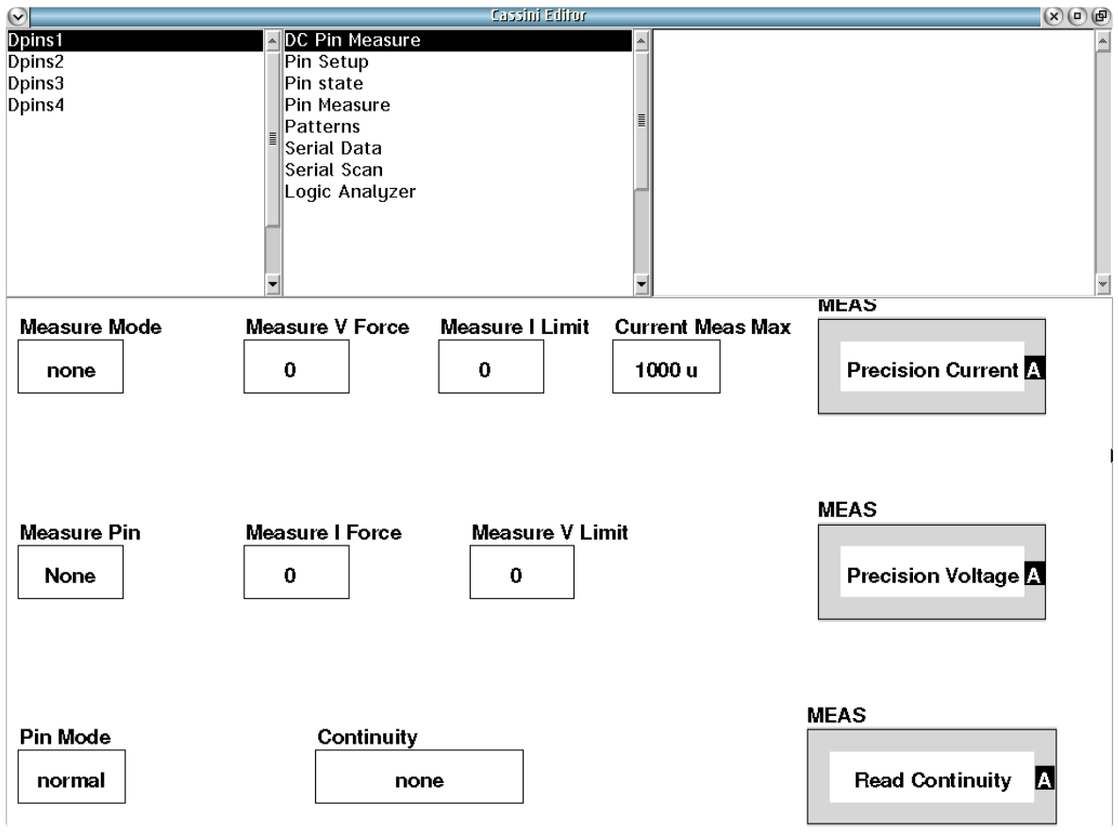
Edit Panels

The RI8535 edit panel or editor window provides instrument function blocks and state buttons for a Dpins instrument consisting of 20-pin digital resources. These button and blocks are used in Cassini's graphical test programming environment and are defined in the following text.

Edit Panels 4 RI8535 Universal Digital Edit Panels

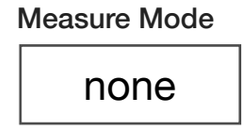


DC Pin Measure provides multimeter and continuity resources and measurement blocks.

DPINS1

Each Dpins# (1 thru 6) instrument contains contains DC Pin Measure, Pin Setup, Pin State, Pin Measure, Patterns, Serial Data, Serial Scan, and Logic Analyzer subsystem panels.

Panel: DC Pin Measure



Measure Mode

A drop down list button that sets the measurement mode of the selected pin set by the **Measure Pin** button.

'none' is the default mode and disconnects all measurement resources from the designated pin.

'Voltmeter' provides precision voltage measure with a high series resistance (1MΩ).

The 'Imeas' selection forces a voltage defined by the **Measure V Force** button and measures the resulting current for the selected resource using the **Measure Pin**. The **Measure I Limit** button restricts the maximum amount of current delivered by the supply

during the measurement to avoid damaging the device pin if there is a DUT failure.

NOTE: The Pin Mode button must be set to 'continuity' to use this mode.

The 'vMeas' selection forces a current defined by the **Measure I Force** button and measures the resulting voltage for the selected resource using the **Measure Pin**. The **Measure V Limit** button restricts the maximum voltage applied during the measurement. Typically the **Measure V Limit** button is set to the DUT's supply rail or ground depending on the polarity of the **Measure I Force** button to avoid damaging the device pin.

NOTE: The Pin Mode button must be set to 'continuity' to use this mode.

The 'low Current' selection measures the current for a selected resource defined by the **Measure Pin**. This mode sets use a high-precision sense resistor to access the lowest current measurement range possible and incorporates a built-in, recursive averaging method to measure DC currents in the pA range.

NOTE: The Pin Mode button must be set to 'leakage' to use this mode.

The 'vCal' selection is the same mode as the 'vMeas' mode with the exception that the current limit settings are deactivated. The value set with the **Measure I Limit** is ignored, and the supply will deliver as much available current as the internal supply can force to set the voltage defined by the **Measure V Force** button.

NOTE: This mode is typically used in continuity tests for device pins with large in-rush currents or long duration time constants during power up.

The Pin Mode button must be set to 'continuity' to use this mode.

The 'iCal' selection is the same mode as the 'Imeas' mode with the exception that the voltage limit settings are deactivated. The value set with the **Measure V Limit** is ignored, and the supply will deliver as much available voltage as possible to force the current condition defined by the **Measure I Force** button.

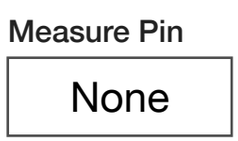
NOTE: The Pin Mode button must be set to 'continuity' to use this mode.

CAUTION: In the iCal mode the pin voltages can exceed the rail voltages of the device under test.

The 'continuity+' mode forces a current and measures the voltage of a Device Pin Group designated by the **Continuity** button. The continuity state of the pin group is measured using the **Read**

Continuity measurement block with the **Pin Mode** button set to 'continuity.'

The 'continuity-' mode sinks a current and measures the voltage state of a Device Pin Group designated by the **Continuity** button. The continuity state of the pin group is measured using the **Read Continuity** measurement block with the **Pin Mode** button set to 'continuity.'

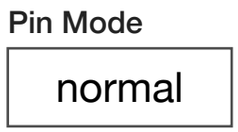


Measure Pin

A drop down list button that selects the Digital Output pin to be connected to the *DPins* internal measurement module (PMU).

The 'none' selection disconnects the digital pin resource from all internal measurement resources.

'D1-1' through 'D1-20' selections connects the specified resource pin to the internal measurement resources specified by the **Measure Mode** and **Pin Mode** buttons.



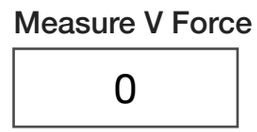
Pin Mode

A drop down list button that selects the internal resource to be connected to the resource pin designated by the **Measure Pin** button. This button is commonly used in conjunction with the **Measure Mode** button.

'normal' connects an internal protection diode network to each of the Dpins to allow for standard voltage drive and digital read/write modes as the default pin mode.

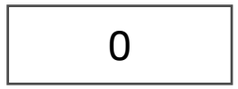
'continuity' disconnects the protection diode network from the Dpins and offsets the internal measurement module to test for continuity voltage compliance within the range of +3V to -1.5V on all pins.

The 'leakage' mode disconnects the protection diode network from and all source and measurement resources from the Dpins to prevent stray leakage currents from affecting low current measurements. This mode is used in conjunction with the **Measure Mode** button in the 'Imeas' and 'low current' modes.



Measure V Force

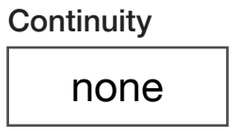
Decimal notation button that sets the value of the voltage force condition for the **Measure Mode**: 'Imeas' setting. The condition is applied to the resource designated by the **Measure Pin** button. The values are in units of volts.



Measure I Force

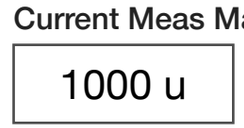
Decimal notation button that sets the value of the current force condition for the **Measure Mode**: ‘vMeas’ setting. The condition is applied to the resource designated by the **Measure Pin** button. The values are input in units of amps.

CAUTION: Setting a value of 0 can cause unexpected or irregular current or voltage measurement conditions at the device pin.



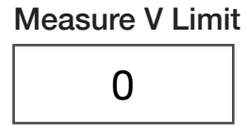
Continuity

A drop down list button that selects a Device Pin Group used for continuity measurements. Pin groups are defined in the Device Pins tab of the Device Connection Editor. The associated ‘Dut’ instrument must be active in the system configuration to be accessible to the **Continuity** button options. Reference the Dut Instrument section for information on how to add a ‘Dut’ instrument to the system configuration.



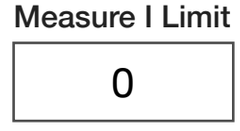
Current Meas Max

Decimal notation input button that optimizes the dynamic range of the internal current measure module to within one of four sense resistor ranges: <2 mA, <200 µA, <20 µA, and <2 µA (i.e. a button value of 500 mA will select the dynamic range to <2 mA for the ADC). This button is used with the **Measure Mode**:‘Imeas’, ‘iCal’, or ‘low Current’ settings and **Measure Pin** buttons.



Measure V Limit

Decimal notation input button that sets the maximum voltage amplitude for the **Measure Mode**: ‘vMeas’ button setting. This setting voltage-limits the supply with a clamping diode when in current drive mode to prevent damaging a DUT pin from unwanted and/or excessive voltage caused by the **Measure I Force** button current criterion.

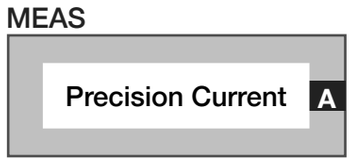


Measure I Limit

Decimal notation input button that sets the maximum current amplitude for the **Measure Mode**: ‘Imeas’ button setting. This setting

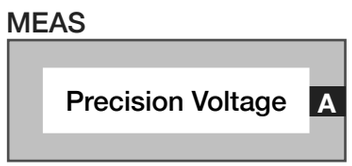
current-limits the supply to prevent damaging a DUT pin from unwanted and/or excessive current caused by the the **Measure V Force** button voltage criterion.

CAUTION: Setting a value of 0 can cause unexpected or irregular current/voltage measurement conditions at the device pin.



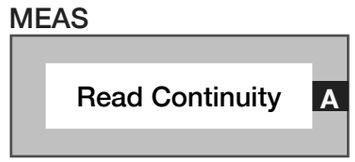
Meas: Precision Current

Measurement block that computes the current at a resource pin designated by the **Measure Pin** button. The maximum measurable current is 2 mA. It is used with the **Measure Pin** and **Pin Mode**: ‘continuity’ or ‘leakage’ button settings.



Meas: Precision Voltage

Measurement block that computes the current at a resource pin designated by the **Measure Pin** button. The maximum measurable voltage range is -3V to +5V. It is used with the **Measure Pin** and **Pin Mode** buttons.



Meas: Read Continuity

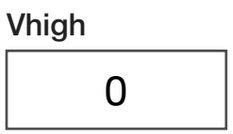
Measurement block that uses an internal voltage comparator to compute the result of a continuity test. This measurement block is used in conjunction with the **Measure Mode**: ‘continuity+’ or ‘continuity-’, **Pin Mode**: ‘continuity’ and **Continuity** buttons. The results are provided for every pin in the Device Pin Group designated by the **Continuity** button. The value return by the measurement block is as follows:

A returned value of 0 is a “pass,” denoting a measured voltage diode drop value between -1 to +3V, excluding 0V. For example, a measured voltage of 0.7V would be returned as 0 denoting a ‘pass’ value.

A returned value of 1 is a “short,” denoting a measured voltage value of approximately 0V.

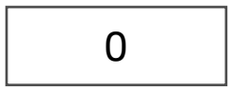
A returned value of 2 is an “open,” denoting a measured voltage value of the rail conditions of -1V or +3V.

Panel: Pin Setup



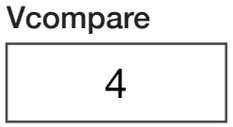
Vhigh

A decimal notation input button that sets the voltage value for a logical ‘1’ or ‘high’ condition for all Dpins in the 20-pin bank. The voltage range is 0 to +4V.



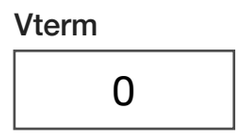
Vlow

A decimal notation input button that sets the voltage value for a logical ‘0’ or ‘low’ condition for all Dpins in the 20-pin bank. The voltage range is 0 to +4V.



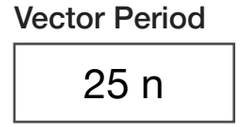
Vcompare

A decimal notation input button that sets the voltage comparator condition for all Dpins in the 20-pin bank. The voltage comparator is used by data read functions and logical analyzer capture tools and is commonly used with buttons found in the *Serial Data*, *Pin Measure*, and *Logic Analyzer* features of the Dpins.
The comparator voltage set range is 0 to +4V.



Vterm

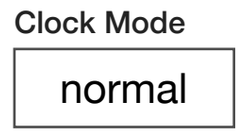
A decimal notation input button that sets the termination voltage condition. This button is used with the **D1-1** through **D1-20:** ‘Vterm’ button settings to set the voltage condition of the Dpins to a specified value. The voltage set range is 0 to +4V.



Vector Period

Decimal notation input button that sets the clock period (clock rate) for any clock pins used for digital communication. The period is input in units of seconds with a maximum rate of 100MHz (‘10 n’ value).

For Scan Timing information, reference Diagram 1 in the Appendix | Section 3: RI8535 Universal Digital.



Clock Mode

A drop down list button that selects the pin or pins in the 20-pin bank that will be used as clocks for digital communication protocols.

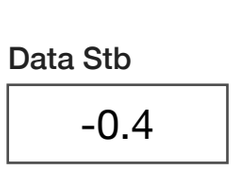
'normal' mode is the default mode and enables pins **5**, **10**, **15**, and **20** as clock pins.

'off' deactivates all pins

'all' allows all pins to be used as clock pins. In this mode, the **Clock Width**, **Data Stb**, and **Read Stb** button values are ignored (duty cycle adjustment and read/data offsetting are disabled).

'd20' designates pin 20 as the only clock in the Dpins bank of pins.

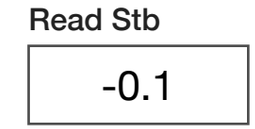
'delay20' mode is no longer supported.



Data Stb

A decimal notation input button that sets the leading edge offset of the data packet in seconds relative to the active edge of the clock. For entries greater than 0.01, the button input value is multiplied by the clock period value in the **Vector Period** button to generate the offset value. This button is used with the **Clock Mode**: 'normal' button setting.

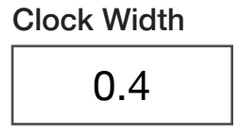
NOTE: A value less than 0 is recommended to provide adequate settling and rise/fall edge time alignment of the strobe signal caused by the device under test or interconnect.



Read Stb

A decimal notation input button that sets the strobe offset in seconds relative to the active edge of the clock. For entries greater than 0.01, the button input value is multiplied by the clock period value in the **Vector Period** button to generate the offset value used. A value of 0 sets the strobe offset to zero, aligning the strobe's active edge with the first active clock edge. This button is used with the **Clock Mode**: 'normal' button setting.

NOTE: A value less than 0 is recommended to provide adequate settling and rise/fall edge time alignment of the strobe signal caused by the device under test or interconnect.



Clock Width

A drop down list button that sets the clock width (duty cycle of the clock) of the 'active' region. The default value of 0.4 represents a 40% active duty cycle. This button is used with the **Clock Mode**: 'normal' and **Vector Period** buttons.

NOTE: Only pins 5, 10, 15, and 20 can adjust duty cycle using the Clock Width button setting.

Panel: Pin state

D 1-1

open

D1-1 through **D1-20**

A drop down list button that sets the pin state for static voltage or declares the logic type in a communication protocol.

‘open’ disconnects the specified *Dpin* from all internal logic drive and read resources.

‘on’ sets the pin to the voltage value specified by the **Vhigh** button.

‘off’ sets the pin to the voltage value specified by the **Vlow** button.

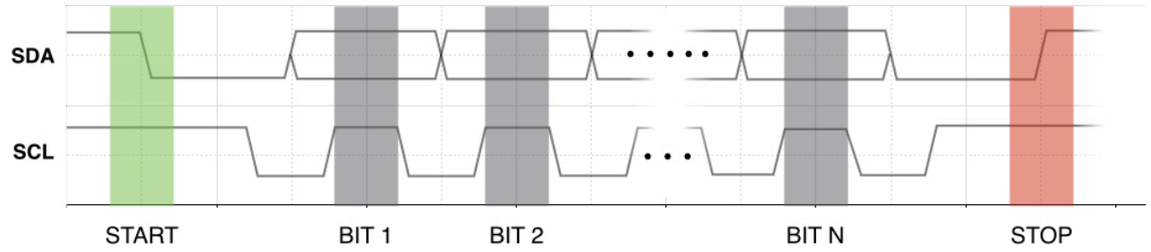
‘clock’ sets the pin as a clock driver output pin to provide a synchronous clock signal to an external device’s clock input pin for various communication protocols. This setting is commonly used with the **Clock Mode**, and **Vector Period** buttons to designate the clock setup and speed as well as the **Read Size** button to designate the number of clock edges in a data read/write packet.

‘/clock’ sets the pin as a reversed value clock driver output pin to provide a synchronous clock signal to an external device’s clock input pin for various communication protocols.

‘sClk’ sets the pin as a I^2C protocol, clock driver output pin that aligns the clock duty cycle (rising and falling edge) to occur within the data bit duty cycle as shown in Figure 2.3.

‘data’ sets the pin as an output pin to send data to an external device’s data input pin in synchronous communication protocols.

FIGURE 2.3 sClk mode Data/Clock Timing Diagram



The ‘sClk’ mode enforces the I2C protocol clock(SCL) and data(SDA) alignment.

‘aux’ sets the pin as a generic output pin to send data to an external logic-based device’s auxiliary pin in synchronous communication protocols.

‘/aux’ sets the pin as a reversed value, generic output pin to send data to an external device’s auxiliary pin in synchronous communication protocols.

‘strobe’ sets the pin as a latch enable or strobe output pin to drive an external device’s enable pin in synchronous communication protocols.

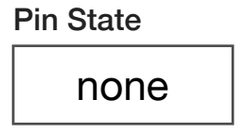
‘/strobe’ sets the pin as a reversed value latch enable or strobe output pin to drive an external device’s enable pin in synchronous communication protocols.

‘read’ designates the pin as an input pin to capture data from the device under test, connecting an internal high impedance network to provide a suitable load. This setting is commonly used with the **Read Pin** button to designate a memory buffer for captured data.

‘term’ connects the designated pin to a series 50Ω resistor terminated with the voltage value specified by the **Vterm** button.

‘r/w’ sets the pin as a bilateral read/write pin to support an external flip-flop or other logic-based device’s synchronous communication protocol. This setting is commonly used with the **Read Pin**, and **Read Size** buttons to designate a memory buffer for captured data as well as **Serial Data**, **Serial Type**, and **Serial Idle** buttons to designate data write information.

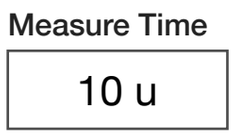
NOTE: The Dpin used as a I²C bidirectional read/write pin must be set to ‘r/w’ to prevent data collisions.



Pin State

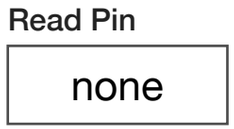
A drop down list button that allows the user to select a pin group that sets the state of the pins in the *Dpins* bank according to the pin group’s designations defined by a Device Pins Group of a **Device Pins** definition in the Device Connection Editor. The associated device must be active in the system configuration to be accessible to the **Serial Group** and **Device Pins** button options. Reference the Dut Instrument section for information on how to add a device to the system configuration.

Panel: Pin Measure



Measure Time

A decimal notation input button that sets the capture window of the frequency counter in units of seconds. This button is used in conjunction with the **Read Pin** button and **Pin Frequency** measurement block.



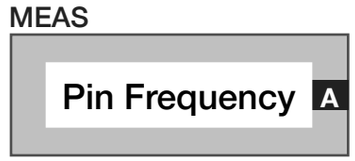
Read Pin

A drop down list button that connects internal measurement module resources for the designated pin. The measurement resource used is dependent on the additional buttons and/or blocks included in the testplan, with commonly used setups listed as follows:

Frequency counter resource includes the **Pin Mode**: ‘normal’ and **Measure Time** buttons with **Pin Frequency** measurement block.

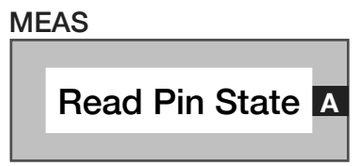
The voltage comparator resource includes the **Pin Mode**: ‘continuity’ button and **Read Pin State** measurement block.

The internal read buffer resource used for synchronous communication protocols includes the **Pin Mode**: ‘normal’, **Read Size**, **Read Polarity**, and **Read Delay** buttons with the **Read Serial** measurement block.



Meas: Pin Frequency

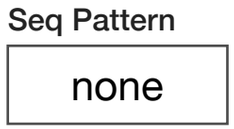
Measurement block that computes the frequency of the *Dpins* resource selected by the **Read Pin** button with a capture window set by the **Measure Time** button. The value is returned in units of Hz.



Meas: Read Pin State

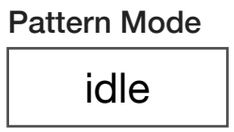
Measurement block that uses the internal voltage comparator to compute the state of the pin selected by **Read Pin** button. This button is used in conjunction with the **Pin Mode**: ‘continuity’ button setting.

Panel: Patterns



Seq Pattern

A drop down list button used to specify a pattern name that will be emitted by the designated communication pins. It is commonly used with the **Pattern Fail** measurement block. The **Seq Pattern** button is only valid in a pre/post measure group. In the pre/post measure group it is followed with a **Seq Repeat** button to execute.



Pattern Mode

A drop down list button that controls the pattern emit engine. It is placed in a pre/post measure or measure sequence button grouping with the **Seq Pattern** and **Seq Repeat** buttons with a **Pattern Fail** or **Read Special** measurement block.

'idle' is the default off state of the pattern emit engine.

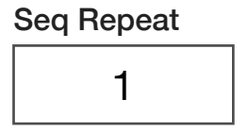
'begin' initiates the pattern emit engine to load the pattern specified by the **Seq Pattern** button. In a measure sequence it is typically placed at the beginning of the sequence and followed by a **Sequence Delay** and **Pattern Mode**: 'run' button.

'beginStep' initiates the pattern emit engine in an inner/outer loop grouping. When the outer loop value is equal to 1, the pattern is loaded and on increments of the loop, the pattern is emitted.

'run' starts the pattern emit in a measure sequence.

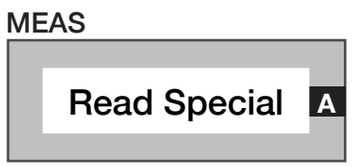
'nextStep' restarts the pattern in a measure sequence.

'stop' forces a hard stop of the pattern emit in a measure sequence or post measure group.



Seq Repeat

An integer data entry button to specify the number of times to repeat a prior pattern. A value of 0 repeats indefinitely.



Meas: Read Special

Measurement block that uses a 4-bit capture buffer on Dpins 16, 17, 18, and 19, using Dpins 20 as a clock input from the device. The returned value is a vector vs. time result with the size of the capture set by **Read Size** button.

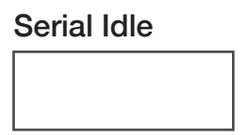
NOTE: the Clock Mode: 'd20' button setting must be used.

Meas: Pattern Fail

Measurement block that returns bit location of the first pattern failure. The block returns 0 if there are no pattern failfailures.

NOTE: The first bit location is designated as location 1.

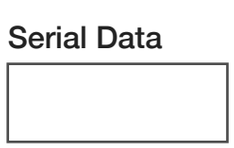
Panel: Serial Data



Serial Idle

Text string input button that sets the idle state for the designated clock, strobe, data and aux pins. The input text capitalization determines the voltage state of the pins before and after a communication protocol is executed. The input value 'CDSa', represents an idle 'high' voltage value set by the **Vhigh** button for clock, data, and strobe with an idle 'low' voltage value set by the **Vlow** button for the aux pin. This button is commonly used with the **D1-1** through **D1-20**, **Serial Data**, **Read Pin**, **Read Size**, **Vector Period**, and **Clock Mode** buttons for serial communication.

NOTE: The idle state of the pins must be defined by the Serial Idle button for serial communication emits to be executed.



Serial Data

Text string input button that generates a serial emit pattern for the serial data output. Data is input as ***protocol*:*packet size*:*write data*:*read mask***.

NOTE: The Serial Data button must be used in a Premeasure or Measure Sequence group.

The ***protocol*** values supported are: 'jtag', 'i2c', and 'spi'.

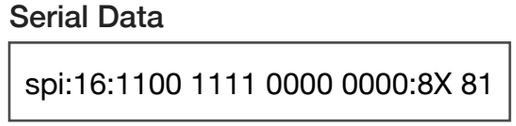
The ***packet size*** value is a number representing the number of bits and associated clock cycles in the packet emit.

The ***write data*** value is the data to be emitted to the device under test in binary form. The value is input as hexadecimal values for the I^2C protocol.

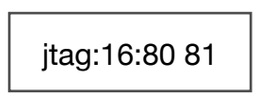
The ***read mask*** text value is an optional entry that defines mask bits to be logical AND'd with the bits captured on the read pin from the device under test. A value of '1' retains the associated bit, '0' or 'X' represent 'don't care' values in the bit stream. For example '1111XXXX' would capture the first four bits and discard the last four bits in a capture. The value is input as hexadecimal values for I^2C protocol.

NOTE: The read mask can be expressed in short-form notation with a number followed by an 'X'. '0', or '1' to represent the number of characters in the mask positions, i.e. - the read mask input value '1111XXXX' can be expressed as '41 4X' and the read mask input value 'XXXX 0000 1111 1111' can be expressed as '4X 40 81'.

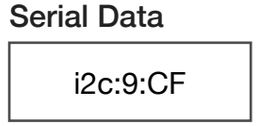
Example Serial Data button inputs:



SPI protocol with 16 clock edges that is emitting the hexadecimal byte CF00 and reading back 16 bits; The first 8 values are ignored, representing the read data as an 8-bit decimal value between 0-255.



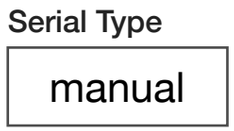
JTAG protocol with 16 clock edges that is emitting the hexadecimal byte 00FF and ignoring any read bits.



I^2C protocol emit with 8 data clock edges and 1 ACK bit that is emitting the hexadecimal byte CF (1100 1111) and ignoring any read bits.

NOTE: Whitespace characters (space bar) are ignored in the Serial Data button and can be used to separate and view binary data chains as bytes.

This button is commonly used with the **D1-1** through **D1-20**, **Serial Idle**, **Serial Type**:'manual', **Read Pin**, **Read Size**, **Vector Period**, and **Clock Mode** buttons as well as the **Serial Read** measurement block.



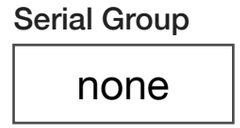
Serial Type

Drop down list button that defines the communication control mode for the read data, data, clock, and strobe pins set by the **D1-1** through **D1-20** button settings. The selection type inherits and enforces timing behavior specified by the *protocol* in the **Serial Data** button or Device Control Definition.

The 'manual' selection provides communication control via the **Serial Data** button. This button is commonly used with the **D1-1** through **D1-20**, **Serial Idle**, **Serial Type**:'manual', **Read Pin**, **Read Size**, **Read Pin**, **Vector Period**, and **Clock Mode** buttons as well as the **Serial Read** measurement block.

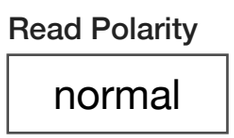
The 'DUT Defined' selection uses the communication parameters defined in the Device Control Editor under the **Formats** tab to enable protocol-aware communication with a DUT. It is typically used with devices that contain multiple registers with programmable functions. This button selection will override the settings for any **Clock Polarity, Serial Direction, Strobe Length, and Strobe Polarity** buttons in the test plan. See the Device Control Definition and DUT Instrument section for more information.

CAUTION: The Serial Type button of the StaticDigital instrument in the RI8546 Device Power TIM defaults to the value of 'Dut Defined.' If the Dpins instrument is the target communication instrument, all Static Digital Serial Type buttons must be placed in the Global Defaults of a test plan and set to 'none.'



Serial Group

A drop down list button that selects a pin group to define the clock, data, read, and or strobe pins. Pin groups are defined in the **Device Pins** tab of the Device Connection Editor. A 'DUT' (Device definition with associated Device Pins definition) must be active in the system configuration to access the **Serial Group** button options. Reference the Dut Instrument section for information on how to add a device to the system configuration.

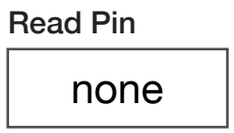


Read Polarity

Drop down list button that sets the polarity of the bit values on the read pin designated by the **Read Pin** button.

'normal' is the default mode and does not alter the bit polarity of the bits from the device under test.

'inverted' reverses the bit polarity of the captured bits on the read line from the device under test.



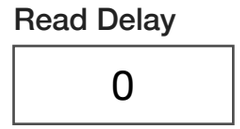
Read Pin

A drop down list button that selects internal measurement resources to connect to the designated pin. The measurement resource used is dependent on additional buttons and/or measurement blocks included in the testplan, with commonly used **Read Pin** setups listed as follows:

Frequency counter resource includes the **Pin Mode**: 'normal' and **Measure Time** buttons with **Pin Frequency** measurement block.

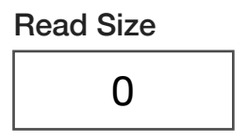
The voltage comparator resource includes the **Pin Mode**: 'continuity' button and **Read Pin State** measurement block.

The internal read buffer resource used for synchronous communication protocols includes the **Pin Mode**: 'normal', **Read Size**, **Read Polarity**, and **Read Delay** buttons with the **Read Serial** measurement block.



Read Delay

Drop down list button that offsets the read signal from the clock to adjust bit read timing alignment. The input values are in units of number of clock periods with valid input values of: -1, 0, 1, or 2. This button is commonly used with the **D1-1** through **D1-20**, **Read Pin**, **Read Size**, **Read Pin**, **Vector Period**, and **Clock Mode** buttons as well as the **Serial Read** measurement block.

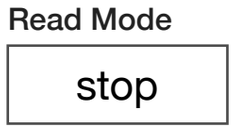


Read Size

Integer data button that sets the number of bits to capture.
The maximum value is 1000 samples.
When used with the **Serial Read** measurement block, the **Read Size** sets the decimal expression range, i.e - a **Read Size** value of '12' would give answers in the decimal range from 0-4095.

When used with the **Logic Analysis** measurement block, the capture size is the **Read Size** value multiplied by the over sample rate set by **Logic Analyzer Mode** value.

NOTE: The Read Size can be dynamically set within a measure sequence group to adjust the capture parameters for multiple measurements, i.e. - the Read Size button value can be set to '8' for a Serial Read measurement to provide a decimal range from 0-255 and then set to 100 to capture a larger capture range for the Logic Analysis measurement block within a single measure sequence group.



Read Mode

Drop down list button that defines bit capture actions. Multiple Read Mode buttons are typically used in conjunction with **Sequence Delay** buttons (in the **System > state** selection of the Edit Panel) to define the capture window duration.

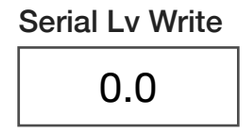
'stop' terminates the read capture. It is typically placed last in a measure sequence or in a post measure grouping.

'start' initiates the read capture. It is typically placed before a **Serial Data** button or other DUT instrument emit command in a measure sequence or pre measure grouping to modify the data capture.

'pause' halts the read capture. It is used in conjunction with a **Sequence Delay** button and the **Read Mode**: 'resume' and/or 'stop' setting in a measure sequence or pre measure grouping.

'resume' continues a previously paused read capture. It is used in a measure sequence or pre measure grouping after a **Read Mode**: 'pause' setting typically in conjunction with a **Sequence Delay** button to modify the data capture.

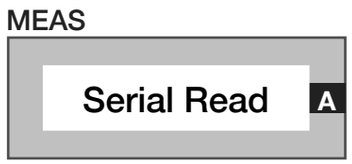
NOTE: Read Mode buttons are only valid in premeasure or measure sequence groups.



Serial Lv Write

Input button used as the target of a local variable write. It uses the **Serial Data** packet size and read mask to set the value range size.

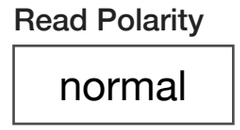
NOTE: This button is only valid in premeasure or postmeasure button groups.



Meas: Serial Read

Measurement block that captures and returns the contents of the serial read buffer designated by the **Read Pin** and **Read Size** buttons and returns the decimal value of the bits. See the A shift B and C calculation block for extracting individual bits or bit strings within a serial read capture.

Panel: Serial Scan

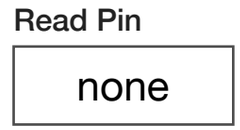


Read Polarity

Drop down list button that sets the polarity for the read pin designated by the **Read Pin** button.

'normal' is the default mode and maintains the logic polarity of the captured bits read from the device under test.

'inverted' reverses the logic polarity of the captured bits from the device under test.



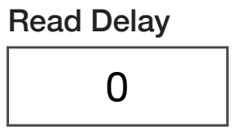
Read Pin

A drop down list button that selects internal measurement resources to connect to the designated pin. The measurement resource used is dependent on additional buttons and/or measurement blocks included in the testplan, with commonly used **Read Pin** setups listed as follows:

Frequency counter resource includes the **Pin Mode**: 'normal' and **Measure Time** buttons with **Pin Frequency** measurement block.

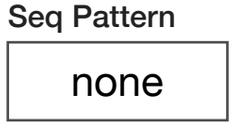
The voltage comparator resource includes the **Pin Mode**: 'continuity' button and **Read Pin State** measurement block.

The internal read buffer resource used for synchronous communication protocols includes the **Pin Mode**: 'normal', **Read Size**, **Read Polarity**, and **Read Delay** buttons with the **Read Serial** measurement block.



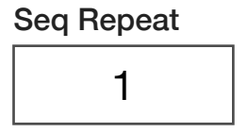
Read Delay

Drop down list button that offsets the read signal from the clock to adjust bit read timing alignment. The input values are in units of number of clock periods with valid input values of: -1, 0, 1, or 2. This button is commonly used with the **D1-1** through **D1-20**, **Read Pin**, **Read Size**, **Read Pin**, **Vector Period**, and **Clock Mode** buttons as well as the **Serial Read** measurement block.



Seq Pattern

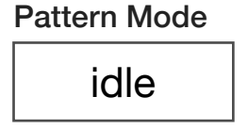
Drop down list button of scan pattern/s loaded into the Dpins instrument that will be emitted. It is only valid in pre measure or measure sequence groups and is used in conjunction with a **Seq Repeat** and or **Pattern Mode** buttons to execute the emit of the designated pattern.



Seq Repeat

An integer value button that sets the number of repeats of a designated pattern from the **Seq Pattern** button. It is only valid in pre measure or measure sequence groups and is used in conjunction with the **Pattern Mode** button.

NOTE: Scan patterns are limited to the default value of 1.



Pattern Mode

A drop down list button that controls the pattern emit engine. It is placed in a pre/post measure or measure sequence button grouping with the **Seq Pattern** and **Seq Repeat** buttons with a **Pattern Fail** or **Read Special** measurement block.

'idle' is the default off state of the pattern emit engine.

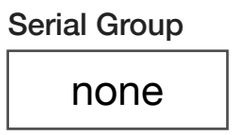
'begin' initializes the pattern engine to load the pattern designated by the Seq Pattern button into the emit buffer.

'beginStep' initiates a pattern emit in an inner/outer loop grouping only. When the outer loop value is equal to 1, the pattern is loaded and on increments of the loop, the pattern is emitted.

'run' starts the pattern emit.

'nextStep' restarts the pattern.

'stop' forces a hard stop of the pattern emit.



Serial Group

A drop down list button that selects a pin group used for continuity measurements. Pin groups are defined in the Device Pins tab of the Device Connection Editor. The associated device must be active in the system configuration to be accessible to the **Serial Group** button options. Reference the Dut Instrument section for information on how to add a device to the system configuration.

Meas: Pattern Fail

Measurement block that returns an integer value indicating the bit location of the first pattern failure. The block returns 0 if there are no pattern failures.

NOTE: The first bit location is designated as location 1.

Panel: Logic Analyzer

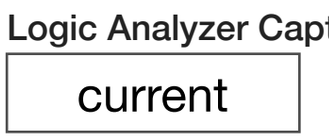
Logic Analyzer Trigger

Drop down list button that controls the analyzer's capture trigger timing when using the **Logic Analysis** measurement block. This button is only valid in a pre/post measure and measure sequence groups and is commonly used with the **Logic Analyzer Signal**, **Logic Analyzer Trigger**, and **Logic Analyzer Capture** buttons.

'off' is the default state and disables the trigger.

'enable' sets the trigger to begin/end when a **Read Mode**:'start' button is encountered in the pre measure or measure sequence group.

'immediate' initiates the trigger in a pre measure or measure sequence group where the **Logic Analyzer Trigger**:'immediate' button is encountered in the sequence.



Logic Analyzer Capture

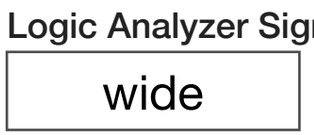
Drop down list button that selects the pins that will be connected to the analyzer instrument during data capture using the **Logic Analysis** measurement block. It is placed in the Global or Section Defaults of a test plan and is commonly used with the **Logic Analyzer Signal**, **Logic Analyzer Trigger**, and **Logic Analyzer Mode** buttons.

'Current' selects all pins designated in the **Seq Pattern** button pattern emit.

'All' selects all 20 pins.

'Serial' selects the pins designated by the **Serial Group** button.

'Other' selects the pins designated by the **Pin Group** button.



Logic Analyzer Signals

Drop down list button that captures and displays additional internal signals in the logic analyzer plot when using the **Logic Analysis** measurement block. It is placed in the Global or Section Defaults of a test plan and is commonly used with the **Logic Analyzer Mode**, **Logic Analyzer Trigger**, and **Logic Analyzer Capture** buttons.

‘wide’ displays additional internal capture/timing/trigger signals of the logic analyzer on y-axis: 21 through 24 of the plot view.
See Example C.

‘narrow’ limits the logic analyzer to only display the 20 *Dpins* in the analyzer plot viewer.

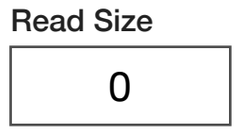
Logic Analyzer Mode

Drop down list button that selects the oversample rate of the logic analyzer relative to the clock period set by the **Vector Period** button when capturing signals with the **Logic Analysis** measurement block. It is placed in the Global or Section Defaults of a test plan and is commonly used with the **Logic Analyzer Signal**, **Logic Analyzer Trigger**, and **Logic Analyzer Capture** buttons.

‘X4’ is the default setting and sets the capture rate to four samples per clock period

‘X2’ sets the capture rate to two samples per clock period.

‘X1’ sets the capture rate to one sample per clock period.

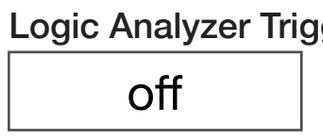


Read Size

Integer data button that sets the number of samples to capture in a bit stream. The maximum input value is 1000 samples.
When used with the **Serial Read** measurement block, the **Read Size** sets the decimal expression range, i.e - a **Read Size** value of ‘12’ would give answers in the decimal range of 0-4095.

When used with the **Logic Analysis** measurement block, the capture size is the **Read Size** value multiplied by the over sample rate set by **Logic Analyzer Mode** value.

NOTE: The Read Size can be dynamically set within a measure sequence group to adjust the capture parameters for multiple measurements, i.e. - the Read Size button value can be set to ‘8’ for a Serial Read measurement to provide a decimal range from 0-255 and then set to 100 to capture a large emit range for the Logic Analysis measurement block within a single measure sequence group.



Logic Analyzer Trigger Mode

Drop down list button that selects an event to trigger the logic analyzer signal capture of the **Logic Analysis** measurement block. It is placed in the Global or Section Defaults of a test plan and is

commonly used with the **Logic Analyzer Signal**, **Logic Analyzer Trigger**, **Logic Analyzer Capture**, and **Logic Analyzer Mode** buttons.

‘off’ deactivates the trigger and no data is captured.

‘external’ is for RI internal purposes only.

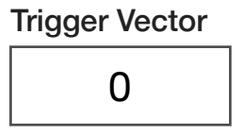
‘onFail’ triggers the logic analyzer capture to start immediately following a measured fail bit in a pattern designated by the **Seq Pattern** button.

‘onRead’ triggers the logic analyzer capture to start when the **Read Mode:** ‘start‘ is encountered, subject to the offset imposed by the **Read Delay** setting.

‘atVector’ triggers the logic analyzer capture to start the capture in accordance with the **Location Mode** setting, subject to the offset imposed by the **Trigger Vector** button value.

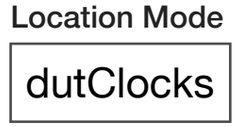
‘patternStart’ captures all bits in the pattern specified by the **Seq Pattern** button.

‘serial’ triggers the captures bits after **Serial Data** button or DUT instrument protocol buttons.



Trigger Vector

Integer value button that offsets the starting point of a trigger event by the specified number of bits or clock edges defined by the **Location Mode** and **Logic Analyzer Trigger Mode** buttons.

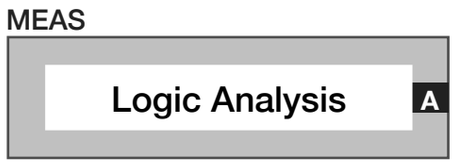


Location Mode

Drop down list button that selects the method for counting pattern vectors when using the **Trigger Vector** button to start or offset the start of a logic analyzer capture. This button is used in conjunction with the **Logic Analyzer Trigger Mode** button to designate the target vector type.

‘dutClocks’ sets the clock pin designated by a **D1-1** to **D1-20:** ‘clock’ or ‘/clock’ button setting as the vector target with the **Logic Analyzer Trigger Mode**: ‘serial’ or ‘onRead’ button setting and **Trigger Vector** offset value.

‘vector’ sets the pattern designated by a **D1-1** to **D1-20:** ‘clock’ or ‘/clock’ buttons as the signal vector target with the **Logic Analyzer Trigger Mode**: ‘atVector’ button setting and **Trigger Vector** offset value.

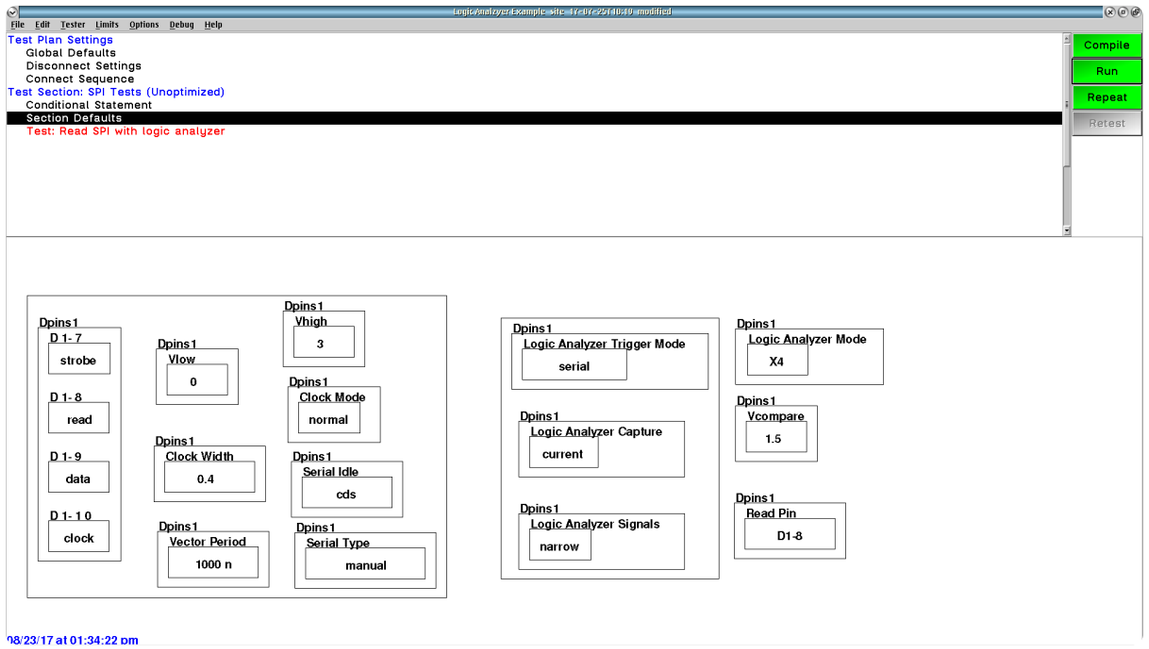


Meas: Logic Analysis

The Logic Analysis measurement block captures the bit stream of pins specified by the **Logic Analyzer Capture** button and displays them in a plot window of a **Local Variable** save. This button is used in conjunction with the **Read Size**, **Read Mode**, **Logic Analyzer Signal**, **Logic Analyzer Trigger**, **Logic Analyzer Capture**, and **Logic Analyzer Mode** buttons. See Example B.

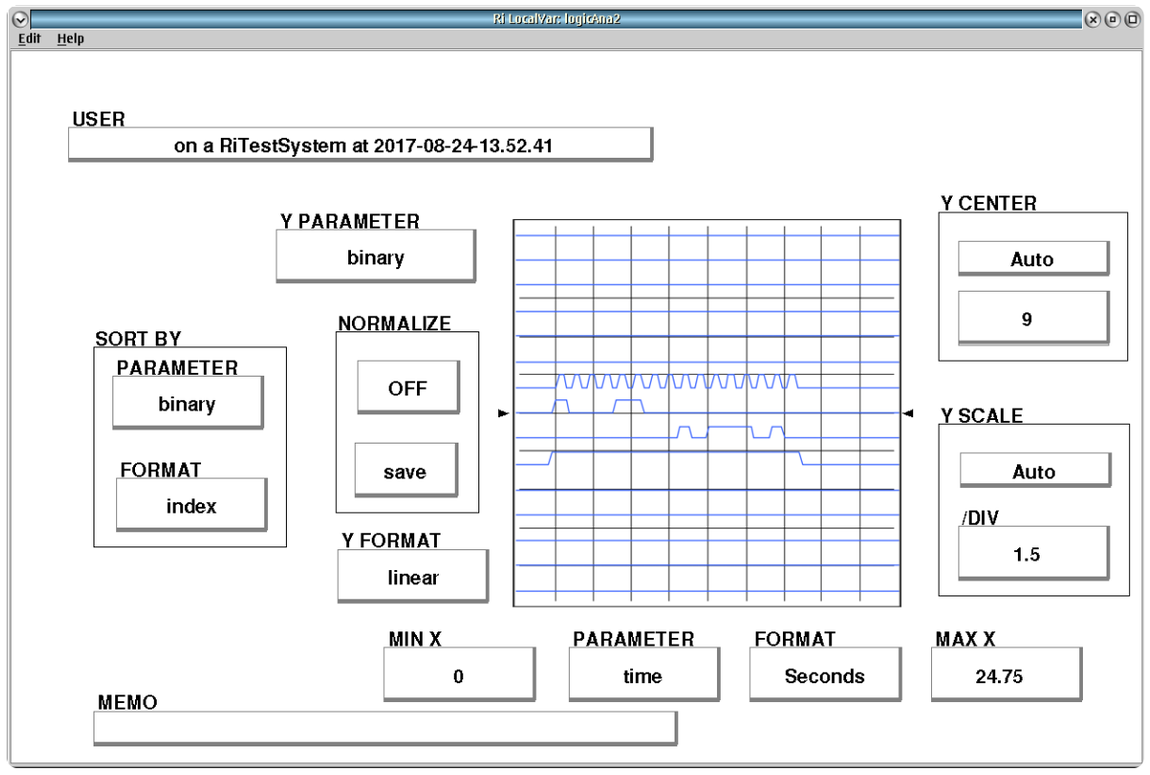
NOTE: The output of the Logic Analysis measurement block must be connected to a Local Variable save. The analyzer plot can be viewed by compiling the test program, left clicking on the Local Variable save block and selecting the Rectangular plot viewer with the Sort By Format set to 'index' and the x parameter set to 'time'. Each Dpin is displayed on the y-axis value that corresponds to the pin number, i.e - the y-axis value of 10 represents Dpins1 bit 10 or D1-10. See Example C.

EXAMPLE B LOGIC ANALYZER SETUP



The above shows the setup for serial SPI communication (buttons on the left of the panel) and the logic analyzer display and capture setup (buttons on the right of the panel)

EXAMPLE C LOGIC ANALYZER VIEWER



The plot viewer shows the resulting clock, data, read and strobe bit streams in a logic analyzer capture. The plot is centered on Dpin 9 (data write) with Dpin 10 (clock) above, Dpin 8 (read) and Dpin 7 (strobe) below.