DATA SHEET

S9165A
Transceiver Control Unit

KEYSIGHT

System Performance

Conditions

Information and data contained in this data sheet is subject to change without notice.

In addition to the following conditions, the S9165A system performance documented in this data sheet is valid for an ambient temperature of 20 to 30 °C unless otherwise noted.

- The product is within its calibration cycle
- The product has been stored at an ambient temperature within the allowed operating range for at least two hours before being powered on
- The product has been powered on continuously for at least 30 minutes warm-up

Definitions

	Description
Specification	Warranted performance. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions. All specifications and characteristics apply over an ambient temperature range of 20 to 30 °C (unless otherwise stated).
Typical (typ)	Describes additional product performance information that is not covered by the product warranty. It is performance beyond specifications that 95% of the units exhibit with a 95% confidence level at room temperature (approximately 25 °C). Typical performance does not include measurement uncertainty. Typical performance is not warranted.
Nominal (nom)	Describes the expected mean or average performance, or an attribute whose performance is by design, such as the 50 Ω connector. This data is measured at room temperature (approximately 25 °C). Nominal performance is not warranted.
Measured (meas)	Describes an attribute measured during the design phase for purposes of communicating expected performance, such as amplitude drift vs. time. This data is measured at room temperature (approximately 25 °C). Measured performance is not warranted.

Recommended best practices

The S9165A module runs extremely hot. It is recommended that the chassis fan speed is set to high. Average internal module temperature is around 60 °C.

S9165A Configurations

This data sheet contains the performance for the S9165A with the following options. S9165A Options:

- 010 - Single channel, controls one transceiver
- 020 - Two channel, controls two transceivers
- 030 - Three channel, controls three transceivers
- 040 - Four channel, controls four transceivers
- 050 - Five channel, controls five transceivers
- 060 - Six channel, controls six transceivers
- 070 - Seven channel, controls seven transceivers
- 080 - Eight channel, controls eight transceivers
- LPN - Low Phase Noise
- EPN - Enhanced Low Phase Noise

S9165A Overview

Capabilities

The S9165A Transceiver Control Unit can drive up to 8 Keysight Transceivers.

It is paired with a Keysight Solution that provides IF capabilities and software that communicates with the S9165A service manager to control the transceiver.

Two phase noise options are provided LPN and EPN depending on the performance needs.

The unit provides two independent LO (Local Oscillator) and a 4.8 GHz reference signal per channel to connect each transceiver.

The unit provides an internal reference clock, or it can be connected to an external reference.

It also provides external 10 MHz and 100 MHz reference signal outputs.

Communication to control the transceiver is provided via USB (Universal Serial Bus) for each transceiver channel.

Specification

Performance

Frequency		
	Frequency range	
Output frequency range per channel	2.4 GHz to 12 GHz	
	Frequency reference	
Accuracy, aging rate, stability	Refer to frequency reference information in S9165A front panel section	
Amplitude range		
	Frequency range	**Settable output level range**
Output power range	2.4 GHz to 12 GHz	0 dBm to +12 dBm
LO1 and LO2 output power accuracy () = typical		
Frequency	**Level**	**Accuracy**
2.4 GHz – 4.3 GHz	0 dBm to +12 dBm	± 3.20 dB (± 2.00 dB)
4.3 GHz – 6 GHz	0 dBm to +12 dBm	± 3.95 dB (± 2.50 dB)
6 GHz – 8.9 GHz	0 dBm to +12 dBm	± 3.75 dB (± 2.30 dB)
8.9 GHz – 12 GHz	0 dBm to +12 dBm	± 4.15 dB (± 2.65 dB)
4.8 GHz reference output		
Output power		+ 5 dBm ± 1.0 dB (typ.)
LO1 and LO2 spectral purity		
Harmonics		< 35 dBc (meas)
Non-harmonics		< 60 dBc (meas)

LO1 and LO2 SSB phase noise option EPN (dBc/Hz), () = typical

	Offset from carrier					
Frequency	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**	**1 MHz**
2.4 GHz	-53 (-59)	-96 (-100)	-114 (-117)	-128 (-130)	-134 (-136)	-152 (nom)
≤ 3.2 GHz	-50 (-59)	-93 (-98)	-111 (-115)	-127 (-129)	-132 (-134)	-149 (nom)
≤ 4 GHz	-51 (-56)	-91 (-95)	-109 (-113)	-123 (-127)	-131 (-133)	-148 (nom)
≤ 6 GHz	-46 (-52)	-88 (-92)	-107 (-110)	-121 (-123)	-127 (-130)	-146 (nom)
≤ 8 GHz	-46 (-51)	-75 (-82)	-99 (-105)	-119 (-121)	-126 (-128)	-144 (nom)
≤ 10 GHz	-41 (-48)	-75 (-82)	-100 (-105)	-118 (-120)	-124 (-126)	-143 (nom)
≤ 12 GHz	-40 (-46)	-76 (-82)	-98 (-102)	-115 (-118)	-122 (-124)	-139 (nom)

LO1 and LO2 SSB phase noise option LPN (dBc/Hz), () = typical

	Offset from carrier					
Frequency	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**	**1 MHz**
2.4 GHz	-44 (-50)	-78 (-81)	-100 (-103)	-115 (-119)	-127 (-129)	-152 (nom)
≤ 3.2 GHz	-43 (-48)	-75 (-79)	-97 (-100)	-113 (-117)	-124 (-127)	-149 (nom)
≤ 4 GHz	-37 (-45)	-73 (-77)	-96 (-98)	-111 (-115)	-121 (-124)	-148 (nom)
≤ 6 GHz	-34 (-41)	-69 (-73)	-91 (-94)	-107 (-111)	-118 (-121)	-146 (nom)
≤ 8 GHz	-33 (-40)	-67 (-70)	-89 (-93)	-105 (-109)	-116 (-119)	-144 (nom)
≤ 10 GHz	-33 (-39)	-66 (-69)	-87 (-90)	-103 (-107)	-114 (-117)	-143 (nom)
≤ 12 GHz	-33 (-37)	-64 (-67)	-86(-89)	-101 (-105)	-112 (-115)	-139 (nom)

4.8 GHz Output SSB phase noise option EPN (dBc/Hz), () = typical

	Offset from carrier					
Frequency	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**	**1 MHz**
4.8 GHz	-52 (-56)	-93(-95)	-109 (-113)	-126 (-128)	-130 (-132)	-151 (nom)

4.8 GHz Output SSB phase noise option LPN (dBc/Hz), () = typical

	Offset from carrier					
Frequency	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**	**1 MHz**
4.8 GHz	-39 (-44)	-72 (-76)	-94 (-97)	-113(-117)	-124 (-126)	-151 (nom)

General Performance

Environmental characteristics		
S9165A transceiver control unit	For indoor use only	
	Altitude up to 3000 m (Up to approximately 10,000 feet)	
	Operating temperature 20 to 30 °C maximum relative humidity (non-condensing): 95% RH	
Power requirements		
	Voltage & frequency	**Power consumption**
S9165A base system (PXIe chassis with modules, rugged panel, and cables)	100/120 V, 50/60 Hz 220/240 V, 50/60 Hz	1200 W Max (lower range) 1300 W Max (upper range)
Size and weights		
	Dimensions	
S9165A	Height: 197.8 mm (7.79 in); with feet installed	
	Width: 449.5 mm (17.70 in); with rugged panel	
	Depth: 568.9 mm (22.40 in); with rugged panel (from back bumper to front BNC)	
S9165A rack space	Instrument: 4 U x 1 rack width. (requires 1U below instrument for proper air flow)	
	Weight	
S9165A	26.5kg (58.42 lbs) maximum (option dependent)	
Remote programming		
Interface	LAN RJ-45	
Warranty		
Standard 1-year warranty		
Calibration cycle		
The recommended calibration cycle is one year; calibration services are available through Keysight service centers.		

S9165A Front Panel

LAN, display port, and USB connectors

LAN 1 and LAN 2 (TCP/IP interface)	
Connectors (Ethernet)	Two, 10/100/1000BASE-T (RJ-45) Gigabit Ethernet ports
Video/Dual display ports	
Connectors (video)	Dual mode display port++ connectors
USB 2.0 and 3.0	
Connectors (USB)	Two, USB 2.0 (type A)
Connectors (USB)	Two, USB 3.0 (type A)
Connectors (USB), USB control	1 through 8 depending on product option, USB 2.0 (type A)

Trig 1 and Trig 2 connectors above the rugged front panel

Trig 1 and Trig 2	
Connects behind rugged panel to M9019A PXIe Chassis Trig 1 and Trig 2. These two front panel trigger connectors (Trig 1 and Trig 2) above the rugged front panel connect to the PXI [0:7] backplane trigger bus in the M9019A chassis and can be configured as Input or Output. To learn more about these connectors, see the Keysight PXIe Chassis Family, User Guide (M9019-90003).	
Connector	BNC (f)
Direction control	Input or output (configurable)
Output level	3.3 V CMOS (TTL compatible, 5 V tolerant)
Output impedance	50 Ω (typical)
Output trigger source	PXI_Trig0 - PXI_Trig7 (segment 2 or 3)
Input level	3.3 V CMOS (TTL compatible, 5 V tolerant)
Input impedance	3 kΩ (typical)
Input trigger destination	PXI_Trig0 - PXI_Trig7 (segment 2 or 3)
Input threshold	1.65 V (typical)
Minimum swing	250 mV (typical)
Minimum pulse width	100 ns (typical)

Related Literature

For more detailed product and specification information refer to the following literature and web pages:

Keysight S9165A Start Up Guide (literature no. S9165-90001)

Keysight M9019A PXIe 18 slot Chassis, Data Sheet (literature no. 5992-1481EN)

Keysight M9035A PXIe Embedded Controller, Data Sheet (literature no. 3121-1327.EN)

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