## **Installation Guide**

## Agilent Technologies N5102A Baseband Studio Digital Signal Interface Module

Due to our continuing efforts to improve our products through firmware and hardware revisions, N5102A module design and operation may vary from descriptions in this guide. We recommend that you use the latest revision of this guide to ensure you have up-to-date product information. Compare the print date of this guide (see bottom of page) with the latest revision, which can be downloaded from the following website:

http://www.agilent.com/find/basebandstudio



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## Notice

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## **Documentation Change: Users Guide to Installation Guide**

The N5102A Baseband Studio digital signal interface module documentation has changed. The N5102A Baseband Studio Digital Signal Interface Module User's Guide (N5102-90001) has been changed to this manual, the N5102A Baseband Studio Digital Signal Interface Module Installation Guide (N5102-90003).

The following information, that was documented in the N5102A user's guide, has been moved to the signal generator documentation.

- The Operation chapter information was moved to:
  - o The Peripheral Devices chapter in the E8257D/67D PSG Signal Generators User's Guide
  - The Digital Signal Interface Module chapter in the E4428C/38C ESG Signal Generators User's Guide
- The Key descriptions were moved to:
  - o E8257D/67D PSG Signal Generators Key Reference
  - o E4428C/38C ESG Signal Generators Key and Data Field Reference
- The SCPI commands were moved to:
  - The Digital Signal Interface Module Commands chapter in the E8257D/67D PSG Signal Generators SCPI Command Reference
  - o The Digital Signal Interface Module Commands chapter in the E4428C/38C ESG Signal Generators SCPI Command Reference

If you are using software that controls the module, you can find the information in the software's Help system. If you do not have these manuals, a current online version is available on the Agilent Technologies web site (at http://www.agilent.com/find/psg, http://www.agilent.com/find/esg, or http://www.agilent.com/find/mxg).

## **Questions or Comments about our Documentation?**

We welcome any questions or comments you may have about our documentation. Please send us an E-mail at **sources\_manuals@am.exch.agilent.com**.

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# **1** Installation

This chapter provides the following:

- "Safety Information" on page 2
- "Getting Started" on page 4
- "Connecting the N5102A Module to the ESG/PSG/X-Series (N5182B/72B) or N5101A PCI Card" on page 8
- "Operation Verification" on page 11
- "Regulatory Information" on page 13

#### **Safety Information**

#### Warnings, Cautions, and Notes

The following safety notations are used throughout this manual. Familiarize yourself with each notation and its meaning before operating this product.

WARNING	<i>Warning</i> denotes a hazard. It calls attention to a condition or situation that could result in personal injury or loss of life. Do not proceed beyond a warning until the indicated conditions or situations are fully understood.	
CAUTION	<i>Caution</i> calls attention to a possible condition or situation that could result in a loss of a user's work, damage, or destruction of the product. Do not proceed beyond a caution until the indicated conditions are fully understood.	
NOTE	<i>Note</i> calls the user's attention to an important point of special information within the text. It provides operational information or additional instructions of which the user should be aware.	

#### **Instrument Markings**

The following markings are is used on the N5102A Baseband Studio digital signal interface module. Familiarize yourself with it and its meaning before operating the module.



The CE mark is a registered trademark of the European Community. If this symbol is accompanied by a year, it is the year when the design was proven.



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



The C-Tick Mark is a trademark registered to the Australian Spectrum Management Agency. This indicates compliance with all Australian EMC regulatory information.



This symbol indicates that the center conductor (of the power supply) is positive, and the outer conductor is negative.



This symbol indicates that the input power required is DC.

ICES/NMB-001

This symbol indicates compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).

#### **General Safety Considerations**

**WARNING** Personal injury may result if the module cover is removed. There are no operator serviceable parts inside. To avoid electrical shock, refer servicing to qualified personnel.

#### **Getting Started**

#### **Checking the Shipment**

1. Inspect the shipping container for damage.

Signs of damage may include a dented or torn shipping container or cushioning material that indicates signs of unusual stress or compacting.

2. Carefully remove the contents from the shipping container and verify that your order is complete.

The following items are shipped standard with each N5102A Baseband Studio digital signal interface module:

- installation guide
- three-prong AC power cord (specific to geographic location)
- power supply
- proprietary three-meter digital bus cable
- five break-out boards (PC boards with connectors that simplify the connections between the N5102A module and the device under test)
- loop back fixture (for troubleshooting)
- Device Interface port mating connector See "Rear Panel" on page 20 for connector locations.

#### **Instrument Dimensions**

Length: 189.9 mm (7.48 in)

Width: 144.8 mm (5.70 in)

Height: 41.6 mm (1.64 in)

#### **Meeting Electrical and Environmental Requirements**

The N5102A module is designed for use in the following environmental conditions:

- indoor use
- altitudes < 15,000 feet (4,572 meters)
- 0 to 55°C temperatures, unless otherwise specified

• 80% relative humidity (maximum for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C).

CAUTION	This product is designed for use in INSTALLATION CATEGORY II and POLLUTION
	DEGREE 2, per IEC 61010-1 and 664, respectively.

#### Ventilation

Ventilation holes are located on the front and rear panels of the N5102A module. Do not allow these holes to be obstructed, as they allow air flow through the module.

When installing the module in a cabinet, the convection into and out of the module must not be restricted. The ambient temperature outside the cabinet must be less than the maximum operating temperature of the module by  $4^{\circ}$ C for every 100 watts dissipated within the cabinet.

CAUTION	Damage to the module may result when the total power dissipated in the cabinet is greater than 800 watts. When this condition exists, forced convection must be applied.

#### **Line Settings**

The N5102A module requires a power supply that meets the following conditions:

Voltage:	5V
Frequency:	DC
Current:	4.0A

The module's *power supply* requires a power source that meets the following conditions:

Voltage:	100–240V
Frequency:	50-60 Hz
Current:	0.7A

**CAUTION** Damage may result if a supply voltage is not within its specified range.

#### Installation Getting Started

#### **Connecting the AC Power Cord**

This is a Safety Class 1 Product provided with a protective earth ground incorporated into the power cord. The AC power cord is the device that disconnects the mains circuits from the mains supply. In addition, an external circuit breaker, readily identifiable and easily reached by the operator, should be available for use as the disconnecting device. Use the following steps to connect the AC power cord:

# **WARNING** Personal injury may occur if there is any interruption of the protective conductor inside or outside of the product. Intentional interruption is prohibited.

# **CAUTION** Damage to the product may result without adequate earth grounding. Always use the supplied three-prong AC power cord.

- 1. Ensure that the power cord is not damaged.
- 2. Install the product so that one of the following items is readily identifiable and easily reached by the operator: AC power cord, alternative switch, or circuit breaker.
- 3. Insert the mains plug into a socket outlet provided with a protective earth grounding.

#### **AC Power Cord Localization**

The AC power cord included with the module is appropriate for the final shipping destination. You can, however, order additional AC power cords for use in different areas: see "Replaceable Parts" on page 50.

#### **Proper Usage and Cleaning**

The N5102A module cover protects against physical contact with internal assemblies that contain hazardous voltages, but does not protect against the entrance of water. To avoid damage and personal injury, ensure that liquid substances are positioned away from your N5102A module.

# WARNING Personal injury may result if the N5102A module is not used as specified. Unspecified use impairs the protection provided by the equipment. The N5102A module must be used with all means for protection intact.

#### **Cleaning Suggestions**

To prevent dust build-up that could potentially obstruct ventilation, clean the N5102A module cover periodically. Use a dry cloth, or one slightly dampened with water, to clean the external case parts.

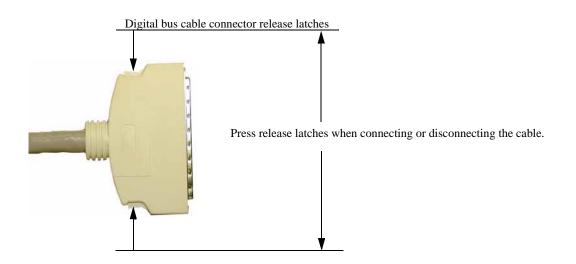
# WARNING Electrical shock may result if the N5102A module is not disconnected from the mains supply before cleaning. Do not attempt to clean internally.

# Connecting the N5102A Module to the ESG/PSG/X-Series (N5182B/72B) or N5101A PCI Card

The N5102A digital signal interface module is used with an Agilent E4438C ESG<sup>1</sup>, E8267C PSG<sup>1</sup>, E8267D PSG<sup>1</sup>, X-Series (N5182B/72B), or a PC with an installed Agilent N5101A PCI card being used with software<sup>2</sup> engineered to control the N5102A module.

This section provides information on connecting the N5102A module to a signal generator or N5101A PCI card. The illustrations in this procedure show the N5102A module being connected to an ESG signal generator, however, the connection process is the same for a PSG signal generator or a PCI card installed in a PC. For more information on the N5101A PCI card, see the *N5101A Installation Guide*.

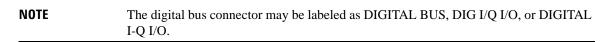
**CAUTION** The digital bus cable connector has a release latch on each side (as shown below). To avoid connector damage, simultaneously squeeze both release latches when connecting or disconnecting the cable. A securely connected cable does not come loose when gently pulled.

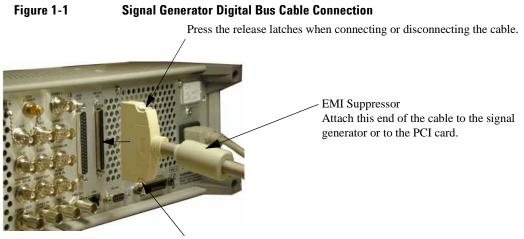


<sup>1.</sup> Requires Options 003 and/or 004, and either 601(if available) or 602.

<sup>2.</sup> For example, the N5110B Baseband Studio for waveform capture and playback software is designed to control the N5102A module.

1. Refer to Figure 1-1. Connect the end of the digital bus cable that has the EMI suppressor to the signal generator or PCI card's digital bus connector.



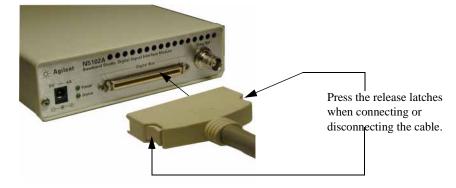


Press the release latches when connecting or disconnecting the cable.

2. Refer to Figure 1-2. Connect the other end of the digital bus cable to the Digital Bus connector on the N5102A module.

The proprietary three meter cable enables you to place the interface module in a location close to the device under test (DUT).

Figure 1-2 N5102A Module Digital Bus Cable Connection



#### Installation Connecting the N5102A Module to the ESG/PSG/X-Series (N5182B/72B) or N5101A PCI Card

- 3. Refer to Figure 1-3. Connect the AC power cord to both the power supply and the AC power source (for details on connecting an AC power cord to an AC power source, see "Connecting the AC Power Cord" on page 6).
- 4. Connect the power supply to the N5102A module DC power receptacle.

#### Figure 1-3 N5102A Module Power Supply Connections

AC Power



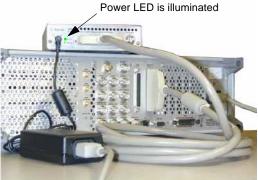


DC Power

The power LED should be illuminated, indicating that the interface module is connected to the power source. If the power LED is not illuminated, check the AC power connection for the power supply and ensure that the DC power supply plug is fully inserted into the N5102A module DC power receptacle. If problems still persist after checking the power cords, refer to Chapter 4, "Troubleshooting," on page 43.

Figure 1-4 shows a completed installation.

#### Figure 1-4 **Completed N5102A Module Installation**



#### Note:

This illustration shows the N5102A module connected to an ESG signal generator. Connections to a PSG signal generator or an N5101A PCI card are similar.

#### **Operation Verification**

This section describes how to verify the operation of the N5102A module when connected to an ESG or PSG signal generator. The operation verification uses the device interface test (Device Intfc), which is one of four interface module diagnostic tests, referred to as loop back tests. This loop back test checks the complete setup, providing a high level of confidence that the system is functioning properly. The three other tests are used if this test fails, and are described in "Running Diagnostic Tests" on page 46.

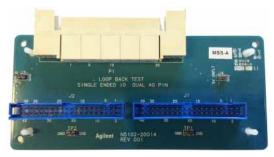
If your N5102A interface module is connected to an N5101A PCI card in a PC, operation verification occurs through the controlling software (for example, N5110B Baseband Studio for waveform capture and playback). For more information, see the software's documentation.

**CAUTION** The Device Interface connector on the interface module communicates using high speed digital data. Use ESD precautions to eliminate potential damage when making connections.

- 1. Connect the N5102A module to the signal generator (as described in "Connecting the N5102A Module to the ESG/PSG/X-Series (N5182B/72B) or N5101A PCI Card" on page 8).
- 2. Refer to Figure 1-5. Connect the Loop Back Test Single Ended IO Dual 40 Pin board to the Device Interface connector on the rear panel of the N5102A module.

#### Figure 1-5 Connecting the Loop Back Board to the N5102A Module

Loop Back Test Single Ended IO Dual 40 Pin Board



Connecting the Board to the Device Interface Connector



The Loop Back Test Single Ended IO Dual 40 Pin board is used both for loop back testing and as a break-out board to simplify the connection between the N5102A module and the device under test. When used for loopback testing, there should be no connections to the dual 40-pin connectors.

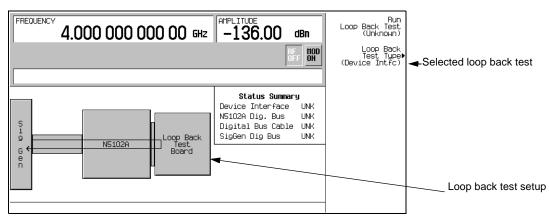
3. If the signal generator is not already on, turn it on.

4. On the signal generator, select the device interface test:

#### Press Aux Fctn > N5102A Interface > Diagnostics > Loop Back Test Type > Device Intfc.

As shown in Figure 1-6, the currently selected test is displayed in parenthesis below the **Loop Back Test Type** softkey. Note also that the graphic provided displays the current test setup.

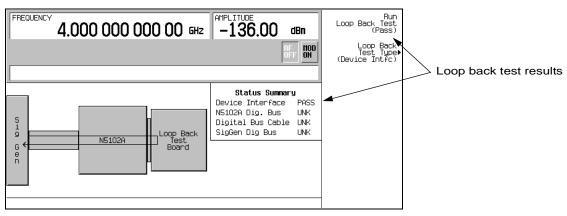
#### Figure 1-6 ESG/PSG/X-Series (N5182B/72B) Diagnostic Test Display



5. Run the selected test: press Run Loop Back Test.

When the test completes, the results of the test (pass or fail) replaces Unknown in both the parenthesis with the softkey and in the Status Summary display as shown in Figure 1-7. If this test fails, refer to "Running Diagnostic Tests" on page 46.

Figure 1-7 ESG/PSG/X-Series (N5182B/72B) Loop Back Test Result



#### **Regulatory Information**

#### **Statement of Compliance**

This product has been designed and tested in accordance with IEC Publication 61010, *Safety Requirements for Electronic Measuring Apparatus*, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

#### Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products. For any assistance, contact Agilent Technologies (see page 51).

#### Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory.

This product does not require calibration.

#### **Declaration of Conformity**

A declaration of conformity is on file for this product, and a copy is available upon request.

#### **Compliance with German Noise Requirements**

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrerordnung –3.GSGV Deutschland).

 Table 1-1
 German Noise Requirements

Acoustic Noise Emiss	sion/Geraeuschemission
LpA < 70 dB	LpA < 70 dB
Operator position	am Arbeitsplatz
Normal position	normaler Betrieb
per ISO 7779	nach DIN 45635 t.19

Installation
Regulatory Information

#### **Compliance with Canadian EMC Requirements**

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB du Canada.

# 2 Overview

This chapter describes the features of the N5102A Baseband Studio digital signal interface module along with the options required for its operation.

- "Features" on page 16
- "Front Panel" on page 18
- "Rear Panel" on page 20

#### **Features**

The N5102A Baseband Studio digital signal interface module works with the Agilent E4438C ESG<sup>1</sup>, E8267C PSG<sup>1</sup>, E8267D PSG<sup>1</sup>, X-Series (N5182B/72B), or N5101A PCI card installed in a PC to provide a flexible digital interface for delivering digital baseband (IQ) or digital intermediate frequency (IF) test signals. The complex modulation formats of the signal generators, including W-CDMA, multitone, 1xEV-DV, WLAN and many more, are available at the bit level for testing digital components, transceivers, and subsystems. The N5102A module delivers the digital IQ or digital IF<sup>2</sup> signals to your device with the data requirements, clock features, and signaling you need. With its selection of logic types and break-out board connectors, the interface module connects into your test system, in most cases eliminating the need for custom fixtures.

The N5102A module provides many features:

- output mode (requires Option 003 for ESG/PSG/X-Series (N5182B/72B) or Option 195 for N5110B waveform playback)
- input mode (requires Option 004 for ESG/PSG/X-Series (N5182B/72B) or Option 194 for N5110B waveform capture)
- bit level access to arbitrary waveform generator (ARB) and real-time signal generator baseband data from a wide range of signal creation applications
- simple user interface
- flexible data formats
  - variable 4-bit to 16-bit word size
  - serial, parallel, and parallel interleaved data transmission
  - 2's complement or offset binary word representation
  - MSB or LSB bit order
  - digital IQ or digital  $IF^2$  signal
- flexible clocking
  - automatic resampling
  - 1 kHz to 100 MHz sample rate
  - multiple clock inputs and outputs
  - 1. Requires Options 003 and/or 004, and either Option 601 or 602.

<sup>2.</sup> Digital IF only available for output mode.

- adjustable clock phase and skew
- multiple clocks per sample 1x, 2x, and 4x (Output mode only. Input mode is limited to 1x.)
- flexible signal interface
  - multiple logic types provide single ended and differential testing capability—low voltage TTL (LVTTL), LVDS, and CMOS 1.5 V, 1.8 V, 2.5 V, and 3.3 V
  - proprietary three meter digital bus cable connects the N5102A module to the signal generator
  - interchangeable break-out boards

When connected to an ESG, PSG, or X-Series (N5182B/72B) signal generator the parameters for the N5102A module are set using the user interface (UI) on the ESG/PSG/X-Series (N5182B/72B). This provides familiar softkey operation for both the modulation format and the interface module. Option 003 (output mode) and Option 004 (input mode) on the ESG/PSG/X-Series (N5182B/72B) enable the N5102A module user interface on the signal generators.

When connected to an N5101A PCI card, the parameters for the N5102A module are set using the UI on the controlling software (for example, N5110B Baseband Studio waveform capture and playback). This provides intuitive operation for both the waveform setup and the interface module in a single software application.

With the capability of connecting an N5102A module to a signal generator or an N5101A PCI card, you can perform multiple levels of testing. Since the baseband data that is provided to the interface module is the same data that can be modulated onto the RF carrier, this enables early-stage testing of digital components and subsystems with the N5102A module, and then testing the integrated system using the modulated RF carrier.

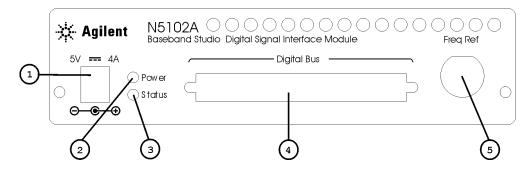
The N5102A digital interface module does not support the Real Time GPS format.

#### Overview Front Panel

### **Front Panel**

The baseband data and frequency reference inputs for the N5102A module are located on the front panel along with the receptacle for the DC power. A Power LED indicates when DC power has been applied and a Status LED shows when the data lines are active.

#### Figure 2-1 Front Panel Features



#### **1. DC Power Receptacle**

This receptacle accepts the DC power cord from the power supply. A DC power cord is shipped with the interface module.

#### 2. Power LED

This LED illuminates when DC power is supplied to the N5102A module.

#### 3. Status LED

This LED illuminates when the interface module is first turned on by an ESG, PSG, X-Series (N5182B/72B), or controlling software.

- For the ESG/PSG/X-Series (N5182B/72B), press the **N5102A Off On** softkey in the signal generator UI or after performing a module diagnostic test. Once lit, the LED stays on until the DC power is removed from the interface module.
- For controlling software, refer to the software's Help system for module control information.

The LED conveys the status of the data lines and has two modes of operation:

Blinks Rapidly This indicates that the data lines are active and ready to transmit or are transmitting a digital signal.

Solid Illumination The data lines are inactive.

#### 4. Digital Bus Connector

The N5102A module uses this connector to communicate with the ESG, PSG, X-Series (N5182B/72B), or PCI card. A proprietary three-meter digital bus cable is supplied that connects to the Digital Bus connector.

#### 5. Freq Ref Connector

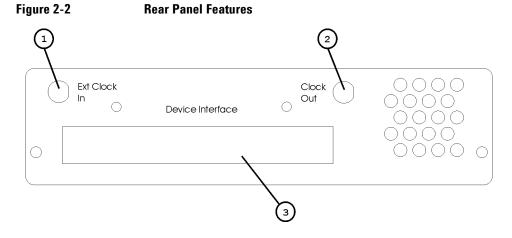
When Internal is the selected clock source, the clock is referenced to this 50W connector. This connector accepts an external clock at 3 dBm  $\pm 6$  dB within the frequency range of 1 MHz to 100 MHz.

CAUTION	us re	is important that the interface module, the DUT, and the signal generator (if one is being ed) are locked to a common frequency reference. Failure to have a common frequency ference may result in a loss of data. Also refer to the common frequency reference formation in:
	•	E4428C/38C ESG Signal Generators User's Guide Digital Signal Interface Module chapter
	•	E8257D/67D PSG Signal Generators User's Guide Peripheral Devices chapter
	•	X-Series Signal Generators User's Guide

• Help system in the software that controls the N5102A module.

### **Rear Panel**

The rear panel has three connectors that are shown in Figure 2-2 and are described in the following sections.



#### **1. Ext Clock In Connector**

This AC coupled 50W connector is used for connecting an external clock source to the N5102A module. It accepts a signal with a nominal amplitude of 0 dBm and has a frequency range of 1 MHz to 400 MHz.

- **CAUTION** It is important that the interface module, the DUT, and the signal generator (if one is being used) are locked to a common frequency reference. Failure to have a common frequency reference may result in a loss of data. Also refer to the common frequency reference information in:
  - E4428C/38C ESG Signal Generators User's Guide Digital Signal Interface Module chapter
  - E8257D/67D PSG Signal Generators User's Guide Peripheral Devices chapter
  - X-Series Signal Generators User's Guide
  - Help system in the software that controls the N5102A module.

#### 2. Clock Out Connector

This 50W connector outputs the clock signal at a nominal 400 mVp-p level with a frequency range of 100 kHz to 400 MHz. For a frequency range of 1 kHz to 100 kHz, a high impedance load of 5 kW produces a nominal 2 Vp-p clock signal.

#### 3. Device Interface Connector

This connector interfaces with the device under test and supplies the digital IQ and digital IF signals in addition to sense lines, ground connections, a DC supply, and input and output clock signals. For more information on this connector, including a pin-out diagram, see "Device Interface Connector" on page 34.

CAUTION	The Device Interface connector on the interface module communicates using high speed
	digital data. Use ESD precautions to eliminate potential damage when making connections.

Overview **Rear Panel** 

## **3** Device Interface Connections

This chapter provides information for the N5102A module Device Interface connector, the supplied break-out boards, and the device interface mating connector.

- "Break-Out Boards" on page 24
- "Device Interface Connector" on page 34
- "Device Interface Mating Connector" on page 39

#### **Break-Out Boards**

This section describes the different break-out boards and provides pin-out diagrams for each one.

To maximize signal integrity, make the device connection as close as possible to the N5102A module Device Interface connector. The break-out boards are supplied to aid in minimizing this distance. An alternate solution is to incorporate the device interface mating connector onto the device under test (DUT). This eliminates the need for the break-out board and connecting cables.

Five interchangeable break-out boards are supplied with the N5102A module, each with a different type of connector, providing a wide range of connection possibilities. The break-out boards connect to the Device Interface connector on the rear panel of the module. The different boards are easily identified by their connector. If the situation arises where none of the break-out boards mate with the device being tested, make a customized connection solution using the device interface mating connector. See "Device Interface Connector" on page 34 and "Device Interface Mating Connector" on page 39 for information. Table 3-1 lists the five break-out boards and the test type for which each is intended.

Break-Out Board	Test Type	Comment	
Single Ended I/O Dual 20 Pin	Single-ended	0.1 inch spaced header	
		This connector is commonly used for Agilent logic analyzer probe connections.	
Differential I/O Dual 38 Pin	Differential	This connector is commonly used for Agilent logic analyzer probe connections.	
Loop Back Test Single Ended IO	Single-ended	0.1 inch spaced header	
Dual 40 Pin		This board serves a dual purpose:	
		• as a break-out board for DUT connectivity	
		• used for N5102A module diagnostic testing	
Single Ended I/O 68 Pin	Single-ended	Single SCSI-style connector	
Differential I/O Dual 100 Pin	Differential	This connector is commonly used for Agilent logic analyzer probe connections.	

The mating connectors for the break-out boards are readily available from suppliers external to Agilent Technologies and are listed in Table 3-2 along with the connectors already mounted on the boards.

Connector Type	Break-out Board Output Connector Manufacturer Part Number	Mating Connector Manufacturer Part Number	Manufacturer
20-Pin	2520-6002UB	3421-6700 (wire connector)	3M
38-Pin Mictor	2-767004-2	767006-1 (board connector)	Tyco Electronics
40-Pin	2540-6002UB	3417-6700 (wire connector)	3M
68-Pin D-Subminiature	787170-7	749621-7 (wire connector)	Tyco Electronics
100-Pin Samtec	ASP-65067-01	ASP-65267-02 (wire connector) Samtec	

#### Table 3-2 Connector Part Numbers and Manufacturers

#### Table 3-3 Clock, Marker, and Trigger Zero-ohm Resistor Installation

Board Type	Data Clock	Marker 1 and Trigger	Marker 2	
63003 Dual 40 Pin	No zero-ohm resistors are required			
63004 Dual 20 Pin	J2–2 <–> C2	J1-2 <-> C12	J2-1 <-> D2	
63005 Mictor	J2–1 <-> C2 (pos. clock) J2–2 <-> C1 (neg. clock)	J1-1 <-> C12 J1-2 <-> C11	N/A	
63006 Samtec	No zero-ohm resistors are required			
63007 SCSI	J1-66 <-> C2	Not available		

#### **Dual 20-Pin Break-Out Board**

Use this break-out board when single-ended testing is required and there are minimal connection points. It is most suitable at lower sample rates using easily constructed ribbon cables. Figure 3-1 shows this board along with the pin-out diagram for the connectors. The 20-pin connectors are a common 0.1 inch spaced header. Notice that the parallel I and Q signals are separated by connectors; J1 provides the Q signals and J2 provides the I signals. The serial signals are also provided on the J2 connector.

To enable the use of clock, trigger, marker 1, or marker 2 signals with this break-out board, zero-ohm resistors must be installed between the contacts for the desired signals, as shown in Figure 3-1. Refer to Table 3-3 on page 25 for a list of required connections.

#### Device Interface Connections Break-Out Boards

The VCCIO (selected high logic level voltage) is obtained at J3, while the + 5 volt unfiltered DC supply is acquired at J4.

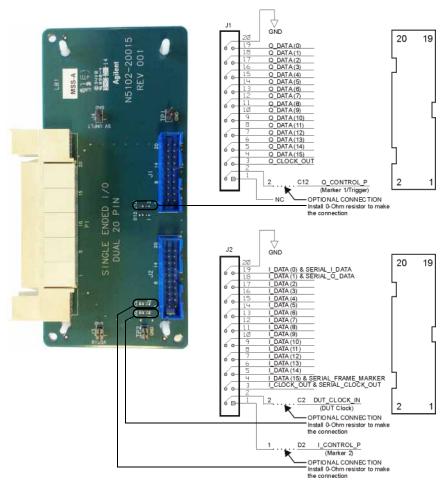


Figure 3-1 Dual 20-Pin 0.1 Spaced Connector

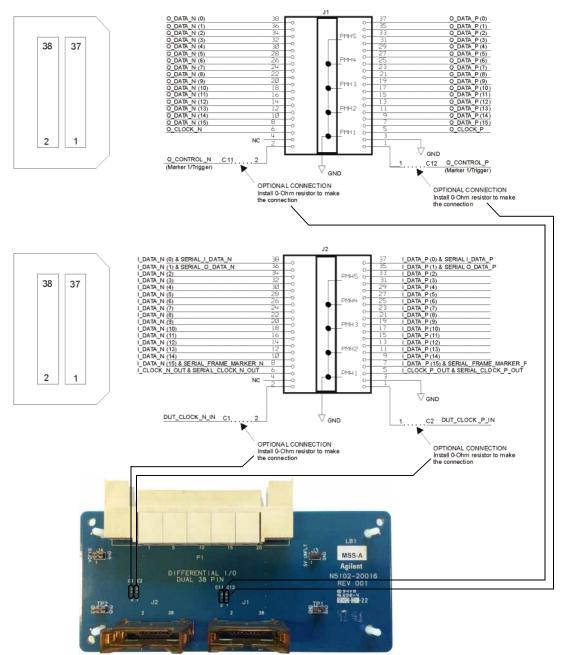
#### **Dual 38-Pin Break-Out Board**

This board is intended for differential testing, however it can also be used for single-ended signals. For single-ended signals, the data is transmitted on the positive lines. Figure 3-2 shows this break-out board along with the pin-out diagram for the connectors. Notice that the parallel I and Q signals are separated by connectors; J1 provides the Q signals and J2 provides the I signals. The serial signals are also provided on the J2 connector.

To enable the use of clock (positive or negative), trigger, marker 1, or marker 2 signals with this break-out board, zero-ohm resistors must be installed between the contacts for the desired signals, as shown in Figure 3-2. Refer to Table 3-3 on page 25 for a list of required connections.

The VCCIO (selected high logic level voltage) is obtained at J4, while the + 5 volt unfiltered DC supply is acquired at J3.

#### Device Interface Connections Break-Out Boards



#### Figure 3-2 D

#### **Dual 38-Pin Mictor Connector**

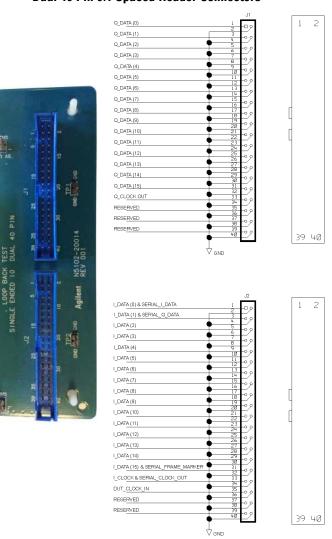
#### **Dual 40 Pin Break-Out Board**

This break-out board is useful for higher rate single-ended signals that benefit from a ground associated with each signal line. The 40-pin connectors are a common 0.1 inch spaced header. Figure 3-3 shows this break-out board along with the pin-out diagram for the connectors. Notice that the parallel I and Q signals are separated by connectors; J1 provides the Q signals and J2 provides the I signals. The serial signals are also provided on the J2 connector.

This board serves a dual function, one as a break-out board simplifying the connectivity of the device under test and the other as a loop back test board when performing N5102A module diagnostic tests.

The VCCIO (selected high logic level voltage) is obtained at J3, while the + 5 volt unfiltered DC supply is acquired at J4.

#### Device Interface Connections Break-Out Boards



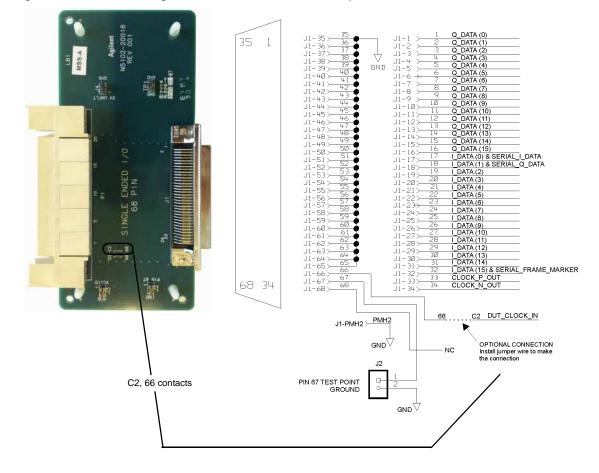
#### Figure 3-3 Dual 40 Pin 0.1 Spaced Header Connectors

# Single 68-Pin SCSI Style Break-Out Board

This break-out board is intended for single-ended testing. The connector is a SCSI style interface that is compatible with some existing products that provide a digital data output. The serial signals are transmitted on the I data lines. Figure 3-4 shows this break-out board along with the pin-out diagram for the output connector.

For the N5102A module to receive a clock through the Device Interface connector by way of this break-out board, a zero-ohm resistor must be installed between the 66 to C2 contacts. This is shown in Figure 3-4.

The VCCIO (selected high logic level voltage) is obtained at J3, while the + 5 volt unfiltered DC supply is acquired at J4.



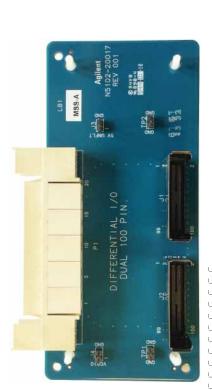
### Figure 3-4 Single 68-Pin D-Subminiature SCSI Style Connector

## **Dual 100-Pin Break-Out Board**

This break-out board is intended for differential testing, however it can also be used for single-ended signals. For single-ended signals, the data is transmitted on the positive lines. Figure 3-5 shows this break-out board along with the pin-out diagram for the connectors. Notice that the parallel I and Q signals are separated by connectors; J1 provides the Q signals and J2 provides the I signals. Serial signals are also provided on the J2 connector.

The VCCIO (selected high logic level voltage) is obtained at J4, while the + 5 volt unfiltered DC supply is acquired at J3.

#### Figure 3-5 **Dual 100-Pin Samtec Connector**

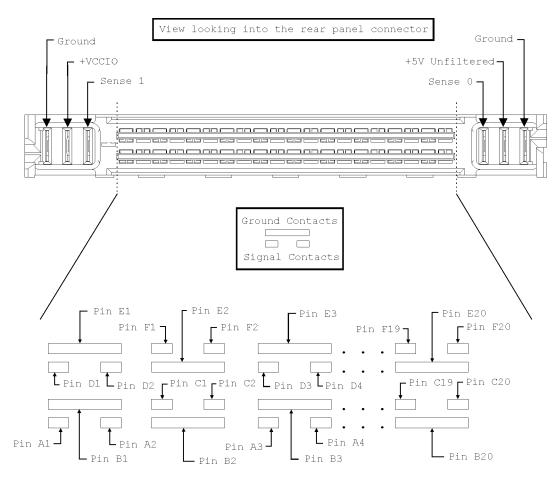


NC         State		1	J1		
0_048A_N(0)       0_048A_P(0)       0_048A_P(0)       1       2         0_048A_N(1)       0_048A_P(0)       0_048A_P(0)       0_048A_P(0)       0_048A_P(0)         0_048A_P(0)       0_048	NC		JI-2>2 JI-4>6 NC		`
QARAN (1)       T	Q_DATA_N (0)		JI-8) 8 Q_DATA_P (0)	1	2
0.047A (12)       12       11       11       12       0.047A (12)         0.047A (12)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (12)         0.047A (13)       12       11       12       0.047A (12)       0.047A (13)         0.047A (13)       12       11       12       0.047A (13)       0.047A (13)         0.047A (13)       12       11       12       0.047A (13)       0.047A (13)         0.047A (13)       12       11       12       12       0.047A (13)         0.047A (13)       0.047A (13)       0.047A (13)       0.047A (13)       0.047A (13)         0.047A (13)       0.047A (13)       0.047A (13)       0.047A (13)       0.047A (13)         0.047A (13)       0.0	Q_DATA_N (1)		J1-10) 12 Q_DATA_P (1)		
Q.DATA.N(3)       10       10       10       10       20       Q.DATA.P(3)         Q.DATA.N(4)       20       10       20       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(5)       20       10       20       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(5)       20       10       20       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(6)       70       10       10       20       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(6)       70       10       10       10       20       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(10)       70       10       10       10       10       Q.DATA.P(4)       Q.DATA.P(4)         Q.DATA.N(10)       70       10 <t< td=""><td>Q_DATA_N (2)</td><td>- I 13 (J1-15</td><td>J1-14) 16 Q_DATA_P (2)</td><td></td><td></td></t<>	Q_DATA_N (2)	- I 13 (J1-15	J1-14) 16 Q_DATA_P (2)		
0 DATA H (h)       221 (1-5)       1 (2)       4       0 DATA P (h)         0 DATA H (h)       221 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       221 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0 DATA P (h)         0 DATA H (h)       21 (1-5)       1 (2)       0	Q_DATA_N (3)		J1-18) 20 Q_DATA_P (3)		
Q DATA NI (5)     27     1 + 50     28     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     28     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     38     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     38     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     38     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     38     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     48     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     48     Q DATA P (6)       Q DATA NI (6)     27     1 + 50     48     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     48     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     48     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     Q DATA P (10)       Q DATA NI (7)     27     1 + 50     1 + 50     <	Q_DATA_N (4)		J1-22> 24 Q_DATA_P (4)		
JOLDATA, N(D)       1	Q_DATA_N (5)				
Q.DATA, N(1)       1       <	Q_DATA_N (6)	● <u>31</u> (JL-29 31 (JL-31	.11-32) 32 T G_DATA_P(0)		
Q-DATA, N(9)          • 1         • 1         • 1	Q_DATA_N (7)		J1-34) 36 Q_DATA_P (7)		
UDAA (N)       43       31-43       31-43       44       O DAA (P (9))         0 DAA (N10)       43       1-43       31-43       44       O DAA (P (10))         0 DAA (N10)       43       1-43       31-43       45       O DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       O DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       O DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       O DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       0 DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       0 DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       0 DAA (P (10))         0 DAA (N110)       43       1-43       31-43       44       0 DAA (P (10))         0 DAA (P (10)       1-43	Q_DATA_N (8)		11_107 40 Y Q_DATA_P (8)		
Q_DATA_N (10)       10 <td>Q_DATA_N (9)</td> <td>43 2.11-43</td> <td>J1-42) 44 Q_DATA_P (9)</td> <td></td> <td></td>	Q_DATA_N (9)	43 2.11-43	J1-42) 44 Q_DATA_P (9)		
Q.DATA,N(12)       1       <	Q_DATA_N (10)		J1-46 46 Q_DATA_P (10)		
Q_DATA_N (12)         32         1-53         1-55         22         Q_DATA_P (12)           Q_DATA_N (13)         555         1-56         1-56         20         Q_DATA_P (12)           Q_DATA_N (14)         555         1-56         1-56         20         Q_DATA_P (14)           Q_DATA_N (15)         555         1-56         1-56         1-56         1-56         1-56           Q_DATA_N (15)         555         1-56         1-56         1-56         1-56         1-56         1-56           Q_CLOCK_N_OUT         775         1-75         1-76         1-76         1-76         1-76         1-76           NC         775         1-73         1-78         1-78         1-76         1-76           RESERVED         575         1-67         1-78         1-78         1-78         1-78           RESERVED         575         1-67         1-78         1-78         1-78         1-78           RESERVED         575         1-68         1-78         78         1-78         1-78           RESERVED         575         1-68         1-78         78         1-78         1-78           RESERVED         575         1-78 <td< td=""><td>Q_DATA_N (11)</td><td></td><td>J1-50&gt; 52 ♥ 9 DATA P (11)</td><td></td><td></td></td<>	Q_DATA_N (11)		J1-50> 52 ♥ 9 DATA P (11)		
Q_DATA_N (13)       0       0       0       Q_DATA_N (14)       0       0       Q_DATA_N (14)       0       Q_DATA_N (14)       0       Q_DATA_N (15)       0       Q_DATA_N (16)       Q_DATA_N (16)       Q_DATA_N (16)       0       Q_DATA_N (16)	Q_DATA_N (12)	JI-53	J1-54		
0_DATA_N (14)       0_0 = 1       1 + 60       62       0_DATA_P (14)         0_DATA_N (15)       0_0 = 1       1 + 60       62       0_DATA_P (15)         0_CLOCK_N_OUT       0_0 = 1       1 + 70       1 + 70       1 + 70       1 + 70         0_CLOCK_N_OUT       0_0 = 1       1 + 70       1 + 70       1 + 70       1 + 70       1 + 70         0_CLOCK_N_OUT       0_0 = 1       1 + 70	Q_DATA_N (13)		J1-58> 58 Q_DATA_P (13)		
O_DATA_N (15)         O_G = 11-66 (71)         11-66 (71)         11-76 (71)         0_C = 11-76 (71)         11-76 (71)         0_C = 11-76 (71)         11-76 (71)         0_C = 11-		♦ 61	J1-62) 62 ♥ Q_DATA_P (14)		
NC         47         11-70         72         72         72         72         72         72         72         72         72         72         72         72         72         72         72		€ 65 (JL-65	J1-66) 68 • Q DATA P (15)		
NC 773 11-72 70 11-7		69 (11-69	J1-70>70		
NC         T         11-70         11-70         11-70         11-70         NC         0_CLOCK_P_OUT           RESERVED         11-80         1		◆ 73 <jl-73< td=""><td>J1-74&gt; 76 • NC</td><td></td><td></td></jl-73<>	J1-74> 76 • NC		
RESERVED       99       100         NC       100       100         NC       1000 </td <td></td> <td></td> <td></td> <td></td> <td></td>					
RESERVED       01-85		BL < JL-81	J1-80) 82 J1-82) 82 PESERVED		
RESERVED       99       100         99       100         11-90       11-90       10-90         11-91       11-90       10-90         11-92       11-90       11-90         11-93       11-90       11-90         11-93       11-90       11-90         11-93       11-90       11-90         11-93       11-90       11-90         11-93       11-90       10-90         11-93       11-90       10-90         11-90       11-90       10-90         12047       NC       5       10-70         12047       N(0)& SERIAL LDATA N       11       10-70         12047       N(1)& SERIAL DATA N       11       10-70         12047       N(1)       SERIAL DATA N       11       10-70         12047       N(1)       SERIAL DATA N       11       10-70         12047       N(2)       11       10-70       10-70       10-70         12047       N(2)       11       10-70       10-70       10-70         12047       N(2)       10-70       10-70       10-70       10-70         12047       N(2)       10-70		85 (JI-83	J1-86) 86 DECEDVED		
1         1         1         1         2         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         3         1         1         3         1         1         3         1         1         3         1         1         3         1		89 √J1-89	J1-88) 90		
NC       97       J1-96       J1-96       NC         NC       97       J1-97       J1-108       NC         NC       97       J1-97       J1-108       NC         NC       97       J1-97       J1-108       NC         VID       97       J1-97       J1-108       NC         VID       97       J2-9       VID       NC         VID       97       J2-9       VID       NC       NC         LDATA_N (0)& SERIAL_L DATA_N       17       J2-9       VID       DATA_P (0) & SERIAL_DATA_P         LDATA_N (2)       17       J2-17       J2-18       ID       LDATA_P (1) & SERIAL_Q DATA_P         LDATA_N (3)       17       J2-17       J2-18       ID       LDATA_P (2)         LDATA_N (3)       17       J2-17       J2-18       ID       LDATA_P (2)         LDATA_N (6)       27       J2-28       J2-28       J2-28       J2-28       J2-28         LDATA_N (6)       27       J2-27       J2-28       J2-28 </td <td></td> <td></td> <td>J1-92&gt;</td> <td>99</td> <td>100</td>			J1-92>	99	100
John John John John John John John John	NC		J1-96) 98 NC J1-98) 100 NC		
LDATA_N (1) & SERIAL_O_DATA_N LDATA_N (2) LDATA_N (2) LDATA_N (3) LDATA_N (3) LDATA_N (4) LDATA_N (4) LDATA_N (6) LDATA_N (6) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (8) LDATA_N (7) LDATA_N (8) LDATA_N (7) LDATA_N (8) LDATA_N (7) LDATA_N (7) LDATA_N (8) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (8) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (8) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (11) LDATA_N (12) LDATA_N (12) LDATA_N (13) LDATA_N (14) LDATA_N (15) LCATA_N (16) LCATA_N			J2-2>2		
LDATA_N (2) (2) (2) (2) (2) (2) (2) (2)			J2-6> 8 ♥   DATA P (0) & SERIAL   DATA	P	,
L DATA_N (3) 17 J2 - 18 18 J LATA_P (3) L DATA_N (4) 27 J2 - 19 J2 - 18 18 J LATA_P (3) L DATA_N (6) 27 J2 - 28 J2 - 24 26 J LATA_P (4) L DATA_N (6) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (6) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (6) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (6) L DATA_N (8) 27 J2 - 27 J2 - 28 J LATA_P (10) L DATA_N (10) 47 J2 - 27 J1 J2 - 28 J LATA_P (10) L DATA_N (10) 47 J2 - 27 J1 J2 - 28 J LATA_P (10) L DATA_N (11) 53 J2 - 25 J J2 - 28 J LATA_P (10) L DATA_N (12) 55 J2 - 25 J J2 - 28 J LATA_P (12) L DATA_N (14) 61 L2 - 61 J2 - 64 G J LATA_P (13) L DATA_N (14) 61 L2 - 61 J2 - 66 J2 - LATA_P (14) L DATA_N (14) 61 L2 - 61 J2 - 66 J2 - LATA_P (14) L DATA_N (14) 61 L2 - 61 J2 - 66 J2 - LATA_P (14) L DATA_N (14) 61 L2 - 61 J2 - 66 J2 - 1 DATA_P (14) L DATA_N (14) 61 L2 - 61 J2 - 66 J2 - 1 DATA_P (15) 8 SERIAL_FRAME_MARKER_N 67 J2 - 67 J2 - 76 J74 N C NC 77 J2 - 77 J4 N C NC 77 J2 - 77 J4 N C NC 77 J2 - 77 J4 - NC NC 77 J2 - 77 J4 - NC NC 77 J2 - 77 J2 - 77 J4 N C NC 77 J2 - 77 J4 - NC NC 77 J2 - 78 - 78 - NC NC 77 J2 - 79 - 74 - 94 - 60 NC NC 77 J2 - 79 - 74 - 94 - 60 NC NC 77 J2 - 79 - 74 - 94 - 60 NC NC 79 - 2 - 79 - 74 - 9	I_DATA_N(T) & SERIAL_Q_DATA_N		J2-6) 8 ↓ LDATA_P (0) & SER IAL_L DATA J2-8) 10 J2-10 12 ↓ LDATA_P (1) & SER IAL_Q DATA	1	2
LIDATA_N (4) 221 C2-21 12-222 221 LIDATA_P (4) LIDATA_N (6) 221 C2-25 12-26 231 LIDATA_P (4) LIDATA_N (6) 231 C2-25 12-26 231 LIDATA_P (6) LIDATA_N (6) 231 C2-25 12-26 231 LIDATA_P (6) LIDATA_N (7) 331 C2-31 22-25 12-26 231 LIDATA_P (6) LIDATA_N (7) 331 C2-31 22-3 34 LIDATA_P (6) LIDATA_N (8) 137 C2-35 22 LIDATA_P (8) LIDATA_N (8) 137 C2-35 22 LIDATA_P (8) LIDATA_N (9) 141 C2-37 32 LIDATA_P (8) LIDATA_N (9) 141 C2-44 LIDATA_P (9) LIDATA_N (9) 145 C2-44 LIDATA_P (9) LIDATA_N (10) 147 C2-44 LIDATA_P (10) LIDATA_N (11) 151 C2-44 LIDATA_P (10) LIDATA_N (12) 257 C2-55 22 LIDATA_P (11) LIDATA_N (13) 557 C2-55 22 LIDATA_P (12) LIDATA_N (14) 64 LID2-45 26 632 LIDATA_P (13) LIDATA_N (14) 64 LID2-46 LIDATA_P (14) LIDATA_N (15) 8 67 C2-56 12-66 633 LIDATA_P (15) 8 SERIAL_FRAME_MARKER_N C7 71 C2-77 74 NC NC 773 C2-73 C2-78 74 NC NC 773 C2-77 C2-78 74 NC NC 777 C2-77 74 NC NC 773 C2-77 C2-78 74 NC NC 777 C2-77 74 NC NC 77			J2-6) ■ I_DATA_P(0) & SERIAL_I_DATA J2-8) 10 I2 I_DATA_P(1) & SERIAL_Q_DATA J2-12) I2 I_DATA_P(1) & SERIAL_Q_DATA J2-12) II	1	2
LDATA_N (6)	I_DATA_N (2)	ý (J2-7 J2-9 11 (J2-11 13 (J2-13) 15 (J2-15 17 (J2-17	J2-6) B ↓ LDATA_P (0) & SERIAL_L DATA, J2-10) 10 ↓ J2-12 ↓ LDATA_P (1) & SERIAL_Q_DATA J2-12 ↓ 14 ↓ J2-14 ↓ 16 ↓ LDATA_P (2) J2-16 ↓ 18 ↓ DATA_P (3)	1	2
LDATA_N (6) 231 C2-29 12-23 12-25	I_DATA_N (2) I_DATA_N (3)	9 (J2-7 9 (J2-9 11 (J2-9 13 (J2-13 15 (J2-13 17 (J2-17 19 (J2-17 19 (J2-17 19 (J2-17 19 (J2-17) 19 (J2-19) 21 (J2-19)	12-6) = 0   DATA P (0) & SERIAL   DATA 12-8) = 10 − 12 − 1   DATA P (1) & SERIAL O DATA 12-12 − 11 − 12 − 1   DATA P (1) & SERIAL O DATA 12-10 − 13 − 1   DATA P (2) 12-10 − 13 − 1   DATA P (3) 12-20 − 22 − 1   DATA P (4) 12-22 − 22 − 1   DATA P (4)	1	2
L DATA_N (7) 1 DATA_N (8) 1 DATA_N (8) 1 DATA_N (8) 1 DATA_N (8) 1 DATA_N (8) 1 DATA_N (9) 1 DATA_N (11) 1 DATA_N (11) 1 DATA_N (11) 1 DATA_N (12) 1 DATA_N (12) 1 DATA_N (12) 1 DATA_N (13) 1 DATA_N (14) 1 DATA_N (15) & 1 DATA_N (15) &	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4)	-         -	J2-6>         ■         L_DATA_P(0) & SERIAL_LDATA_           J2-8>         ■         L_DATA_P(1) & SERIAL_O_DATA           J2-10>         12         □         L_DATA_P(1) & SERIAL_O_DATA           J2-12>         □         L_DATA_P(2)         □           J2-10>         12         □         L_DATA_P(2)           J2-10>         10         □         L_DATA_P(3)           J2-20>         22         L_DATA_P(4)         □           J2-24>         -24         L_DATA_P(4)         □           J2-24>         -24         L_DATA_P(4)         □	1	2
L DATA_N (8) 277 J2-287 38 J L DATA_P (8) J2-15 279 J2-298 38 J L DATA_P (8) J2-15 279 J2-199 440 JL DATA_P (8) J2-14 J2-249 440 JL DATA_P (9) J2-145 J2-46 45 J2-46 J2 J2-46 J2	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5)	9         22-7           9         12-7           11         32-1           12         12-13           15         32-15           17         32-17           19         32-17           23         32-17           23         32-23           25         32-25           27         32-25           23         32-27           23         32-27	12-6>         ■         1_DATA_P(0) & SERIAL_LDATA_           12-8>         1_DATA_P(1) & SERIAL_O_DATA           21-10         12         1_DATA_P(1) & SERIAL_O_DATA           21-21         14         1_DATA_P(1) & SERIAL_O_DATA           21-21         14         1_DATA_P(2)           2-10         16         1_DATA_P(3)           2-10         18         1_DATA_P(3)           2-22         22         1_DATA_P(4)           2-24         24         1_DATA_P(5)           2-26         23         1_DATA_P(5)           2-30         32         1_DATA_P(6)	1	2
L DATA_N (9) 41	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (6)	-         -	J2-6)         B         I_DATA_P(0) & SERIAL_LDATA.           J2-8)         B         I_DATA_P(1) & SERIAL_O_DATA.           J2-12>         I_DATA_P(1) & SERIAL_O_DATA.           J2-13         I         I_DATA_P(2).           J2-14>         I_DATA_P(2).           J2-15>         I_DATA_P(2).           J2-16>         I_DATA_P(3).           J2-18>         I_DATA_P(3).           J2-20>         Z2           J2-20>         Z2           J2-20>         Z4           J2-20>         Z4           J2-20>         Z4           J2-30>         J2           J2-30>         J4           J2-30>         J4           J2-30>         J4           J2-30>         J4           J2-30>         J4           J2-30>         J4           J4         J4           J4 <t< td=""><td>1</td><td>2</td></t<>	1	2
LDATA_N (10) 445 22-46 46 LDATA_P (10) LDATA_N (11) 45 22-47 22-46 46 LDATA_P (10) LDATA_N (11) 53 22-47 22-46 46 LDATA_P (11) LDATA_N (12) 53 22-51 12-50 53 LDATA_P (12) 557 22-57 12-50 538 LDATA_P (13) 557 22-57 12-50 538 LDATA_P (14) 61 22-61 12-64 22 LDATA_P (13) LDATA_N (14) 61 22-61 12-64 22 LDATA_P (14) LDATA_N (15) 8 67 22-65 12-64 63 LDATA_P (14) LDATA_N (14) 61 12-61 12-64 12-64 63 LDATA_P (14) LDATA_N (14) 61 12-61 12-64 63 LDATA_P (15) 8 SERIAL_FRAME_MARKER_N 69 22-65 12-66 63 LDATA_P (15) 8 SERIAL_FRAME_MARKER_N 69 22-67 12-68 12-68 78 V NC 773 12-77 12-78 78 V LCLK_N & SERIAL_CLK_N_OUT 79 22-77 12-78 NC LCLK_N & SERIAL_CLK_N_OUT 79 22-77 12-78 NC LCLK_N & SERIAL_CLK_N_OUT 79 22-79 12-68 86 RESERVED LCLK_N & SERIAL_CLK_N_OUT 79 22-79 12-68 86 RESERVED MC 97 22-89 12-89 99 NC NC 97 22-89 12-89 99 NC NC 97 22-99 12-100 NC NC 97 22-99 12-100 NC	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (6) I_DATA_N (7)	9	12-6)         ■         1_DATA_P(0) & SERIAL_DATA_           12-8)         ■         1_DATA_P(1) & SERIAL_O_DATA           21-12)         ■         1_DATA_P(1) & SERIAL_O_DATA           21-12)         ■         1_DATA_P(2)           21-13         ■         1_DATA_P(2)           21-14)         ■         1_DATA_P(2)           21-15         ■         1_DATA_P(2)           21-16         ■         1_DATA_P(3)           22-20         22	1	2
LDATA_N (11) LDATA_N (12) LDATA_N (12) LDATA_N (12) LDATA_N (12) LDATA_N (13) ST U2-55 LDATA_N (14) LDATA_N (14) LDATA_N (14) LDATA_N (14) LDATA_N (14) LDATA_N (14) LDATA_N (14) LDATA_N (15) SERIAL_FRAME_MARKER_N NC 773 L2-55 SERIAL_FRAME_MARKER_N NC 773 L2-57 NC 773 L2-57 L2-59 NC 773 L2-57 12-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-69 NC 773 L2-77 L2-78 NC NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 773 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-89 NC 775 L2-79 L2-79 L2-89 NC NC 775 L2-79 L	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (6) I_DATA_N (7) I_DATA_N (8)	9	12-6>         6         1         DATA P (0) & SERIAL L DATA,           12-8         10         12         L DATA, P (1) & SERIAL Q DATA           12-10         12         L DATA, P (1) & SERIAL Q DATA           12-11         14         L DATA, P (1) & SERIAL Q DATA           12-14         14         L DATA, P (2)           12-15         16         L DATA, P (3)           12-18         10         12           13-20         22         L DATA, P (3)           12-22         23         24           13-230         23         L DATA, P (6)           12-30         30         L DATA, P (6)           12-30         12         12           12-30         30         L DATA, P (6)           12-30         30         L DATA, P (6)           12-30         30         L DATA, P (6)           12-30         40         L DATA, P (7)	1	2
LOATA_N (12) 557 U-269 U-265 LOATA_P (12) LOATA_N (13) 557 U-265 U-265 S6 LOATA_P (12) LOATA_N (13) 557 U-265 S6 LOATA_P (13) LOATA_N (14) 661 U-261 U-260 600 LOATA_P (13) LOATA_N (14) 661 U-261 U-262 600 LOATA_P (14) LOATA_N (14) 661 U-264 U-266 U-264	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (6) I_DATA_N (7)	9         22-7           9         13           13         22-9           13         22-19           15         22-19           15         22-19           221         22-19           221         22-23           231         22-23           237         22-23           237         22-23           331         22-27           333         22-37           337 <t< td=""><td>J2-6&gt;         0         I_DATA_P(0) &amp; SERIAL_I_DATA_P(1)           J2-10         12         L_DATA_P(1) &amp; SERIAL_O_DATA           J2-14         14         L_DATA_P(1)           J2-15         14         L_DATA_P(1)           J2-16         18         L_DATA_P(1)           J2-16         19         L_DATA_P(1)           J2-16         10         L_DATA_P(1)           J2-18         10         L_DATA_P(1)           J2-18         10         L_DATA_P(1)           J2-20         22         L_DATA_P(1)           J2-20         24         L_DATA_P(1)           J2-30         32         L_DATA_P(1)</td><td>1</td><td>2</td></t<>	J2-6>         0         I_DATA_P(0) & SERIAL_I_DATA_P(1)           J2-10         12         L_DATA_P(1) & SERIAL_O_DATA           J2-14         14         L_DATA_P(1)           J2-15         14         L_DATA_P(1)           J2-16         18         L_DATA_P(1)           J2-16         19         L_DATA_P(1)           J2-16         10         L_DATA_P(1)           J2-18         10         L_DATA_P(1)           J2-18         10         L_DATA_P(1)           J2-20         22         L_DATA_P(1)           J2-20         24         L_DATA_P(1)           J2-30         32         L_DATA_P(1)	1	2
LDATA_N (13) LDATA_N (14) LDATA_N (14) LDATA_N (15) & 517	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (8) I_DATA_N (7) I_DATA_N (8) I_DATA_N (8) I_DATA_N (9)	9 9 13 14 15 15 15 15 15 15 15 15 15 15	J2-6)         B         LDATA,P(0) & SERIAL_LDATA,           J2-8)         I_DATA,P(1) & SERIAL_O_DATA           J2-10         I2         LDATA,P(1) & SERIAL_O_DATA           J2-11         I_DATA,P(1) & SERIAL_O_DATA           J2-12         I_DATA,P(2)           J2-10         IA           J2-20         220           J2-22         I_DATA,P(3)           J2-24         24           J2-25         25           J2-26         26           J2-27         I_DATA,P(6)           J2-28         35           J2-29         34           J2-20         22           J2-20         23           J2-24         24           J2-24         24           J2-24         24           J2-24         24           J2-24         24           J2-24         24           J2-30         35           J2-30         35           J2-30         35           J2-40         J_DATA,P (6)           J2-40         J_DATA,P (8)           J2-40         J_DATA,P (9)           J2-40         J_DATA,P (9)           J2-40	1	2
LDATA_N (14)         61         1/2-3/1         1/2-80         62         1/2-1/2           LDATA_N (14)         63         1/2-61         1/2-2/2         64         1/2-0/2         1/2-1/2           LDATA_N (15) &         65         1/2-65         1/2-66         64         1/2-0/2         1/2-1/2           LDATA_N (15) &         65         1/2-65         1/2-66         65         1/2-67         1/2-0/2           SERIAL_FRAME_MARKER_N         67         1/2-67         1/2-0/2         SERIAL_FRAME_MARKER_P         NC           NC         77         1/2-73         1/2-77         1/2-70         7/2         NC           NC         77         1/2-73         1/2-71         1/2-77         NC         NC           NC         77         1/2-73         1/2-70         7/8         NC         NC           NC         77         1/2-73         1/2-70         7/8         NC         NC           ULCLK_N & SERIAL_CLK_N_OUT         79         1/2-71         1/2-70         7/8         NC           NC         79         1/2-89         1/2-89         1/2-10         NC         1/2-10           RESERVED         83         1/2-89         1/2-89	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (6) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (10) LDATA_N (11)	$\begin{array}{c c} & g & \mathcal{R}^{-7} \\ g & \mathcal{R}^{-7} \\ & 11 & \mathcal{R}^{-1}13 \\ & \mathcal{R}^{-1}13 $	J2-6>         0         L_DATA_P(0) & SERIAL_LDATA,           J2-80         12         L_DATA_P(1) & SERIAL_O_DATA           J2-10         12         L_DATA_P(1) & SERIAL_O_DATA           J2-10         16         L_DATA_P(2)           J2-10         16         L_DATA_P(3)           J2-18         L_DATA_P(3)         J2-22           J2-18         L_DATA_P(4)         J2-23           J2-20         23         L_DATA_P(6)           J2-23         33         L_DATA_P(6)           J2-30         32         L_DATA_P(6)           J2-30         32         L_DATA_P(6)           J2-30         32         L_DATA_P(6)           J2-30         32         L_DATA_P(6)           J2-30         34         L_DATA_P(6)           J2-30         35         L_DATA_P(6)           J2-30         34         L_DATA_P(6)           J2-40         44         L_DATA_P(6)           J2-40         44         L_DATA_P(10)           J2-40         44         L_DATA_P(10)           J2-40         45         L_DATA_P(10)           J2-50         50         L_DATA_P(12)	1	2
LDATA_N (15) & 65	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12)	'9         22-7           13         22-7           13         22-7           14         22-7           15         22-7           16         22-7           17         22-7           18         22-7           19         22-7           19         22-7           10         22-7           11         22-7           12         22-7           13         22-7           14         22-7           15         22-7           16         22-7           17         22-7           18         22-7           19         22-7           10         22-7           11         22-7           12         22-7           13         22-7           13         22-7           10         22-7           11         22-7           12         22-7           13         22-7           13         22-7           13         22-7           12         22-7           13         22-7           13	J2-6)         B         LDATA_P(0) & SERIAL_LDATA,           J2-8)         LDATA_P(1) & SERIAL_O_DATA           J2-10         T2         LDATA_P(1) & SERIAL_O_DATA           J2-10         T2         LDATA_P(2)           J2-10         T6         LDATA_P(2)           J2-10         T6         LDATA_P(3)           J2-22         Z2         LDATA_P(4)           J2-24         Z4         LDATA_P(6)           J2-26         Z5         LDATA_P (6)           J2-30         Z4         LDATA_P (7)           J2-30         Z4         LDATA_P (7)           J2-30         Z4         LDATA_P (7)           J2-30         J4         LDATA_P (10)           J2-40         H6         LDATA_P (10)           J2-40         LDATA_P (10)           J2-40         LDATA_P (11)           J2-40         LDATA_P (11)           J2-50         S5           J2-50         S6         LDATA_P (12)	1	2
SERIAL_FRAME_MARKER_N         6-9         12-70         70         SERIAL_FRAME_MARKER_P           NC         71         12-71         72         72         NC           NC         71         12-71         72         NC         NC           NC         75         12-73         72         NC         NC           L_CLK_N & SERIAL_CLK_N_OUT         79         12-73         12-74         NC           L_CLK_N & SERIAL_CLK_N_OUT         79         12-73         12-74         NC           DUT_CLOCK_N_IN         83         42-83         84         DUT_CLOCK_P_IN           RESERVED         857         12-86         84         DUT_CLOCK_P_IN           RESERVED         857         12-86         86         RESERVED           97         12-81         12-80         86         RESERVED           NC         97         12-81         12-82         94           NC         97         12-75         12-76         94           NC         97         12-75         12-76         94           NC         97         12-76         12-76         94           NC         97         12-76         12-76 <td< td=""><td>LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (6) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (13)</td><td>9 9 13 14 15 15 15 15 15 15 15 15 15 15</td><td>12-6)         6         1         DATA_P(0) &amp; SERIAL_DATA_P(1)           12-10         12         L         DATA_P(1) &amp; SERIAL_O_DATA           12-11         12         L         DATA_P(1) &amp; SERIAL_O_DATA           12-11         14         L         DATA_P(2)           12-14         19         L         DATA_P(3)           12-12         L         DATA_P(3)         SERIAL_O_DATA           12-14         19         L         DATA_P(3)           12-12         L         DATA_P(3)         SERIAL_O_DATA           12-12         L         DATA_P(4)         SERIAL_O_DATA           12-20         22         L         DATA_P(6)         SERIAL_O_DATA           12-20         22         L         DATA_P(6)         SERIAL_O_DATA           12-20         23         12         DATA_P(6)         SERIAL_O_DATA           12-20         24         L         DATA_P(7)         SERIAL_O_DATA           2-20         24         L         DATA_P(7)         SERIAL_O_DATA           2-40         40         L         DATA_P(10)         SERIAL_O_DATA           2-40         40         L         DATA_P(10)         SERIAL_O_DATA</td><td>1</td><td>2</td></td<>	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (6) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (13)	9 9 13 14 15 15 15 15 15 15 15 15 15 15	12-6)         6         1         DATA_P(0) & SERIAL_DATA_P(1)           12-10         12         L         DATA_P(1) & SERIAL_O_DATA           12-11         12         L         DATA_P(1) & SERIAL_O_DATA           12-11         14         L         DATA_P(2)           12-14         19         L         DATA_P(3)           12-12         L         DATA_P(3)         SERIAL_O_DATA           12-14         19         L         DATA_P(3)           12-12         L         DATA_P(3)         SERIAL_O_DATA           12-12         L         DATA_P(4)         SERIAL_O_DATA           12-20         22         L         DATA_P(6)         SERIAL_O_DATA           12-20         22         L         DATA_P(6)         SERIAL_O_DATA           12-20         23         12         DATA_P(6)         SERIAL_O_DATA           12-20         24         L         DATA_P(7)         SERIAL_O_DATA           2-20         24         L         DATA_P(7)         SERIAL_O_DATA           2-40         40         L         DATA_P(10)         SERIAL_O_DATA           2-40         40         L         DATA_P(10)         SERIAL_O_DATA	1	2
NC         77         32         74         NC           C         77         32         75         12         74         NC           C         77         32         75         74         NC         74         NC           C         77         32         75         75         76         NC         NC         77         32         75         12         76         76         NC         NC         77         32         75         12         77         74         NC         NC         77         32         75         12         77         74         NC         NC         77         32         77         32         77         74         NC         77         32         77         32         77         74         NC         77         32         77         74         NC         77         74         NC         77         74         NC         77         74         NC         77         74         74         74         74         74         74         74         74         74         74         74         74         74         74         74         74         74         74	I_DATA_N (2) I_DATA_N (3) I_DATA_N (5) I_DATA_N (6) I_DATA_N (6) I_DATA_N (7) I_DATA_N (7) I_DATA_N (9) I_DATA_N (10) I_DATA_N (10) I_DATA_N (11) I_DATA_N (12) I_DATA_N (13) I_DATA_N (14)	9	J2-6>         5         I_DATA_P(0) & SERIAL_LDATA_P           J2-80         12         I_DATA_P(1) & SERIAL_O_DATA           J2-10         12         I_DATA_P(1) & SERIAL_O_DATA           J2-14         I_DATA_P(2)         J2-14           J2-15         16         I_DATA_P(3)           J2-20         22         I_DATA_P(4)           J2-22         12         I_DATA_P(4)           J2-23         I_DATA_P(4)           J2-24         I_DATA_P(6)           J2-25         1_DATA_P(6)           J2-30         32           J2-40         43           J2-41         J_DATA_P(6)           J2-42         J_DATA_P(10)           J2-44         43           J2-45         53           J2-44         J_DATA_P(10)           J2-45         53           J2-45         54 <td>1</td> <td>2</td>	1	2
NC         777         J2-75         J2-76         787         NC           L_CLK_N & SERIAL_CLK_N_OUT         797         J2-77         J2-78         B87         L_CLK_P & SERIAL_CLK_P_OUT           DUT_CLOCK_N_IN         81         J2-79         J2-80         B87         L_CLK_P & SERIAL_CLK_P_OUT           DUT_CLOCK_N_IN         83         J2-81         J2-80         B87         L2-80         B87           RESERVED         87         J2-81         J2-80         98         RESERVED         B79         J2-90         90         RESERVED         B79         J2-91         J2-93         92         RESERVED         B79         J2-95	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (6) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (12) LDATA_N (13) LDATA_N (14) LDATA_N (15) & SERIAL_FRAME_MARKER_N	9         22-7           9         11           13         22-19           13         22-19           15         22-19           15         22-19           17         12           17         22-19           221         22-23           227         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           237         22-23           242-237         23-33           333         22-23           242-23         23-33           337         22-37           247         22-37           333         22-37           333         22-37           337         22-37           337         22-37           337         22-37           337         22-37           337         22-37           337	J2-6>         ■         L_DATA_P (I) & SERIAL_L DATA,           J2-80         ■         L_DATA_P (I) & SERIAL_O_DATA           J2-10         12         L_DATA_P (I) & SERIAL_O_DATA           J2-110         12         L_DATA_P (I) & SERIAL_O_DATA           J2-110         16         L_DATA_P (I)           J2-12         L_DATA_P (I)         SERIAL_O_DATA           J2-13         ■         L_DATA_P (I)           J2-14         16         L_DATA_P (I)           J2-18         ■         L_DATA_P (I)           J2-22         >         L_DATA_P (I)           J2-230         32         L_DATA_P (I)           J2-30         32         L_DATA_P (I)           J2-40         44         L_DATA_P (I)           J2-40         44         L_DATA_P (I)           J2-40         44         L_DATA_P (I1)           J2-50	1	2
DUT_CLOCK_N_IN 81 U2-71 U2-80 82 DUT_CLOCK_P_IN B1 U2-71 U2-80 82 DUT_CLOCK_P_IN 85 U2-81 U2-81 U2-81 DUT_CLOCK_P_IN RESERVED 87 U2-81 U2-81 B8 RESERVED 87 U2-81 U2-80 98 RESERVED 97 U2-91 U2-90 94 RESERVED 0 97 U2-97 U2-99 V2 RESERVED 0 97 U2-97 U2-99 NC NC 97 U2-97 U2-98 96 NC NC 97 U2-97 U2-98 NC	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (6) LDATA_N (7) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (13) LDATA_N (15) & SERIAL_FRAME_MARKER_N NC	•         9	J2-6>         B         L DATA P (0) & SERIAL L DATA,           J2-80         I         LDATA, P (1) & SERIAL_O DATA,           J2-10         I2         L         LDATA, P (1) & SERIAL_O DATA,           J2-110         I2         L         LDATA, P (1) & SERIAL_O DATA,           J2-110         I3         LDATA, P (1) & SERIAL_O DATA,           J2-12         L         LDATA, P (3)           J2-130         J2         LDATA, P (3)           J2-24         LDATA, P (4)         J2-24           J2-250         J2         LDATA, P (6)           J2-30         J2         LDATA, P (10)           J2-30         J2         LDATA, P (10)           J2-40         H49         LDATA, P (10)           J2-40         H49 <td< td=""><td>1</td><td>2</td></td<>	1	2
RESERVED         65         12-85         12-86         66         RESERVED           87         12-87         12-80         86         RESERVED           RESERVED         91         12-87         12-80         92         RESERVED           91         12-91         12-93         93         RESERVED         91         1200           NC         97         12-93         12-94         94         NC         91         1200           NC         97         12-97         12-96         94         NC         91         1200           NC         97         12-97         12-98         96         NC         91         1200         1200	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (10) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (15) SERIAL_FRAME_MARKER_N NC	· 9	J2-6)         0         L DATA, P (I) & SERIAL, L DATA, J2-8)           J2-10         12         L DATA, P (I) & SERIAL, O, DATA           J2-10         14         L DATA, P (I) & SERIAL, O, DATA           J2-10         16         L DATA, P (I) & SERIAL, O, DATA           J2-10         16         L DATA, P (I) & SERIAL, O, DATA           J2-10         16         L DATA, P (I)           J2-10         16         L DATA, P (I)           J2-10         16         L DATA, P (I)           J2-20         22         L DATA, P (I)           J2-21         10         DATA, P (I)           J2-22         22         L DATA, P (I)           J2-30         30         L DATA, P (I)           J2-31         10         L DATA, P (I)           J2-33         30         L DATA, P (I)           J2-34         40         L DATA, P (I)           J2-35         30         L DATA, P (I)           J2-40         44         L DATA, P (I)           J2-50         55         L DATA, P (I1)           J2-50         55         L DATA, P (I2)           J2-40         44         L DATA, P (I3)           J2-40         44         L DATA, P (I3)	1	2
NCL         099         L2-87         J2-88         091         RCGAR NLD           RESERVED         993         L2-89         100         992         100           NC         993         L2-91         J2-92         94         RESERVED         993         100           NC         997         L2-93         J2-93         NC         NC         91         100           NC         977         L2-93         J2-93         NC         NC         NC         NC           NC         977         J2-93         J2-93         NC         NC         NC         NC           NC         977         J2-93         J2-93         NC         NC         NC         NC	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (5) I_DATA_N (7) I_DATA_N (8) I_DATA_N (8) I_DATA_N (9) I_DATA_N (10) I_DATA_N (11) I_DATA_N (12) I_DATA_N (13) I_DATA_N (15)& SERIAL_FRAME_MARKER_N NC NC I_CLK_N & SERIAL_CLK_N_OUT	9         R2-79           13         R2-79           13         R2-19           13         R2-19           15         R2-19           17         R2-19           18         R2-19           19         R2-19           10         R2-19           11         R2-212           11         R2-213           11         R2-219           11         R2-219           11         R2-219           12         R2-219           13         R2-233           13         R2-233           13         R2-233           14         14           14         14           14         14           14         14           14         14           14         14           14         14           14         14           14         14           14         14           14         12           13         12           14         12           14         12           14         12           15	J2-6)         B         LDATA, P(I) & SERIAL, LDATA,           J2-8)         IDATA, P(I) & SERIAL, O, DATA           J2-10         IZ         LDATA, P(I) & SERIAL, O, DATA           J2-10         IG         LDATA, P(I)           J2-10         IG         LDATA, P(I)           J2-10         IG         LDATA, P(I)           J2-21         IDATA, P(I)         J2-22           J2-30         J2         LDATA, P(I)           J2-33         J2         LDATA, P(I)           J2-34         LDATA, P(I)         J2-35           J2-35         J2         LDATA, P(I)           J2-40         44         LDATA, P(I)           J2-40         44         LDATA, P(I)           J2-55         SS         LDATA, P(I)           J2-56         SS         LDATA, P(I)           J2-57         SS         LDATA, P(I)           J2-58         SS         LDATA, P(I)           J	1	2
NCC 937 L2-91 L2-92 34 NCC NC NC 957 L2-93 L2-94 66 NC NC 977 L2-95 L2-93 96 NC NC 977 L2-95 L2-96 NC NC 977 L2-97 L2-96 NC NC 977 L2-97 L2-98 L2-98 NC NC 977 L2-97 L2-98 NC NC 977 L2-97 L2-98 L2-98 NC NC 977 L2-97 L2-97 L2-98 NC NC 977 L2-97 L2-97 L2-97 L2-97 L2-98 NC NC 977 L2-97 L2-	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (5) I_DATA_N (7) I_DATA_N (7) I_DATA_N (8) I_DATA_N (9) I_DATA_N (10) I_DATA_N (11) I_DATA_N (12) I_DATA_N (13) SERIAL_FRAME_MARKER_N NC NC I_CLK_N & SERIAL_CLK_N_OUT DUT_CLOCK_N_N	'9         22-7           13         22-21           14         22-21           15         22-19           16         22-19           17         22-21           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-22           27         22-27           28         22-27           29         22-27           29         22-27           29         22-27           29         22-27           29         22-27           29         22-27           29         22-27 <td>J2-6&gt;         5         LDATA_P (0) &amp; SERIAL_LDATA,           J2-80         12         LDATA_P (1) &amp; SERIAL_O_DATA           J2-10         12         LDATA_P (1) &amp; SERIAL_O_DATA           J2-10         16         LDATA_P (2)           J2-10         16         LDATA_P (3)           J2-18         16         LDATA_P (3)           J2-21         16         LDATA_P (4)           J2-22         24         LDATA_P (6)           J2-23         25         LDATA_P (6)           J2-30         30         LDATA_P (6)           J2-23         25         LDATA_P (6)           J2-33         32         LDATA_P (6)           J2-34         LDATA_P (6)         J2-34           J2-35         33         LDATA_P (6)           J2-34         LDATA_P (10)         J2-35           J2-34         LDATA_P (10)         J2-35           J2-34         LDATA_P (10)         J2-35           J2-35         35         LDATA_P (10)           J2-35         35         LDATA_P (10)           J2-35         35         LDATA_P (11)           J2-35         35         LDATA_P (12)           J2-36         36         LD</td> <td>1</td> <td>2</td>	J2-6>         5         LDATA_P (0) & SERIAL_LDATA,           J2-80         12         LDATA_P (1) & SERIAL_O_DATA           J2-10         12         LDATA_P (1) & SERIAL_O_DATA           J2-10         16         LDATA_P (2)           J2-10         16         LDATA_P (3)           J2-18         16         LDATA_P (3)           J2-21         16         LDATA_P (4)           J2-22         24         LDATA_P (6)           J2-23         25         LDATA_P (6)           J2-30         30         LDATA_P (6)           J2-23         25         LDATA_P (6)           J2-33         32         LDATA_P (6)           J2-34         LDATA_P (6)         J2-34           J2-35         33         LDATA_P (6)           J2-34         LDATA_P (10)         J2-35           J2-34         LDATA_P (10)         J2-35           J2-34         LDATA_P (10)         J2-35           J2-35         35         LDATA_P (10)           J2-35         35         LDATA_P (10)           J2-35         35         LDATA_P (11)           J2-35         35         LDATA_P (12)           J2-36         36         LD	1	2
NC 97 U2-95 U2-96 NC NC 97 U2-97 U2-96 NC NC 99 U2-100 NC	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (6) LDATA_N (8) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (13) LDATA_N (15) SERIAL_FRAME_MARKER_N NC NC LCL_N & SERIAL_CLK_N_OUT DUT_CLOCK_N_IN RESERVED	9         22-79           13         22-21           13         22-21           15         22-21           17         22-19           18         22-21           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-22           277         22-23           277         22-23           277         22-23           277         22-23           277         22-23           277         22-23           277         22-23           277         22-23           277         22-33           277         22-37           277         22-37           277         22-47           277         22-51           557         22-61           277         22-77           277         22-77           801	J2-6>         6         I_DATA_P(0) & SERIAL_LDATA,           J2-10         12         LDATA_P(1) & SERIAL_QDATA,           J2-110         12         LDATA_P(1) & SERIAL_QDATA,           J2-14         11         LDATA_P(2)           J2-15         13         LDATA_P(3)           J2-16         11         LDATA_P(4)           J2-16         13         LDATA_P(3)           J2-18         LDATA_P(4)         J2-20           J2-20         22         LDATA_P(4)           J2-20         22         LDATA_P(6)           J2-30         32         LDATA_P(10)           J2-42         40         LDATA_P(10)           J2-43         53         LDATA_P(10)           J2-44         44         LDATA_P(11)           J2-55         53         LDATA_P(12)           J2-56         53         LDATA_P(12)           J2-56         54         LDATA_P(12)           J2-56         55         LDATA_P(12)	1	2
	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (6) LDATA_N (8) LDATA_N (8) LDATA_N (9) LDATA_N (9) LDATA_N (10) LDATA_N (11) LDATA_N (12) LDATA_N (13) LDATA_N (15) SERIAL_FRAME_MARKER_N NC NC NC LCLK_N & SERIAL_CLK_N_OUT DUT_CLOCK_N_IN RESERVED	9	J2-6>         5         L DATA P (0) & SERIAL L DATA,           J2-80         12         L DATA, P (1) & SERIAL O DATA           J2-10         12         L DATA, P (1) & SERIAL O DATA           J2-14         14         L DATA, P (2)           J2-15         15         L DATA, P (3)           J2-18         15         L DATA, P (3)           J2-18         10         LDATA, P (3)           J2-19         10         LDATA, P (4)           J2-20         22         LDATA, P (6)           J2-30         30         1           J2-40         40         1           J2-40         40         1           J2-40         40         1           J2-40         40         1           J2-40 </td <td></td> <td></td>		
↓ GND ↓ GND	LDATA_N (2) LDATA_N (3) LDATA_N (4) LDATA_N (5) LDATA_N (5) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (7) LDATA_N (10) LDATA_N (10) LDATA_N (11) LDATA_N (11) LDATA_N (13) LDATA_N (14) NC NC NC RESERVED NC	9         1         1         22-7           1         1         22-7         1         1           1         1         3         22-7         1         1           1         1         3         22-7         1	J2-6)         ■         LDATA, P (I) & SERIAL, LDATA,           J2-8)         IDATA, P (I) & SERIAL, O, DATA           J2-10         IZ         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I)           J2-10         IDATA, P (I)         SERIAL, FORMANIA           J2-10         IDATA, P (I)         J2-22           J2-10         IDATA, P (I)         J2-23           J2-24)         SERIAL, IDATA, P (I)         J2-24           J2-30         J2         LDATA, P (I)           J2-33         J2         LDATA, P (I)           J2-34         J4         LDATA, P (I)           J2-35         J2         LDATA, P (I)           J2-40         44         LDATA, P (I)           J2-40         J4         LDATA, P (I)           J2-55         SS         LDATA, P (I1)           J2-56         SS         LDATA, P (I1)           J2-56         SS         LDATA, P (I3)           J2-64         G4         LDATA, P (I3)		
	I_DATA_N (2) I_DATA_N (3) I_DATA_N (4) I_DATA_N (5) I_DATA_N (5) I_DATA_N (6) I_DATA_N (7) I_DATA_N (8) I_DATA_N (8) I_DATA_N (9) I_DATA_N (10) I_DATA_N (11) I_DATA_N (12) I_DATA_N (13) I_DATA_N (15) SERIAL_FRAME_MARKER_N NC I_CLK_N & SERIAL_CLK_N_OUT DUT_CLOCK_N_IN RESERVED NC	9         1         1         22-7           1         1         22-7         1         1           1         1         3         22-7         1         1           1         1         3         22-7         1	J2-6)         ■         LDATA, P (I) & SERIAL, LDATA,           J2-8)         IDATA, P (I) & SERIAL, O, DATA           J2-10         IZ         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I) & SERIAL, O, DATA           J2-10         IG         LDATA, P (I)           J2-10         IDATA, P (I)         SERIAL, FORMANIA           J2-10         IDATA, P (I)         J2-22           J2-10         IDATA, P (I)         J2-23           J2-24)         SERIAL, IDATA, P (I)         J2-24           J2-30         J2         LDATA, P (I)           J2-33         J2         LDATA, P (I)           J2-34         J4         LDATA, P (I)           J2-35         J2         LDATA, P (I)           J2-40         44         LDATA, P (I)           J2-40         J4         LDATA, P (I)           J2-55         SS         LDATA, P (I1)           J2-56         SS         LDATA, P (I1)           J2-56         SS         LDATA, P (I3)           J2-64         G4         LDATA, P (I3)		

# **Device Interface Connector**

The figures and information shown in this section will assist when customizing a connection solution for the device under test using the device interface mating connector (see "Device Interface Mating Connector" on page 39). The signal contact layout for the Device Interface connector is shown in Figure 3-6 and the connector pin-out is shown in Figure 3-7 and Figure 3-8.





W1 X1 Y1 Z1	<	GND	
W2 X2 Y2 Z2	<		ILTERED
W3 X3 Y3 Z3	<	SENSE (I	D)
C2Ø ←	Q_DATA_P (1) Q_DATA_N (1)		F2Ø <
B20 (		GND	E20 (
A2Ø ←	— Q_DATA_P (3) — Q DATA N (3)		120 ← 119 ←
	· ·	- GND	E 19
	Q_DATA_P (5) Q_DATA_N (5)		F 18 ← F 17 ←
		GND	E 18
A18 ← A17 ←	Q_DATA_P (7) Q_DATA_N (7)		D18 ← D17 ←
B17 ←		- GND	E 17 ←
C16 ← C15 ←	— Q_DATA_P (9) — Q_DATA_N (9)		F 16 <del>(</del> F 15 <del>(</del>
B16 ←		GND	E16 ←
A16 ← A15 ←	— Q_DATA_P (11) — Q_DATA_N (11)		116 ← 115 ←
B15 ←		- GND	E 15
C14 ← C13 ←	— Q_DATA_P (13) — Q_DATA_N (13)		F 14 ← F 13 ←
B14 ←		GND	E14 ←
A14 ← A13 ←	— Q_DATA_P (15) — Q_DATA_N (15)		D14 ← D13 ←
		GND	E 1 3 ←
C12 ← C11 ←			F 12 ← F 11 ←
₿12 ←		- GND	E 12 ←
A12 ← A11 ←			D12 ← D11 ←
		- GND	E11 ←

### Figure 3-7 Device Interface Connector Pin-Out

F2Ø ← F19 ←		
E2Ø (		- GND
]2Ø ←	— Q_DATA_P (2) — Q_DATA_N (2)	
E19 ←	G_DATA_N(2)	010
		- GND
F 18 ← F 17 ←		
E 18		- GND
118 ←	Q DATA P (6)	
ĨĨ7 ↔		
E17 ←		- GND
F 16 ←	— Q_DATA_P (8) — Q_DATA_N (8)	
F 15 ←	Q_DATA_N (8)	
E16 ←		- GND
116 ←	— Q_DATA_P (10) — Q_DATA_N (10)	
E 15		- GND
F 14 ←	Q_DATA_P (12)	
F I 3 ←	Q_DATA_N (12)	
E14 ←		- GND
D14 ←	— Q_DATA_P (14) — Q_DATA_N (14)	
→ E 1 U	Q_DATA_N (14)	
E13		- GND
F 12 ←	— Q_CLOCK_P — Q_CLOCK_N	
E12 ←		- GND
D12 ←		
	- RESERVED	
E11 ←		- GND

# Device Interface Connections Device Interface Connector

### Figure 3-8 Device Interface Connector Pin-Out (continued)

C1Ø ← C9 ←	- I_DATA_P (1) & SERIAL_Q ' I_DATA_N (1) & SERIAL_Q	_DATA_P _DATA_N	
₿10 ←			
A10 (	L_DATA_P (3)		
89 ←		GND	
C8 <	L DATA P (5)	OND	
C7	I_DATA_N (5)		
88 ←───		GND	
A8 ← A7 ←	- I_DATA_P (7)		
87 ←		GND	
C6 ←	L DATA P (0)	0140	
C5 ←	' I_DATA_N (9)		
86 ←		GND	
A6 ← A5 ←	. I_DATA_P (11)		
85 ←		GND	
•		GND	
C4 ← C 3 ←	I_DATA_N (13)		
₿4 ←		GND	
A4	I_DATA_P (15) & SERIAL_F	RAME_M	ARKER _P
В3 ←	I_DATA_N (15) & SERIAL_F		ARKER_N
	DUT CLOCK IN D	GND	
	DUT_CLOCK_IN_N		
B2 ←		GND	
A2 ← A1 ←	RESERVED		
₿1 ←		GND	
W4 X4 Y4 Z4	<	:	SENSE (1)
W5 X5 Y5 Z5	<		+VCCIO
W6 X6 Y6 Z6	<		GND

F1Ø ← F9 ←	- I_DATA_P (0) & SERIAL_I_ - I_DATA_N (0) & SERIAL_I_	DATA_P DATA_N
E10		GND
D10 ← D9 ←	- I_DATA_P (2) <sup>-</sup> I_DATA_N (2)	
E 9		GND
F8 ← F7 ←	- I_DATA_P (4) - I_DATA_N (4)	
E8		GND
D8 ← D7 ←	- I_DATA_P (6) - I_DATA_N (6)	
E7		GND
F6 ← F5 ←	- I_DATA_P (8) <sup>-</sup> I_DATA_N (8)	
E6		GND
D6 ← D5 ←	- I_DATA_P (10) - I_DATA_N (10)	
E5 ←		GND
F 4 ← F 3 ←	- I_DATA_P (12) - I_DATA_N (12)	
E4		GND
D4 ← D3 ←		
E 3 ←		GND
F2 ← F1 ←	- I_CLOCK_P & SERIAL_CL - I_CLOCK_N & SERIAL_CL	OCK_P_OUT
E2 ←		GND
D2 ← D1 ←	- RESERVED - RESERVED	
E1 ←		GND

## **Input and Output Clock Signals**

There are multiple output clock lines and two input clock lines to handle differential clocking. The N5102A module can be configured to accept the device under test clock through the Device Interface connector for data clocking. Using the input clock signal from the Device Interface connector is an alternative to using a clock signal applied to the Clock In connector. Table 3-4 lists the Device Interface connector pins for the different clock signals and the serial frame marker.

### Table 3-4 Clock Signal and Serial Frame Marker Lines

Clock Signal Type	Pin	Clock Signal Type	Pin
Output Q-Clock Neg	F11	Output Q-Clock Pos	F12
Output I-Clock Neg	F1	Output I-Clock Pos	F2
Output Serial Clock Neg	F1	Output Serial Clock Pos	F2
Output Serial Frame Marker Pos	A3	Output Serial Frame Marker Neg	A4
Input Clock Signal (DUT Clock) Neg	C1	Input Clock Signal (DUT Clock) Pos	C2

### **Data Lines**

There are 64 data lines on the Device Interface connector that allow for either differential or single-ended signals. These 64 data lines consist of 32-I lines (16 positive and 16 negative), and 32-Q lines (16 positive and 16 negative). Single-ended signals are routed on the positive data lines. Table 3-5 shows which data lines are used for a given signal.

Table 3-5Data Lines

Signal	Serial Data		Parallel Data <sup>1</sup>		
I	I	٥	I	٥	
Differential	Positive and negative lines: F9 & F10	Positive and negative lines: C9 & C10	Positive and negative lines 0–16 (A3–A10, C3–C10 D3–D10, F3–F10)	Positive and negative lines 0–16 (A13–A20, C13–C20, D13–D20, F13–F20)	
Single-Ended	F10	C10	Positive lines 0–16 (A4, A6, A8, A10, C4, C6, C8, C10, D4, D6, D8, D10, F4, F6, F8, F10)	Positive lines 0–16 (A14, A16, A18, A20, C14, C16, C18, C20, D14, D16, D18, D20, F14, F16, F18, F20)	

1. Parallel interleaving (IQ and QI) occurs on the I data lines.

# **DC Supply**

Referring to Figure 3-6, notice that the interface module provides an unfiltered +5 volts DC supply through the Device Interface connector. This DC supply provides up to 100 mA and has a self-resettable fuse. Use this DC current to bias components on the device under test where the noise will not compromise test results.

# VCCIO

The Device Interface connector also provides a connection for the VCCIO that can be measured at a test point on each break-out board. The VCCIO amplitude is equal to the high voltage level of the selected logic type.

# **Device Interface Mating Connector**

A mating connector for the Device Interface port is supplied to make the device under test connection easier when none of the break-out boards offer a connection solution for the device.

There are two ways to use the mating connector. One is to attach wires directly to the pins providing a quick connection solution. The other is to make a PC board with a footprint that matches the connector mounting pins. Figure 3-9 shows the layout of the signal contacts while looking directly into the connector and the pin footprint while viewing the connector from the bottom. Figure 3-10 shows the connector footprint for a PC board.

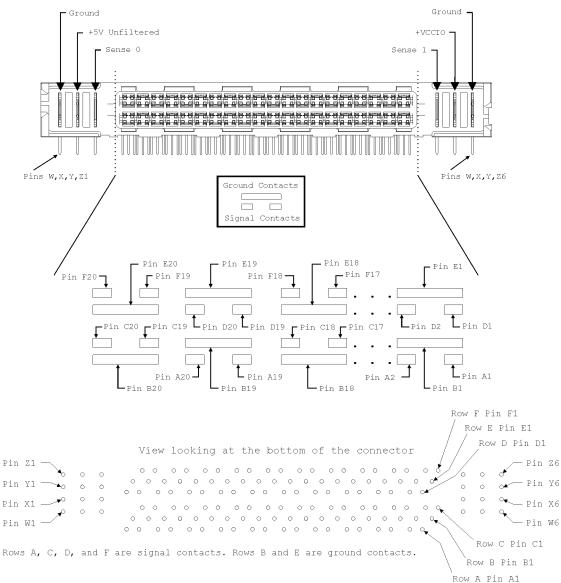
The signal pin-out for the connector can be obtained from Figure 3-7 on page 35 and Figure 3-8 on page 36. These figures display the pin-out diagrams for the N5102A module Device Interface connector.

 Table 3-6 provides the manufacturer and the part numbers for the Device Interface connector and its mate.

 Both connectors are available from suppliers external to Agilent Technologies.

Connector Type	Connector Manufacturer Part Number	Mating Connector Manufacturer Part Number	Manufacturer
144-Pin Z-Dok+	1367550-5	1367555-2 (board connector)	Tyco Electronics

### Table 3-6 Device Interface Connector Manufacturer and Part Numbers



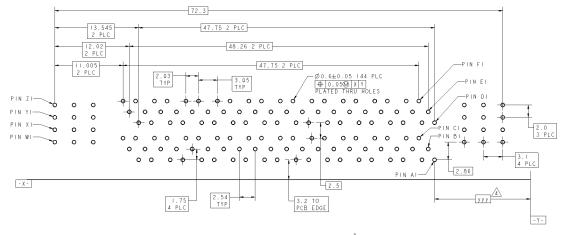
### Figure 3-9 Z-Dok+ Device Interface Mating Connector Layout and Footprint

### Figure 3-10 Z-Dok+ Device Interface Mating Connector PC Board Foot Print

Component Side Shown

It is recommended that you check the Tyco Electronics web site for the most current PC board footprint drawing.

Rows A, C, D, and F are signal contacts. Rows B and E are ground contacts.



A DIMENSIONS PER CUSTOMER BOARD LAYOUT.

Device Interface Connections
Device Interface Mating Connector

# 4 Troubleshooting

This chapter provides the following information to assist you in troubleshooting the N5102A Baseband Studio digital signal interface module:

- "If You Encounter a Problem" on page 44
- "Replaceable Parts" on page 50
- "Returning an N5102A Module to Agilent Technologies" on page 51

# If You Encounter a Problem

# **CAUTION** Immediately unplug the N5102A module from the AC power line if the unit shows any of the following symptoms:

- Smoke, arcing, or unusual noise from inside the unit.
- A circuit breaker or fuse on the main AC power line opens.

These potentially serious faults must be corrected before proceeding.

When connected to the ESG/PSG/X-Series (N5182B/72B) and the signal generator displays an error, read the error message text by pressing **Utility** > **Error Info**. Resolve any problems specific to the signal generator (refer to the signal generator's documentation).

When connected to a PCI card, read the controlling software's error message and resolve any problems identified in the message. Refer to the software's online help for more information.

If the N5102A module is not operating properly, refer to the following table to begin troubleshooting.

Symptom	Action
Power LED is off	Go to "Checking Power Problems" on page 45
Fails "Operation Verification" on page 11	Go to "Running Diagnostic Tests" on page 46
ESG/PSG/X-Series (N5182B/72B) or controlling software has a persistent N5102A module error.	Reset the module (disconnect the power supply from the digital module and then reconnect it).
A module error persists even after you fix the problem described in the ESG/PSG/X-Series (N5182B/72B) error message and clear the error queue: Utility > Error Info > Clear Error Queue(s)	

**NOTE** If new firmware is downloaded to the ESG/PSG/X-Series (N5182B/72B) while the digital module is connected, you must power cycle the digital module to restore normal operation. Disconnect the power supply from the digital module and then reconnect it. This will preset the digital module.

# **Checking Power Problems**

When you connect the power supply to the module, the green Power LED should light.

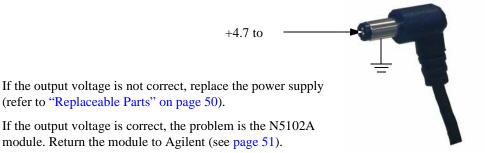


If the Power LED does not light:

- 1. Check the power cord; ensure that it is:
  - in good condition
  - properly plugged in to a live outlet (line power connection is described on page 6)
  - properly connected to the power supply (power supply connection is described on page 10) and the DC power supply plug is fully inserted into the N5102A module DC power receptacle

If this does not solve the problem, go to step 2 to check the power supply.

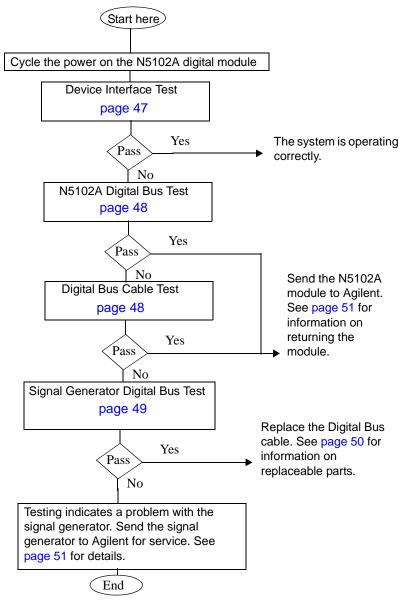
2. Using a DVM, check the power supply output.



# Troubleshooting If You Encounter a Problem

# **Running Diagnostic Tests**

Diagnostic tests, referred to as loop back tests, are provided to help isolate problems when connected to the ESG/PSG/X-Series (N5182B/72B). Perform the tests, in the order listed, in the following flow chart. When connected to a PCI card, use the controlling software's self tests wizard to diagnose the problem.



### **Device Interface (System) Test**

This is a comprehensive test that checks the paths from the signal generator Digital Bus connector to the Device Interface connector on the N5102A module. This is the same test used in the section, "Operation Verification" on page 11, which describes the test in more detail.

- 1. Connect the N5102A module to the signal generator according to the steps in "Connecting the N5102A Module to the ESG/PSG/X-Series (N5182B/72B) or N5101A PCI Card" on page 8.
- 2. Connect the Loop Back Test Single Ended IO Dual 40 Pin board, shown at right, to the Device Interface connector on the rear of the N5102A module.

Ensure that there are no connections to the two 40-pin connectors.



- 3. Select and run the Device Interface test:
  - a. On the signal generator, press
     Aux Fctn > N5102A Interface > Diagnostics > Loop Back Test Type > Device Intfc.

Note that the test selection in parentheses below the **Loop Back Test Type** softkey updates to reflect the current test.

b. Press Run Loop Back Test.

Because all signal generator modulation formats and the N5102A module interface must be off before a loop back test can run, if they are active when you press the **Run Loop Back Test** softkey, they turn off automatically.

### **Results:**

- Pass The system is operating correctly.
- Fail Examine all connectors (they should be clean and undamaged) and connections (they must be secure). If the test still fails, perform the N5102A Digital Bus test to help isolate the problem.

### N5102A Digital Bus Test

This test checks the communication path from the Digital Bus connector on the signal generator to the input of the N5102A module. It does not require the use of a loop back test board.

1. If not already done, disconnect the Loop Back Test Single Ended IO Dual 40 Pin board from the N5102A module.

Leave all other connections.

2. Select and run the N5102A Digital Bus test:

On the signal generator, press Loop Back Test Type > N5102A Dig Bus > Run Loop Back Test.

### **Results:**

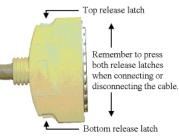
Pass The N5102A module has a problem, send the module to Agilent for service (see page 51).

Fail Perform the Digital Bus Cable test to further isolate the problem.

### **Digital Bus Cable Test**

This test checks the communication path from the Digital Bus connector on the signal generator to the end of the digital bus cable. It requires the use of the digital bus loop back fixture.

1. Disconnect the digital bus cable from the N5102A module.



- 2. Check the connectors on the digital bus loop back fixture, shown at right, to ensure that they are clean and undamaged, then connect it securely to the digital bus cable in place of the module.
- 3. Select and run the Digital Bus Cable test:

On the signal generator, press Loop Back Test Type > Dig Bus Cable > Run Loop Back Test.

Connect to the digital bus cable



Connect to the signal generator

### **Results:**

Pass The N5102A module has a problem, send the module to Agilent for service (see page 51).

Fail Perform the Signal Generator Digital Bus test to further isolate the problem.

### **Signal Generator Digital Bus Test**

This test checks the digital output capability of the signal generator and requires the use of the loop back fixture, shown at right.

- 1. Disconnect the digital bus loop back fixture from the digital bus cable.
- 2. Disconnect the digital bus cable from the signal generator, and connect the digital bus loop back fixture securely in its place.
- 3. Select and run the Signal Generator Digital Bus test

On the signal generator, press Loop Back Test Type > SigGen Dig Bus > Run Loop Back Test.



### **Results**:

- Pass The problem is with the digital bus cable; replace the cable (see "Replaceable Parts" on page 50).
- Fail The problem is with the signal generator; send the signal generator to Agilent for service (see page 51).

# **Replaceable Parts**

Contact Agilent (see Table 4-1) for price and availability of the following parts.

Description	Part Number	Description	Part Number
Digital Bus Cable	N5102-60019	Power Cord	
Digital Bus Loop Back Fixture	E4400-63768	United Kingdom	8120-8709
Loop Back Test Single Ended IO Dual 40 Pin Board	N5102-63014	Australia and New Zealand	8120-0696
Single Ended I/O Dual 20 Pin Board	N5102-63015	Continental Europe	8120-1692
Differential I/O 38 Pin Board	N5102-63016	United States and Canada, 120V	8120-1521
Differential I/O Dual 100 Pin Board	N5102-63017	Switzerland	8120-2296
Single Ended I/O 68 Pin Board	N5102-63018	Denmark	8120-2957
N5102A Installation Guide	N5102-90003	South Africa and India	8120-4600
Power Supply, AC-DC 5V 4A	0950-4540	Japan	8120-4754
		Israel	8120-5181
		Argentina	8120-6868
		Chile	8120-6979
		China	8120-8377
		Brazil and Thailand	8120-8671

# **Returning an N5102A Module to Agilent Technologies**

To return your N5102A digital signal interface module to Agilent Technologies for servicing, follow these steps:

- 1. Gather as much information as possible regarding the module's problem.
- 2. Call the phone number listed on the Internet (*http://www.agilent.com/find/assist*) that is specific to your geographic location. If you do not have access to the Internet, contact your Agilent field engineer.

After sharing information regarding the module and its condition, you will receive information regarding where to ship your module for repair.

3. Ship the module in the original factory packaging materials, if available, or use similar packaging to properly protect the module.

Troubleshooting
Returning an N5102A Module to Agilent Technologies

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100-pin break-out board, 32 20-pin break-out board, 25 38-pin break-out board, 27 40-pin break-out board, 29 68-pin break-out board, 31

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