe:MS5[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a fundamental channel with 5 ms frames, as reported by the mobile station.
Query	Range: YES|NO|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:FCHANNEL:FRAME:MS5:SUPPORT?"`	

CALL:MS:REPorted:CAPability:FCHannel:FORWard:RCONfig?

Function	This query only command returns the mobile station's capability to support radio configurations on the forward fundamental radio channel, as reported by the mobile station. This query returns a comma-separated string of any combination of 1, 2, 3, 4, 5, or null.
Query	Range: 1|2|3|4|5|null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:FCHANNEL:FORWARD:RCONFIG?"`	

CALL:MS:REPorted:CAPability:FCHannel:REVerse:RCONfig?

Function	This query only command returns the mobile station's capability to support radio configurations on the reverse fundamental radio channel, as reported by the mobile station. This query returns a comma-separated string of any combination of 1, 2, 3, 4, 5, or null.
Query	Range: 1|2|3|4|5|null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:FCHANNEL:REVERSE:RCONFIG?"`	

CALL:MS:REPorted:QUERy

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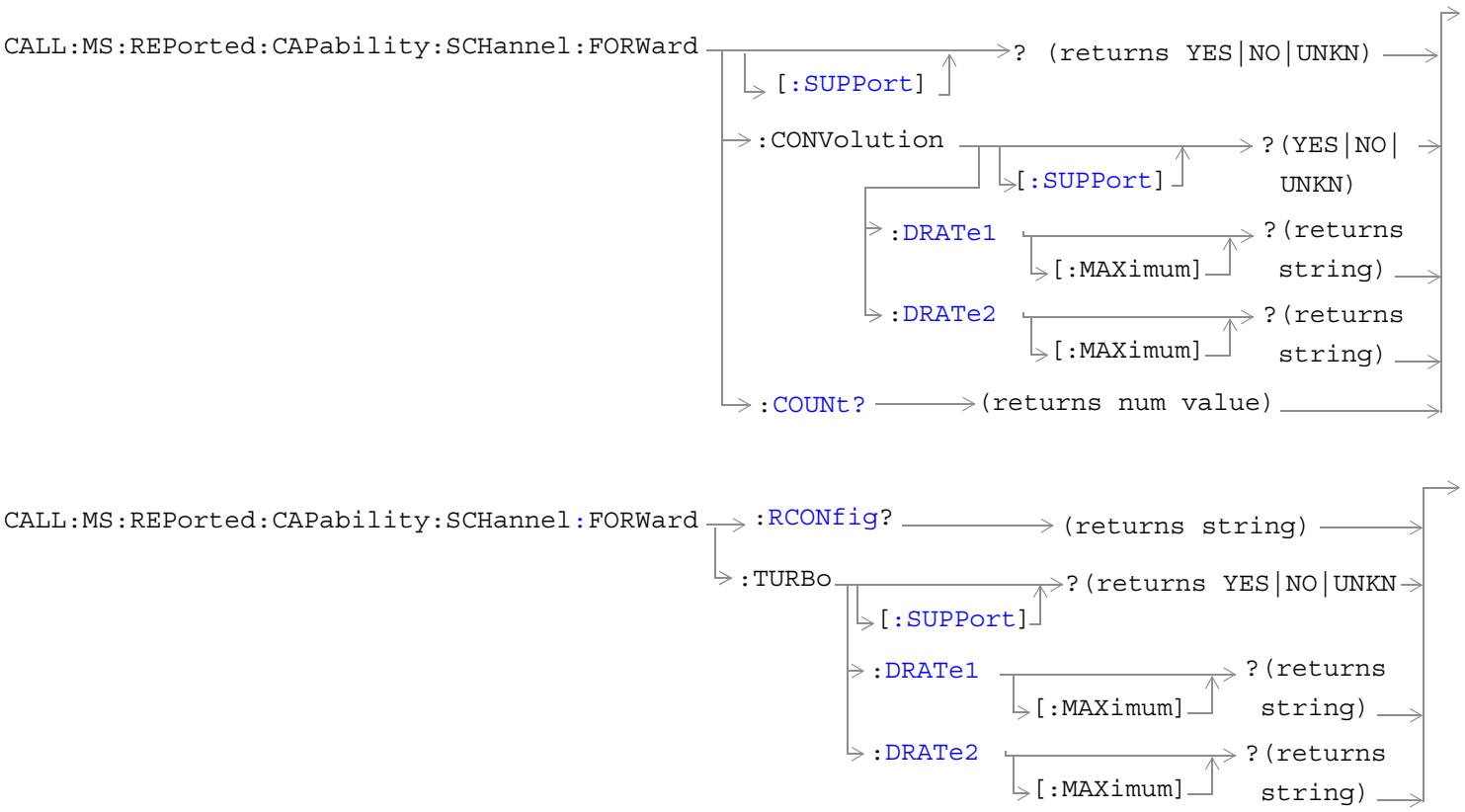
CALL:MS:REPorted:CAPability:QUERy

Function	This command causes the test set to obtain the queriable mobile station capability results. This command is only applicable to active cell mode in the IS-2000 system.
Query	N/A
*RST Setting	N/A
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:QUERY" obtains queriable mobile station capability results from the mobile station.`	

CALL:MS:REPorted:SCHannel:FORWard



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CALL:MS:REPorted:CAPability:SCHannel:FORWard[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a forward supplemental channel (SCH), as reported by the mobile station.
Query	Range: YES | NO | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:SUPPPORT?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:CONVolution[:SUPPort]?

Function	This query only command returns the mobile station's capability to support convolutional coding on the forward supplemental channel, as reported by the mobile station.
Query	Range: YES | NO | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:SUPPORT?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:CONVolution:DRATe1[:MAXimum]?

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the forward supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600 | BPS19200 | BPS76800 | BPS153600 | BPS307200 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:DRATE1:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:CONVolution:DRATe2[:MAXimum]?

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the forward supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS230400 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:DRATE2:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:COUNt?

Function	This query only command returns the mobile station's capability to support multiple forward supplemental channels, as reported by the mobile station.
Query	Range: 0|1|2, 9.91 E+37
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:COUNT?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:RCONfig?

Function	This query only command returns the mobile station's capability to support forward supplemental channel radio configurations, as reported by the mobile station. This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3|4|5|null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:RCONFIG?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo[:SUPPort]?

Function	This query only command returns the mobile station's capability to support the forward supplemental channel turbo coder, as reported by the mobile station.
Query	Range: YES|NO|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:SUPPORT?"`	

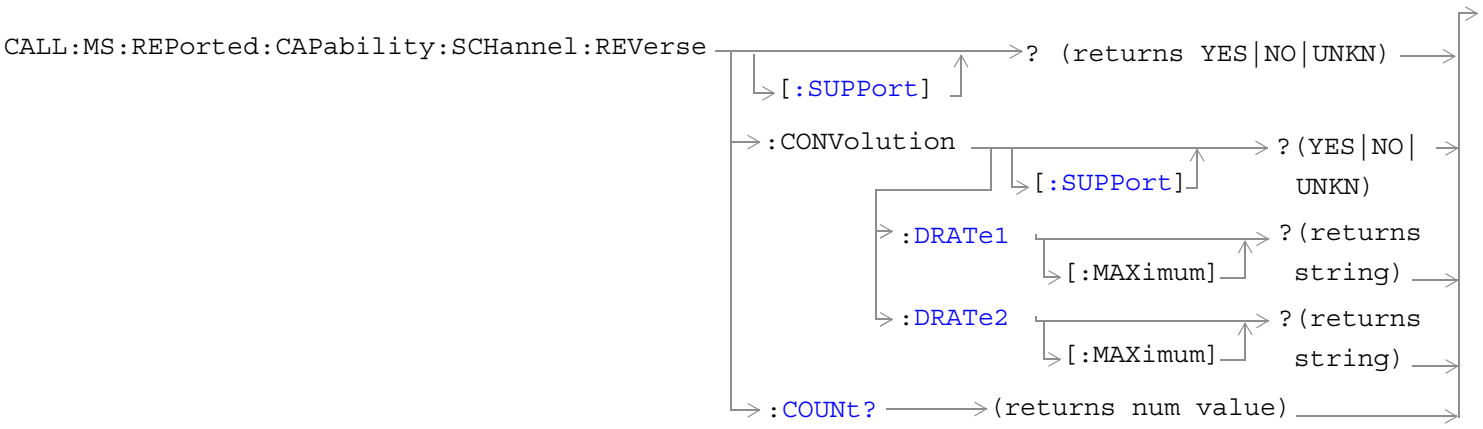
CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo:DRATe1[:MAXimum]?

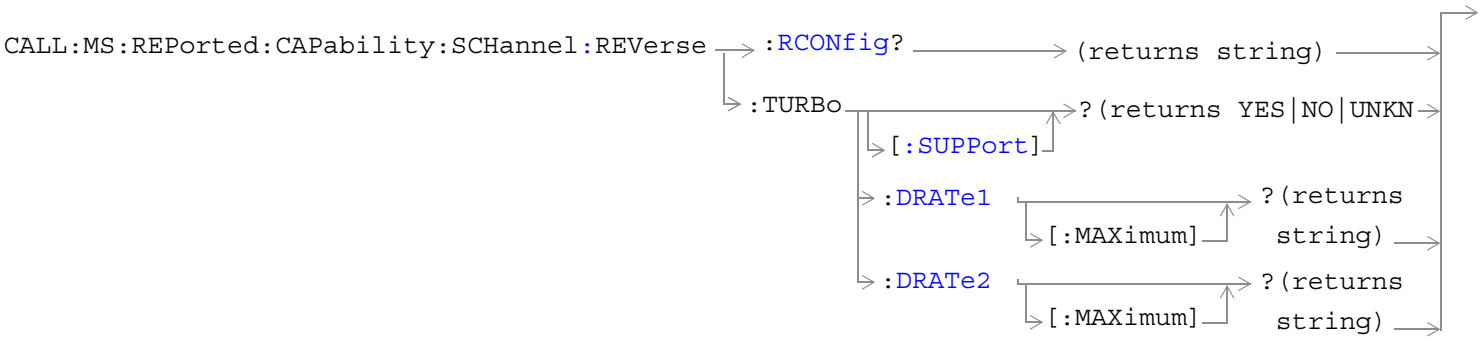
Function	This query only command returns the mobile station's maximum turbo coder data rate on the forward supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600|BPS19200|BPS76800|BPS153600|BPS307200|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:DRATE1:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo:DRATe2[:MAXimum]?

Function	This query only command returns the mobile station's maximum turbo coder data rate on the forward supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS230400 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:DRATE2:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse





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CALL:MS:REPorted:CAPability:SCHannel:REVerse[:SUPPort]?

Function	This query only command returns the mobile station's capability to support the reverse supplemental channel, as reported by the mobile station.
Query	Range: YES | NO | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:SUPPORT?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution[:SUPPort]?

Function	This query only command returns the mobile station's capability to support convolutional coding on the reverse supplemental channel, as reported by the mobile station.
Query	Range: YES | NO | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:SUPPORT?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution:DRATe1[:MAXimum]?

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the reverse supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600 | BPS19200 | BPS76800 | BPS153600 | BPS307200 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:DRATE1:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution:DRATe2[:MAXimum]?

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the reverse supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS230400 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:DRATE2:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:COUNt?

Function	This query only command returns the mobile station's capability to support multiple reverse supplemental channels, as reported by the mobile station.
Query	Range: 0|1|2, 9.91 E+37
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:COUNT?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:RCONfig?

Function	This query only command returns the mobile station's capability to support reverse supplemental channel radio configurations, as reported by the mobile station. This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3|4|5|null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:RCONFIG?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo[:SUPPort]?

Function	This query only command returns the mobile station's capability to support the reverse supplemental channel turbo coder, as reported by the mobile station.
Query	Range: YES|NO|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:SUPPORT?"`	

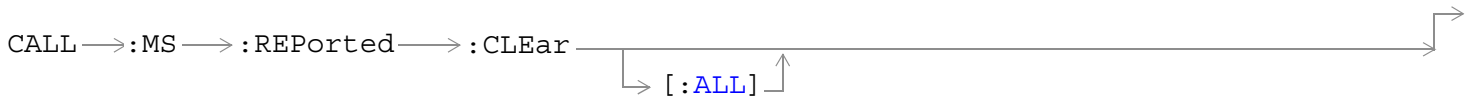
CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo:DRATe1[:MAXimum]?

Function	This query only command returns the mobile station's maximum turbo coder data rate on the reverse supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600|BPS19200|BPS76800|BPS153600|BPS307200|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:DRATE1:MAXIMUM?"`	

CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo:DRATe2[:MAXimum]?

Function	This query only command returns the mobile station's maximum turbo coder data rate on the reverse supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS230400 | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:DRATE2:MAXIMUM?"`	

CALL:MS:REPorted:CLEar



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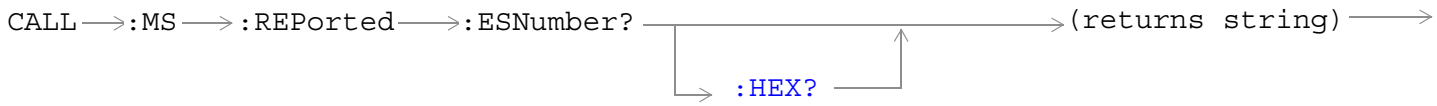
CALL:MS:REPorted:CLEar[:ALL]

Function	Clears the mobile station database (clear MS & capability info). The following mobile station data is cleared: • Page MS Information, • Status Request Information, • Queriable MS Information (mobile capabilities), • Registration Type, • Mobile Protocol Capability Indication, • MS Called Party Number. After the MS database is cleared, the test set will re-acquire the mobile station for the Status Request Information during the next registration.
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CLEAR:ALL"`	

CALL:MS:REPorted:ESN



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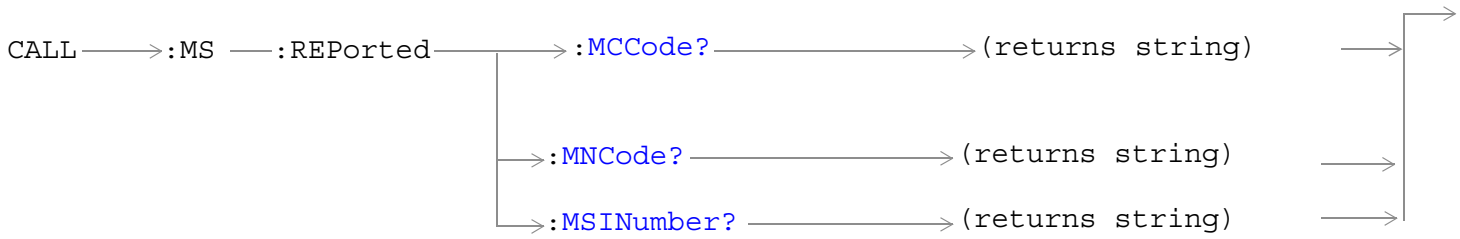
CALL:MS:REPorted:ESNumber:HEX?

Function	Queries the hexadecimal formatted version of the electronic serial number. Returns a string of hexadecimal characters. Used only in active cell operating mode.
Query	Range: 0x00000000 to 0xFFFFFFFF, or null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:ESNUMBER:HEX?" !Queries the Hexadecimal value of the ESN.`	

CALL:MS:REPorted<MCC,MNC,MSIN>



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CALL:MS:REPorted:MCCode?

Function	Queries the mobile country code (MCC), as reported by the mobile station.
Query	Range: 0 to 999
*RST Setting	Null string
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MCCODE?"`	

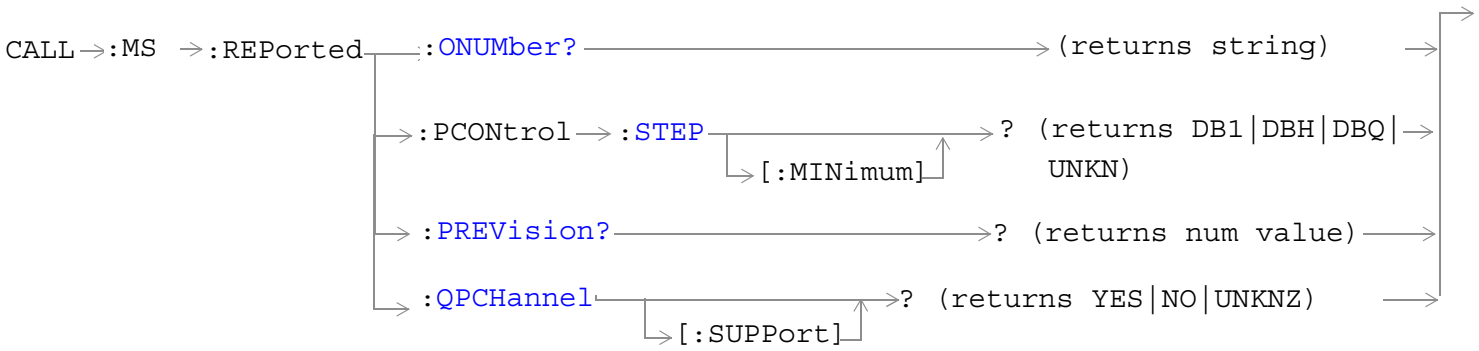
CALL:MS:REPorted:MNCode?

Function	Queries the mobile network code (MNC), as reported by the mobile station.
Query	Range: 0 to 999
*RST Setting	Null string
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MNCODE?"`	

CALL:MS:REPorted:MSINumber?

Function	Queries the mobile station reported mobile station identification number.
Query	Range: returns up to 10 digits
*RST Setting	Null string
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MSINUMBER?"`	

CALL:MS:REPorted<ONUM,PREV,QPCH,CPCL>



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CALL:MS:REPorted:ONUMber?

Function	Queries the phone number the mobile station dialed in a mobile originated call. Used only in active cell mode. Returns a string of up to 16 digits.
Query	Range: up to 16 digits: 0 through 9, *,#, or null
*RST Setting	null
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:ONUMBER?" !Returns the phone number the mobile dialed.`	

CALL:MS:REPorted:PCONtrol:STEP[:MINimum]?

Function	Queries the mobile reported minimum power control step size. The actual power control step size used by the mobile during closed loop power control is set using the "CALL[:CELL]:CLPControl:REVerse:STEP" command. The mobile reported minimum power control step size indicates the smallest step the mobile is capable of making during closed loop power control.
Query	Range: DB1|DBH|DHQ|UNKN
*RST Setting	DB1
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:PCON:STEP:MINIMUM?"`	

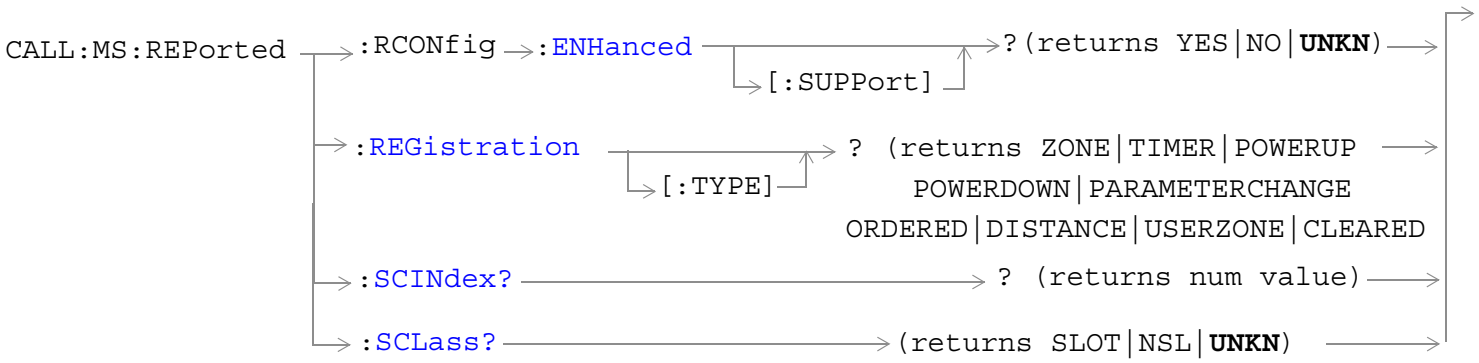
CALL:MS:REPorted:PREVision?

Function	Queries the mobile reported protocol revision. The values returned have the following definitions: 0 = Null String 1 = J_STD-008 (if CELL:BAND? returns USPC) or Korean PCS (if CELL:BAND? returns KPCS) 2 = Null String 3 = TSB-74 (if CELL:BAND? returns USC) or ARIB_T53 (if CELL:BAND? returns JCDM 4 = IS-95B 5 = IS-95B plus 6 = IS-2000 Rev0 7 = Null string
Query	Range: 0 to 7, 9.91 E+36
*RST Setting	9.91 E+36
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:PREVISION?"`	

CALL:MS:REPorted:QPCHannel[:SUPPort]?

Function	Queries whether the mobile supports quick paging. When the test set's quick paging channel state is on it will send out slotted quick pages.
Query	Range: YES | NO | UNKN
*RST Setting	CLEARED
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:QPCHANNEL:SUPPORT?"`	

CALL:MS:REPorted:<RCON:ENH,REG,SCIN,SCL>



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CALL:MS:REPorted:RCONfig:ENHanced[:SUPPort]?

Function	Queries whether or not the mobile station supports enhanced radio configurations, as reported by the mobile station. If the mobile station supports any radio configuration in radio configuration class 2, this mobile station reported result will be YES.
Query	Range: YES|NO|UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:RCON:ENH?"`	

CALL:MS:REPorted:REGistration[:TYPE]?

Function	Queries the type of registration that was last received by the test set, as reported by the mobile station.
Query	Range: ZONE | TIMER | POWERUP | POWERDOWN | PARAMETERCHANGE | ORDERED | DISTANCE | USERZONE | CLEARED
*RST Setting	CLEARED
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:REGISTRATION?"`	

CALL:MS:REPorted:SCINdex?

Function	Queries the mobile reported slot cycle index, as reported by the mobile station.
Query	Range: 0 to 7, 9.91 E+37
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:SCINDEX?"`	

CALL:MS:REPorted:SCLass?

Function	Queries the mobile reported slot cycle index, as reported by the mobile station. The test set will page the mobile station in slotted mode unless the mobile station has registered as non-slotted (NSL).
Query	Range: SLOT | NSL | UNKN
*RST Setting	UNKN
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:SCLASS?"`	

CALL[:CELL]:NIDentity

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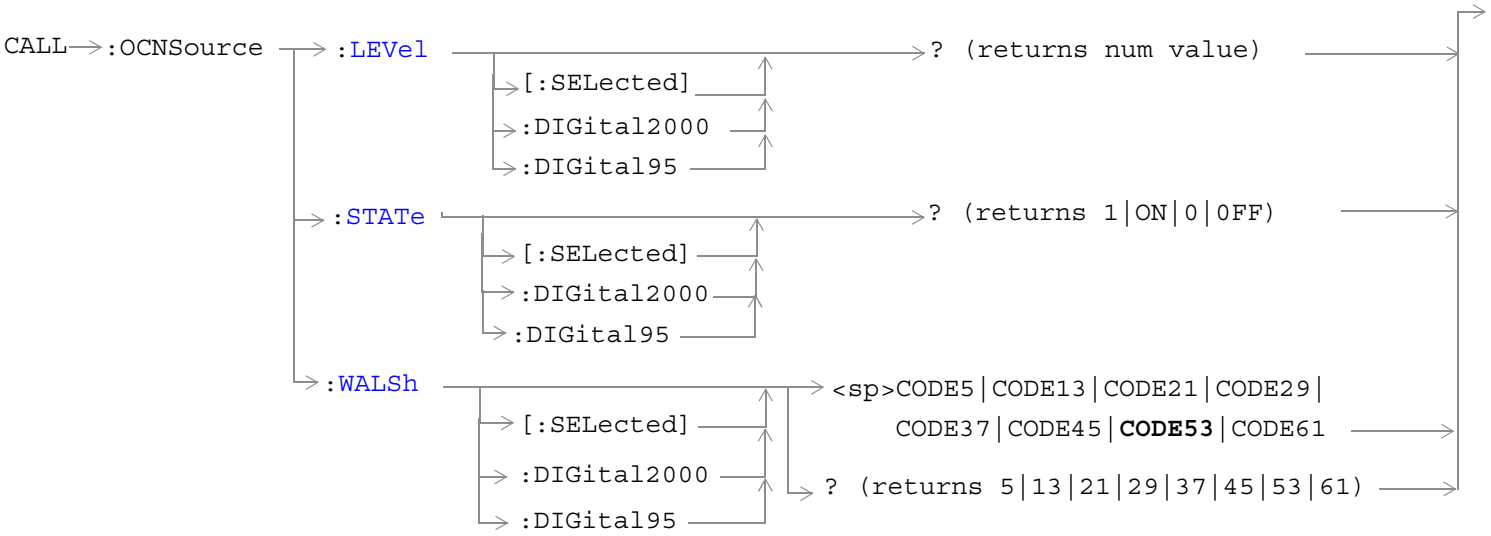
CALL[:CELL]:NIDentity

Function	Sets/queries the network ID (NID). This parameter can be set any time and will be sent out in the next overhead message.
Setting	Range: 0 to 65535
Query	Range: 0 to 65595
*RST Setting	1
Programming Example `OUTPUT 714;"CALL:CELL:NIDENTITY 3056" !Sets the network identifier to 3056.`	

CALL:OCNSource



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CALL:OCNSource:LEVel[:SELected]?

Function	Queries the calculated level of the orthogonal channel noise simulator (OCNS). The optional [:SELected] keyword in this command specifies that the OCNS level being queried applies to the current system type. The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Paging (PCH) • Pilot (PICH) • Sync (SCH) • Fundamental (FCH) • Supplemental (SCH) • Quick Paging (QPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Query	Range: 0 to -20 dB, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example `OUTPUT 714;"CALL:OCNSOURCE:LEVEL?" !Queries the calculated OCNS level.`	

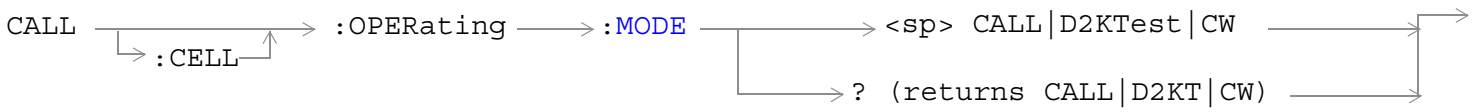
CALL:OCNSource:STATe[:SELected]?

Function	Queries the on/off state of the orthogonal channel noise simulator (OCNS) The optional [:SELected] keyword in this command specifies that the OCNS on/off state being queried applies to the current system type. The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Paging (PCH) • Pilot (PICH) • Sync (SCH) • Fundamental (FCH) • Supplemental (SCH) • Quick Paging (QPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Setting	Range: 1|0
*RST Setting	1 (on)
Programming Example `OUTPUT 714;"CALL:OCNSOURCE:STATE?"`	

CALL:OCNSource:WALSh[:SELected]

Function	Sets/queries the Walsh code used for the orthogonal channel noise simulator (OCNS). The optional [:SELected] keyword in this command specifies that the OCNS Walsh code being set/queried applies to the current system type. The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.
Setting	Range: CODE5|CODE13|CODE21|CODE29|CODE37|CODE45|CODE53|CODE61
Query	Range: 5|13|21|29|37|45|53|61
*RST Setting	CODE53
Programming Example `OUTPUT 714;"CALL:OCNSOURCE:WALSH CODE13" !Sets the OCNS channel walsh code to 13.`	

CALL[:CELL]:OPERating



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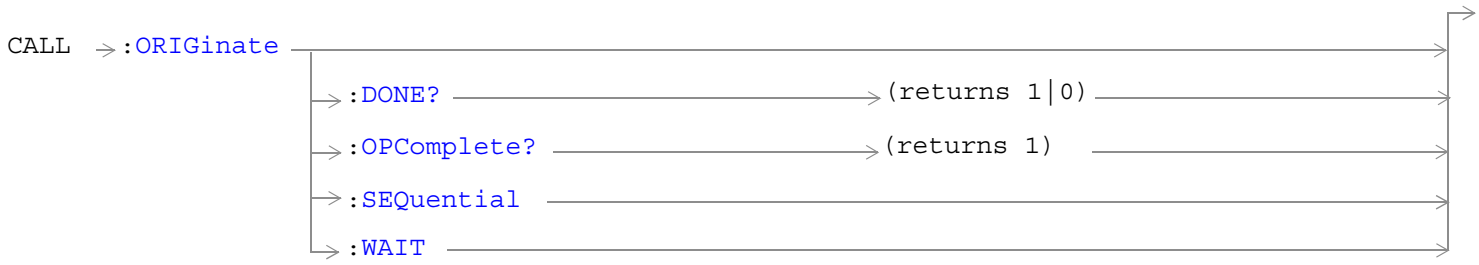
CALL[:CELL]:OPERating:MODE

Function	Sets/queries the operating mode of the base station emulator. If a call is in progress during a change in operating mode it will be dropped. CALL is the default operating mode. In CALL mode (also called active cell mode), signaling between the mobile station and the base station emulator is used for call origination, handoffs, and other operations that simulate in-service mobile interaction. When CALL is selected, closed loop power control will be automatically set to its active mode. See "CALL[:CELL]:CLPControl:REVerse:MODE" for closed loop power control commands. D2KTest mode commands the test set to transmit a forward CDMA channel with no call processing capability. In this mode, a mobile station that complies with IS-2000 test mode will camp on to the forward channel. The test set will continually send an F-FCH on the user entered Walsh code, which the mobile station can use to make FER measurements. The mobile station must begin transmitting the R-FCH before reverse link measurements can be made.
Setting	Range: CALL|D2KTest|CW
Query	Range: CALL|D2KT|CW
*RST Setting	CALL
Programming Example `OUTPUT 714;"CALL:CELL:OPERATING:MODE D2KTEST" !Selects IS-2000 test mode.`	

CALL:ORIGinate



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CALL:ORIGinate

Function	Generates a page attempt to the mobile station. If the call attempt fails, the test set will return to the idle call processing state.
Programming Example `OUTPUT 714;"CALL:ORIGINATE" !pages the mobile station`	

CALL:ORIGinate:DONE?

Function	See "Call Processing Event Synchronization"
Query	Range: 1|0
Programming Example `OUTPUT 714;"CALL:ORIGINATE:DONE?"`	

CALL:ORIGinate:OPComplete?

Function	See "Call Processing Event Synchronization"
Query	Range: 1
Programming Example `OUTPUT 714;"CALL:ORIGINATE:OPCOMPLETE?"`	

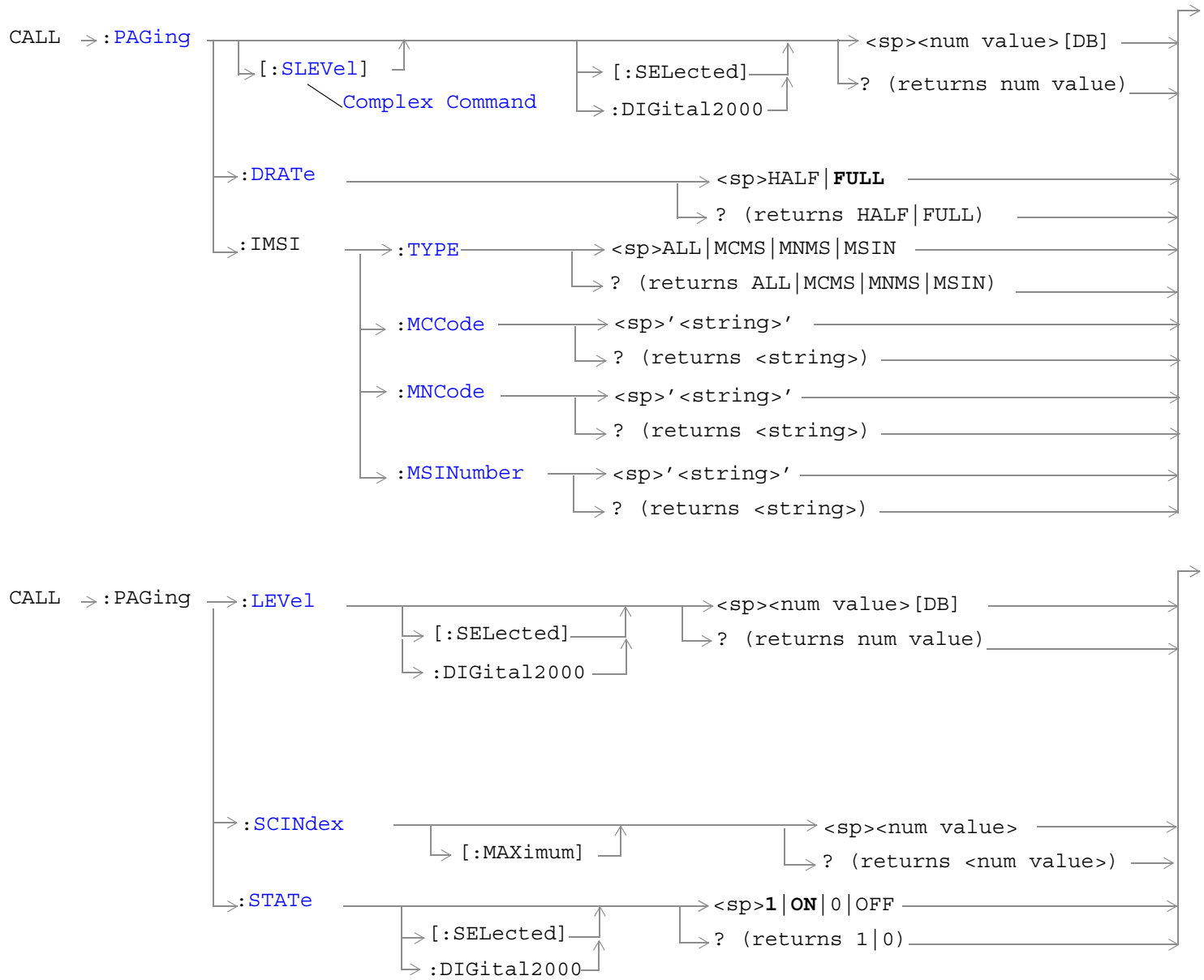
CALL:ORIGinate:SEQuential

Function	See "Call Processing Event Synchronization"
Programming Example `OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL"`	

CALL:ORIGinate:WAIT

Function	See "Call Processing Event Synchronization"
Setting	Range:
Programming Example `OUTPUT 714;"CALL:ORIGINATE:WAIT"`	

CALL:PAGing



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CALL:PAGing[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward paging channel (PCH) level, and (2) turns the PCH on/off state to ON. The query form returns the PCH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example `OUTPUT 714;"CALL:PAGING:SLEVEL:SELECTED -10"`	

CALL:PAGing:DRATe

Function	Sets/queries the forward paging channel (PCH) data rate.
Setting	Range: FULL|HALF
Query	Range: FULL|HALF
*RST Setting	FULL
Programming Example `OUTPUT 714;"CALL:PAGING:DRATE HALF" !Sets the PCH data rate to half.`	

CALL:PAGing:IMSI:TYPE

Function	Sets/queries the international mobile subscriber identity IMSI type. This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station.
Setting	Range: ALL|MCMS|MNMS|MSIN MCMS = mobile country code (MCC) + mobile station identification number (MSIN) MNMC = mobile network code (MNC) + mobile station identification number (MSIN) MSIN = mobile station identification number (MSIN) only.
Query	Range: ALL|MCMS|MNMS|MSIN
*RST Setting	ALL
Programming Example `OUTPUT 714;"CALL:PAGING:IMSI:TYPE MCMS"`	

CALL:PAGing:IMSI:MCC

Function	Sets/queries the mobile country code. This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station. If paging MCC is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 3 digit string
Query	Range: 3 digit string
*RST Setting	310
Programming Example `OUTPUT 714;"CALL:PAGING:IMSI:MCC '222'"`	

CALL:PAGing:IMSI:MNC

Function	Sets/queries the mobile network code. This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station. If paging MNC is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 2 digit string
Query	Range: 2 digit string
*RST Setting	00
Programming Example `OUTPUT 714;"CALL:PAGING:IMSI:MNC '10'"`	

CALL:PAGing:IMSI:MSIN

Function	Sets/queries the mobile country code. This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station. If paging MSIN is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 10 digit string
Query	Range: 10 digit string
*RST Setting	5099214001

Programming Example
`OUTPUT 714;"CALL:PAGING:IMSI:MSIN '5099213572'"`
`!sets the paging IMSI MSIN to 5099213572.`	

CALL:PAGing:LEVel[:SELected]

Function	Sets/queries the paging level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example `OUTPUT 714;"CALL:PAGING:LEVEL:SELECTED -10"`	

CALL:PAGing:SCINdex[:MAXimum]

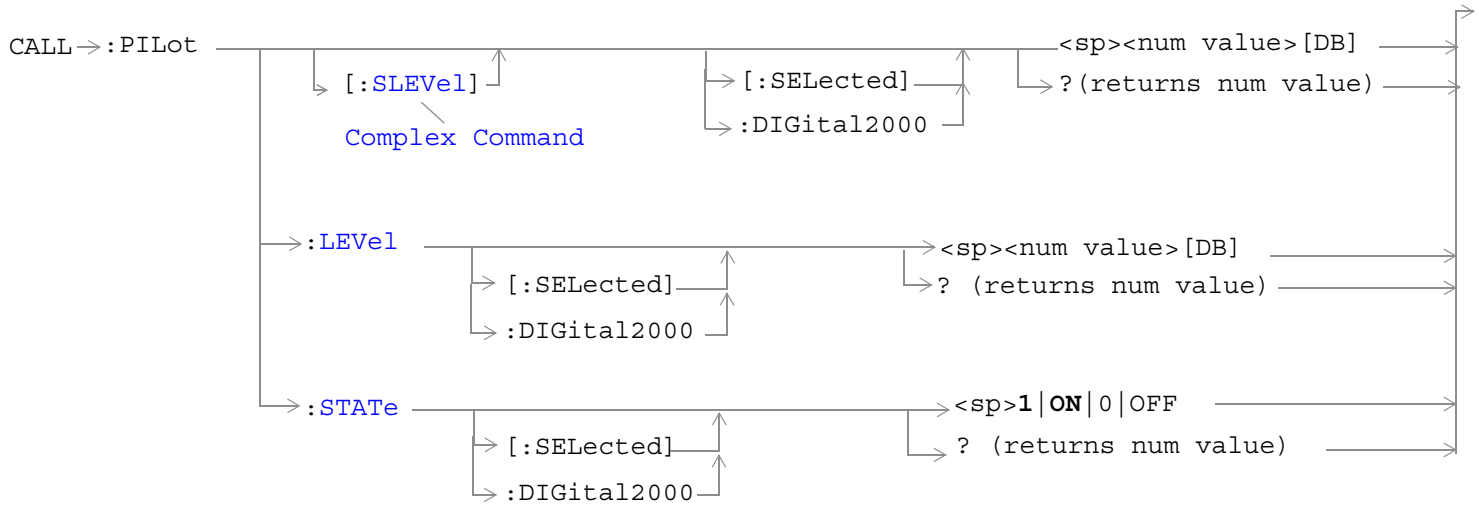
Function	Sets/queries the maximum slot cycle index. The test set will page the mobile station using slotted mode unless the mobile station has registered as non-slotted. The test set will use the lesser value of maximum slot cycle index or "CALL:MS:REPorted:SCINdex?" for slotted paging.
Setting	Range: 0 to 7
Query	Range: 0 to 7
*RST Setting	1
Programming Example `OUTPUT 714;"CALL:PAGING:SCINDEX 2"`	

CALL:PAGing:STATe[:SELected]

Function	Sets/queries the forward paging channel on/off state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (on)

Programming Example
`OUTPUT 714;"CALL:PAGING:STATE:DIGITAL2000 OFF"`
`!Sets the IS-2000 paging on/off state to off.`	

CALL:PILot



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CALL:PILOT[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward pilot channel (PICH) level, and (2) turns the PICH state to ON. The query form returns the PICH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -10 dB Resolution: 0.01 dB
Query	Range: 0 to -10 dB Resolution: 0.01 dB
*RST Setting	-7 dBm

Programming Example
`OUTPUT 714;"CALL:PILOT:SLEVel -10"`
`!Sets the cell pilot state to ON and sets the level to -10 dB.`	

CALL:PILOT:LEVel[:SELected]

Function	Sets/queries the forward pilot channel (PICH) level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -10 dB Resolution: 0.01 dB
Query	Range: 0 to -10 dB Resolution: 0.01 dB
*RST Setting	-7 dB
Programming Example `OUTPUT 714;"CALL:PILOT:LEVEL -10"`	

CALL:PILOT:STATe[:SELected]

Function	Sets/queries the forward pilot channel (PICH) state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (on)
Programming Example `OUTPUT 714;"CALL:PILOT:STATE OFF"`	

CALL[:CELL]:PNOFfset

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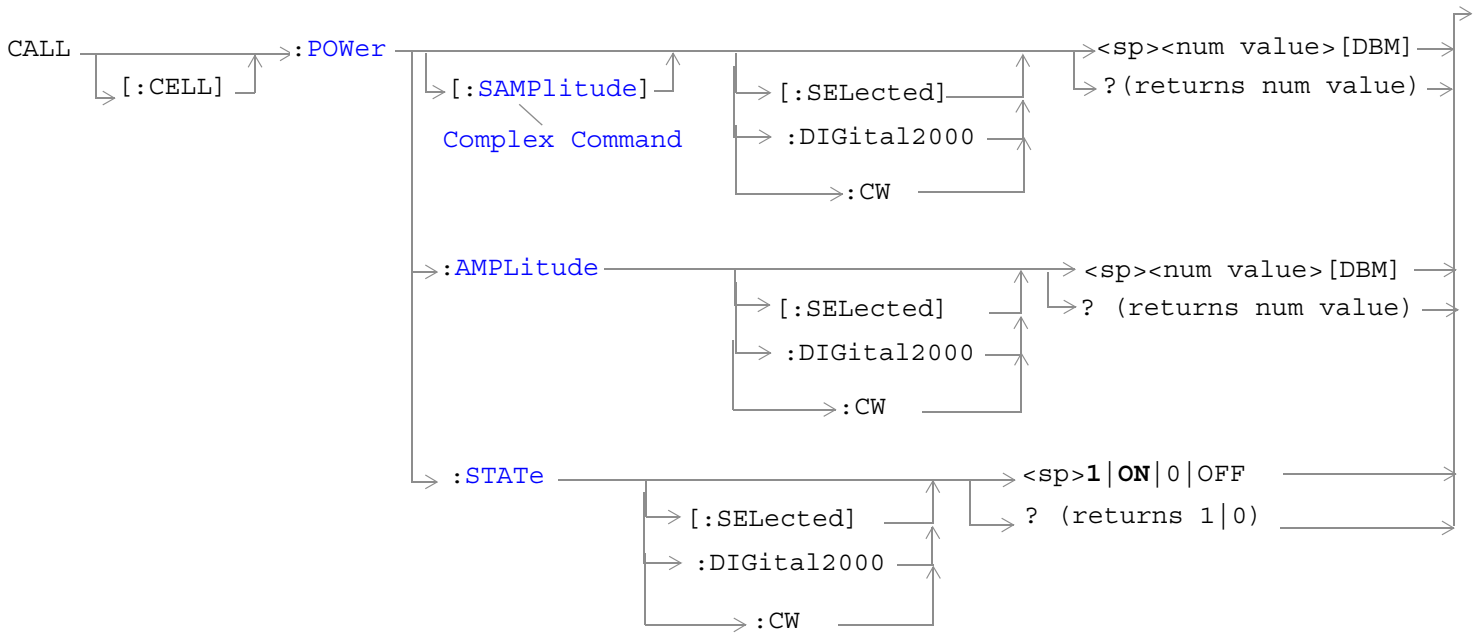
CALL[:CELL]:PNOFfest

Function	Sets/queries the pseudonoise (PN) offset. The PN offset is the timing of the cell's short codes relative to system time. This command may take up to 2 seconds to complete. The PN offset cannot be changed while a call is connected.
Setting	Range: 0 to 511
Query	Range: 0 to 511
*RST Setting	12
Programming Example `OUTPUT 714;"CALL:CELL:PNOFFSET 333" sets the PN offset to 333.`	

CALL[:CELL]:POWer



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CALL[:CELL]:POWer[:SAMPlitude][:SELected]

Function	The setting form of this command performs two functions: (1) sets the cell power level and (2) turns the cell power on/off state to on. The query form returns the cell power level (including compensation for amplitude offset) or NAN. The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz. Resolution 0.01 dB
Query	Range: Same as setting range. Resolution: 0.01 dB
*RST Setting	-55 dBm/1.23 MHz

Programming Example

```
OUTPUT 714;"CALL:CELL:POWER:SAMPLITUDE -30"
!Sets the cell power state to ON and sets RF output power to -30 dBm.
```

CALL[:CELL]:POWer:AMPLitude[:SELected]

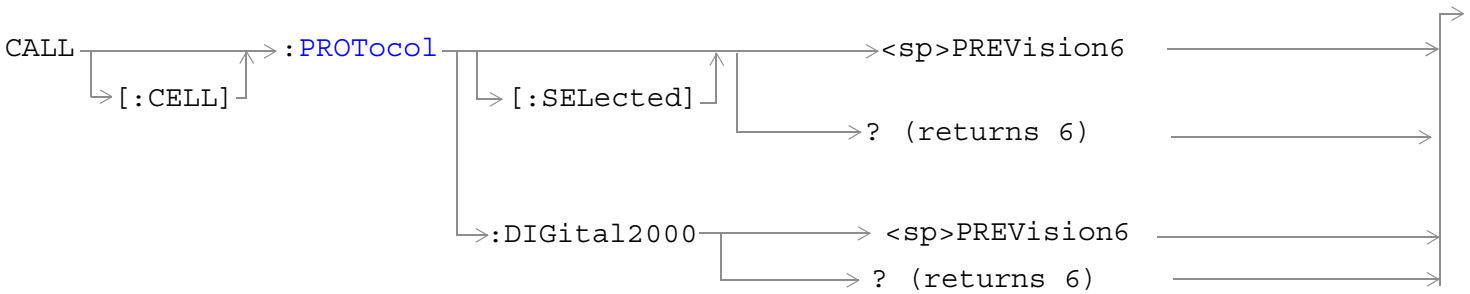
Function	Sets/queries the cell power level (including compensation for amplitude offset). The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz. Resolution 0.01 dB
Query	Range: Same as setting range. Resolution: 0.01 dB
*RST Setting	-55 dBm/1.23 MHz

Programming Example
`OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -30"`
`!Sets the cell power level -30 dBm.`	

CALL[:CELL]:POWer:STATe[:SELected]

Function	Sets/queries the cell power state. The optional [:SELected] keyword in this command specifies that the cell power state being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:CELL:POWER:STATE OFF" !Turns off cell power.`	

CALL[:CELL]:PROTocol



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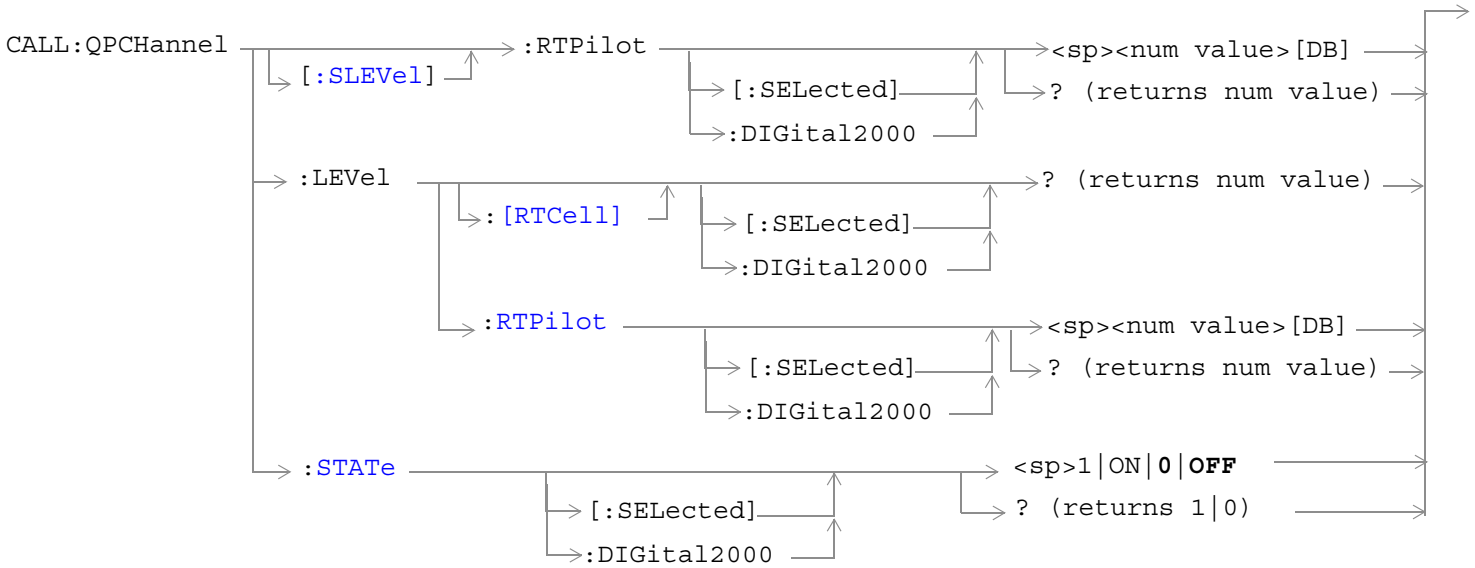
CALL[:CELL]:PROTocol[:SELected]

Function	Sets/queries the protocol standard. Currently there is only one protocol revision available, PREV6. PREVision6 corresponds with IS2000-Rev0.
Setting	Range: PREVision6
Query	Range: 6
*RST Setting	PREV6
Programming Example `OUTPUT 714;"CALL:CELL:PROT PREV6"`	

CALL:QPCHannel



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CALL:QPCHannel[:SLEVel]:RTPilot[:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward quick paging channel (QPCH) level relative to the pilot level, and (2) turns the QPCH state to ON. The query form returns the QPCH level relative to the pilot level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. The QPCH channel is slotted (pulsed). When the state of the QPCH is on (see "CALL:QPCHannel:STATe"), OCNS is calculated based on the channel power when QPCH is present in the signal. When the QPCH state is off, the output power is not fully calibrated.
Query	Range: +2 to -5 dB Resolution: integer
*RST Setting	-3

Programming Example
`OUTPUT 714;"CALL:QPCHANNEL:SLEVEL:RTPILOT:SELECTED?"`
`! Sets the QPCH level state to on and queries the QPCH level relative to the pilot power.`	

CALL:QPCHannel:LEVel[:RTCell][:SELected]?

Function	Queries the forward quick paging channel (QPCH) level relative to the cell power level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.
Query	Range: 0 to -15 dB, NAN Resolution: 0.01 dB
*RST Setting	-10 dB
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"`	

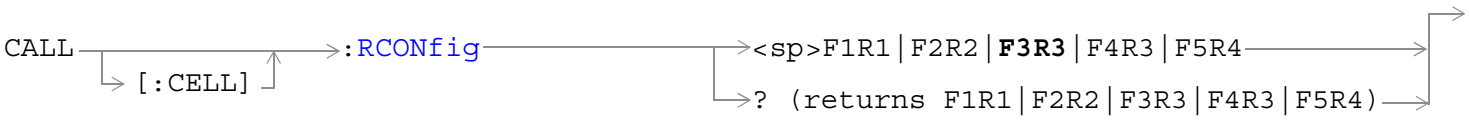
CALL:QPCHannel:LEVel:RTPilot[:SELected]

Function	Sets/queries the forward quick paging channel (QPCH) level relative to the pilot level The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. The QPCH channel is slotted (pulsed). The test set adjusts OCNS (orthogonal channel noise simulator) to an appropriate level for the periods of time when the slotted QPCH signal is pulsed on. When QPCH is pulsed off, the output level will not be fully calibrated.
Query	Range: +2 to -5 dB Resolution: integer
*RST Setting	-3
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:LEVEL:RTPILOT:SELECTED?" !queries the QPCH level relative to the pilot level.`	

CALL:QPCHannel:STATe

Function	Sets/queries the forward quick paging channel's (QPCH) state. When the state of the forward QPCH channel is on, the test set will transmit it even if the mobile station does not support QPCH. The QPCH channel is slotted (pulsed). The test set adjusts OCNS (orthogonal channel noise simulator) to an appropriate level for the periods of time when the slotted QPCH signal is pulsed on. When QPCH is pulsed off, the output level will not be fully calibrated.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:STATE ON" !Turns on the quick paging channel.`	

CALL[:CELL]:RCONfig

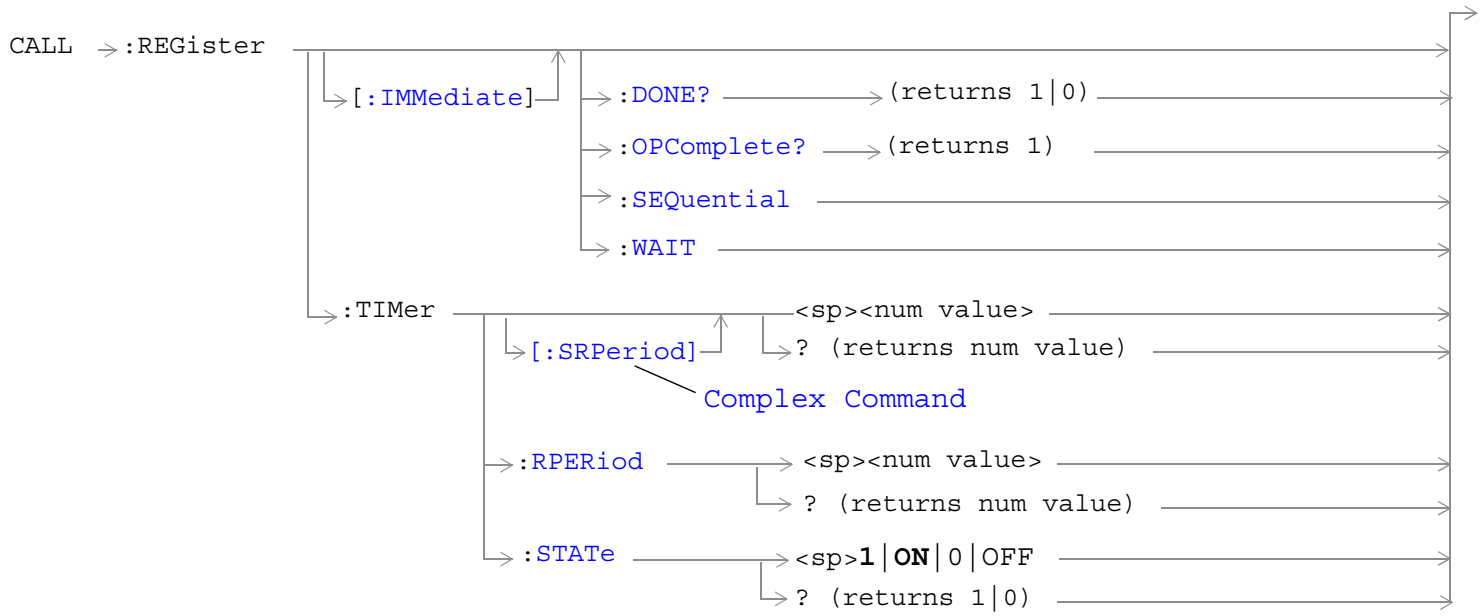


"Diagram Conventions" on page 171

CALL[:CELL]:RCONfig

Function	Sets/queries the current radio configuration. The radio configuration specifies the base data rate and service options supported. Data rates for the F-FCH can be set using the "CALL:TRAFfic" commands. Data rates for the F-SCH can be set using the "CALL:SCHannel" commands. Radio configurations are often referred to in a shorthand terms. These terms are: • RC1 (for F1R1) • RC2 (for F2R2) • RC3 (for F3R3) • RC4 (for F4R3) • RC5 (for F5R4)
Setting	Range: F1R1 | F2R2 | F3R3 | F4R3 | F5R4
Query	Range: F1R1 | F2R2 | F3R3 | F4R3 | F5R4
*RST Setting	F3R3
Programming Example `OUTPUT 714;"CALL:CELL:RCONFIG F1R1" !Sets the radio configuration to RC1.`	

CALL:REGister



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CALL:REGister[:IMMediate]

Function	Generates a zone based (forced) registration.
Programming Example `OUTPUT 714;"CALL:ORIGINATE"`	

CALL:REGister[:IMMediate]:DONE?

Function	See “Call Processing Event Synchronization” .
Query	Range: 1 | 0
Programming Example `OUTPUT 714;"CALL:ORIGINATE:DONE?"`	

CALL:REGister[:IMMediate]:OPComplete?

Function	See “Call Processing Event Synchronization” .
Query	Range: 1
Programming Example `OUTPUT 714;"CALL:ORIGINATE:OPCOMPLETE?"`	

CALL:REGister[:IMMediate]:SEQuential

Function	See “Call Processing Event Synchronization” .
Programming Example `OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL"`	

CALL:REGister[:IMMediate]:WAIT

Function	See “Call Processing Event Synchronization” .
Programming Example `OUTPUT 714;"CALL:ORIGINATE:WAIT"`	

CALL:REGister:TIMer[:SRPeriod]

Function	Sets the time between time based registrations (when timer based registration is on) and turns the timer based registration state to on. The value is not the actual time. The registration period is used in the following equation to determine the time between registrations: time between registrations= [integer portion of $2^{(reg_period/4)}$] x 0.08 seconds
Setting	Range: 29 to 85 Resolution: integer
Query	Range: 29 to 85
*RST Setting	29 (12 seconds)

Programming Example
`OUTPUT 714;"CALL:REGISTER:TIMER:SRPERIOD 35"`
`!Turns the timer's state on, and sets the registration period to 35.`	

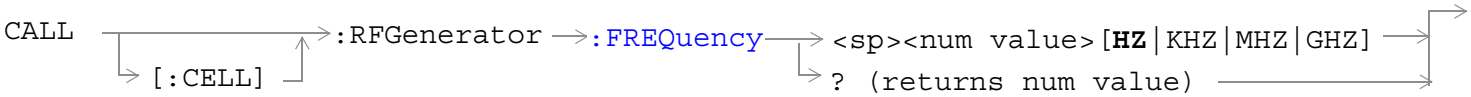
CALL:REGister:TIMer:STATe

Function	Sets the state of timer based registrations.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:REGISTER:TIMER:STATE OFF"`	

CALL:REGister:TIMer:RPERiod

Function	Sets the time between time based registrations (when timer based registration is on). The value is not the actual time. The registration period is used in the following equation to determine the time between registrations. time between registrations = [integer portion of $2^{(reg_period/4)}$] x 0.08 seconds
Setting	Range: 29 to 85 Resolution: integer
Query	Range: 29 to 85
*RST Setting	29 (12 seconds)
Programming Example `OUTPUT 714;"CALL:REGISTER:TIMER:RPERIOD 35"`	

CALL[:CELL]:RFGenerator



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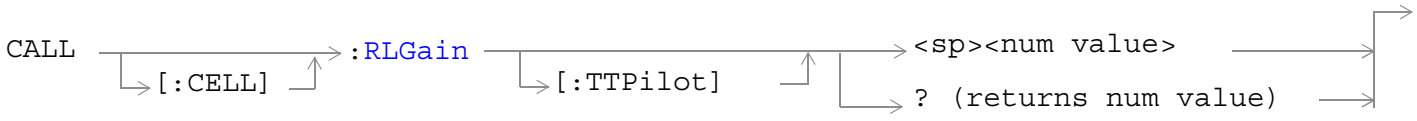
CALL[:CELL]:RFGenerator:FREQuency

Function	Sets/queries the RF generator CDMA forward channel frequency. If no units are specified the setting defaults to Hz. The test set will tune to the frequency entered using this command when the "CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO" command is set to manual.
Setting	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
*RST Setting	851 MHz

Programming Example
 	
`OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY 450 MHZ"`
`!Sets the CDMA forward channel frequency to 450 MHz.`	

CALL:[:CELL]:RLGain



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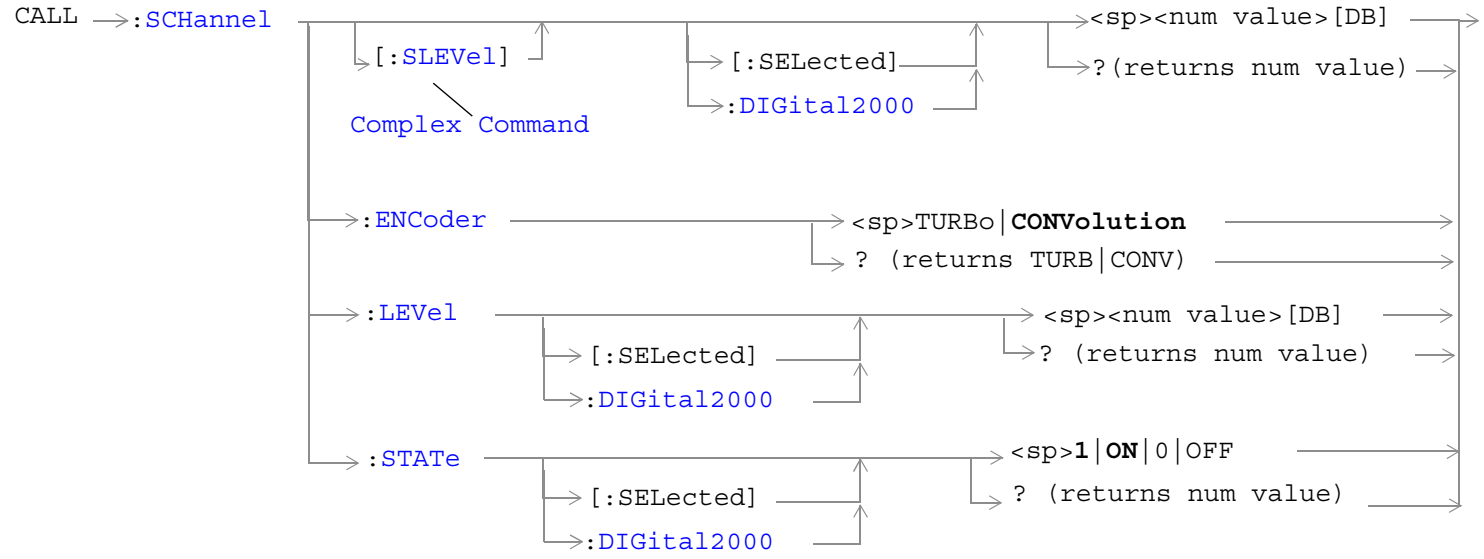
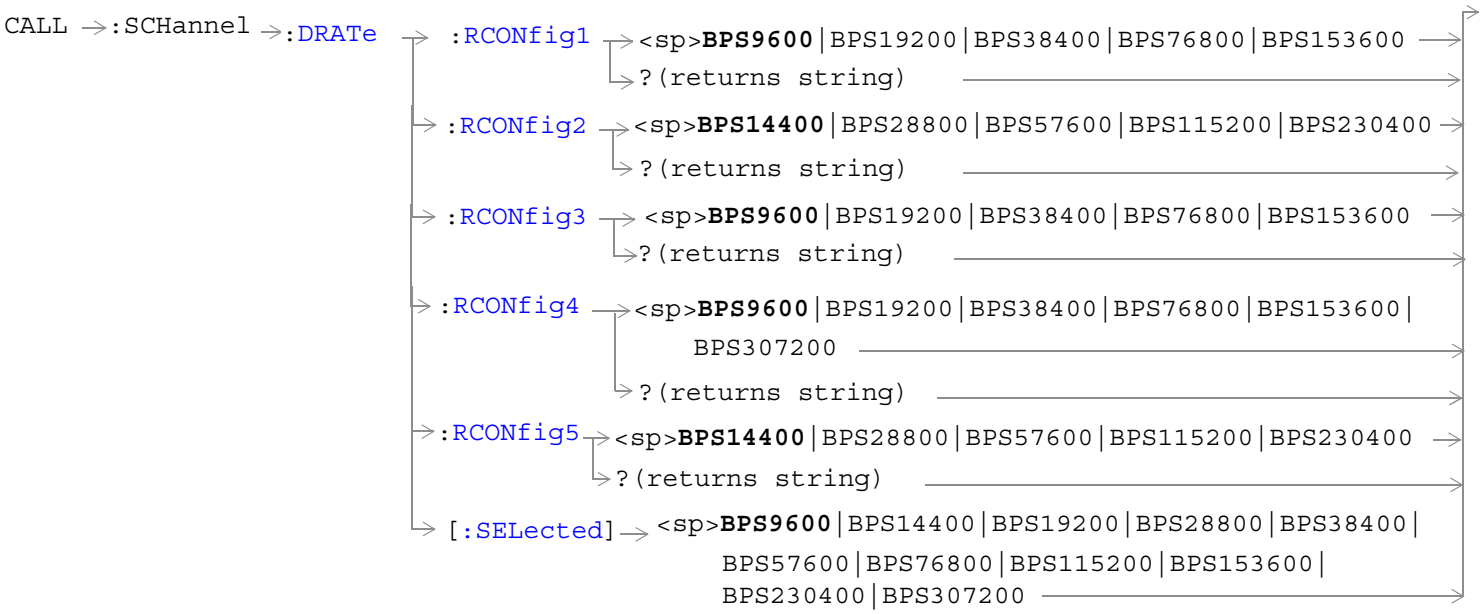
CALL[:CELL]:RLGain[:TTPilot]

Function	Sets/queries reverse link, traffic-to-pilot level (RLGAIN_TRAFFIC_PILOT) gain. RLGAIN_TRAFFIC_PILOT is sent in an overhead message to the mobile station and is used by the mobile station to adjust the reverse channel traffic channel level, relative to the reverse channel pilot. This parameter applies only when the current radio configuration is greater than 2. Each integer translates into a 1/8 dB step.
Setting	Range: -32 to +31 Resolution: integer
Query	Range: -32 to+31 Resolution: integer
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:CELL:RLGAIN:TTPILOT 8"`	

CALL:SCHannel





Note: Data rates used with the SELected keyword must be compatible with the currently selected radio configuration. If a data rate that does not belong to the selected radio configuration's rate set is used, an error message will be generated.

See "Diagram Conventions" on page 171

CALL:SCHannel[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the level of the forward supplemental channel (SCH), and (2) turns the state of the SCH on. The query form of this command returns the level of the SCH. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB

Programming Example
 	
`OUTPUT 714;"CALL:SCHANNEL:SLEVel:SELECTED -10"`
`!Sets the cell's forward supplemental channel state to on and the level to -10 dB.`	

CALL:SCHannel:ENCoder

Function	Sets/queries which encoder is used for the supplemental data. If the SCH data rate has been set to the base rate for the current radio configuration (base rates are data rates below 19.2 kbps), the convolutional encoder is used regardless of this parameter setting. If the SCH data rate has been set to the highest rate available for the current radio configuration, the convolutional encoder is used regardless of this parameter setting. The current radio configuration is selected by the "CALL[:CELL]:RCONfig" command.
Setting	Range: TURBo | CONVolution
Query	Range: TURB | CONV
*RST Setting	CONVolution
Programming Example `OUTPUT 714;"CALL:SCHANNEL:ENCODER TURBO" !Sets the SCH encoder to turbo mode.`	

CALL:SCHannel:LEVel[:SELected]

Function	Sets/queries the level of the forward supplemental channel (SCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
Programming Example `OUTPUT 714;"CALL:SCHANNEL:LEVEL:SELECTED -10"`	

CALL:SCHannel:STATe[:SELected]

Function	Sets/queries the on/off state of the forward supplemental channel (SCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON

Programming Example
`OUTPUT 714;"CALL:SCHANNEL:STATE:SELECTED OFF"`
`!Turns off the forward supplemental channel.`	

CALL:SCHannel:DRATe:[:SELected]

Function	Sets/queries the data rate of the currently selected radio configuration. To find out which radio configuration is currently selected, see "CALL[:CELL]:RCONfig" . Entering a data rate that is not included in the radio configuration's set of valid entries will cause the test set to generate an error message.
Setting	Range: See command descriptions for RCONfig1 through RCONfig5.
Query	Range: See command descriptions for RCONfig1 through RCONfig5.
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE?" Queries the data rate for the currently selected radio configuration`	

CALL:SCHannel:DRATe:RCONfig1

Function	Sets/queries the data rate of the radio configuration 1 (RC1) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG1 BPS38400"`	

CALL:SCHannel:DRATe:RCONfig2

Function	Sets/queries the data rate of the radio configuration 3 (RC3) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
*RST Setting	BPS14400
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG2 BPS28800"`	

CALL:SCHannel:DRATe:RCONfig3

Function	Sets/queries the data rate of the radio configuration 3 (RC3) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG3 BPS38400"`	

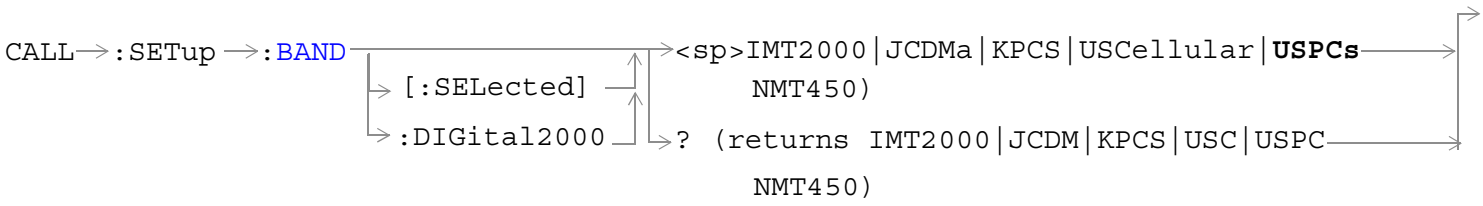
CALL:SCHannel:DRATe:RCONfig4

Function	Sets/queries the data rate of the radio configuration 4 (RC4) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600 | BPS307200
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600 | BPS307200
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG4 BPS76800"`	

CALL:SCHannel:DRATe:RCONfig5

Function	Sets/queries the data rate of the radio configuration 5 (RC5) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
*RST Setting	BPS14400
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG5 BPS57600"`	

CALL:SETup:BAND



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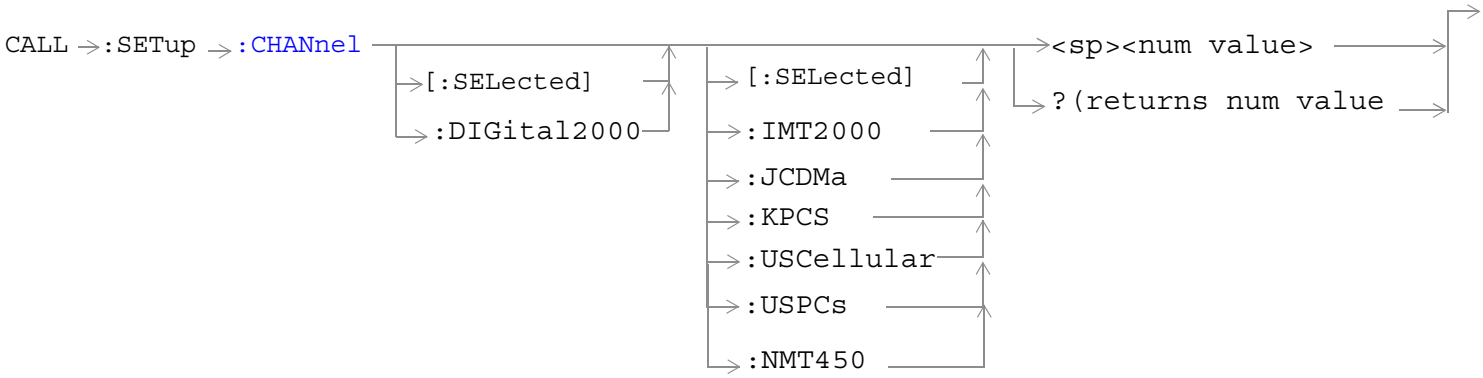
CALL:SETup:BAND:[:SELected]

Function	Sets/queries the frequency band that the mobile station will be handed off to. Frequency bands are associated with a handoff system type, and the "CALL:SETup:SYSTem" command determines the current handoff system type. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current handoff system type. To initiate a handoff, see the "CALL:HANDoff" command description.
Setting	Range: • DIGital2000: IMT2000|JCDMa|KPCS |USCellular|USPCs|NMT450
Query	Range: • DIGital2000: IMT2000|JCDMa|KPCS |USCellular|USPCs|NMT450
*RST Setting	USPCs

Programming Example
`OUTPUT 714;"CALL:SETUP:BAND KPCS"`
`!Sets the handoff frequency band to Korean PCS cell band for handoffs to the IS-2000 system type.`	

CALL:SETup:CHANnel



"Diagram Conventions" on page 171

CALL:SETup:CHANNel[:SELected][:SELected]

Function	Sets/queries the handoff physical channel. The handoff physical channel number is associated with a handoff system type and a handoff cell band. The first optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current handoff system type. See "CALL:SETup:SYSTem" to query or change the current handoff system type. The second optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current handoff cell band. See "CALL:SETup:BAND" to query or change the current handoff cell band. Specifying a non-current handoff system type or handoff cell band when setting a channel number will cause the test set to store the channel number. Specifying a non-current handoff system type or handoff cell band when querying a channel number will return a stored channel number that is not current. To initiate a handoff, see the "CALL:HANDoff" command description.
Setting	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199 • NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016
Query	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199 • NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016
*RST Setting	Channel 525 (IS-2000 system, U.S. PCS band)

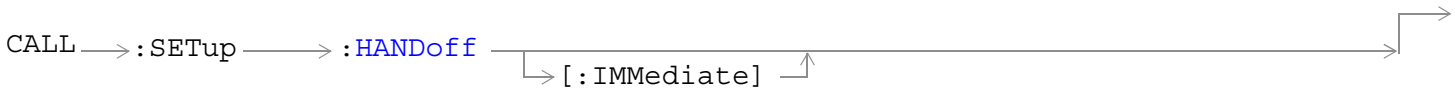
Programming Example

```
OUTPUT 714;"CALL:SETUP:CHANNEL?"
!Queries the channel number of the current handoff system and band.

OUTPUT 714;"CALL:SETUP:CHANNEL 384"
!Sets the channel number of the current handoff system and band.

OUTPUT 714;"CALL:SETUP:CHANNEL:DIGital2000:KPCS 384"
!Sets the handoff channel number for the IS-2000 system and Korean PCS band to 384. If this system
!and band are not being handed off to, the value 384 is stored and will be transmitted when Digital
!2000 and Korean PCS are handed off to.
```

CALL:SETup:HANDoff

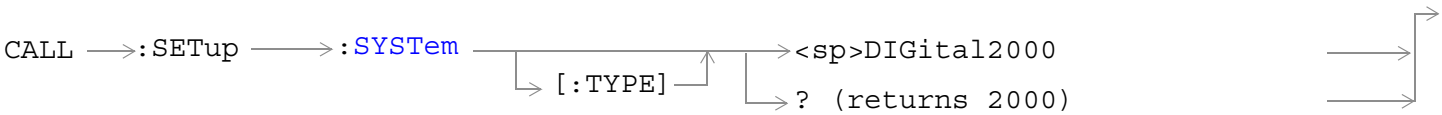


"Diagram Conventions" on page 171

CALL:SETup:HANDoff[:IMMediate]

Function	Initiates a handoff within the current system or between systems.
Programming Example `OUTPUT 714;"CALL:SETUP:HANDOFF:IMMEDIATE"`	

CALL:SETup:SYSTem



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CALL:SETup:SYSTem[:TYPE]

Function	Sets/queries the system type that will the mobile station will be handed off to when the "CALL:HANDoff" command is used. If handoff system type is the same as active cell system type (see "CALL[:CELL]:SYSTem"), the mobile station will be handed off within the current system. If handoff system type is different than active cell system type, the call will be handed off to the system indicated by this command.
Setting	Range: DIGital2000
Query	Range: 2000
*RST Setting	DIG2000
Programming Example `OUTPUT 714;"CALL:SETUP:SYSTEM:TYPE DIG2000" !Selects IS-2000 as the handoff system type.`	

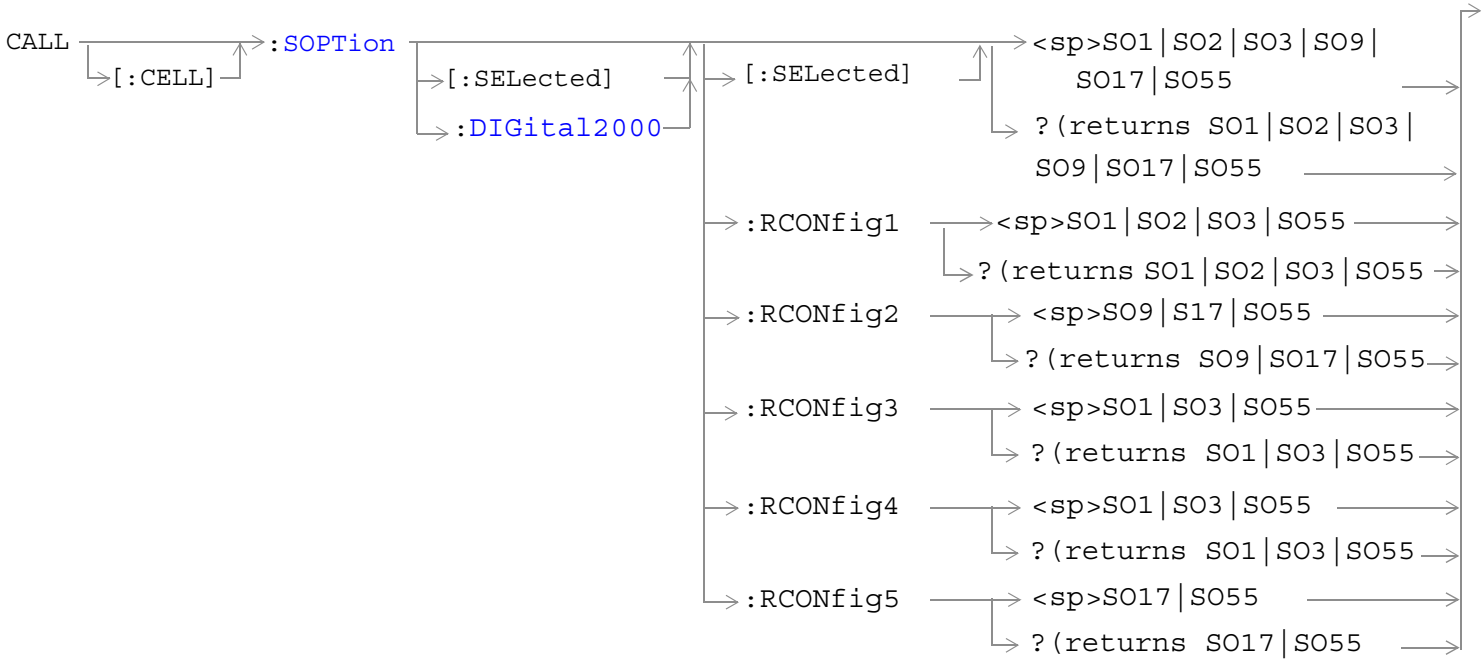
CALL[:CELL]:SIDentity

"Diagram Conventions" on page 171

CALL[:CELL]:SIDentity

Function	Sets/queries the system identification number.
Setting	Range: 0 to 32767
Query	Range: 0 to 32767
*RST Setting	231
Programming Example `OUTPUT 714;"CALL:CELL:SIDENTITY 231" !Sets the system identifier to 231.`	

CALL[:CELL]:SOPTION



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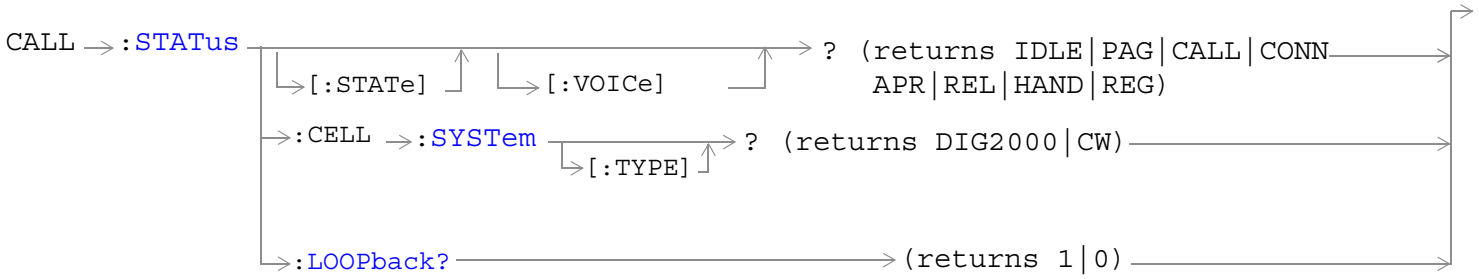
CALL[:CELL]:SOPTion[:SELected][:SELected]

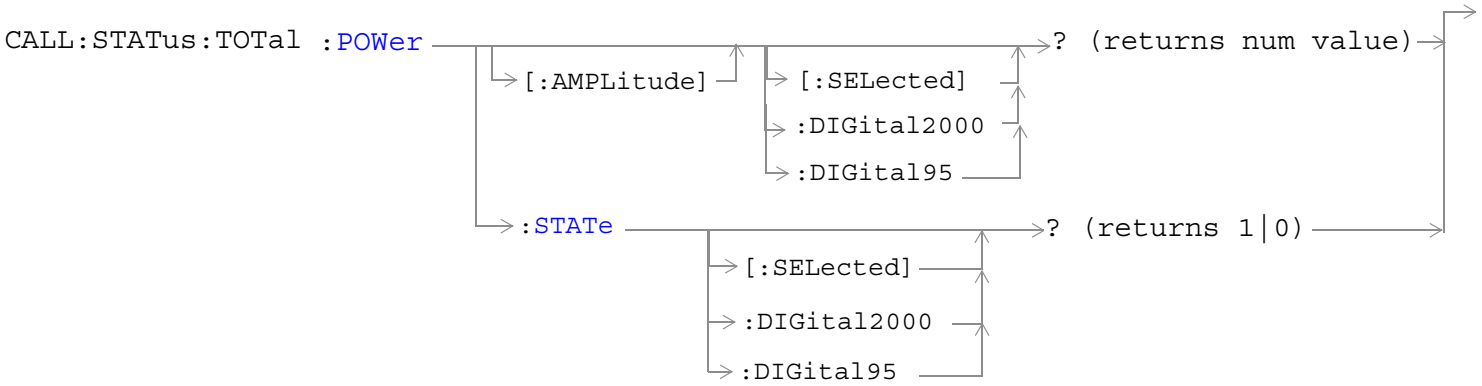
Function	Sets/queries the service option for the system type and radio configuration specified by command parameters. The first optional [:SELected] keyword in this command specifies that the service option being set/queried applies to the current system type. The second optional [:SELected] keyword in this command specifies that the service option being set/queried applies to the current radio configuration. Specifying a non-current radio configuration when setting a service option will cause the test set to store that service option for use when the specified radio configuration is current. Specifying a non-current radio configuration when querying a service option will return a stored service option that is not the current service option. To set (make current) a radio configuration or query the current radio configuration, use the "CALL[:CELL]:RCONfig" command.
Setting	Range: SO1|SO2|SO3|SO9|SO17|SO55
Query	Range: SO1|SO2|SO3|SO9|SO17|SO55
*RST Setting	SO2 for RCONfig1, RCONfig3, and RCONfig4. SO17 for RCONfig2 and RCONfig5

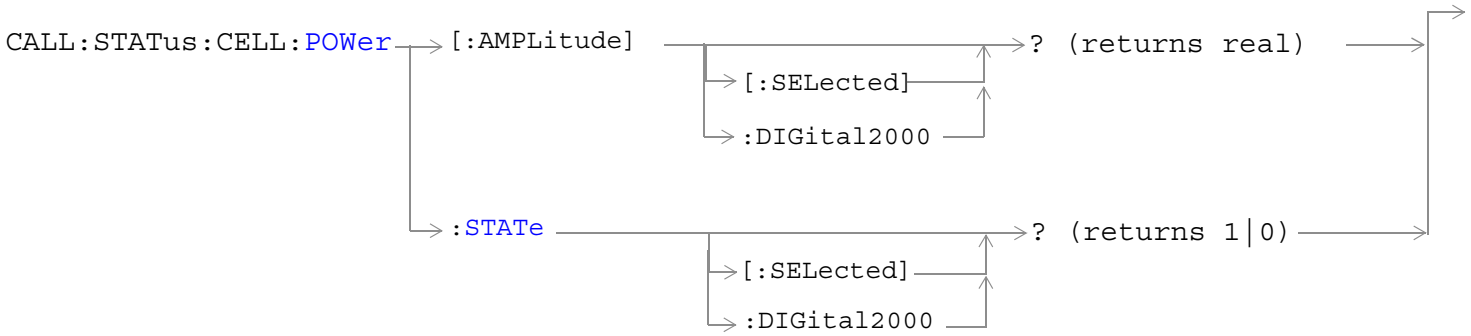
Programming Example

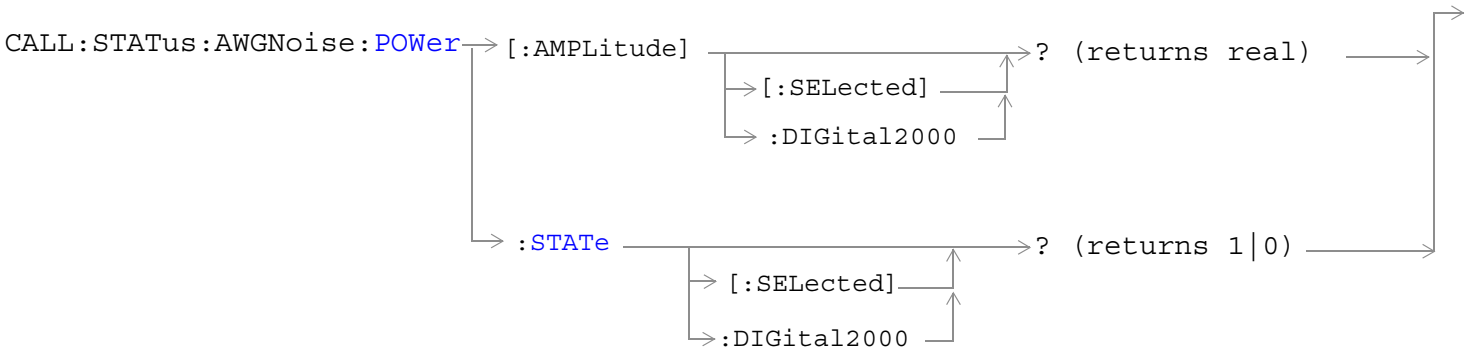
```
OUTPUT 714;"CALL:CELL:SOPTION?"
!Queries the service option of the currently selected system type and radio configuration.

OUTPUT 714;"CALL:CELL:SOPTION SO3"
!Selects service option 3 for the currently selected system type and radio configuration.


OUTPUT 714;"CALL:CELL:SOPTION:DIGital2000:RCONFIG3 SO3"
!Sets the service option for the digital 2000 system and radio configuration 3 to service option 3.
!If this system and radio configuration are not current, service option 3 is stored and will be
!used when digital 2000 and radio configuration 3 are current.
```

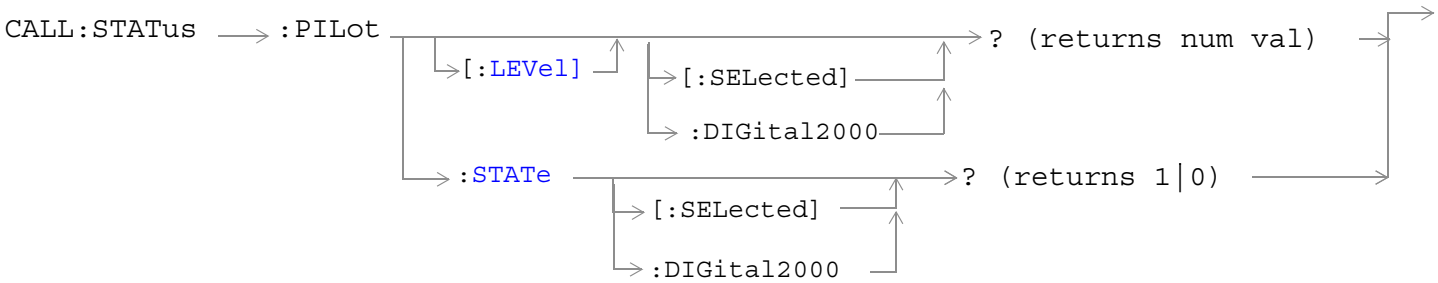
CALL:STATus

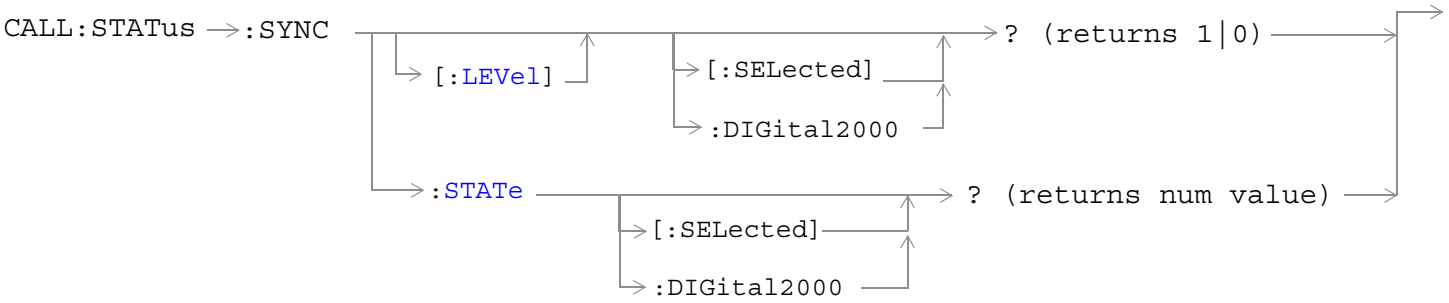

CALL
:STATus
[:STATe]
[:VOICe]
? (returns IDLE|PAG|CALL|CONN
APR|REL|HAND|REG)
:CELL
:SYSTem
[:TYPE]
? (returns DIG2000|CW)
:LOOPback?
(returns 1|0)

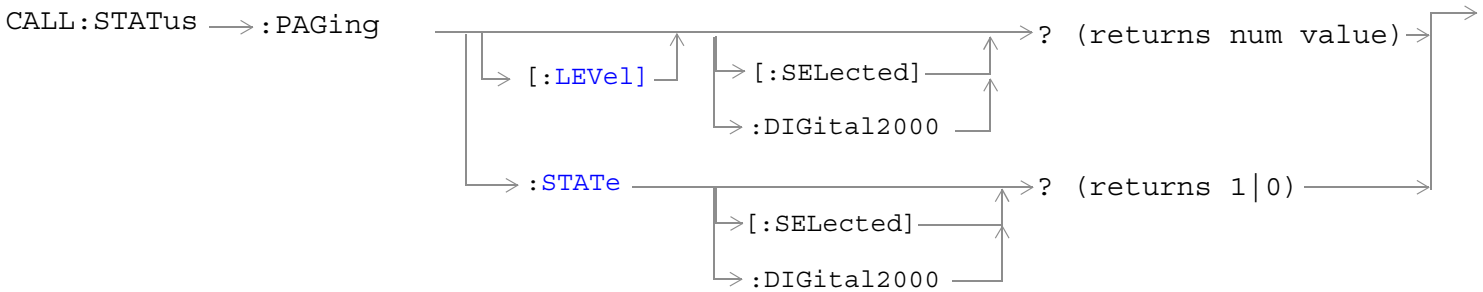

CALL:STATus:TOTal
:POWer
[:AMPLitude]
[:SELected]
:DIGital2000
:DIGital95
? (returns num value)
:STATe
[:SELected]
:DIGital2000
:DIGital95
? (returns 1|0)


CALL:STATus:CELL:POWer
[:AMPLitude]
[:SELected]
:DIGital2000
? (returns real)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus:AWGNoise:POWer
[:AMPLitude]
[:SELected]
:DIGital2000
? (returns real)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus
:PILot
[:LEVel]
[:SELected]
:DIGital2000
? (returns num val)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus
:SYNC
[:LEVel]
[:SELected]
:DIGital2000
? (returns 1|0)
:STATe
[:SELected]
:DIGital2000
? (returns num value)


CALL:STATus
:PAGing
[:LEVel]
[:SELected]
:DIGital2000
? (returns num value)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)

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CALL:STATus[:STATe]?

Function	Queries the status of the call. Status can be idle, paging, call (alerting), connected, access probe, releasing, handoff, or registering.
Query	Range: IDLE | PAG | CALL | CONN | APR | REL | HAND | REG
*RST Setting	IDLE
Programming Example `OUTPUT 714;"CALL:STATUS?" !Returns the current call processing state.`	

CALL:STATus:CELL:SYSTem[:TYPE]?

Function	Queries the current system type that the test set is currently emulating. When the test set is in active cell operating mode (see "CALL[:CELL]:OPERating") the current system type is selected by the "CALL[:CELL]:SYSTem" command. When the test set is in any test mode operating mode (see "CALL[:CELL]:OPERating") or CW operating mode this command will return the corresponding system type.
Query	Range: DIG2000 | CW
*RST Setting	DIG2000
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:SYSTEM:TYPE?"`	

CALL:STATus:LOOPback?

Function	Queries the current loopback mode. Loopback mode indicates if the selected service option is currently SO2 or SO9 (loopback) and a call is connected in the current system. (The test set does not attempt to verify that data is actually being looped back by the mobile station when responding to this query). Loopback mode is set using the "CALL[:CELL]:SOPTION" command.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:LOOPBACK?"`	

CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?

Function	Queries the total RF power of the currently selected system type. The total RF power is equal to the sum of the cell power setting (see "CALL[:CELL]:POWer") and the AWGN setting (see "CALL:AWGNoise:POWer").
Query	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset), 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:TOTAL:POWER:AMPLITUDE:SELECTED?"`	

CALL:STATus:TOTal:POWer:STATe[:SELected]?

Function	Queries the current total RF power measurement's state for the currently selected system type. This query will return a 1 (on) if either current cell power ("CALL[:CELL]:POWer") or current AWGN ("CALL:AWGNoise:POWer") power states are on.
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:STATUS:TOTAL:POWER:STATE:SELECTED?"`	

CALL:STATus:CELL:POWer:AMPLitude[:SELected]?

Function	Queries the current cell power for the selected system type. Cell power is set using the "CALL[:CELL]:POWer" commands.
Query	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset if on). Resolution: 0.01 dB
*RST Setting	-55.0 dBm/1.23 MHz
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:POWER:AMPLITUDE:SELECTED?"`	

CALL:STATus:CELL:POWer:STATe[:SELected]?

Function	Queries the state of the cell power measurement for the currently selected system type. Cell power state is set using the "CALL[:CELL]:POWer" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:POWER:STATE:SELECTED?"`	

CALL:STATus:AWGNoise:POWer:AMPLitude[:SELected]?

Function	Queries the current power level of the additive white Gaussian noise (AWGN) source for the currently selected system type. AWGN power level is set using the "CALL:AWGNoise:POWer" commands.
Query	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset, if on). Resolution: 0.01 dB
*RST Setting	-54.0 dBm/1.23 MHz

Programming Example
`OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:AMPLITUDE:SELECTED?"`
`!Queries the current AWGN power for the current system type.`	

CALL:STATus:AWGNoise:POWer:STATe[:SELected]?

Function	Queries the current on/off state of the additive white Gaussian noise (AWGN) source for the currently selected system type. AWGN power level on/off state is set using the "CALL:AWGNoise:POWer" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:STATE:SELECTED?"`	

CALL:STATus:PILot:LEVel[:SELected]?

Function	Queries the current forward pilot level for the currently selected system type. Forward pilot level is set using the "CALL:PILot" commands.
Query	Range: 0 to -10 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:PILOT:LEVEL:SELECTED?"`	

CALL:STATus:PILot:STATe[:SELected]?

Function	Queries the current forward channel pilot level state for the currently selected system type. Forward pilot level on/off state is set using the "CALL:PILot" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:PILOT:STATE:SELECTED?"`	

CALL:STATus:SYNC:LEVel[:SELected]?

Function	Queries the current forward sync channel level for the currently selected system type. The forward sync channel level is set using the "CALL:SYNC" commands.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:SYNC:LEVEL:SELECTED?"`	

CALL:STATus:SYNC:STATe[:SELected]?

Function	Queries the current sync channel level state for the currently selected system type. The forward sync channel level on/off state is set using the "CALL:SYNC" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:SYNC:STATE:SELECTED?"`	

CALL:STATus:PAGing:LEVel[:SELected]?

Function	Queries the current paging level for the currently selected system type. The forward paging channel level is set using the "CALL:PAGing" commands.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:PAGING:LEVEL:SELECTED?"`	

CALL:STATus:PAGing:STATe[:SELected]?

Function	Queries the current paging level state for the currently selected system type. The forward paging channel level is set using the "CALL:PAGing" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:PAGING:STATE:SELECTED?"`	

CALL:STATus:QPCHannel[:LEVel][:RTCell][:SELected]?

Function	Queries the current forward quick paging channel (QPCH) level, relative to the cell power level. The forward quick paging channel level is set using the "CALL:QPCHannel" commands.
Query	Range: 0 to -15 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"`	

CALL:STATus:QPCHannel[:LEVel]:RTPilot[:SELected]?

Function	Queries the current forward quick paging channel (QPCH) level, relative to the pilot level. The forward quick paging channel level is set using the "CALL:QPCHannel" commands.
Query	Range: +2 to -5 dB, 9.91 E+37 Resolution: integer
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:LEVEL:RTPILOT:SELECTED?"`	

CALL:STATus:QPCHannel:STATe?

Function	Queries the current on/off state of the forward quick paging channel (QPCH). When the QPCH is set to off, the current QPCH level will be set to 9.91 E+37. The forward quick paging channel on/off state is set using the "CALL:QPCHannel" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:STATE?"`	

CALL:STATus:FCHannel:LEVel[:SELected]?

Function	Queries the current forward fundamental channel (FCH) level. The forward fundamental channel level is set using the "CALL:FCHannel" commands.
Query	Range: 0 to 30 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:FCHANNEL:LEVEL?"`	

CALL:STATus:FCHannel:STATe[:SELected]?

Function	Queries the current forward fundamental channel (FCH) on/off state. The forward fundamental channel on/off state is set using the "CALL:FCHannel" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:FCHANNEL:STATE:DIGITAL2000?"`	

CALL:STATus:SCHannel:LEVel[:SELected]?

Function	Queries the current forward supplemental channel (SCH) level. The forward supplemental channel level is set using the "CALL:SCHannel" commands.
Query	Range: 0 to 30 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:SCHANNEL:LEVEL?"`	

CALL:STATus:SCHannel:STATe[:SELected]?

Function	Queries the current on/off state of the forward supplemental channel (SCH). The forward supplemental channel on/off state is set using the "CALL:SCHannel" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:SCHANNEL:STATE?"`	

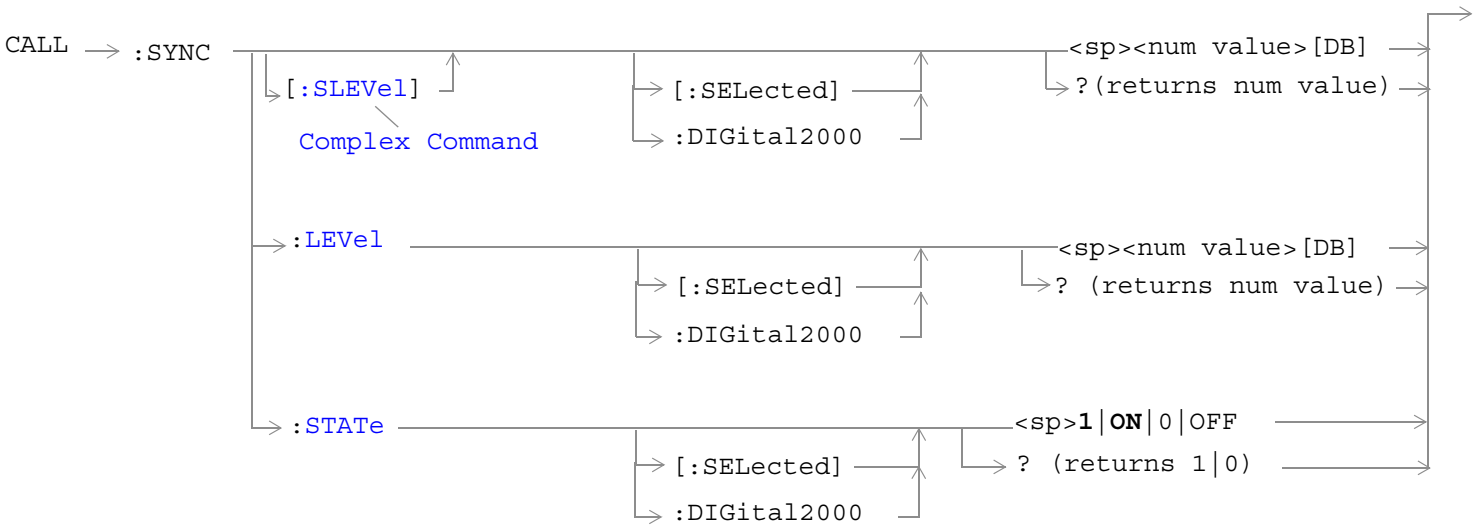
CALL:STATus:OCNSource[:LEVel][:SELected]?

Function	Queries the orthogonal channel noise source (OCNS) level for the selected system type. The OCNS level is set using the "CALL:OCNSource" commands.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:OCNSOURCE:LEVEL:SELECTED?"`	

CALL:STATus:OCNSource:STATe[:SELected]?

Function	Queries the current on/off state of the orthogonal channel noise simulator channel (OCNS). The OCNS channel on/off state is set using the "CALL:OCNSource" commands.
Query	Range: 1 | 0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:OCNS:STATE:SELECTED?"`	

CALL:SYNC



"Diagram Conventions" on page 171

CALL:SYNC[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the sync channel (SYNCH) level, and (2) turns the SYNCH state to ON. The query form returns the SYNCH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-16 dB

Programming Example
`OUTPUT 714;"CALL:SYNC:SLEVel -16"`
`!Sets the SYNCH state to ON and sets the level to -16 dB.`	

CALL:SYNC:LEVel[:SELected]

Function	Sets/queries the forward pilot channel (SYNCH) level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-16 dB
Programming Example `OUTPUT 714;"CALL:SYNC:LEVEL -16" !Set the SYNCH channel level to -16 dB.`	

CALL:SYNC:STATe[:SELected]

Function	Sets/queries the synchronization (SYNCH) channel state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:SYNC:STATE OFF" !Turns off the SYNCH channel.`	

CALL[:CELL]:SYSTem

"Diagram Conventions" on page 171

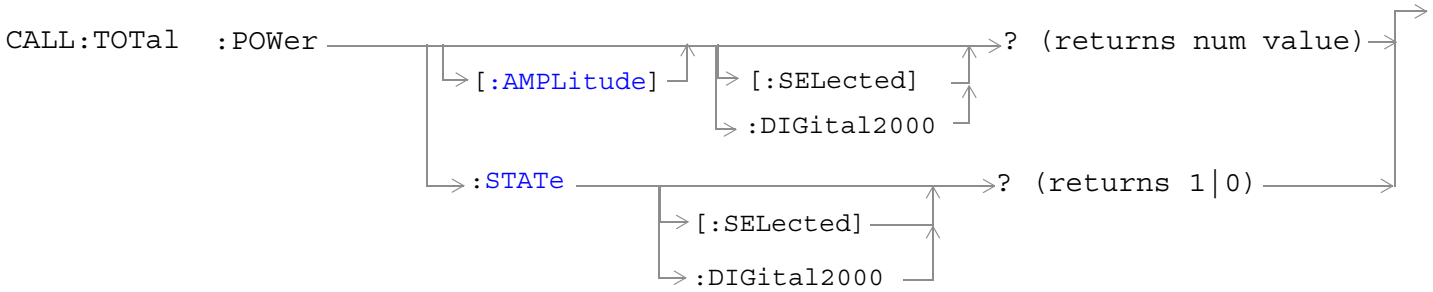
CALL[:CELL]:SYSTem[:TYPE]

Function	Sets/queries the active cell system type.
Setting	Range: DIGital2000
Query	Range: DIG2000
*RST Setting	DIGital2000

Programming Example

```
OUTPUT 714;"CALL:CELL:SYSTEM:TYPE DIG2000"
!Sets the system type to DIGital2000.
```

CALL:TOTal:POWer



"Diagram Conventions" on page 171

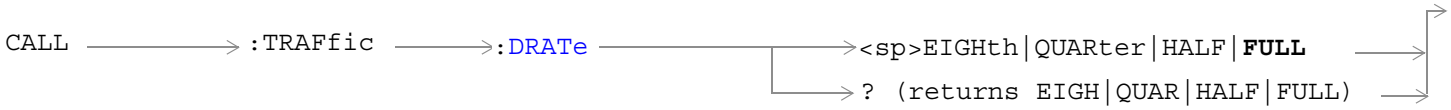
CALL:TOTal:POWer[:AMPLitude][:SELected]?

Function	Queries the total RF power settings for the current system type. Total RF power is the sum of cell power level and AWGN power level. The return value for this query is not necessarily the power level being transmitted by the test set at the moment this command is processed by the test set. It may return a value that the test set has been requested to transmit, but that has been pended or delayed for some reason. To query the power level the test set is transmitting at the moment the command is sent, use the "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" command. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Query	Range: -170 dBm/1.23 MHz to +35 dBm/1.23 MHz, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:AMPLITUDE:SELECTED?"`	

CALL:TOTal:POWer:STATe[:SELected]?

Function	Queries the total RF power state for the current system type. The total RF power state is 1 (on) if either cell power or AWGN power is on. The return value for this query is not necessarily the total power state at the moment this command is processed by the test set. This command may return a state that has been requested of the test set, but that has been pended or delayed for some reason.To query the power state of the test set at the moment, use the "CALL:STATus:TOTal:POWer:STATe[:SELected]?" command. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:STATE:SELECTED?"`	

CALL:TRAFfic

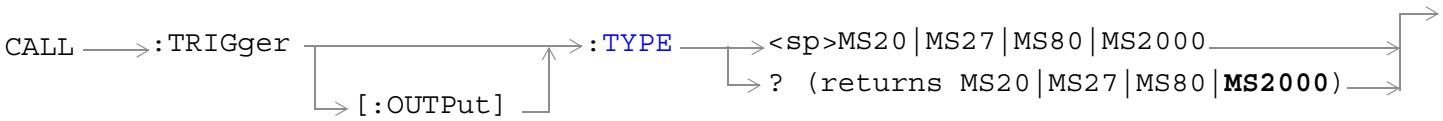


"Diagram Conventions" on page 171

CALL:TRAFfic:DRATe

Function	Sets/queries the traffic channel (TCH) and fundamental channel (FCH) data rates used when a loopback service option is selected (see "CALL[:CELL]:SOPTION"). TCH data rate is not applied when a call is in echo mode (service options 1,3,17, and 32768). If one of these service options is selected, the data rate is stored. It will be applied when a loopback service option is selected.
Setting	Range: EIGHth | QUARter | HALF | FULL
Query	Range: EIGH | QUAR | HALF | FULL
*RST Setting	Full
Programming Example `OUTPUT 714;"CALL:TRAFfic:DRATE HALF" !Set the data rate to half.`	

CALL:TRIGger:TYPE



"Diagram Conventions" on page 171

CALL:TRIGger[:OUTPut]:TYPE

Function	Sets/queries the frame clock that is routed to the TRIG OUT rear panel connector. See "Rear Panel Connectors" on page 457. Each choice consists of a CDMA frame clock period. For example, MS20 is the 20 millisecond frame clock. The triggers are based on the internally generated frame clock. There is no on/off state setting for external triggers.
Setting	Range: MS20 | MS27 | MS80 | MS2000
Query	Range: MS20 | MS27 | MS80 | MS2000
*RST Setting	MS2000 (2 seconds)

Programming Example
`OUTPUT 714;"CALL:TRIGGER:OUTPUT:TYPE MS27"`
`!Sets the external trigger signal to 26.67 ms.`	

DISPlay Subsystem

Description

The DISPlay subsystem is used to configure the test set's display mode or display brightness . Use of the DISPlay subsystem is not required to set or query any data or results.

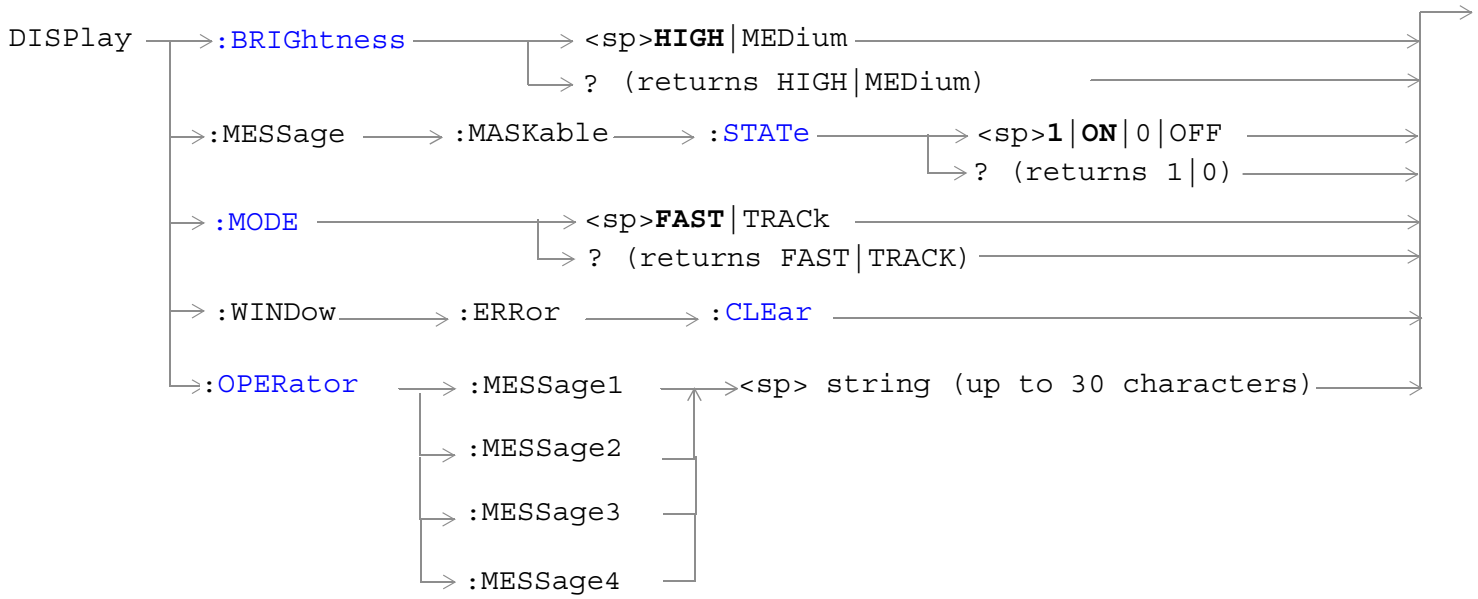
Display Backlight Dimming

The test set's display brightness parameter has two settings at this time, high and medium. The life of the display's backlight will be maximized when brightness is set to medium. The test set has an auto dimming feature that will lower the display brightness automatically if approximately 10 minutes pass without a key being pressed on the test set's front panel. The display will return to the brightness level shown in the Display Brightness field when the test set is set to local and any front panel key is pressed. There is no other user control for this feature.

Syntax Diagram and Command Descriptions

"DISPlay"

DISPlay



"Diagram Conventions" on page 171

DISPlay:BRIGhtness

Function	Sets/queries the test set's display brightness. A display backlight dimming feature lowers the display brightness after approximately 10 minutes without any manual user interaction with the test set. See "Display Backlight Dimming" on page 294.
Setting	Range: MEDium | HIGH
Query	Range: MED | HIGH
Factory setting	HIGH (this parameter is not affected by any reset operation and can only be changed by direct user access)
Programming Example `OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" !Sets display brightness to medium.`	

DISPlay:MESSage:MASKable:STATe

Function	Blocks maskable messages from appearing on the test set display screen but not from the Message Log. Maskable messages are reported to the Message Log in either state. See "Error Messages" on page 474.
Setting	Range: On | Off
Query	Range: On | Off
Factory setting	On

Programming Example
`OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF"`
`!Prevents certain messages from appearing on the display.`	

DISPlay:MODE

Function	Sets/queries the test set's display mode. See "Display Mode (Track/Fast)" for a description of fast and track display modes.
Setting	Range: FAST | TRACK
Query	Range: FAST | TRAC
*RST setting	TRACK
Programming Example `OUTPUT 714;"DISPLAY:MODE FAST" !Sets display mode to fast.`	

DISPlay:WINDow:ERRor:CLEar

Function	Clears the error message from the display screen but not from the Message Log.
Programming Example `OUTPUT 714;"DISPLAY:WINDOW:ERROR:CLEAR" !Clears an error message from the display.`	

DISPlay:OPERator:MESSage

Function	Allows the operator to enter up to four messages, each up to 30 characters in length. These messages will be printed to the display when the command is sent and "DISPlay:MODE" is set to FAST.
Setting	1|2 |3|4 1=uppermost field, 4=lowermost field
Factory setting	Each message is initialized to a null string. Nothing will be displayed until one or more of the four GPIB messages is sent to the test set.

Programming Example
`OUTPUT 714;"DISP:OPER:MESS1'Press F6 to stop test'"`
`!Writes the message "Press F6 to stop test" to the uppermost display field.`	

FETCh? Subsystem

Description

The FETCh? query is a function that allows users to query results from a measurement that was previously INITiated or READ. It does NOT begin a measurement. If no measurement is in progress it will return the integrity and measurement values from the last measurement made, or return an integrity of No Result Available and results of NAN. If a measurement is in process, the query will hang until the results are available, or the measurement fails or times out. The exact results returned with a FETCh? will depend on the specific measurement. A measurement may have a number of different results or combination of results for a FETCh?. The FETCh? queries are intended to be used to provide overlapped operation access to measurement results from the test set. When used along with SETup and INITiate commands , FETCh? is the primary way for the user to retrieve measurement results. In order to use the test set's concurrent test capabilities the overlapped commands of INITiate and FETCh? must be used. Overlapped commands allow the user to send commands and not wait for completion.

Syntax Diagrams and Command Descriptions

"FETCh:CPOWer" on page 300 (Channel Power measurements)

"FETCh:DAPower" on page 302 (Digital Average Power measurements)

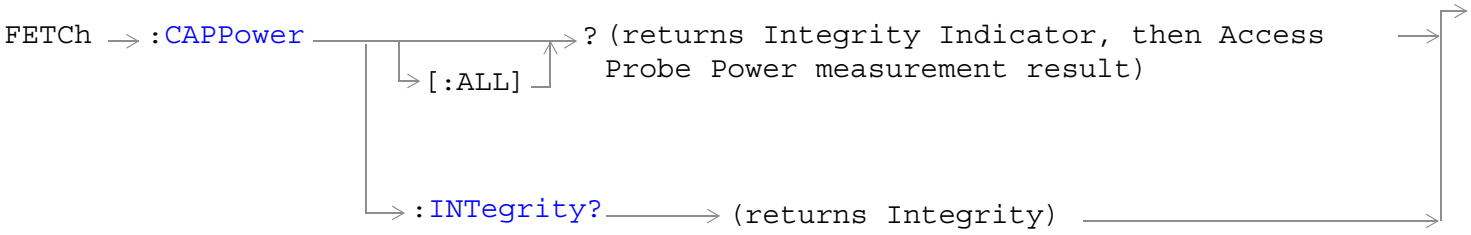
"FETCh:WQUality" on page 312 (Waveform Quality/Code Domain power measurements)

"FETCh:CFERror" on page 304 (Frame Error Rate test results)

"FETCh:FSTability" on page 306 (Frequency Stability measurements)

"FETCh:CAPPower" on page 299 (Access Probe Power measurements)

FETCh:CAPPower



"Diagram Conventions" on page 171

FETCh:CAPPower[:ALL]?

Function	Queries the access probe power measurement results. This query returns an integrity indicator followed by the most recent access probe power measurement result (if results are available).
Query	• Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dBm

Programming Example

```
OUTPUT 714;"FETCH:CAPPower:ALL?" !Returns integrity, access probe power measurement.
```

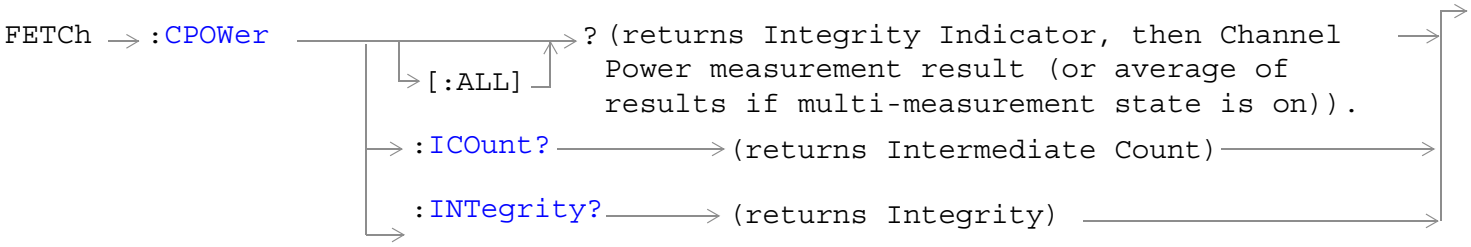
FETCh:CAPPower:INTegrity?

Function	Queries the measurement integrity indicator for the last access probe power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 144 for information about non-zero integrity results.
Query	Range: 0 through 23

Programming Example

```
OUTPUT 714;"FETCH:CAPPower:INTegrity?"
!Queries the integrity indicator for the most recent access probe power results.
```

FETCh:CPOWer



"Diagram Conventions" on page 171

FETCh:CPOWer[:ALL]?

Function	Queries a channel power measurement result. This query returns an integrity indicator followed by a channel power measurement result (if results are available). If the multi-measurement state is on, the result represents the *average* of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:CPOWer:COUNt[:SNUMber]" .
Query	• Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dBm

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:ALL?" !Returns integrity, channel power measurement.
```

FETCh:CPOWer:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see "SETup:CPOWer:COUNt[:SNUMber]" .
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:ICOUNT?" !Returns the intermediate count of channel power
multi-measurements.
```

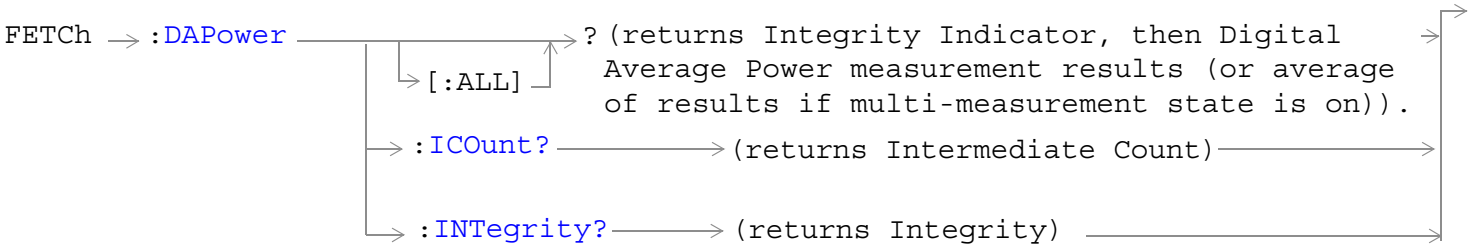
FETCh:CPOWer:INTegrity?

Function	Queries the measurement integrity indicator for the last channel power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 144 for information about non-zero integrity results.
Query	Range: 0 through 23

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:INTegrity?"
!Queries the integrity indicator for the channel channel power results.
```

FETCh:DAPower



"Diagram Conventions" on page 171

FETCh:DAPower[:ALL]?

Function	Queries a digital average power measurement result. This query returns an integrity indicator followed by a digital average power measurement result (if results are available). If the multi-measurement state is on, the result represents the *average* of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:DAPower:COUNt[:SNUMber]" .
Query	• Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dB

Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:ALL?" !Returns integrity, average transmit power.
```

FETCh:DAPower:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. The multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:DAPower:COUNt[:SNUMber]"
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:ICOUNT?"
```

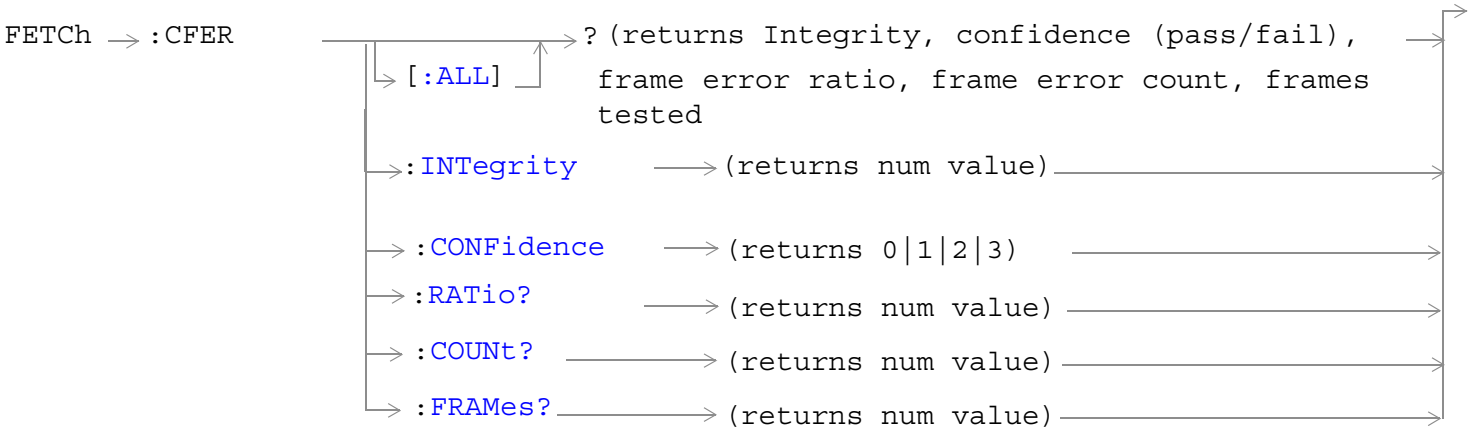
FETCh:DAPower:INTegrity?

Function	Queries the measurement integrity indicator for the last digital average power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 144 for information about non-zero integrity results.
Query	Range: 1 through 16

Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:INTegrity?"
!Queries the inegrity indicator for the average digital tranmit power results.
```

FETCh:CFERror



"Diagram Conventions" on page 171

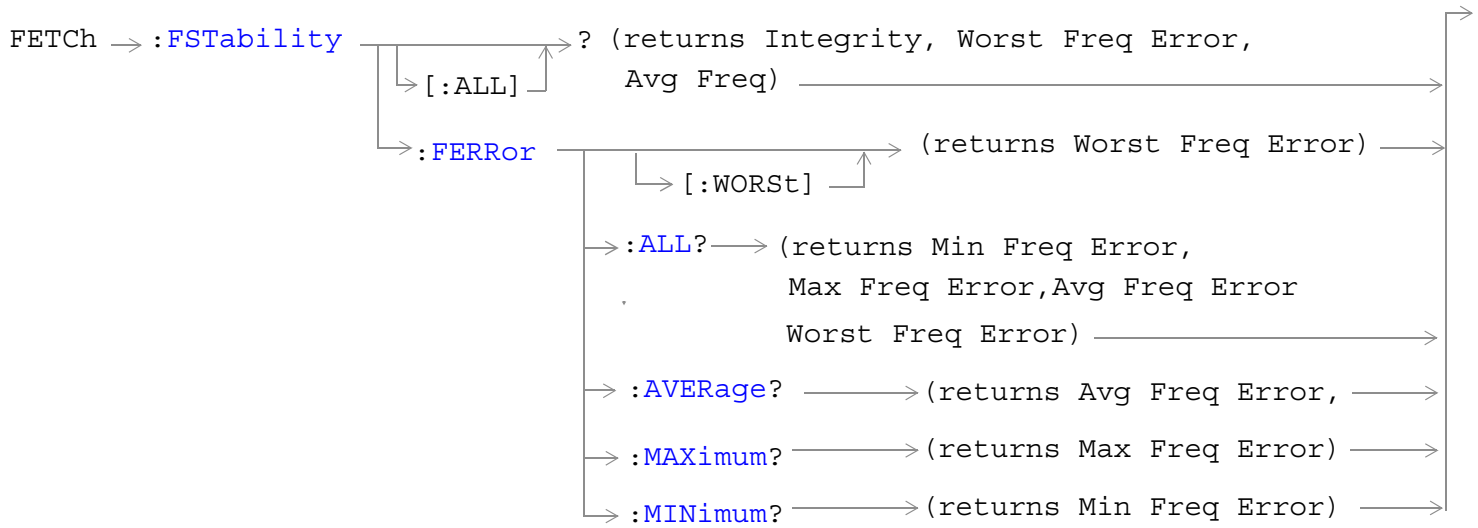
FETCh:CFER[:ALL]?

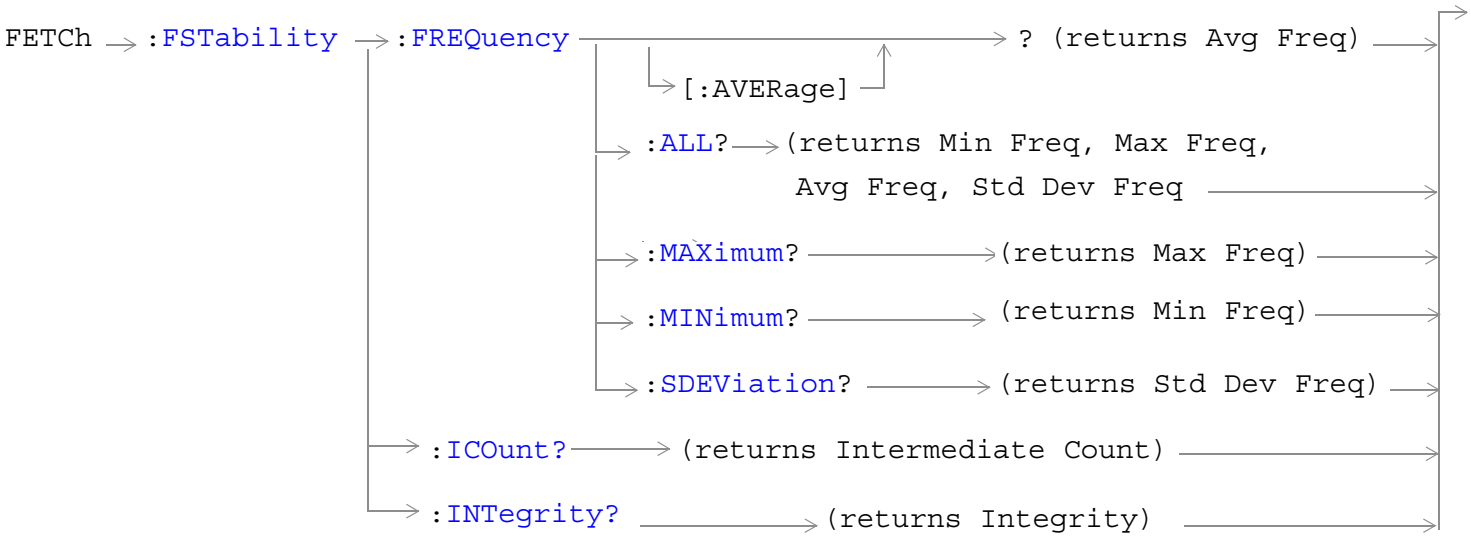
Function	Queries the frame error rate measurement results. This measurement returns up to 5 results in the following order: integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames tested.
Query	Integrity • Range: 0 to 16 see "Integrity Indicator" • Resolution: 1 Confidence limit pass/fail result • Range: 0 to 3 (0 = passed, 1 = failed, 2 = max frames, 3 = undetermined) • Resolution: 1 Frame error ratio • Range: 0.00 to 100.00, 9.91 E+37 • Resolution: 0.01 % Frame error count • Range: 0 to 10,000,000, 9.91 E+37 • Resolution: 1 frame Frames tested • Range: 0 to 10,000,000, 9.91 E+37 • Resolution: 1 frame

Programming Example

```
OUTPUT 714;"FETCH:CFERROR?"
!Returns integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames
!tested.
```

FETCh:FSTability





"Diagram Conventions" on page 171

FETCh:FSTability[:ALL]?

Function	Queries the full results of a frequency stability measurement. Returns integrity, worst-case frequency error, and average frequency.
Query	Worst-case frequency error: • Range: -500 to 500 parts per million (ppm) • Resolution: 0.01 ppm Average frequency: • Range: 100 E+6 to 3 E+9 Hz • Resolution: 0.01 ppm

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:ALL?"
!Returns integrity, worst-case frequency error, and average frequency.
```

FETCh:FSTability:FERRor[:WORSt]?

Function	Queries the worst case frequency stability measurement during a multi-measurement.
Query	Range: -500 to 500 parts per million (ppm) Resolution: 0.01 ppm

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:WORST?"
```

FETCh:FSTability:FERRor:ALL?

Function	Queries the full results of a frequency stability . Measurement results are returned in the following order: minimum frequency error, maximum frequency error, average frequency error, worst-case frequency error.
Query	Maximum, minimum frequency error: • Range: -500 E+3 to 500 E+3 Hz • Resolution: 1 Hz Average frequency error: • Range: -500 E+3 to 500 E+3 Hz • Resolution: 1 Hz Worst-case frequency error: • Range: -500 to 500 parts per million (ppm) • Resolution: 0.01

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:ALL?"
!Returns minimum, maximum, average, and worst-case frequency error.
```

FETCh:FSTability:FERRor:AVERage?

Function	Queries the average frequency error measurement.
Query	Range: -500 E+3 to 500 E+3 Hz Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:AVERAGE?"
```

FETCh:FSTability:FERRor:MAXimum?

Function	Queries the maximum frequency error measurement of a multi-measurement.
Query	Range: -500 E+3 to 500 E+3 Hz Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:MAXIMUM?"
```

FETCh:FSTability:FERRor:MINimum?

Function	Queries the minimum frequency error measurement of a multi-measurement.
Query	Range: -500 E+3 to 500 E+3 Hz Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:MINIMUM" !.
```

FETCh:FSTability:FREQuency[:AVERage]?

Function	Queries the frequency stability average frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Hz Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:AVERAGE?"
```

FETCh:FSTability:FREQuency:ALL?

Function	Queries the frequency stability frequency measurement. Measurement results are returned in the following order: minimum frequency, maximum frequency, average frequency, and standard deviation frequency.
Query	Minimum, maximum, average frequency: • Range: 100 E+6 to 3 E+9 • Resolution: 1 Hz Standard deviation frequency: • Range: 0 to 500 E+3 Hz • Resolution: 0.1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:ALL?"
!Returns minimum, maximum, average, and standard deviation frequency.
```

FETCh:FSTability:FREQuency:MAXimum?

Function	Queries the frequency stability maximum frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:MAXIMUM?"
```

FETCh:FSTability:FREQuency:MINimum?

Function	Queries the frequency stability minimum frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Resolution: 1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:MINIMUM?"
```

FETCh:FSTability:FREQuency:SDEViation?

Function	Queries the frequency stability frequency standard deviation of a multi-measurement.
Query	Range: 0 to 500 E+3 Hz Resolution: 0.1 Hz

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:SDEVIATION?"
```

FETCh:FSTability:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:ICOUNT?"
```

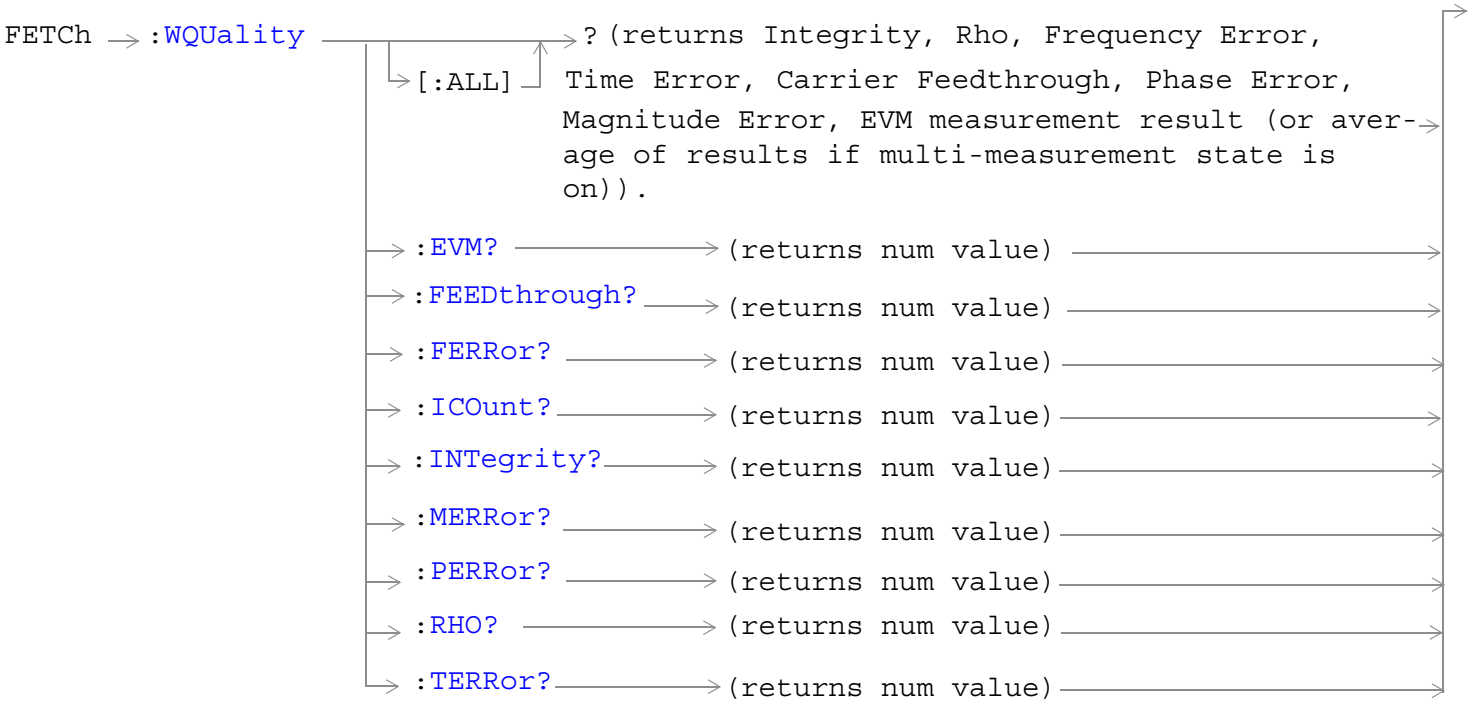
FETCh:FSTability:INTegrity?

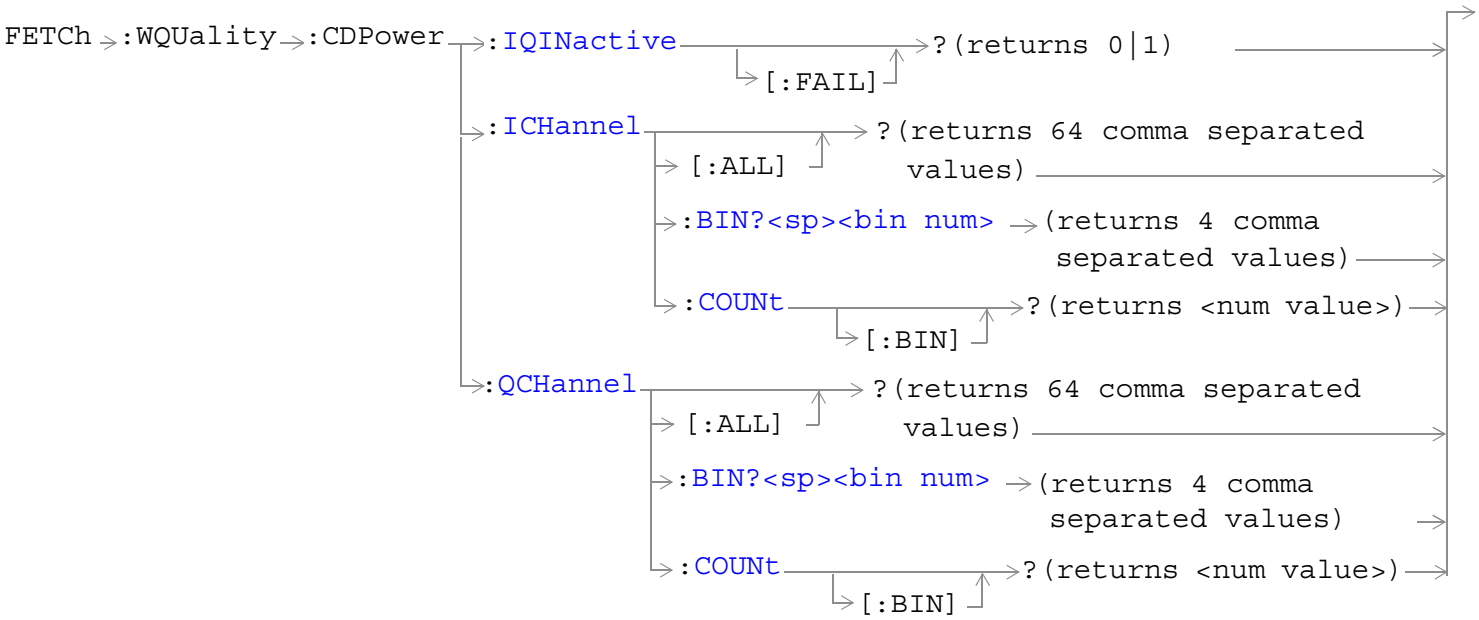
Function	Queries the measurement integrity indicator for the last frequency stability measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 144 for information about non-zero integrity results.
Query	Range: 1 through 16

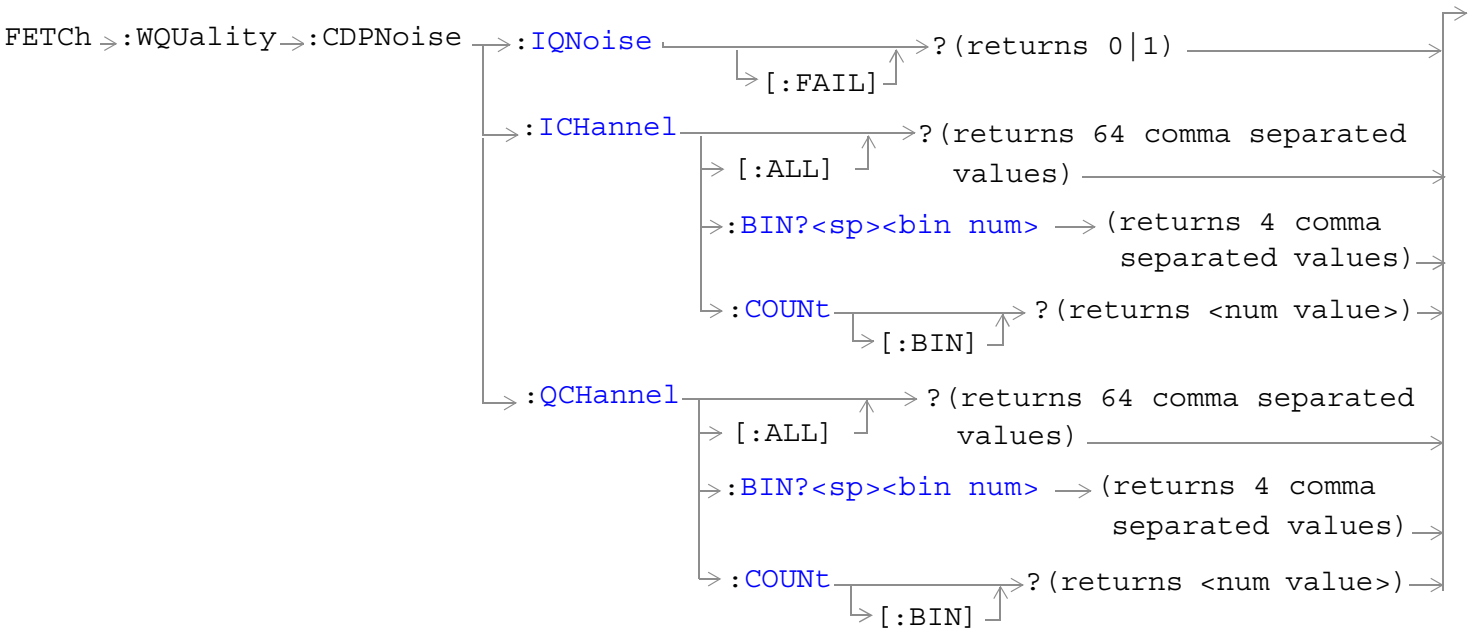
Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:INTEGRITY"
!Returns the integrity indicator for the frequency stability measurement.
```

FETCh:WQUality







"Diagram Conventions" on page 171

FETCh:WQUality[:ALL]?

Function	Queries the waveform quality/code domain power measurements. Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, and error vector magnitude (EVM). If the multi-measurement state is on, each result represents the *average* of a number of waveform quality/code domain power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WQUality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 16 • Resolution: 1 Rho • Range: 0.000 to 1.000, 9.91 E+37 • Resolution: 0.001 Frequency Error • Range: -9999.0 to 9999.0 Hz, 9.91 E+37 • Resolution: 0.1 Hz Time Error • Range-99.99 to 99.99 µs, 9.91 E+37 • Resolution: 0.01 µs Carrier Feedthrough • Range: -100 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: -180.0 to 180.0 degrees • Resolution: 0.1 Magnitude Error • Range: 0 to 100%, 9.91 E+37 • Resolution: 0.01 Error Vector Magnitude (EVM) • Range: 0 to 100% • Resolution: 0.01%

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:ALL?"
!Returns integrity, rho, frequency error, time error, carrier feedthrough, phase error,
!magnitude error, EVM.
```

FETCh:WQUality:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:ICOUNT?"
```

FETCh:WQUality:CDPower:IQINactive[:FAIL]?

Function	Queries the code domain measurement's pass/fail result indicating whether the power level in the inactive code channels exceeded the level set using the "SETup:WQUality:CDPower:IQINactive[:LIMit]" command.
Query	Range: 0 | 1, 9.91 E+37 0 = passed, 1 = failed, 9.91 E+37 = undefined

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:IQINACTIVE:FAIL?"
```

FETCh:WQUality:CDPower:ICHannel[:ALL]?

Function	Queries the I-channel code domain power measurement results for all 16 measurement graph bars (bins). This query returns a string consisting of 64 comma-separated values. These represent 4 values for each of 16 bins (maximum). Since measurements will usually have less than 16 bins, higher numbered bins frequently return 9.91 E+37 results.
Query	"FETCh:WQUality:CDPower:ICHannel:ALL?" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:ALL?"
```

FETCh:WQUality:CDPower:ICHannel:BIN? <bin num>

Function	Queries the I-channel results for a specific measurement graph bar (bin) on the code domain graph. Bins are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns a string of 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power.
Setting	<bin num> range: 0 to 15
Query	"FETCh:WQUality:CDPower:ICHannel:BIN? 0" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:BIN? 13"
!Queries the I-channel code domain power level in bin 13.
```

FETCh:WQUality:CDPower:ICHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:COUNT:BIN?"
```

FETCh:WQUality:CDPower:QCHannel[:ALL]?

Function	Queries the code domain power in the Q-channel. This query returns a string of 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).
Query	"FETCh:WQUality:CDPower:QCHannel:ALL?" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; 1 (active) or 0 (inactive), Walsh code, spread factor, power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:ALL?"
```

FETCh:WQUality:CDPower:QCHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns a string of 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power.
Query	"FETCh:WQUality:CDPower:QCHannel:BIN? 0" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:BIN? 13"
!Queries the Q-channel power in bin 13.
```

FETCh:WQUality:CDPower:QCHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:COUNT:BIN?"
```

FETCh:WQUality:CDPNoise:IQNoise[:FAIL]?

Function	Queries the code domain power + noise measurement pass/fail indicator indicating whether the noise power level exceeded the level set using the "SETup:WQUality:CDPNoise:IQNoise[:LIMit]" command.. 0 = passed, 1 = failed, 9.91 E+37 = undefined
Query	Range: 0 | 1 | 9.91 E+37

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:IQNOISE:FAIL?"
```

FETCh:WQUality:CDPNoise:ICHannel[:ALL]?

Function	Queries the code domain noise power in the I-channel. This query returns 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).
Query	"FETCh:WQUality:CDPNoise:ICHannel:ALL?" returns: Walsh code, spread factor, noise power, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; Walsh code, spread factor, noise power, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:ALL?"
```

FETCh:WQUality:CDPNoise:ICHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: Walsh code, spread factor, noise power, and power.
Query	“FETCh:WQUality:CDPNoise:ICHannel:BIN? 0” returns: Walsh code, spread factor, noise power, and power for bin 0.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:BIN? 13"
!Queries the I-channel code domain power + noise measurement results for bin 13.
```

FETCh:WQUality:CDPNoise:ICHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:COUNT:BIN?"
```

FETCh:WQUality:CDPNoise:QCHannel[:ALL]?

Function	Queries the code domain noise power in the Q-channel. This query returns 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).
Query	“FETCh:WQUality:CDPNoise:QCHannel:ALL?” returns: Walsh code, spread factor, noise power, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; Walsh code, spread factor, noise power, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:ALL?"
```

FETCh:WQUality:CDPNoise:QCHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values:Walsh code, spread factor, noise power, and power.
Query	“FETCh:WQUality:CDPNoise:QCHannel:BIN? 0” returns: Walsh code, spread factor, noise power, and power for bin 0.

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:BIN? 13"
!Queries the Q-channel power in bin 13.
```

FETCh:WQUality:CDPNoise:QCHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:COUNT:BIN?"
```

INITiate Subsystem

Syntax Diagrams and Command Descriptions

"INITiate" on page 322

Description

INITiate Command Functions

The INITiate subsystem is used to:

- Start (activate) individual or multiple (concurrent) measurements.
- Turn individual measurements off.
- Determine the number of measurements currently active (INIT:COUNT?).
- Determine the names of the measurements currently active (INIT:ON?).
- Determine which measurements are finished (INIT:DONE?).

What Happens When a Measurement is INITiated?

When a measurement is started using INITiate commands, a new measurement cycle is started. If the selected measurement is currently in a measurement cycle, it is aborted. If a timeout is specified, the timeout period begins when a measurement is initiated.

NOTE The INITiate subsystem is derived from SCPI, but has some modifications to make it more compatible with the manual operation of the test set. Most notably, the choice of single or continuous measurement triggering is made using the SETup subsystem.

INITiate Programming Examples (how INIT commands are used)

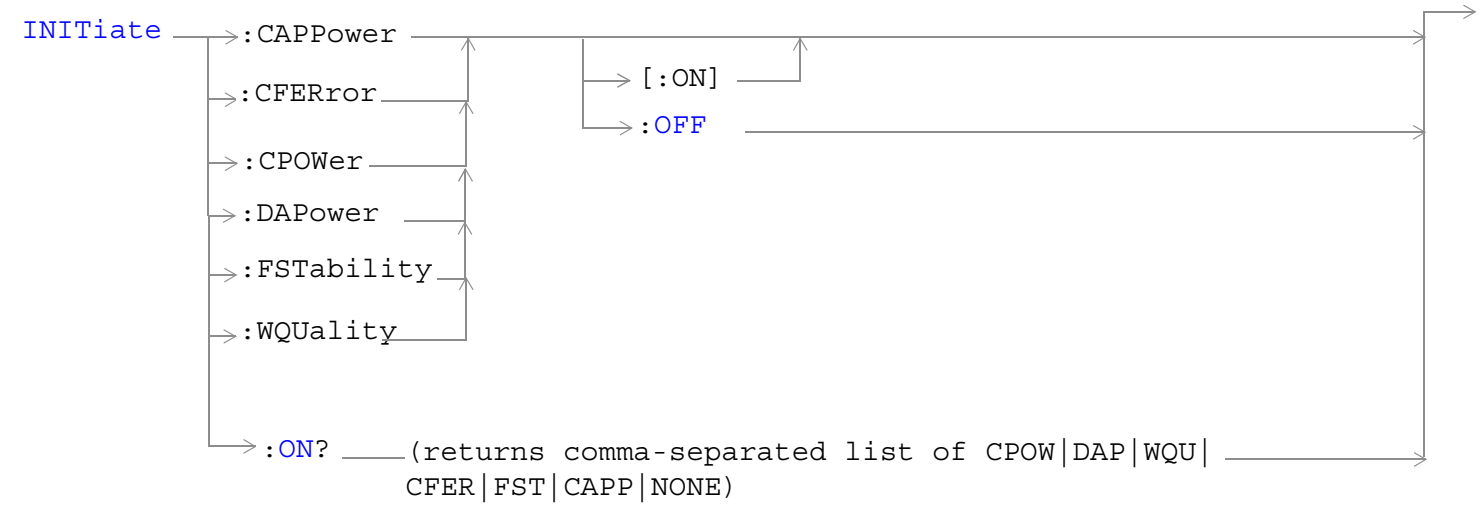
The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Digital Average Power and Waveform Quality measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see "Measurement Event Synchronization" on page 153.

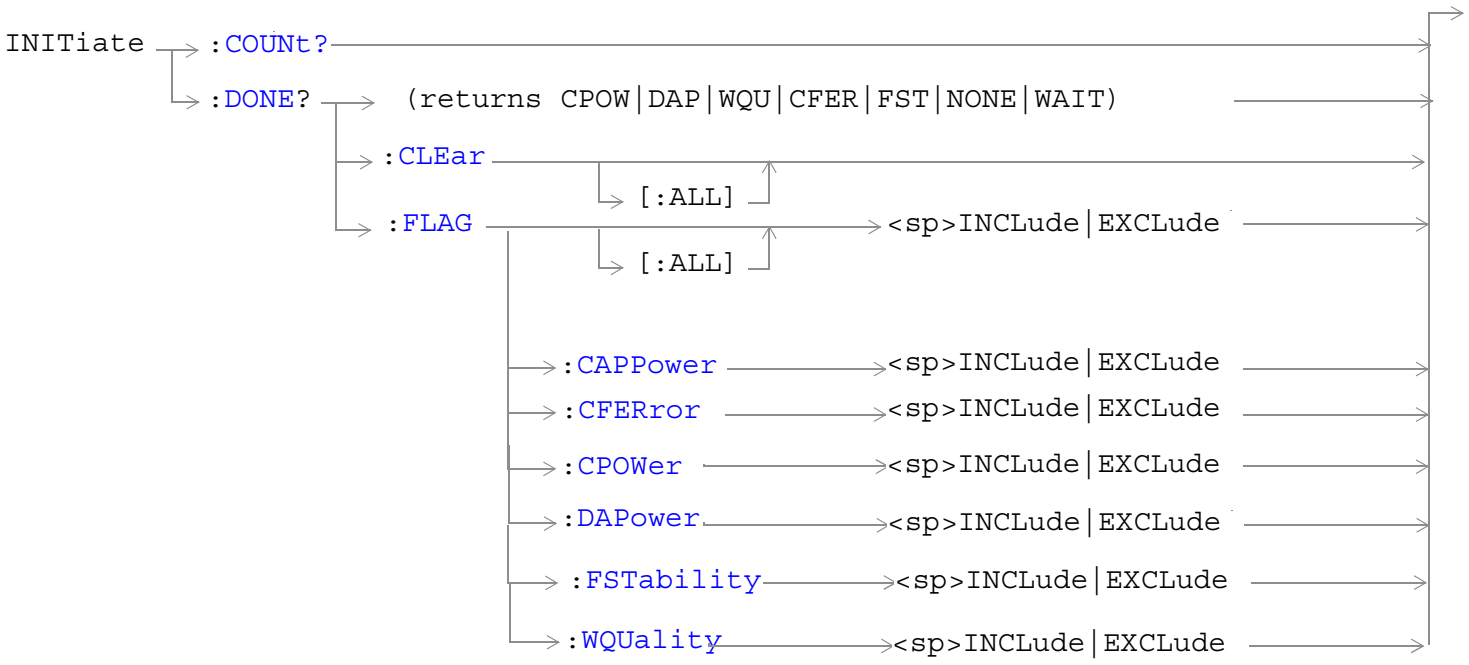
When the measurements are done, the FETCh command is used to acquire the results, and the results are entered into variables in the controlling application. The program ends when the INITiate:DONE? command returns the string "NONE" indicating that all initiated measurements have gone through the measuring state see "Measurement States" on page 142.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. The best practice (during remote operation) is to use single measurement mode. This simplifies the tasks of starting concurrent measurements, then using the INIT subsystem commands to determine which measurements are ready to be FETChed.

```
10 OUTPUT 714;"SETup:ALL:CONTinuous:OFF" ! selects single trigger  mode.
20 OUTPUT 714;"INITiate:DAPower;WQUality" ! starts digital average power and
30                                        !waveform accuracy measurements.
40 LOOP
50 OUTPUT 714;"INITiate:DONE?" !query to find out if any measurements are done.
60 ENTER 714;Meas_complete$
70 SELECT Meas_complete$
80 CASE "DAP" !tests for the string "DTXP", indicating digital average power measurement is
done.
90 OUTPUT 714;"FETCh:DAPower:POWer?" !Queries average digital TX power measurement.
100 ENTER 714;Dtxpower
110 CASE "WQU" !tests for the string "WQU", indicating that the waveform quality
120                                                                  !measurement is done.
130 OUTPUT 714;"FETCh:WQU:RHO?" !Queries rho.
140 ENTER 714;rho
150 END SELECT
160 EXIT IF Meas_complete$="NONE"
170 END LOOP
180 END
```

INITiate





"Diagram Conventions" on page 171

INITiate:<measurement mnemonic>[:ON]

Function	These commands initiate (start) the following measurements: • CAPP - Access Probe Power • CFER - Frame Error Rate • CPOW - Channel Power • DAP - Digital Average Power • FST - Frequency Stability • WQU - Waveform Quality This command also queries the active state using the ON? keyword in place of a measurement mnemonic. The INITiate command is associated with the SETup "SETup Subsystem" on page 339 and the "FETCh? Subsystem" on page 298. One or more measurements can be initiated with the same program line (see "Concurrent Measurements" on page 149 and the Programming Example below). This command is also used to activate a measurement. See "INITiate Programming Examples (how INIT commands are used)" on page 320.
Range	CPOW | DAP | WQU | CFER | FST | CAPP

Programming Example
`OUTPUT 714;"INITIATE:CPOWER;WQUALITY:ON"`
`!Initiates a channel power and a waveform quality measurement.`	

INITiate:ON?

Function	Queries the measurements that are on. Returns a comma separated list of measurement mnemonics.
Query	Range: CPOW | DAP | WQU | CFER | FST | CAPP | NONE
Programming Example `OUTPUT 714;"INITIATE:ON?"`	

INITiate:<measurement mnemonic>:OFF

Function	Deactivates the selected measurement. See "Measurement States" on page 142. Only one measurement can be deactivated at a time. To stop one or more measurements and leave them in the active state, use "ABORt" on page 174.
Programming Example `OUTPUT 714;"INITIATE:CPOWER:OFF" !Deactivates the channel power measurement.`	

INITiate:COUNt?

Function	Queries the number of measurements that have been initiated (are active). See "Measurement States" on page 142.
Query	Range: 0 to 10
Programming Example `OUTPUT 714;"INITIATE:COUNT?"`	

INITiate:DONE?

Function	Queries (one at a time) which measurements, if any, are finished or have timed-out. See "Measurement Event Synchronization" on page 153 for how to use this command. See "Measurement States" on page 142 to understand the test set's measurement states. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 325 for include or exclude commands.
Query	Range: CPOW | DAP | WQU | CFER | FST | CAPP | NONE | WAIT

INITiate:DONE:CLEar

Function	Clears the done flag from all measurements.
Programming Example `OUTPUT 714;"INITIATE:DONE:CLEAR" !Clears the done flag.`	

INITiate:DONE:FLAG[:ALL]

Function	Specifies that all measurements are either included or excluded when the INITitate:DONE? query is sent. If a measurement trigger arm is left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT. The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done; therefore, the measurement will never appear to be done. If a measurement's triggering must be continuously armed, you should exclude the measurement using "INITiate:DONE:FLAG:<measurement mnemonic>" . Use INITitate:DONE:FLAG:ALL EXCLude to exclude all measurements. Once INITiate:DONE:FLAG has been set to EXCLude for a measurement, the user must send the INCLude command for that measurement in order to query that measurement with the INITiate:DONE? query. The test set will not reset any excluded measurement with any type of preset.
Setting	Range: INCLude | EXCLude

Programming Example
`OUTPUT 714;"INITIATE:DONE:FLAG:ALL INCLUDE"`
`!Includes all measurements in the INITIATE:DONE? query.`	

INITiate:DONE:FLAG:<measurement mnemonic>

Function	Specifies if a measurement done flag is considered (using the INCLude or EXCLude settings) when the INITitate:DONE? query is sent. If more than one measurement is active, and one or more measurement trigger arm states is continuous, the INITiate:DONE? query may not be effective. The best solution is to change the arm state of all measurements to single using the "SETup[:ALL]:CONTinuous" command. However, if a measurement must be continuously triggered, you should exclude the measurement using the EXCLude setting provided by this command if you want to use INITiate:DONE? to query measurement done status. The test set will not reset any excluded measurement to included with any type of preset.
Setting	Range: INCLude|EXCLude

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:DAP EXCLUDE"
!Excludes the digital average power measurement from responding to the INITIATE:DONE? query.
```

READ? Subsystem

Syntax Diagram and Command Descriptions

"READ" on page 328

Description

The READ? command provides a sequential method to make measurements and retrieve the results. READ? will hang the GPIB bus until the measurement is completed, or until the timeout value has been exceeded. Associated SETup commands (for each measurement) are used with the READ? command to retrieve desired measurement results in a sequential manner.

Sending a READ? command is equivalent to an INITiate/FETCh cycle for a measurement. A READ? command executes an abort action on that measurement followed by an INITiate and a FETCH?.

READ? commands can be mixed with FETCH? queries in order to make combinations of sequential and overlapped operations. One measurement can be issued a READ? command (sequential), and the next measurement can be issued INITiate/FETCh? commands (overlapped), if necessary.

The advantage of using the READ? commands to obtain measurement results, as opposed to the INITiate/FETCh method is:

- It is simpler. Fewer commands are required to obtain measurement results.

Some disadvantages of using READ? over INITiate and FETCh are:

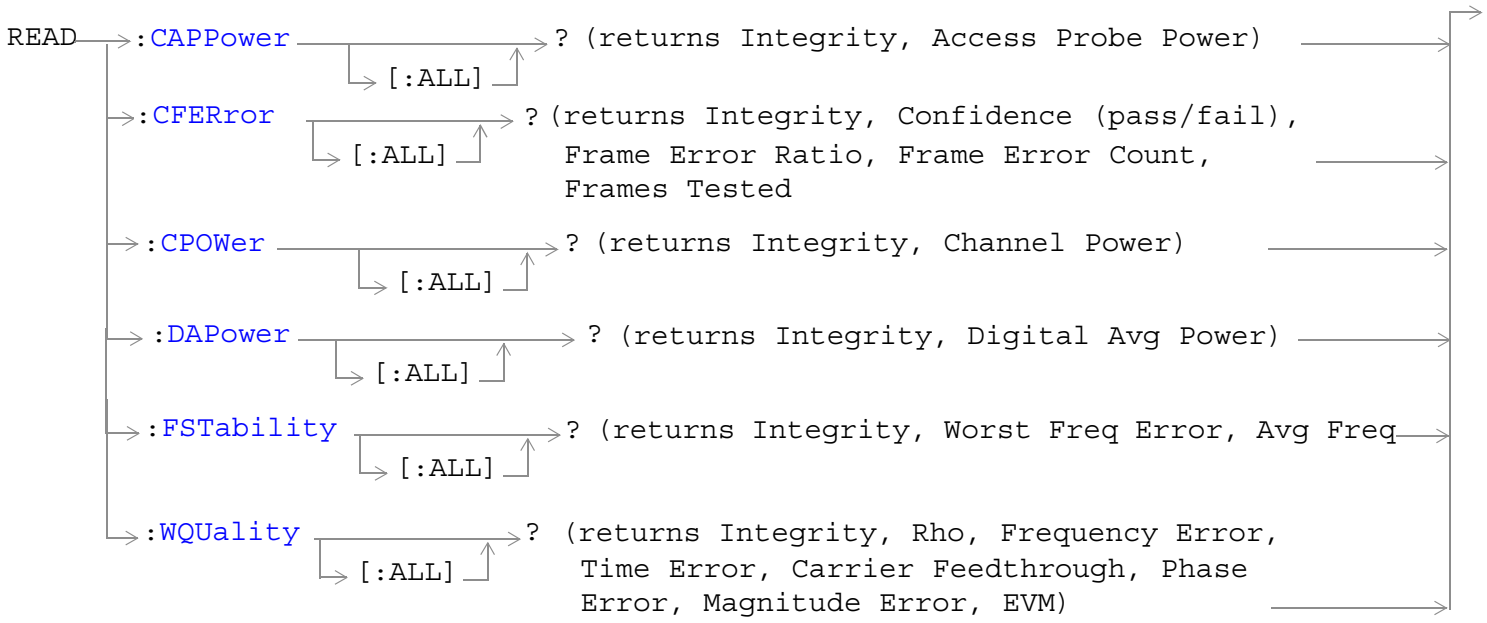
- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- The READ? command does not provide measurement results such as statistics that are available using the INITiate/FETCh method.
- The READ? commands have pre-defined measurement results. If additional results are needed from a measurement they may be obtained with a FETCh? query.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. Best practice during remote operation is to set trigger arm to single (Continuous Off).

Program Example - READ:DAPower?

```
OUTPUT 714;"READ:DAPower?" !Starts digital average power measurement. As soon as the
                           !measurement cycle has completed, the test set
                           !provides the digital average power measurement results to the
                           !controlling application.
ENTER 714;Integrity, Digital_power !Enters the integity indicator and
                                   !digital average power measurement values into
                                   !controlling application.
```

READ



"Diagram Conventions" on page 171

READ:CAPPower[:ALL]?

Function	Initiates and fetches an access probe power measurement as a sequential operation. Measurement results are returned in the following order: integrity, access probe power.
Query	Access probe power • Range: -100 to 100 dBm • Resolution: 0.01 dB

READ:CFERror[:ALL]?

Function	Initiates and fetches the FER (frame error rate) measurements as a sequential operation. FER measurement results are returned in the following order: integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames tested.
Query	Integrity • Range: 0 to 16 see "Integrity Indicator" • Resolution: 1 Confidence limit pass/fail result • Range: 0 to 3 (0 = passed, 1 = failed, 2 = max frames, 3 = undetermined) • Resolution: 1 Frame error ratio • Range: 0.00 to 100.00, 9.91 E+37 • Resolution: 0.01 % Frame error count • Range: 0 to 10,000,000, 9.91 E+37 • Resolution: 1 frame Frames tested • Range: 0 to 10,000,000, 9.91 E+37 • Resolution: 1 frame

READ:CPOWer[:ALL]?

Function	Initiates and fetches a channel power measurement as a sequential operation. Measurement results are returned in the following order: integrity, average channel power. If the multi-measurement state is on, the result represents the average of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:CPOWer:COUNt[:SNUMber]” .
Query	Channel power • Range: -100 to 100 dBm • Resolution: 0.01 dB

READ:DAPower[:ALL]?

Function	Initiates and fetches a digital average power measurement as a sequential operation. Measurement results are returned in the following order: integrity, digital average transmit power. If the multi-measurement state is on, the result represents the *average* of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:DAPower:COUNt[:SNUMber]” .
Query	Digital average power: • Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dB

READ:FSTability[:ALL]?

Function	Initiates and fetches a frequency stability measurement as a sequential operation. Measurement results are returned in the following order: integrity, worst-case frequency error, average frequency.
Query	Worst-case frequency error • Range: -500 to 500 parts per million (ppm) • Resolution: 0.01 Average frequency • Range: 100 E+6 to 3 E+9 Hz • Resolution: 1 Hz

READ:WQUality[:ALL]?

Function	Initiates and fetches the waveform quality measurements as a sequential operation. Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, EVM. If the multi-measurement state is on, each result represents the *average* of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WQUality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 16 • Resolution: 1 Rho • Range: 0.000 to 1.000, 9.91 E+37 • Resolution: 0.001 Frequency Error • Range: -9999.0 to 9999.0 Hz, 9.91 E+37 • Resolution: 0.1 Hz Time Error • Range-99.99 to 99.99 µs, 9.91 E+37 • Resolution: 0.01 µs Carrier Feedthrough • Range: -100 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: -180.0 to 180.0 degrees • Resolution: 0.1 Magnitude Error • Range: 0 to 100%, 9.91 E+37 • Resolution: 0.01 Error Vector Magnitude (EVM) • Range: 0 to 100% • Resolution: 0.01%

RFANalyzer Subsystem

Description

The RFANalyzer command subsystem performs “lower-level” functions that control the test set's measuring receiver. The measuring receiver includes three separate signal paths:

- Power detector
- Demodulation
- Measurement

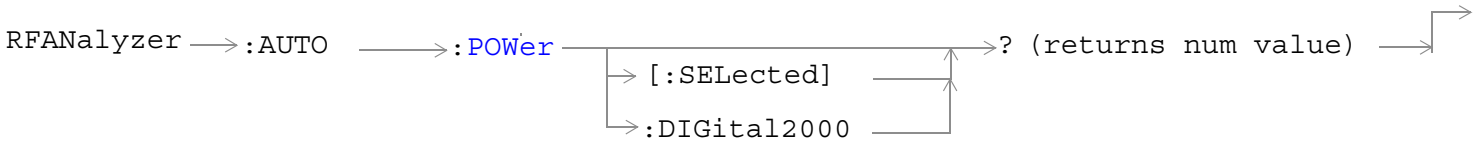
Refer to the “Block Diagram” on page 504 for a description of the signal paths.

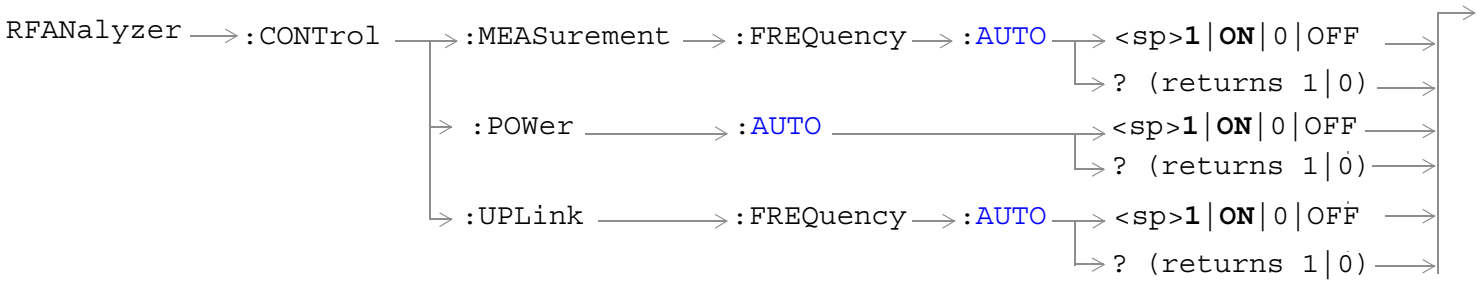
The RFANalyzer commands allow manual settings to the tune frequency or expected power level to each of these paths if it is necessary to override automatic settings.

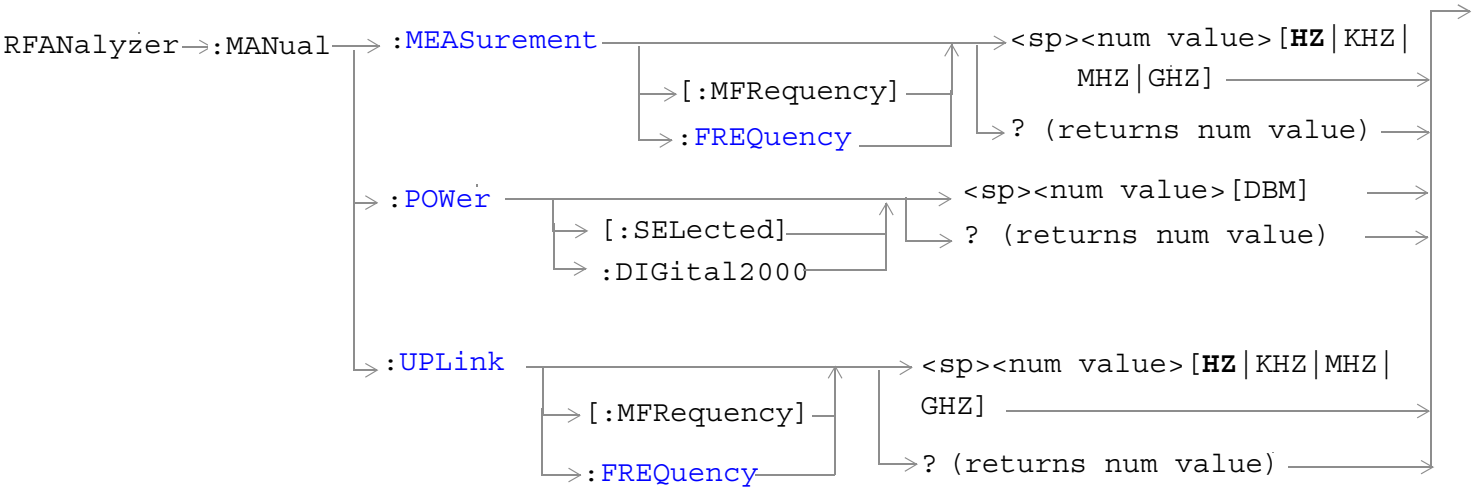
Syntax Diagrams and Command Descriptions

“RFANalyzer” on page 333

RFANalyzer







"Diagram Conventions" on page 171

RFANalyzer:AUTO:POWer[:SELected]?

Function	Queries the expected input power for the currently selected system type when the test set's power detector control mode is set to automatic. You can also query a specific system type by replacing [:SELected] with a system type mnemonic (such as DIG2000). The test set's power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command.
Query	Range: -69 dBm to +30 dBm Resolution: 0.01 dBm
*RST setting	13 dBm

Programming Example
`OUTPUT 714;"RFANalyzer:AUTO:POWER:SELECTED?"`
`!Queries the expected input power for the currently selected system type when the power detector is !set to automatic control mode.`	

RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO

Function	Turns on/off the auto Meas Frequency feature which determines the measurement downconverter signal path frequency control mode. (See "Block Diagram" .) ON = automatic OFF = manual
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)

Programming Example
`OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF"`
`!Enables manual control of the measurement signal path tune frequency.`	

RFANalyzer:CONTrol:POWer:AUTO

Function	Sets/queries the test set's receiver input power control mode. ON = automatic OFF = manual
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)

Programming Example
`OUTPUT 714;"RFANALYZER:CONTROL:POWER:AUTO OFF"`
`!Enables manual control of the expected input power level.`	

RFANalyzer:CONTrol:UPLink:FREQuency:AUTO

Function	Sets/queries the test set's demodulation signal path tune frequency control mode. ON = automatic OFF = manual.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)
Programming Example `OUTPUT 714;"RFANALYZER:CONTROL:UPLINK:FREQUENCY:AUTO OFF" !Enables manual control of the demodulation signal path tune frequency.`	

RFANalyzer:CW:EXPected:POWer

Function	Sets/queries the expected CW receiver input power. This setting is only used when the Operating Mode is set to CW. (See "CALL[:CELL]:OPERating" .)
Setting	Range: -60 dBm to +53 dBm
Query	Range: -60 dBm to +53 dBm
*RST setting	+13 dBm
Programming Example `OUTPUT 714;"RFANALYZER:CW:EXPECTED:POWER -20"`	

RFANalyzer:MANual:POWer[:SELected]

Function	Sets/queries the receiver input power for the currently selected system type when the test set's receiver input power control mode is set to manual. The test set's receiver power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command. The test set's measuring receiver will include amplitude offsets along with this setting to calculate input power range settings.
Setting	Range: Test application and system type dependent (approximately -25 to +43 dBm). Resolution: 0.01 dBm
Query	Range: Test application and system type dependent (approximately -25 to +43 dBm).
*RST setting	-75 dBm
Programming Example `OUTPUT 714;"RFANALYZER:MANUAL:POWER:SELECTED 24 DBM" !Sets the manual power control mode expected input power level for the currently selected system type to 24 dBm.`	

RFANalyzer:MANual:MEASurement[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the Meas Frequency of the test set's measurement signal path, and (2) selects manual (auto off) tune mode for the test set's measurement signal path. (See "Block Diagram" .) The query form of this command returns the tune frequency of the test set's measurement signal path. The tune mode for the test set's measurement signal path can be returned to auto using the "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:MFREQUENCY 942.6 MHZ"`
`!Enables manual control of the measurement signal path tune frequency and sets the tune frequency to 942.6 MHz.`	

RFANalyzer:MANual:MEASurement:FREQuency

Function	Sets/queries Meas Frequency, the measurement downconverter signal path frequency control mode. (See "Block Diagram" .) This setting is applied when manual mode is selected (see "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO").
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:FREQUENCY 942.6 MHZ"
!Sets the measurement signal path tune frequency to 942.6 MHz when manual control mode is used.
```

RFANalyzer:MANual:UPLink[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the tune frequency of the test set's demodulation signal path, and (2) selects manual tune mode for the test set's demodulation signal path. The query form of this command returns the tune frequency of the test set's demodulation signal path. The tune mode for the test set's demodulation path can be returned to auto using the "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO" command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:MFREQUENCY 1955.030 MHZ"

!Enables manual control of the demodulation signal path tune frequency and sets the tune frequency
!to 1955.030 MHz.
```

RFANalyzer:MANual:UPLink:FREQuency

Function	Sets/queries the tune frequency of the test set's demodulation signal path. This setting is applied when manual mode is selected (see "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO").
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:FREQUENCY 942.6 MHZ"`
`!Sets the test set's demodulation signal path tune frequency to 942.6 MHz.`	

SETup Subsystem

Description

The SETup subsystem is used to configure the test set for each measurement. Typical settings include:

- Multi-Measurement Count, how many measurements will be made each time a measurement is initiated.
- Trigger Arm, determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).
- Trigger Source, how a measurement is triggered.
- Trigger Delay, controls the delay time between the trigger and the start of sampling.
- Measurement Timeout, length of time before a measurement times out.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. In most cases, it is a best practice (during remote operation) to use “single” measurement mode. This simplifies the tasks of starting concurrent measurements, using the INIT subsystem commands to determine which measurements are ready to be fetched, then using the FETCh subsystem to obtain results. The command “SETup:CONTinuous:OFF sets all measurements to “single” trigger mode.

Syntax Diagrams and Command Descriptions

“SETup:CPOWer” on page 343

“SETup:DAPower” on page 347

“SETup:WQUality” on page 360

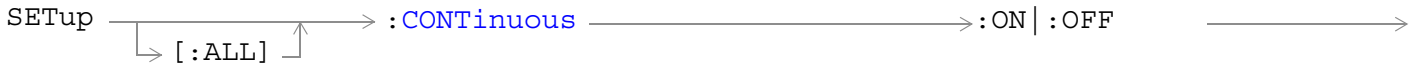
“SETup:CFERror” on page 351

“SETup:FSTability” on page 356

“SETup:CAPPower” on page 341

“SETup[:ALL]:CONTinuous” on page 340

SETup[:ALL]:CONTinuous



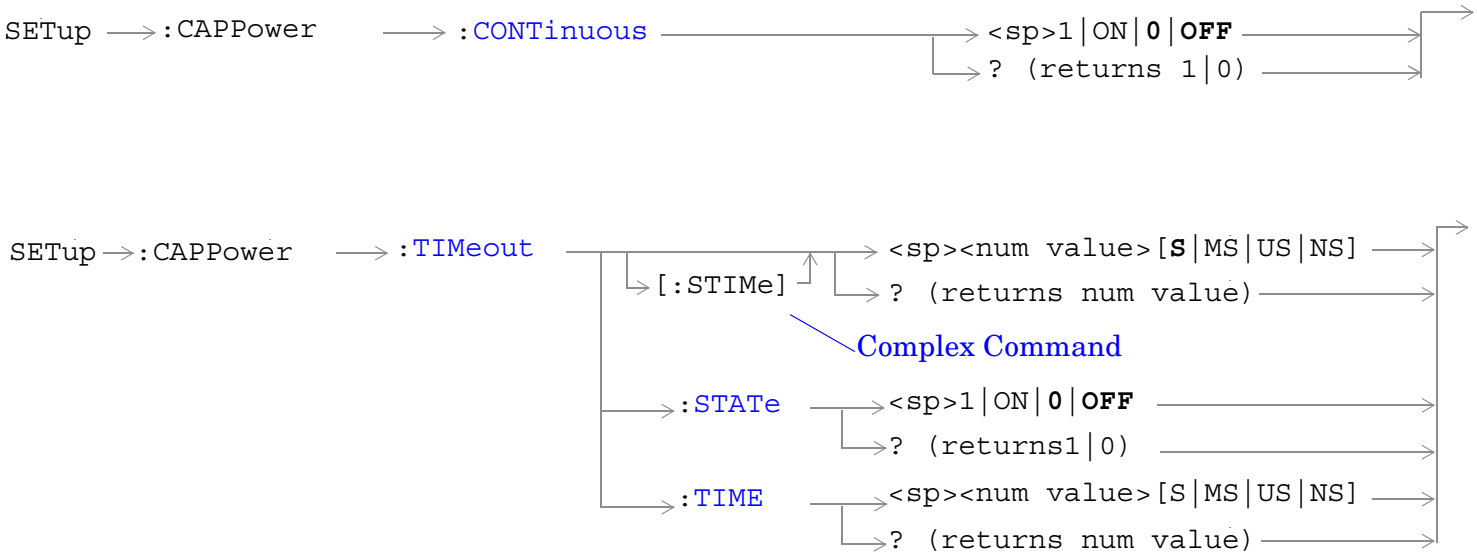
"Diagram Conventions" on page 171

SETup[:ALL]:CONTinuous

Function	Sets the trigger arm state for all measurements. Determines whether all measurements will make one measurement then stop (OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (ON (continuous)). This setting overrides previously set trigger arm settings for individual measurements.
Setting	Range: ON, OFF
Programming Example `OUTPUT 714;"SETup:ALL:CONTinuous:OFF" !Sets all measurements to single trigger mode.`	

SETup:CAPPower

NOTE



"Diagram Conventions" on page 171

SETup:CAPPower:CONTinuous

Function	Sets/queries the trigger arm state for the access probe power measurement. The trigger arm state determines whether the access probe power measurement will be made on the first access probe in an access probe sequence then stop (0|OFF (single)), or automatically re-arm and make measurements on each of the following access probes (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:CAPPOWER:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:CAPPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the access probe power measurement's timeout (see "Timeouts") value, and (2) sets the access probe power measurement's timeout STATe to 1 (on). The query form returns the access probe power measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:CAPPOWER:TIMEOUT:STIME 5 S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

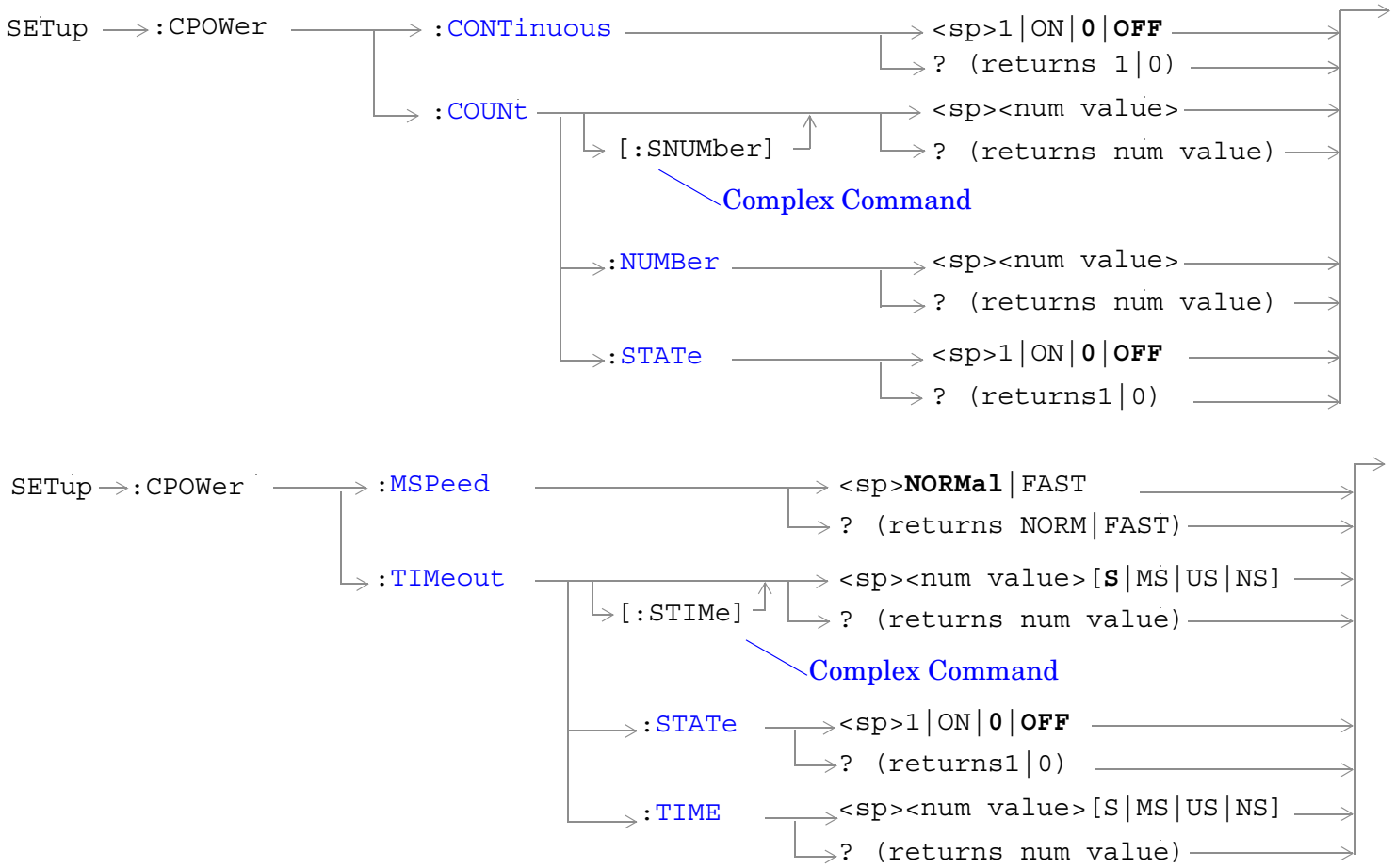
SETup:CAPPower:TIMeout:STATe

Function	Sets/queries the access probe power measurement's timeout (see "Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CAPPOWER:TIMEOUT:STATE ON"`	

SETup:CAPPower:TIMeout:TIME

Function	Sets/queries the access probe power measurement's timeout (see "Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:CAPPOWER:TIMEOUT:TIME 5 S"`	

SETup:CPOWer



"Diagram Conventions" on page 171

SETup:CPOWer:CONTinuous

Function	Sets/queries the trigger arm state for the channel power measurement. The trigger arm state determines whether the channel power measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:CPOWER:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:CPOWer:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of channel power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of channel power multi-measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:CPOWER:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:CPOWer:COUNt:NUMBer

Function	Sets/queries the number of channel power measurements to be made when the mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:CPOWER:COUNT:NUMBER 5"`
`!Sets the number of channel power multi-measurements to 5.`	

SETup:CPOWer:COUNt:STATe

Function	Sets/queries the channel power multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CPOWER:COUNT:STATE ON" !Turns on channel power multi-measurements.`	

SETup:CPOWer:MSPeed

Function	Sets/queries the channel power measurement speed. Channel power measurement speed is determined by the measurement sampling period. NORMal channel power measurements are sampled for 10 milliseconds, while FAST channel power measurements are sampled for 1.25 milliseconds. NORMal speed channel power measurements are compatible with both gated (RF) or non-gated signals. Since NORMal channel power measurements are slower than FAST measurements, use NORMal when measuring gated input signals. Gated input signals occur when radio configuration 1 or 2 are selected and any data rate other than full is selected. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig" . FAST channel power measurement speed is compatible only with non-gated (RF) signals. Non-gated signals occur when radio configuration 3, 4, or 5 are selected or radio configuration 1 or 2 is selected with full rate. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig" .
Setting	Range: NORMal | FAST
Query	Range: NORM | FAST
*RST Setting	NORM
Programming Example `OUTPUT 714;"SETUP:CPOWER:MSPEED FAST" !Sets up fast channel power measurements.`	

SETup:CPOWer:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the channel power measurement's timeout (see "Timeouts") value, and (2) sets the channel power measurement's timeout STATe to 1 (on). The query form returns the channel power measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STIME 5 S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

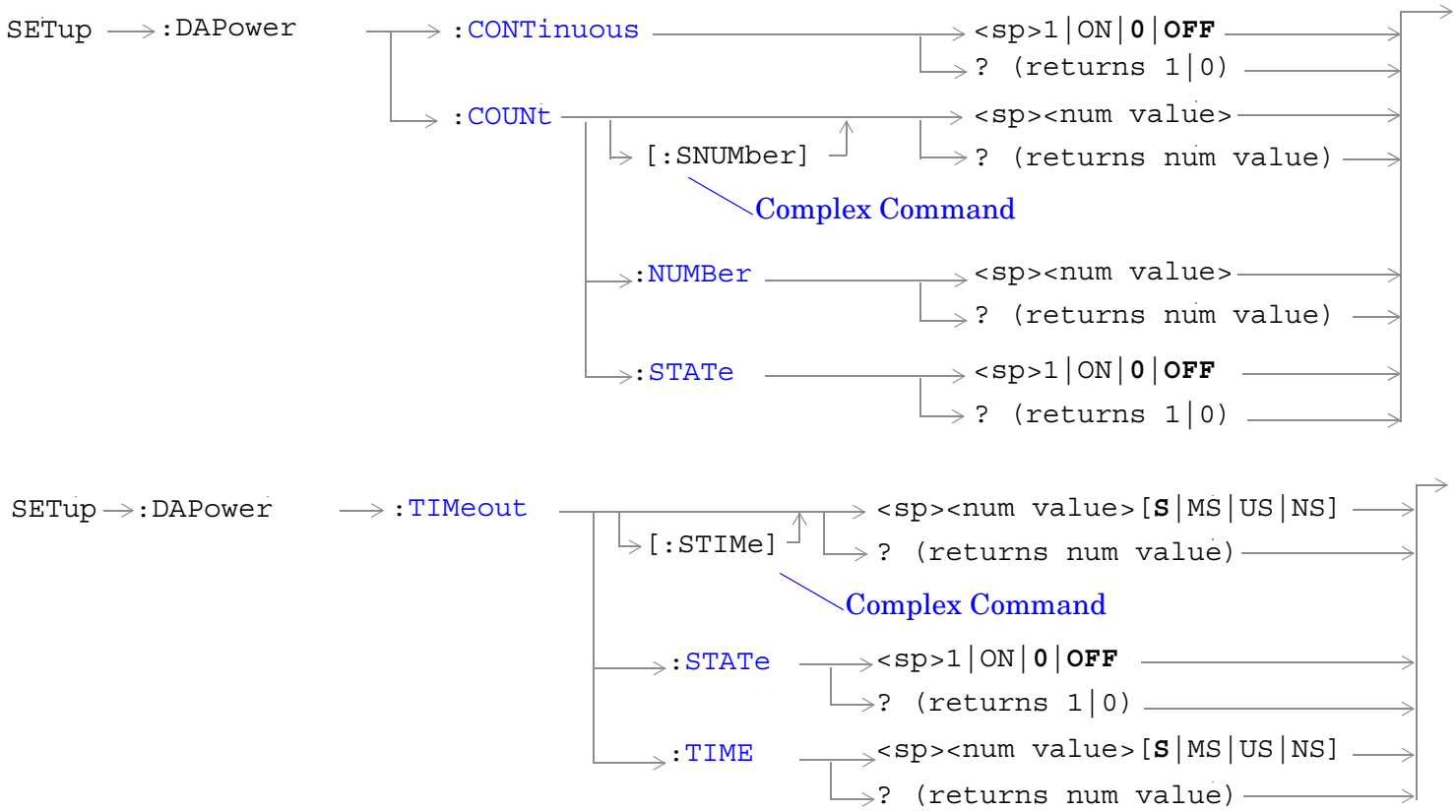
SETup:CPOWer:TIMeout:STATe

Function	Sets/queries the channel power measurement's timeout (see "Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STATE ON"`	

SETup:CPOWer:TIMeout:TIME

Function	Sets/queries the channel power measurement's timeout (see "Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:CPOWER:TIMEOUT:TIME 5 S"`	

SETup:DAPower



"Diagram Conventions" on page 171

SETup:DAPower:CONTinuous

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON"`
`!Sets measurement to single trigger mode.`	

SETup:DAPower:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of digital average power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of digital average power multi-measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:DAPower:COUNt:NUMBer

Function	Sets/queries the number of digital average power measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:COUNT:NUMBER 5"`
`!Sets the number of measurements to 5 when the multi-measurement state is set to ON.`	

SETup:DAPower:COUNt:STATe

Function	Sets/queries the multi-measurement state of the digital average power measurement.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:DAPOWER:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:DAPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the digital average power measurement's timeout value, and (2) sets the digital average power measurement's timeout STATe to 1 (on). The query form returns the channel power measurement's timeout value.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STIME 5S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

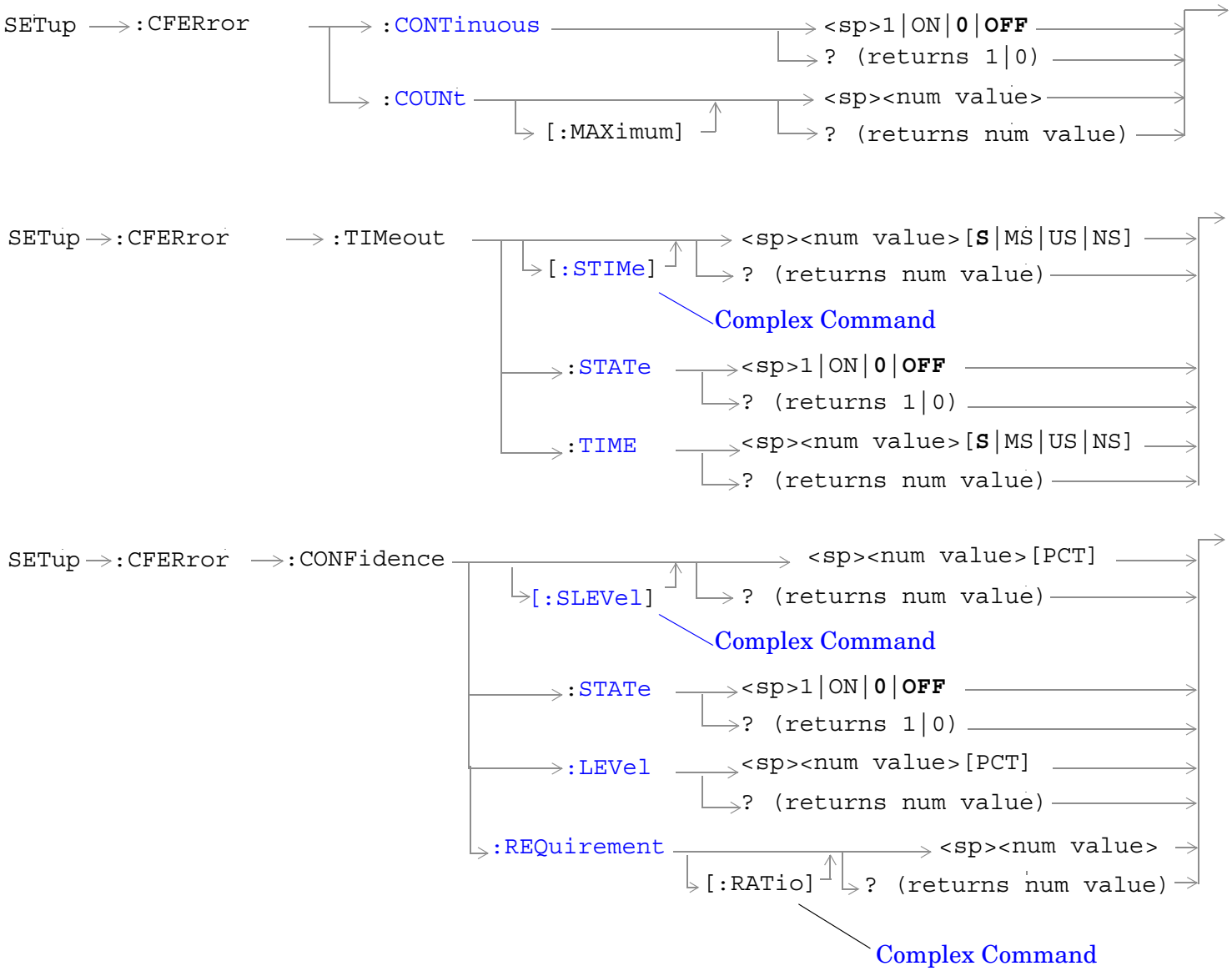
SETup:DAPower:TIMeout:STATe

Function	Sets/queries the digital average power measurement's timeout state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STATE ON"`	

SETup:DAPower:TIMeout:TIME

Function	Sets/queries the digital average power measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:TIME 5S"`	

SETup:CFERror



SETup:CFERror:CONTinuous

Function	Sets/queries the trigger arm state for the FER (frame error rate) measurement. The trigger arm state determines whether the waveform quality measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:CFERROR:CONTINUOUS OFF"`
`!Sets the FER measurement to single trigger mode.`	

SETup:CFERror:COUNt[:MAXimum]

Function	The setting form of this command sets the maximum frame count parameter for frame error rate measurements. If the confidence level parameter is off, the FER (frame error rate) measurement will continue until the maximum frame count is reached. If the confidence level parameter is on and the FER measurement reaches max frames, the FER measurement will return the string value "Max Frames" (see "FETCh:CFER[:ALL]?"). The query form returns the maximum frame count parameter.
Setting	Range: 25 to 10,000,000
Query	Range: 25 to 10,000,000
*RST Setting	10,000

Programming Example
`OUTPUT 714;"SETUP:CFERror:COUNT 10000"`
`!sets the maximum frames value to 10,000.`	

"Diagram Conventions" on page 171

SETup:CFERror:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the FER (frame error rate) measurement's timeout value, and (2) sets the FER measurement's timeout STATe to 1 (on). The query form returns the FER measurement's timeout value.
Setting	Range: 1 to 200,000 seconds Resolution: 1 second
Query	Range: 1 to 200,000
*RST Setting	200 seconds, on

Programming Example
`OUTPUT 714;"SETUP:CFERROR:TIMEOUT:STIME 200S"`
`!Sets timeout state to ON and sets the timeout time to 200 seconds.`	

SETup:CFERror:TIMeout:STATe

Function	Sets/queries the FER (frame error rate) measurement's timeout state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CFERROR:TIMEOUT:STATE ON"`	

SETup:CFERror:TIMeout:TIME

Function	Sets/queries the FER (frame error rate) measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 200,000 seconds Resolution: 1 second
Query	Range: 1 to 200,000
*RST Setting	200 seconds
Programming Example `OUTPUT 714;"SETUP:CFERROR:TIMEOUT:TIME 200S"`	

SETup:CFERror:CONFidence[:SLEVel]

Function	The setting form of this command performs two functions: (1) sets the FER (frame error rate) measurement's confidence level, and (2) sets the FER measurement's confidence limit STATe to 1 (on). The query form of this command returns the FER measurement's confidence level setting.
Setting	Range: 80 to 99.99 percent Resolution: 0.01 percent
Query	Range: 80 to 99.99
*RST Setting	95 percent, On

Programming Example
`OUTPUT 714;"SETUP:CFERROR:CONFIDENCE 95"`
`!sets the FER confidence level to 95 percent`	

SETup:CFERror:CONFidence:STATe

Function	Sets/queries the FER (frame error rate) measurement confidence limit testing on/off state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:STATE ON"`	

SETup:CFERror:CONFidence:LEVel

Function	Sets/queries the FER (frame error rate) measurement's confidence limit level.
Setting	Range: 80 to 99.99%
Query	Range: 80 to 99.99
*RST Setting	95%, on

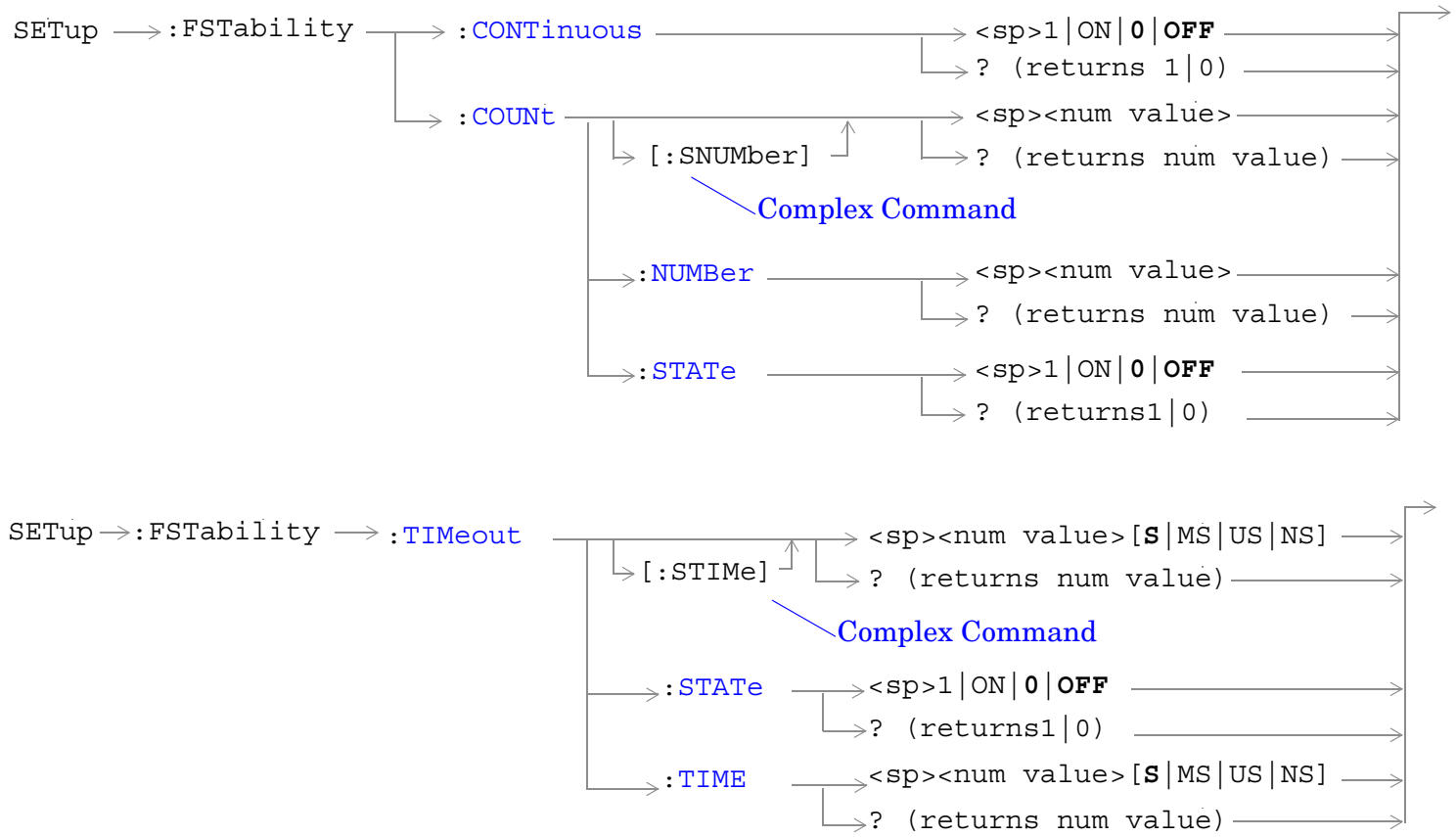
Programming Example
`OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:LEVEL 95"`
`!sets the confidence level to 95%.`	

SETup:CFERror:CONFidence:REQuirement[:RATio]

Function	Sets/queries the FER (frame error rate) measurement's FER requirement. This value specifies the percentage of frame errors used in determining confidence limit pass/fail results.
Setting	Range: 0.10 to 5.0
Query	Range: 0.10 to 5.0
*RST Setting	1.00 %

Programming Example
`OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:REQUIREMENT 2 PCT"`
`!sets the confidence limit requirement to 2.00 percent.`	

SETup:FSTability



"Diagram Conventions" on page 171

SETup:FSTability:CONTinuous

Function	Sets/queries the trigger arm state for the frequency stability measurement. Determines whether measurement will make one measurement then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:FSTABILITY:CONTINUOUS ON"`
`!Sets measurement to continuous trigger mode.`	

SETup:FSTability:COUNt[:SNUMber]

Function	Sets/queries the number of frequency stability measurements to be made in a mulit-measurement setup. This command sets the count, and automatically sets the multi-measurement STATe command to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10, on

Programming Example
`OUTPUT 714;"SETUP:FSTABILITY:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:FSTability:COUNt:NUMBer

Function	Sets/queries the number of frequency stability measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:FSTABILITY:COUNT:NUMBER 5"`
`!Sets the number of measurements to 5 when the multi-measurement state is set to ON.`	

SETup:FSTability:COUNt:STATe

Function	Sets/queries the multi-measurement state of the frequency stability measurement.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:FSTABILITY:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:FSTability:TIMeout[:STIMe]

Function	Sets/queries the frequency stability measurement's timeout setting and automatically sets the timeout state to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:STIME 5S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

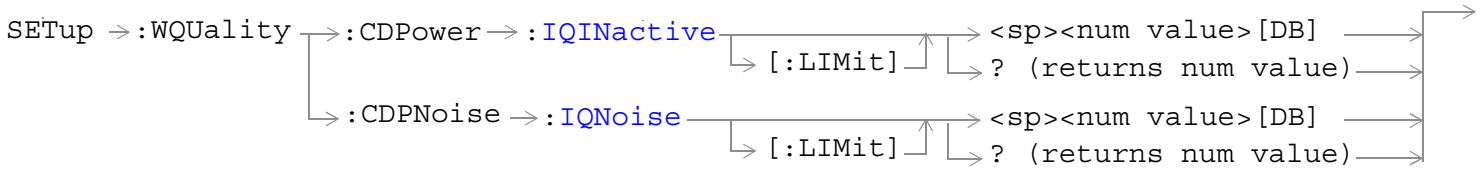
SETup:FSTability:TIMeout:STATe

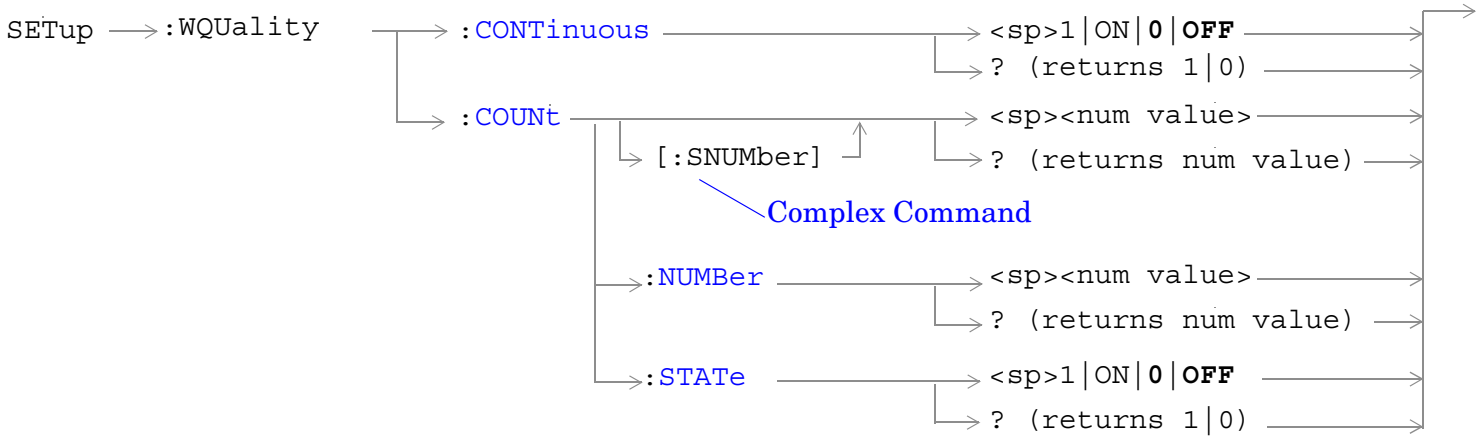
Function	Sets/queries the frequency stability measurement's timeout state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:STATE ON"`	

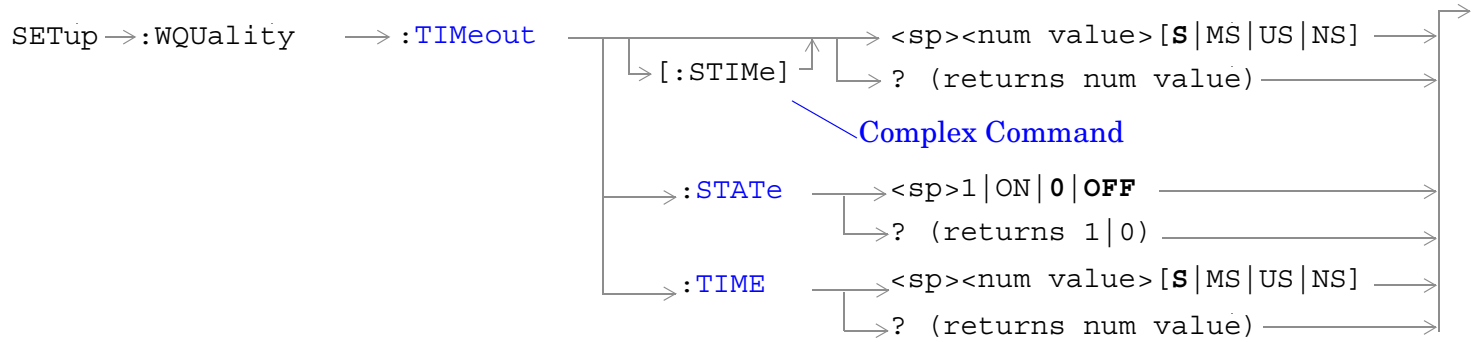
SETup:FSTability:TIMeout:TIME

Function	Sets/queries the frequency stability measurement's timeout setting.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999 seconds Resolution: 0.1 second
*RST Setting	10 seconds, on
Programming Example `OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:TIME 5S"`	

SETup:WQUality







"Diagram Conventions" on page 171

SETup:WQUality:CDPower:IQINactive[:LIMit]

Function	Sets/queries the pass/fail limit for inactive channel power on the Code Domain Power measurement .
Setting	Range: -100 to 0 dB
Query	Range: -100 to 0 dB
*RST Setting	-26 dB

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CDPOWER:IQINACTIVE:LIMIT -26 DB"`
`!Sets code domain power measurement's pass/fail limit.`	

SETup:WQUality:CDPNoise:IQNoise[:LIMit]

Function	Sets/queries the pass/fail limit for noise energy measured by the Code Domain Power and Noise measurement.
Setting	Range: -100 to 0 dB
Query	Range: -100 to 0 dB
*RST Setting	-26 dB

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CDPNOISE:IQNOISE:LIMIT?"`
`!Queries the code domain power plus noise measurement's pass/fail limit.`	

SETup:WQUality:CONTinuous

Function	Sets/queries the trigger arm state for the waveform quality measurement. The trigger arm state determines whether the waveform quality measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:WQUality:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of waveform quality measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of waveform quality multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:WQUality:COUNt:NUMBer

Function	Sets/queries the number of waveform quality measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:COUNT:NUMBER 5"`
`!Sets the number of measurements to 5 when the multi-measurement state is set to ON.`	

SETup:WQUality:COUNt:STATe

Function	Sets/queries the multi-measurement state of the waveform quality measurement.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:WQUALITY:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:WQUality:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the waveform quality measurement's timeout value, and (2) sets the waveform quality measurement's timeout STATe to 1 (on). The query form returns the waveform quality measurement's timeout value.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STIME 5S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

SETup:WQUality:TIMeout:STATe

Function	Sets/queries the waveform quality measurement's timeout state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STATE ON"`	

SETup:WQUality:TIMeout:TIME

Function	Sets/queries the waveform quality measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:TIME 5S"`	

STATus Subsystem

Description

The STATus subsystem is used to communicate current test set status information to the controlling application program.

Syntax Diagrams and Command Descriptions

"STATus:OPERation:" on page 366

"STATus:PRESet" on page 384

"STATus:QUEStionable" on page 385

"Standard Event Status Register" on page 409

"Status Byte Register" on page 408

Status Register Bit Definitions

"Status Byte Register Bit Assignments" on page 408

"Standard Event Status Register Bit Assignment" on page 410

"STATus:QUEStionable Condition Register Bit Assignment" on page 391

"STATus:QUEStionable:CALL Condition Register Bit Assignment" on page 392

"STATus:QUEStionable:ERRors Condition Register Bit Assignment" on page 395

"STATus:QUEStionable:HARDware Condition Register Bit Assignment" on page 406

"STATus:OPERation Register Bit Assignments" on page 371

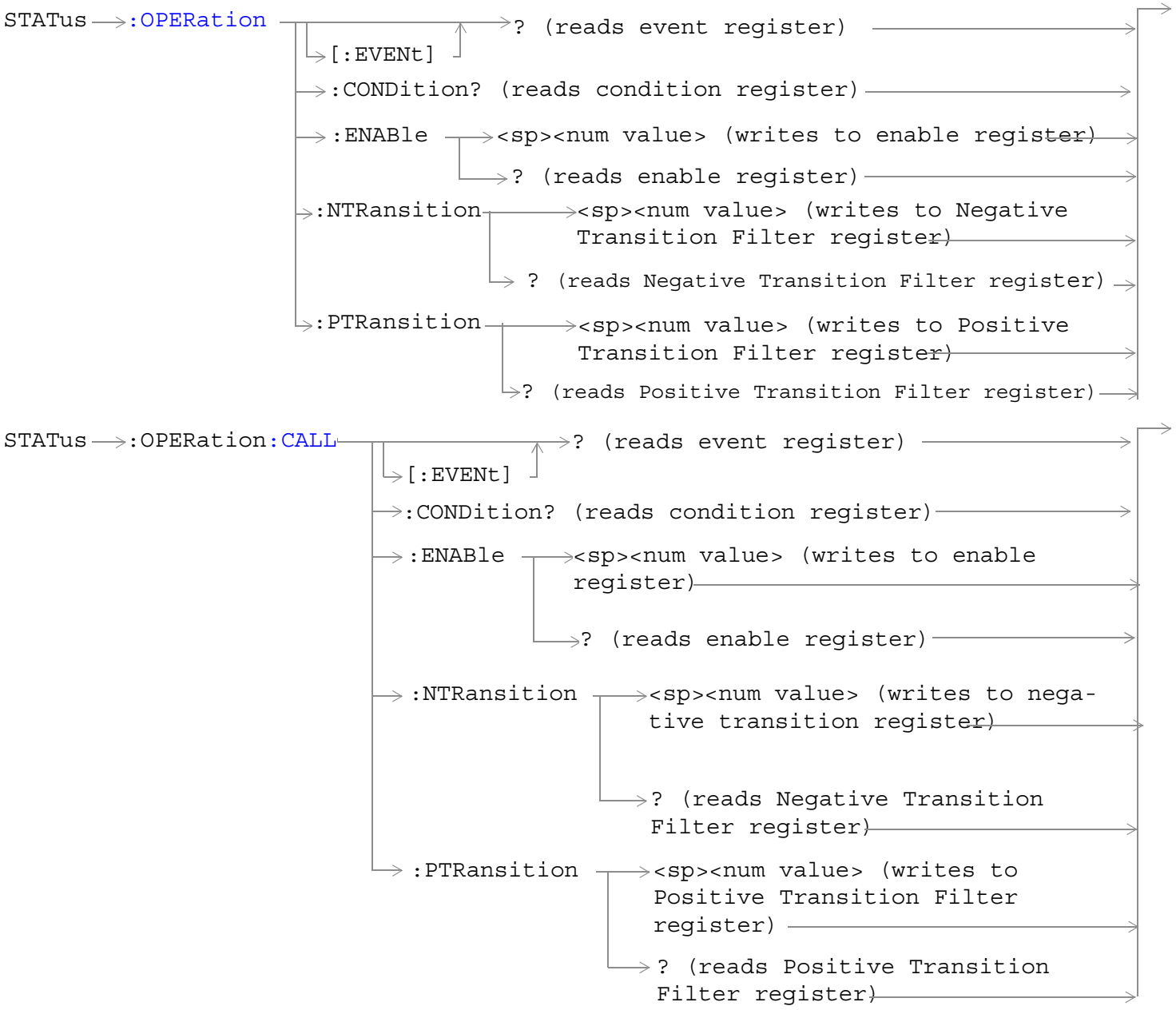
"STATus:OPERation:CALL Condition Register Bit Assignment" on page 372

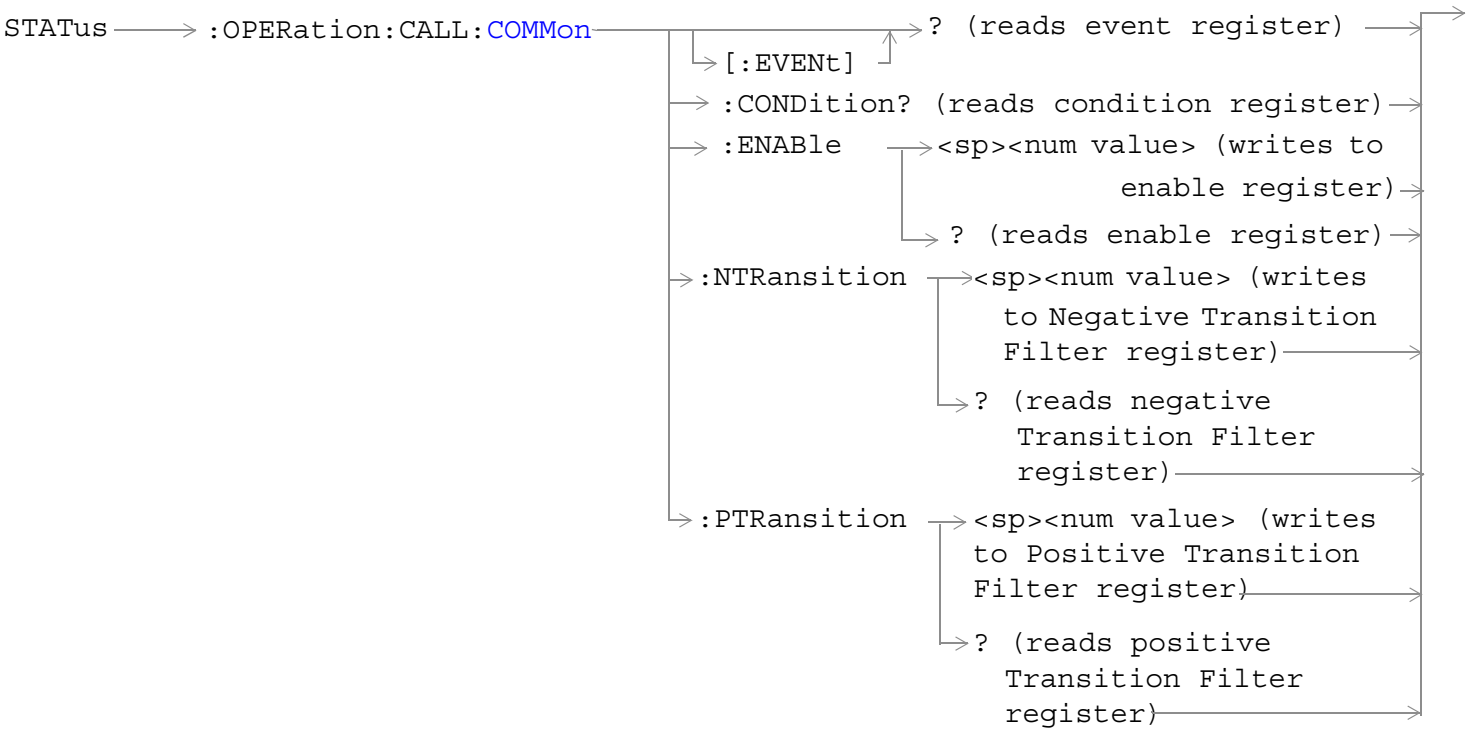
"STATus:OPERation:NMRReady Register Bit Assignments" on page 376

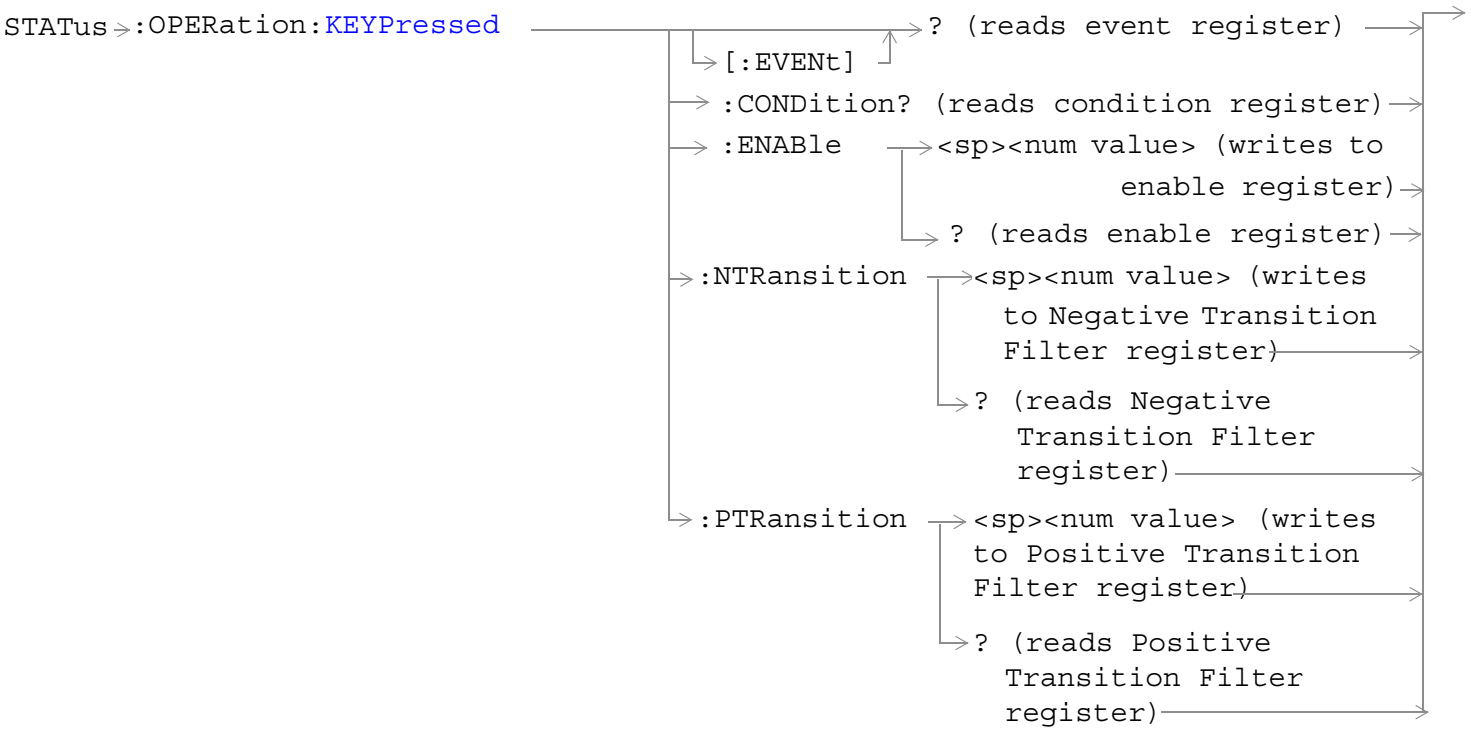
Related Topics

"Status Subsystem Overview" on page 120

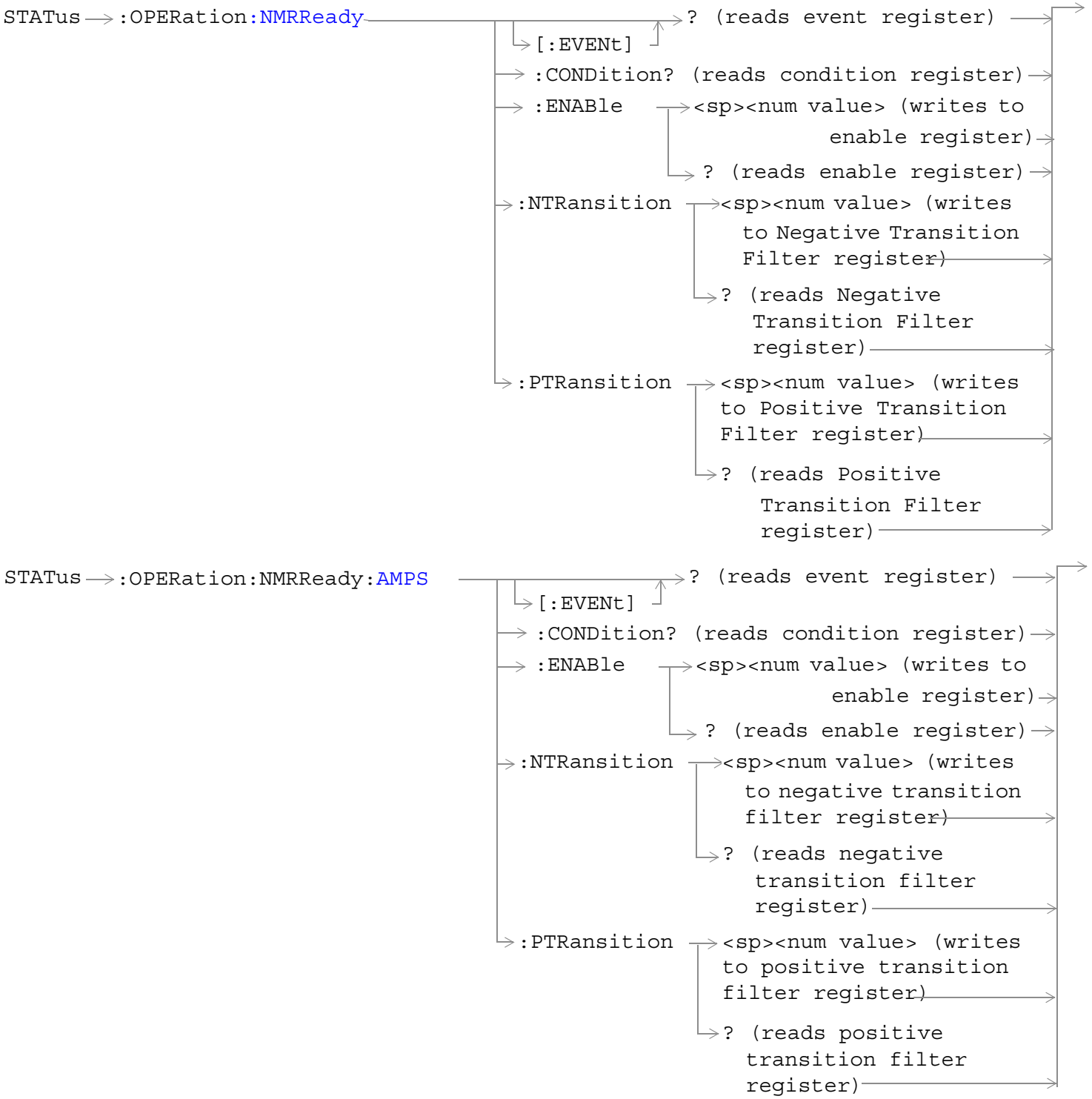
STATus:OPERation:

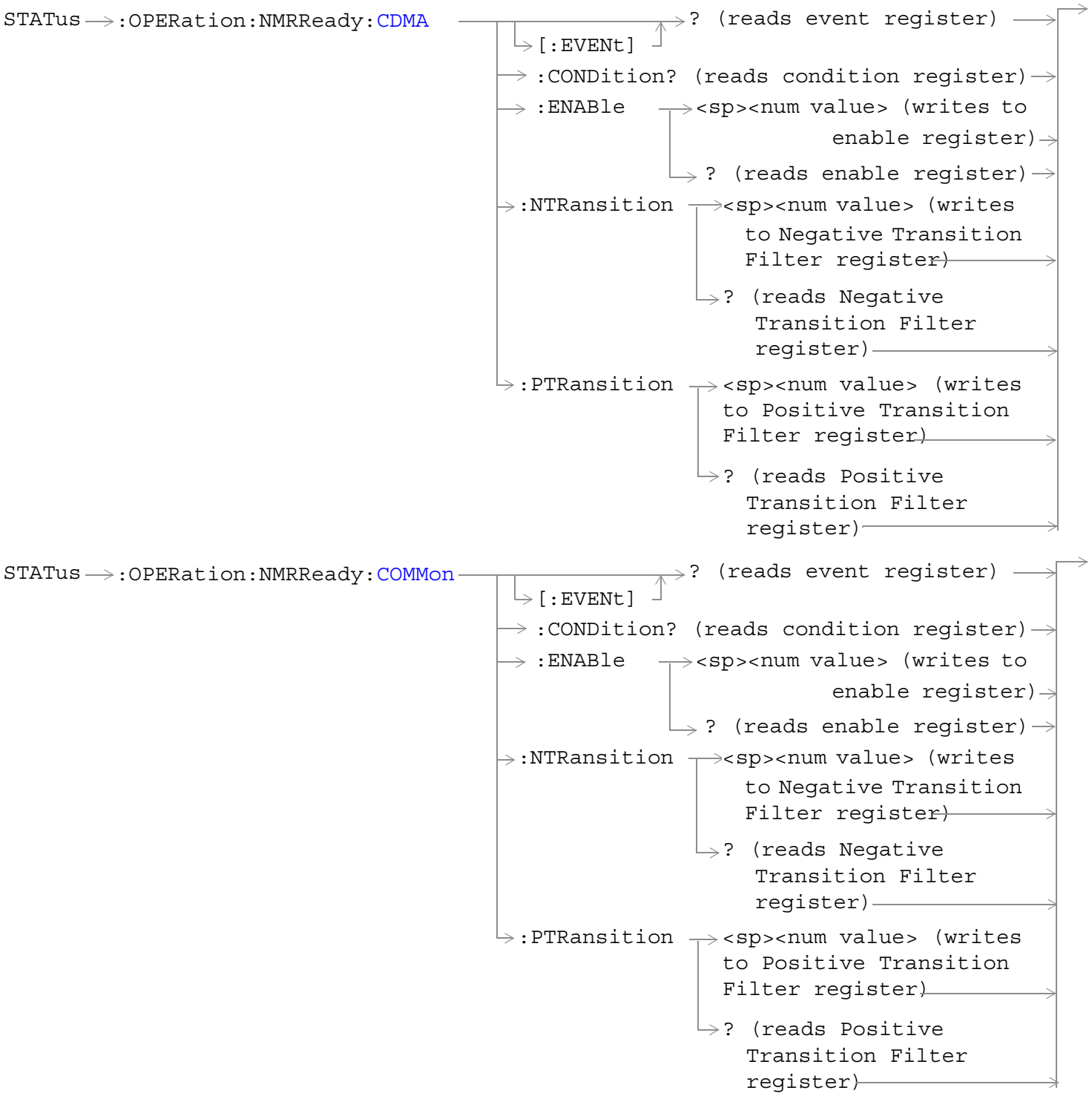



STATus
:OPERation:CALL:COMMon
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads positive Transition Filter register)

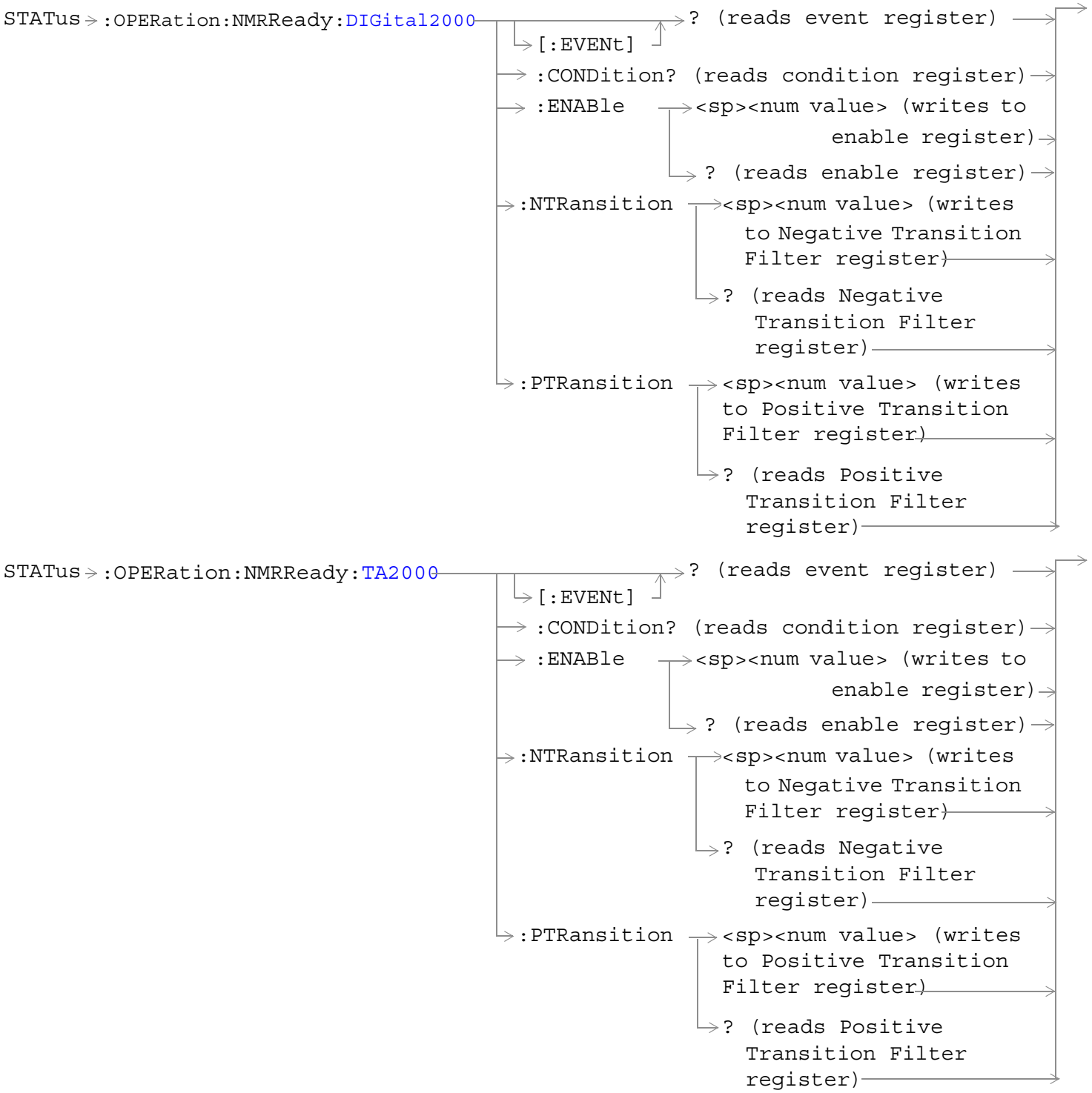

STATus
:OPERation:KEYPressed
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

STATus:OPERation:




STATus
:OPERation:NMRReady:CDMA
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus
:OPERation:NMRReady:COMMon
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

STATus:OPERation:



"Diagram Conventions" on page 171

STATus:OPERation Register Bit Assignments

The OPERation status register set contains bits which give an indication of conditions that are part of the test set's normal operation.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Processing SYSTem:SYNChronized Command	This condition bit is “pulsed" by the SYSTem:SYNChronized command. This will allow the status system to indicate that the input buffer is synchronized to the point where this command is parsed and that all prior sequential commands are completed and all prior overlapped commands have started.
11	2048	Reserved for future use	This bit is always 0.
10	1024	CALL Summary	This bit is the summary message bit for the STATus:OPERation:CALL register.
9	512	NMRReady (New Measurement Result Ready) Summary	This bit is the summary message bit for the STATus:OPERation:NMRReady register.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation

```
OUTPUT 714;"STATUS:OPERATION:EVENT?" !Queries the Operation Event
                                     !Register.
OUTPUT 714;"STATUS:OPERATION:CONDITION?" !Queries the Operation Condition
                                        !Register.
OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Sets the Operation Enable
                                          !Register for bit 10.
OUTPUT 714;"STATUS:OPERATION:NTR 1024" !Sets the Operation Negative Transition
                                       !Register for bit 10.
OUTPUT 714;"STATUS:OPERATION:PTR 512" !Sets the Operation Event Positive Transition
                                      !Register for bit 9.
```

STATus:OPERation:CALL Condition Register Bit Assignment

The STATus:OPERation:CALL register bits will be used to indicate status of processes that occur during normal call processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGITAL136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:GSM register.

Bit Number	Binary Weighting	Condition	Description
1	2	COMMon Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:CALL

```
OUTPUT 714;"STATUS:OPERATION:CALL:EVENT?" !Queries the Operation Call Event
                                          !Register.
OUTPUT 714;"STATUS:OPERATION:CALL:CONDITION?" !Queries the Operation Call
                                              !Condition Register.
OUTPUT 714;"STATUS:OPERATION:CALL:ENABLE 4" !Sets the Operation Call Enable
                                            !Register for bit 2.
OUTPUT 714;"STATUS:OPERATION:CALL:NTR 4" !Sets the Negative Transition
                                         !Register for bit 2.
OUTPUT 714;"STATUS:OPERATION:CALL:PTR 256" !Sets the Positive Transition
                                           !Register for bit 8.
```

STATus:OPERation:CALL:COMMon Condition Register Bit Assignment

The STATus:OPERation:CALL:COMMon register bits will be used to indicate status of processes that occur during normal call processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.)	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Registering (BS initiated)	This bit is set to a 1 when the Base Station initiates registration.
8	256	Reserved for future use.	This bit is always 0.
7	128	BS Originating	This bit is a 1 when: • Active Cell mode - the call processing state leaves the idle state • Test mode - the test set has noted a base station origination.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Call Control Status Registering	This bit will be a 1 when the test set is in the call control status registering state.
3	8	Call Control Status is “Alerting”	This bit is a 1 when the test set is in the call alerting state (ringing).
2	4	Call Control Status is “Connected”	This bit is a 1 when the test set is in the call connected state.
1	2	Call Control Status is “Idle”	This bit is a 1 when the test set is in the call idle state.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:CALL:COMMon

```
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:EVENT?” !Queries the Operation Call Common Event
                                                 !Register.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:CONDITION?” !Queries the Operation Call Common
                                                     !Condition Register.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:ENABLE 8” !Sets the Operation Call Common Enable
                                                   !Register for bit 3.
```

```
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:NTR 8" !Sets the Negative Transition
                                               !Register for bit 3.
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:PTR 256" !Sets the Positive Transition
                                                  !Register for bit 8.
```

STATus:OPERation:KEYPressed Register Bit Assignments

The STATus:OPERation:KEYPressed register bits indicate when a softkey on the test set's front panel has been pressed while the test set is in remote operating mode.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	F12 softkey	This bit is a 1 when the test set's F12 softkey has been pressed.
10	1024	F11 softkey	This bit is a 1 when the test set's F11 softkey has been pressed.
9	512	F10 softkey	This bit is a 1 when the test set's F10 softkey has been pressed.
8	256	F9 softkey	This bit is a 1 when the test set's F9 softkey has been pressed.
7	128	F8 softkey	This bit is a 1 when the test set's F8 softkey has been pressed.
6	64	F7 softkey	This bit is a 1 when the test set's F7 softkey has been pressed.
5	32	F6 softkey	This bit is a 1 when the test set's F6 softkey has been pressed.
4	16	F5 softkey	This bit is a 1 when the test set's F5 softkey has been pressed.
3	8	F4 softkey	This bit is a 1 when the test set's F4 softkey has been pressed.
2	4	F3 softkey	This bit is a 1 when the test set's F3 softkey has been pressed.
1	2	F2 softkey	This bit is a 1 when the test set's F2 softkey has been pressed.
0	1	F1 softkey	This bit is a 1 when the test set's F1 softkey has been pressed.

Program Examples - STATus:OPERation:KEYPressed

```
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:EVENT?" !Queries the Keypressed
                                                !Event Register.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:CONDITION?" !Queries the
                                                     !Keypressed
                                                     !Condition Register.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:ENABLE 16" !Sets
                                                   !Keypressed Enable
                                                   !register for bit 4.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:NTR 2" !Sets the Keypressed
                                               !Negative Transition
                                               !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:PTR 4" !Sets the
                                               !Keypressed Positive
                                               !Transition Register
                                               !for bit 2
```

STATus:OPERation:NMRReady Register Bit Assignments

The STATus:OPERation:NMRReady register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA136 register.
4	16	DIGITAL136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGITAL136 register.

Bit Number	Binary Weighting	Condition	Description
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:AMPS register.
2	4	GSM Summary bit	STATus:This bit is the summary message bit for the OPERation:NMRReady:GSM register.
1	2	COMMON Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:EVENT?" !Queries the New Measurement
                                              !Results Ready Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CONDITION?" !Queries the New Measurement
                                                  !Results Ready
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:ENABLE 16" !Sets New Measurement Results
                                                 !Ready Enable Regigter
                                                 !for bit 4.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:NTR 2" !Sets the New Measurement Results
                                             !Ready Negative Transition
                                             !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:PTR 4" !Sets the New Measurement
                                             !Results Ready Positive
                                             !Transition Register
                                             !for bit 2
```

STATus:OPERation:NMRReady:AMPS Condition Register Bit Assignment

The STATus:OPERation:NMRReady:AMPS register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use	This bit is always 0.
2	4	Frequency Stability New Measurement Result Ready	This is a 1 if the measurement has been completed and has produced new results.
1	2	Reserved for future use	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:AMPS

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:AMPS:EVENT?" !Queries the New Measurement
                                                   !Results Ready AMPS Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:AMPS:CONDITION?" !Queries the New Measurement
                                                        !Results Ready AMPS
                                                        !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:AMPS:ENABLE 8" !Sets New Measurement Results
                                                     !Ready AMPS Enable Regigter
                                                     !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:AMPS:NTR 2" !Sets the New Measurement Results
                                                  !Ready AMPS Negative Transition
                                                  !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:AMPS:PTR 4" !Sets the New Measurement
                                                  !Results Ready AMPS Positive
                                                  !Transition Register
                                                  !for bit 2
```

STATus:OPERation:NMRReady:CDMA Register Bit Assignments

The STATus:OPERation:NMRReady:CDMA register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	CPOWer New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 140.
2	4	WQUality New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 140.
1	2	DAPower New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 140.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:CDMA

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:EVENT?" !Queries the New Measurement
                                                   !Results Ready CDMA Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:CONDITION?" !Queries the New Measurement
                                                       !Results Ready CDMA
                                                       !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:ENABLE 8" !Sets New Measurement Results
                                                     !Ready CDMA Enable Regigter
                                                     !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:NTR 2" !Sets the New Measurement Results
                                                  !Ready CDMA Negative Transition
                                                  !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:PTR 4" !Sets the New Measurement
                                                  !Results Ready CDMA Positive
                                                  !Transition Register
                                                  !for bit 2
```

STATus:OPERation:NMRReady:COMMon Register Bit Assignments

The STATus:OPERation:NMRReady:COMMon register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Audio Analyzer	This is the summary message bit for the STATus:OPERation:NMRReady:COMMon Audio Analyzer register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:COMMon

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:EVENT?" !Queries the New Measurement
                                                !Results Ready Common Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:CONDITION?" !Queries the New Measurement
                                                     !Results Ready Common
                                                     !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:ENABLE 2" !Sets New Measurement Results
                                                    !Ready Common Enable Register
                                                    !for bit 1.

OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:NTR 2" !Sets the New Measurement Results
                                                  !Ready Common Negative Transition
                                                  !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:PTR 2" !Sets the New Measurement
                                                  !Results Ready Common Positive
                                                  !Transition Register
                                                  !for bit 1
```

STATus:OPERation:NMRReady:DIGital2000 Register Bit Assignments

The STATus:OPERation:NMRReady:DIGital2000 register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:DIGital2000

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:EVENT?" !Queries the New Measurement
                                                        !Results Ready DIG2000 Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:CONDITION?" !Queries the New
                                                             !Measurement Results Ready DIG2000
                                                             !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:ENABLE 8" !Sets New Measurement Results
                                                           !Ready DIG2000 Enable Register
                                                           !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:NTR 2" !Sets the New Measurement Results
                                                        !Ready DIG2000 Negative Transition
                                                        !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:PTR 4" !Sets the New Measurement
                                                        !Results Ready DIG2000 Positive
                                                        !Transition Register
                                                        !for bit 2
```

STATus:OPERation:NMRReady:TA2000 Register Bit Assignments

The STATus:OPERation:NMRReady:TA2000 register bits indicate when a measurement has been completed and new measurement results are available. These registers are not available at this time

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:TA2000

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:TA2000:EVENT?" !Queries the New Measurement
                                                     !Results Ready TA2000 Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:TA2000:CONDITION?" !Queries the New Measurement
                                                         !Results Ready TA2000
                                                         !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:TA2000:ENABLE 8" !Sets New Measurement Results
                                                       !Ready TA2000 Enable Register
                                                       !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:TA2000:NTR 2" !Sets the New Measurement Results
                                                    !Ready TA2000 Negative Transition
                                                    !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:TA2000:PTR 4" !Sets the New Measurement
                                                    !Results Ready TA2000 Positive
                                                    !Transition Register
                                                    !for bit 2
```

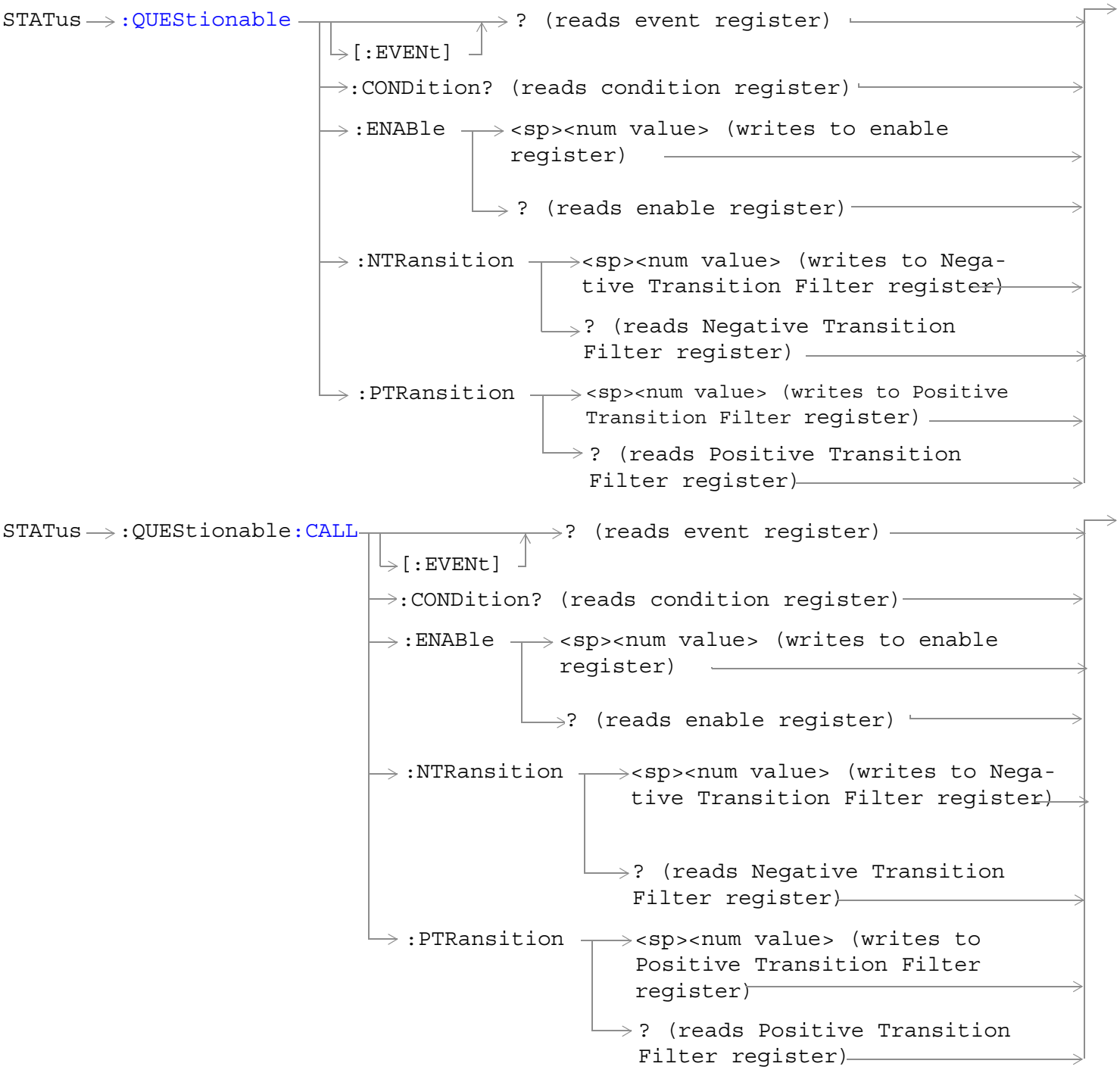
STATus:PRESet

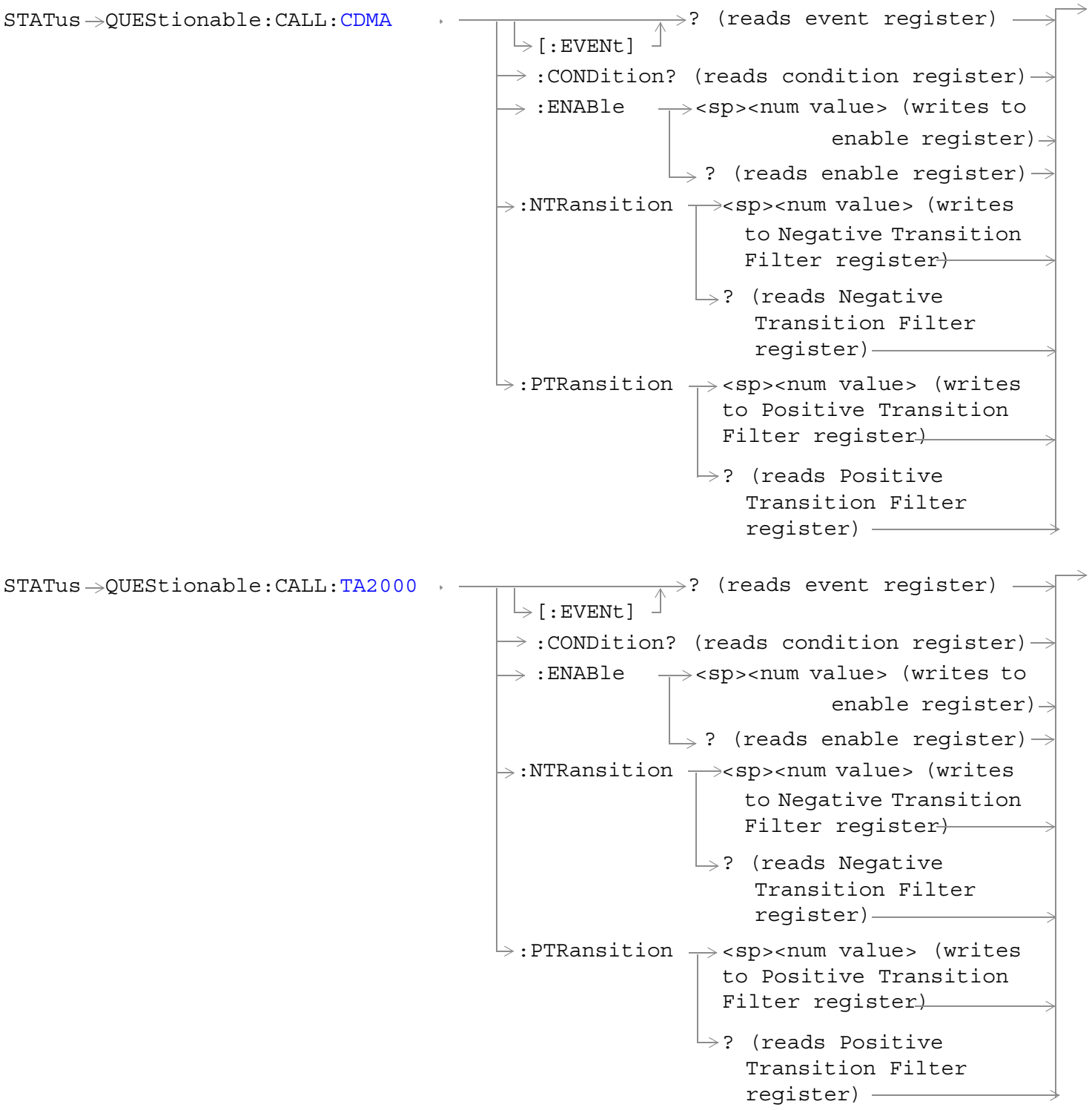
"Diagram Conventions" on page 171

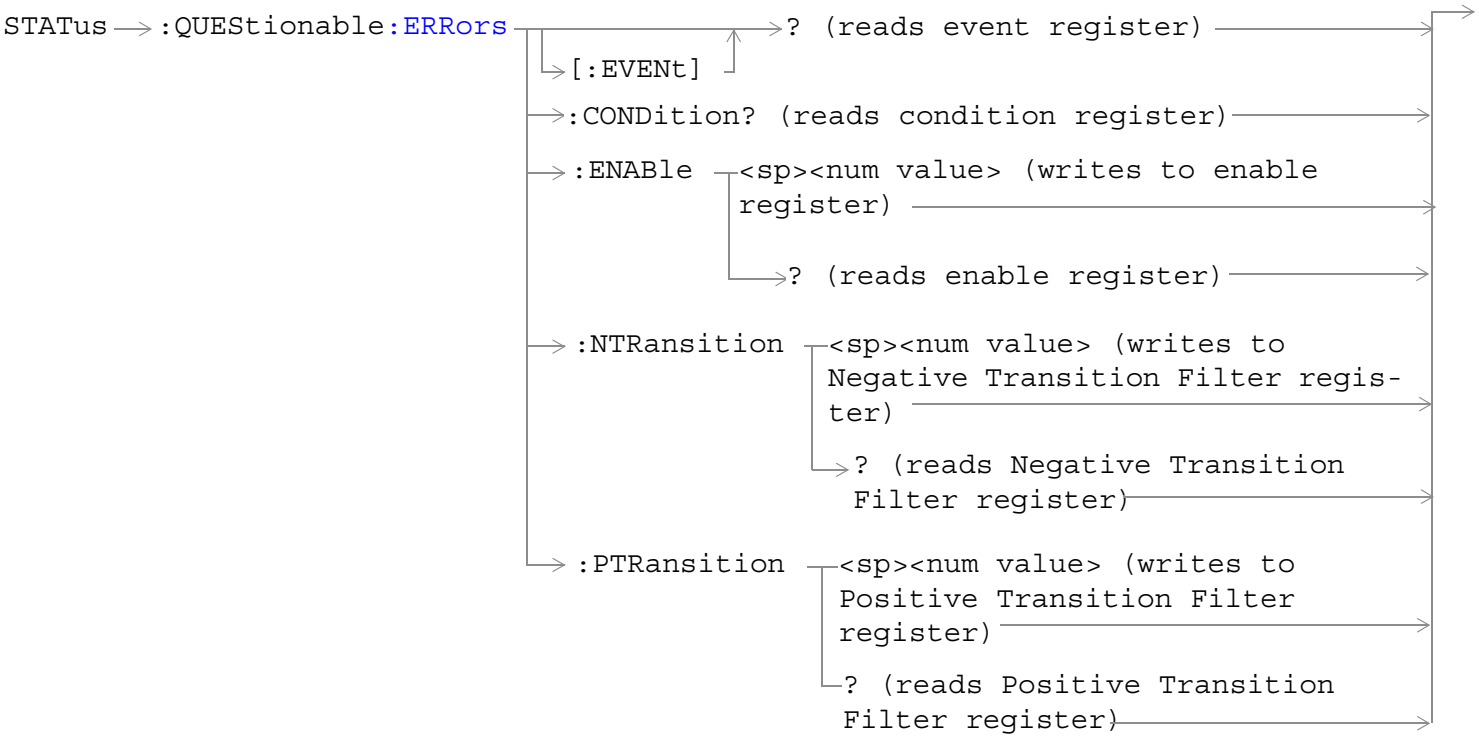
STATus:PRESet

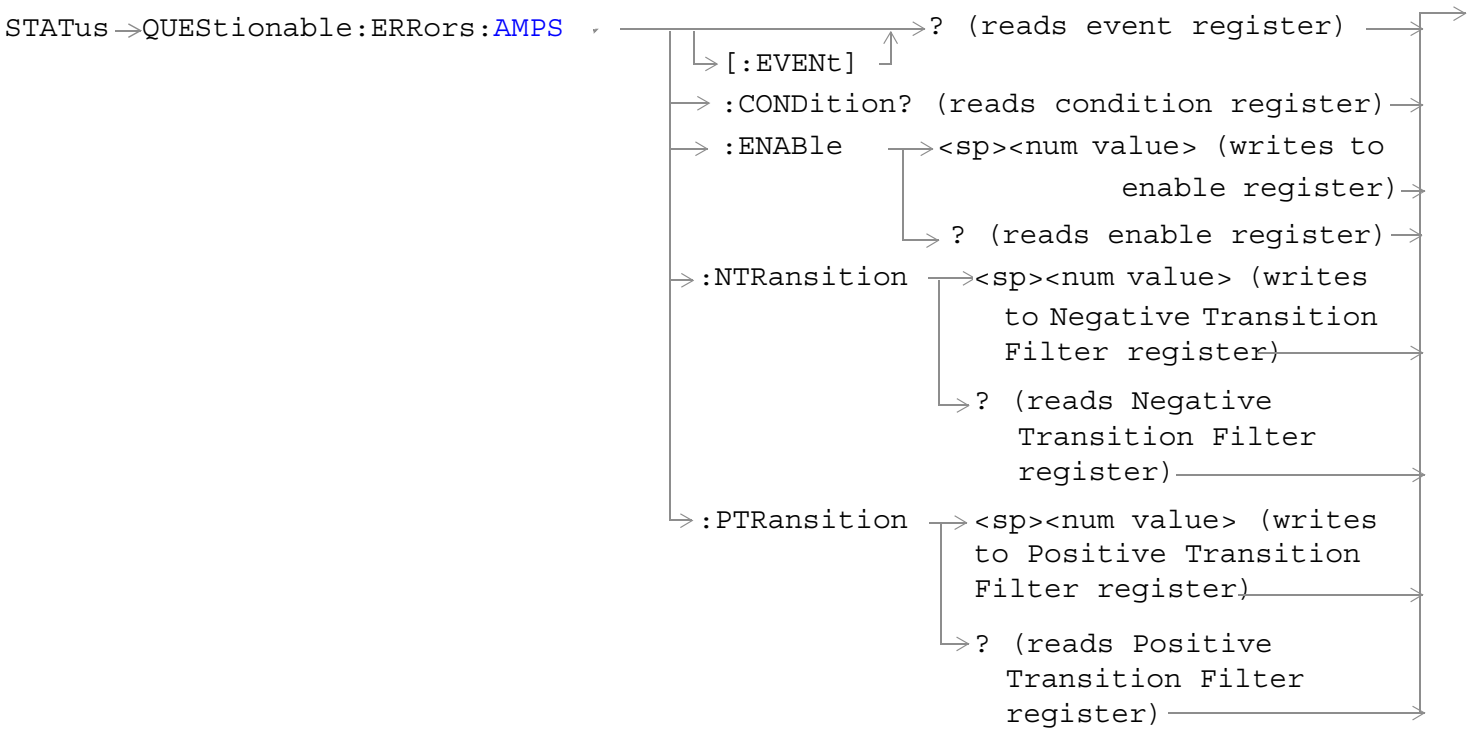
Function	Presets the status subsystem. Presetting the status subsystem performs the following functions: • All enable registers are set to 0 (not enabled) • All Positive Transition Registers (PTR's) are set to 1 (positive transitions enabled). • All Negative Transition Registers (NTR's) are set to 0 (negative transitions disabled).

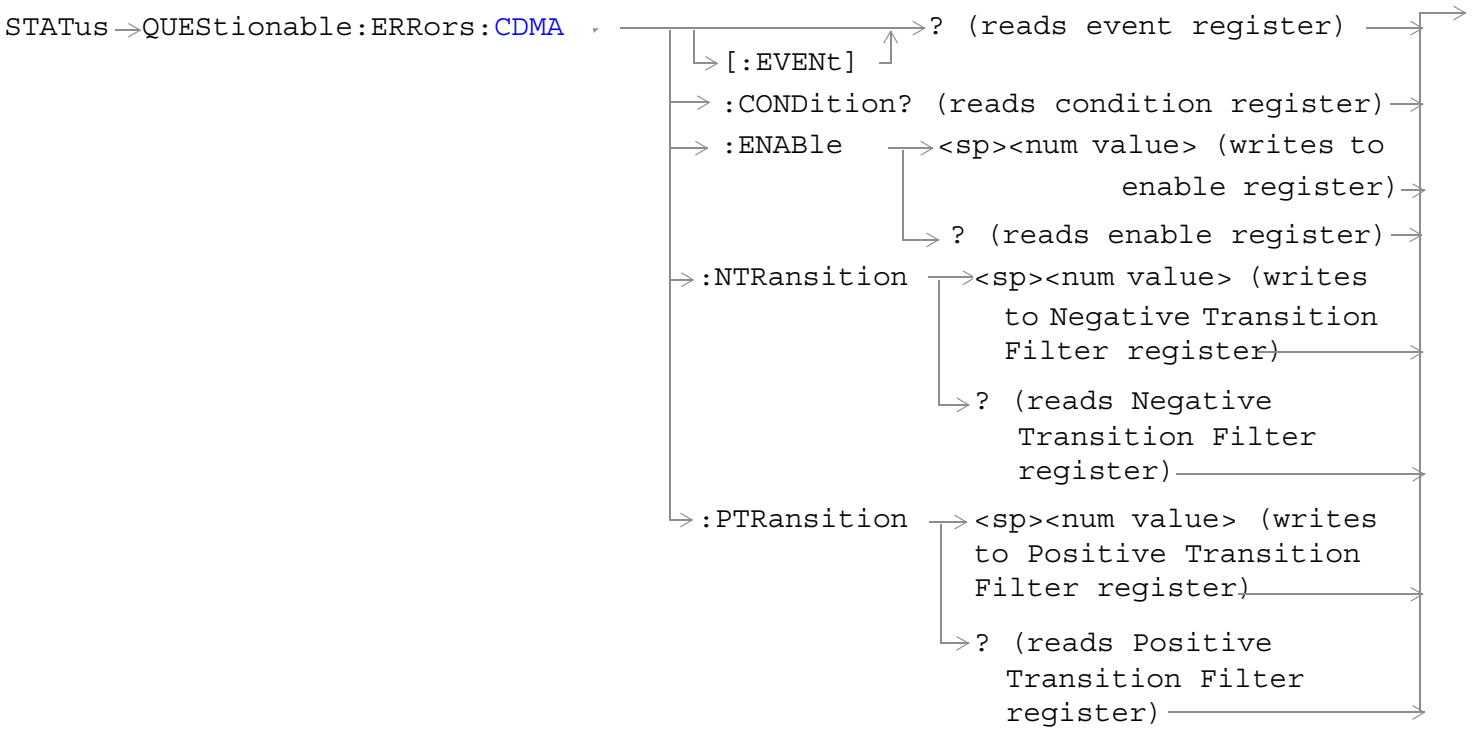
STATus:QUEStionable

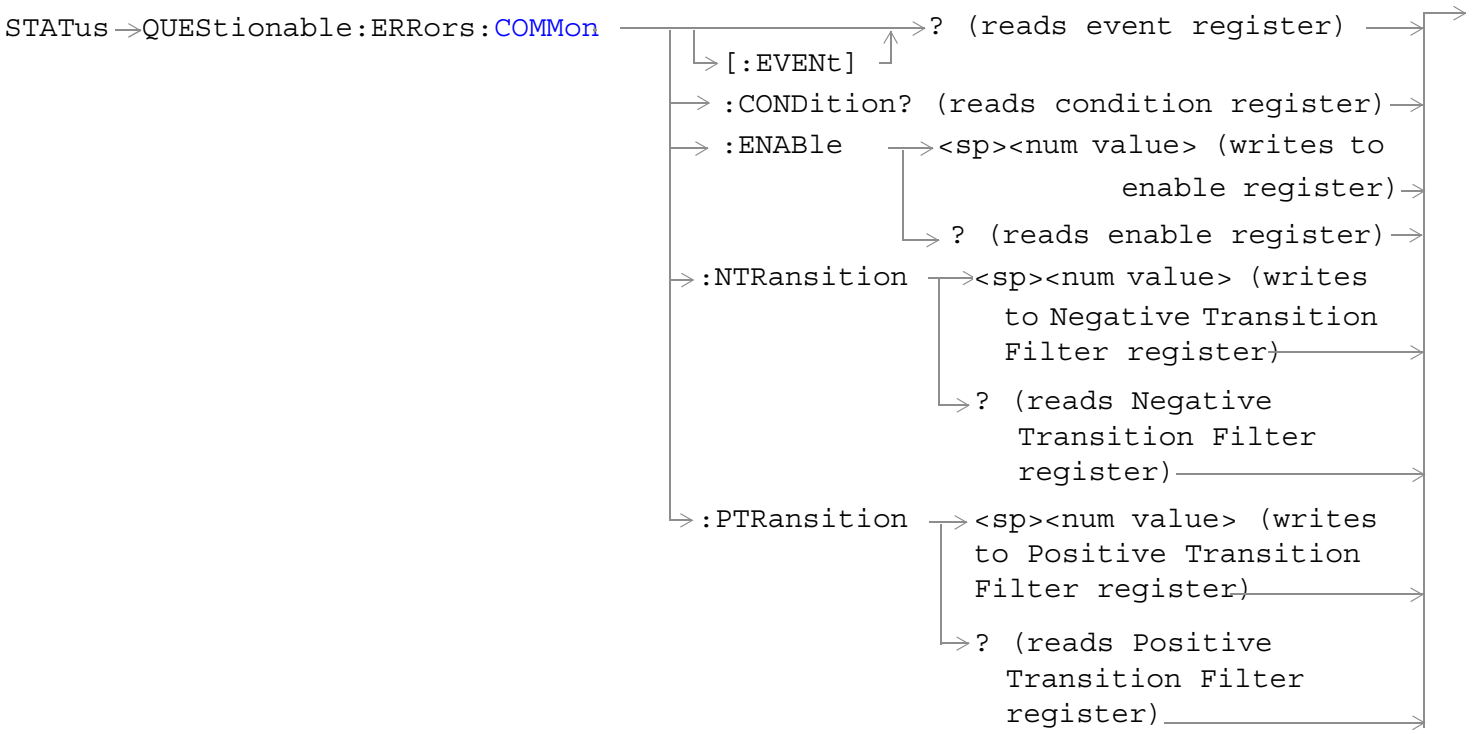


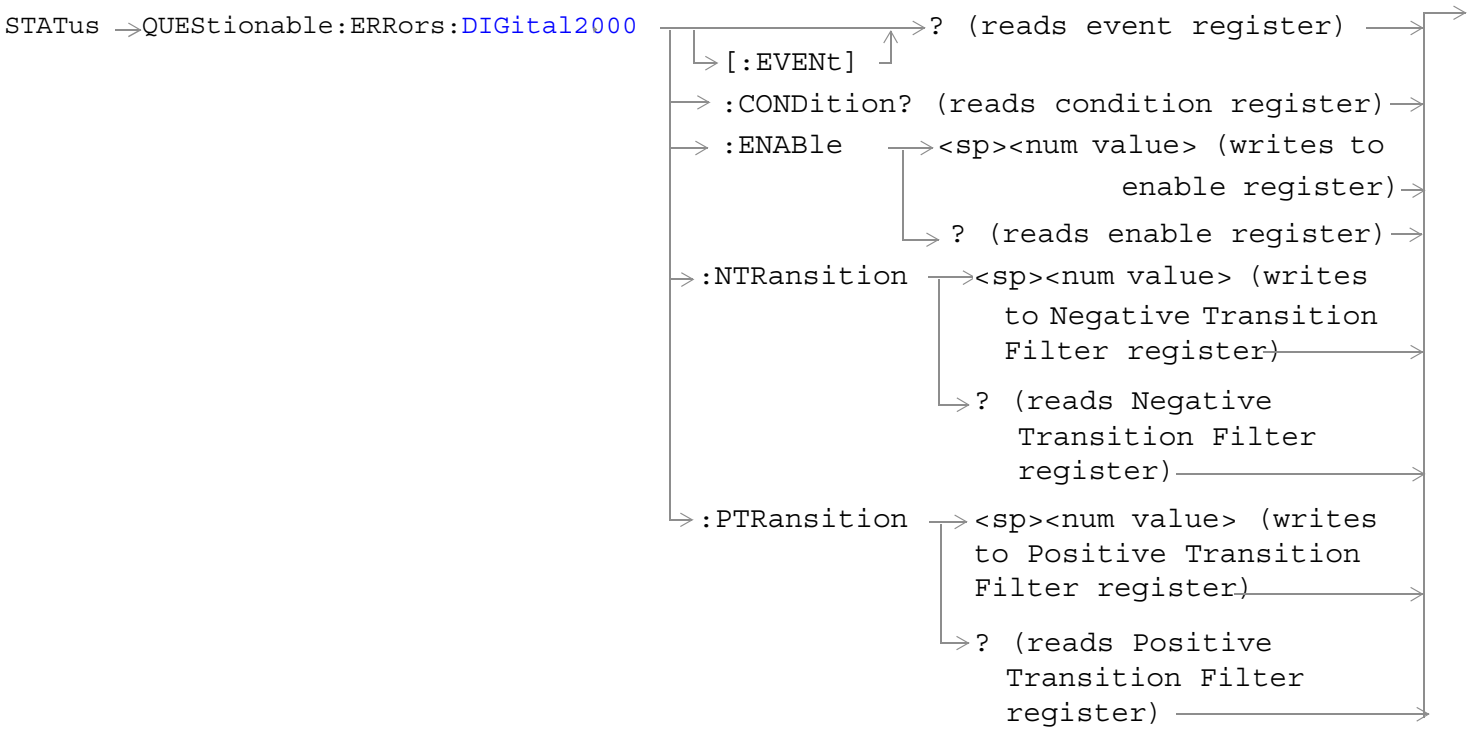

STATus
QUEStionable:CALL:CDMA
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus
QUEStionable:CALL:TA2000
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

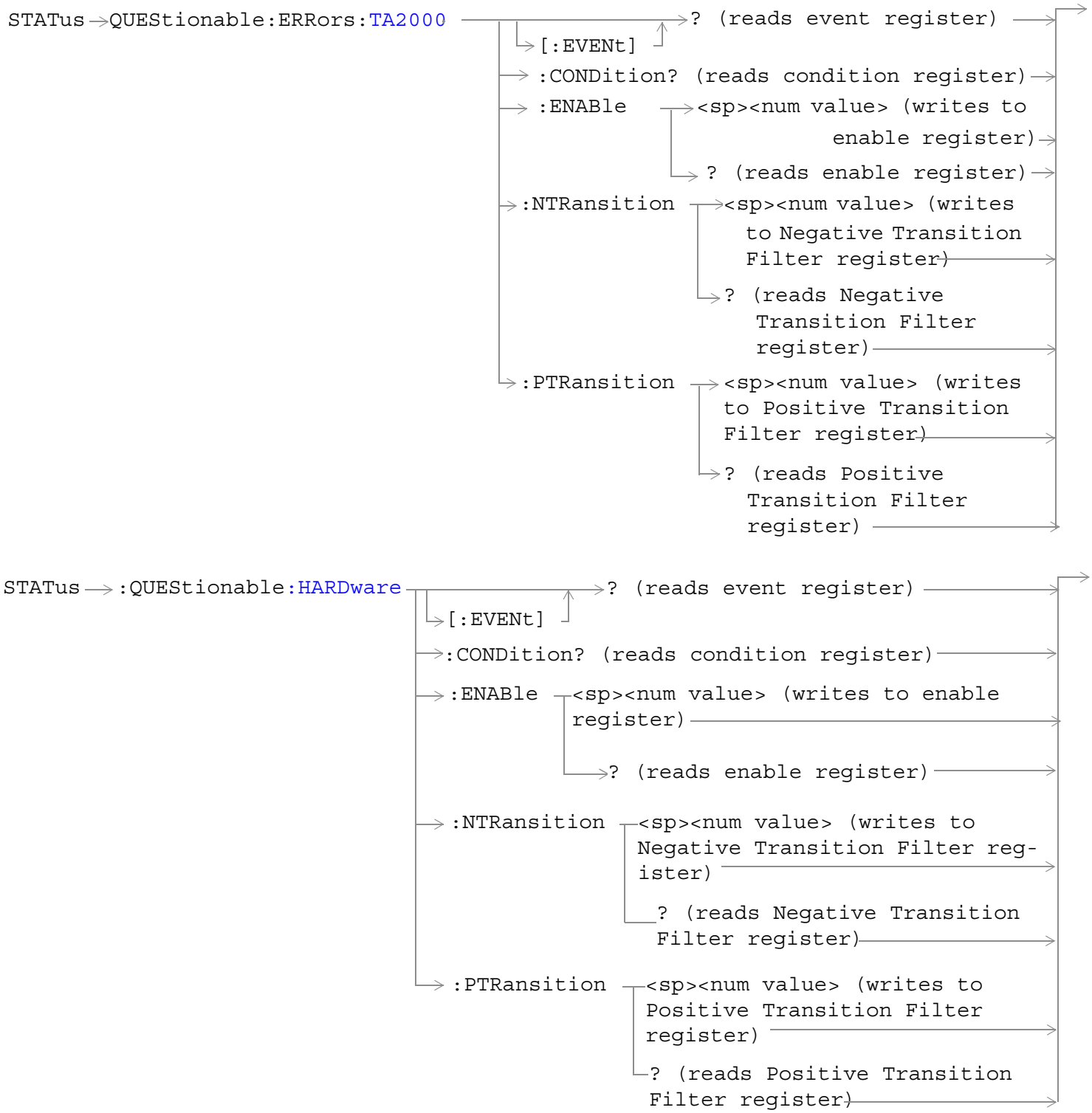

STATus
:QUEStionable:ERRors
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
QUEStionable:ERRors:AMPS
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
QUEStionable:ERRors:CDMA
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
QUEStionable:ERRors:COMMon
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
QUEStionable:ERRors:DIGital2000
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)



"Diagram Conventions" on page 171

STATus:QUEStionable Condition Register Bit Assignment

The STATus:QUEStionable register contains bits which give an indication that the data currently being acquired or generated is of questionable quality due to some condition affecting the functionality associated with that bit.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	QUEStionable:HARDware summary	This bit is the summary message bit for the STATus:QUEStionable:HARDware register.
10	1024	QUEStionable:CALL summary	This bit is the summary message bit for the STATus:QUEStionable:CALL register.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	QUEStionable:ERRors summary	This bit is the summary message bit for the STATus:QUEStionable:ERRors register.
0	1	Reserved for future use.	This bit is always 0.

Program Example - STATus:QUEStionable Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:EVENT?" !Queries and clears the Questionable Event
                                        !Register
OUTPUT 714;"STATUS:QUESTIONABLE:CONDITION?" !Queries and clears the Questionable Condition
                                           !Register
OUTPUT 714;"STATUS:QUESTIONABLE:ENABLE 1024" !Sets the Questionable Enable Register
                                            !for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:NTRANSITION 2" !Sets the Questionable Negative
                                               !Transition Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:PTRANSITION 2" !Sets the Questionable Positive
                                               !Transition Filter Register for bit 1
```

STATus:QUEStionable:CALL Condition Register Bit Assignment

The STATus:QUEStionable:CALL registers will contain information about which event(s) occurred during call processing that indicate what call processing procedure failed

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:GSM register.
1	2	COMMon Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:EVENT?" !Queries and clears the Questionable
                                             !Call Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CONDITION?" !Queries and clears the Questionable
                                                 !Call Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:ENABLE 1024" !Sets the Questionable
```

```
                                                    !Call Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:NTRANSITION 2" !Sets the Questionable Call
                                                    !Negative Transition Filter Register
                                                    !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:PTRANSITION 2" !Sets the Questionable Call
                                                    !Positive Transition Filter Register
                                                    !for bit 1
```

STATus:QUEStionable:CALL:CDMA Condition Register Bit Assignment

The STATus:QUEStionable:CALL:CDMA registers will contain information about which event(s) occurred during call processing that indicate what call processing procedure failed

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Call drop timer timed out	This bit is a 1 after 250 consecutive bad frames are counted indicating that the reverse link is lost
3	8	Service connect completion not received	This bit is a 1 when the test set has not received a message from the MS that it has completed the change to a new Service Option or Radio Configuration.
2	4	Service Option or Radio Configuration rejected by MS	This bit is a 1 when the MS receives a Service Option or a Radio Configuration that it does not support.
1	2	Traffic channel preamble not received	This bit is a 1 if no preamble was received from the MS.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:CDMA Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:EVENT?" !Queries and clears the Questionable
                                                  !Call CDMA Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:CONDITION?" !Queries and clears the Questionable
                                                     !Call CDMA Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:ENABLE 1024" !Sets the Questionable
                                                      !Call CDMA Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:NTRANSITION 2" !Sets the Questionable Call CDMA
                                                        !Negative Transition Filter Register
                                                        !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:PTRANSITION 2" !Sets the Questionable Call CDMA
                                                        !Positive Transition Filter Register
                                                        !for bit 1
```

STATus:QUEStionable:CALL:TA2000 Condition Register Bit Assignment

The STATus:QUEStionable:CALL:TA2000 registers will contain information about which event(s) occurred during call processing that indicate what call processing procedure failed

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	MS reject order received	This bit is a 1 if the Service Option or Radio Configuration change was rejected by the MS while connected.
3	8	Carrier not detected on new channel	This bit is a 1 when no power is detected by the test set after a handoff or when making a call.
2	4	Handoff completion not received	This bit is a 1 if the test set does not receive a handoff completion message from the MS.
1	2	Release order not received	This bit is a 1 if the MS does not send the call release to the test set.

Bit Number	Binary Weighting	Condition	Description
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:TA2000 Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:TA2000:EVENT?" !Queries and clears the Questionable
                                                    !Call Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:TA2000:CONDITION?" !Queries and clears the Questionable
                                                        !Call Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:TA2000:ENABLE 1024" !Sets the Questionable
                                                         !Call Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:TA2000:NTRANSITION 2" !Sets the Questionable Call
                                                           !Negative Transition Filter Register
                                                           !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:TA2000:PTRANSITION 2" !Sets the Questionable Call
                                                           !Positive Transition Filter Register
                                                           !for bit 1
```

STATus:QUEStionable:ERRors Condition Register Bit Assignment

The STATus:QUEStionable:ERRors register bits will be used to indicate information about test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA136 register.

Bit Number	Binary Weighting	Condition	Description
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:GSM register.
1	2	COMMon Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:ERRors register.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:EVENT?" !Queries and clears the Questionable
                                               !Errors Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CONDITION?" !Queries and clears the Questionable
                                                   !Errors Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:ENABLE 1024" !Sets the Questionable
                                                    !Errors Enable
                                                    !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:NTRANSITION 2" !Sets the Questionable Errors
                                                      !Negative Transition Filter Register
                                                      !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:PTRANSITION 2" !Sets the Questionable Errors
                                                      !Positive Transition Filter Register
                                                      !for bit 1
```

STATus:QUEStionable:ERRors:AMPS Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:AMPS register bits will be used to indicate information about AMPS related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	MUI Maskable Messages	This bit is a 1 when a Maskable Message has occurred. Maskable Messages are not displayed on the test set display.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition is be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:AMPS Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:EVENT?" !Queries and clears the Questionable
                                                    !Errors AMPS Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:CONDITION?" !Queries and clears the Questionable
                                                        !Errors AMPS Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:ENABLE 1024" !Sets the Questionable
                                                         !Errors AMPS Enable
                                                         !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:NTRANSITION 2" !Sets the Questionable Errors
                                                           !AMPS Negative Transition
                                                           !Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:PTRANSITION 2" !Sets the Questionable Errors
                                                           !AMPS Positive Tranasition
                                                           !Filter Register for bit 1
```

STATus:QUEStionable:ERRors:CDMA Register Bit Assignments

The STATus:QUEStionable:ERRors:CDMA register bits will be used to indicate information about CDMA related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:CDMA Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:EVENT?" !Queries and clears the Questionable
                                                    !Errors CDMA Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:CONDITION?" !Queries and clears the Questionable
                                                        !Errors CDMA Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:ENABLE 1024" !Sets the Questionable
                                                         !Errors CDMA Enable
                                                         !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:NTRANSITION 2" !Sets the Questionable Errors
                                                           !CDMA Negative Transition
                                                           !Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:PTRANSITION 2" !Sets the Questionable Errors
                                                           !CDMA Positive Tranasition
                                                           !Filter Register for bit 1
```

STATus:QUEStionable:ERRors:COMMon Register Bit Assignments

The STATus:QUEStionable:ERRors:COMMon register bits will be used to indicate information about the COMMon test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:COMMon Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:EVENT?" !Queries and clears the Questionable
                                                      !Errors Common Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:CONDITION?" !Queries the and clears the
                                                          !Questionable Errors
                                                          !Common Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:ENABLE 1024" !Sets the Questionable
                                                           !Errors Common Enable
                                                           !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:NTRANSITION 2" !Sets the Questionable Errors
                                                             !Common Negative Transition
                                                             !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:PTRANSITION 2" !Sets the Questionable Errors
                                                             !Common Positive Tranasition
                                                             !Register for bit 1
```

STATus:QUEStionable:ERRors:DIGital2000Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:DIGital2000 register bits will be used to indicate information about DIGital2000 related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors:DIGital2000 Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:EVENT?" !Queries and clears the
                                                        !Questionable Errors
                                                        !DIGITAL2000 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:CONDITION?" !Queries and clears the
                                                            !Qestionable Errors
                                                            !DIGITAL2000 Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:ENABLE 1024" !Sets the Questionable
                                                             !Errors DIGITAL2000 Enable
                                                             !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:NTRANSITION 2" !Sets the Questionable
                                                               !Errors DIGITAL2000 Negative
                                                               !Transition Filter
                                                               !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:PTRANSITION 2" !Sets the Questionable
                                                               !Errors DIGITAL2000 Positive
                                                               !Transition Filter
                                                               !Register for bit 1
```

STATus:QUEStionable:ERRors:TA2000 Register Bit Assignments

The STATus:QUEStionable:ERRors:TA2000 register bits will be used to indicate information about TA2000 related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. Query the Event Register to find out if one of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:TA2000 Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:EVENT?" !Queries and clears the
                                                      !Questionable Errors
                                                      !TA2000 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:CONDITION?" !Queries and clears the
                                                          !Qestionable Errors
                                                          !TA2000 Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:ENABLE 1024" !Sets the Questionable
                                                           !Errors TA2000 Enable
                                                           !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:NTRANSITION 2" !Sets the Questionable
                                                             !Errors TA2000 Negative
                                                             !Transition Filter
                                                             !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:PTRANSITION 2" !Sets the Questionable
                                                             !Errors TA2000 Positive
                                                             !Transition Filter
                                                             !Register for bit 1
```

STATus:QUEStionable:HARDware Condition Register Bit Assignment

The STATus:QUEStionable:HARDware register bits give an indication that the data/signals currently being acquired or generated are of questionable quality.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Power-up Self Test(s) Failed	This bit will be a 1 if the power-up self tests failed.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit.	This bit will always be 0.

Program Example - STATus:QUEStionable:HARDware Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:EVENT?" !Queries and clears the Questionable
                                                 !Hardware Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:CONDITION?" !Queries and clears the Questionable
                                                     !Hardware Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:ENABLE 1024" !Sets the Questionable
                                                      !Hardware Enable
                                                      !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:NTRANSITION 2" !Sets the Questionable
                                                        !Hardware Negative Transition Filter
                                                        !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:PTRANSITION 2" !Sets the Questionable
                                                        !Hardware Positive Transition Filter
                                                        !Register for bit 1
```

Status Byte Register

*STB?

*STB?

NOTE The Status Byte Register can also be read with a serial poll. For example, the command "Status_byte = SPOLL(714)" would perform a serial poll of the Status Byte Register, returning and releasing RQS (bit 6).

Status Byte Register Bit Assignments

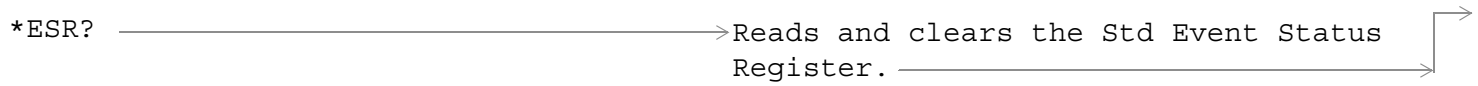
Bit Number	Binary Weighting	Label	Description
7	128	STATus: OPERation	Summarizes the STATus: OPERation Status Register, which fans out to the NMRReady and CALL Status Registers.
6	64	RQS (SRQ TRUE?)/Master Summary Status	RQS is read by a serial poll (SPOLL) Master Summary Status is read by a *STB? query - defined by IEEE 488.2
5	32	Standard Event Status Register	Summarizes the Standard Event Status Register
4	16	Message Available	SCPI - Defined
3	8	STATus: QUEStionable Status Register	Summary Message comes from the STATus: QUEStionable Status Register, which fans out to the CALL and HARDware Status Registers
2	4	Error/ Event Queue	SCPI - Defined
1	2	Reserved	
0	1	Reserved	

Program Example - Status Byte Register Bit Assignments

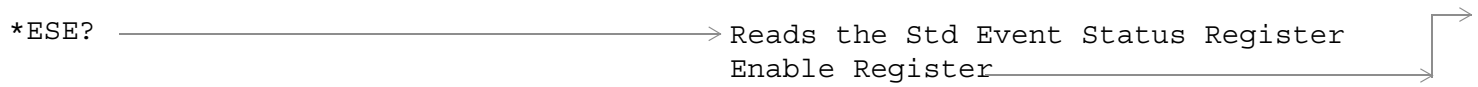
```
OUTPUT 714;"*STB?" !Queries the Status Byte.
```

Standard Event Status Register

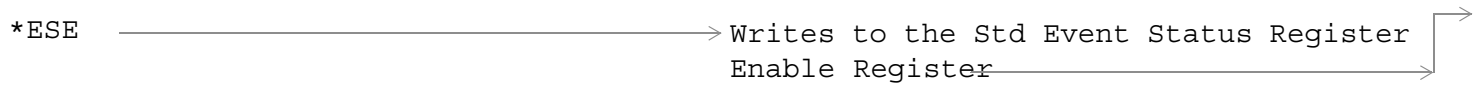
*ESR?



*ESE?



*ESE



"Diagram Conventions" on page 171

Standard Event Status Register Bit Assignment

Bit Number	Binary Weighting	Condition	Description
15	32768	Reserved by IEEE.	This bit will always be 0.
14	16384	Reserved by IEEE.	This bit will always be 0.
13	8192	Reserved by IEEE.	This bit will always be 0.
12	4096	Reserved by IEEE.	This bit will always be 0.
11	2048	Reserved by IEEE.	This bit will always be 0.
10	1024	Reserved by IEEE.	This bit will always be 0.
9	512	Reserved by IEEE.	This bit will always be 0.
8	256	Reserved by IEEE.	This bit will always be 0.
7	128	Power On	This bit is set to 1 if the power supply has been turned off and on since the last time this register was read or otherwise cleared. Defined in "IEEE Std. 488.2-1992",11.5.1.1.2
6	64	Reserved for future use.	This bit will always be 0.
5	32	Command Error	This bit is set to 1 if the test set detects an error while trying to process a command. The following events cause a command error: • An IEEE 488.2 syntax error. The test set received a message that did not follow the syntax defined by the standard. • A semantic error. For example the test set received an incorrectly spelled command. • The test set received a group execution trigger (GET) inside a program message
4	16	Execution Error	This bit is set to 1 if the test set detects an error while trying to execute a command. The following events cause a execution error: • A <PROGRAM DATA> element received in a command is outside the legal range for the test set, or it is inconsistent with the operation of the test set. • The test set could not execute a valid command due to some test set hardware/firmware condition.
3	8	Device Dependent Error	This bit is set to 1 if a test set operation does not execute properly due to an internal condition (such as, overrange). This bit indicates that the error was not a command, query, or execution error.

Bit Number	Binary Weighting	Condition	Description
2	4	Query Error	This bit is set to 1 if an error has occurred while trying to read the test set's output queue. The following events cause a query error: • An attempt is made to read data from the output queue when no data is present or is pending. • Data in the output queue has been lost. An example of this would be an output queue overflow.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Operation Complete	This bit is set to 1 when the test set has completed all pending operations and is ready to accept new commands. This bit is only generated in response to the *OPC IEEE 488.2 common command.

Program Example - Standard Event Status Register

```
OUTPUT 714;"*ESR?" !Queries (reads) the Standard Event Status Register.
```

SYSTem Subsystem

Description

The SYSTem subsystem performs system level configuration functions of the test set.

Syntax Diagrams and Command Descriptions

"SYSTem:APPLication" on page 413

"SYSTem:BEEPer" on page 419

"SYSTem:COMMunicate" on page 421

"SYSTem:CONFigure:INFormation:HARDware:VERBose?" on page 420

"SYSTem:CORRection" on page 424

"SYSTem:APPLication" on page 413

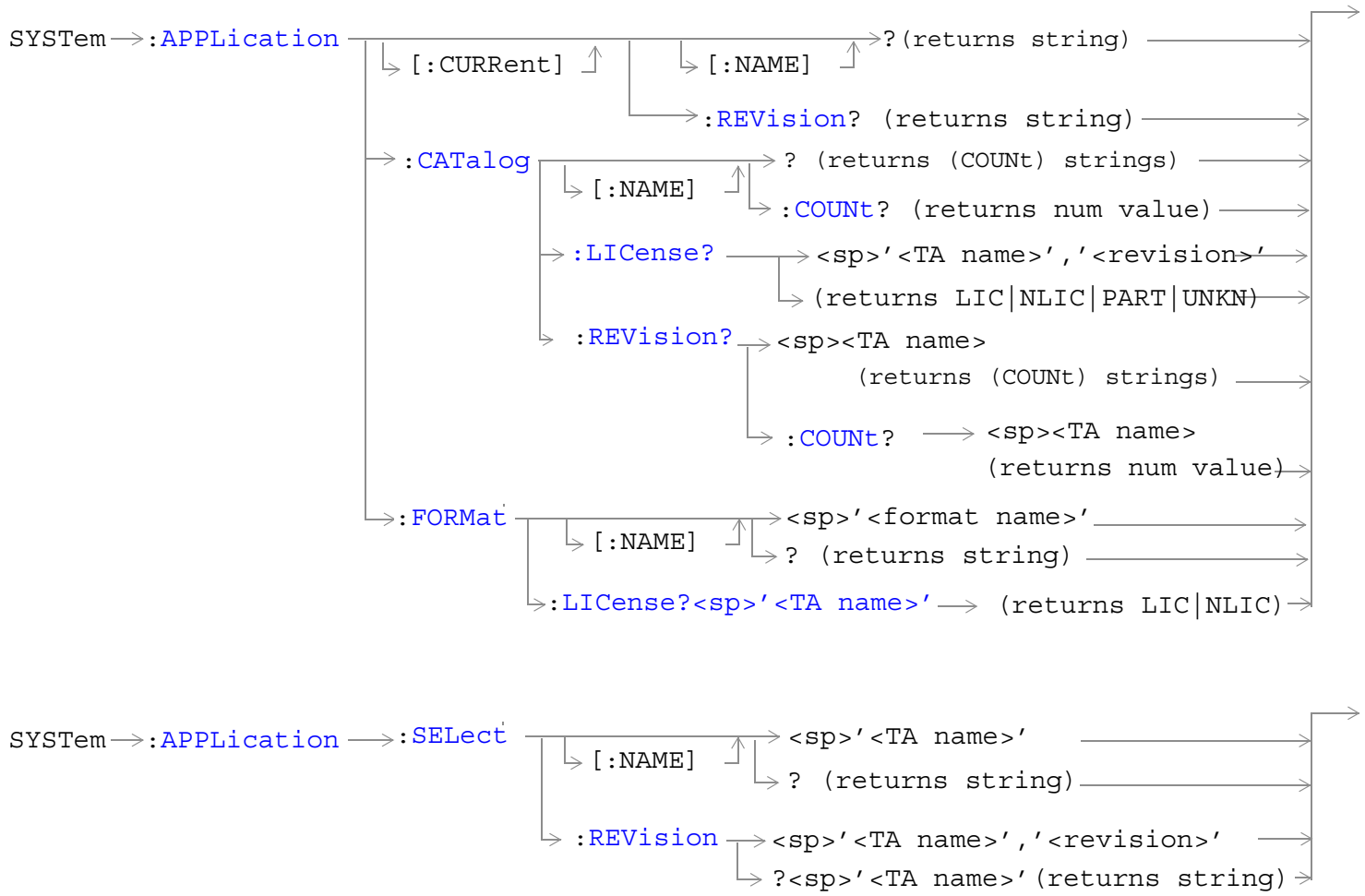
"SYSTem:ERRor?" on page 431

"SYSTem:MEASurement:RESet" on page 432

"SYSTem:PRESet" on page 433

"SYSTem:SYNChronized" on page 436

SYSTem:APPLication



"Diagram Conventions"

SYSTem:APPLication[:CURRent][:NAME]?

Function	Queries the test set for the name of the currently running test application.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GPRS Mobile Test null string
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"`	

SYSTem:APPLication[:CURRent]:REVision?

Function	Queries the test set for the currently running test application revision number.
Query	Range: Any string up to 20 characters including null. A typical example would be A.01.01 for a licensed version.
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"`	

SYSTem:APPLication:CATalog:LICense? '<test application name>','<revision>'

Function	Query the license status for a selected revision. The query must include two strings separated by a comma. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. The returned values are: • "LIC" indicates this is a licensed test application. • "NLIC" indicates this is not a licensed test application. • "PART" only part of the test application with multiple radio formats is licensed • "UNKN" indicates that license status is unknown.
Query	Range: LIC|NLIC|UNKN
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.05.06'"`	

SYSTem:APPLication:CATalog:REVision? '<test application name>'

Function	Query the test set for all of the revision numbers stored on the test set's hard drive. You must specify a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
Query	Range: One or more comma separated strings or a null string
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"`	

SYSTem:APPLication:CATalog:REVision:COUNt? '<test application name>'

Function	Queries the test set for the number of revisions present on the hard disk for a specified test application. Up to 30 revisions can be stored for a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
Query	Range: 0 through 30
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'AMPS/136 MOBILE TEST'"`	

SYSTem:APPLication:CATalog[:NAME]?

Function	Queries the test set for all of the names of the test applications stored on the hard drive. This query returns one or more strings, each string is separated by a comma.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GPRS Mobile Test
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"`	

SYSTem:APPLication:CATalog[:NAME]:COUNt?

Function	Queries the test set for the total number test application names stored on the hard drive. Up to 30 test applications can be stored.
Query	Range: 0 through 30
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"`	

SYSTem:APPLication:FORMat[:NAME] '<format name>'

Function	Switches radio formats in a fast switching test application. A licensed fast switching test application must be selected to use this command. Queries the test set for the name of the fast switching test application. This string is not case sensitive.
Setting	Range: A string that represents the name of a radio format included in a fast switching test application.
Query	Range: A string up to 25 characters, or the null string.

Programming Example
`OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:NAME 'AMPS/136'"`
`OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:NAME?"`	

SYSTem:APPLication:FORMat:LICense? '<format name>'

Function	Queries the test set for the license status of the fast switching test application. The returned values are: • "LIC" indicates this is a licensed test application. • "NLIC" indicates this is not a licensed test application.
Query	Range: LIC|NLIC
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:LICENSE? 'CDMA 2000'"`	

SYSTem:APPLication:SELect[:NAME] '<test application name>'

Function	Selects a test application and reboots the test set. This will switch the test application to the revision already selected. There is no need to re-select the revision before switching. The reboot process takes about 1 minute. Queries the test set for the test application that is selected and will run after the next reboot of the test set. This string is not case sensitive. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. **NOTE** Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding. The directions for how to determine test application name and revision are found in this document.
Setting	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GPRS Mobile Test
Query	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GPRS Mobile Test null string

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'AMPS/136 MOBILE TEST'"
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"
```

SYSTem:APPLication:SELect:REVision '<test application name>','<revision>'

Function	Selects a test application revision and a test application. The revision does not need to be set in order to switch test applications. The only time you select revisions is to change revisions. Queries the test set for the revision of a specified test application. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. **NOTE** GSM Mobile Test; revisions before A.04.00 did not have test application switching and provide no way to return to revisions that have switching. Users will need to reload a revision that has test application switching following the download process for upgrading firmware.
Setting	Range: A valid test application name and revision number for any licensed test application.
Query	Range: A string up to 20 characters, or the null string.

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'CDMA 2000 MOBILE TEST','01011210'"
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'CDMA 2000 MOBILE TEST'"
```

Related Topics

"Test Application Switching" on page 528

"Test Application Revisions and Licenses" on page 530

"Test Application Name" on page 532

"SYSTem:CURRent:TA" on page 430

SYSTem:BEEPer

"Diagram Conventions" on page 171

SYSTem:BEEPer:STATe

Function	Sets/queries the beeper state of the test set.
Setting	0|OFF | 1|ON
Query	0|1
*RST Setting	1 (on)
Related Topics	"Test Set Beeper"
Programming Example `OUTPUT 714;"SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off.`	

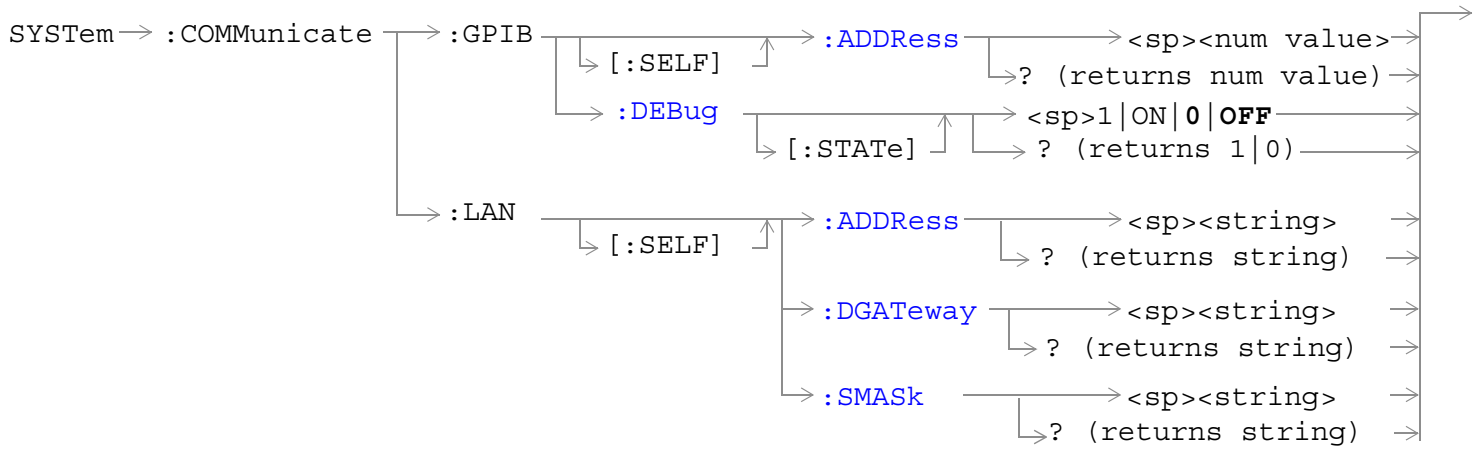
SYSTem:CONFigure:INFormation:HARDware:VERBose?

"Diagram Conventions"

SYSTem:CONFigure:INFormation:HARDware:VERBose?

Function	Query the manufacturer, model number, model number of the test application running, serial number, revision, board ID, and cal file information. The information provided by the query represents the configuration that existed when the test set was powered up.
*RST Setting	Resets have no effect on this information. The information is gathered during the power up cycle.
Related topics	"Hardware Configuration Report"
Programming Example `OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?" !Queries system hardware.`	

SYSTem:COMMunicate



"Diagram Conventions" on page 171

SYSTem:COMMunicate:GPIB:[:SELF]:ADDRess

Function	Sets/queries the test set's GPIB address.
Setting	Range: 0 to 30 Resolution: 1
Query	Range: 0 to 30 Resolution: 1
Factory setting	14 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics	"Configuring the Test Set's GPIB" on page 527
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14" !Sets the GPIB address to 14.`	

SYSTem:COMMunicate:GPIB:DEBug[:STATe]

Function	Sets/queries the test set's SCPI debugger state. When the state is on; enhanced error messages (generated from GPIB commands with syntax errors) are shown the test set display. The error message is printed along with the syntax. <ERR> is displayed at the end of the incorrect node. Non-printable characters will be replaced with the $ symbol. See "Error Messages" on page 474 for a list of the errors. The debugger state should be set to on only during GPIB code development. Test times will increase if the debugger state is left on.
Setting	Range: 0|OFF | 1|ON
Query	0|1
*RST setting	0|off
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:DEBUG:STATE ON" !Sets debugger to on.`	

SYSTem:COMMunicate:LAN[:SELF]:ADDRess

Function	Sets/queries the test set's LAN IP address. The value of A is used to determine the subnet mask, see "SYSTem:COMMunicate:LAN[:SELF]:SMASk" on page 423. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Query	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Factory setting	0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics	"Configuring the Test Set's LAN" on page 525
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:ADDRESS '130.015.156.255'" !Sets the !LAN IP !address.`	

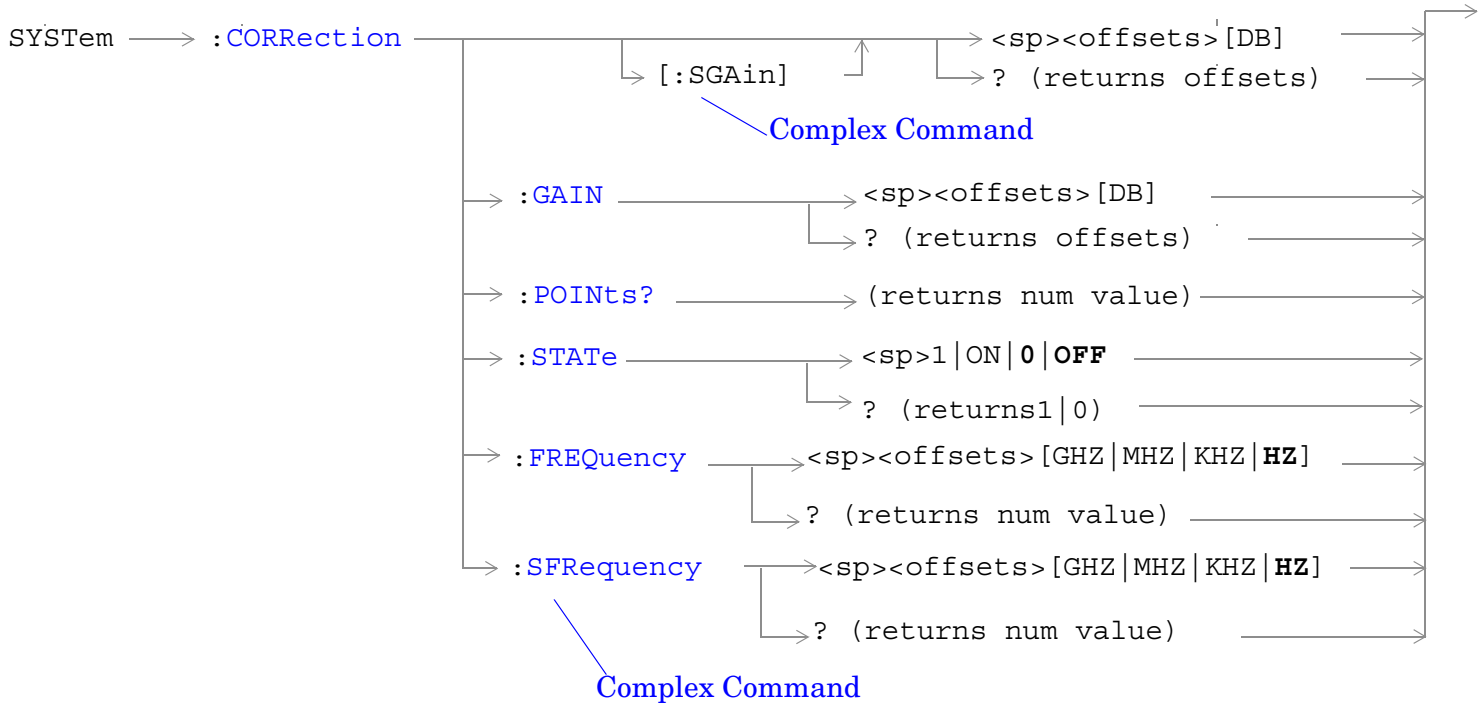
SYSTem:COMMunicate:LAN[:SELF]:DGATeway

Function	Sets/queries the LAN IP router/gateway address for the test set.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces), blank field
Query	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D = 0 to 255 (no embedded spaces). blank field
Factory setting	blank field, (this parameter is not affected by any reset operation)
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:DGATEWAY '130.2.6.200'"`	

SYSTem:COMMunicate:LAN[:SELF]:SMASk

Function	Sets/queries the subnet mask of the test set based on the LAN IP address selected. The subnet mask changes according to the value of A used for the LAN IP address. If A is less than or equal to 127, the subnet mask is 255.0.0.0. If A is greater than 127 and less or equal to 191, the subnet mask is 222.255.0.0. If A is grater than 191, the subnet mask is 255.255.255.0. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Query	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Factory setting	0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:SMASK '255.2.6.200'"`	

SYSTem:CORRection



"Diagram Conventions" on page 171

SYSTem:CORRection:[:SGAin]

Function	Sets/queries up to 20 comma-separated amplitude offset values in dB. This command sets the state to On. See "Measurement Related Configuration" on page 45. The units, dB, are optional. If no units are specified then units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
Setting	Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query	Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting	Offsets 1 through 20, are set to 0.00 dB, state is set to Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets
!and sets the state to On for the frequencies, offsets and
!RF IN/OUT Amplitude Offset State

OUTPUT 714;"SYSTEM:CORRECTION:SGAIN"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:GAIN

Function	Sets/queries up to 20 comma-separated frequency values in MHz. The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz. See "Measurement Related Configuration" on page 45. Sending a null list (no values) sets the state of all frequencies to Off.
Setting	Range: 0 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query	Range: 1 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting	1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies


OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:FREQuency

Function	Sets/queries the up to 20 comma separated offset values in dB. See "Measurement Related Configuration" on page 45. The units, dB, are optional. If no units are specified, units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
Setting	Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query	Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting	Offsets 1 through 20, are set to 0.00 dB, state is set to off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23"
!Sets up to 20 comma separated offset values.

OUTPUT 714;"SYSTEM:CORRECTION:GAIN"
!Sets the state for all frequencies and offsets to Off.
```

SYSTem:CORRection:POINts

Function	Query returns the number of offsets that are in their On state when the RF IN/OUT Amplitude Offset State is also set to On. See "Measurement Related Configuration" on page 45.
Query	Range: 1 to 20, and NAN (9.91E+37) Resolution: 1

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:POINTS?"

!Returns the number of frequencies and offsets with their state set to On.
```

SYSTem:CORRection:SFRequency

Function	Sets/queries up to 20 comma separated frequency values in MHz. This command sets the state to On. The units (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to MHz. See "Measurement Related Configuration" on page 45. Sending a null list (no values) sets the state of all frequencies to Off.
Setting	Range: 0 to 20 comma separated values from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query	Range: 1 to 20 comma separated values from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting	1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies and sets the state to On for the frequency,
!offset, and RF IN/OUT Amplitude Offset State


OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

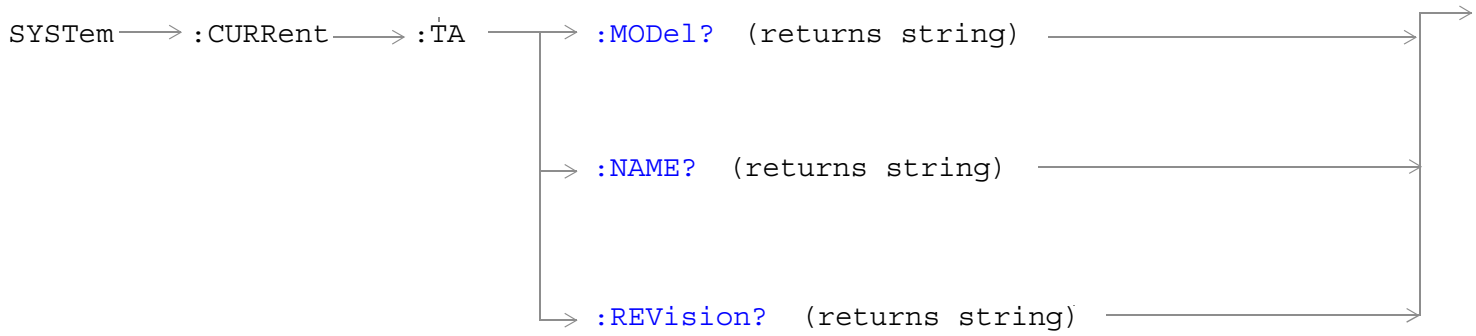
SYSTem:CORRection:STATe

Function	Sets/queries the RF IN/OUT Amplitude Offset State. The state must be On before any of the offsets are active regardless of the state for any of the frequencies or offsets. When the RF IN/OUT Amplitude Offset State is On, the Instrument Status Area will indicate “Offset" regardless of the state for any of the frequencies or offsets. Setting any of the frequency or offset states to On will set the RF IN/OUT Amplitude Offset State to On. See “Measurement Related Configuration” on page 45.
Setting	0|OFF | 1|ON
Query	0|1
Factory Setting	0 (off)

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
                                        !Amplitude Offset State to On
```

SYSTem:CURRent:TA



"Diagram Conventions"

SYSTem:CURRent:TA:MODel?

Function	Queries the model number of the test application running. Printable ASCII characters up to a 15 character string.
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set's hard disk

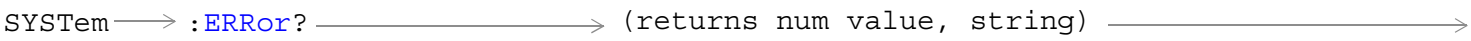
SYSTem:CURRent:TA:NAME?

Function	Queries the name of the test application running. Printable ASCII characters up to a 25 character string. This command is not recommended see "SYSTem:APPLication[:CURRent][:NAME]?" .
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set's hard disk

SYSTem:CURRent:TA:REVision?

Function	Queries the coordinated codeware revision for the test application running. Printable ASCII characters up to a 20 character string. This command is not recommended see "SYSTem:APPLication[:CURRent]:REVision?" .
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set's hard disk.

SYSTem:ERRor?



"Diagram Conventions" on page 171

SYSTem:ERRor?

Function	Queries the contents of the error/event queue. The error/event queue may contain one or more messages with an error or event description. Manual users may view the message log from the SYSTEM CONFIG screen. The contents of the error/event queue and the message log may not match. For example, manual user errors are not displayed with SYSTem:ERRor? They are viewed from the Message Log. See "Error Messages" .
Query	Error/Event Queue • Range: 0 to 100 messages up to 255 characters in length
Programming Example `OUTPUT 714;"SYSTEM:ERROR?" !`Query the contents of the Error/Event Queue	

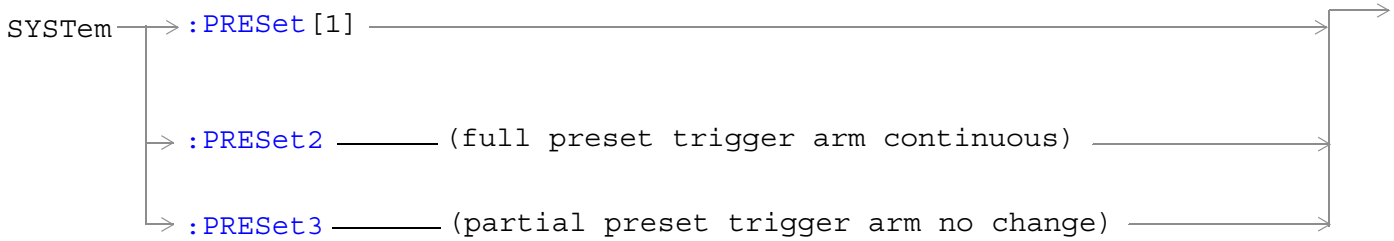
SYSTem:MEASurement:RESet

"Diagram Conventions" on page 171

SYSTem:MEASurement:RESet

Function	Aborts all measurements. If continuous triggering is enabled, measurements will begin a new measurement cycle.
Setting	Measurement results are set to their default values when measurement reset occurs.

SYSTem:PRESet



"Diagram Conventions" on page 171

SYSTem:PRESet[1] (not recommended for use)

Function	Not recommended for use at this time. See "SYSTem:PRESet3" for a recommended partial preset. Performs a partial preset. This command is intended to be used when changing from remote operation to manual operation and a partial preset is needed. Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm (Single or Continuous) Description" on page 142.
Related Topics	See "Partial Preset" on page 116 for more details
Programming Example `OUTPUT 714;"SYSTEM:PRESET" !Partial preset when changing from remote to manual operation.`	

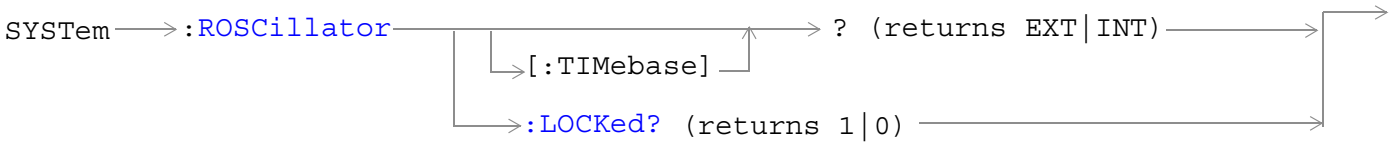
SYSTem:PRESet2

Function	Performs a full preset of the test set. This is the remote equivalent of pressing the SHIFT Preset keys on the front panel of the test set. All parameters are set to their default values. All measurements are aborted the trigger arm is set to continuous. See "Trigger Arm (Single or Continuous) Description" on page 142. The *RST command will set the trigger arm to single.
Related Topics	See "Full Preset" on page 116 for details about the *RST full preset.
Programming Example `OUTPUT 714;"SYSTEM:PRESET2" !Full preset, trigger arm set to continuous.`	

SYSTem:PRESet3

Function	Performs a partial preset. This is the recommended command for users when a partial preset is needed during remote operation of the test set. Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm.
Related Topics	See "Partial Preset" for more details.
Programming Example `OUTPUT 714;"SYSTEM:PRESET3" !Partial preset when in remote operation.`	

SYSTem:ROSCillator



"Diagram Conventions" on page 171

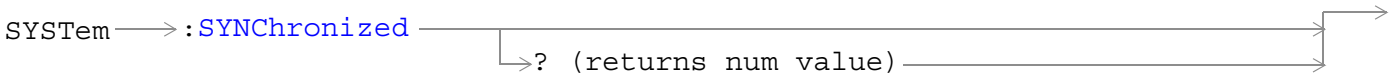
SYSTem:ROSCillator[:TIMebase]?

Function	Queries the timebase source. If an external timebase is used, it must have these characteristics: • an output level of 0 to +13 dBm • frequency of 10 MHz
Query	Range: INT = internal source EXT = external source

SYSTem:ROSCillator:LOCKed?

Function	Queries the timebase to find out if it is locked or unlocked. Returns 0 or 1.
Query	Range: 0 = unlocked 1 = locked

SYSTem:SYNChronized



"Diagram Conventions" on page 171

SYSTem:SYNChronized

Function	Sets/queries the test set to see that all prior sequential commands have completed or that all prior overlapped commands have started, indicating that the input buffer is synchronized.
Setting	Bit 12 of the status operation condition register is pulsed.
Query	Range: 1

IEEE 488.2 Common Commands

Description

***CLS**

The *CLS, clear status command, is defined in “IEEE Std 488.2-1992”, 10.3. This command will also clear and close the error message screen on the test set’s display.

***ESE**

The *ESE, standard event status enable command, is defined in “IEEE Std 488.2-1992”, 10.10.

***ESE?**

The *ESE?, standard event status enable query, is defined in “IEEE Std 488.2-1992”, 10.11.

***ESR?**

The *ESR?, standard event status register query, is defined in “IEEE Std 488.2-1992 “,10.12.

***IDN?**

The *IDN?, identification query, is defined in “IEEE Std 488.2-1992”, 10.14.*IDN? is used to retrieve information about the test set in ASCII format.

*IDN?, returns ASCII codes 32 through 126 excluding comma and semicolon in four comma separated fields. Field 1 returns the manufacturer, field 2 returns the instrument model number, field 3 returns the serial number, field 4 returns 0.

***OPC**

The *OPC, operation complete command, is defined in “IEEE 488.2-1992”, 10.18. *OPC causes the test set to continuously sense the No Operation Pending flag. When the No Operation Pending flag becomes TRUE, the OPC event bit in the standard event status register (ESR) is set to indicate that the state of all pending operations is completed. The *OPC common command is not recommended for use as an overlapped command.

***OPC?**

The *OPC?, operation complete query, is defined in “IEEE Std 488.2-1992”, 10.19. The *OPC? query allows synchronization between the controller and the test set using either the message available (MAV) bit in the status byte, or a read of the output OPC?. The *OPC? query does not effect the OPC event bit in the Standard Event Status Register (ESR). The *OPC? common command is not recommended for use as an overlapped command.

***OPT?**

The *OPT?, option identification query, is defined in “IEEE Std 488.2-1992”, 10.20. Each option will have a unique name, that name will be retuned with the query.

***RST**

The *RST, full preset command, is defined in “IEEE Std 488.2-1992”, 10.32. A full preset is also accomplished using the SYStem:PRESet2 command. A full preset restores the majority of settings to their default values and sets measurement trigger arm to single.

***SRE**

The *SRE, service request enable command, is defined in “IEEE Std 488.2-1992”, 10.34. The parameter range for this command is 0 through 255.

***SRE?**

The *SRE?, service request enable query, is defined in “IEEE Std 488.2-1992”, 10.35. Values returned by this query range from 0 through 255.

***STB?**

The *STB?, read status byte query, is defined in “IEEE Std 488.2-1992”, 10.36. Values returned by this query range from 0 through 255.

***WAI**

The *WAI, wait-to-continue command, is defined in “IEEE Std 488.2-1992”, 10.39. The *WAI command prevents the test set from executing any further commands or queries until all pending operation flags are false. The *WAI common command is not recommended for use as an overlapped command.

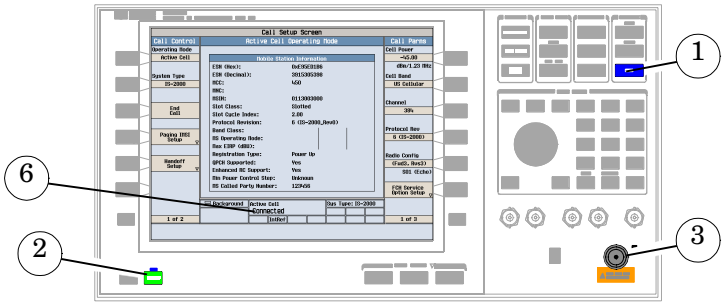
See also

“Obtaining Identification Information (*IDN)”

5 Manual Operation

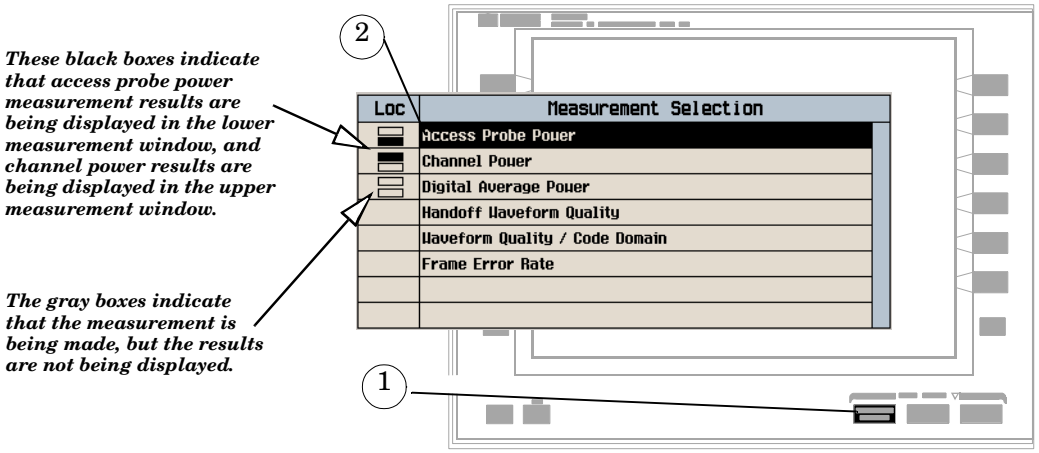
How Do I Make Measurements on a Mobile?

A. Establish a call.



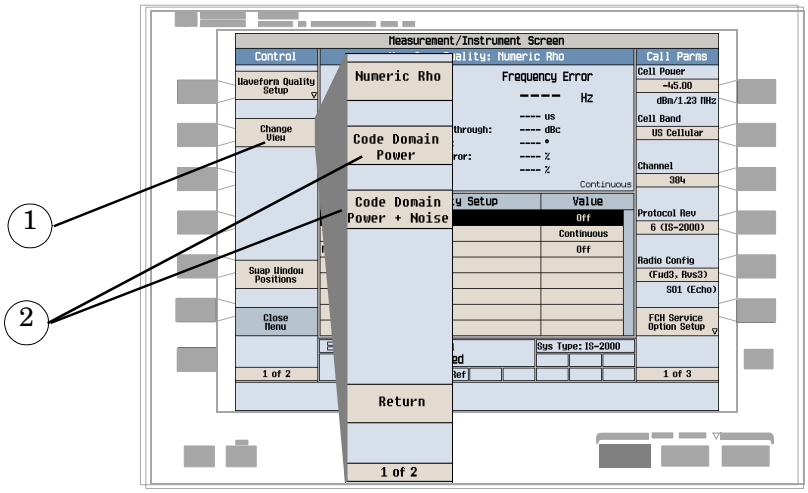
1. Press the blue **SHIFT** key.
2. Press the green **PRESET** key.
3. Connect the mobile to the Test Set.
4. Turn the mobile on and wait for it to camp.
5. On the mobile, press **1**, **2**, **3**, then press send.
6. Check for `Connected` in the `Active Cell` field.

B. Select measurements.



1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to add measurements.

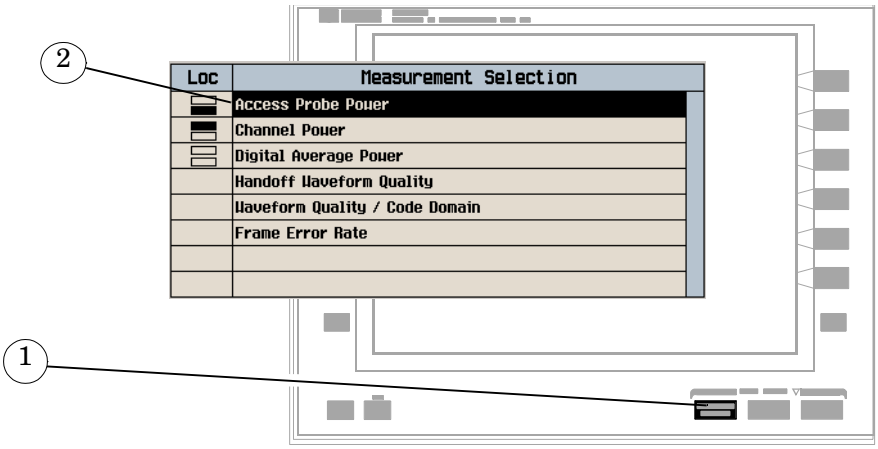
How Do I View a Graphical Measurement?



1. Select a measurement with a graphical view (for example Waveform Quality/Code Domain).
2. Press the `Change View` (**F2**) key.
3. Select the desired graphical view.

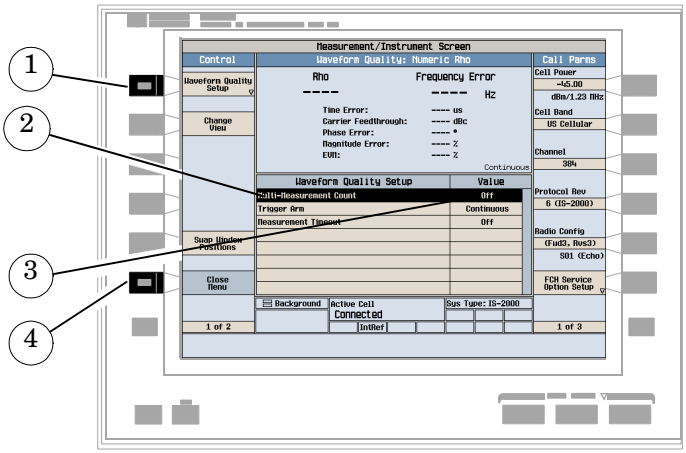
How Do I Change the Measurement Setup?

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight a measurement to set up and press the knob.

B. Set up the measurement.

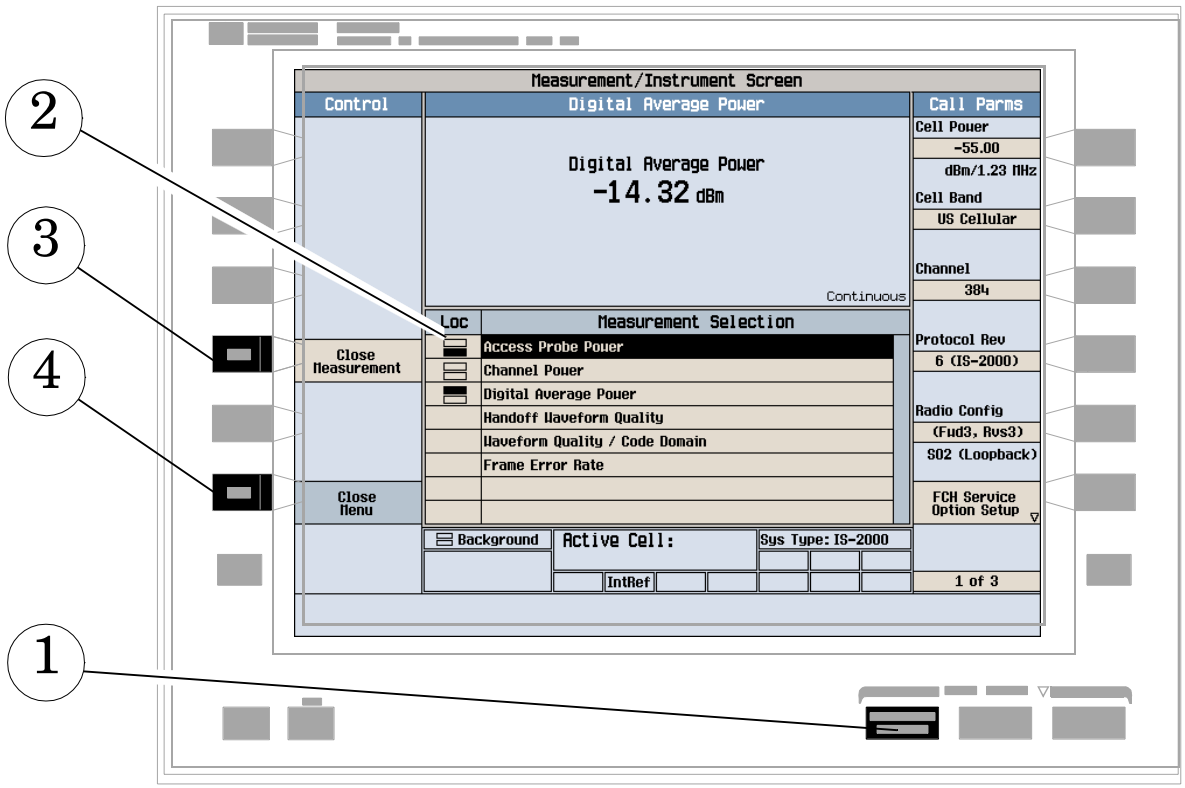


1. Press the measurement's setup (**F1**) key.
2. Highlight a parameter and press the knob.
3. Enter a value or selection and press the knob.

NOTE For statistical measurement results, change the `Multi-Measurement Count` parameter from "Off" to a number >1.

4. Press the `Close Menu` (**F6**) key.

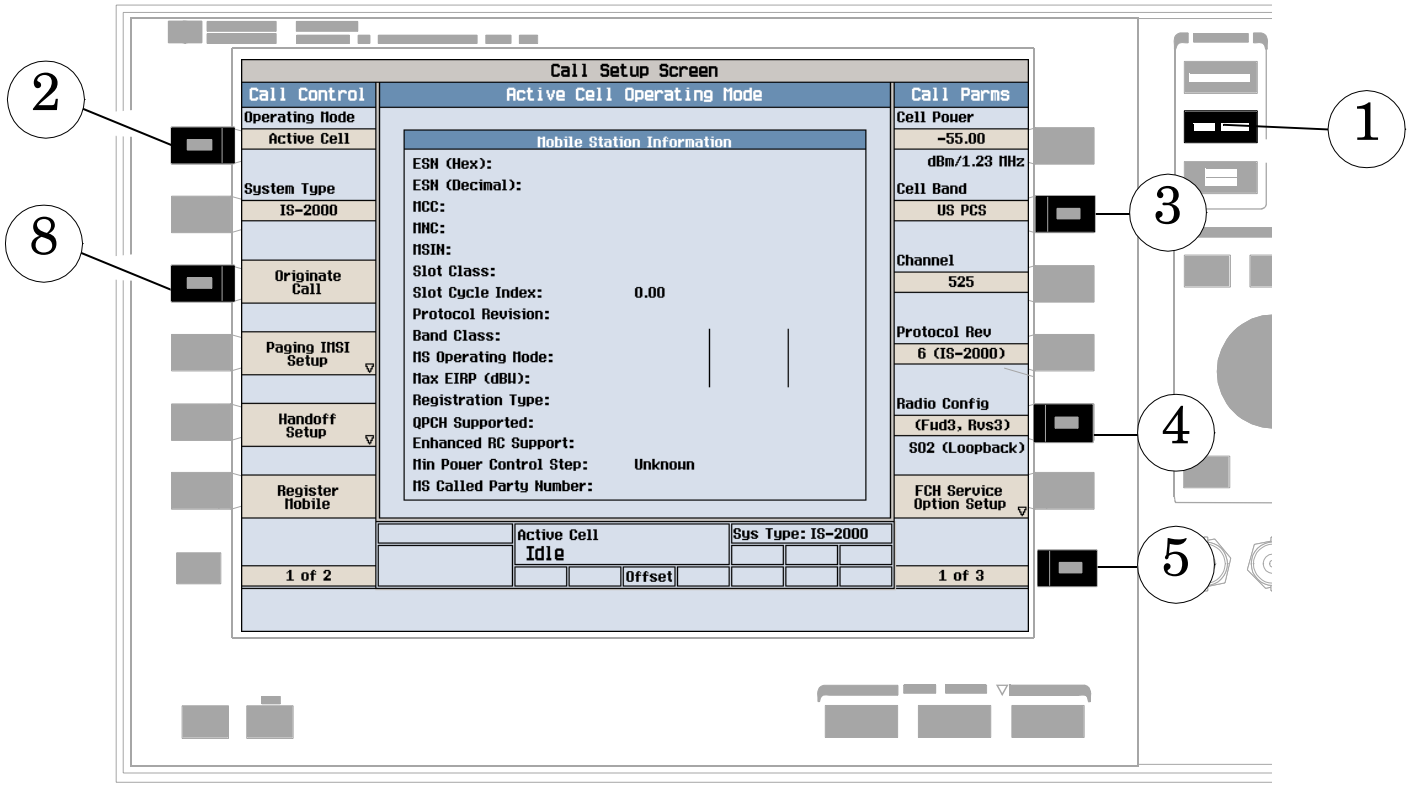
How Do I Turn Off a Measurement?



1. Press the MEASUREMENT SELECTION key.
2. Use the knob to highlight the measurement you want to turn off.
3. Press Close Measurement (F4).
4. Press Close Menu (F6).

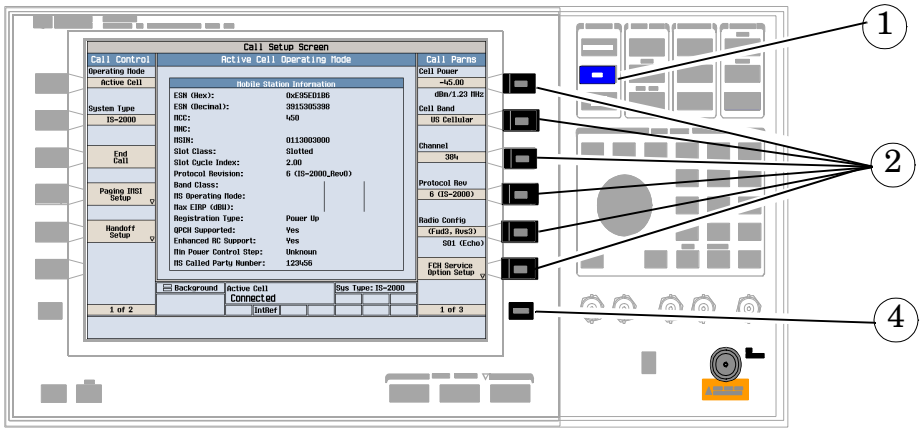
How Do I Set Up a Call?

The Call Parms keys and Call Control keys provide access to the parameters needed to set up a call..



1. Press the **CALL SETUP** key.
2. Press the `Operating Mode` (**F2**) key and set the operating mode to `Active Cell`.
3. Press the `Cell Band` (**F8**) key and select the band in which you would like to bring up the call.
4. Press the `Radio Config` (**F11**) key and select the radio configuration in which you would like to bring up the call.
5. Check the rest of the Call Parms settings (keys **F7** through **F12**) then press the **More** key to check the settings displayed on the 2 of 3 and 3 of 3 menus.
6. Make sure the cell settings, such as SID (System Identification) are compatible with the mobile station. See "How Do I Change Cell Information?" on page 447.
7. Turn on power to the mobile station and wait for an indication that it has found service.
8. Make a mobile station originated call or wait for the mobile station to perform power up registration, then press the `Originate Call` (**F3**) key.
9. Verify that the call is connected.

How Do I Change Call Parameters?



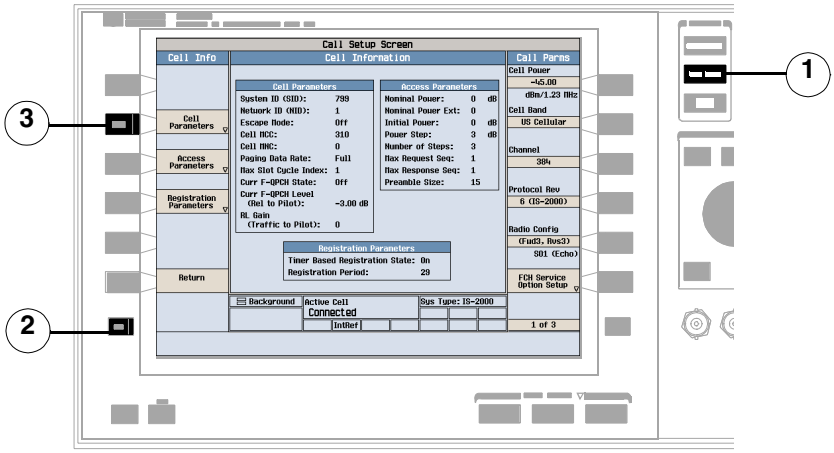
1. Press the **CALL SETUP** key.
2. On the Call Parms menu (1 of 2) press any key.
3. Highlight a selection and press the knob. Enter a value.
4. Press the **MORE** key for additional call parameters.

How Do I Change Cell Information?

There are three types of cell information: cell parameters, access parameters, and registration parameters.

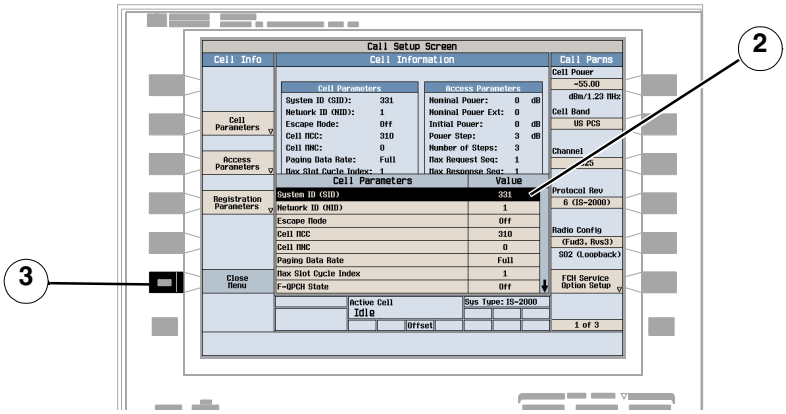
A. Set cell parameters.

1. Select the Cell Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Cell Parameters` (**F2**) key.

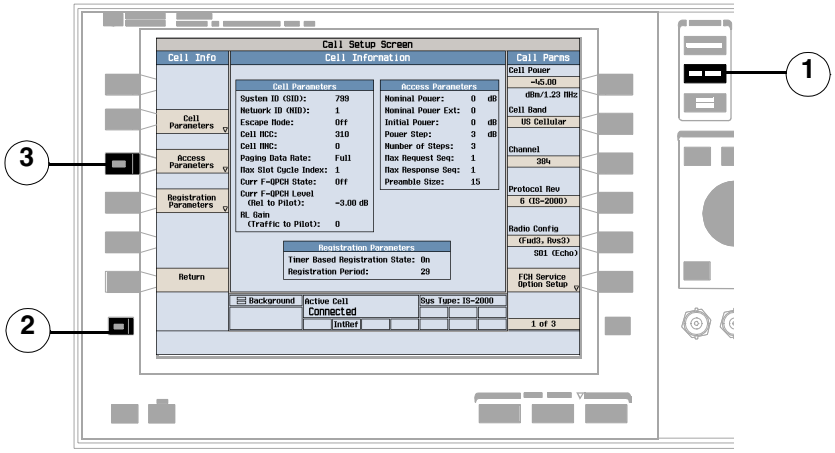
2. Set a cell parameter.



1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.

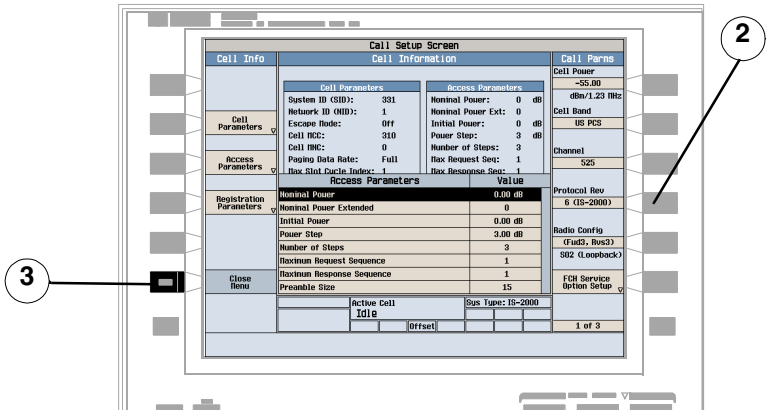
B. Set access parameters.

1. Select the Access Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Access Parameters` (**F3**) key.

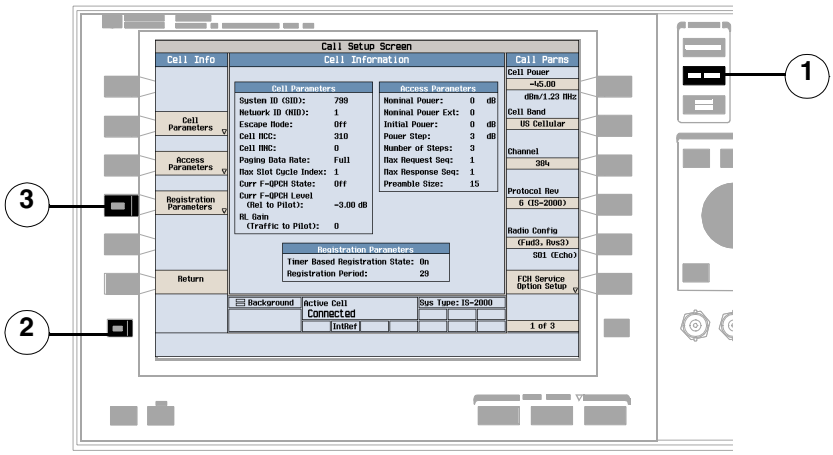
2. Set an access parameter.



1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.

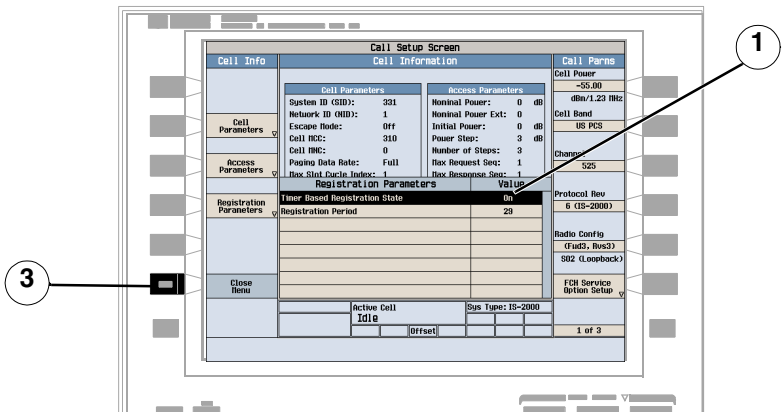
C. Set registration parameters.

1. Select the Registration Parameters menu.



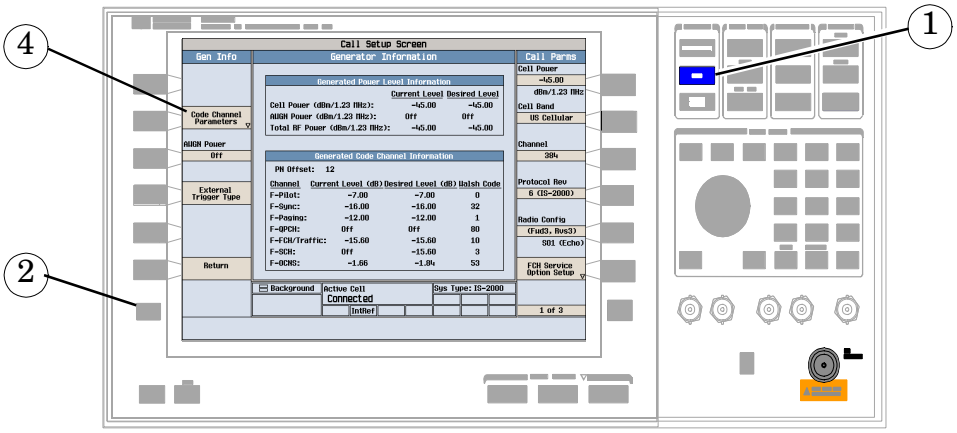
1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Registration Parameters` (**F4**) key.

2. Set a registration parameter.



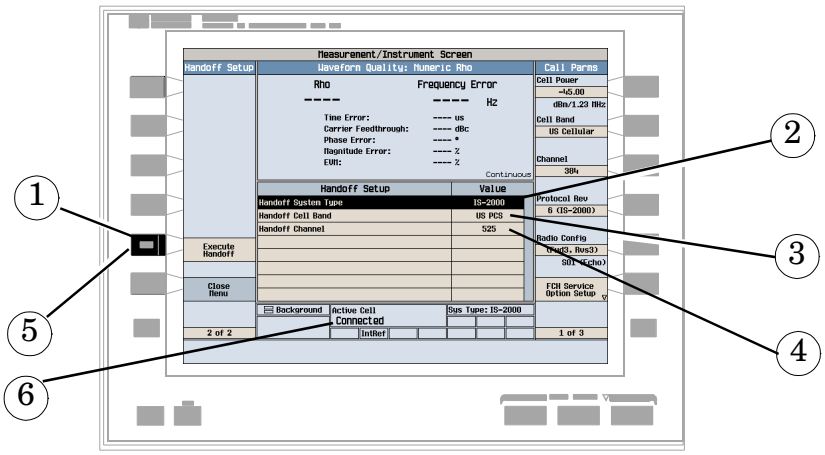
1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.

How Do I Change Code Channel Levels?



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Generator Info` key.
4. Press the `Code Channel Parameters` **(F2**) key.
5. Set the level of the desired channel by using the knob and numeric keys.

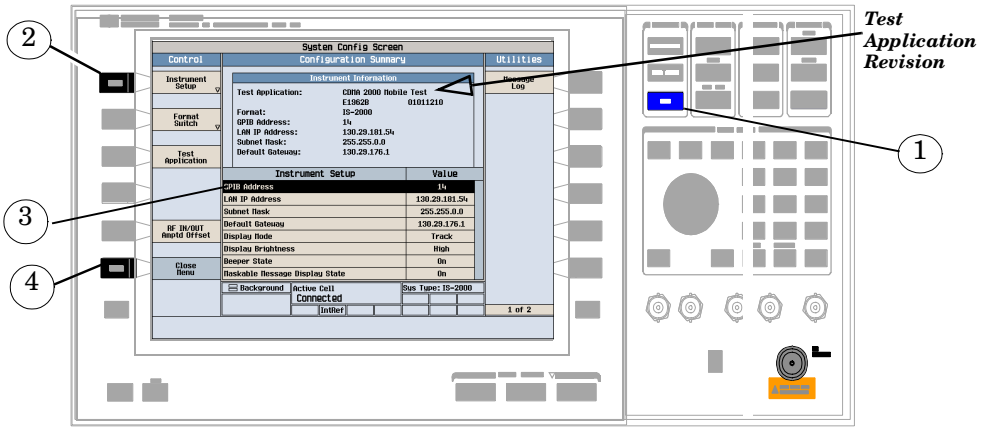
How Do I Perform a Handoff?



1. On the Call Setup screen, press the `Call/Handoff Setup` (**F5**) key.
2. Highlight the Handoff System Type parameter and select the desired system.
3. Highlight the Handoff Cell Band parameter and select the desired band.
4. Highlight the Handoff Channel parameter and select the desired channel.
5. Press the `Execute Handoff` **(F5**) key to complete the handoff, or the `Close Menu` (**F6**) key to abort the handoff.
6. Check for `Connected` in the `Active Cell` status field.

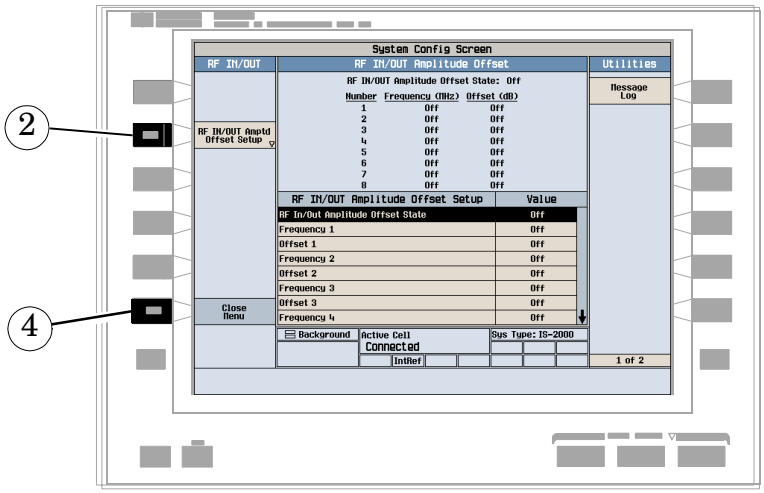
How Do I Configure the Test Set for My Test System?

A. Configure instrument information and setup.



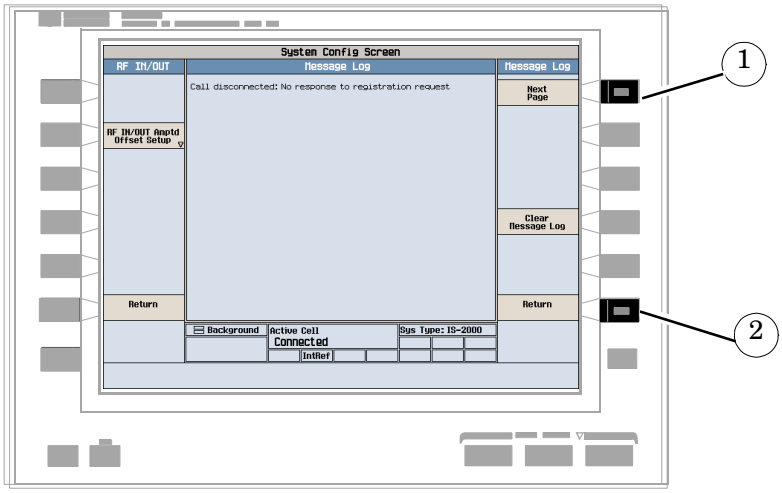
1. Press the **SYSTEM CONFIG** key.
2. Press the `Instrument Setup` (**F1**) key.
3. Adjust an instrument setting.
4. Press the `Close Menu` (**F6**) key.

B. Set amplitude offsets.



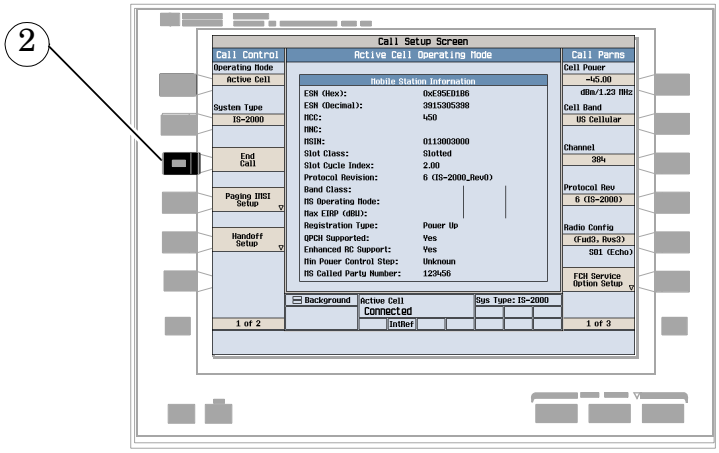
1. On the Configuration Summary screen (not shown), press the `RF IN/OUT Amptd Offset` (**F5**) key.
2. On the RF IN/OUT Amplitude Offset screen, press the `RF IN/OUT Amptd Offset Setup` (**F2**) key.
3. Enter the amplitude offset for the test frequencies you use.
4. Press the `Close Menu` (**F6**) key.

C. Check message log.



1. From any System Config screen, press the `Message Log` (**F7**) key and view the message log.
2. Press the `Return` (**F12**) key.

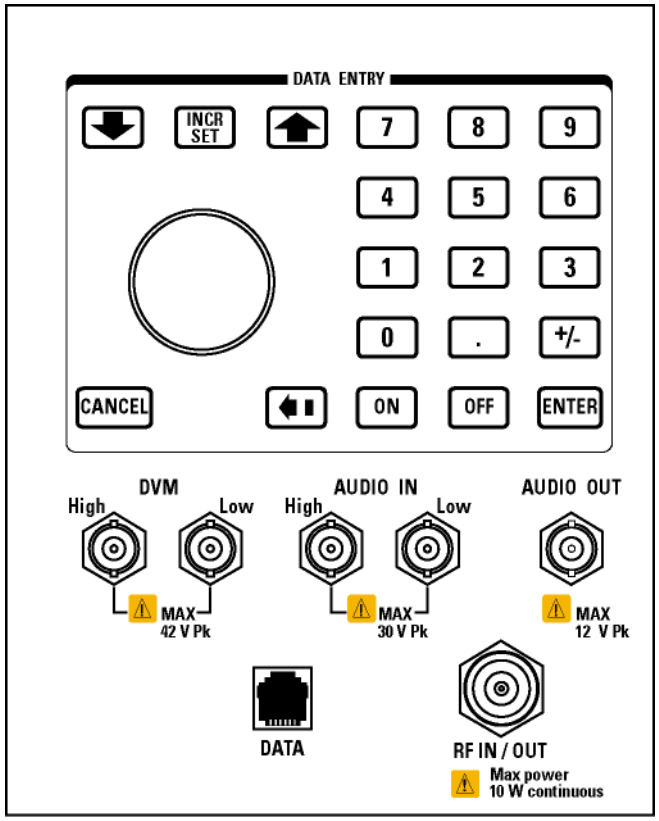
How Do I End a Call?



1. Press the **CALL SETUP** key.
2. Press the `End Call` (**F3**) key, or end the call from the mobile.
3. Check for `Idle` in the `Active Cell` status field.

Front Panel Connectors

Description



AUDIO IN

The input to the audio analyzer is a floating input differential amplifier. Both the AUDIO IN High and AUDIO IN Low BNC connectors should be connected to provide noise immunity. Refer to the technical specifications for more information.

AUDIO OUT

This BNC connector accesses to the test set's audio generator. Refer to the technical specifications for more information.

DATA

This RJ-45 connector provides front panel access to the rear panel LAN connection. This connector is used for downloading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector, connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

DVM

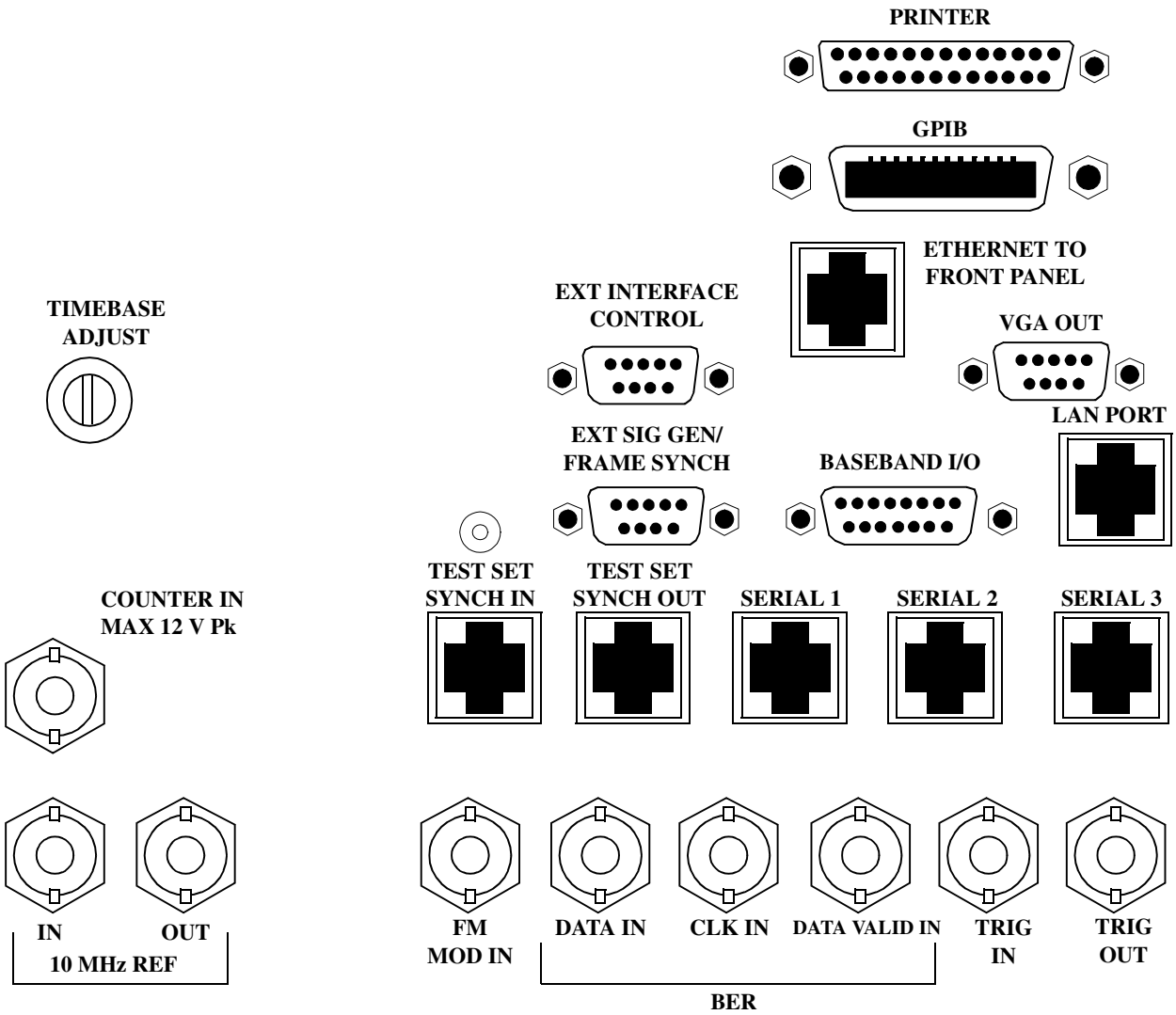
Not functional for this release.

RF IN/OUT

This Type-N connector is the path for all RF signals in or out of the test set. Refer to the technical specifications for more information.

Rear Panel Connectors

Description



BASEBAND I/O

Not functional for this release.

CLK IN

Not functional for this release.

COUNTER IN

Not functional for this release.

DATA IN

Not functional for this release.

DATA VALID IN

Not functional for this release.

ETHERNET TO FRONT PANEL

This RJ-45 connector is used with a separate LAN jumper cable to connect the front panel DATA connector to the rear panel LAN PORT.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector the user must connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

EXT INTERFACE CONTROL

Not functional for this release.

EXT SIG GEN/FRAME SYNCH

Not functional for this release.

FM MOD IN

This BNC connector let's you use an external signal to frequency modulate the test set's RF generator. It has a fixed sensitivity of 20 KHz/volt, and a frequency range of 100Hz to 20 KHz.

GPIB

The GPIB connector allows test set control with compatible devices.

LAN PORT

This RJ-45 connector provides connection for down loading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

PRINTER

Not functional for this release.

SERIAL 1

Not functional for this release.

SERIAL 2

Not functional for this release.

SERIAL 3

Not functional for this release.

TEST SET SYNCH IN

Not functional for this release.

TEST SET SYNCH OUT

Not functional for this release.

TIMEBASE ADJUST

This is the timebase adjust cover, removing this screw allows access for timebase adjustment.

TRIG IN

Not functional for this release.

TRIG OUT

This BNC connector allows for synchronization of the test set to other equipment and is configured by setting Frame Trigger Parameters.

VGA OUT

This DB-15 connector allows the user to simultaneously route the test set's display to another monitor.

10 MHZ REF IN

This BNC connector accepts an external 10 MHz timebase signal. The nominal input impedance is 50 ohm. This version of test set can only accept a 10 MHz timebase signal.

10 MHZ REF OUT

This BNC connector provides a 10 MHz timebase signal to external test equipment. The accuracy of this signal is determined by the timebase used. The nominal output impedance is 50 ohm with a typical level of 0.5 V rms.

Remote/Local Mode

Description

Remote Mode

When the test set is operated remotely, all of the keys on the front panel of the test set are disabled (except the LOCAL key and the power switch). During remote operation the test set is controlled by the Remote User Interface, (RUI).

Any open menus are be closed, and any manual entries are be aborted when the test set transitions from local mode to remote mode.

The remote annunciator (R) will appear in the Instrument Status Area of the test set's display indicating that the test set is in remote mode.

When the test set is in remote mode press the LOCAL key on the front panel in order to gain manual control.

Local Mode

During local mode all front panel keys and the knob are enabled. During local operation the test set is controlled by the Manual User Interface, (MUI).

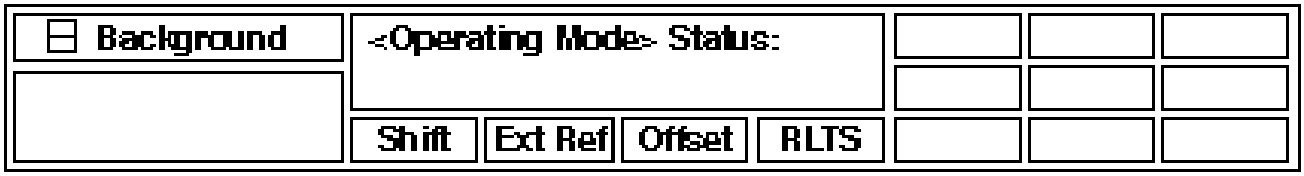
The remote annunciator (R) is turned off when the test set is operated in local mode.

Instrument Status Area

Description

The Instrument status area is found on the bottom center of the test set's display.

Figure 11. Status Area of the Test Set Display



Background

Users are able to initiate more than one measurement at a time with the test set. The test set's display will show a maximum of 2 measurements. When 3 or more measurements are initiated, or the MEASUREMENT screen is not displayed, the Background annunciator reminds you that measurements are active but not displayed.

<Operating Mode> Status

The call processing status and the operating modes are displayed in this area. This area may change (depending on the TA that is active) in order to provide TA specific information.

Shift

This annunciator indicates that the blue SHIFT key has been pressed, and that the next key you press will perform the shifted function indicated, also in blue.

Ext Ref

When a suitable external time base is connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Int Ref

When a suitable external time base is not connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Offset

Indicates that the Amplitude Offset state is set to On.

R L T S

This annunciator indicates the state of four different conditions of the test set:

- Remote annunciator. ‘R’ turns on when the test set is operated remotely.
- Listen annunciator. ‘L’ turns on when the test set is listening to a command.
- Talk annunciator. ‘T’ turns on when the test set is providing information over GPIB.
- SRQ annunciator. ‘S’ turns on when an SRQ is active.

6 Troubleshooting

Access Probe Power Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:CAPPower:CONTinuous" . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to "Input Signal Requirements" on page 33.

Access probe power measurement results are affected by the Amplitude Offset value. Use the "SYSTem:CORRection:GAIN" command to determine offset values.

Access probe power measurements are triggered by a rise in RF power that crosses approximately -55 dBm. See "Access Probe Power Measurement Description" on page 32 for details.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 144.

If over range (5) is returned the input power has exceeded the test set's internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set's power detector.

If under range (6) is returned the measurement result is below the expected input power level. Under range is also indicated if the input power is below the calibrated range of the test set's power detector.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

Related Topics

"Integrity Indicator" on page 144

"Access Probe Power Measurement Description" on page 32

Channel Power Measurement Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:CPOWer" on page 343. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

Digital average power measurement results are affected by the Amplitude Offset value. Use the "SYSTem:CORRection:GAIN" command to set offset values.

The test set receiver's expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see "Active Cell Operating Mode") but can also be done manually (see "Receiver Control" on page 118) .

See "Triggering of Measurements" on page 140 for a description of each trigger setting.

Interpreting Integrity Indicator values

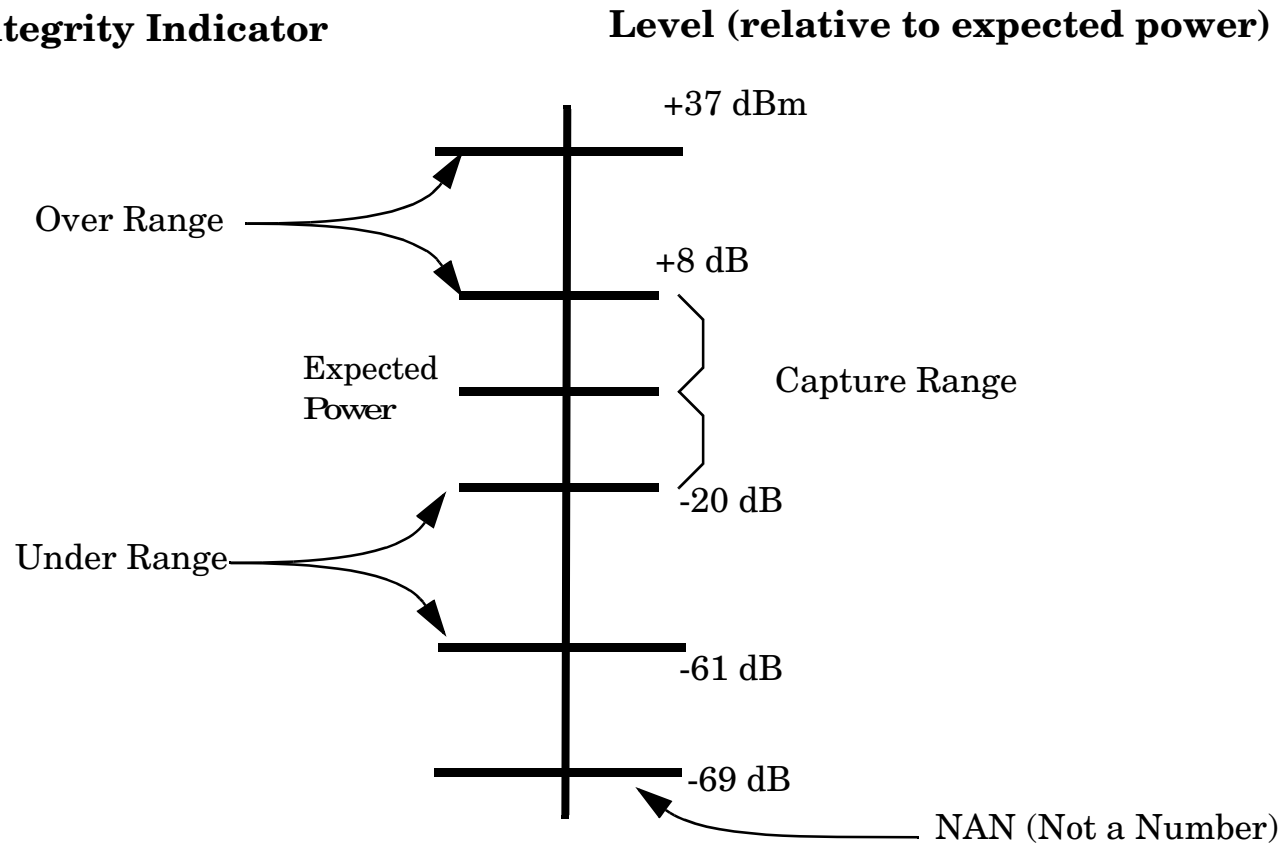
If Over Range (5) is returned; the input power has exceeded +37 dBm or is greater than 8 dB above the expected power level of the receiver.

If Under Range (6) is returned; the input power is below -69 dBm or is less than -20 dB below the expected power level of the receiver.

See "RFANalyzer:AUTO:POWer[:SELected]?" on page 334 for the GPIB command to query expected power.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

Figure 12. Channel Power Under Range/Over Range Integrity Indicators



Related Topics

"Integrity Indicator" on page 144

"Channel Power Measurement Description" on page 34

Digital Average Power Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:DAPower" . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to "Input Signal Requirements" on page 36.

Digital average power measurement results are affected by the Amplitude Offset value. Use the "SYSTem:CORRection:GAIN" command to determine offset values.

The test set receiver's expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see "Active Cell Operating Mode") but can also be done manually (see "Receiver Control" on page 118) .

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 144.

If over range (5) is returned the input power has exceeded the test set's internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set's power detector.

If under range (6) is returned the measurement result is below the expected input power level. Under range is also indicated if the input power is below the calibrated range of the test set's power detector.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

Related Topics

"Integrity Indicator" on page 144

"Digital Average Power Measurement Description" on page 36

Frequency Stability Measurement Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:FSTability:CONTinuous" on page 357. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

This measurement is not designed to measure digital signals.

See "Input Signal Requirements" on page 39.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 144.

Related Topics

"Frequency Stability Measurement Description" on page 39

Frame Error Rate Measurement Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:CFERror:CONTinuous" on page 352. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The test set receiver's expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see "Active Cell Operating Mode") but can also be done manually (see "Receiver Control" on page 118) .

A call must be connected with a loopback service option selected (see "CALL[:CELL]:SOPTION") to perform frame error rate measurements.

Frame error rate measurements require an accurate Amplitude Offset value because of the low levels transmitted during sensitivity measurements. Use the "SYSTem:CORRection:GAIN" command to set offset values.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 144.

Related Topics

"Frame Error Rate Measurement Description" on page 37

Waveform Quality Measurement Troubleshooting

Possible Setup Issues

IMPORTANT If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the "SETup:CAPPower:CONTinuous" command to set the trigger arm state to single and retry this measurement.

During remote operation of this measurement, you should configure the Trigger Arm to Single. See "SETup:WQUality:CONTinuous" on page 361. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

If a waveform quality measurement is attempted while in active cell operating mode, a call must be connected so that long code information can be obtained from the mobile station and measurement triggers can be synchronized to the CDMA frame clock inside the test set.

The test set receiver's expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see "Active Cell Operating Mode") but can also be done manually (see "Receiver Control" on page 118) .

Interpreting Integrity Indicator values

An integrity indicator of 17 (Can not correlate), indicates that the received signal did not correlate with an internally generated reference signal. See "Integrity Indicator" on page 144.

Related Topics

"Waveform Quality/Code Domain Measurement Description" on page 40

Error Messages

Error Message Descriptions

"Fixed Timer Messages" on page 477

"Manual User Error Messages" on page 480

"-400 through -499 Error Message Descriptions" on page 481

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"-200 through -299 Error Message Descriptions" on page 484

"-100 through -199 Error Message Descriptions" on page 487

"+100 through +199 Error Message Descriptions" on page 491

"+200 through +299 Error Message Descriptions" on page 494

"+300 through +399 Link Control Device-Specific Error" on page 496

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"+500 through +599 Test Application Hardware Device-Specific Error" on page 500

"+600 through +699 Error Message Descriptions" on page 501

"+700 through +799 Error Message Descriptions" on page 502

"+800 through +899 Error Message Descriptions" on page 503

Description

Reading Error Messages

Each error message that is generated is recorded in either the error/event queue or the message log or both. Error messages are shown in a message window at the center of the test set's display.

When an error message is displayed an audio beep occurs, the beeper state of the test set can be set to on or off.

The error/event queue is read remotely using the SYSTem:ERRor? query. The error/event queue is able to hold 100 messages. To read the entire error/event queue use the following program.

```
10 DIM Err_msg$[255]
20 REPEAT
30 OUTPUT 714;"SYSTEM:ERROR?"
40 ENTER 714; Err_num,Err_msg$
50 PRINT Err_num,Err_msg$
60 UNTIL Err_num = 0
```

The message log may be viewed on the test set's display by pressing the SYSTEM CONFIG screen's Message Log key. The message log can display up to 24 entries over two pages.

Error messages can be cleared from the test set's display using the DISPlay:WINDow:ERRor:CLEar command. Pressing any functional front panel key, i.e. the LOCAL key, will clear an error message for the test set's display.

Classes of Errors

Error messages are divided into classes, each class of error is handled differently by the test set. The message log is cleared when the test set is power cycled.

Measurement Integrity Indicators These messages occur as a result of a measurement, they indicate the validity of the measurement. Measurement integrity indicators are read with the FETCh command.

Non-Persistent Errors These messages are generated when a condition occurs that is incorrect, but has no serious or long lasting effect on the test set's operation. Examples could include an out of range value to a parameter, or an invalid GPIB mnemonic. The message window is cleared when any front panel key is pressed.

Persistent Errors These errors are generated when a non-transitory error condition exists. Persistent errors occur when a hardware failure is found, or when damage or injury to a person or the test set may occur.

The test set displays these errors in the error message window and as a prompt at the bottom of the display screen where it remains until the error condition no longer exists.

Fatal Errors When these errors occur no further operation of the test set is possible without cycling the power switch. Fatal errors are not saved in the error message log. The test set display will provide the user with information about what to do next and some details about what the test set was doing when the fatal error occurred.

Maskable Messages These messages are intended to inform the user of a condition within the test set. They are generally meant to provide information to the user. The user will need to decide if this condition is undesirable and if they want the message to appear.

Maskable Message Display State The Maskable Messages Display State found in the Instrument Setup menu gives users a way to block these messages and the associated beep from ever happening. When the state is Off these messages and their associated beep will be blocked. The Maskable Message Display State can be set manually or with the following GPIB command:

```
OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the
display.
```

Instrument Maskable Messages

- Instrument warning: Audio Generator instrument has been closed.
- Instrument warning: Audio Analyzer instrument has been closed.
- Instrument warning: Analog Audio instrument has been closed.

Related Topics

"SYSTem:ERRor?" on page 431

Error Message Log

Description

When an error message is displayed, it is also logged in the error message log. This log is only accessible manually; it is not available through GPIB. The error message log can have two pages it can be displayed by pressing the F7 menu key from the SYSTEM CONFIG screen, Next Page and Previous Page controls are provided.

All errors and events that are generated are displayed in the error message log. When the log is full a new message is sent to the log and the oldest message is removed from the log. The log is cleared when the test set powers up or when the user presses F10 (Clear Error Message Log).

Related Topics

"Error Messages" on page 474

Fixed Timer Messages

Description

This is the list of fixed timers with a brief explanation and their values. A timer expiry message appears in its own window, on the test set display. The user has no access to these values and can not change them. None of the fixed timers are active when operating mode is Test Mode.

Timer Name	Description	Value
T100 RADIO-LINK-TIMEOUT	Detects the presence of the radio link by detecting SACCH frames every 480 ms.	4 SACCH multiframes. That is 1.92 seconds if the SACCH is completely absent.
T200 Data link timer	Used for re-transmission on the data link. The value varies depending on the message type.	155 ms for FACCH
T301 Alerting (ringing) timer	Timer used to limit the amount of time a user has to answer a call.	20 seconds
T303 Mobility Management connection timer	Time the network waits after sending a CM SERVICE REQUEST until receiving a response. This occurs before initiating call clearing procedures towards the MS.	10 seconds
T305 Release timer	Time the network waits after transmitting a DISCONNECT message until receiving a RELEASE message.	10 seconds
T306 In-band tones release timer	Time the network waits after transmitting a DISCONNECT message while in-band tones/announcements are provided, until receiving a RELEASE message.	10 seconds
T308 Release timer	Time the network waits after sending a RELEASE message until receiving a RELEASE COMPLETE message. This occurs before re-transmitting the RELEASE or releasing the Mobility Management connection.	10 seconds
T310 Call proceeding timer	Time the network waits after receiving a CALL CONFIRMED message until receiving a ALERTING, CONNECT, or DISCONNECT message before initiating clearing procedures towards the MS.	10 seconds

Timer Name	Description	Value
T313 Connect acknowledge timer	Time the network waits after transmitting a CONNECT message until receiving the CONNECT ACKNOWLEDGE message before performing clearing procedures with the MS.	10 seconds
T323 Modify complete timer	Time the network waits after sending a MODIFY message during call mode changes, until receiving a MODIFY COMPLETE or MODIFY REJECT message before initiating call clearing procedures.	10 seconds
T3101 Immediate assignment timer	Time the network waits after sending the IMMEDIATE ASSIGNMENT or IMMEDIATE ASSIGNMENT EXTENDED message until the main signalling link is established before releasing the newly allocated channels.	1 second
T3103 Handover timer	Time the network waits after transmitting a HANDOVER COMMAND message until receiving HANDOVER COMPLETE or HANDOVER FAILURE or the MS re-establishes the call before the old channels are released. If the timer expires and the network has not received a correctly decoded L2 (format A or B) or TCH frame, then the newly allocated channels are released.	2 seconds
T3105 Physical information repetition timer	Time the network waits after sending the PHYSICAL INFORMATION message until receiving a correctly decoded L2 (format A or B) or TCH frame. This occur before re-transmitting the PHYSICAL INFORMATION message or releasing the newly allocated channels.	50 ms
T3107 Channel assignment timer	Time the network waits after transmitting an ASSIGNMENT COMMAND message until receiving the ASSESSMENT FAILURE message or the MS re-establishes the call before releasing the old and the new channels.	3 seconds
T3109 Signalling disconnection timer	Time the network waits after sending the CHANNEL RELEASE message before disconnecting the signalling link.	5 seconds
T3111 Channel deactivation after disconnection timer	Time the network waits after disconnecting the signalling link before deactivating the channel.	500 ms

Timer Name	Description	Value
T3113 Paging timer	Time the network waits after transmitting the PAGING REQUEST message until receiving the PAGING RESPONSE message. This occurs before re-transmitting the PAGING REQUEST (if the maximum number of re-transmissions have not been exceeded).	5 seconds
T3212 Location update timer	The location update timer is set to zero, periodic location update by the MS are disabled. If the MS camps to the BCH and decodes a new MCC or MNC from the one it last camped on, it should perform a location update.	zero = infinite time
T3250 TMSI reallocation timer	Time the network waits after sending the TMSI REALLOCATION COMMAND until receiving TMSI REALLOCATION COMPLETE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds
T3260 Authentication response timer	Time the network waits after an AUTHENTICATION REQUEST until receiving AUTHENTICATION RESPONSE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds

Manual User Error Messages

Description

These messages are intended to be displayed on the manual user interface only, and are not entered into the Error/Event Queue.

Error Message	Description
The function you requested is not yet available.	The test set does not have this capability.
IQ Calibration completed successfully for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
IQ Calibration failed for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
The function you requested is not available in this TA.	This function is used in another Test Application.
IQ Calibration for modulator 1 in progress (10 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
IQ Calibration for modulator 2 in progress (6 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
Instrument warning: Audio generator instrument has been closed.	The audio generator instrument was closed automatically by the test set.
Measurement warning: Audio Analyzer instrument has been closed.	The audio analyzer instrument was closed automatically by the test set.
Measurement warning: Analog audio measurement has been closed.	Analog audio measurements have been closed by the test set.
Protocol warning: Setting change has terminated the link with the DUT	Some setting change has caused the call to disconnect.
Warning; Call processing disabled	The call processing functions are not active because the test set is performing calibration operations.
IQ first modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.
IQ second modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.

-400 through -499 Error Message Descriptions

Description

A Query error is generated either when data in the instrument's GPIB output queue has been lost, or when an attempt is being made to read data from the output queue when no output is present or pending.

Error Message	Description
-400 Query error	This event bit (Bit 2) indicates that an attempt to read data from the Output Queues when no output is present or pending, to data in the Output Queue has been lost see IEEE488.2, 11.5.1.1.7.
-410 Query INTERRUPTED	Indicates the test set has been interrupted by a new program message before it finishes sending a RESPONSE MESSAGE see IEEE 488.2, 6.3.2.3.
-420 Query UNTERMINATED	Indicates an incomplete Query in the program see IEEE 488.2, 6.3.2.2.
-430 Query DEADLOCKED	Indicates that the Input Buffer and Output Queue are full see IEEE 488.2, 6.3.1.7.
-440 Query UNTERMINATED after indefinite response	Indicates that a query was received in the same program message after a query requesting an indefinite response was executed see IEEE 488.2, 6.5.7.5.

-300 through -399 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. When one of these errors is generated, the device specific error bit in the event status register is set.

Error Message	Description
-300 Device specific error	This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6.
-311 Memory error	Indicates some physical fault in the devices memory, such as a parity error.
-312 PUD memory lost	Indicates protected user data saved by the *PUD command has been lost, see IEEE 488.2, 10.27.
-313 Calibration memory lost	Indicates that nonvolatile calibration data used by the *CAL? command has been lost, see IEEE 488.2, 10.2.
-314 Save/recall memory lost	Indicates that the nonvolatile data saved by the *SAV command has been lost, see IEEE 488.2, 10.33.
-315 Configuration memory lost	Indicates that nonvolatile configuration data saved by the device has been lost.
-320 Storage fault	Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element.
-321 Out of memory	An internal operation needed more memory than was available
-330 Self test failed	Indicates a problem with the device that is not covered by a specific error message. The device may require service.
-340 Calibration failed	Indicates a problem during calibration of the device that is not covered by a specific error.
-350 Queue overflow	Indicates that there is no room in the queue and an error occurred but was not recorded. This code is entered into the queue in lieu of the code that caused the error.
-360 Communication error	This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363.

Error Message	Description
-361 Parity error in program message	Parity bit not correct when data received for example, on a serial port.
-362 Framing error in program message	A stop bit was not detected when data was received for example, on a serial port (for example, a baud rate mismatch).
-363 Input buffer overrun	Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing.

-200 through -299 Error Message Descriptions

Description

These errors are generated when something occurs that is incorrect in the current state of the instrument. These errors may be generated by a user action from either the remote or the manual user interface.

Error Message	Description
-200 Execution error	This event bit (Bit 4) indicates a PROGRAM DATA element following a header was outside the legal input range or otherwise inconsistent with the device's capabilities, see IEEE 488.2, 11.5.1.1.5.
-203 Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-220 Parameter error	Indicates that a program data element related error occurred.
-221 Setting conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-222 Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range defined by the devices
-223 Too much data	Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224 Illegal parameter value	Indicates that the value selected was not part of the list of values given.
-225 Out of memory	The device has insufficient memory to perform the requested operation.
-226 Lists not the same length	Attempted to use LIST structure having individual LIST's of unequal lengths.
-230 Data corrupt or stale	Indicates invalid data, a new reading started but not completed since the last access.
-231 Data questionable	Indicates that measurement accuracy is suspect.

Error Message	Description
-233 Invalid version	Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. For example, a not supported file version, a not supported instrument version.
-240 Hardware error	Indicates that a legal program command or query could not be executed because of a hardware problem in the device.
-241 Hardware missing	Indicates that a legal program command or query could not be executed because of missing device hardware. For example, an option was not installed.
-250 Mass storage error	Indicates that a mass storage error occurred. The device cannot detect the more specific errors described for errors -251 through -259.
-251 Missing mass storage	Indicates that a legal program command or query could not be executed because of missing mass storage.
-252 Missing media	Indicates that a legal program command or query could not be executed because of missing media. For example, no disk.
-253 Corrupt media	Indicates that a legal program command or query could not be executed because of corrupt media. For example, bad disk or wrong format.
-254 Media full	Indicates that a legal program command or query could not be executed because the media is full. For example, there is no room left on the disk.
-255 Directory full	Indicates that a legal program command or query could not be executed because the media directory was full.
-256 File name not found	Indicates that a legal program command or query could not be executed because the file name was not found on the media.
-257 File name error	Indicates that a legal program command or query could not be executed because the file name on the device media was in error. For example, an attempt was made to read or copy a nonexistent file.
-258 Media protected	Indicates that a legal program command or query could not be executed because the media was protected. For example, the write-protect switch on a memory card was set.
-270 Macro error	Indicates that a macro related execution error occurred.

Error Message	Description
-271 Macro syntax error	Indicates that a syntactically legal macro program data sequence, according to IEEE 488.2, 10.7.2, could not be executed due to a syntax error within the macro definition.
-272 Macro execution error	Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition, see IEEE 488.2, 10.7.6.3.
-273 Illegal macro label	Indicates that the macro label was not accepted, it did not agree with the definition in IEEE 488.2, 10.7.3
-274 Macro parameter error	Indicates that the macro definition improperly used a macro parameter placeholder, see IEEE 4882, 10.7.3.
-275 Macro definition too long	Indicates that a syntactically legal macro program data sequence could not be executed because the string of block contents were too long for the device to handle, IEEE 488.2, 10.7.6.1.
-276 Macro recursion error	Indicates that a syntactically legal macro program data sequence count not be executed because it would be recursive, see IEEE 488.2, 10.7.6.6.
-277 Macro redefinition not allowed	Indicates that redefining an existing macro label, see IEEE 488.2, 10.7.6.4.
-278 Macro header not found	Indicates that a legal macro label in the *GMS?, see IEEE 488.2, 10.13, could not be executed because the header was not previously defined.

-100 through -199 Error Message Descriptions

Description

A command error indicates that the test set's GPIB parser has detected an IEEE 488.2 syntax error.

When one of these errors is generated, the command error bit in the event status register is set.

Error Message	Description
-100 Command error	This event bit (Bit 5) indicates a syntax error, or a semantic error, or a GET command was entered, see IEEE 488.2, 11.5.1.1.4.
-101 Invalid character	Indicates a syntactic elements contains a character which is invalid for that type.
-102 Syntax error	Indicates that an unrecognized command or data type was encountered. For example, a string was received when the device does not accept strings.
-103 Invalid separator	The parser was expecting a separator and encountered an illegal character. For example, the semicolon was omitted after a program message unit.
-104 Data type error	The parser recognized a data element different than one allowed. For example, numeric or string data was expected but block data was encountered.
-105 Get not allowed	Indicates a Group Execute Trigger was received within a program message. Correct the program so that the GET does not occur within the program code.
-108 Parameter not allowed	Indicates that more parameters were received than expected for the header. For example, *ESE common command only accepts one parameter, so *ESE 0,1 is not allowed.
-109 Missing parameter	Indicates that less parameters were received than required for the header. For example, *ESE requires one parameter, *ESE is not allowed.
-110 Command header error	Indicates an error was detected in the header. This error is used when the device cannot detect the more specific errors -111 through -119.
-111 Header separator error	Indicates that a character that is not a legal header separator was encountered while parsing the header.
-112 Program mnemonic too long	Indicates that the header contains more that twelve characters, see IEEE 488.2, 7.6.1.4.1.

Error Message	Description
-113 Undefined header	Indicates the header is syntactically correct, but it is undefined for this specific device. For example, *XYZ is not defined for any device.
-114 Header suffix out of range	Indicates the value of a header suffix attached to a program mnemonic makes the header invalid.
-120 Numeric data error	This error, as well as errors -121 through -129, are generated when parsing a data element which appears to be numeric, including non-decimal numeric types. This particular error is used if the device cannot detect a more specific error.
-121 Invalid character in number	Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a “9” in octal data.
-123 Exponent too large	Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1.
-124 Too many digits	Indicates the mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros, see IEEE 488.2, 7.7.2.4.1.
-128 Numeric data not allowed	Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header.
-130 Suffix error	This error, as well as errors -131 through -139, are generated when parsing a suffix. This particular error message is used if the device cannot detect a more specific error.
-131 Invalid suffix	Indicates the suffix does not follow the syntax described in IEEE 488.2, 7.7.3.2, or the suffix is inappropriate for this device.
-134 Suffix too long	Indicates the suffix contain more than 12 characters, see IEEE 488.2, 7.7.3.4.
-138 Suffix not allowed	Indicates that a suffix was encountered after a numeric element that does not allow suffixes.
-140 Character data error	This error, as well as errors -141 through -149, are generated when parsing a character data element. This particular error message is used if the device cannot detect a more specific error.
-141 Invalid character data	Indicates that the character data element contains an invalid character or the particular element received is not valid for the header.
-144 Character data too long	Indicates the character data element contains more than twelve characters, see IEEE 488.2, 7.7.1.4.

Error Message	Description
-148 Character not allowed	Indicates a legal character data element was encountered where prohibited by the device.
-150 String data error	This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error.
-151 Invalid string data	Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character.
-158 String data not allowed	Indicates that a string data element was encountered but was not allowed by the device at this point in parsing.
-160 Block data error	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161 Invalid block data	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied.
-168 Block data not allowed	Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing.
-170 Expression error	This error, as well as errors -171 through -179, are generated when parsing an expression data element. This particular error message is used if the device cannot detect a more specific error.
-171 Invalid expression	Indicates the expression data element was invalid, see IEEE 488.2, 7.7.7.2. For example, unmatched parentheses or an illegal character.
-178 Expression data not allowed	Indicates a legal expression data was encountered, but was not allowed by the device at this point in parsing.
-180 Macro error	This error, as well as error -181 through -189, are generated when defining a macro or execution a macro. This particular error message is used if the device cannot detect a more specific error.
-181 Invalid output macro definition	Indicates that a macro parameter place holder was encountered outside of a macro definition.
-183 Invalid inside macro definition	Indicates that the program message unit sequence, sent with a *DDT or a *DMC command, is syntactically invalid, see IEEE 488.2, 10.7.6.3.

Error Message	Description
-184 Macro parameter error	Indicates that a command inside the macro definition had the wrong number or type of parameters.

+100 through +199 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error.

These are general errors generated by the core instrument. When one of these errors is generated, the '+100 errors' bit in the questionable error status register is set.

Error Message	Description
+101 Assert; Cycle power. Assert message<message1>	<message1> will appear as: If the DSP generated the assert: ;P:DSP T:<task ID> E:<error code> C:<error classif.> F1:<flag 1> F2:<flag 2> If the Protocol processor generated the assert: ;P:Protocol T:<task ID> L:<line number> F:<file name> If the Host processor generated the assert: ;P:Host T:<task ID> L:<line number> F:<file name>
+102 Exception; Cycle power. Exception message<message2>	<message2> will appear as: T:<task ID> or V:<vector number> or PC:<program counter> or DA:<data adrs reg value>. Vector number, program counter and data address register values are hexadecimal format.
+103 Failure; No measurements or settings can be made	Indicates none of the VI's are operational because a serious problem exists.
+104 Failure; No settling operations will take place	Indicates none of the VI's are operational because a serious problem exists.
+105 Failure; No measurements or setting can be made for the function selected	Indicates none of the VI's are operational because a serious problem exists.
+110 Input pacing; Internal communication queue overflow likely	Indicates that GPIB commands are too fast for the device input queue and should be slowed.
+111 Input pacing; Internal communication queue overflow imminent. Pacing increased	Indicates that GPIB commands were too fast and the device input queue has not kept pace.
+112 Internal error; Protocol error <message3>	<message3> is an eight digit hexadecimal number that is the error code reported by protocol.

Error Message	Description
+113 Internal error; <VI NAME> forced inactive	Indicates that a VI is inactivated when not executed. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”.
+114 Internal error; <VI NAME> not responding	Indicates that a VI has not been instantiated or the state is not available. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI” , “RfHwAccessVI”.
+115 Internal error; <VI NAME> inactive	Indicates that a VI has been made inactive. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”.
+120 Warning; Receiver over range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is above the range of the test set.
+121 Warning; Receiver under range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is below the range of the test set.
+122 Warning; Reference out of lock	Indicates the test set’s internal reference is out of lock.
+123 Warning; Duplicate RF IN/OUT Amplitude Offset Frequency entry. First frequency entry in RF IN/OUT Amplitude Offset table will be used.	Indicates that an amplitude offset value for that frequency has already been entered. The test set will use the amplitude offset value entered first.
+124 Warning; Source over range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is above the test set’s range.
+125 Warning; Source under range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is below the test set’s range.
+130 Configuration error; Unable to switch to indicated Test Application	The test application selected is not available for this test set.
+131 Configuration error; Current Test Application is not licensed (License = N). Select another Test Application	The test application selected is not licensed. Select another revision or test application that is licensed (License = L).
+132 Configuration error; Selected Test Application Format is not available.	Indicates that the fast switching operation will not activate a particular radio format. Check the revision number of the test application associated with the radio format, does the revision correspond with what the fast switching test application needs?

Error Message	Description
+133 Configuration error; Selected Test Application Format is not licensed, (License = N).	The radio format selected is not licensed. Select another revision or obtain a licensed revision of the test application test application that is licensed (License = L).
+134 Configuration error; Unable to switch to selected Test Application Format	The Test Application Format name used is correct but for some reason the test set can not switch to that format.
+150 Calibration operation; Recalibrating due to present temperature	Indicates that the test set is recalibrating due to hardware inaccuracies based on temperature changes. Any measurements that are running will be temporarily aborted and then restarted after the recalibration is complete.

+200 through +299 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. Errors are categorized as follows:

- TA2000: errors with test application scope
- CDMA: errors common to the IS-95 and IS-2000 System Types
- Digital2000: errors applicable to only the IS-2000 System Type
- Digital95: errors applicable to only the IS-95 System Type

When one of these errors is generated, the +200 errors bit in the questionable error status register is set.

Table 9. TA2000 Call Processing Errors

Error Message	Description
+271 Release order not received	
+272 Handoff completion not received	
+273 Carrier not detected on new channel	
+274 MS reject order received <reason>	
+275 Unexpected message received and ignored	

Table 10. CDMA Call Processing Errors

Error Message	Description
+270 Traffic channel preamble not received	
+271 MS ack of initial BS ack order not received	
+272 MS ack order not received	
+273 Service Option or Radio Configuration rejected by MS	
+274 Service response not received	
+275 Service request not received	
+276 Service connect completion not received	
+277 Call drop timer timed out	
+278 Status response not received	

Table 10. CDMA Call Processing Errors (Continued)

Error Message	Description
+279 Walsh code cannot be changed while a call is connected	
+280 PN Offset cannot be changed while a call is connected	

Table 11. Digital2000 Call Processing Errors

Error Message	Description
+270 F-SCH assign ignored due to F-SCH state off	
+271 F-SCH assign ignored due to no call connected	
+272 F-SCH assign ignored due to lack of support in current radio configuration	
+273 Query MS capability info ignored due to no call connected	

+300 through +399 Link Control Device-Specific Error

These errors are generated when a problem occurs in maintaining the link between the test set and a DUT. These errors generally occur when a message is received from the DUT that is unexpected.

When one of these errors is generated, the '+300 errors' bit in the questionable error status register is set. Refer to "Standard Event Status Register" on page 409 for information on this register.

No link control errors are currently defined for this test application.

+400 through +499 Error Message Descriptions

Description

These errors are generated when a problem occurs in one of the test set's hardware modules that is part of the test set's core instrument.

When one of these errors is generated, the '+400 errors' bit in the questionable error status register is set.

Error Message	Description
+400 Hardware failure; Hardware is not available	
+401 Hardware failure; Protocol processor hardware is not responding	
+402 Hardware failure; Demod receiver hardware is not responding	
+403 Hardware failure; Measurement receiver hardware is not responding	
+404 Hardware failure; RF source 1 hardware is not responding	
+405 Hardware failure; RF source 1 digital modulation hardware is not responding	
+406 Hardware failure; RF source 1 level hardware is not responding	
+407 Hardware failure; DSP demod control hardware is not responding	
+408 Hardware failure; 2nd demod receiver hardware is not responding	
+409 Hardware failure; Base station emulator trigger hardware is not responding	
+410 Hardware failure; Audio source hardware is not responding	
+411 Hardware failure; RF source 2 hardware is not responding	
+412 Hardware failure; Internal voltmeter hardware is not responding	
+413 Hardware failure; Fixed timebase input is not responding	

Error Message	Description
+414 Hardware failure; Fixed external reference output is not responding	
+415 Hardware failure; Instrument reference is not responding	
+416 Hardware failure; Bit clock A is not responding	
+417 Hardware failure; RF source 2 frequency hardware is not responding	
+418 Hardware failure; RF source 2 digital modulation hardware is not responding	
+419 Hardware failure; RF source 2 level hardware is not responding	
+420 Hardware failure; RF source hopping hardware is not responding	
+421 Hardware failure; Digital demod hopping hardware is not responding	
+422 Hardware failure; Misc VI hardware is not responding	
+423 Hardware failure; Unable to access networking information	
+424 Hardware failure; Bit clock B is not responding	
+425 Hardware failure; Invalid EEPROM checksum <EEPROM board ID>	See the list of EEPROM board ID names below.
+426 Hardware failure; Unable to write to EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+427 Hardware failure; Unable to read from EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+428 Hardware failure; Board not identified <board ID>	See the list of board ID names below.
+429 Hardware failure; Could not create board identification <board ID>	See the list of board ID names below.
+430 Hardware failure; Control version not compatible with FW <board ID>	See the list of board ID names below.
+431 Hardware failure; RF IO DAC cannot be calibrated due to present temperature	
+432 Hardware failure; RF hardware is not responding	
+433 Hardware failure; RF source FM hardware is not responding	
+434 Hardware failure; Audio source FM hardware is not responding	

Error Message	Description
+460 Hardware failure; Hardware doesn't support requested operation	This error occurs when a setting is attempted that is not possible with the test set's hardware. The current firmware needs new hardware in order to work.

<board ID> names

3 GHZ ATTENUATOR 1| ;3GHZ ATTENUATOR 2| ;AUDIO BD| ;ROM BASEBAND GENERATOR 1| ;ROM BASEBAND GENERATOR 2| ;DEMOD DOWNCONVERTER| ;VECTOR OUTPUT BOARD 1| ;VECTOR OUTPUT BOARD 2| ;IVF MEASUREMENT| ;MEASUREMENT DOWCONVERTER| ;RF POWER DETECTORS| ;REFERENCE MODULE| ;SYNTH DOUBLER 1| ;SYNTH DOUBLER 2| ;TIMING REF| ;MOMENTUM INSTRUMENT| ;RF MOTHER BOARD| ;JUMPER BOARD| ;DIGITAL MOTHER BOARD| ;FLAT PANEL ADAPTER| ;REAR PANEL BOARD

<EEPROM board ID> names

Instrument Eeprom ID State| ;Atten 1 Eeprom ID State| ;Atten 2 Eeprom ID State| ;Audio Eeprom ID State| ;BaseBandGen 1 Eeprom ID State| ;BaseBandGen 2 Eeprom ID State| ;Demod DC Eeprom ID State| ;Digital Mother Board Eeprom ID State| ;IQ Output 1 Eeprom ID State| ;IQ Output 2 Eeprom ID State| ;IVF Meas Eeprom ID State| ; Jumper Board Eeprom ID State| ; Meas DC Eeprom ID State| ;RF Mother Board Eeprom ID State| ;RF Interface Eeprom ID State| ; Ref Mod Eeprom ID State| ;Sig Gen 1 Eeprom ID State| ; Sig Gen 2 Eeprom ID State| ;Time Ref Eeprom ID State| ;Display Interface Eeprom ID State| ;Rear Panel Eeprom ID State

+500 through +599 Test Application Hardware Device-Specific Error

Description

These errors are generated when a problem occurs with a hardware module that is required for a particular test application.

When one of these errors is generated, the '+500 errors' bit in the questionable error status register is set.

No hardware specific errors are currently defined for this test application.

+600 through +699 Error Message Descriptions

Description

These errors are generated when a problem occurs that is specific to one of the test set's instruments. These errors are part of the test set's core. Note that these measurements may not be present in every test application and therefore, these errors may not be present in every test application. There is no plan at present to support test application specific instruments.

An instrument in this context refers to the measurement-like functionality such as the audio generator and not to the test set as a whole.

When one of these errors is generated, the '+600 errors' bit in the questionable error status register is set.

Error Message	Description
+601 Instrument failure; Audio generator hardware is not responding	Indicates a problem occurs when attempting to control the test set's audio generator.

+700 through +799 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. Errors are categorized as follows:

- TA2000: errors common to the test application
- CDMA: errors common to the IS-95 and IS-2000 system type
- Digital2000: errors applicable to only the IS-2000 system type
- Digital95: errors applicable to only the IS-95 system type

When one of these errors is generated, the +700 errors bit in the questionable error status register is set.

Table 12. CDMA Measurement Errors

Error Message	Description
+701 Digital average power measurement is not responding	
+702 Waveform quality measurement is not responding	
+703 Channel power measurement is not responding	
+704 Frame error rate measurement is not responding	
+705 Access probe power measurement is not responding	

Table 13. Digital2000 Measurement Errors

Error Message	Description
+701 Handoff waveform quality measurement is not responding	

+800 through +899 Error Message Descriptions

Description

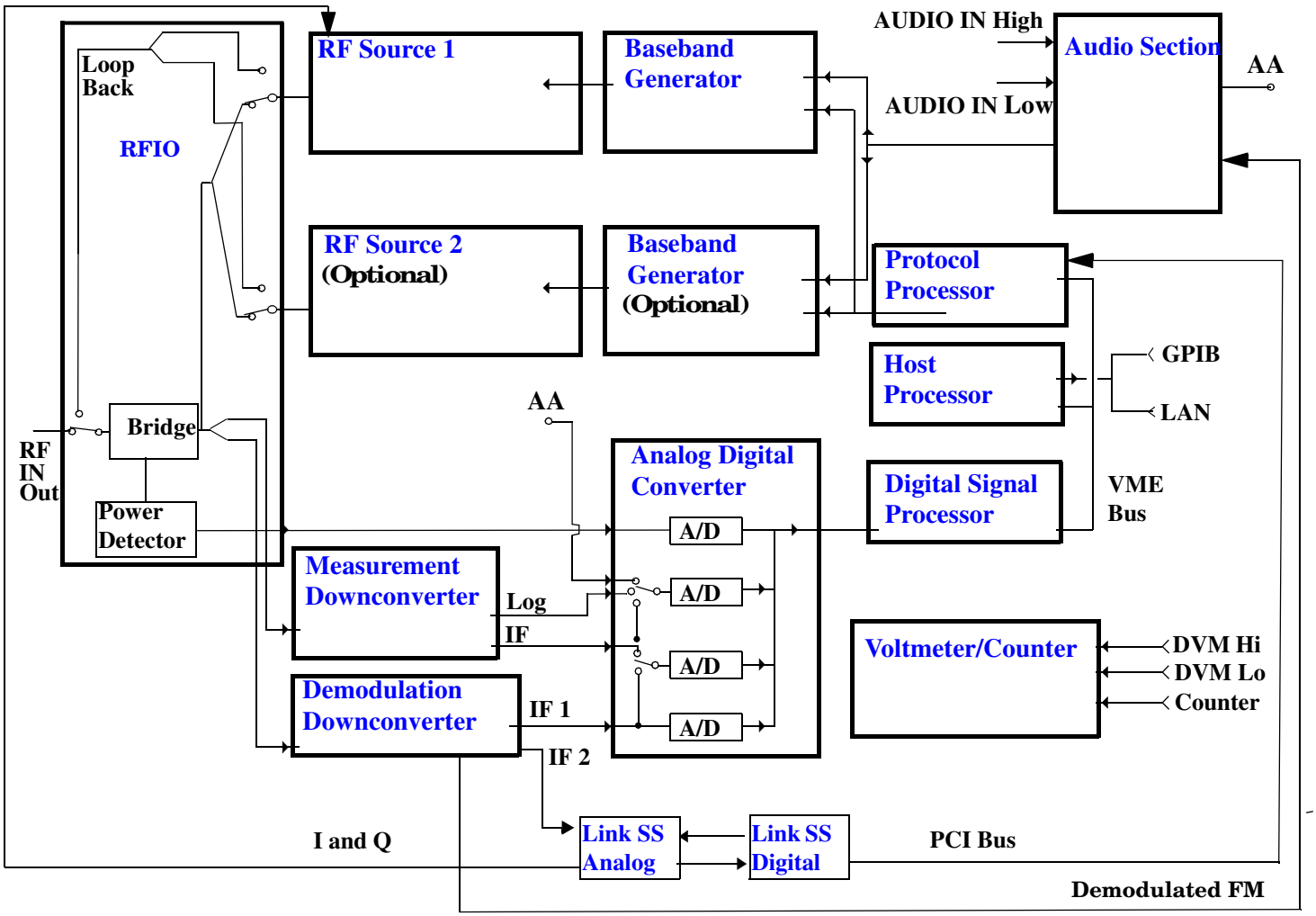
These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

When one of these errors is generated, the '+800 errors' bit in the questionable error status register is set.

Error Message	Description
+801 Measurement failure; Analog audio hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.
+802 Measurement failure; Audio analyzer hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.

Block Diagram

Description



RF Interface Module

Input and output signals are routed through the RF Interface module. The RF Interface module consists of a directional bridge for sampling incoming power and hybrid power splitters which create 4 bidirectional ports, (two receiver ports and two source ports), RF amplifiers, video gain circuits, and fast and slow power detectors. The source signals can be looped back through the input switch to cross calibrate the Measurement Downconverter and the Power Detector. The directional bridge couples power to the Power Detector.

The RF Interface module provides two identical RF Source path connections to the In/Out port of the instrument. There is about 25 dB of isolation between the two source paths. There is about 35 dB of isolation between the source paths and either receiver path. The RFIO module has nominally 23 dB of insertion loss in the source path. A temperature sensing circuit facilitates compensation for path loss variation with temperature.

The sampled input power from the directional bridge can be amplified by as many as two 18 dB range amplifiers and then can be directed to the fast detector, or the slow detector. The input power to the fast detector is detected by a diode detector that is part of a feedback loop. The input to the slow detector is measured in a bridge using a pair of RMS thermal detectors in a feedback loop. Signals from the fast and slow power detectors are calibrated with Gain DAC's. Video gain can be applied in 6 dB and 1.5 dB steps.

Signal Downconversion

The test set's downconversion receiver section has two downconversion modules; a high performance Measurement Downconversion Module for making measurements, and a Demodulation Downconversion Module for maintaining the radio link.

Demodulation Downconverter Module The Demodulation Downconverter module is used as part of the demodulation receiver that maintains the radio link. There are 2 output paths from the Demodulation Downconverter.

- The GSM, AMPS/136 signals are sent out the IF 1 path to the Analog to Digital Converter, the digital data then goes to the protocol subsystem.
- CDMA signals are sent out the IF 2 path where the (flexible) Link Subsystem maintains the link.

Measurement Downconverter Module The Measurement Downconverter module provides high quality (wide dynamic range, spurious free) signals to the Analog To Digital Converter module's measurement sampler input. These signals are:

- detected envelope of the Intermediate Frequency signal
- 10 kHz - 6 kHz Intermediate Frequency signal

The Measurement Downconverter module is designed for very high performance operation to ensure accurate and repeatable measurement results. The Measurement Downconverter module contains two downconversion stages, two local oscillators, and a logarithmic IF envelope detector . Both first and second LO synthesizers are tunable. The first LO is used when tuning to the RF input frequency, and the second LO is used when setting second IF frequency, which is fed to the measurement sampler on the Analog To Digital Converter module.

Link Subsystem The Link Subsystem maintains the radio link for all CDMA formats. The Link Subsystem has three parts:

- Link Subsystem Analog
- Link Subsystem Digital
- Protocol Processor

The Link Subsystem Analog board processes the signal from the Demodulation Downconverter through a 12 bit DAC. The digital data is sent to the Link Subsystem Digital board and processed into I/Q digital data. The I/Q digital data is returned to the Link Subsystem Analog board and converted into I/Q analog baseband signals . The I/Q baseband signals are sent to the I/Q modulator in the RF Source.

The Link Subsystem Digital board provide Layer 1 digital signal processing. There are several Field Programmable Logic Arrays , which are programmed for different CDMA formats.

Analog To Digital Converter Module

Following the Measurement Downconverter and Demodulation Downconverter IF 1 is the Analog to Digital Converter module. The purpose of the Analog to Digital Converter module is to convert the downconverted analog signals into digital data streams which can be processed by the Digital Signal Processing module.

In order to maintain the radio link of non-CDMA formats, the downconversion path through the Demodulation Downconverter module has a dedicated A/D conversion path.

In order to optimize measurement throughput, the fast RF power detector also has a single dedicated A/D path. This allows power measurements, in many cases, to be made concurrently with other measurements. The two outputs from the Measurement Downconverter module, and the Audio In signal share a single multiplexed A/D path.

The outputs of the various analog to digital converters on the Analog to Digital Converter module share a common data bus to the Digital Signal Processing module.

Digital Signal Processing Module

The Digital Signal Processing (DSP) module is responsible for a variety of tasks within the overall test set architecture. These tasks are:

demodulating data from the radio under test (data received from the Demodulation Downconverter module) and sending the demodulated data bits to the Protocol Processor module

for some systems, perform audio measurements using audio information sent to the DSP module from the Protocol Processor module

execute a variety of signal processing algorithms to perform measurements on the radio system of the currently loaded TA (data received from the power detector ADC, the measurement ADC and, in some cases, data received from the Demodulation Downconverter ADC)

The DSP processor communicates with the Host Processor and the Protocol Processor, as well as controlling the configuration and synchronization of the Analog To Digital Converter module.

Protocol Processor Module

The Protocol Processor module is responsible for maintaining the radio link between the test set and the mobile station under test. The primary tasks of the Protocol Processor module are:

generating the protocol messaging necessary for the forward channel and sending that protocol stream to the test set's RF source for transmission to the mobile station

decoding the protocol messaging received from the mobile station under test on the reverse channel

computing measurement results which are associated with data bits contained within the mobile stations messaging, such as bit error ratio

Host Processor Module

The Host Processor module is responsible for a variety of tasks within the overall test set architecture. These tasks include:

control of the manual user interface (MUI)

executing commands and processing data received from the LAN interface

executing commands and processing data received from the GPIB interface

controlling hard disk access

control of all RF and audio hardware modules

routing measurement results received form the Digital Signal Processing and Protocol Processor modules to the appropriate output device (display, GPIB, LAN, serial, etc.)

Voltmeter/Counter

Voltmeter The voltmeter is primarily used to measure external DC & AC voltages. A secondary purpose is to measure internal voltages for instrument self-diagnostics.

The external voltmeter is capable of measuring DC voltages up to + 50 VDC and AC voltages up to 50 V peak. A true RMS detector is used for measuring AC voltages. For internal measurements, a switch routes the diagnostic MUX output to the Voltmeter 1 path.

Frequency Counter The Frequency Counter is used to measure external frequencies from the front panel Audio IN, High or Low BNC connectors, and to measure internal signals for diagnostics. The external input can receive a signal between 20 Hz and 50 MHz, with a level from 25 mV to 8 V rms.

The counter circuit is based on the METRON IC. This IC contains a reciprocal counter. A reciprocal counter functions by counting the input signal and a reference signal simultaneously during a selected gate period. At the end of this period, the counting is stopped and the values of the signal and reference counters are read. The ratio of these values is used to calculate the input signal frequency.

Audio Section

Audio Analysis Path Externally applied audio signals can be analyzed through the test set's DSP module for such characteristics as AC level, SINAD, or distortion.

The audio signal to be analyzed is input to the test set using the front panel Audio IN High/Low connectors. The signal is then routed to the Analog To Digital Converter module's measurement sampler for analysis by the DSP module.

The Audio In connector accepts signals from 20 Hz to 15 KHz, at input levels from 10 mV to 20 V peak.

Audio 1 Path The Audio 1 path provides analog baseband signals used for frequency modulation of the test set's RF sources. Up to four separate audio sources may be summed together in any combination to provide the composite Audio 1 output. These include the external FM input, internal direct digital synthesis (DDS,) regenerated SAT, and audio echo input.

The external FM input accepts an externally supplied audio signal with a peak voltage between 0.25 and 2 V peak.

The internal DDS generates low distortion audio signals from DC to 20 KHz with 0.1 Hz resolution. One to four signals may be generated and internally summed, with independent level control of each waveform.

The SAT regeneration circuit outputs a signal which is phase-locked to a received SAT signal. This is useful for testing situations where the test set needs to emulate a mobile station.

The audio echo input is used for retransmitting the received audio after a selectable time delay, to check both radio transmit and receive paths simultaneously.

For most applications, only one or two of these Audio 1 path sources are enabled at any given time.

Audio 2 Path The Audio 2 path provides a secondary means for sending analog baseband signals to the FM modulator. Audio 2 contains only one source, a DDS similar to that used for Audio 1.

Typically, the Audio 2 path DDS is used for cases where multiple signals must be summed together with the lowest possible distortion. Another potential use of Audio 2 would be to obtain higher output levels than Audio 1 is capable of (up to twice as much), assuming the two outputs are set to the same frequency and phase, and then summed together at the Baseband Generator module.

Audio 2 is rarely used in practice because the DDS used for Audio 2 is the same DDS that is used for the front panel audio output.

Audio Out Path Any one of four inputs may be coupled to the front panel audio output connector. These include a 4 channel DDS (shared with Audio 2), receiver discriminator audio from the Demodulation Downconverter module, audio echo from the Analog To Digital Converter module, and audio vocoder.

The front panel output is capable of providing signal levels up to 9 V peak into > 600 ohm loads, and up to 0.8 V peak into an 8 ohm load (e.g. speaker). The output level is calibrated for all modes except discriminator audio,
The discriminator audio has an uncalibrated volume control provided due to the high tolerances involved.

Typically the DDS mode is used to feed the MIC input of a radio, or it may simply be used as a general purpose low distortion function generator.

Audio echo can be selected to route the received audio to the front panel audio output connector.

RF Sources

The test set can contain two identical RF sources. The RF sources are used to provide analog or digitally modulated RF carriers for use in parametric testing of mobile stations encompassing a variety of cellular radio formats. In general, the sources have a frequency range of 292 MHz to 2.7 GHz and an amplitude range of -10 dBm to -127 dBm.

The RF sources consist of a Synthesized Signal Generator module followed by a Vector Output module and an RF Attenuator module. Baseband modulation information is supplied to the RF sources from a Baseband Generator module preceded by an Audio Section module. The various components which make up the test set source system are described in the following sections.

Baseband Generators

The purpose of the Baseband Generator module is to provide, for the modulation type currently in effect, properly formatted baseband signals to the modulation circuits on the RF Source modules.

The Baseband Generator performs several functions related to the generation and processing of these base-band modulation signals. These are:

Transform data and clock signals from the Protocol Processor module into base-band analog I/Q modulation signals for the I/Q modulator in the Vector Output module

Transform data from the Protocol Processor module into baseband FSK modulation for the FM modulator in the Signal Generator module

Provide baseband FM path source selection, gain adjustment and summing node for analog FM signals from the Audio module and internally generated baseband FSK signals which are output to the FM modulator in the Signal Generator module

- Transform burst and adjacent timeslot signals from the Protocol Processor module into baseband burst modulation signals for the burst modulator in the Vector Output module

Forward Channel Description

Description

The forward channels transmitted by the test set in test mode include:

- Pilot Channel
- Sync Channel
- Paging Channel (overhead messages only)
- 1 Quick Paging Channel (all on or all off indicators)
- 1 Traffic or Fundamental Channel (depending on the radio configuration)
- 1 Supplemental Channel (RC3, RC4 or RC5 only)
- 1 OCNS Channel
- AWGN

Relative power levels can be set for all channels except for OCNS (orthogonal channel noise simulator) , which is used to simulate other users on the forward CDMA channel. OCNS is calculated to make the sum of the walsh coded channels sum up to the cell power setting. Cell power is set using the "CALL[:CELL]:POWer" commands.

Data Patterns/Rates

All data patterns are 2^{15-1} PRBS.

Data rates available on the FCH (fundamental channel) depend on the RC (radio configuration) and include:

Table 14. Forward FCH Data Rates

RC1	RC2	RC3	RC4	RC5
1.2 kbps	1.8 kbps	1.5 kbps	1.5 kbps	1.8 kbps
2.4 kbps	3.6 kbps	2.7 kbps	2.7 kbps	3.6 kbps
4.8 kbps	7.2 kbps	4.8 kbps	4.8 kbps	7.2 kbps
9.6 kbps	14.4 kbps	9.6 kbps	9.6 kbps	14.4 kbps

FCH data rates can be set using the "CALL:TRAFfic" commands.

Data rates available on the SCH (supplemental channel) also depend on the RC (radio configuration) and include:

Table 15. Forward SCH Data Rates

RC3	RC4	RC5
9.6 kbps	9.6 kbps	14.4 kbps
19.2 kbps	19.2 kbps	28.8 kbps
38.4 kbps	38.4 kbps	57.6 kbps
76.8 kbps	76.8 kbps	115.2 kbps
153.6 kbps	153.6 kbps	240.4 kbps
NA	307.2 kbps	NA

SCH data rates can be set using the "CALL:SCHannel" commands.

Closed Loop Power Control

There is no active (closed loop) power control on the forward channel. The only closed loop power control bit patterns available are:

- Alternating up/down
- All up
- All down

Closed loop power control bit patterns can be set using the "CALL[:CELL]:CLPControl" commands.

7 Configuration

Obtaining Identification Information (*IDN)

Description

Test set information is returned from a *IDN? query. The *IDN? query provides information about the Manufacturer, Model Number, Serial Number, and Firmware Revision. *IDN? is defined in IEEE Std. 488.2-1992, 10.14.

Test Set Information

*IDN? query returns identification information as a comma separated string.

```
DIM A$[100]
OUTPUT 714;"*IDN?" !returns manufacturer,model number, serial number and "0"
                   !separated by commas
ENTER 714;A$
PRINT A$           !prints, for example "Agilent Technologies, 8960 Series 10 E5515B,
                    !US38020105,0
```

- Agilent Technologies is the manufacturer.
- Printable ASCII characters excluding comma and semicolon up to a 25-character string.

  Model number example: 8960 Series 10 E5515B
- Printable ASCII characters excluding comma and semicolon up to a 10-character string.

  Serial number example: US00000123
- Printable ASCII characters excluding comma and semicolon up to a 20-character string.

  Firmware revision example: 0

NOTE The *IDN? query will always indicate that the firmware revision is zero. SYSTem:APPLication[:CURRent]:REVision? is the recommended way to query the firmware revision.

Related Topics

"Hardware Configuration Report"

Hardware Configuration Report

Description

You can generate a list of the test set's hardware configuration over the LAN or GPIB.

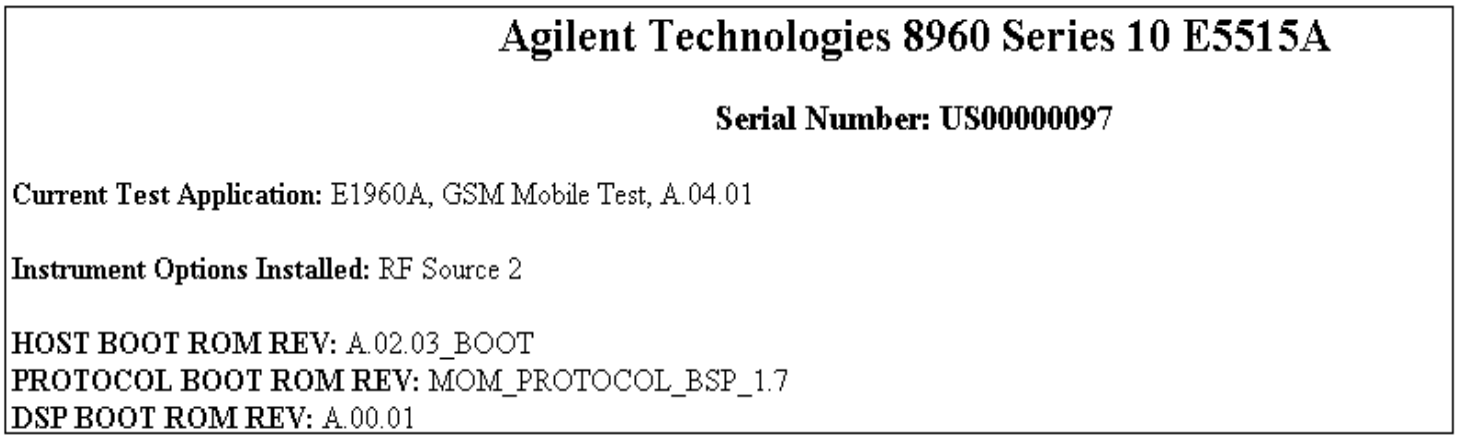
The LAN query is the easiest and most direct way to query the test set's hardware configuration. This method uses your web browser to display a formatted report.

The GPIB query returns an unformatted character string that must be buffered and saved to an HTML file to provide formatted text.

LAN Query

1. Refer to the SYSTEM CONFIG screen to determine the LAN address.
2. Open a web browser and enter <LAN address>/iconfig. For example, if your LAN address is 130.2.2.147, you would enter:

   130.2.2.147/iconfig
3. The web browser will then display formatted text. A partial list of the hardware configuration information is shown below:



GPIB Query

Use the following Basic example as a model to store the test set's configuration as an HTML file.

GPIB Example:

```
10    DIM Buf1$[20000],Buf2$[20000] ! This is the minimum space for the arrays
20    OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?"
30    ENTER 714;Buf1$,Buf2$
40    CREATE "HW.htm",1              ! Create an HTML file
50    ASSIGN @File TO "HW.htm"
60    OUTPUT @File;Buf1$,Buf2$
70    END
```

In the future, the hardware configuration report may increase in length. More space would then need to be allocated for the arrays.

Display the HTML file using a web browser or HTML text editor.

Related Topics

"SYSTem:CONFigure:INFormation:HARDware:VERBose?" on page 420

"Obtaining Identification Information (*IDN)" on page 515

Revision Information

This document describes features and functionality that are part of the Agilent Technologies E1962B cdma2000 Mobile Test Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

- "B.XX release - March 2001" on page 518

B.XX release - March 2001

These are the original features of the Agilent E1962B.

Transmitter Measurements

- Channel Power
- Average Power
  - — Peak Detector
  - — Thermal Detector
- Access Probe Power
- Modulation Quality
  - — Rho
  - — Frequency Error
  - — Time Error
- Modulation Quality
  - — Multi-Code Rho
  - — Frequency Error
  - — Time Error
  - — EVM
  - — Code Domain Power

Receiver Measurements

- Sensitivity
- Dynamic Range
- Access Probe Power
- Demodulation of FCH with AWGN
- Loopback Support with Service Option 002,009, and 055

IS-2000 Functionality

- Call Processing
  - — Registration
  - — One-Button Page
  - — Autoanswer MS Origination
  - — Hard Handoff (Band and Channel)
- RF Generator
  - — Pilot, Sync, Paging, Quick Paging, FCH, OCNS, and AWGN Channels
- Radio Configuration Support
  - — Forward RC1 + Reverse RC1
  - — Forward RC2 + Reverse RC2
  - — Forward RC3 + Reverse RC3
  - — Forward RC4 + Reverse RC3
  - — Forward RC5 + Reverse RC4

Display Brightness

Description

This parameter allows you to adjust the brightness of the test set's display. The test set's display screen has two brightness settings:

- medium brightness
- high brightness

Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" ! sets screen brightness to medium.
```

Related Topics

"DISPlay" on page 295

Display Mode (Track/Fast)

Description

There are two display modes to select from when operating the test set remotely.

- Display mode fast
- Display mode track

Fast Mode

When operating remotely, there is often no need for the display to be updated as measurements are made. Using the fast display mode will increase the speed of the test set when it is operated remotely.

Fast mode is designed for remote use only. The test set returns to track mode if you change to manual operation.

- No screen or menu items are visible (except error messages).
- Error messages will be displayed in their normal location.
- “This instrument is being operated remotely” will be displayed at the bottom of the screen.

Example

```
OUTPUT 714;”DISPLAY:MODE FAST” !Selects fast mode
```

Track Mode

The track display mode is used to allow users to see what the test set is doing while it is being controlled remotely. Track mode is the default mode of the test set.

- Any changes made remotely will be updated on the screen if that screen is displayed.
- The error message window will be displayed as required when an error occurs.

Example

```
OUTPUT 714;”DISPLAY:MODE TRACK”!Selects track mode
```

Writing Messages to the Display

The capability to write up to four 30-character lines of text to the front panel display for operator messages is available when the display is in "Fast Mode" . This feature can be used to control the flow of software running on an external controller by pressing softkeys on the test set's front panel.

For example, by displaying a message that prompts the operator to press a front panel softkey and then monitoring that softkey through status register bits, the programmer can design code that starts measurements, stops measurements, or branches to a selected routine or function without the need for access to the external computer's keyboard.

The GPIB commands for writing messages to the display are found in the "DISPlay:OPERator:MESSage" table.

The status bit register GPIB commands and bit definitions for monitoring the test set's sofkeys are found in the "STATus:OPERation:KEYPressed Register Bit Assignments" table.

Related Topics

"DISPlay" on page 295

"STATus:OPERation:KEYPressed Register Bit Assignments" on page 375

Test Set Beeper

Description

This parameter allows you to change the beeper state to on or off. A beep will indicate error conditions caused during manual or remote operation of the test set.

A 100 ms, 1.24 kHz audible tone (beep) is generated when an error message is logged and the beeper state is set to on. If two errors are generated in quick succession, two beeps are generated to indicate that more than one error has been logged.

The beeper state can be manually set in the Instrument Setup window found in the SYSTEM CONFIG screen.

Example

```
OUTPUT 714;"SYSTEM:BEEPER:STATE OFF"
```

Related Topics

"SYSTem:BEEPer" on page 419

Timebase Description/Configuration

Description

The time base source is selected by the test set, either an internal time base or an external source (if a suitable signal is detected) is used as the reference oscillator. If a 10 MHz +/- 100 ppm signal, that has an input level from 0 to +13 dBm is connected to the 10 MHz REF IN connector on the rear panel, the test set will automatically select the external timebase.

You can read the status window at the bottom of the test set display for the EXT REF indicator, or query the test set to verify if it is using an external time base or an internal time base. You may also query the test set to verify if the time base is locked. The reference oscillator functionality is controlled through the SYSTEM subsystem.

Example:

```
OUTPUT 714;"SYSTEM:ROSCILLATOR[:TIMEBASE]?" !returns INT or EXT
                                            !(internal or external) timebase.
OUTPUT 714;"SYSTEM:ROSCILLATOR:LOCKED?" !returns 1 or 0 (locked or unlocked)
                                        !condition for timebase
```

Related Topics

"SYSTem:ROSCillator"

"Rear Panel Connectors"

Configuring the Test Set's LAN

Description

LAN IP Address

The LAN address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223, and B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN address can be set/queried using the SYSTem subsystem.

The LAN address is a non-volatile parameter. The LAN address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

For convenience the DATA port on the front panel may be configured as a LAN port. When a RJ45 jumper cable, (part number E5515-61160) is connected from the LAN PORT on the rear panel, to the ETHERNET TO FRONT PANEL port also on the rear panel, the user has LAN access from the front panel of the test set. Without the RJ45 jumper cable, the test set connection to a LAN is the rear-panel, LAN PORT connector.

LAN Default Gateway

The LAN router, (default gateway), is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223 , and B, C, and D are between 0 and 255, no embedded spaces are allowed. If the default gateway is set to a format not allowed with the LAN address or the subnet mask that have been selected, the default gateway will be set to a null string, indicated by a blank field on the test set display. The address may be manually set/viewed in the system configuration screen. The LAN default gateway can be set/queried using the SYSTem subsystem.

The LAN default gateway is the address of a router that routes messages between networks and or subnets. If this value is not specified, LAN communications will be limited to the network and subnet specified by the LAN IP address and the subnet mask. Your network administrator will know if a default gateway is needed and if so, the address of the router. If the default gateway address is not needed by your network, it may be disabled by entering any of the following values: "0" (zero), "" (null string), "0.0.0.0"

The LAN default gateway is a non-volatile parameter. The LAN default gateway is not affected by any reset operation and can only be changed by direct access to the parameter itself.

LAN Subnet Mask

The LAN subnet mask address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A , B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN subnet mask address can be set/queried using the SYSTem subsystem.

The subnet mask number combined with the IP address identifies which network and subnet your computer is on. Contact your system administrator for the correct subnet mask for your network.

The subnet mask determines the boundaries between the subnet ID and the host ID.

The LAN subnet mask is a non-volatile parameter. The LAN subnet mask is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

The subnet mask number is obtained from your network administrator.

Related Topics

"SYSTem:COMMunicate"

Configuring the Test Set's GPIB

Description

The GPIB address is an integer between 0 and 30. The test set comes with a default address of 14 and may be set/queried using the SYSTem subsystem or manually through the system configuration screen by selecting the parameter and changing the number with the knob or the keypad.

The GPIB address is a non-volatile parameter. The GPIB address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

Related Topics

"SYSTem:COMMunicate" on page 421

Test Application Switching

Description

Different radio formats (such as GSM, AMPS, CDMA 2000 or TIA/EIA 136) can be tested when the optional test applications are purchased from Agilent Technologies. The test set allows you to select a different test application and switch to it, a reboot makes the test application functional. The reboot will happen automatically when the you tell the test set to switch test applications. Switching to another test application takes about one minute.

Some radio formats are combined as fast switching test applications. Switching formats in a fast switching test application takes less than 2 seconds.

Test Application Switching GPIB Command

In order to switch to another test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"
```

Sending this command causes the test set to reboot.

Test Application Revision and Licensing

Each test application must have a valid license and revision to function. Licensed revisions of test applications are available from Agilent Technologies.

It may take several seconds before revision, model, and name information is returned.

Test Application Switching Programming Example

This program example shows you how to switch to the GSM test application.

1. Query the list of test application names to get exact spelling of the GSM test application. This is not necessary if you already know the exact name.
2. Query the test set to get a list of all revisions for "GSM Mobile Test." This is not necessary if you are not changing revisions.
3. Select a revision of "GSM Mobile Test." This is required if you are changing revisions.
4. Select the GSM test application. This will switch test applications and cause the test set to reboot.

```
10    OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"
20    !Queries all of the test application names
30    ENTER 714;N$
40    PRINT "The CATALOG names that are loaded are ";N$
50    OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'GSM MOBILE TEST'"
60    !Queries all revisions of GSM MOBILE TEST
70    ENTER 714;Cat_rev$
80    PRINT "The revisions for the GSM Mobile Test Application are ";Cat_rev$
90    OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM MOBILE TEST','A.04.01'"
100   !Selects a revision
110   OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"
120   !Switches the test application to GSM MOBILE TEST
130   END
```

Related Topics

"Test Application Revisions and Licenses" on page 530

"SYSTem:APPLication" on page 413

"SYSTem:CURRent:TA" on page 430

"Test Application Name" on page 532

Test Application Revisions and Licenses

Description

Different revisions of the test applications in your test set provide different capabilities. The selected test application revision is loaded after the next test application switch or power cycle of the test set Once you select a revision the revision does not change unless you select another revision.

You can query the selected revision, all available revisions, and the total count of available revisions for a selected test application. These queries are helpful when selecting revisions but are not usually necessary when switching test applications.

NOTE The Agilent E1960A GSM mobile test application revisions prior to A.04.00 do not support test application switching. If you select a revision prior to A.04.00 you will not have a path to switch back to later revisions.

If you accidentally switch to a non-supported revision, use the firmware upgrade process to load firmware with the correct revision.

Test Application Revision Queries and Commands

These are commands to query revision information or select a revision.

- To query a **selected** test application revision (running or not) use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'AMPS/136 MOBILE TEST'"
```

- To query the revision of the test application **currently running** use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"
```

- To query **all** of the revisions available for a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"
```

- To **select** a revision of a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM mobile test','A.04.01'"
```

- To query the number of revisions for a specified test application:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'GSM MOBILE TEST'"
```

Test Application License Status Query

The test application license status can be queried for a particular test application and revision using the following GPIB query:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.01'"
```

This query returns one of the following:

- "LIC" - This revision of test application appears to have a LICense. The test application may have been developed before licensing and therefore needs no license.
- "NLIC" - This test application does not appear to have a license. Selecting a Not LICensed revision will result in an error +130.
- "PART" - Some PART of the test application does not appear to have a license.
- "UNKN" - This test application has UNKNown license status.

NOTE If you switch to a not licensed revision the test set will reboot to the SYSTEM CONFIG screen. You will be unable to select any other screen or make any measurements. Query or view the Test Application Setup menu to determine the licensed versions of test applications available.

Revision and license information can be viewed and selected from the SYSTEM CONFIG screen, by selecting the Test Application Setup menu. Revisions are shown with their license status. After the revision number is a letter. That letter indicates the revision license status; Licensed "L", Not Licensed "N", or Unknown "U".

- "L"- This revision of test application appears to have a License. The test application may have been developed before licensing and therefore needs no license.
- "N" - This test application does not appear to have a license. Selecting a Not licensed revision will result in an error +130.
- "P" - Some Part of the test application does not appear to have a license.
- "U" - This test application has Unknown license status.

Related Topics

"Test Application Switching" on page 528

"SYSTem:APPLication" on page 413

Test Application Name

Description

The following queries give you details about the test application name. To query or switch test applications you must use the test application name as it appears in the catalog (without regard to case).

- To query the name of the all test applications installed in the test set use this GPIB query.

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"
  ```

- To query the name of the selected test application (running or not) use this GPIB query.

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"
  ```

- To query the name of the currently running test application use this GPIB query.

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"
  ```

- To query the number of test applications installed in the test set use this GPIB query.

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"
  ```

The test application names can also be displayed in the Test Application Setup menu on the test set's display.

Related Topics

"SYSTem:APPLication" on page 413

"Test Application Switching" on page 528

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