

Keysight Wireless Test Sets

E7515A UXM Wireless Test Set

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Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

<http://www.keysight.com/find/uxm>

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

<http://www.keysight.com/find/MyKeysight>

Information on preventing instrument damage can be found at:

www.keysight.com/find/PreventingInstrumentRepair

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

<http://www.keysight.com/find/techsupport>

Safety

WARNING

This is a Safety Class 1 Product (provided with a protective earth ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

WARNING

This instrument is heavy. Two people are required to lift this instrument.

WARNING

Please consult ergonomic guidelines regarding placement of the external keyboard when using it with the instrument. Using the keyboard in an uncomfortable or awkward environment could result in personal injury.

CAUTION

Before switching on this instrument, make sure:

- the rating for the service breaker is correct.
 - the supply voltage is in the specified range.
-

CAUTION

This instrument has auto-ranging line voltage input. Be sure the supply voltage is within the specified range and voltage fluctuations do not exceed 10 percent of the nominal supply voltage.

CAUTION

The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

CAUTION

This product is designed for use in Installation Category II and Pollution Degree 2 environment.

CAUTION

Use the Keysight supplied power cord or one with the same or better electrical rating.

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1 Applications on the Test Set

The following topics can be found in this section:

“Types of Applications” on page 10

“Identifying the applications for programming” on page 12

“Using HiSLIP to send commands” on page 13

Application Switch Tool on page 20

Types of Applications


This guide is concerned with the high-level Control Panel application of the test set (a general-purpose interface for the test set as a whole).

Figure 1-1 Control Panel



However, configuring and programming the UXM wireless set usually relates mainly to the measurement applications which can run on the test set, as illustrated below.

Figure 1-2 UXM Applications



UXM Applications

Control Panel (general instrument interface)			
T9080B/ T9082B/ T9080C/ T9082C	E7530A	T9071A/ T9073B/ T9079A	E7521A/ E7523A/ E7529A
X-series LTE/LTE-A/ NB-IoT/eMTC Apps	UXM LTE/LTE-A/ NB-IoT/eMTC Apps	X-series 2G/3G Apps	UXM 2G/3G App

Each of the measurement applications has its own user interface, its own set of SCPI commands, and its own documentation.

This guide will present information on how to configure, operate, and program the test set at the level of the Control Panel application, and also on how to connect the test set with other equipment (including another UXM test set, connected to form an array).

Information on how to configure, operate, and program the applications which run on the test is provided in applications documents; these are referenced below, rather than incorporated within this document. All of them are available under the Document Library tab on the web page:

<http://www.keysight.com/find/e7515a>

- T9071A X-Series GSM application: see the application help file for T9071A.
- T9073B X-Series W-CDMA application: see the application help file for T9073B.
- T9079A X-Series TD-SCDMA application: see the application help file for T907A.
- T9080B X-Series LTE/LTE-A FDD application: see the application help file for T9080B.
- T9080C X-Series LTE/LTE-A/NB-IoT/eMTC FDD application: see the application help file for T9080C.
- T9082B X-Series LTE/LTE-A TDD application: see the application help file for T9082B.
- T9082C X-Series LTE/LTE-A TDD application: see the application help file for T9082C."
- E7530A E7530A UXM LTE/LTE-A/NB-IoT/eMTC application: see the application help file for E7530A.
- E7521A UXM GSM application: see the application help file for E7521A.
- E7523A UXM W-CDMA application: see the application help file for E7523A.
- E7529A UXM TD-SCDMA application: see the application help file for E7529A.

Identifying the applications for programming

Device IDs and Port numbers are given in the table below, for the Control Panel application and the measurement applications which run on the test set. (The device IDs and port numbers are set up this way in the UXM before it is shipped from the factory; changing them is not recommended.)

NOTE

HiSLIP has a fixed port number of 4880. The applications are identified by means of a HiSLIP Device ID. Because HiSLIP Device IDs are case-sensitive; be sure to use lower-case letters, as shown here.

Element	HiSLIP Device ID	TCP (Socket) Port	Telnet Port
LTE/LTE-A/NB-IoT/eMTC Application (E7530A)	hislip2	5125	5124
2G/3G Applications (E7521A, E7523A, E7529A)	hislip4	5225	5224
X-Series Measurement Application, running in RF Transceiver A	hislip1	5075	5074
X-Series Measurement Application, running in RF Transceiver B	hislip3	5175	5174
Control Panel	hislip0	5025	5024

NOTE

It is recommended that you use the Keysight Connection Expert software to control the UXM components. The software is available as a free download at: www.keysight.com/find/iosuite

Using HiSLIP to send commands

There are a few steps involved in creating the connection that enables you to send SCPI commands to each of the UXM software elements:

- 1. Obtaining the IP address of the UXM.**
- 2. Determining the HiSLIP ID for each application.**
- 3. Adding applications in the Keysight Connection Expert.**

These steps are described in more detail below:

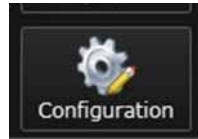
NOTE

The E7515A is not auto-discoverable. You need to add it manually to your software environment. For example, if using Keysight Connection Expert, follow the procedure described on [page 18](#).

Setting the IP address

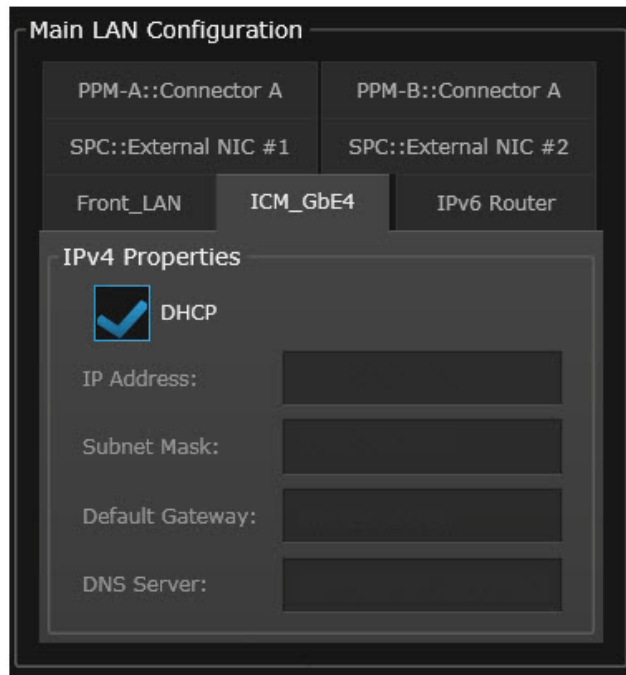
Begin by clicking the Configuration icon in the Control Panel window.

Figure 1-3 Configuration Icon



This brings up a LAN configuration window, which includes the IP address of the test set and other details. In the example illustrated below, the tab showing the properties of the rear-panel GbE4 connection is displayed; select the Front_LAN tab instead, if the UXM is connected to the network by way of the LAN connector on the front panel.

Figure 1-4 LAN Configuration



Determining the HiSLIP IDs and Communication Ports

This information is found in different locations, depending on what type of application is involved.

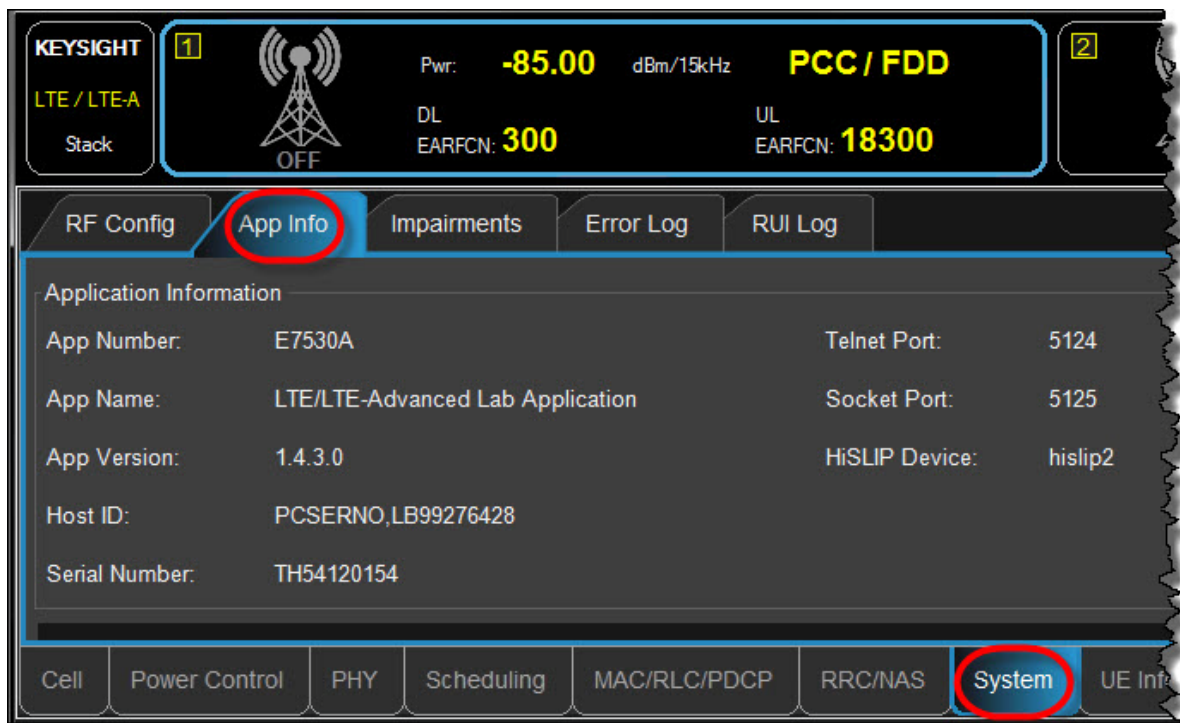
NOTE

This is reference information; changing these values from their factory default settings is not recommended.

UXM Applications (E7521A/E7523A/E7529A, E7530A)

Navigate to the **Systems** lower tab, **App Info** upper tab, and view the HiSLIP IDs and Communication Ports, as illustrated below.

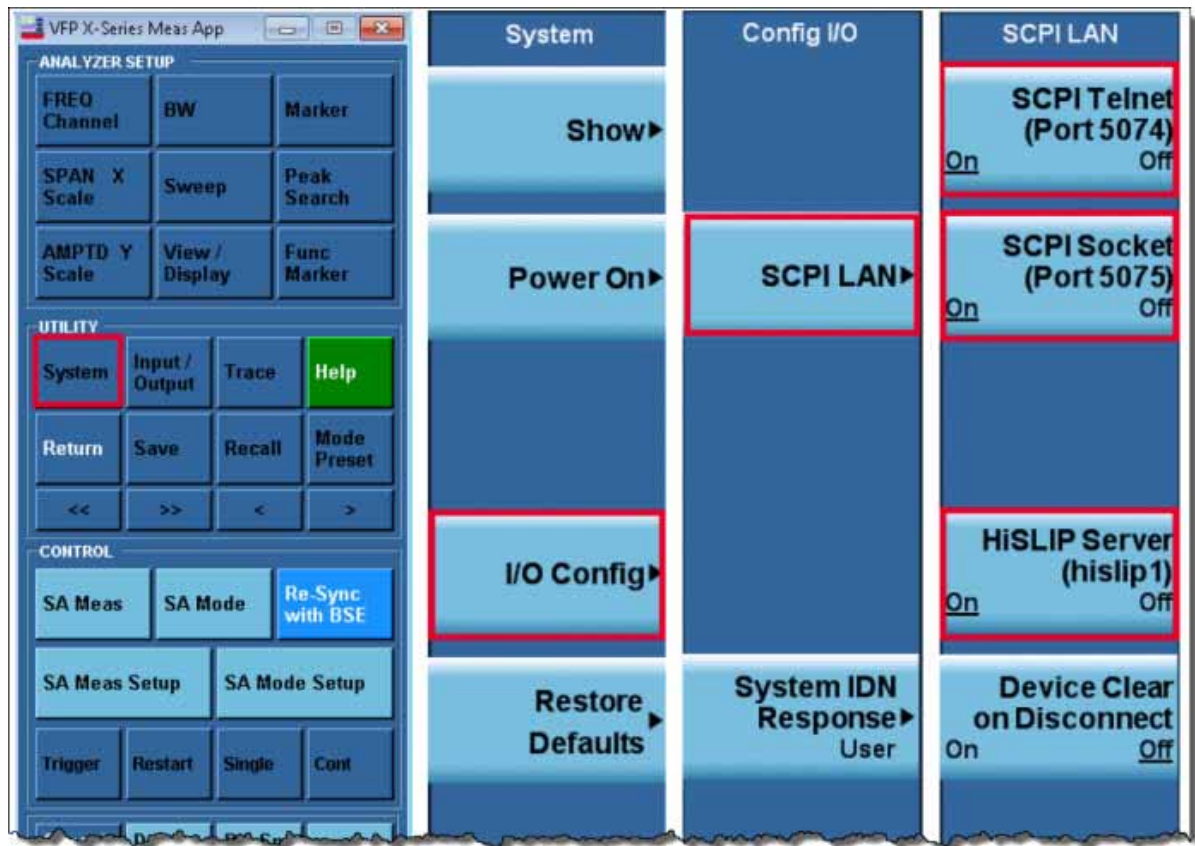
Figure 1-5 HiSLIP IDs and Ports for UXM Applications



X-Series Applications (T9073B, T9080B, T9082B)

Use the App Switcher to open the X-Series application. The HiSLIP IDs, Telnet Port Numbers, and Socket Port Numbers can be viewed at the following location: **System > I/O Config > SCPI LAN**.

Figure 1-6 HiSLIP IDs and Communication Ports for X-Series Applications T9073B, T9080B, T9082B



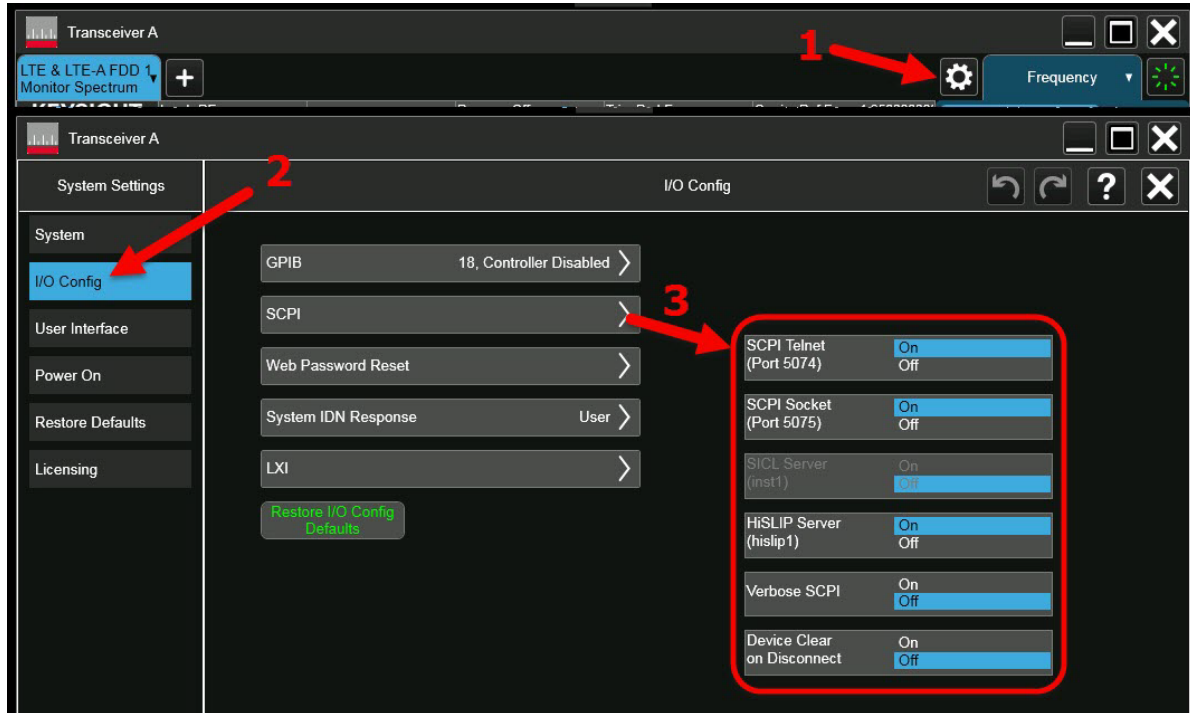
Applications on the Test Set
Using HiSLIP to send commands

X-Series Applications (T9080C, T9082C)

This optional X-Series applications are only available for E7530A LTE/LTE-A/NB-IoT applications.

Use the App Switcher to open the X-Series application. The HiSLIP IDs, Telnet Port Numbers, and Socket Port Numbers can be viewed at the following location: **Setup > System > I/O Config > SCPI**.

Figure 1-7 HiSLIP IDs and Communication Ports for X-Series Applications T9080C/T9082C



Platform Application (Control Panel)

This application is always set as follows:

- HiSLIP: 0
- Socket Port: 5025
- Telnet Port: 5024

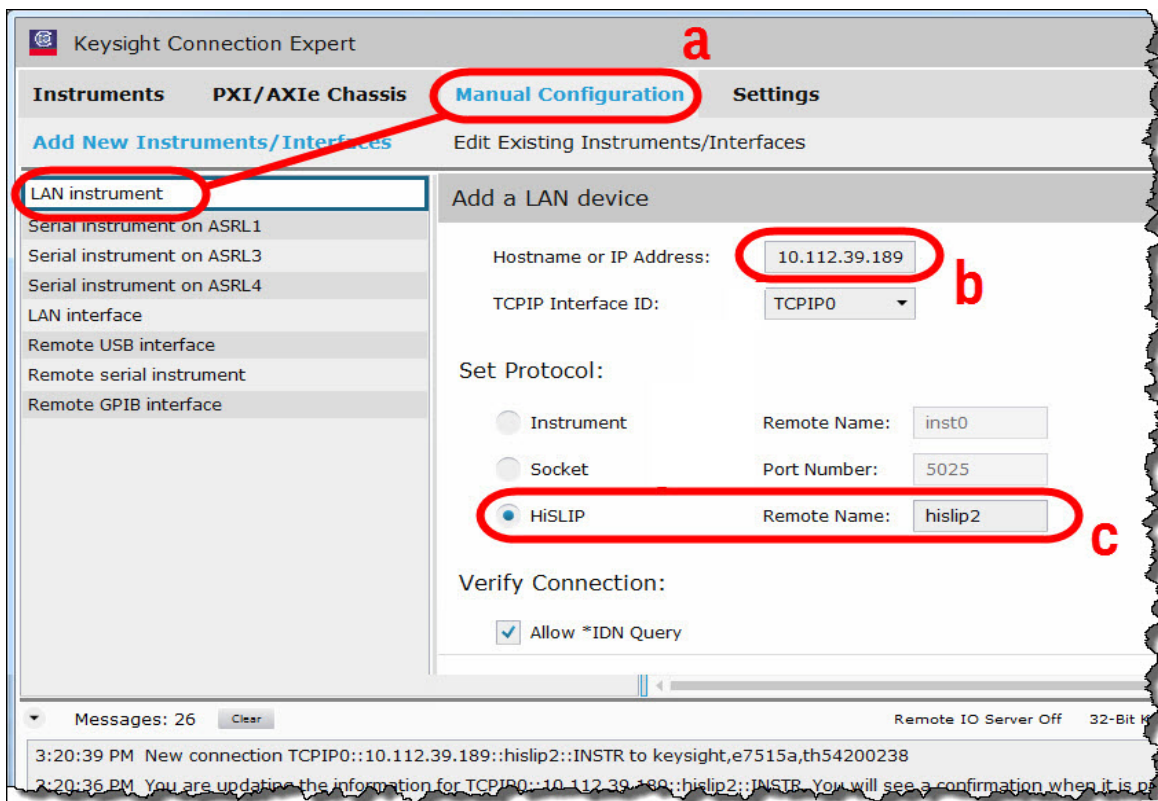
These values are not available to view or edit.

Adding applications to Connection Expert

In this example, only the HiSLIP connection is presented. This method works for most applications (LTE-A, X-Series, and Control Panel). For 2G/3G applications, see [“Adding a 2G/3G Application” on page 19](#).

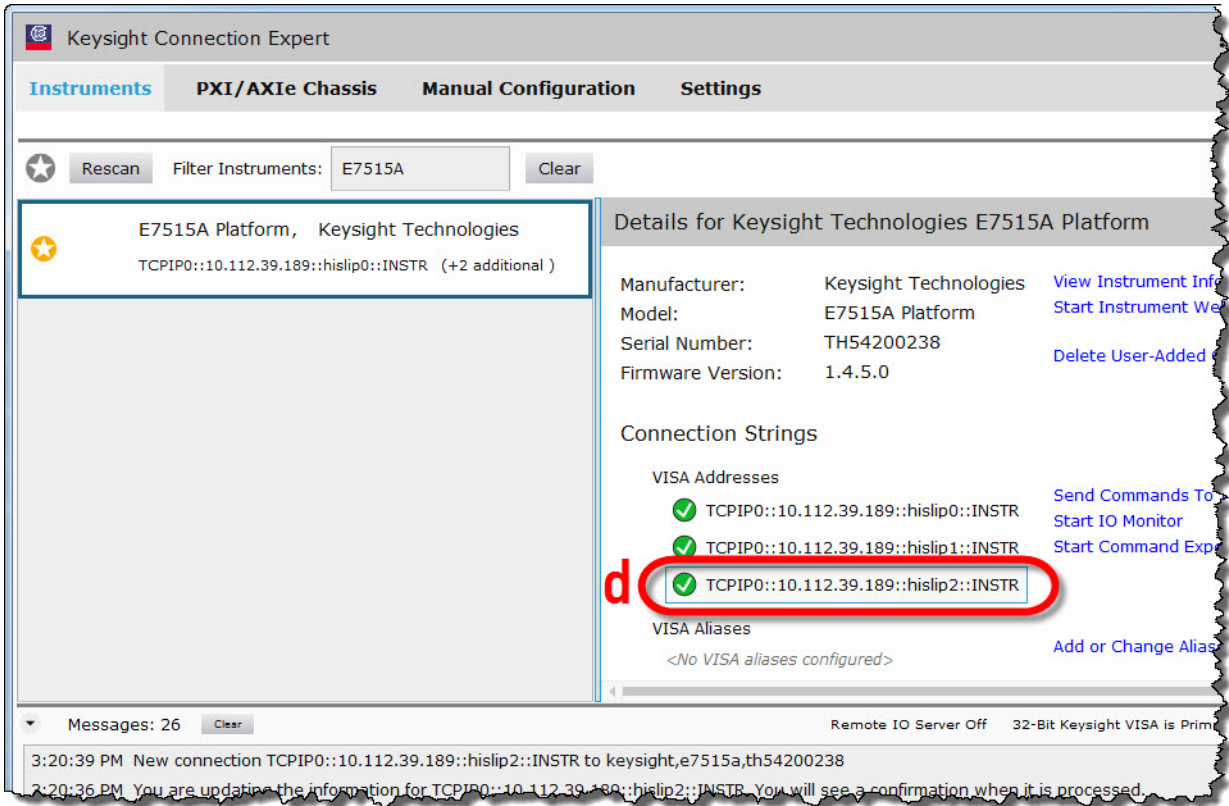
1. Open the Keysight Connection Expert.
2. Add the application using the UXM IP address and the appropriate HiSLIP ID (see [“Identifying the applications for programming” on page 12](#)).
 - a. Select **Manual Configuration**, **LAN instrument**.
 - b. Under "Set LAN Address", enter the IP address of the UXM.
 - c. Under "Set Protocol", select **HiSLIP**, and edit the field to add the appropriate ID for the application (remember to use lower case letters: the ID for the LTE-A app is hislip2 rather than HiSLIP2). See [Figure 1-8](#).
 - d. Verify the instrument has been added. See [Figure 1-9](#).

Figure 1-8 Adding UXM applications using Keysight Connection Expert



3. Similarly, add the X-Series applications (hislip1 and hislip3) and the Control Panel application (hislip0).
4. See the Instruments tab to verify each instrument has been added; see [Figure 1-9](#).

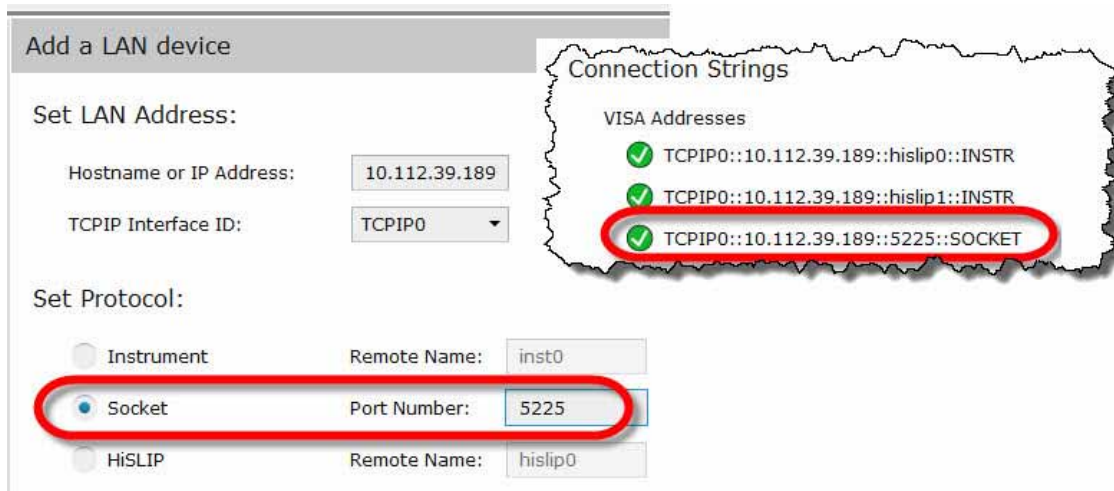
Figure 1-9 Verifying added applications



Adding a 2G/3G Application

Because HiSlip IDs are not currently supported by the 2G/3G application, use the Socket Port Number instead when connecting to that application. The process is otherwise the same as was described above.

Figure 1-10 Adding 2G/3G applications using Keysight Connection Expert



Application Switch Tool

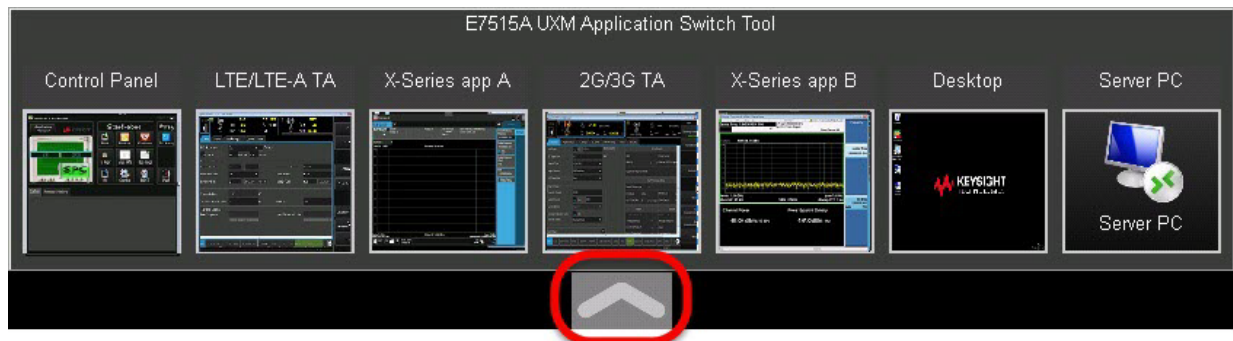
When multiple applications are running on the UXM, the application window you want to see may be blocked from view by another window. For easier access to application windows, click on the gray down-arrow at the top of the UXM display, and drag it downward to see a row of large icons.

Figure 1-11 Application Switch pull-down icon



The icons represent the various applications that are running on the UXM; click on the relevant icon to bring that application forward in the display. To hide this tool again, click on gray up-arrow and drag it upward.

Figure 1-12 Application icons and pull-up icon



NOTE

The Application Switch Tool is a feature of two of the UXM applications, rather than a feature of the UXM itself. The tool becomes unavailable when neither the E7521A/E7523A/E7529A (2G/3G) application nor the E7530A (LTE/LTE-A/NB-IoT) application is running.

2 UXM Connectivity

The following topics can be found in this section:

[“UXM Arrays” on page 22](#)

[“External Instruments” on page 26](#)

UXM Arrays

Two UXM test sets can be combined in an array. For purposes of synchronization, one UXM in the array is designated as the "Main" unit, and the other as "Auxiliary". Interconnections between them include Internal Ethernet, RIO (Rapid I/O), and Synchronization. All three are described below.

NOTE

When UXMs are configured in an array, it is necessary to use the Interconnectivity Hardware Kit (E7515A-AC1). The cables included in this kit have the characteristics (including cable length) that are needed to support proper synchronization of the instruments.

Figure 2-1 UXM Array



NOTE

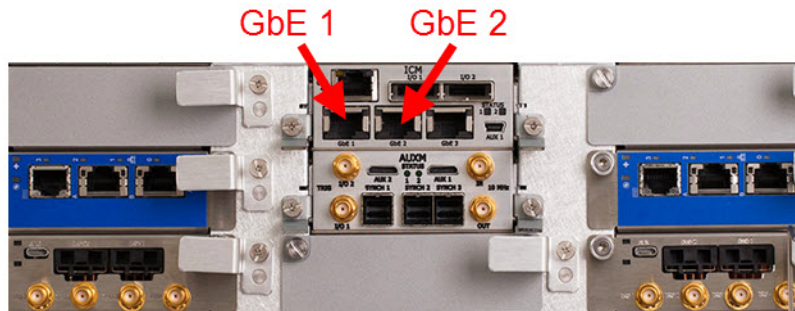
Cable interconnections between units in an array can be left in place when you exit the array; the cables do not interfere with operation in stand-alone mode.

Internal Ethernet

Internal Ethernet Connection ports are located in the ICM section of the UXM's back panel:

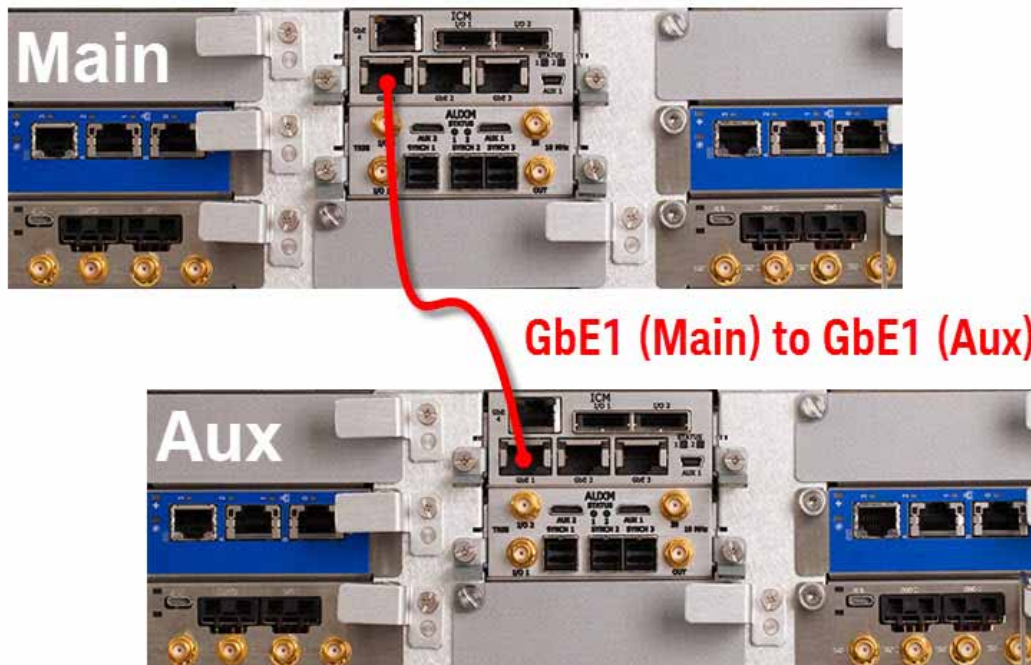
- GbE 1 and GbE 2 are used for the UXM array connection
- GbE 3 and GbE 4 are reserved for other purposes

Figure 2-2 Internal Ethernet Connection Ports



The UXM array requires either the GbE 1 or the GbE 2 connector on the main UXM to be connected to either of the equivalent connectors on the auxiliary UXM (an example is illustrated below). In stand-alone mode, the Ethernet traffic local to a UXM does not get out through either of these connectors (GbE 1 or GbE 2), isolating Ethernet traffic between units.

Figure 2-3 Internal Ethernet Connection Ports in an Array

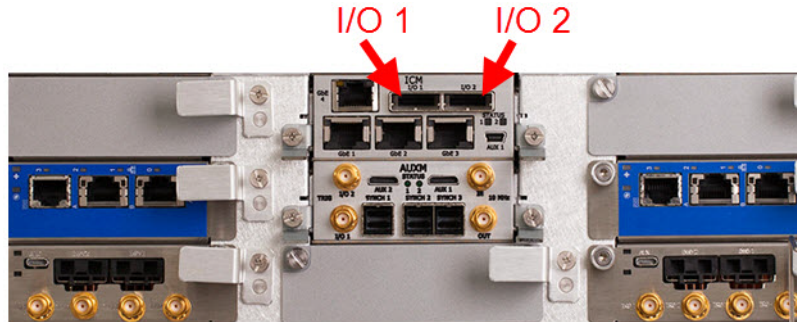


RIO

The RIO (Rapid I/O) ports are located in the ICM section of the UXM's back panel:

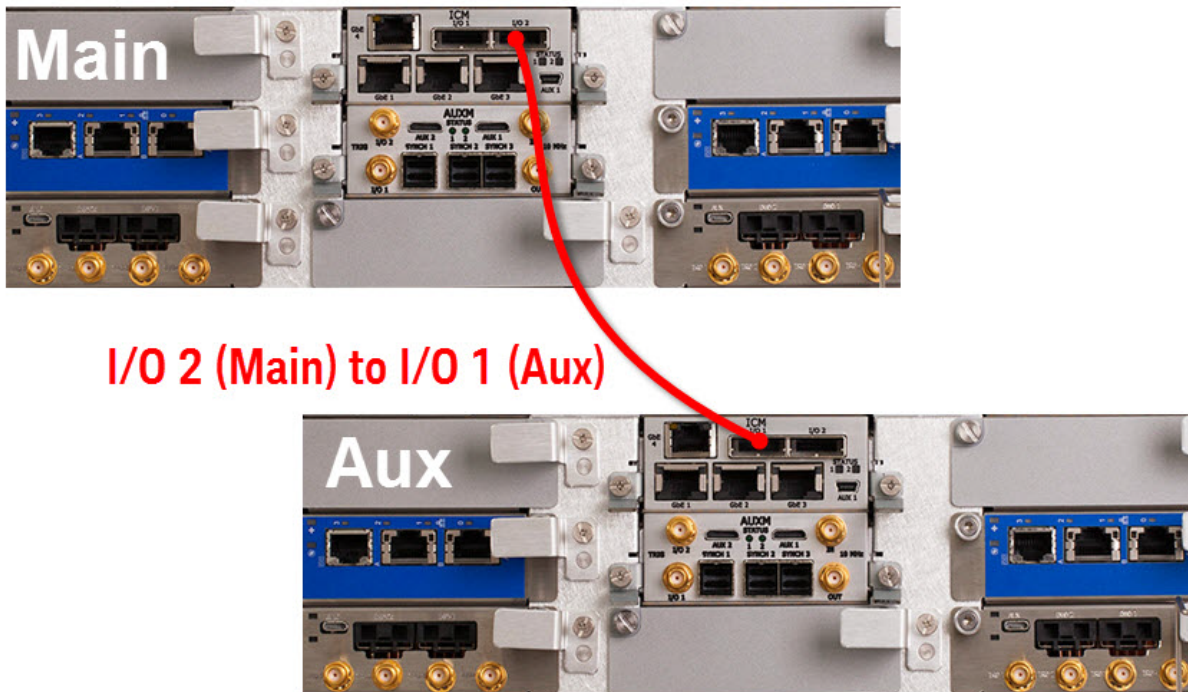
- I/O 1, I/O 2

Figure 2-4 RIO Ports



The UXM array requires the I/O 2 connector on the main UXM to be connected to the I/O 1 connector on the auxiliary UXM.

Figure 2-5 RIO Ports in an Array



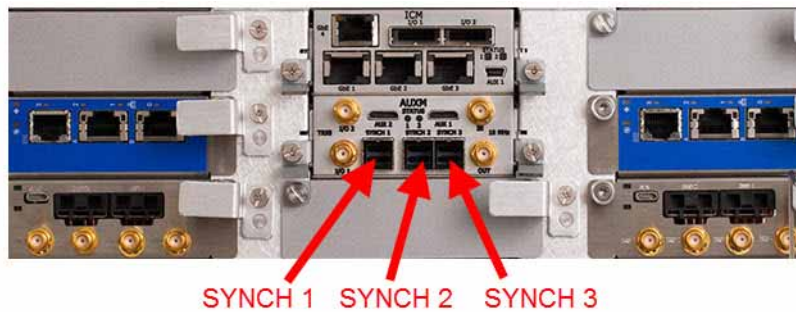
Synchronization Signals

The Synchronization ports are located in the AUXM section of the UXM's back panel:

- SYNCH 1, SYNCH 2, SYNCH 3

Figure 2-6

Synchronization Ports

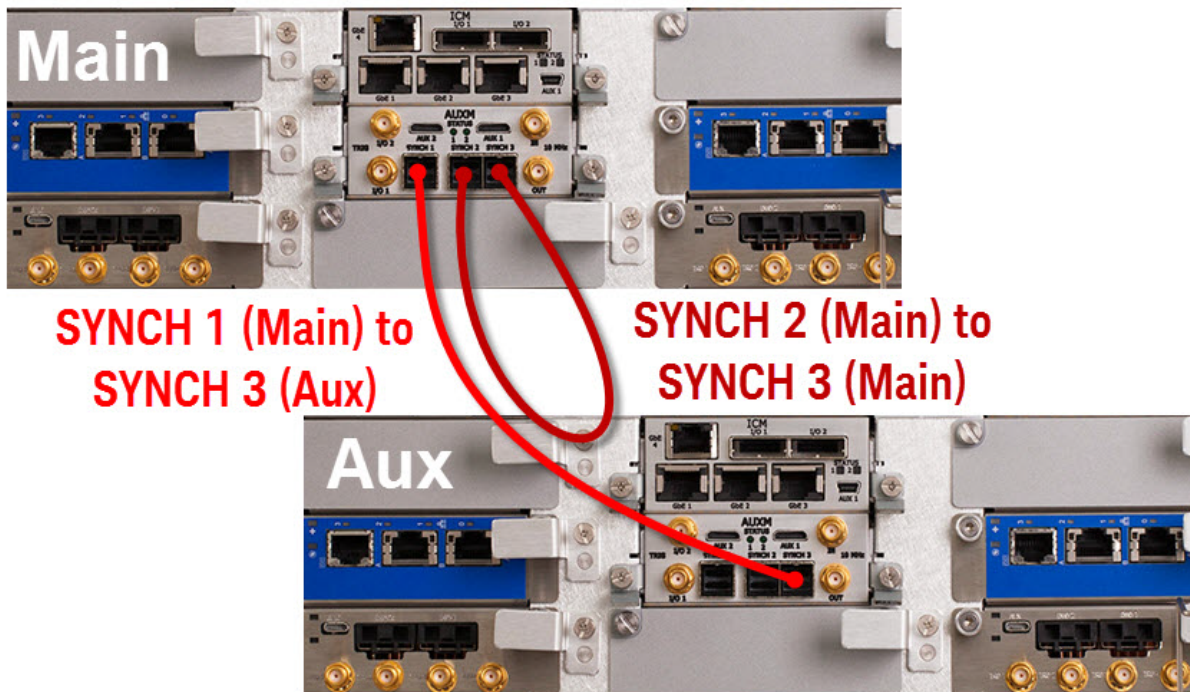


For proper synchronization of the array units, the clock output of the main unit must drive the clock inputs of *both* units. This requires two cable connections (because of cable length requirements, be sure to use the cables from the Interconnectivity Hardware Kit, E7515A-AC1):

- SYNCH 1 on the main UXM is connected to SYNCH 3 on the auxiliary UXM.
- SYNCH 2 and SYNCH 3 on the main UXM are connected to each other.

Figure 2-7

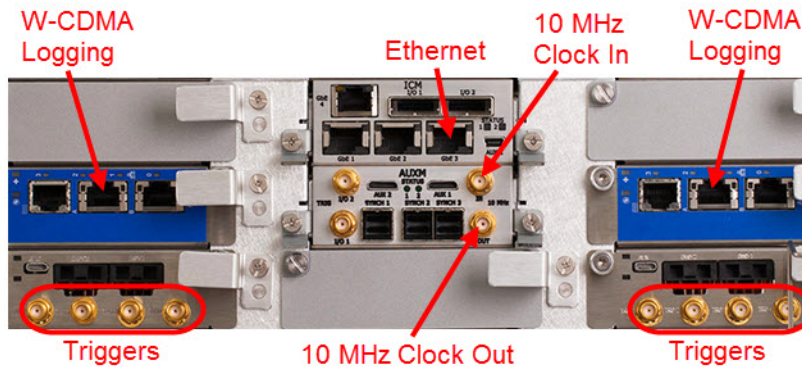
Synchronization Ports in an Array



External Instruments

A number of ports are provided for making connections between the UXM and other instruments.

Figure 2-8 External Instrument Connections



The ports include:

- GbE 3 Ethernet port; can be used by external equipment for debugging purposes (the external equipment must be configured to support Jumbo packages).
- 10 MHz Clock Out (provides a 10 MHz clock reference to external UXMs or other instruments)
- 10 MHz Clock In (accepts a 10 MHz clock reference from external UXMs or other instruments)
- Trigger Ports:
 - TRG 1 (not available for customer use)
 - TRG 2 (used by X-series applications as an input trigger which starts a measurement capture; for more information, search for "Trigger" in the X-series application help)
 - TRG 3 (used by X-series applications as an output trigger, activated when a measurement capture is finished; for more information, search for "Trigger" in the X-series application help)
 - TRG 4 (used by UXM applications as a periodic output trigger, used for synchronization with other equipment; for more information, search for "Periodic Trigger Settings" in the UXM application help)
- Logging (dedicated to 2G/3G Application protocol logging).

3 Control Panel Application

The following topics can be found in this section:

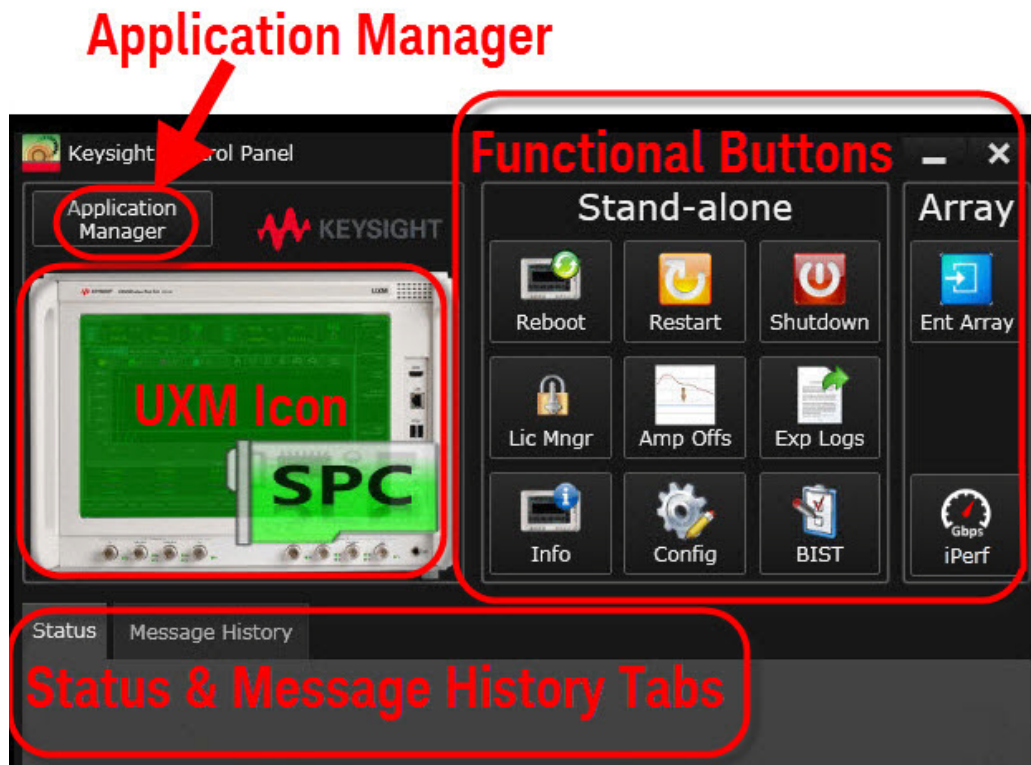
- [Screen Interface on page 28](#)
- [Global Features on page 35](#)
- [Local Features on page 40](#)
- [Stand-Alone Features on page 66](#)
- [Array Features on page 67](#)
- [Main Unit Features on page 68](#)
- [BIST \(Built-In Self Test\) on page 69](#)

Screen Interface

The Control Panel is an application which allows you to interact with the UXM test set. It provides real time status information of the unit, together with traceability information (serial numbers, firmware versions, calibration status, etc.). It also provides access to some maintenance functions such as built-in self-tests, configuration, and management.

In addition, the Control Panel provides a means of launching the Application Manager (see [“Application Manager” on page 75](#)).

Figure 3-1 Control Panel Application



In addition to a large icon representing the UXM (color-coded to indicate instrument status), the Control Panel includes a number of functional buttons, a tabbed display areas for status messages and message history, and a button for launching the Application Manager.

Stand-Alone and Array Versions of the Screen Interface

If the UXM is in stand-alone mode, the Control Panel window displays a single, large icon to represent the UXM. The superimposed "SPC" icon, in this example, indicates that the UXM includes the optional Server PC.

Figure 3-2 Control Panel Display for a Stand-Alone UXM



If the UXM is connected to another in an array, the Control Panel window displays the Main and Auxiliary units as two side-by-side icons. To make room for this, the functional buttons are slightly re-arranged:

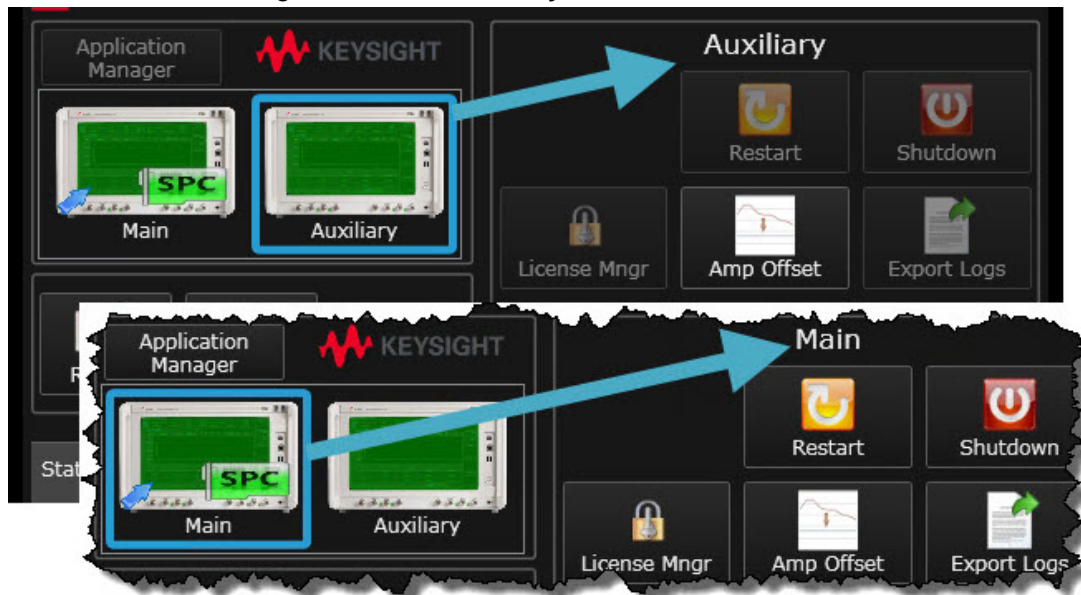
Figure 3-3 Control Panel Display for an Array



Control Panel Application
Screen Interface

Clicking one or the other of these UXM icons causes the window to display controls for that unit.

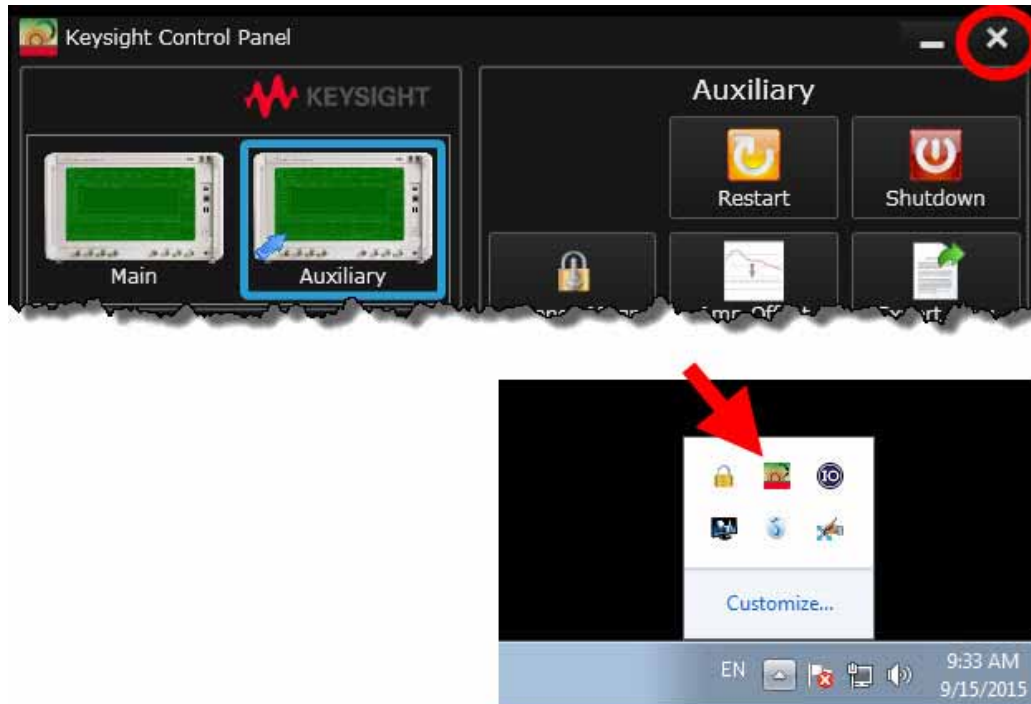
Figure 3-4 Selecting the Main or Auxiliary Unit



Control Panel Icon

If the Control Panel window was closed (by clicking on the X in the upper right corner of the window), it can be re-opened by double-clicking on its taskbar icon.

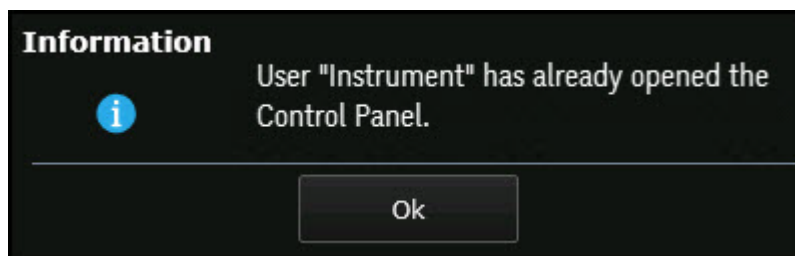
Figure 3-5 Control Panel Icon



Control Panel Instance Limitation

Each user can only run a single instance of the Control Panel application. Attempting to launch a second instance will produce an error window, of the type illustrated below.

Figure 3-6 Control Panel instance limitation

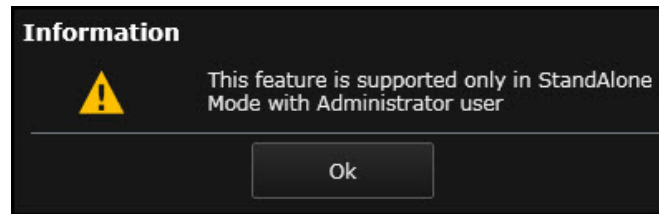


User Accounts

You can log into the UXM as "Instrument" (default password: measure4u) or as "Administrator" (default password: Keysight4u!).

In Stand-Alone mode, you could use either account, but in Array mode, you must use the "Instrument" account. If you are logged in as Administrator, attempting to launch the Application Manager will produce a warning window, as illustrated below.

Figure 3-7 User account limitation in Array mode



If you change the account you are using, or if you log off, the Application Manager stops the current Deployment Scenario.

NOTE

The Administrator account is generally used only for purposes of installation or PC configuration. For normal operation of the UXM, it is best to use the "Instrument" account.

SCPI Syntax

Some of the features of the Control Panel's screen interface can also be activated by means of SCPI commands. If a feature of the interface has an equivalent SCPI command, the command will be described here as well. Some important aspects of the SCPI syntax, as it applies to UXM generally, are described below.

Optional characters in command names

The names of most SCPI commands can be abbreviated; where a name is given with a mixture of upper-case and lower-case letters, the lower-case letters can be omitted to shorten the command. (**CORRection** becomes **CORR**, for example). However, this mixture of upper and lower cases is used simply to show which characters are optional. Case is not actually significant in SCPI command parsing; **CORR** could also be sent as **Corr** or **corr**.

Alternative parameter values

Where a parameter has a limited set of possible values, the alternatives are stated in the form of a list separated by vertical bars. For example, **A|B|C** means that the parameter must be either **A**, **B**, or **C**.

Optional elements

Often the full format of a command includes elements that can be omitted in most circumstances (they are enclosed in **[brackets]** to show that they are optional). If an element is optional, that means it has a default value, and therefore doesn't need to be stated in the command unless the default value is unacceptable.

The node **:INSTrument[0|1]** can be given as **INSTrument0** or **INSTrument1**. However, the numerical suffix is optional, meaning that **0** is the default value, and therefore **INSTrument** means the same thing as **INSTrument0**. Because the lower case letters can be omitted, **INST** also means the same thing as **INSTrument0**.

The **[:INSTrument[0|1]]** node

In the node **[:INSTrument[0|1]]**, the default value **0** represents a stand-alone unit or the main unit in an array; when sending a command to that a stand-alone or main unit, you can shorten the node to **INST**. The value **1** represents the auxiliary unit in an array; when sending a command to that unit, the node can be shortened to **INST1**.

The node **[:INSTrument[0|1]]**, in addition to having optional suffixes of **0** and **1**, is optional as a whole. If the node is omitted, the command applies to the local unit (regardless of whether it is a stand-alone unit, a main unit in an array, or the auxiliary unit in an array).

The :CSET node

The node **:CSET** identifies the compensation set to be used. However, Compensation Set 1 is currently the only set supported by the UXM, therefore no suffix needs to be added to the node. to distinguish the default set from any other. The node can be entered simply as **CSET** in the command. However, the node itself is not optional; **CSET** cannot be omitted.

The :ARRAY node

Where the command includes the **:ARRAY** node, this applies equally to any UXM system, whether it is an array or a stand-alone UXM. For example, the status query **SYSTem:ARRay:STATus?** will return the status of an array or the status of a stand-alone UXM.

Global Features

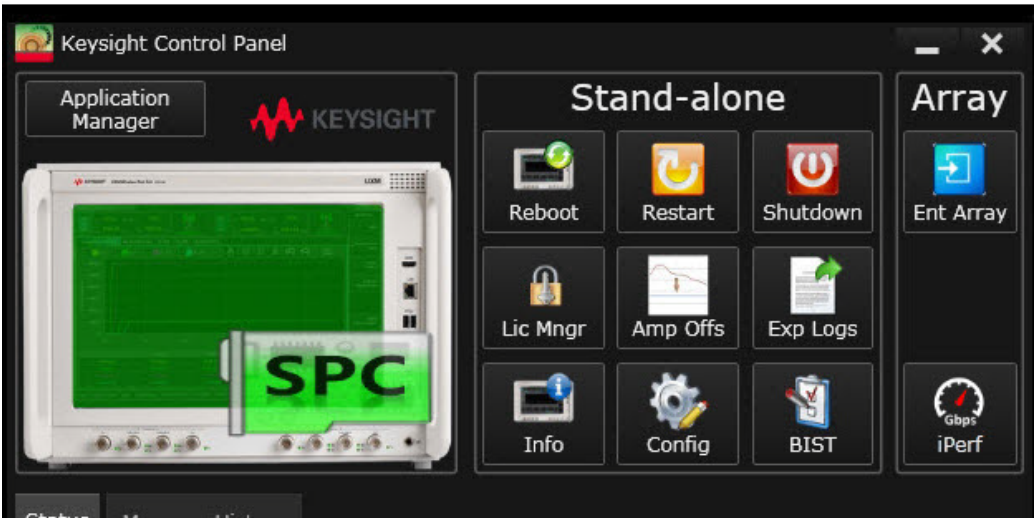
Global features are those which pertain to an entire system, whether it consists of a single UXM test set or an array of UXMs.

System Status

The Control Panel application uses icons and color changes to indicate system status.

The picture of the UXM in the illustration below has a green screen (indicating that the system status is "Operational"). It also has an SPC icon superimposed on it in this example, indicating that a Server PC is installed in the UXM.

Figure 3-8 System Status Indicators



If the UXM belongs to an array, both the main unit and the auxiliary unit are represented by separate icons; this results in some rearrangement of the other screen icons.

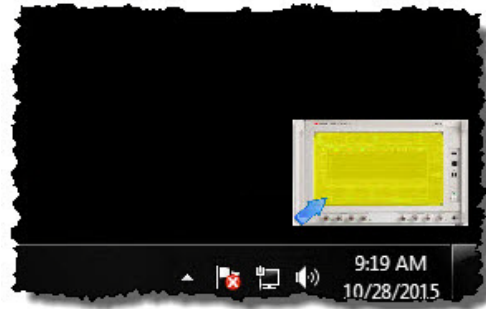
Figure 3-9 Alternative status display for array units



A separate icon of the UXM is sometimes displayed at the lower right corner of the screen, to indicate status changes (in this example, the yellow color indicates an "Initializing", "Inactive" or "Unreachable" status.)

Figure 3-10

System Status Icon



System states

Some states are classified as "temporary", meaning that the UXM is expected to transition to another state on its own. The temporary states are:

- Unknown (gray): there is no status information available.
SCPI abbreviation: **UNKN**
- Initializing (yellow): hardware is completing (or checking the results of) initialization tasks.
SCPI abbreviation: **INIT**
- Inactive (yellow): hardware is present but is deactivated (or not yet activated).
SCPI abbreviation: **INAC**
- Unreachable (yellow): hardware is activated but is without an established Ethernet connection
SCPI abbreviation: **UNR**

Some states are classified as "final", meaning that no change of state is expected without user intervention. The final states are:

- Operational (green): the normal state of the UXM; a required state for most operations
SCPI abbreviation: **OPER**
- Not Installed (gray): hardware not present
SCPI abbreviation: **NINS**
- Faulty (red): hardware failure or lack of valid calibration
SCPI abbreviation: **FAUL**
- Halted (red): hardware in a non-recoverable state
SCPI abbreviation: **HALT**

Querying status in SCPI

The array status query is:

SYSTem:ARRay:STATus?

This query returns the status of any UXM system (array or single):

> **OPER**

For a single UXM (in or out of an array), the instrument status query can also be used:

SYSTem[:INSTrument[0|1]]:STATus?

A value of **1** identifies the auxiliary unit of an array. The default value of **0** identifies the main unit, or a stand-alone unit, so for either of those the command will typically be abbreviated to:

SYST:STAT?

For either status query, the possible return values are:

- UNKN
- NINS
- INAC
- UNR
- INIT
- OPER
- FAUL
- HALT

For definitions of these states, see **“System states” on page 36**. Also, see **“SCPI Syntax” on page 33**.

Deployment Scenario Display

An additional feature of the display illustrates the deployment scenario that is currently being run, with labeled bars superimposed on the UXM screen (or screens, in the case of an array) to show which applications are in use. In the example illustrated below, there is a single image of a UXM screen (indicating this is a stand-alone unit rather than an array), with Transceiver A dedicated to the LTE application and Transceiver B dedicated to the 2G/3G application.

See **“Application Manager” on page 75** for information about how the deployment scenario is set up.

Figure 3-11

Deployment Scenario Display



The information can also be found by sending SCPI queries (see **“SCPI Syntax” on page 33**). The query for determining which deployment scenario is currently running is:

```
SYSTem:AMANager:CONFig:RUNning?
```

Or, in abbreviated form:

```
SYST:AMAN:CONF:RUNN?
```

This query returns the name of the deployment scenario:

```
> "1LTE_12G/3G"
```

Detailed description of the scenario is returned by the query:

```
SYSTem:AMANager:CONFig:INFormation? <name>
```

For example, this query:

```
SYST:AMAN:CONF:INF? "3LTE_12G/3G"
```

returns a detailed description of the deployment scenario "3LTE_12G/3G":

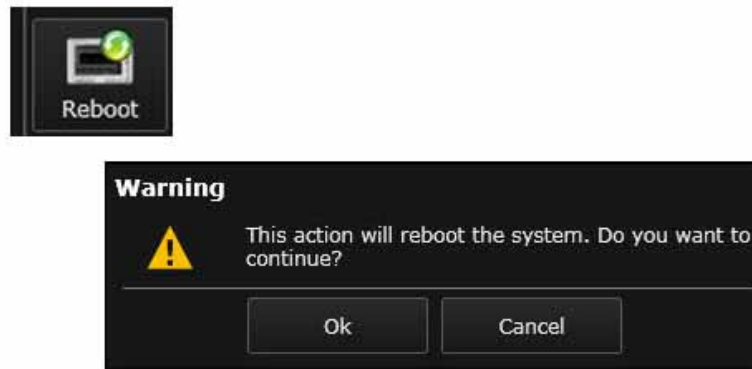
```
> '<Description Version="1.0">
  <Application Name="LTE" Mode="LTE 3 Cell">
    <Node>UXM0</Node>
      <Transceiver>UXM0.TRXA</Transceiver>
      <Transceiver>UXM0.TRXB</Transceiver>
      <Transceiver>UXM1.TRXA</Transceiver>
  [etc...]
```

Reboot

Clicking the **Reboot** icon resets the UXM hardware to its initial state. As a global feature, it affects both stand-alone UXM test sets and arrays.

- In a stand-alone UXM, the reboot affects all of its boards, except the EmbPC and SPC (if present).
- In an array, the reboot affects all of the boards, except the EmbPC and SPC (if present), for each UXM in the array. The reboot can be called from either the main unit or an auxiliary unit.

Figure 3-12 **Reboot**



As a "destructive" operation, the reboot requires your confirmation to continue, as illustrated above.

The SCPI command for the reboot operation is:

SYSTem:ARRay:POWer:REBoot

(See **“SCPI Syntax” on page 33.**)

Local Features

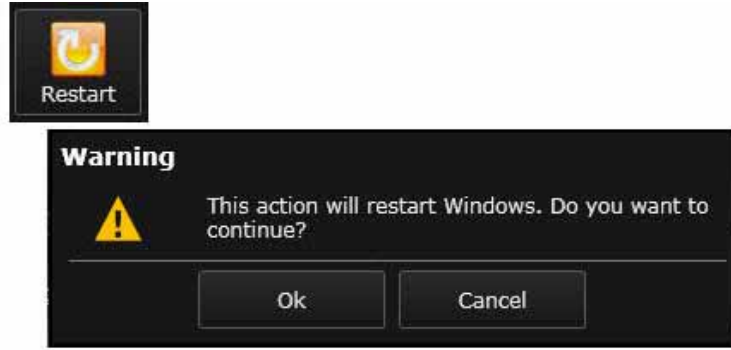
Local features are those which pertain only to an individual UXM test set, even if it is within an array of UXMs.

UXM Restart

Clicking the **Restart** icon is equivalent to a Windows restart.

Figure 3-13

Restart



As a "destructive" operation, the restart requires your confirmation to continue, as illustrated above.

The SCPI command for the restart operation is:

SYSTem:POWer:REStart

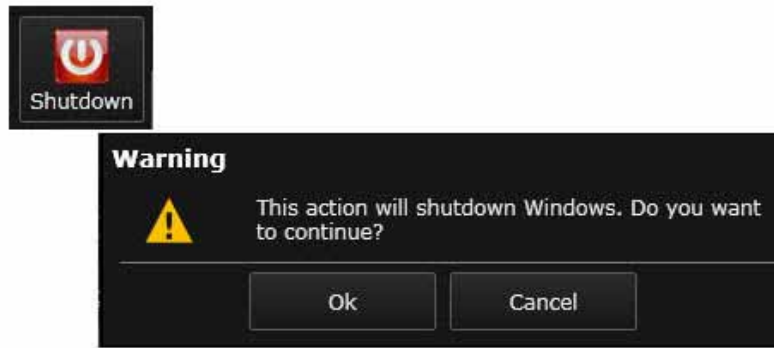
(See [“SCPI Syntax” on page 33.](#))

UXM Shutdown

Clicking the **Shutdown** icon is equivalent to a Windows shutdown. This is the recommended method to power down the instrument.

Figure 3-14

Shutdown



As a "destructive" operation, the shutdown requires your confirmation to continue, as illustrated above.

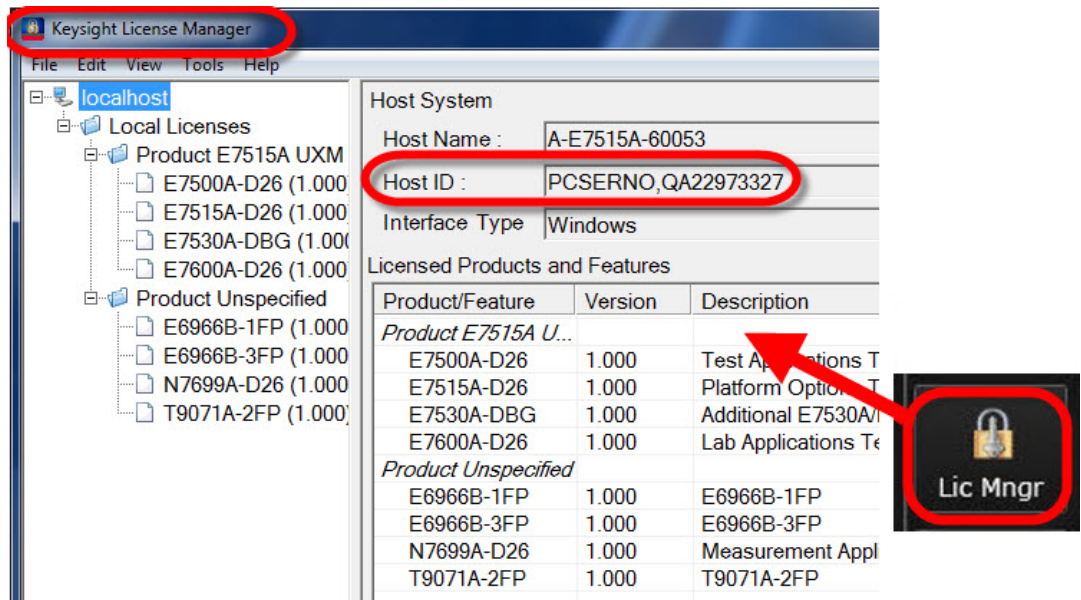
The SCPI command for the shutdown operation is:
SYSTem:POWer:SHUTdown

(See [“SCPI Syntax” on page 33.](#))

Launching License Manager

Clicking the **License Manager** icon activates a separate application, Keysight License Manager, which can be used to control the use of Keysight licenses on the UXM.

Figure 3-15 License Manager



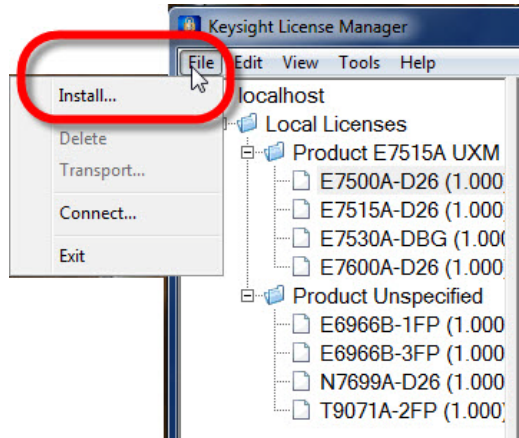
It is often unnecessary to open this application window at all. Licenses can be installed simply by copying them to a portable USB drive and connecting the drive to the instrument; in that case, the Keysight License Manager application detects and installs the license automatically. However, you can open the application window to find out which licenses are installed, to add new licenses, or to delete existing licenses.

NOTE

The PC Serial Number given in the Host ID field of the License Manager window is the ID for which Keysight issues a license. When you download a license from Keysight, do *not* use the unrelated hardware serial number that is labeled on the rear panel of the UXM.

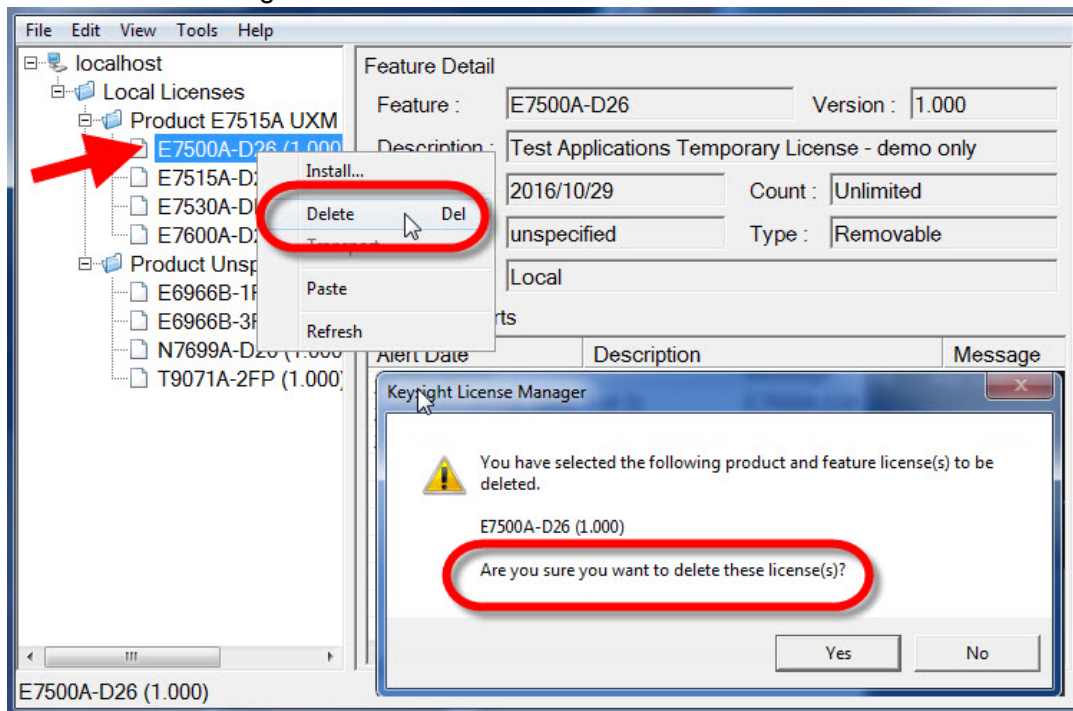
Licenses can be saved to the instrument drive, and installed by clicking **File > Install** in the Keysight License Manager window. (This opens a file window, which you can use to browse for the license and select it.)

Figure 3-16 Installing a license



An installed license can also be deleted, by right-clicking on the license in the left pane, and selecting **Delete** from the right-click menu. (A confirmation window appears, to ensure that the deletion is intentional.)

Figure 3-17 Deleting a license



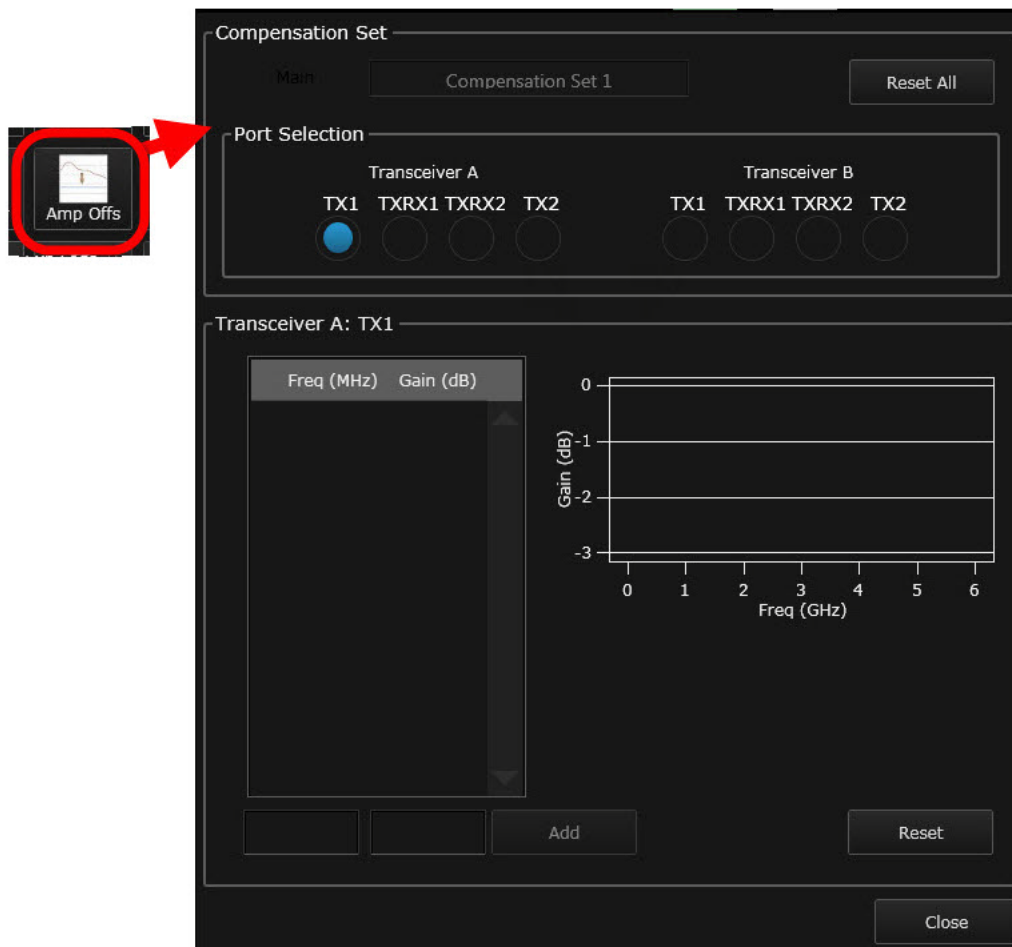
For more information about using the Keysight License Manager, refer to the online help system embedded in that application.

Amplitude Offset Window

Clicking the **Amplitude Offset** icon opens the Amplitude Offset window. This feature enables you to enter cable loss compensation data for any of the eight RF connectors on the UXM front panel. (In the case of an array, this applies to the Main unit or the Auxiliary unit, depending on which of the two has been selected by clicking on its instrument graphic in the Control Panel; see [Figure 3-4 on page 30](#).)

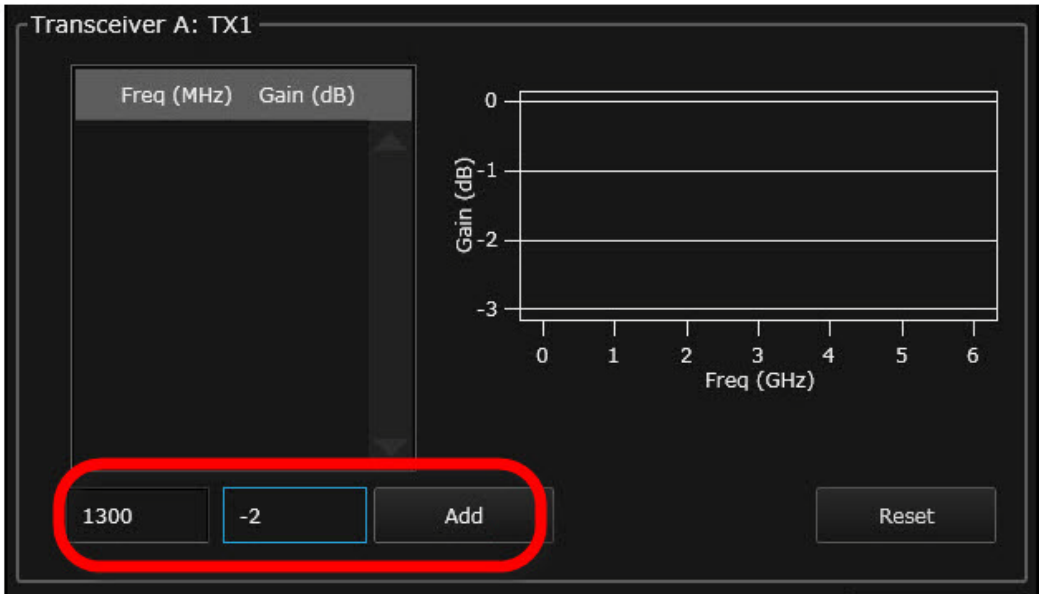
To begin creating a table of compensation data values, first select one of the four ports (TX1, TXRX1, TXRX2, or TX2) from Transceiver A, or one of the equivalent ports from Transceiver B. In this example, the values entered are for the TX1 port on Transceiver A.

Figure 3-18 Opening the Amplitude Offset window



To add a data point, enter a frequency in MHz (within the frequency range of the UXM, as determined by the options ordered) and add a Gain value in dB for the frequency range leading up to that frequency. When you click **Add**, frequency and gain value are added in a new row in the table above.

Figure 3-19 Entering a data point



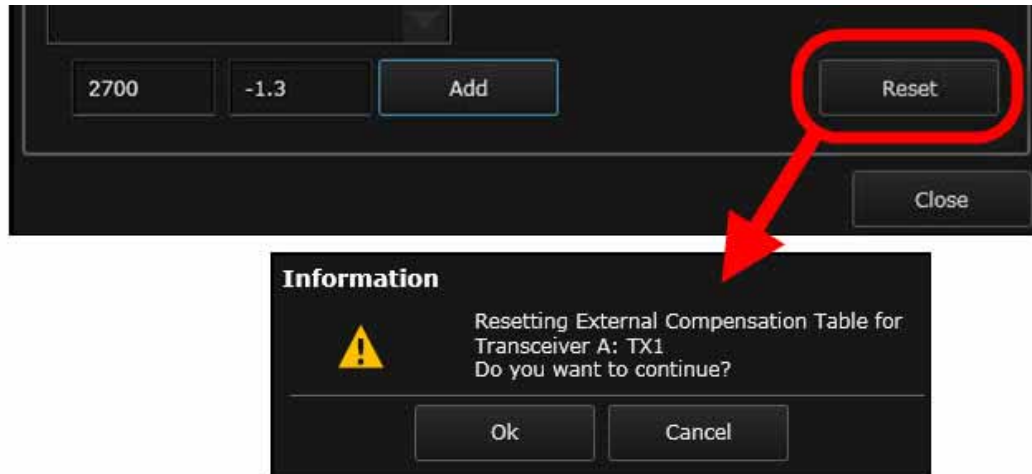
In addition, the gain values are plotted against frequency in a graphical display to the right of the table.

Figure 3-20 Display of added data points



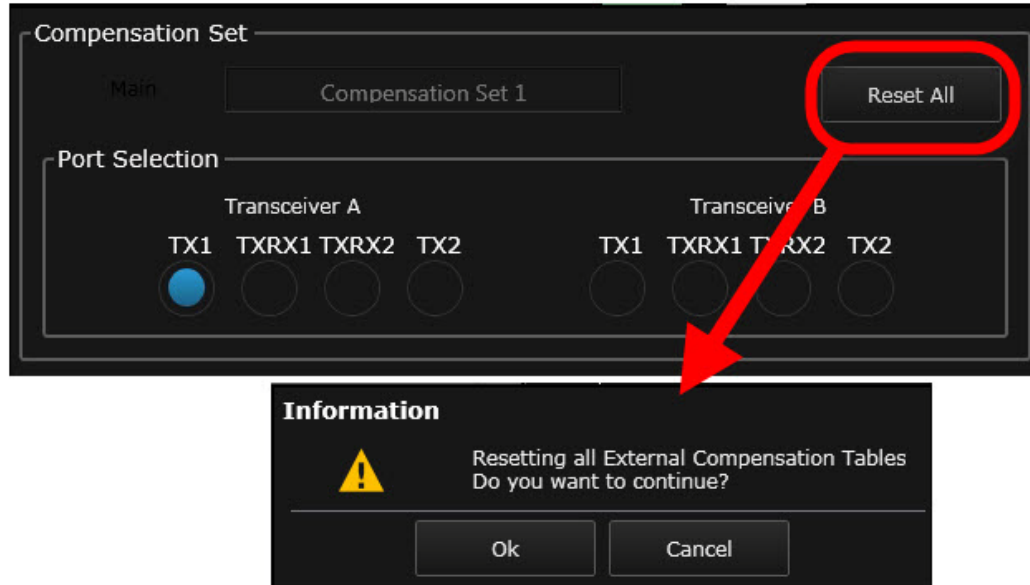
Clicking **Reset** at the lower right clears the table for the selected port (a confirmation window appears first, however).

Figure 3-21 Resetting the table for this port



Clicking **Reset All** at the upper right clears the table for the all ports (a confirmation window appears first, however).

Figure 3-22 Resetting all tables



Amplitude Offset Commands

Compensation tables for amplitude offset can also be set up using SCPI commands rather than the graphical window, as described below. For information on the SCPI syntax (and how to simplify it by omitting optional elements), see [“SCPI Syntax” on page 33](#).

Adding values

The SCPI command for entering amplitude offset data to the compensation table is:

```
SYSTem[:INSTrument[0|1]]:CORRection:CSET[1]:TRXA|TRXB:  
TX1|TX2|TXRX1|TXRX2:DATA <values>
```

The command ends in a comma-separated list of data pairs (each consisting of a frequency in Hz and a gain value in dB). For example:

```
SYST:CORR:CSET:TRXA:TXRX1:DATA 700e6, -0.2,  
1300e6, -0.4, 2e9, -0.55
```

In the compensation table for Transceiver A, port TXRX1, this command adds three rows, representing gain values of -0.2 dB at 700 MHz, -0.4 at 1300 MHz, and -0.55 at 2 GHz.

Reading Values

The SCPI command used for adding values to a compensation table can also be used in query form, to read the current values in the table:

```
SYSTem[:INSTrument[0|1]]:CORRection:CSET[1]:TRXA|TRXB:  
TX1|TX2|TXRX1|TXRX2:DATA?
```

For example, to read the values in the compensation table for Transceiver A, port TXRX1:

```
SYST:CORR:CSET:TRXA:TXRX1:DATA?
```

This query returns the comma-separated list of frequencies and gain values currently stored in the table:

```
> 700e6, -0.2, 1300e6, -0.4, 2e9, -0.55
```

Reading the number of points

This SCPI command can be used to find the number of points currently in a compensation table:

```
SYSTem[:INSTrument[0|1]]:CORRection:CSET[1]:TRXA|TRXB:  
TX1|TX2|TXRX1|TXRX2:POINTS?
```

For example, to find the number of points in the compensation table for Transceiver A, port TXRX1:

```
SYST:CORR:CSET:TRXA:TXRX1:POINTS?
```

This query returns the number of points currently stored in the table:

```
>3
```

Clearing a table

The SCPI command for clearing data from the compensation table for a particular port is:

```
SYSTem[:INSTrument[0|1]]:CORRection:CSET[1]:TRXA|TRXB:  
TX1|TX2|TXRX1|TXRX2:RESet
```

For example:

```
SYST:CORR:CSET:TRXA:TXRX1:RESet
```

In the compensation table for Transceiver A, port TXRX1, this command deletes all data.

Clearing all tables

The SCPI command for clearing data from the compensation tables for all ports is:

```
SYSTem:CORRection:CSET:RESet
```

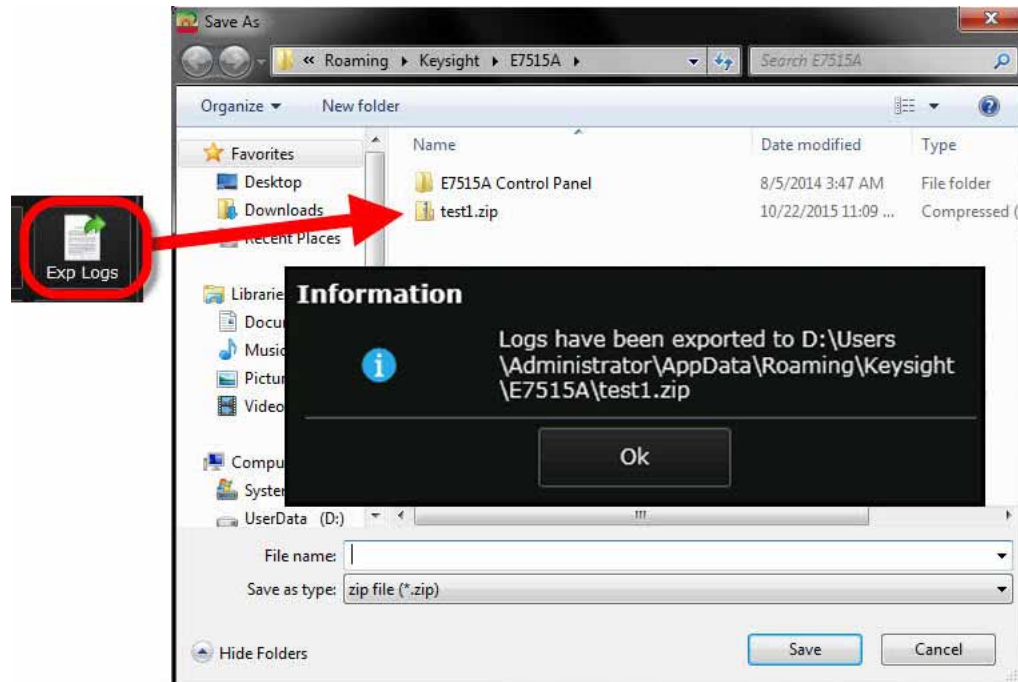
In all compensation tables for all ports, this command deletes all data.

Export Logs

Clicking the **Export Logs** icon opens a Save As window; the log files from the hardware and applications of the test set are saved in a compressed .zip file.

Figure 3-23

Export Logs

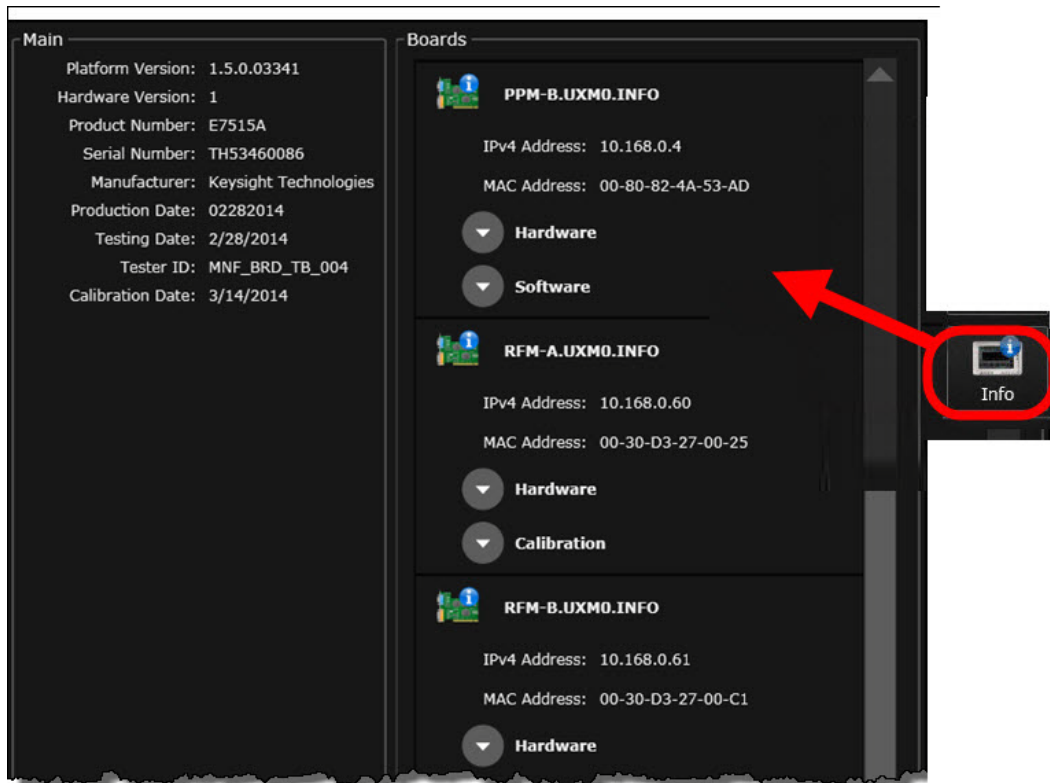


This feature is used by Keysight Customer Support, for troubleshooting purposes.

Unit Information

Clicking the **Information** icon opens a window which provides configuration information about the UXM unit and its PC boards. (In the case of an array, this applies to the Main unit or the Auxiliary unit, depending on which of the two has been selected by clicking on its instrument graphic in the Control Panel; see [Figure 3-4](#) on page 30.)

Figure 3-24 Information window

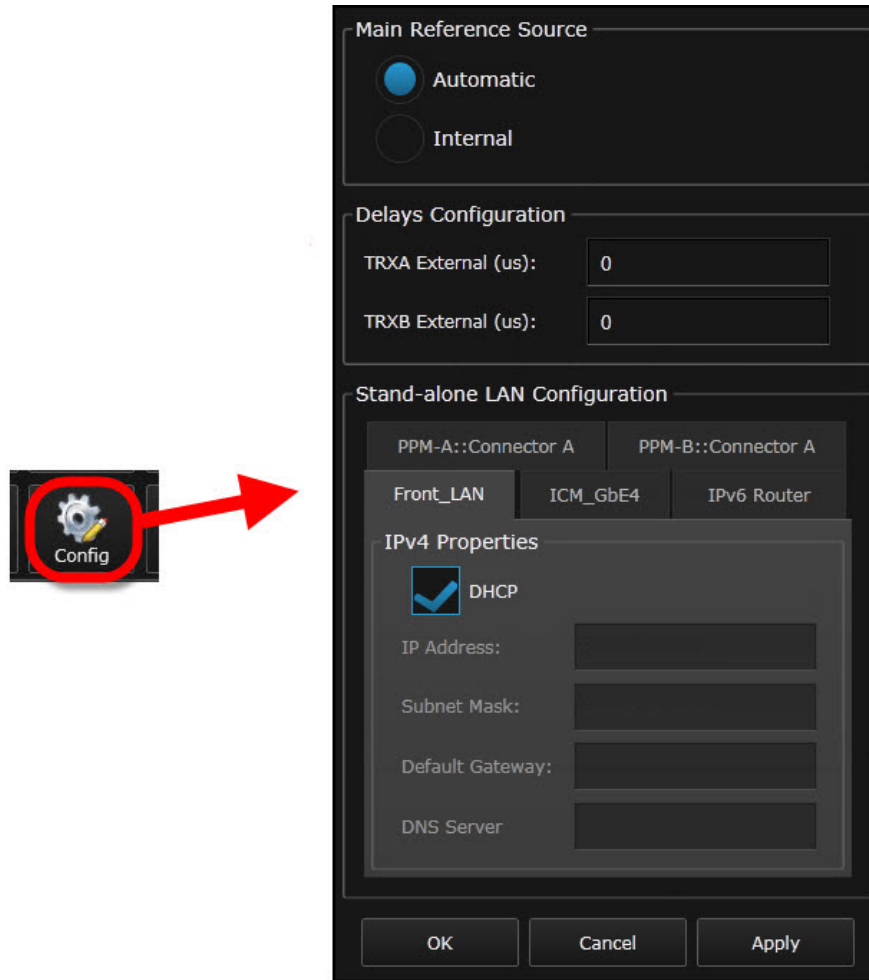


This feature is used primarily by Keysight Customer Support.

Configuration

Clicking the **Config** icon opens a window with multiple tabs, which can be used to read or change settings for the main frequency reference source and Local Area Network configuration. (In the case of an array, this applies to the Main unit or the Auxiliary unit, depending on which of the two has been selected by clicking on its instrument graphic in the Control Panel; see [Figure 3-4](#) on page 30.)

Figure 3-25 Configuration window



Main Reference Source

This refers to the frequency source used as reference clock signal by the UXM.

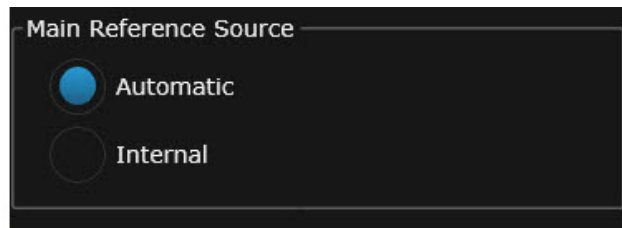
- If **Internal** is selected, the reference clock is the internal 10 MHz clock of the UXM.
- If **Automatic** is selected, the reference signal received at the 10 MHz Clock In connector on the back panel is used, if a signal is detected there. If no external input is detected, the internal 10 MHz clock of the UXM is used instead. If the external input is present initially but is later lost, the UXM will automatically switch to the internal clock. (However, because that sort of loss and recovery could cause synchronization problems, an external input should be used only if it is stable.)

NOTE

For a UXM array, if **Automatic** is selected, only an external reference received by the main unit will be used. An external reference received by the auxiliary unit will not be used, even if there is no reference received by the main unit.

Figure 3-26

Main Reference Source



The SCPI command for this function is:

SYSTem:ARRay:CREference INTernal|AUTomatic

For example, to set the source to Internal:

SYST:ARR:CREF INT

(See **“SCPI Syntax” on page 33.**)

NOTE

The "ARRay" node in the command indicates that, if the UXM belongs to an array, the setting applies to the array as a whole. However, the command syntax remains the same if the UXM is not in an array.

Delays Configuration

This refers to an uplink timing offset which can be selected for use with an external fader. The values you enter are replied to Transceiver A and Transceiver B, respectively, of the UXM test set.

NOTE

The delay range is 0 to 900 μ s. If you enter an invalid value, the corresponding parameter turns red.

Figure 3-27 Delays Configuration (valid and invalid values)

The figure consists of two side-by-side screenshots of a 'Delays Configuration' window. Both windows have a title bar 'Delays Configuration' and two input fields. The left window shows 'TRXA External (us):' with the value '203' and 'TRXB External (us):' with the value '20'. The right window shows 'TRXA External (us):' with the value '1203' (the text and the input field are outlined in red) and 'TRXB External (us):' with the value '20'.

The SCPI command for setting a delay value is:

```
SYSTem[:INSTrument[0|1]]:RFM[1|2]:DELays:EXTernal <value>
```

RFM1 (or RFM) represents Transceiver A, and RFM2 represents Transceiver B. For example, to set a delay of 203 μ s for Transceiver B:

```
SYST:RFM2:DEL:EXT 540
```

The current setting can be found by sending the query:

```
SYST:RFM2:DEL:EXT?
```

```
> 540
```

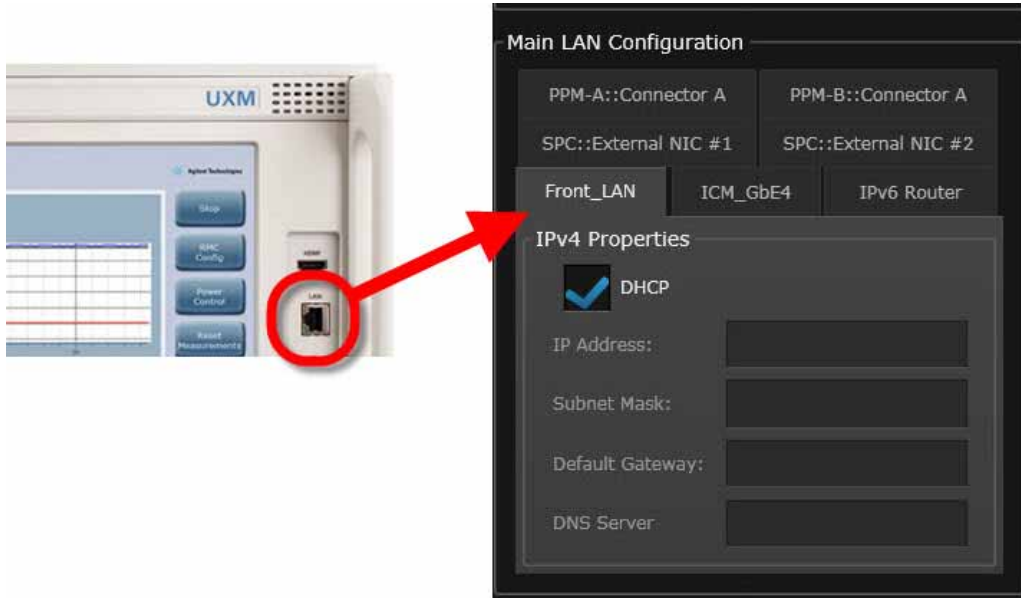
(See “[SCPI Syntax](#)” on page 33.)

Front_LAN

This tab includes Host PC IPv4 settings for the front-panel LAN connector.

Figure 3-28

Front_LAN



The **DHCP** checkbox determines whether or not Dynamic Host Configuration Protocol (which allows for automatic configuration of the LAN settings) is enabled. If the box is checked, the other fields in the tab are disabled; if the box is unchecked, the LAN port is in static mode and the other fields in the window need to be filled in.

Selecting DHCP mode in SCPI

(See **“SCPI Syntax” on page 33.**)

The SCPI command equivalent to checking the box is:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE:DHCP
```

The default setting of **INST** refers to the local unit, and the default setting of **NIC** refers to the front panel LAN connection. The command can typically be shortened to:

```
SYST:HPC:NIC:IPV4:MODE:DHCP
```

De-selecting DHCP mode in SCPI

The SCPI command equivalent to un-checking the **Use DHCP** box (and filling in the four fields shown in the window) is:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE:STATic  
"<IP address>", "<Subnet mask>", "<Default gateway>",  
"<DNS server>"
```

This changes DHCP mode to Static mode. The default setting of **INST** refers to the local unit, and the default setting of **NIC** refers to the front panel LAN connection. The command can typically be shortened to this format:

```
SYST:HPC:NIC:IPV4:MODE:STAT "86.52.6.85", "255.255.255.0",  
"86.52.6.1", "86.52.6.101"
```

Determining the current mode

To determine whether the LAN is currently in DHCP mode or static mode, send the query:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE?
```

The default setting of **INST** refers to the local unit, and the default setting of **NIC** refers to the front panel LAN connection. The command can typically be shortened to:

```
SYST:HPC:NIC:IPV4:MODE?
```

This query returns "STAT" or "DHCP".

Determining the current configuration

To determine how the LAN is currently configured, send the query:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4?
```

The default setting of **INST** refers to the local unit, and the default setting of **NIC** refers to the front panel LAN connection. The command can typically be shortened to:

```
SYST:HPC:NIC:IPV4?
```

This query returns the current settings of IP address, Subnet mask, Default gateway, and DNS Server, in the format:

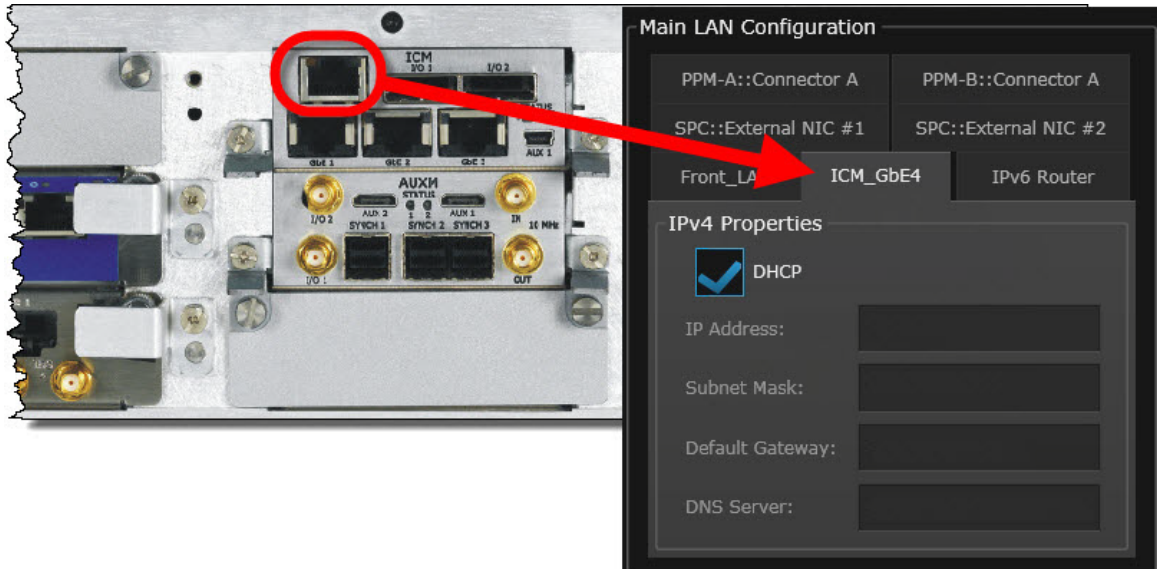
```
> "86.52.6.85", "255.255.255.0", "86.52.6.1", "86.52.6.101".
```

ICM_GbE4

This tab includes IPv4 settings for the back-panel GbE4 connector.

Figure 3-29

ICM_GbE4



The **DHCP** checkbox determines whether or not Dynamic Host Configuration Protocol (which allows for automatic configuration of the LAN settings) is enabled. If the box is checked, the other fields in the tab are disabled; if the box is unchecked, the LAN port is in static mode and the other fields in the window need to be filled in.

Selecting DHCP mode in SCPI

(See [“SCPI Syntax” on page 33.](#))

The SCPI command equivalent to checking the box is:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE:DHCP
```

The default setting of **INST** refers to the local unit, and **NIC2** refers to the back panel GbE 4 connector. The command can typically be shortened to:

```
SYST:HPC:NIC2:IPV4:MODE:DHCP
```

De-selecting DHCP mode in SCPI

The SCPI command equivalent to un-checking the **Use DHCP** box (and filling in the four fields shown in the window) is:

```
SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE:STATIC  
"<IP address>", "<Subnet mask>", "<Default gateway>",  
"<DNS server>"
```

This changes DHCP mode to Static mode. The default setting of **INST** refers to the local unit, and **NIC2** refers to the back panel GbE 4 connector. The command can typically be shortened to this format:

```
SYST:HPC:NIC2:IPV4:MODE:STAT "86.52.6.85", "255.255.255.0",  
"86.52.6.1", "86.52.6.101"
```

Determining the current mode

To determine whether the LAN is currently in DHCP mode or static mode, send the query:

SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4:MODE?

The default setting of **INST** refers to the local unit, and **NIC2** refers to the back panel GbE 4 connector. The command can typically be shortened to:

SYST:HPC:NIC2:IPV4:MODE?

This query returns "STAT" or "DHCP".

Determining the current configuration

To determine how the LAN is currently configured, send the query:

SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV4?

The default setting of **INST** refers to the local unit, and **NIC2** refers to the back panel GbE 4 connector. The command can typically be shortened to:

SYST:HPC:NIC2:IPV4?

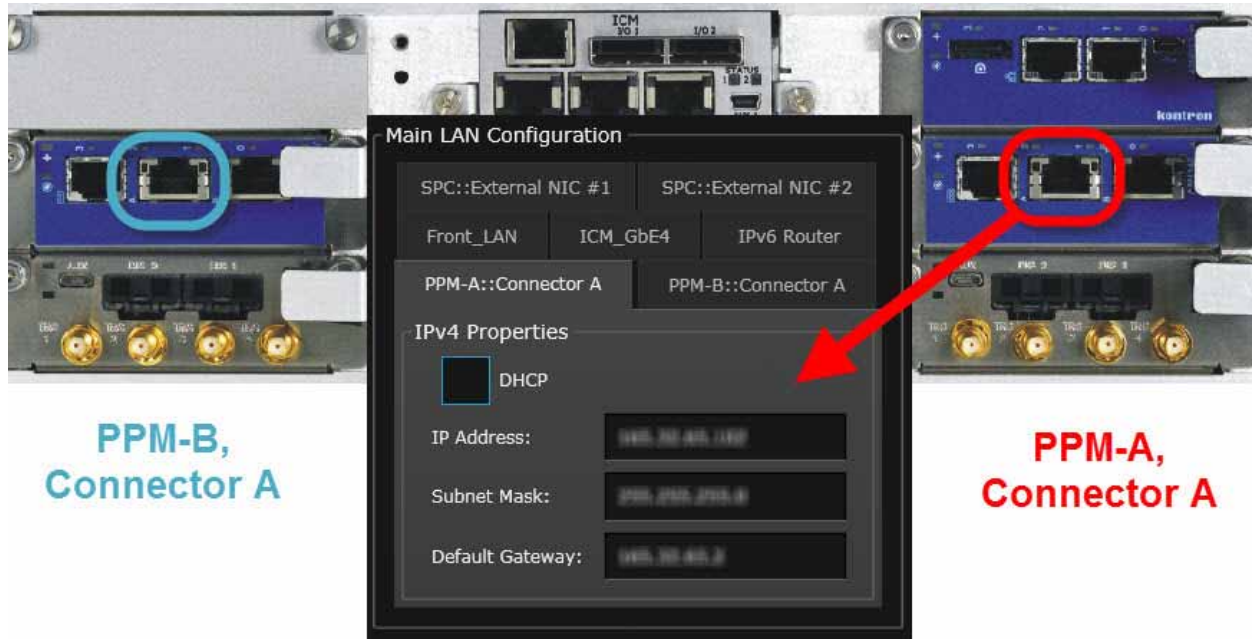
This query returns the current settings of IP address, Subnet mask, Default gateway, and DNS Server, in the format:

> "86.52.6.85", "255.255.255.0", "86.52.6.1", "86.52.6.101".

PPM-A (& PPM-B)

The PPM-A::Connector A tab includes Host PC IPv4 settings for the Ethernet Connector A for PPM-A on the back panel. (The PPM-B::Connector A tab is the same; it applies to Transceiver Unit B, and appears only if that unit is installed in the UXM.)

Figure 3-30 PPM-A Connector A and PPM-B Connector A



The **DHCP** checkbox determines whether or not Dynamic Host Configuration Protocol (which allows for automatic configuration of the LAN settings) is enabled. If the box is checked, the other fields in the tab are disabled; if the box is unchecked, the LAN port is in static mode and the other fields in the window need to be filled in. (Remember to click **Apply** when you're finished entering the settings.)

Selecting DHCP mode in SCPI

(See **"SCPI Syntax" on page 33.**)

The SCPI command equivalent to checking the box is:

```
SYSTem[:INSTrument[0|1]]:PPM[1|2]:NIC:IPV4:MODE:DHCP
```

PPM1 refers to PPM-A, and **PPM2** to PPM-B. The default setting of **INST** refers to the local unit. The command can typically be shortened to:

```
SYST:PPM1:NIC:IPV4:MODE:DHCP
```

De-selecting DHCP mode in SCPI

The SCPI command equivalent to un-checking the **Use DHCP** box (and filling in the four fields shown in the window) is:

```
SYSTem[:INSTrument[0|1]]:PPM[1|2]:NIC:IPV4:MODE:STATic  
"<IP address>", "<Subnet mask>", "<Default gateway>",  
"<DNS server>"
```

This changes DHCP mode to Static mode. **PPM1** refers to PPM-A, and **PPM2** to PPM-B. The default setting of **INST** refers to the local unit. The command can typically be shortened to this format:

```
SYST:PPM1:NIC:IPV4:MODE:STAT "86.52.6.85", "255.255.255.0",  
"86.52.6.1", "86.52.6.101"
```

Determining the current mode

To determine whether the LAN is currently in DHCP mode or static mode, send the query:

```
SYSTem[:INSTrument[0|1]]:PPM[1|2]:NIC:IPV4:MODE?
```

PPM1 refers to PPM-A, and **PPM2** to PPM-B. The default setting of **INST** refers to the local unit. The command can typically be shortened to:

```
SYST:PPM1:NIC:IPV4:MODE?
```

This query returns "STAT" or "DHCP".

Determining the current configuration

To determine how the LAN is currently configured, send the query:

```
SYSTem[:INSTrument[0|1]]:PPM[1|2]:NIC:IPV4?
```

PPM1 refers to PPM-A, and **PPM2** to PPM-B. The default setting of **INST** refers to the local unit. The command can typically be shortened to:

```
SYST:PPM1:NIC:IPV4?
```

This query returns the current settings of IP address, Subnet mask, Default gateway, and DNS Server, in the format:

```
> "86.52.6.85", "255.255.255.0", "86.52.6.1", "86.52.6.101".
```

SPC External NIC#1 (& NIC#2)

The SPC::External NIC #1 connector A tab includes Host PC IPv4 settings for the Ethernet connector for the SPC External NIC #1 on the back panel. (The SPC::External NIC #2 tab is the same; it applies to the NIC #2 connector.) These tabs do not appear if the SPC is not installed in the UXM.

Figure 3-31

SPC Connectors (NIC #1 & NIC #2)



The **DHCP** checkbox determines whether or not Dynamic Host Configuration Protocol (which allows for automatic configuration of the LAN settings) is enabled. If the box is checked, the other fields in the tab are disabled; if the box is unchecked, the LAN port is in static mode and the other fields in the window need to be filled in. (Remember to click **Apply** when you're finished entering the settings.)

Selecting DHCP mode in SCPI

(See “**SCPI Syntax**” on page 33.)

The SCPI command equivalent to checking the box is:

```
SYSTem[:INSTrument[0|1]]:SPC:NIC[1|2]:IPV4:MODE:DHCP
```

NIC1 and **NIC2** are used to differentiate between the two connectors. The default setting of **INST** refers to the local unit. The command can typically be shortened, as in this example:

```
SYST:SPC:NIC2:IPV4:MODE:DHCP
```


De-selecting DHCP mode in SCPI

The SCPI command equivalent to un-checking the **DHCP** box (and filling in the four fields shown in the window) is:

```
SYSTem[:INSTrument[0|1]]:SPC:NIC[1|2]:IPV4:MODE:STATic  
"<IP address>", "<Subnet mask>", "<Default gateway>",  
"<DNS server>"
```

This changes DHCP mode to Static mode. **NIC1** and **NIC2** are used to differentiate between the two connectors. The default setting of **INST** refers to the local unit. The command can typically be shortened, as in this example:

```
SYST:SPC:NIC2:IPV4:MODE:STAT "86.52.6.85", "255.255.255.0",  
"86.52.6.1", "86.52.6.101"
```

Determining the current mode

To determine whether the LAN is currently in DHCP mode or static mode, send the query:

```
SYSTem[:INSTrument[0|1]]:SPC:NIC[1|2]:NIC:IPV4:MODE?
```

NIC1 and **NIC2** are used to differentiate between the two connectors. The default setting of **INST** refers to the local unit. The command can typically be shortened to:

```
SYST:SPC:NIC2:IPV4:MODE?
```

This query returns "STAT" or "DHCP".

Determining the current configuration

To determine how the LAN is currently configured, send the query:

```
SYSTem[:INSTrument[0|1]]:SPC:NIC[1|2]:IPV4?
```

NIC1 and **NIC2** are used to differentiate between the two connectors. The default setting of **INST** refers to the local unit. The command can typically be shortened to:

```
SYST:SPC:NIC2:IPV4?
```

This query returns the current settings of IP address, Subnet mask, Default gateway, and DNS Server, in the format:

```
> "86.52.6.85", "255.255.255.0", "86.52.6.1", "86.52.6.101".
```

IPv6 Router

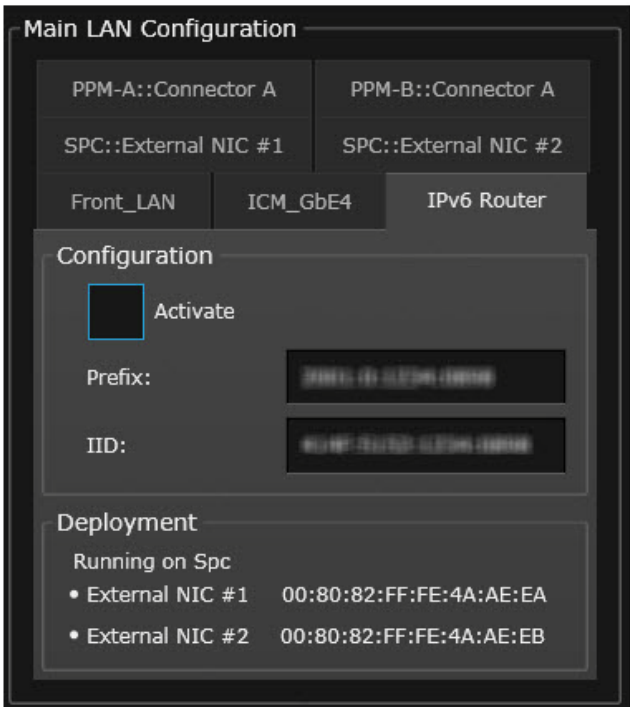
This tab can be used to activate and configure the IPv6 Router.

NOTE

After you apply changes here, the IMS-SIP Server Emulator is restarted (the emulator runs in the Embedded PC, or in the SPC if installed).

Figure 3-32

IPv6 Route



The **Activate** checkbox is used to activate the router. The **Prefix** and **IID** fields are used to set the IPv6 address prefix and the IPv6 address ID.

The **Deployment** section of the window is read-only; it indicates whether the router is running on the Host PC or the SPC, and it gives the IPv6 IDs for the LAN ports (NIC #1 refers to the front panel LAN connector, and NIC #2 refers to the back panel GbE 4 connector).

Activating/deactivating the router

(See [“SCPI Syntax” on page 33](#).)

The SCPI command equivalent to checking or unchecking the box is:
SYSTem:EPCore:IPV6router:STATe 1|0

(Use "1" to activate, "0" to deactivate.) The command can be shortened, as in this example, which activates the router:
SYST:EPC:IPV6:STAT 1

To determine whether the router is currently activated, send the query:
SYSTem:EPCore:IPV6router:STATe?

This query returns "1" (active) or "0" (inactive).

Setting/reading the prefix

To set the IPv6 router prefix, send the command:

SYSTem:EPCore:IPV6router:PREFIX "<prefix>"

For example:

SYST:EPC:IPV6:PREFIX "20:43:0E:C8:85:94:50:0A"

The command can be given in query form, to find out what prefix is currently set:

SYST:EPC:IPV6:PREFIX?

> "20:43:0E:C8:85:94:50:0A"

Setting/reading the IPv6 Router IID

To set the IID for the IPv6 Router, send the command:

SYSTem:EPCore:IPV6router:IID "<ID>"

For example:

SYST:EPC:IPV6:IID "3B:02:A9:FF:FE:B0:61:0C"

The command can be given in query form, to find out what IID is currently set:

SYST:EPC:IPV6:IID?

> "3B:02:A9:FF:FE:B0:61:0C"

Reading the Host PC LAN IID

To read the IID corresponding to the front panel LAN or back-panel GbE4 connector:

SYSTem[:INSTrument[0|1]]:HPC:NIC[1|2]:IPV6:IID?

For example:

SYST:HPC:NIC2:IPV6:IID?

> "5B:52:01:FF:FE:43:CA:73"

Reading the SPC Ethernet ID

To read the IID corresponding to the SPC External NIC #1 or NIC #2 rear panel connector, send the query:

SYSTem[:INSTrument[0|1]]:SPC:NIC[1|2]:IPV6:IID?

For example:

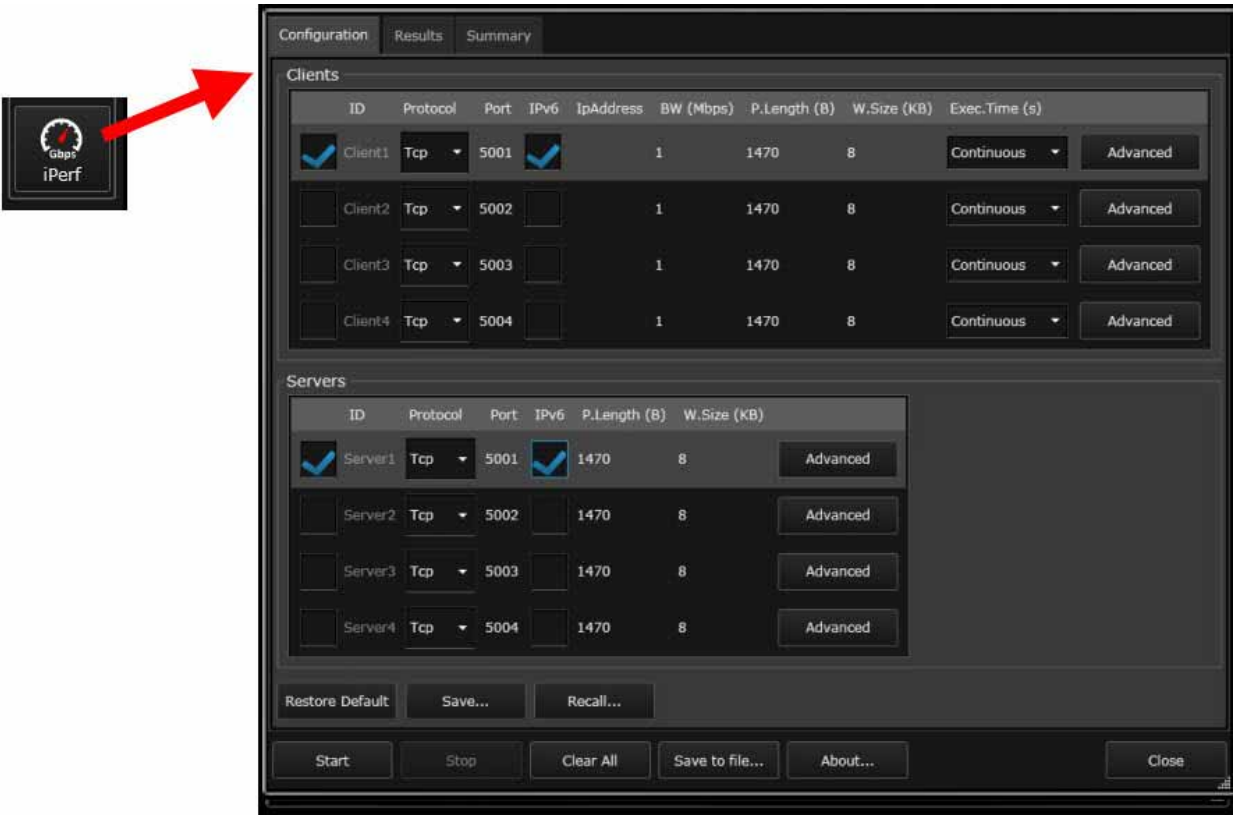
SYST:SPC:NIC2:IPV6:IID?

> "18:B3:50:FF:FE:83:A0:77"

iPerf Tool

This optional feature allows you to run the integrated traffic generator (iPerf). Once the **iPerf** icon is pressed, a new window is opened. The elements of the iPerf interface are described in [Chapter 6](#).

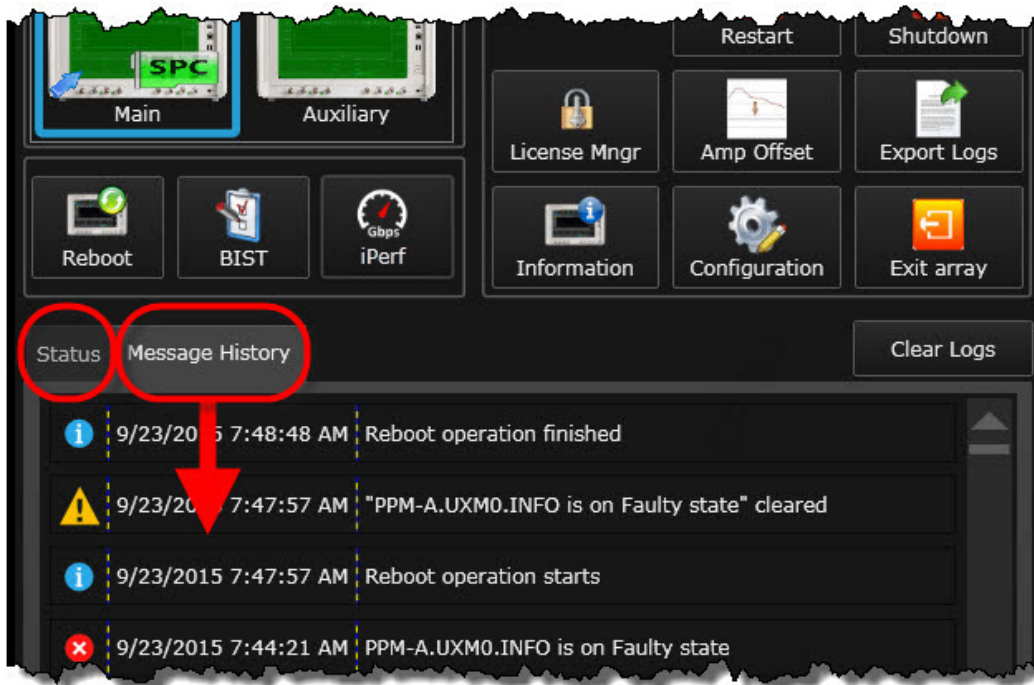
Figure 3-33 Launching the iPerf window



Message Panel

The message panel (the lower pane of the Control Panel window) features two tabs. The left tab (Status) displays current status messages (for more information on system status, see [“Querying status in SCPI” on page 37](#)). The right tab (Message History) displays messages with dates and times.

Figure 3-34 Message Panel: Status & Message History



Local Built-in Self Tests

A BIST (built-in self test) can be run on a single local unit, or on an array. See [“BIST \(Built-In Self Test\)” on page 69](#).

Stand-Alone Features

These are features available only in a stand-alone UXM.

Enter Array

To integrate a stand-alone UXM into an array, click the **Enter Array** icon. The **Role in Array** window asks you to choose between **Main** and **Auxiliary**:

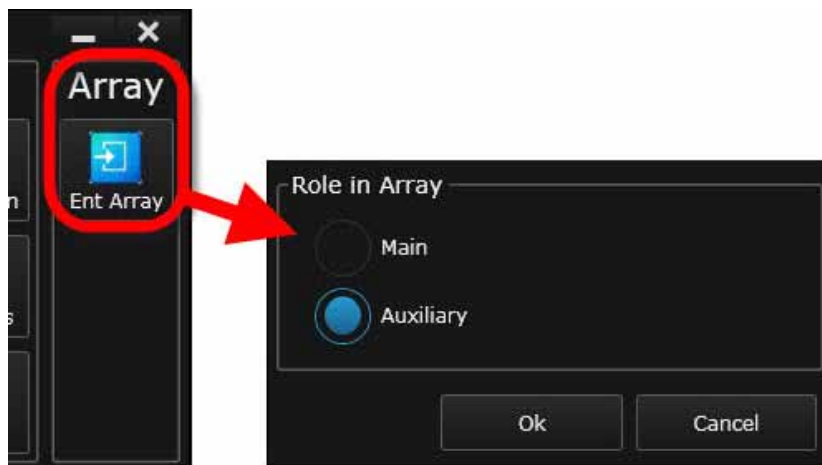
- The Main unit provides synchronizing signals to the other unit in the array.
- The Auxiliary unit receives synchronizing signals from the Main unit.

NOTE

While the UXM is entering or exiting an array, both the Application Manager and the measurement applications become temporarily inactive; they cannot be used again until the array operation is complete. Also, the Application Manager can only be used on the Main unit or a Stand-alone unit, not on the Auxiliary unit of an array.

Figure 3-35

Enter Array



The SCPI command for changing the role of the UXM is:

SYSTem:CONNectivity STANdalone|MAIN|AUXiliary

which can be simplified to:

SYST:CONN STAN|MAIN|AUX

(See **“SCPI Syntax”** on page 33.)

For example, to set up the stand-alone unit as the main unit in an array:

SYST:CONN MAIN

To find out the current configuration of the UXM, send the query:

SYSTem:CONNectivity?

For example:

SYST:CONN?

> MAIN

Array Features

These are features available only in a UXM which belongs to an array.

Exit Array

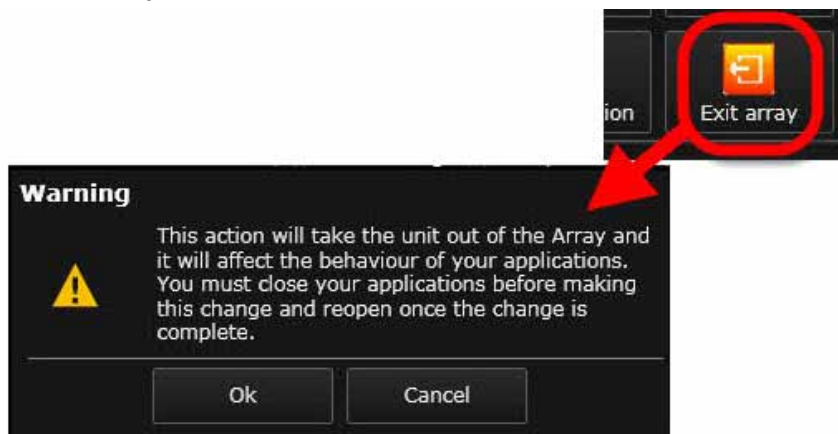
To remove the UXM from an array, and operate it as a stand-alone unit, click the **Exit Array** icon. A warning window asks you to make sure all measurement applications are closed first.

NOTE

While the UXM is entering or exiting an array, both the Application Manager and the measurement applications become temporarily inactive; they cannot be used again until the array operation is complete. Also, the Application Manager can only be used on the Main unit or a Stand-alone unit, not on the Auxiliary unit of an array.

Figure 3-36

Exit Array



The SCPI command for removing the UXM from the array is:

SYSTem:CONNectivity STANDalone

which can be simplified to:

SYST:CONN STAN

(See **“SCPI Syntax”** on page 33.)

To find out the current configuration of the UXM, send the query:

SYSTem:CONNectivity?

For example:

SYST:CONN?

> STAN

NOTE

If you exit the array, and operate the UXM in stand-alone mode, hardware cables that were being used for array connections can be left in place; they don't interfere with stand-alone operation.

Main Unit Features

These are features available on the main unit of an array, but not on the auxiliary unit.

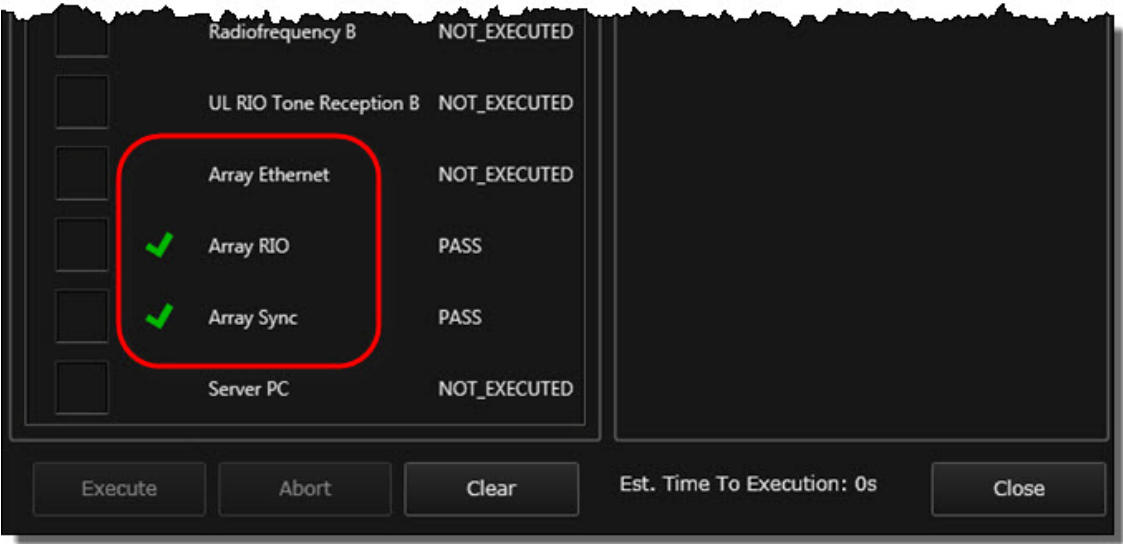
Access to the Application Manager

See [“Application Manager” on page 75](#).

Array Built-In Self Tests

Some of the UXM’s Built-In Self Tests (BISTs) pertain specifically to arrays:

Figure 3-37 Array BISTs



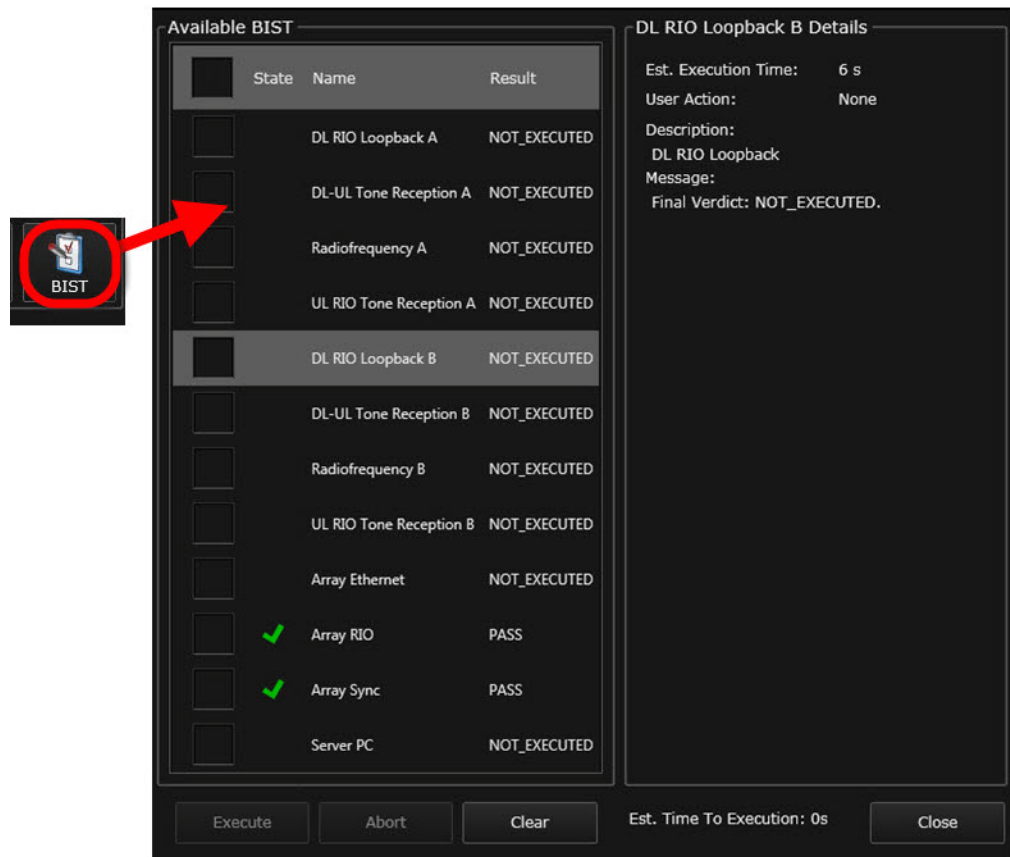
These tests are selected and run the same way as any other kind of BIST; see [“BIST \(Built-In Self Test\)” on page 69](#).

BIST (Built-In Self Test)

Clicking **BIST** opens a window which is used to run the UXM's built-in self tests. The tests available on the instrument are listed. (In the case of an array, this applies to the Main unit or the Auxiliary unit, depending on which of the two has been selected by clicking on its instrument graphic in the Control Panel; see [Figure 3-4 on page 30](#).)

Figure 3-38

BIST



The right pane of the window displays information about the test currently highlighted in the left pane, including:

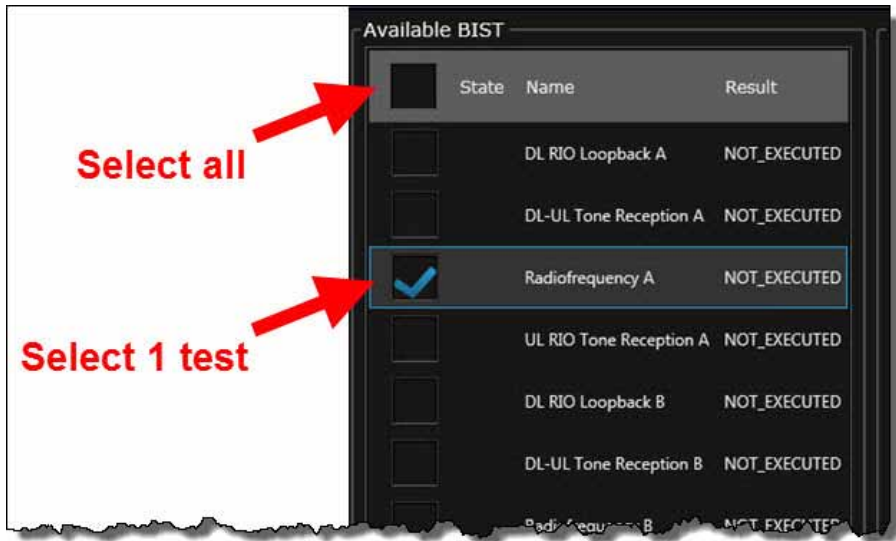
- The estimated execution time in seconds (a message at the bottom of the window also gives an estimate of the total execution time for all tests currently selected).
- The required user action (if any) to set up hardware connections for the test: "TAL" (Transceiver A Loopback or "TBL" (Transceiver B Loopback); these are further explained under "Description".
- A description of the test, including an explanation of any required user action.
- A message about the result of the test (passed, failed, or not executed).

For information on how to run tests by means of sending commands, see [“SCPI commands for BIST” on page 72.](#)

Selecting tests

To select a test, click in the checkbox to the left of the test name. (To select all available tests, click in the checkbox in the upper left corner.)

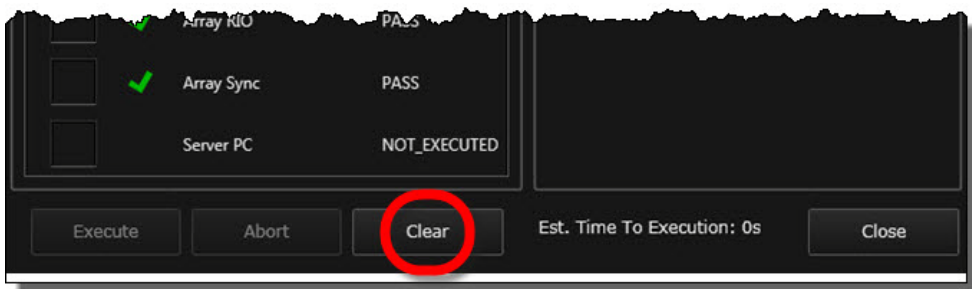
Figure 3-39 Test-selection checkboxes



Clearing test results

To clear the results of all the selected tests, click **Clear**.

Figure 3-40 Clear

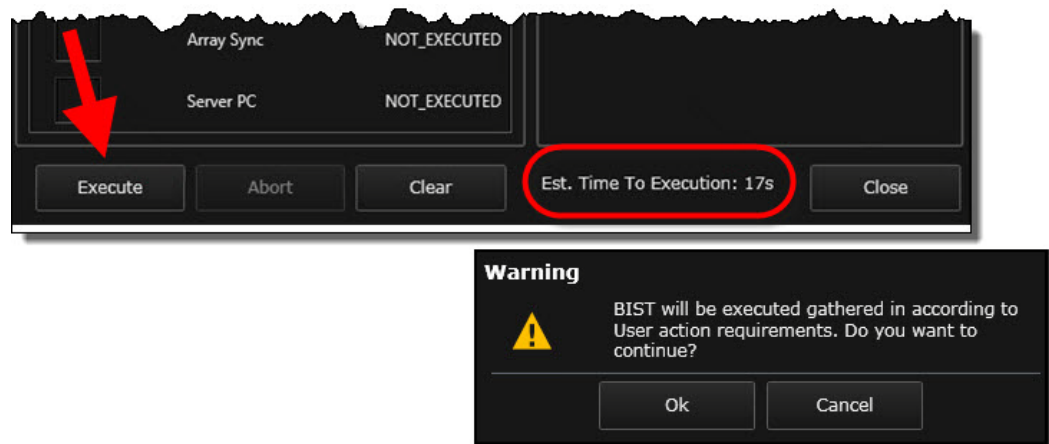


Executing tests

To execute the selected tests, click **Execute**. A confirmation window appears, partly as a reminder that the test may require some user action before it is run (check the description of each test, in the right pane of the window, to see if any preliminary steps need to be taken, such as attaching a test cable).

After the selected tests are run, the window will update its display of pass/fail results.

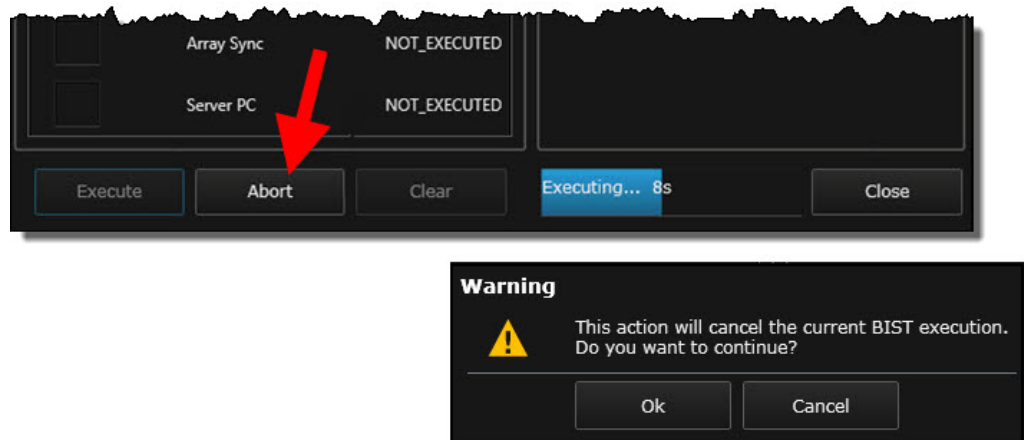
Figure 3-41 Execute



Aborting tests

To abort a test while it is running, click **Abort**. A warning/confirmation window appears.

Figure 3-42 Execute



SCPI commands for BIST

The BIST operations described above can be implemented as SCPI commands.

(See “**SCPI Syntax**” on page 33.)

Running a test

To run a test, send the SCPI command:

DIAGnostic:BIST:EXECute "<name>"

The name of the test to be executed is appended to the command:

DIAG:BIST:EXEC <name> "DL-UL Tone Reception A"

Finding the names of the available tests

The name of the test to be run must be spelled correctly in the **EXECute** command, and the named test must be available on the UXM. To obtain a correct list of tests available on the local UXM, send the query:

DIAG:BIST:LIST?

This query returns a list of available commands. For example:

```
> "Radiofrequency A", "Radiofrequency B", "DL-UL Tone Reception A",  
"DL-UL Tone Reception B", "DL RIO Loopback A", "DL RIO Loopback B",  
"UL RIO Tone Reception A", "UL RIO Tone Reception B", "Server PC",  
"Array Ethernet", "Array RIO", "Array Sync"
```

Find the setup requirements of a test

For certain tests you will need to perform some action to set up proper conditions for the test. To find out if a test has a requirement of this kind, send the query:

DIAGnostic:BIST:INFO? "<name>"

The name of the relevant test is appended to the query:

DIAG:BIST:INFO? "Radiofrequency B"

This query returns one of three messages:

```
> NONE (no setup requirement)  
> TAL (in Transceiver A, set up loopback cables from Tx1 to Rx1, and from Tx2  
to Rx2)  
> TBL (in Transceiver B, set up loopback cables from Tx1 to Rx1, and from Tx2  
to Rx2)
```

Get the result of a test

To find the result of a test, send the query:

DIAGnostic:BIST:RESult? "<name>"

The name of the relevant test is appended to the query:

DIAG:BIST:RES? <name> "Radiofrequency B"

This query returns one of three messages:

- > **"Not executed"** (the test wasn't run)
- > **"Pass"** (the last execution of the test was successful)
- > **"<any other string>"** (the last execution of the test failed; the string includes the reason).

Clear all test results

To clear the results of all tests executed so far, send the SCPI command:

DIAGnostic:BIST:CLEar

4 Application Manager

The following topics can be found in this section:

[Application Manager Window on page 76](#)

[Named Deployment Scenarios on page 81](#)

[SCPI commands for the Application Manager on page 84](#)

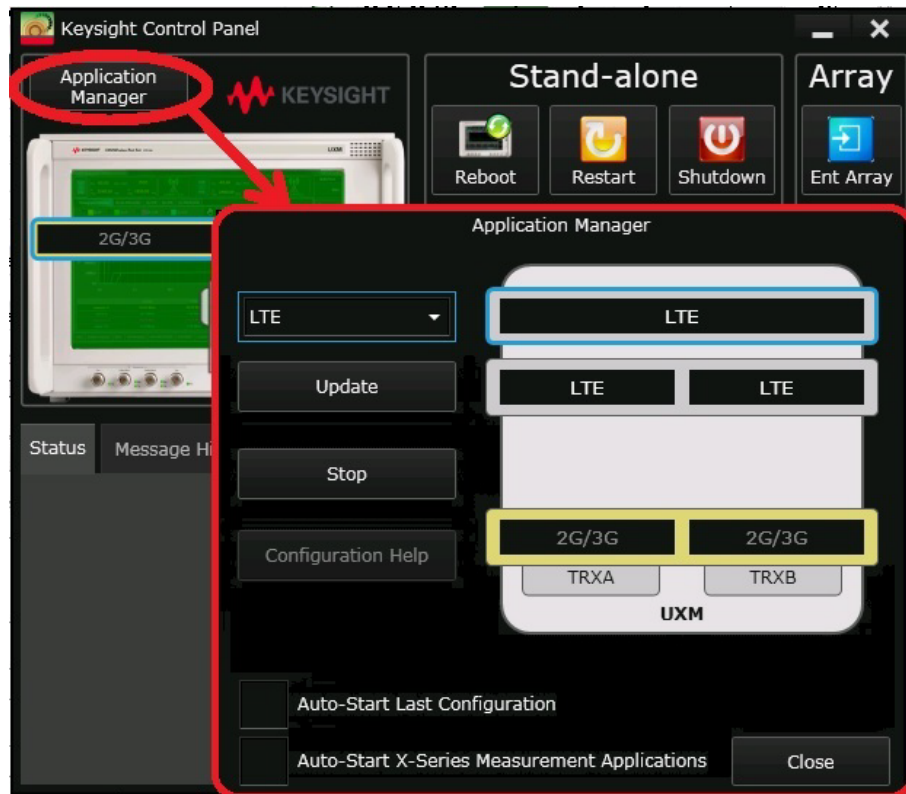
Application Manager Window

Clicking **Application Manager** on the Control Panel opens the Application Manager window (while this window is open, all other windows are locked out and their controls are disabled).

NOTE

If you are logged in as Administrator, the Application Manager can be used only in Stand-alone mode. Attempting to use it in Array mode will open a message window stating that the feature is not supported for the Administrator user.

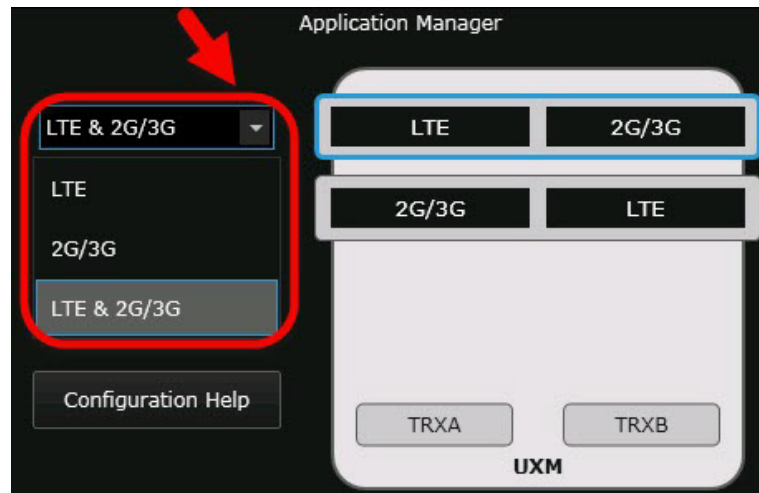
Figure 4-1 Application Manager (stand-alone unit)



The illustration above shows the format of the window for a stand-alone UXM; in the case of an array, the window shows both units.

A drop-down selector is used to select one of the available deployment scenario groups (sets of deployment scenarios which have a predetermined combination of technologies). The current deployment scenario is illustrated to the right, showing how applications are being run on the transceivers of the stand-alone UXM or, in case of an array, on the transceivers of the main and auxiliary units.

Figure 4-2 Pull-down selector for deployment scenarios



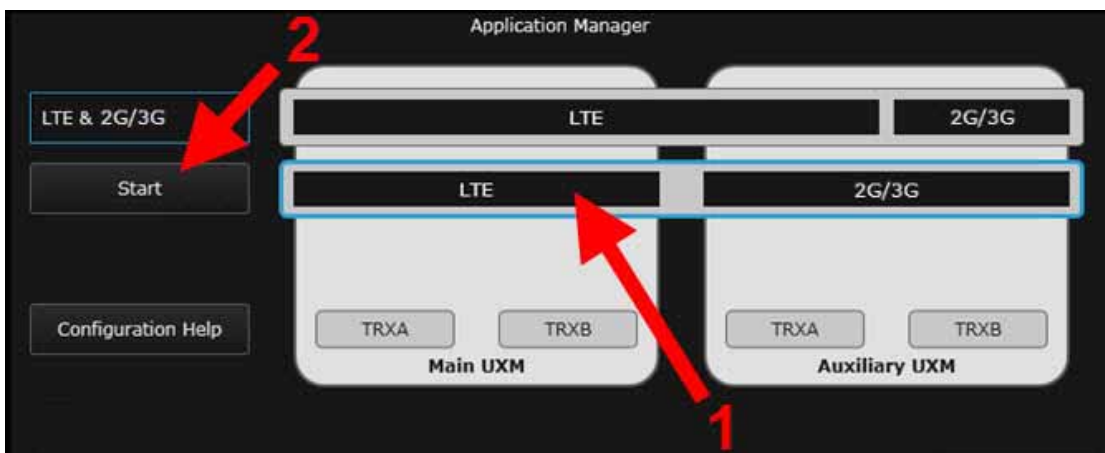
NOTE

Clicking on an item from the drop-down selector does **not** launch applications for the selected scenario! The **Start** button is grayed out and inactive at that point. Click on the black bar (on the right side of the window) that is labeled with the scenario name and is highlighted in blue. Then click **Start** to launch it.

“LTE” Application means the E7530A LTE/LTE-A/NB-IoT/eMTC Test Application (the capabilities are combined within one application).

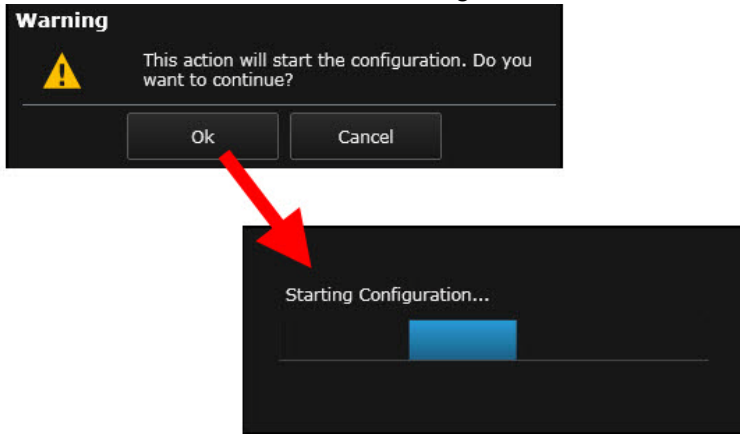
The scenario illustrated below is for an array running the LTE application on the main unit, and a combination of the LTE and 2G/3G applications on the auxiliary unit.

Figure 4-3 Launching the application or applications



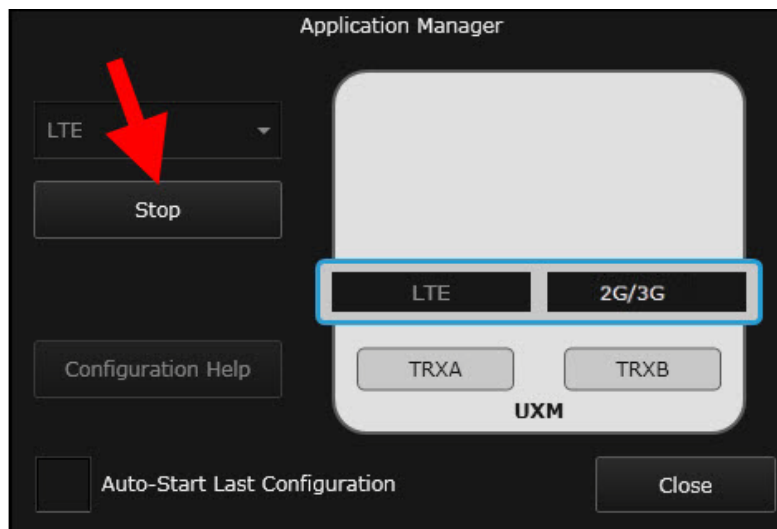
Because of the time it takes to launch all applications in a deployment scenario, you will need to click **Ok** on a confirmation window to begin the process. While applications are loading, a progress indicator is displayed:

Figure 4-4 Confirmation and loading



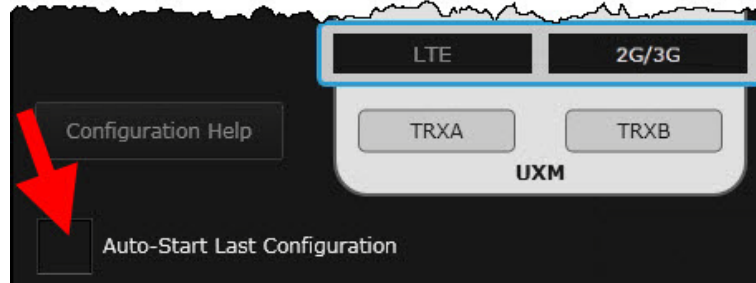
If you want to stop the selected scenario, press Stop. Again, a window will appear, asking you to confirm this choice.

Figure 4-5 Stopping the scenario



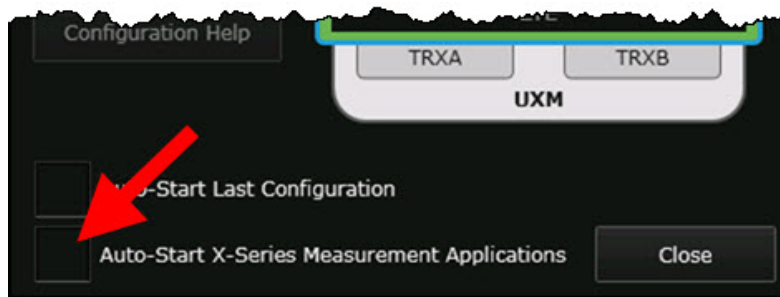
If you want the UXM to automatically start the last-used deployment scenario each time the UXM starts up, check the **Auto-Start Last Configuration** checkbox.

Figure 4-6 Selecting Auto-Start



If you want the UXM to automatically start the X-Series applications, check the **Auto-Start X-Series Measurement Applications** checkbox.

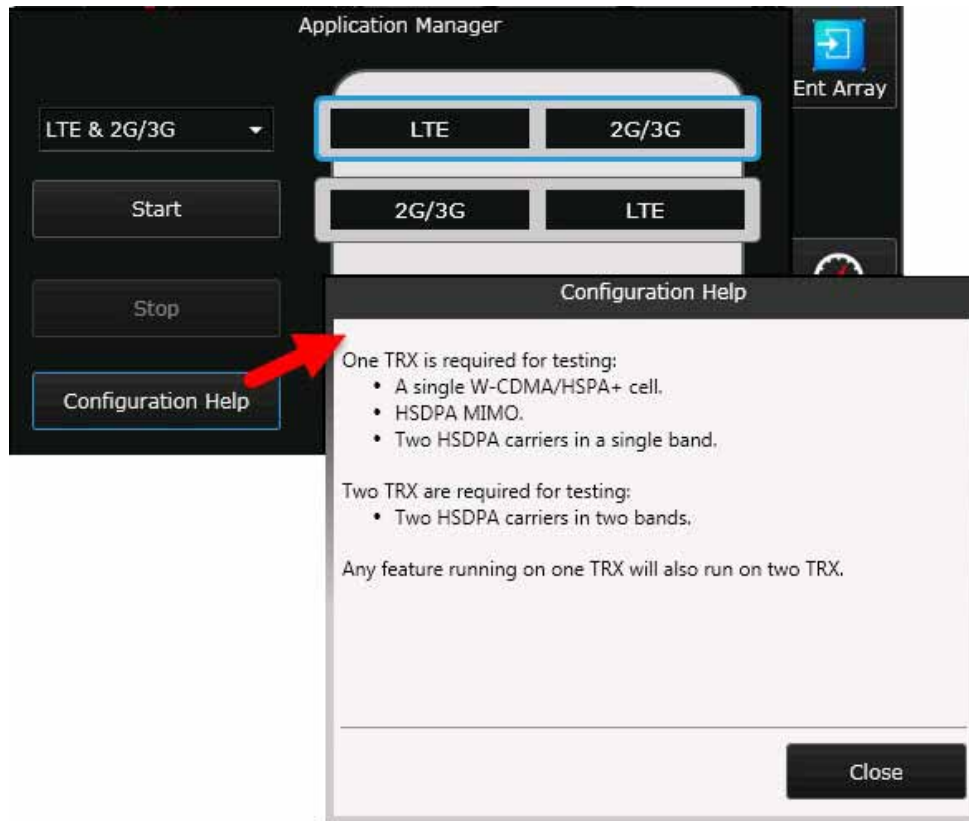
Figure 4-7 Selecting Auto-Start X-Series Measurement Applications



Configuration help

For some of the deployment scenarios (those which include the 2G/3G application), a simple help screen can be displayed, explaining the way UXM hardware resources are reserved for that application (only available for WCDMA technology). In those cases, the help screen can be opened by clicking on Configuration Help.

Figure 4-8 Configuration Help



Behavior during array operations

While the UXM is entering or exiting an array, both the Application Manager and the measurement applications become temporarily inactive; they cannot be used again until the array operation is complete. Also, the Application Manager can only be used on the Main unit or a Stand-alone unit, not on the Auxiliary unit of an array.

NB-IoT and eMTC Application modes are not available in Array mode. Therefore, the Application Mode Switch is not available, and the LTE/LTE-A Application mode is used by default.

Named Deployment Scenarios

A set of deployment scenarios is defined for the UXM; the names of these scenarios must be used when they are selected by means of SCPI commands.

The name of a Deployment Scenario must be unique. The name format is:

"<x><AppInstance1>[_<y><AppInstance2>[_<z><AppInstance3>]]"

where <x> and <y> and <z> are the number of transceivers used for each Application Instance. (The bracketed elements are optional, because most scenarios include only two instances, and some include only one.) The <AppInstance> element is the name of the relevant mode (**LTE** or **2G/3G**). For example, in the case of an LTE Application sharing 3 transceivers and a 2G/3G Application using 1 transceiver, the name is **"3LTE_12G/3G"**.

The possibilities are outlined in the table on the following page.

NOTE

"LTE" may mean either LTE/LTE-A, NB-IoT or eMTC; the capabilities are combined within a single application.

Possible Scenarios

UXM0 TRX A	UXM0 TRX B	UXM1 TRX A	UXM1 TRX B	Scenario Name
LTE				1LTE
2G/3G				12G/3G
LTE	2G/3G			1LTE_12G/3G
2G/3G	LTE			12G/3G_1LTE
LTE	LTE			1LTE_1LTE
2G/3G	2G/3G			12G/3G_12G/3G
LTE sharing 2 TRXs				2LTE
2G/3G sharing 2 TRXs				22G/3G
LTE sharing 2 TRXs		LTE		2LTE_1LTE
LTE sharing 2 TRXs		2G/3G		2LTE_12G/3G
2G/3G sharing 2 TRXs		2G/3G		22G/3G_12G/3G
2G/3G sharing 2 TRXs		LTE		22G/3G_1LTE
LTE sharing 3 TRXs				3LTE
LTE sharing 3 TRXs			LTE	3LTE_1LTE
LTE sharing 3 TRXs			2G/3G	3LTE_12G/3G
LTE sharing 2 TRXs		LTE sharing 2 TRXs		2LTE_2LTE
LTE sharing 2 TRXs		2G/3G sharing 2 TRXs		2LTE_22G/3G
LTE sharing 2 TRXs		2G/3G	2G/3G	1LTE_12G/3G_12G/3G
2G/3G sharing 2 TRXs		2G/3G sharing 2 TRXs		22G/3G_22G/3G
LTE sharing 4 TRXs				4LTE

Hardware requirements

Some of the possible scenarios may not be available, depending on what hardware is present. The table below shows how many UXMs and transceivers are needed to support each of the available scenarios. (Availability of a scenario is also limited by the firmware and licenses installed.)

Scenario Name	1 UXM 1 TRX	1 UXM 2 TRX	Array: 2 TRX + 1 TRX	Array: 2 TRX + 2 TRX
1LTE	X			
12G/3G	X			
1LTE_12G/3G		X		
12G/3G_1LTE		X		
1LTE_1LTE		X		
12G/3G_12G/3G		X		
2LTE		X		
22G/3G		X		
2LTE_1LTE			X	
2LTE_12G/3G			X	
22G/3G_12G/3G			X	
22G/3G_1LTE			X	
3LTE			X	
3LTE_1LTE				X
3LTE_12G/3G				X
2LTE_2LTE				X
2LTE_22G/3G				X
1LTE_12G/3G_12G/3G				X
22G/3G_22G/3G				X
4LTE				X

SCPI commands for the Application Manager

The functions of the Application Manager can also be controlled and monitored by means of SCPI commands.

(See “**SCPI Syntax**” on page 33.)

NOTE

Refer to “**Named Deployment Scenarios**” on page 81 for a list of the names which can be appear in these commands (or in results returned by a query).

Start a Deployment Scenario

To start a scenario, send the SCPI command:

SYSTem:AMANager:CONFig:START "<scenario name>"

The name of the scenario to be started is appended to the command. For example:

SYST:AMAN:CONF:START "1LTE_12G/3G"

Stop a Deployment Scenario

To stop a scenario, send the SCPI command:

SYSTem:AMANager:CONFig:STOP

For example:

SYST:AMAN:CONF:STOP

Activate or Deactivate Auto-Start

To activate or deactivate the auto-start mode (in which the last-used scenario is loaded at startup), send the SCPI command:

SYSTem:AMANager:CONFig:START:AUTO 1|0

For example, to activate auto-start:

SYST:AMAN:CONF:STAR:AUTO 1

To deactivate auto-start:

SYST:AMAN:CONF:STAR:AUTO 0

To determine if auto-start is on or off, send the query::

SYST:AMAN:CONF:STAR:AUTO?
> 0

Obtain a list of available scenarios

For a list of scenarios, send the SCPI command:

SYSTem:AMANager:CONFig:LIST?

The names of the tests to be executed are returned:

SYST:AMAN:CONF:LIST?
> "1LTE", "12G/3G"

Determine which scenario is running

For the name of the current scenario, send the SCPI command:

SYSTem:AMANager:CONFig:RUNNing?

The name of the scenario is returned:

SYST:AMAN:CONF:RUNN?

> "12G/3G"

An empty string is returned if no scenario is running.

Obtain a scenario description

For a description of a scenario, send the SCPI query:

SYSTem:AMANager:CONFig:INFormation? "<scenario name>"

For example:

SYST:AMAN:CONF:INF? "3LTE_12G/3G"

This returns a detailed description of the named scenario:

```
> '<Description Version="1.0">
  <Application Name="LTE" Mode="LTE 3 Cell">
    <Node>UXM0</Node>
      <Transceiver>UXM0.TRXA</Transceiver>
      <Transceiver>UXM0.TRXB</Transceiver>
      <Transceiver>UXM1.TRXA</Transceiver>
    [etc...]
  </Description>'?
```


5 Application Modes

The following topics can be found in this section:

[LTE/LTE-A Pro Test Application GUI on page 88](#)

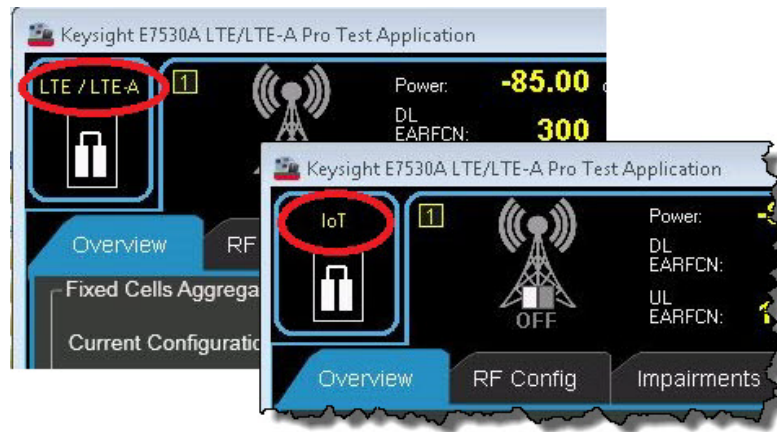
[Application Mode Switch on page 89](#)

[Making Mode Selections Using SCPI on page 93](#)

LTE/LTE-A Pro Test Application GUI

When the “E7530A LTE/LTE-A Pro Test Application” is launched, there are 3 different Application Modes in which to operate: LTE/LTE-Advanced, NB-IoT and eMTC. The currently selected mode is indicated by an icon at the upper left of the display:

Figure 5-1 Application Mode Indicator



NOTE

The icon labeled simply "IoT" indicates the combined interface for the NB-IoT and eMTC modes.

Application Mode Switch

An application mode can be selected using the **Application Mode Switch** in the **Utility** menu, illustrated below:

Figure 5-2 Application Mode Switch

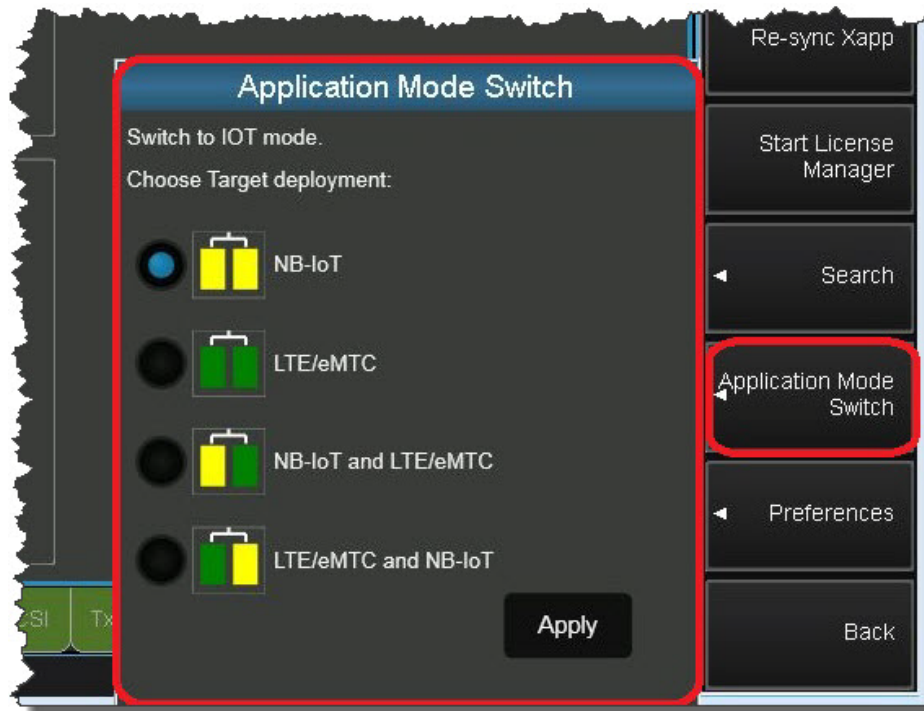


The following examples show how this switch is used.

Switching from LTE/LTE-A to NB-IoT/eMTC

Select the desired mode combination and click **Apply**. The process of switching modes can take up to 2 minutes to complete. See also: **“Switching within NB-IoT/eMTC” on page 92.**

Figure 5-3 Selecting the NB-IoT/eMTC mode



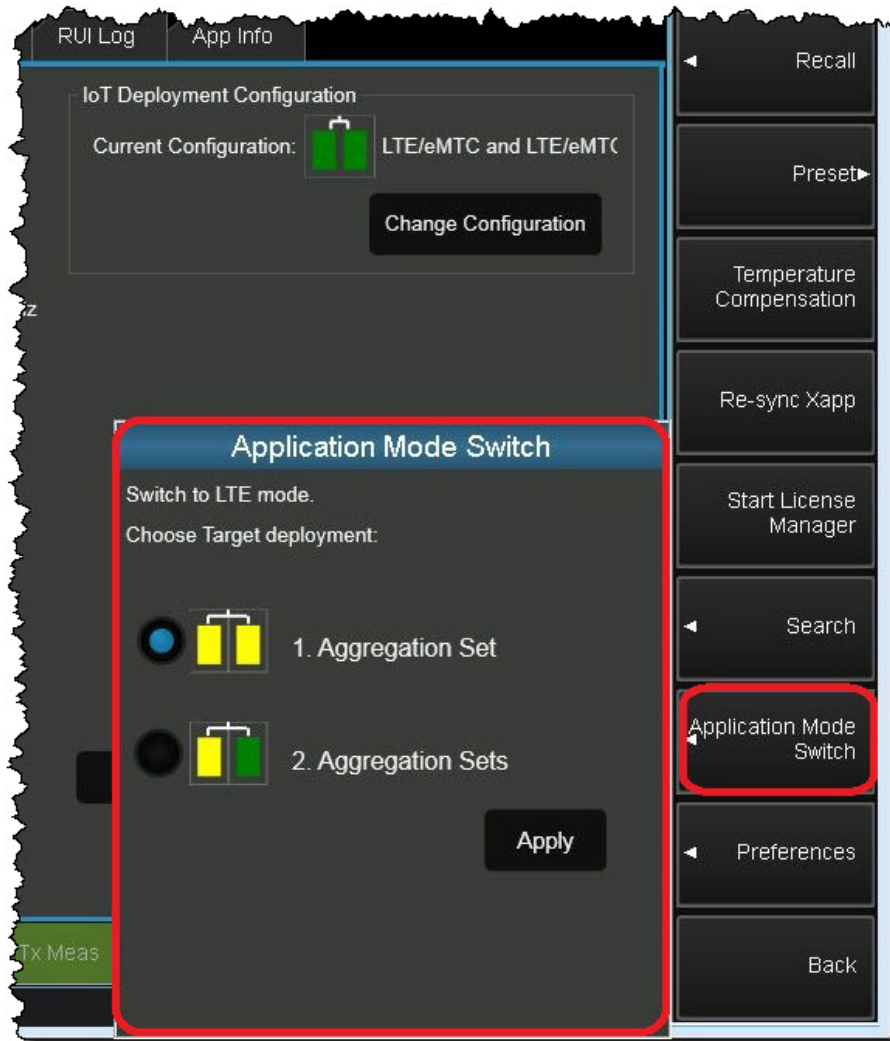
NOTE

The designation "LTE/eMTC" in this interface is not meant to represent two different modes combined; it means the eMTC mode, but identifies it as "LTE/eMTC" because eMTC originated as an LTE technology and is often identified that way.

Switching from NB-IoT/eMTC to LTE/LTE-A

Select the desired mode combination and click **Apply**. The process of switching modes can take up to 2 minutes to complete.

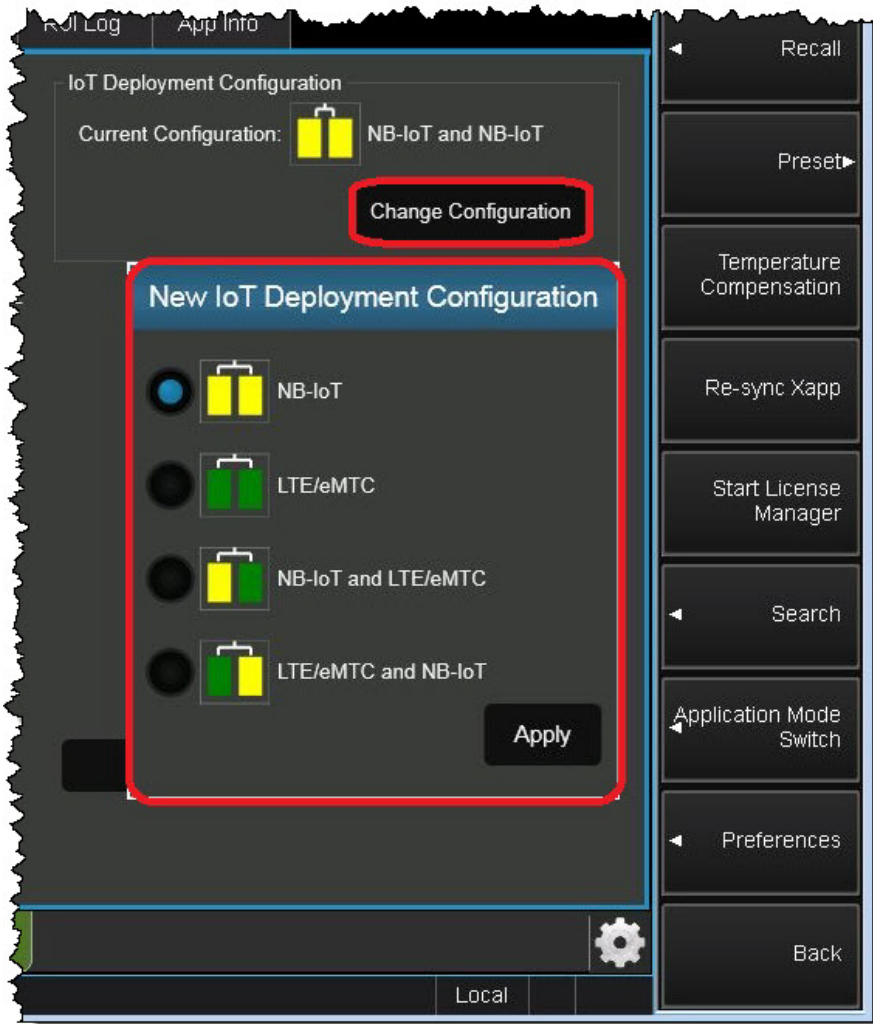
Figure 5-4 Selecting the LTE/LTE-A mode



Switching within NB-IoT/eMTC

After the “IoT” test application (combination of NB-IoT and eMTC) is selected (see [“Switching from LTE/LTE-A to NB-IoT/eMTC” on page 90](#) for instructions), click **Change Configuration** on the **Main Menu > Overview** sub-menu of the **System** tab, to select the desired combination of NB-IoT and/or eMTC. The process of changing this configuration can take up to 2 minutes to complete.

Figure 5-5 Selecting the LTE/LTE-A mode



NOTE

The designation "LTE/eMTC" in this interface is not meant to represent two different modes combined; it means the eMTC mode, but identifies it as "LTE/eMTC" because eMTC originated as an LTE technology and is often identified that way.

Making Mode Selections Using SCPI

The functions of the Application Manager can also be controlled and monitored by means of SCPI commands (see **"SCPI Syntax" on page 33**).

NOTE

Making mode selections in SCPI is a two-part process, requiring two separate commands. The use of two commands rather than one is necessary to support backwards-compatibility with scripts used by some customers who had an earlier version of UXM firmware.

NOTE

The "<x>,<y>" parameters in these commands are used to differentiate between transceivers. In a UXM with a single transceiver, or in an application with only one dedicated transceiver, only the <x> value is required.

Commands for switching from LTE/LTE-A to NB-IoT/eMTC

To select NB-IoT or eMTC for each transceiver, the command format is:

BSE:CONFig:ALL:IOT:DEPLoyment:TARGet "<x>,<y>"

where <x> and <y> are the application mode for each transceiver used. The <x> and <y> values must be "NBIoT" or "eMTC".

To complete the switch to the NB-IoT/eMTC mode, send the SCPI command:

BSE:CONFig:APPLication:MODE IOT

Commands for switching from NB-IoT/eMTC to LTE/LTE-A

To select the LTE/LTE-A Application and Aggregation setup, the command format is:

BSE:CONFig:ALL:CAGGregation:CASSignment:NEW "<x>"

where <x> indicates the aggregation setup for the transceiver used. The value must be "N1" (for all cells configured as PCC) or "N2" (for the first cell as PCC and the other cells, if any, as SCC).

To complete the switch to the LTE/LTE-A mode, send the SCPI command:

BSE:CONFig:APPLication:MODE LTE

Commands for switching within NB-IoT/eMTC

To reconfigure the NB-IoT/eMTC mode, the command format is:

BSE:CONFig:ALL:IOT:DEPLoyment:TARGet "<x>,<y>"

The where <x> and <y> are the Application Mode for each transceiver used. The <x> and <y> values must be "NBIoT" or "eMTC".

To complete the modification of the NB-IoT/eMTC mode, send the SCPI command:

BSE:CONFig:ALL:IOT:DEPLoyment:APPLy

6 iPerf Tool

The optional iPerf feature allows you to run the integrated traffic generator, a network testing tool used primarily to establish the maximum throughput of a client/server link. The following topics can be found in this section:

iPerf Client and Server on page 96

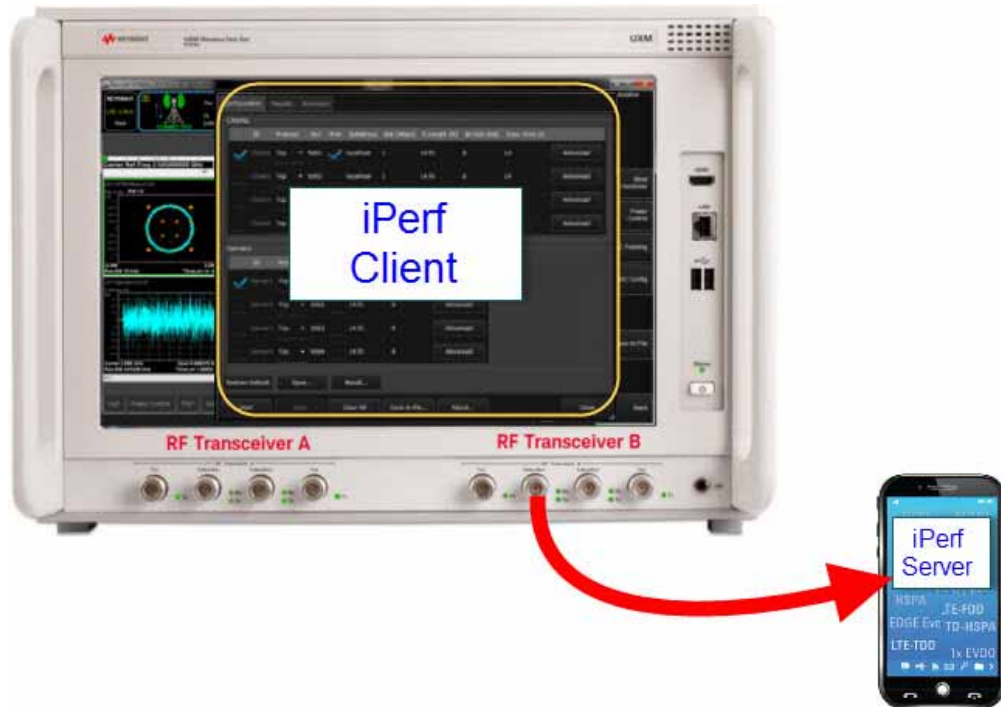
iPerf Interface on page 98

iPerf SCPI Commands on page 107

iPerf Client and Server

The iPerf tool generates traffic between an iPerf client (which generates data) and an iPerf server (which receives data). Using this feature requires the User Equipment to have an iPerf server or client (or both, for bi-directional testing). In the case of downlink communication, the client is in the UXM and the server is in the UE. (The connection can be through an RF cable, or can be made wirelessly by connecting the UXM to an antenna.)

Figure 6-1 iPerf downlink communication



iPerf Tool
iPerf Client and Server

For uplink communication, the server is in the UXM and the client is in the UE.
Or, the two configurations can be combined for bidirectional testing.

Figure 6-2 iPerf uplink communication

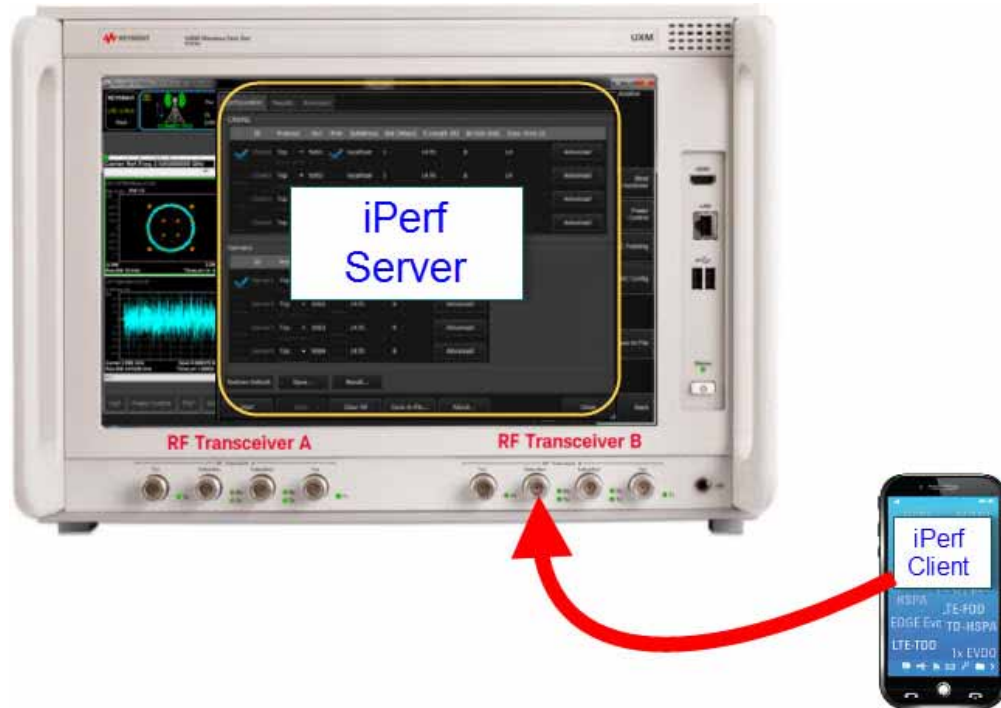
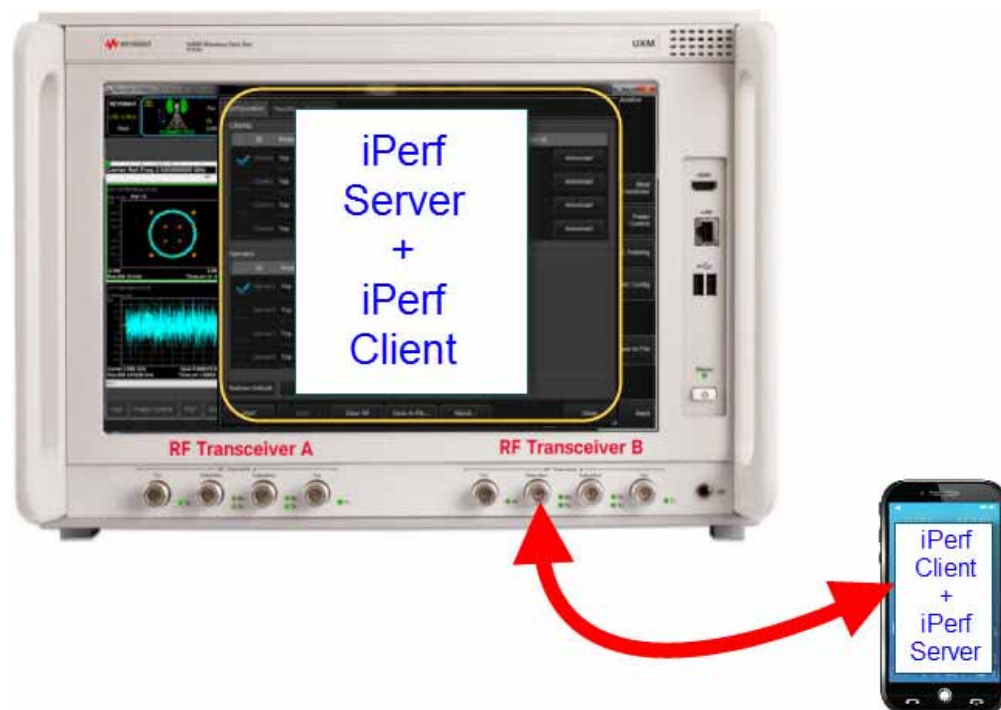


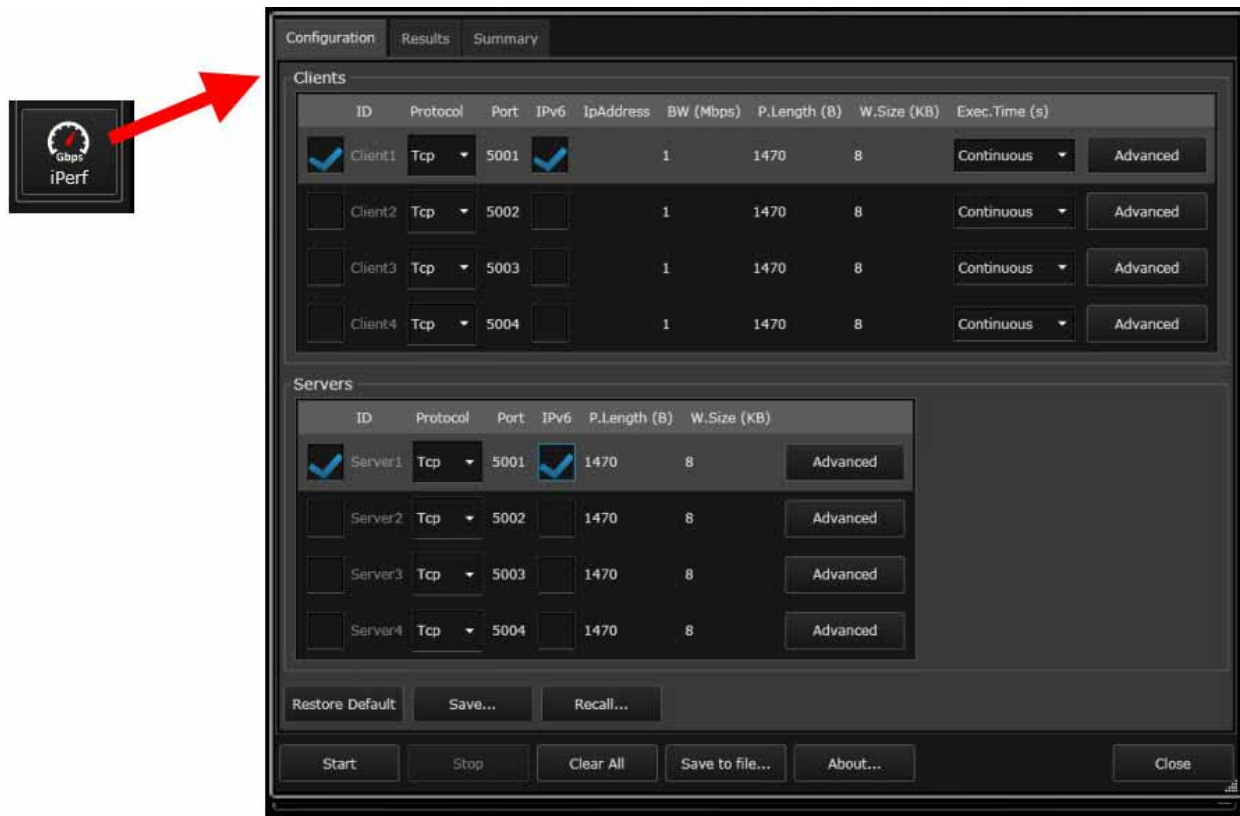
Figure 6-3 iPerf bi-directional communication



iPerf Interface

Once the **iPerf** icon on the Control Panel is pressed, a new window is opened.

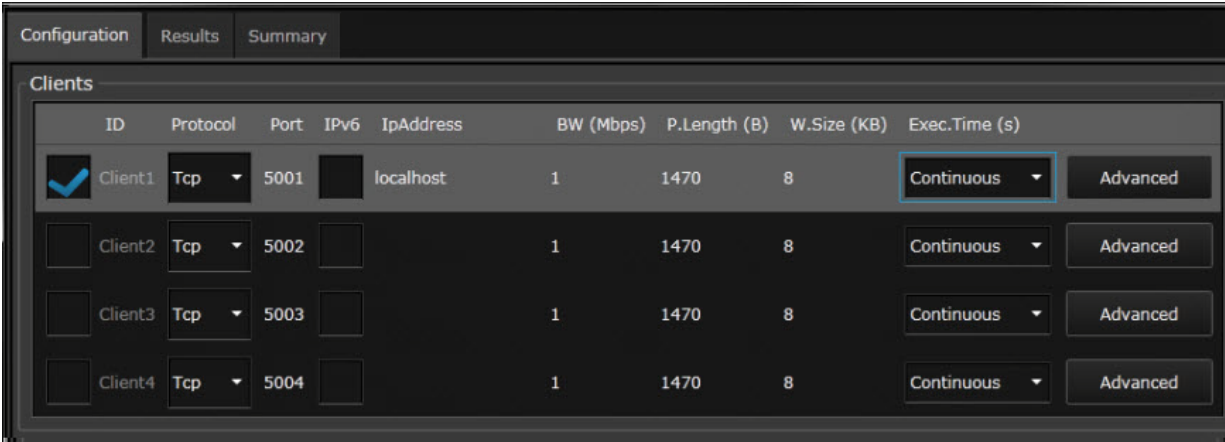
Figure 6-4 iPerf window



Configuration: Client

The top section of the Configuration tab shows settings for the iPerf client.

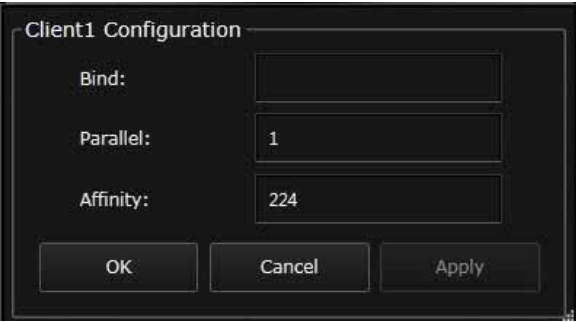
Figure 6-5 Client setup on the Configuration tab



The elements of the Configuration tab are described below. For equivalent SCPI commands, see [“iPerf Client Commands” on page 107](#).

Feature	Description
ID	Use the checkboxes to select Client1, Client 2, etc.
Protocol	Select the iPerf client transport protocol (TCP, which prioritizes data integrity, or UDP, which prioritizes throughput).
Port	Set the iPerf client socket port for the transport protocol (this needs to match the port used by the server).
IPv6	IPv6: activate or deactivate IPv6.
IP address	Set the iPerf client IP address.
BW (Mbps)	Set the iPerf client traffic bandwidth (speed) in Mbps. The setting allows high precision (.000001 Mbps).
P. Length (B)	Set the iPerf client packet length in bytes (the default value of 1470 is designed to be close to the maximum practical length).
W. Size (KB)	Set the iPerf client window size in kilobytes. This sets the socket buffer size, which in the TCP protocol determines the window size; a larger window size reduces the number of times the protocol will pause to wait for an ACK. In the UDP protocol, this setting determines the size of the buffer that datagrams are received in, and so limits the largest receivable datagram size.
Exec. Time (s)	Set the iPerf client execution time in seconds. (From the drop down menu, select "Insert value..." to enter a specific time, or "Continuous".)

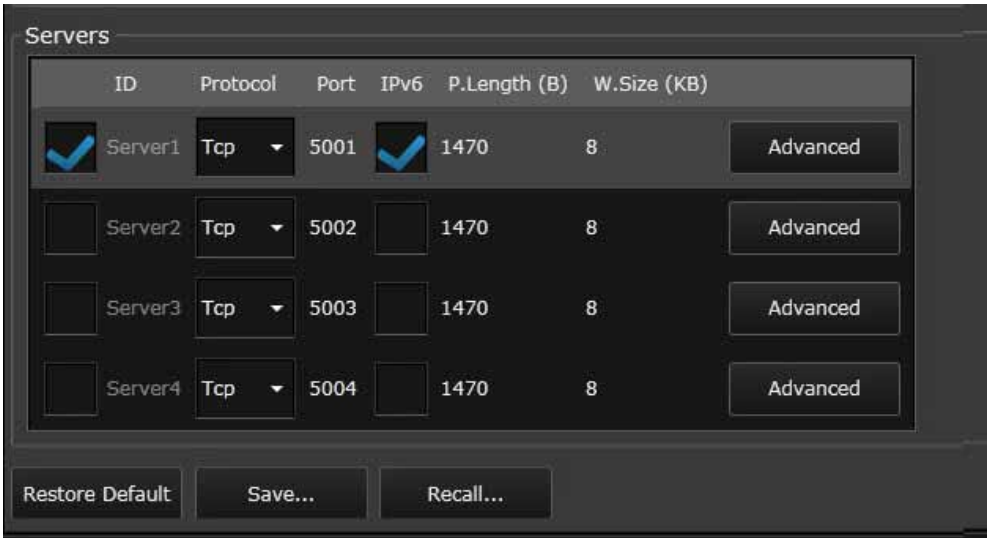
Feature	Description
Advanced	<p>Opens a window for setting Bind, Parallel, and Affinity.</p> <ul style="list-style-type: none">- Bind sets the iPerf client outbound interface IP address (and optionally the port).- Parallel sets the number of parallel threads in the iPerf client.- Affinity specifies the set of processor cores on the UXM in which the iPerf client can run. The value entered is an 8-bit binary mask, one bit per core, where CPU 7 is the MSB. The default value of 224 (binary 11100000) specifies CPU 7, CPU 6, and CPU 5. Most users will want to use this default value; other values could result in unexpected behavior.



Configuration: Server

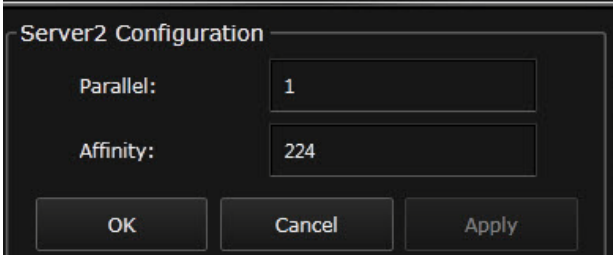
The bottom section of the Configuration tab shows settings for the iPerf server, and some general functions which apply to the client and server both.

Figure 6-6 Server setup on the Configuration tab



The elements of the Configuration tab are described below. For equivalent SCPI commands, see [“iPerf Server Commands” on page 112](#).

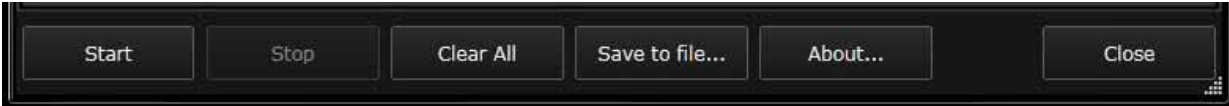
Feature	Description
ID	Use the checkboxes to select Server1, Server2, etc.
Protocol	Select the iPerf server transport protocol (TCP, which prioritizes data integrity, or UDP, which prioritizes throughput).
Port	Set the iPerf server socket port for the transport protocol (this needs to match the port used by the client).
IPv6	Activate or deactivate IPv6.
P. Length (B)	Set the iPerf server packet length in bytes.
W. Size (KB)	Set the iPerf server window size in kilobytes. This sets the socket buffer size, which in the TCP protocol determines the window size; a larger window size reduces the number of times the protocol will pause to wait for an ACK. In the UDP protocol, this setting determines the size of the buffer that datagrams are received in, and so limits the largest receivable datagram size.

Feature	Description
Advanced	<p>Opens a window for setting Parallel and Affinity.</p> <ul style="list-style-type: none">- Parallel sets the number of parallel threads in the iPerf server.- Affinity specifies the set of processor cores on the UXM in which the iPerf server can run. The value entered is an 8-bit binary mask, one bit per core, where CPU 7 is the MSB. The default value of 224 (binary 11100000) specifies CPU 7, CPU 6, and CPU 5. Most users will want to use this default value; other values could result in unexpected behavior. <div></div>
Restore Default	Returns the iPerf configuration (for both client and server) to its default settings.
Save...	Save the iPerf configuration (for both client and server) to a file (opens a file-save window).
Recall...	Recall the iPerf configuration (for both client and server) from a file (opens a file-open window).


iPerf General Functions

The bottom of the iPerf window includes six functions which apply generally to all tabs.

Figure 6-7 General setup on the Configuration tab



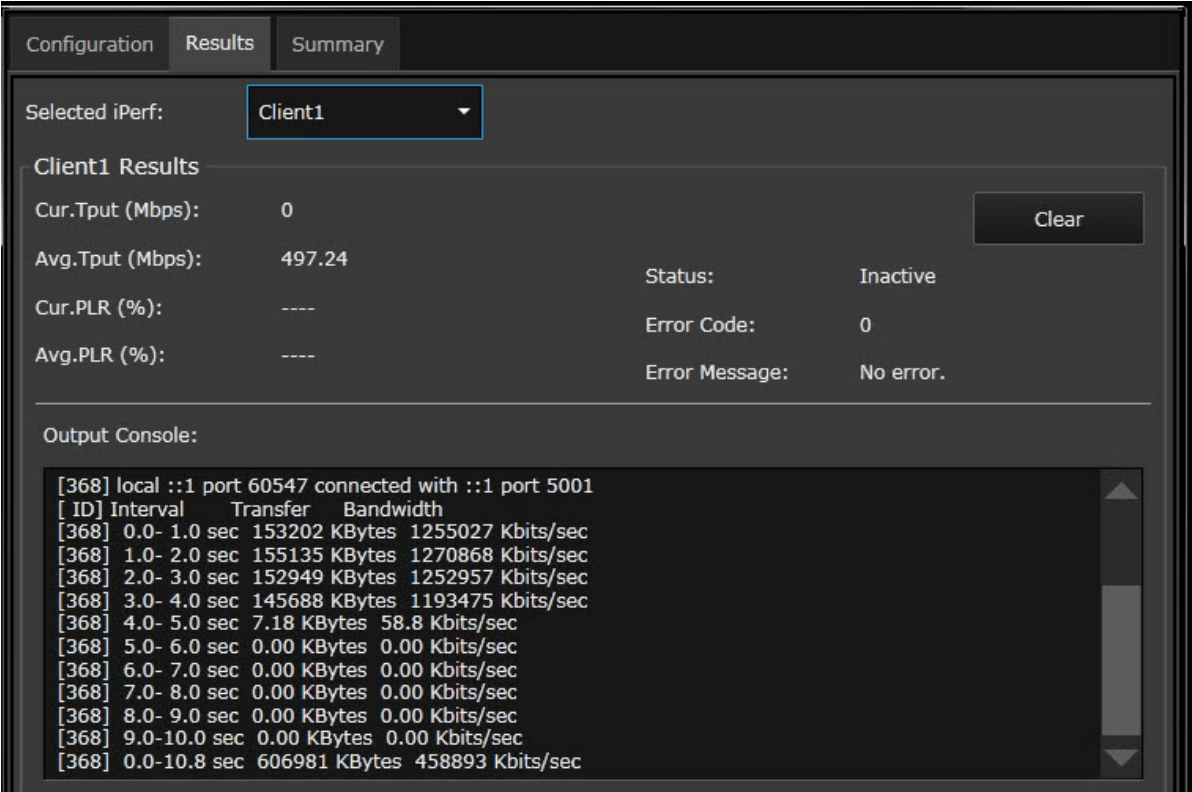
The elements of this part of the window are described below. For equivalent SCPI commands, see [“iPerf General Commands” on page 115](#).

Feature	Description
Start	Start the selected iPerf clients and servers. When there is an iPerf client or an iPerf server running, this button is disabled.
Stop	Stop the selected iPerf clients and servers.
Clear All	Clear all content on the Results and Summary tabs of the iPerf window.
Save to file...	Save logs (capturing time-stamped information about iPerf outputs and events) to a file.
About...	Open a pop-up window with iPerf version information: <div data-bbox="604 1020 1232 1222"><div>Information</div><div> iPerf version: 2.0.8</div><div>Ok</div></div>
Close	Shut down the iPerf window. (This does not stop the running clients and servers.)

Results Tab

The **Results** tab displays results for a selected client or server.

Figure 6-8 iPerf Results tab (client)



The elements of this part of the window are described below. For equivalent SCPI commands, see [“iPerf Results and Summary Commands” on page 116](#).

Feature	Description
Selected iPerf	Select a particular client or server from the drop-down menu.
Cur. Tput (Mbps)	Current throughput for the iPerf client or server, in Mbps.
Avg. Tput (Mbps)	Average throughput for the iPerf client or server (since it was started), in Mbps.
Cur. PLR (%)	Curent packet loss ratio, for the iPerf server, in %.
Avg. PLR (%)	Average packet loss ratio, for the iPerf server (since it was started), in %.
Clear	Clear contents of the Results and Summary tabs of the iPerf window which pertain to the selected client or server.
Status	The iPerf client or server status (Inactive, Error, or Executing).
Error Code	The last error code (if any) from the iPerf client or server since the last start.

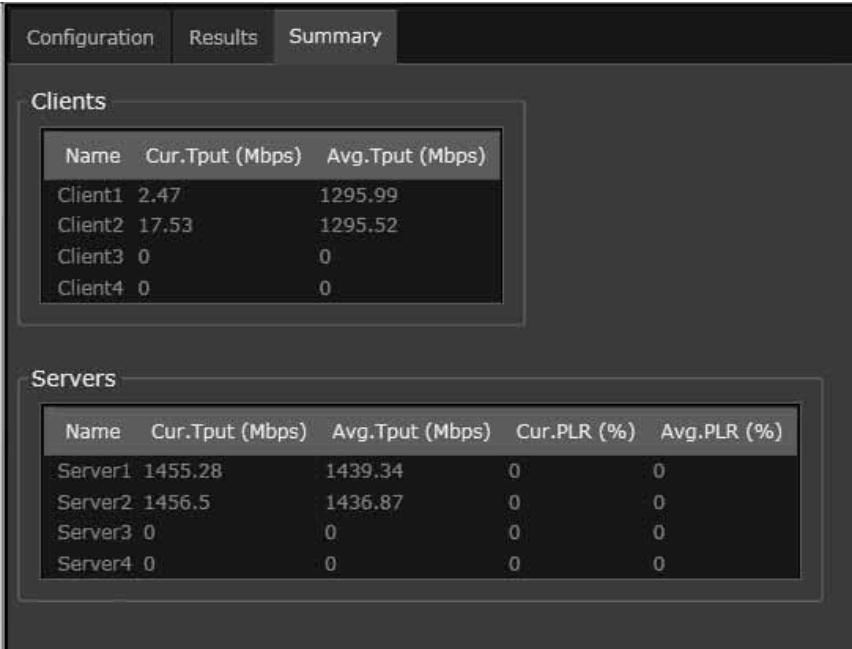
iPerf Tool
iPerf Interface

Feature	Description
Error Message	The last error message (if any) from the iPerf client or server since the last start.
Output Console	The iPerf client or server console output.

Summary tab

The **Summary** tab displays results from all clients and servers.

Figure 6-9 iPerf window (Summary tab)



The elements of this part of the window are described below. For equivalent SCPI commands, see **iPerf Results and Summary Commands** on page 116.

Feature	Description
Clients: Name	Clients listed by name.
Clients: Cur. Tput (Mbps)	Current throughput for the iPerf client, in Mbps.
Clients: Avg. Tput (Mbps)	Average throughput for the iPerf client (since it was started), in Mbps.
Servers: Name	Servers listed by name.
Servers: Cur. Tput (Mbps)	Current throughput for the iPerf server, in Mbps.
Servers: Avg. Tput (Mbps)	Average throughput for the iPerf server (since it was started), in Mbps.
Servers:Cur. PLR (%)	Current packet loss ratio, for the iPerf server, in %.
Servers: Avg. PLR (%)	Average packet loss ratio, for the iPerf server (since it was started), in %.

iPerf SCPI Commands

iPerf Client Commands

(See “[SCPI Syntax](#)” on page 33, and also “[iPerf Results and Summary Commands](#)” on page 116.)

NOTE

In commands which include the `:CLient[1|2|3|4]` node, the numerical suffix is used to specify which client is referred to. As “1” is the default, `:CLient1` can be given as `:CLI` for brevity.

iPerf client transport protocol

The SCPI command for setting the client transport protocol is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:PROTocol  
TCP|UDP
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:PROT TCP
```

The protocol can be queried:

```
SYST:APPL:IPER:CLI:CONF:PROT?  
> TCP
```

iPerf client port

The SCPI command for setting the client port is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:PORT <value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:PORT 8010
```

The server port can be queried:

```
SYST:APPL:IPER:CLI:CONF:PORT?  
> 8010
```

iPerf client IPv6 activation

The SCPI command for activating or deactivating IPv6 in the iPerf client:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:IPV6 0|1
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:IPV6 1
```

The IPv6 activation can be queried:

```
SYST:APPL:IPER:CLI:CONF:IPV6?  
> 1
```

iPerf client IP address

The SCPI command for setting the client IP address is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:IPAdDress  
<string>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:IPAD "141.11.11.11"
```

The address can be queried:

```
SYST:APPL:IPER:CLI:CONF:IPAD?  
> "141.11.11.11"
```

iPerf client bandwidth

The SCPI command for setting the client bandwidth in Mbps is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:BANDwidth  
<value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:BAND 150
```

The current bandwidth can be queried:

```
SYST:APPL:IPER:CLI:CONF:BAND?  
> 150
```

iPerf client bandwidth with high precision

The SCPI command for setting the client bandwidth with high precision is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:PBANDwidth  
<value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:PBAN 1.8 Kbps
```

The current bandwidth can be queried:

```
SYST:APPL:IPER:CLI:CONF:PBAN?  
> 1.800E-03
```

iPerf client packet length

The SCPI command for setting the client packet length in bytes is:

```
SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:PLENght  
<value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CONF:PLEN 1470
```

The packet length can be queried:

```
SYST:APPL:IPER:CLI:CONF:PLEN?  
> 1470
```


iPerf client window size

The SCPI command for setting the client window size in KB:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:WSize <value>

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CONF:WSIZ 8

The window size can be queried:

SYST:APPL:IPER:CLI:CONF:WSIZ?

> 8

iPerf execution time

The SCPI command for setting the client execution time in seconds:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:ETIMe <value>

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CONF:ETIM 10

The window size can be queried:

SYST:APPL:IPER:CLI:CONF:ETIM?
> 10

iPerf client bind

The SCPI command for setting the IP address for the client outbound interface:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:BIND <address>

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CONF:BIND "11.11.11.11"

The address can be queried:

SYST:APPL:IPER:CLI:CONF:BIND?
> "11.11.11.11"

iPerf client parallel threads

The SCPI command for setting the number of parallel threads in the client:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:PARAllel <value>

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CONF:PAR 3

The setting can be queried:

SYST:APPL:IPER:CLI:CONF:PAR?
> 3

iPerf client affinity

The SCPI command for setting affinity in the client (in the form of an 8-bit mask matching the processor CPUs, where the bit 7 is associated to CPU7 and the bit 0 to CPU0). Active bits in this mask correspond to possible CPUs where the iPerf client could be run:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CONFigure:AFFinity <value>

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CONF:AFF 224

The setting can be queried:

SYST:APPL:IPER:CLI:CONF:AFF?
> 224

iPerf client start

The SCPI command for starting the client is:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:START

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:STAR

iPerf client stop

The SCPI command for stopping the client is:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:STOP

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:STOP

iPerf client status

The SCPI query for getting the client status (INAC, ERR|, or EXEC) is:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:STATus?

The query can be shortened, as in this example:

SYST:APPL:IPER:CLI:STAT?

> EXEC

iPerf client error

The SCPI query for getting the server error is:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:STATus:ERRor?

The query can be shortened, as in this example:

SYST:APPL:IPER:CLI:STAT:ERR?

> "10061","Connection refused"

iPerf client clear

The SCPI command for clearing the client results and logs is:

SYSTem:APPLications:IPERf:CLient[1|2|3|4]:CLEar

The command can be shortened, as in this example:

SYST:APPL:IPER:CLI:CLE

iPerf Server Commands

(See “[SCPI Syntax](#)” on page 33, and also “[iPerf Results and Summary Commands](#)” on page 116.)

NOTE

In commands which include the :SERVer[1|2|3|4] node, the numerical suffix is used to specify which client is referred to. As "1" is the default, :SERVer1 can be given as :SERV for brevity.

iPerf server transport protocol

The SCPI command for setting the server transport protocol is:

```
SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:PROTocol  
TCP|UDP
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:SERV:CONF:PROT UDP
```

The transport protocol can be queried:

```
SYST:APPL:IPER:SERV:CONF:PROT?  
> UDP
```

iPerf server port

The SCPI command for setting the server port is:

```
SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:PORT <value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:SERV:CONF:PORT 8010
```

The server port can be queried:

```
SYST:APPL:IPER:SERV:CONF:PORT?  
> 8010
```

iPerf server IPv6 activation

The SCPI command for activating or deactivating IPv6 in the iPerf server is:

```
SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:IPV6 0|1
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:SERV:CONF:IPV6 1
```

The IPv6 activation can be queried:

```
SYST:APPL:IPER:SERV:CONF:IPV6?  
> 1
```

iPerf server packet length

The SCPI command for setting the server packet length in bytes is:

```
SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:PLENgtH  
<value>
```

The command can be shortened, as in this example:

```
SYST:APPL:IPER:SERV:CONF:PLEN 1470
```

The packet length can be queried:
SYST:APPL:IPER:SERV:CONF:PLEN?
> 1470

iPerf server window size

The SCPI command for setting the server window size in KB is:
SYSTEM:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:WSize <value>

The command can be shortened, as in this example:
SYST:APPL:IPER:SERV:CONF:WSIZ 8

The window size can be queried:
SYST:APPL:IPER:SERV:CONF:WSIZ?
> 8

iPerf server parallel threads

The SCPI query for getting the number of parallel threads in the server:
SYSTEM:APPLications:IPERf:SERVer[1|2|3|4]:Ient:CONFigure:PARallel?

The query can be shortened, as in this example:
SYST:APPL:IPER:SERV:CONF:PAR?
> 1

iPerf server affinity

The SCPI command for setting affinity in the server (in the form of an 8-bit mask matching the processor CPUs, where the bit 7 is associated to CPU7 and the bit 0 to CPU0). Active bits in this mask correspond to possible CPUs where the iPerf server could be run:

SYSTEM:APPLications:IPERf:SERVer[1|2|3|4]:CONFigure:AFFinity
<value>

The command can be shortened, as in this example:
SYST:APPL:IPER:SERV:CONF:AFF 224

The setting can be queried:
SYST:APPL:IPER:SERV:CONF:AFF?
> 224

iPerf server start

The SCPI command for starting the server is:
SYSTEM:APPLications:IPERf:SERVer[1|2|3|4]:START

The command can be shortened, as in this example:
SYST:APPL:IPER:SERV:STAR

iPerf server stop

The SCPI command for stopping the server is:

SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:STOP

The command can be shortened, as in this example:

SYST:APPL:IPER:SERV:STOP

iPerf server status

The SCPI query for getting the server status is:

SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:STATus?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:STAT?

iPerf server error

The SCPI query for getting the server error is:

SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:STATus:ERRor?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:STAT:ERR?

> "0", "No Error"

iPerf server clear

The SCPI command for clearing the server results and logs is:

SYSTem:APPLications:IPERf:SERVer[1|2|3|4]:CLEar

The command can be shortened, as in this example:

SYST:APPL:IPER:SERV:CLE

iPerf General Commands

(See “[SCPI Syntax](#)” on page 33, and also “[iPerf Results and Summary Commands](#)” on page 116.)

iPerf restore defaults

The SCPI command for setting the iPerf configuration to its default values is:

SYSTem:APPLications:IPERf:CONFigure:DEFault

The command can be shortened, as in this example:

SYST:APPL:IPER:CONF:DEF

iPerf save

The SCPI command for saving the iPerf configuration to a file is:

SYSTem:APPLications:IPERf:CONFigure:SAVE <"file path">

The command can be shortened, as in this example:

SYST:APPL:IPER:CONF:SAVE "ftp://localhost/iperf-conf.xml"

iPerf recall

The SCPI command for retrieving the iPerf configuration from a file is:

SYSTem:APPLications:IPERf:CONFigure:RECall <"file path">

The command can be shortened, as in this example:

SYST:APPL:IPER:CONF:REC "ftp://localhost/iperf-conf.xml"

iPerf Results and Summary Commands

(See [“SCPI Syntax” on page 33](#), and also [“iPerf Client Commands” on page 107](#) and [“iPerf Server Commands” on page 112](#).)

iPerf client average throughput

The SCPI query for getting the client average throughput (in Mbps, since it was started) is:

```
SYSTem:APPLications:IPERf:CLient:ATHRoughput?
```

The query can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:ATHR?  
> 600
```

iPerf client current throughput

The SCPI query for getting the client current throughput (in Mbps) is:

```
SYSTem:APPLications:IPERf:CLient:CTHRoughput?
```

The query can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:CTHR?  
> 130
```

iPerf client console output

The SCPI query for getting the server console output (the output since the last time this command was executed, or since the client was started):

```
SYSTem:APPLications:IPERf:CLient:OUTPut?
```

The query can be shortened, as in this example:

```
SYST:APPL:IPER:CLI:OUTP?  
> <-  
#3129«x0A»«x0D»«x0A»iperf.exe«x20»-c«x20»localhost«x20»-w«x20»8K«x20»-l«x20»1470«x20»-p«x20»5001«x20»«x20»«x20»-P«x20»1«x20»-i«x20»1«x20»-t«x20»604800«x20»-f«x20»k«x20»ProcAffinity«x20»:«x20»224«x0A»connect«x20»failed:«x20»Connection«x20»refused// Some output
```

iPerf server average packet loss

The SCPI query for getting the server average packet loss (in %, since it was started) is:

```
SYSTem:APPLications:IPERf:SERVer:APLoss?
```

The query can be shortened, as in this example:

```
SYST:APPL:IPER:SERV:APL?  
> 1.2
```


iPerf server current packet loss

The SCPI query for getting the server current packet loss (in %) is:

SYSTem:APPLications:IPERf:SERVer:CPLoss?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:CPL?

> 0.3

iPerf server average throughput

The SCPI query for getting the server average throughput (in Mbps, since it was started) is:

SYSTem:APPLications:IPERf:SERVer:ATHRoughput?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:ATHR?

> 600

iPerf server current throughput

The SCPI query for getting the server current throughput (in Mbps) is:

SYSTem:APPLications:IPERf:SERVer:CTHRoughput?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:CTHR?

> 130

iPerf server console output

The SCPI query for getting the server console output is:

SYSTem:APPLications:IPERf:SERVer:OUTPut?

The query can be shortened, as in this example:

SYST:APPL:IPER:SERV:OUTP?

> <-

#3129«x0A»«x0D»«x0A»iperf.exe«x20»-c«x20»localhost«x20»-w«x20»8K«x20»-l«x20»1470«x20»-p«x20»5001«x20»«x20»«x20»-P«x20»1«x20»-i«x20»1«x20»-t«x20»604800«x20»-f«x20»k«x20»ProcAffinity«x20»:«x20»224«x0A»connect«x20»failed:«x20»Connection«x20»refused// Some output

iPerf results save

The SCPI command for saving the iPerf results.

SYSTem:APPLications:IPERf:SAVE

The command can be shortened, as in this example:

SYST:APPL:IPER:SAVE

