RI 7100A TESTER BUTTONS

Digital Pattern — Measurements Panel			
Button	**Range**	**Default**	**Description**
MEAS Frequency	1 Hz to 50 kHz	Hz	Measure Base Band Frequency
SAMPLES	>1	1	Samples/Measurement
MEAS RATE	<50 kHz	100 Hz	Setting Gate Time

Programmable DUT Controller — State Panel			
Button	**Range**	**Default**	**Description**
VCC1, 2	+10V	0 Volts	CW and Pulsed DC Supply, 200 mA max.
VCC1, 2 Mode	Voltage or Current	Voltage	Set V and Measure I or Set I and Measure V
PowerV1, 2, 3	0 to 10V	0 Volts	VI, CW and Pulsed DC Supply, 3.5A max.
PowerI1, 2, 3	0 to 4A	0 Amps	Current Limit Setting for PowerV1, 2, 3
Fixture Power	ON or OFF	OFF	DC Power to Fixture
Von	+10V	0 Volts	On State Voltage for Control Lines 1-8
Voff	+10V	0 Volts	Off State Voltage for Control Lines 1-8
CONTROL 1 - 4	ON or OFF	OFF	Bi-State Digital Control Lines (Bits)
CONTROL 5 - 8	ON or OFF	OFF	Digital Control Lines or Serial Data Bus

Programmable DUT Controller — Device Power Panel			
Button	**Range**	**Default**	**Description**
Device Power 1 - 8	Open, Gnd, Vcc3,Vcc4	Open	Multi-State Supply Lines
VCC3, 4	+10V	0 Volts	CW and Pulsed DC Supply, 200 mA max.
VCC3, 4 Mode	Voltage or Current	Voltage	Set V and Measure I or Set I and Measure V
Current Meas Range	1, .1, 0.01, 0.001A	1 Amps	Current Measure Range for VCC Lines

Programmable DUT Controller — Measurements Panel			
Button	**Range**	**Default**	**Description**
MEAS ICC1 - 4	+1, .1, .01, .001A	+1 Amp	Measure VCC1 - 4 Supply Currents
Current Meas Range	1, .1, .01 and .001A	1 Amp	Current Measurement Range, VCC Lines
MEAS Power Icc 1 -3	40, 4, .4, .04A	4 Amps	Measure Power Icc 1 - 3 Supply Currents
Power Current Meas Range	40, 4, .4, .04A	4 Amps	Current Measurement Range, Power VIs
MEAS Voltage	+10, 1, .1, 0.01V	10 Volts	Measure DC Voltage on Vmeasure PIN
MEAS Voltage Vs Time	+10, 1, .1, 0.01V	10 Volts	Measure DC Voltage on Vmeasure PIN vs Time. The data is saved as a Vector (2 Dimensional Array).
Voltage Meas Range	+10, 1, .1, 0.01V	10 Volts	Voltage Range Setting for Vmeasure PIN
Voltage Meas Mode	single or diff	single	Voltage Measurement Mode Single ended (PINs 1 - 6 vs Gnd) or Differential (PINs 1 - 6 vs 1N - 6N)
Vmeasure PIN	1 - 6, 1N - 6N,	Vcc1 - 6, VI 1 - 31	Select Voltage Measurement Pin

Programmable DUT Controller — Vcc5 and Vcc6 Panel			
Button	**Range**	**Default**	**Description**
VCC5, 6	+10V	0 Volts	CW and Pulsed DC Supply, 200 mA max.
MEAS ICC5, 6	+1, .1, .01, .001A	+1 Amp	Measure VCC5, 6 Supply Currents

Gain Compression — State Panel			
Button	**Range**	**Default**	**Description**
Start, Stop, Points	Source RF Output	-10 dBm, 0 dBm, 11 points	Compression Test Input Signal Range
Compression	> 0 dB	1 dB	Target Compression Point
Gain Averages	> 1	1	# of Measurements Performed at 1st Gain Measurement point

Gain Compression — Measurements Panel			
Button	**Range**	**Default**	**Description**
Gain Compression	Set by Start,Stop, Points Button	watts	Performs Output Gain Compression Measurement. Measures both Pin and Pout Interpolates between Measurement points. Fin and Fout are the same.
Output Compression	Set by Start,Stop, Points Button	watts	Performs Output Gain Compression Measurement. Only Measures Pout Interpolates between Measurement points. Fin and Fout can be different. Uses System Frequency and RF Port
Output Power	Set by Start,Stop, Points Button	linear	Measures Pout vs Pin. The data is saved as a Vector (2 Dimensional Array) Uses System Frequency and RF Port
Output Compression at Rec	Set by Start, Stop, Points Button	watts	Performs Output Gain Compression Measurement. Only Measures Pout Interpolates between Measurement points. Fin and Fout can be different. Uses Receiver Frequency and RF Port
Output Power at Rec	Set by Start, Stop, Points Button	linear	Measures Pout vs Pin. The data is saved as a Vector (2 Dimensional Array) Uses Receiver Frequency and RF Port

Intermod — Measurements Panel			
Button	**Range**	**Default**	**Description**
Intermod	Tones>10kHz apart	Watts	3rd Order Intermod Output Intercept Point Measures both tones and sidebands. Tones are equally spaced above and below carrier frequency.
Sideband Ratio	Tones>10kHz apart	linear	Carrier to Sideband Ratio Measurement. Measures both tones and sidebands. Tones are equally spaced above and below carrier frequency.
Carrier	Tones>10kHz apart	Watts	Carrier tone Measurements only. Measures both tones, returns smaller. Tones are equally spaced above and below carrier frequency.
Upper Sideband	Tones>10kHz apart	Watts	Upper Sideband Measurement. Only measures upper IM distortion signal. Tones are equally spaced above and below carrier frequency.
Lower Sideband	Tones>10kHz apart	Watts	Lower Sideband Measurement. Only measures lower IM distortion signal. Tones are equally spaced above and below carrier frequency.

Noise Figure — Measurements Panel			
Button	**Range**	**Default**	**Description**
Noise Gain		Linear	Gain Measurement using Noise Figure Hardware. Fin and Fout can be different.
Hot Noise		Watts	Performs a Hot Noise Measurement. Turns on the Noise Source and measures noise power
Cold Noise		Watts	Performs a Cold Noise Measurement. Device input terminated into Zo load and system measures noise power.
Noise Figure	>0 dB	linear	Y factor Noise Figure Measurement Hardware. Fin and Fout can be different.
Mixer Noise Figure	>0 dB	linear	Older Button, use Noise Figure button.
Amplifier Noise Figure	>0 dB	linear	Older Button, use Noise Figure button.

Pmeter — Measurements Panel			
Button	**Range**	**Default**	**Description**
Frequency	< 20 GHz	999 MHz	Power Meter's RF Frequency Setting.
CAL TABLE		sensor 1	Select RF Power Sensor Calibration Table.
Power		dBm	Measures RF Power using Power Meter and RF Power Sensor.

Receiver — State Panel			
Button	**Range**	**Default**	**Description**
Frequency	< 20 GHz	1000 MHz	Receiver's RF Frequency Setting.
IF GAIN	0, 10, 20, 30, 40, 50 dB	0 dB	Receiver's IF Gain Setting
IF BW	Wide or Narrow	Wide	Receiver's IF Measurement Bandwidth Narrow (approx. 7 kHz), Wide (approx 4 MHz)
MIX SIDE	High, Low, Default	High	Location of System LO relative to Device Signal: High Side, Low Side or Default.
INPUT	0.1 - 2, 2 - 20,0.005 - 2, 0.1 - 20 to Aux Out	0.1 to 2 GHz	Selects Signal Path to Receiver

Receiver - Measurements Panel		
Button	**Default**	**Description**
Rel Complex	Complex V	Measures Uncorrect Complex Voltages
Complex Voltage	Complex V	Measures Corrected Complex Voltages
Power	Watts	Measures Error Corrected RF Power
Spurious Power	Watts	Older Button, Use Power Button
Rel Noise Power	Watts	Measures Uncorrected Noise Power
Noise Power	Watts	Measures Error Corrected Noise Power
Complex vs Time	Complex V	Measures Error Correct RF Voltages vs Time. The data is saved as a Vector (3 Dimensional Array).
Multiple Complex	Complex V	Older Button, use Complex vs Time
Rel RMS	Watts	Measures Uncorrected RMS power. Measurement BW is 100 KHz to 5 MHz from Receiver Frequency
Absolute RMS	Watts	Measures Error Corrected RMS power. Measurement BW is 100 KHz to 5 MHz from Receiver Frequency.

Receiver LO — State Panel			
Button	**Range**	**Default**	**Description**
FREQUENCY	10 MHz - 20 GHz	1021.4 MHz	To set Receiver LO's RF Frequency.
POWER	+10 to -25 dBm	+10 dBm	To set Receiver LO's RF Output Level
RF STATE	ON or OFF	ON	To turn ON or OFF the Receiver LO's RF Output
MODULATION	OFF, FM, DC FM AM	OFF	To select the modulation applied to the Receiver LO's RF Output Signal.

Source 1 — State Panel			
Button	**Range**	**Default**	**Description**
FREQUENCY	10 MHz - 20 GHz	999 MHz	To set Source1's RF Frequency.
POWER	+8 to -120 dBm	0 dBm	To set Source1's RF Output Level
RF STATE	ON or OFF	ON	To turn ON or OFF Source1's RF Output
MODULATION	OFF, FM, DC FM, AM	OFF	To select the modulation applied to Source1's RF Output Signal.

Source 2 — State Panel			
Button	**Range**	**Default**	**Description**
FREQUENCY	10 MHz - 20 GHz	999 MHz	To set Source2's RF Frequency.
POWER	+8 to -120 dBm	0 dBm	To set Source2's RF Output Level
RF STATE	ON or OFF	ON	To turn ON or OFF Source2's RF Output
MODULATION	OFF, FM, DC FM, AM	OFF	To select the modulation applied to Source2's RF Output Signal.

Source 3 — State Panel			
Button	**Range**	**Default**	**Description**
FREQUENCY	10 MHz - 20 GHz	999 MHz	To set Source3's RF Frequency.
POWER	+8 to -120 dBm	0 dBm	To set Source3's RF Output Level
RF STATE	ON or OFF	ON	To turn ON or OFF Source3's RF Output
MODULATION	OFF, FM, DC FM, AM	OFF	To select the modulation applied to Source3's RF Output Signal.

Source Module — State Panel			
Button	**Range**	**Default**	**Description**
SOURCE1 ATTN	0 - 110 dB	0 dB	Source 1 Path Step Attenuator. Precedes Power Amp and Combiner
SOURCE2 ATTN	0 - 110 dB	0 dB	Source 2 Path Step Attenuator. Precedes Power Amp and Combiner
Source Output Mode	5 Path Choices	Sources	Selects the Source 1, Source 2 and Aux Source SignalPaths
SOURCE 3 MODE	LO or Clock	LO	Selects the Source 3 Signal Path. LO: Direct path to RF Port 2. Clock: The Signal/64 is sent to WF8
Intermod Freq Spacing	>0.01 MHz	0 MHz	To select the spacing between the IM tones from RF Source 1 and 2. Both Tones are equally spaced above and below the carrier frequency.
Intermod Power Spacing		0 dB	To select the power offset between RF Source 1 and 2. Source 1 is the Master Source and Source 2 is the Slave.

System — Data Saves Panel	
Button	**Description**
SAVE NO FORMAT	Saves the data in the default measurement units (format)
SAVE FORMAT	Saves the data in the measurement units (format) selected. Supports test limits.
SAVE ADJUSTED	The data is converted to the units selected, multiplied by the correlation factor and saved in the data base. Supports test limits.
LOCAL VAR SAVE	Saves the data in a local variable User selects the local variable name.
LOCAL VAR SOURCE	Outputs the data which was previously saved in the local variable. User selects the local variable name.
SORTED LV SAVE	Saves the data in a local variable Data is sorted by the parameter selected. User selects the local variable name and the sort parameter.
INSTR STATE SOURCE	Outputs the current state of the selected instrument parameter. User selects the instrument and parameter.
CAL DATA	Saves the data in the tester's calibration tables. Only For Calibration Test Plans. User selects the instrument and parameter.
CAL FACTOR	Outputs data from the tester's calibration tables. User selects the instrument and parameter.
INDEXED BY?	Saves the data in a local variable. Data is indexed by the parameter selected. User selects the local variable name and the index by parameter.
LOCAL VAR PROMPT	Prompts the operator during test execution to enter a value. The value entered is saved in a local variable. User selects the local variable name and enters the operator prompt message.

System — Calculations Panel	
Button	**Description**
CALC (1 input)	User definable calculation block. Single Input.
CALC (2 input)	User definable calculation block. Two Inputs.
CALC (3 input)	User definable calculation block. Three Inputs.
CALC CONSTANT (1 input)	User definable calculation block. 1 input and User entered constant.
CALC CONSTANT (2 inputs)	User definable calculation block. 2 inputs and User entered constant.
CALC INPUT	Outputs the result from the User definable calculation block. The user can enter a calculation constant.
MEAS Calc Only	Add this button to any test panel which does not have a measurement button (i.e. only performs calculations.)
SYMBOL (1.23)	Enters value into test plan symbol table. User enters a floating point constant
SYMBOL (0)	Enters value into test plan symbol table. User enters a integer constant.
Self Cal	Performs System Self Cal. For Calibration Test Plans Only.
RESET CAL	Resets the calibration data for the calibration parameter selected. For Calibration Test Plans Only

System — Flow Control Panel	
Button	**Description**
Set Flag	Sets a flag based on the results of user specified test limits. User selects flag name and enters test limits.
SKIP IF TRUE	Skip test section if flag is true.
SKIP IF FALSE	Skip test section if flag is false.
ABORT IF TRUE	Stop testing if flag is true.
ABORT IF FALSE	Stop testing if flag is false.
OPERATOR PAUSE	Pauses test execution and displays an operator prompt. The test execution will continue after the operator presses the Enter key.

System — State Panel		
Button	**Default**	**Description**
REPEAT	1	Sets the number of times to repeat all of the measurements in the test panel.
PAUSE	0 microseconds	Sets the amount of additional time the tester will wait after setting up the instrument states before executing the measurements in the test panel.
AVERAGES	1	Sets the number of measurements that are averaged together.
SEQUENCE DELAY	0 microseconds	Used in Pre and Post Measure Sequences. Sets the delay time before executing the setting button to the right of the SEQUENCE DELAY button.
POINTS	1	Used by Measurement buttons which perform sequential measurements such as Voltage vs Time. This button sets the number of measurement points to be performed. Used with DELAY button.
DELAY	1	Used by Measurement buttons which perform sequential measurements such as Voltage vs Time. This button sets the delay time between measurement points. Used with POINTS button.

System — 1 Input Calculations Panel	
Button	**Description**
CALC Avg	Returns the average value of the input data.
CALC Min	Returns the minimum value of the input data.
CALC Max	Returns the maximum value of the input data.
CALC peak to peak	Returns the peak to peak value (Max - Min) of the input data.
CALC peak	Calculates the min and max values of the input data and returns the largest absolute value of the min or max.
CALC std deviation	Returns the standard deviation of the input data.
CALC Median	Returns the median value of the input data.
CALC ellipse phase	Returns the phase of an ellipse defined by the input data which must be complex vector data.
CALC ellipse mag	Returns the magnitude of the ratio of the axes of an ellipse defined by the input data. The input data must be complex vector data.

System — 2 Input Calculations Panel	
Button	**Description**
CALC A+B	Returns the sum of input A and input B.
CALC A*B	Returns the product of input A and input B.
CALC A-B	Returns input A minus input B.
CALC A/B	Returns input A divided by input B.
CALC FIND VALUE	Three inputs. Top node A, Bottom Node B and the entered value E. The button takes the input data from B and finds the location of the entered value E. This location is then used to find the value in the input data from A. The resulting value is output from the button. The input data from A and B must be of the same length.

System — Output Frequency Panel		
Button	**Default**	**Description**
FREQ REFERENCE	None	Frequency Reference Instrument. The system uses the following equation to define the relationship between the DUT's input signal frequency and the DUT's output signal frequency: Fout = Fin x OUT FREQ SCALE + OUT FREQ OFFSET. Fin is defined as the FREQ REFERENCE instrument's output frequency.
OUT FREQ OFFSET	0	Output Frequency Offset. The system uses the following equation to define the relationship between the DUT's input signal frequency and the DUT's output signal frequency: Fout = Fin x OUT FREQ SCALE + OUT FREQ OFFSET. Fin is defined as the FREQ REFERENCE instrument's output frequency.
OUT FREQ SCALE	0	Output Frequency Scale Factor. The system uses the following equation to define the relationship between the DUT's input signal frequency and the DUT's output signal frequency: Fout = Fin x OUT FREQ SCALE + OUT FREQ OFFSET. Fin is defined as the FREQ REFERENCE instrument's output frequency.

Test Head — State Panel			
Button	**Range**	**Default**	**Description**
RF 2	Receive, Src 3	Receive	Selects the RF source or Receive path connected to RF Port 2.
RF 3	Receive, Src1-noise	Receive	Selects the RF source or Receive path connected to RF Port 3.
RF 6	Receive, Src1-noise	Receive	Selects the RF source or Receive path connected to RF Port 6.
RF 7	Receive, Src1-noise	Receive	Selects the RF source or Receive path connected to RF Port 7.
SOURCE 1	RF 3, RF 6 , RF 7	RF 3	Selects the RF port path connected to RF Source 1 or the noise source.
SOURCE 1 MODE	source, noise	source	Connects either RF Source 1 or the noise source to the SOURCE 1 signal path.
INPUT PORT	RF 2, RF 3, RF 6, RF 7	RF 3	Selects the RF Test Port connected to the DUT's Input Port.
OUTPUT PORT	RF 2, RF 3, RF 6, RF 7	RF 6	Selects the RF Test Port connected to the DUT's Output Port.
REC ATTENUATION	0 to 110 dB	0 dB	Sets the RF attenuation applied by the step attenuator to the receive path of the RF Test Head.
RECEIVE MODE	S Parameters, Ref Noise, Receive	S Parameters	Selects the receive signal path. S Parameters: S parameter Hardware. Receive: straight thru - Noise Figure Path Ref Noise: Connects Reference noise source to receive signal path.
PARAMETER	a1, a2, b1, b2	a1	Selects the wave parameter to be measured.

vna — Measurements Panel		
Button	**Default**	**Description**
s para	linear S parameters	Performs Error Corrected 2 port S parameters (S11, S21, S12, S22). All four results are available.
wave parameters	Complex Voltage	Performs Error Corrected 2 port wave parameters (a11, a12, a21, a22, b11, b12, b21, b22). All eight results are available. The input and output frequency must be the same.
Phase	Degrees	Performs Error Corrected S parameters Provides S21 phase only.
Input Power	Watts	Performs Error Corrected S parameters. Provides Incident Power to the DUT.
Output Power	Watts	Performs 2 port S parameters. Provides Output Power from the DUT at the DUT's output frequency. The input and output frequency must be the same.
single wave	Watts	Measures a single wave parameter. Test Head PARAMETER, INPUT PORT and OUTPUT PORT buttons are used to select the wave parameter and test port.
S11	linear S11	Performs Error Corrected S parameters Provides S11.
Output Rec Pwr	Watts	Provides Output Power from the DUT at the DUT's output frequency. The input and output frequency can be different. Corrects for signal path loss.
Low Level Output Power	Watts	Provides Output Power from the DUT at the DUT's output frequency. The input and output frequency can be different. Does not correct for device output match. Useful for low level power measurements
Conv Gain	voltage ratio	Performs conversion gain measurements The input and output frequency can be different. Calculates Pout/Pin. Corrects for signal path loss.
rec wave para	complex voltage	Performs port wave parameters (a11, a12, a21, a22, b11, b12, b21, b22). All eight results are available. The input and output frequencies can be different.

vna — Amplifier Measurements Panel		
Button	**Default**	**Description**
GAIN	linear	Performs Error Corrected S parameters. Provides linear magnitude of S21.
Input VSWR	VSWR	Performs Error Corrected S parameters. Provides S11 VSWR.
Input Match	complex reflection coefficient	Performs Error Corrected S parameters. Provides S11 as complex reflection coefficient.
Output Match	complex reflection coefficient	Performs Error Corrected S parameters. Provides S22 as complex reflection coefficient.
Reverse GAIN	linear	Performs Error Corrected S parameters. Provides linear magnitude of S12.
Fwd GAIN	linear	Performs S parameters. Does not use S22 in error correction. Provides linear magnitude of S21.
Harmonics	Power Ratio	Performs two DUT output power measurements. One measurement at the input freq times the out freq scale + out freq offset, the second measurement at the input frequency. The button provides the resulting power ratio.

Waveform — State Panel			
Button	**Range**	**Default**	**Description**
WF 2 Amplitude	<3 Volts peak	0 Volts	Set the waveform peak output voltage for WF2.
WF 2 OFFSET	+3 Volts	0 Volts	Set the waveform offset voltage for WF2.
WF 2 PHASE		0 degrees	Set the delay in degrees for WF2.
WF 2 WIDTH		0 degrees	Set the width of the initial pulse in degrees of the period.
WF 3 Amplitude	<3 Volts peak	0 Volts	Set the waveform peak output voltage for WF3.
WF 3 OFFSET	+3 Volts	0 Volts	Set the waveform offset voltage for WF3.
WF 3 PHASE		0 degrees	Set the delay in degrees for WF3.
WF 3 WIDTH		0 degrees	Set the width of the initial pulse in degrees of the period.
MIN SAMPLES		4	Set the minimum number of samples per waveform.
FREQUENCY		1 MHz	Set the waveform frequency. The button shows the actual frequency obtained.
TYPE	none, sin, quad, pulse		Select the type of waveform to be generated.
SAMPLE RATE	50 nsec, 500 nsec.	50 nsec	Select the time between output samples.

Receiver			
Measurement	**Data Class**	**Default Units**	**Other Units**
RelComplex	RiComplexV	Complex Voltage	
Complex Voltage	RiComplexV	Complex Voltage	
Power	RiPowerD	Watts	dBm and dBW
Rel Noise Power	RiPowerD	Watts	dBm and dBW
Noise Power	RiPowerD	Watts	dBm and dBW
Rel RMS	RiPowerD	Watts	dBm and dBW
Absolute RMS	RiPowerD	Watts	dBm and dBW
Complex vs Time	RiTimeVsComplex	Complex Voltage	
Multiple Complex	RiComplexV	Complex Voltage	

vna			
Measurement	**Data Class**	**Default Units**	**Other Units**
spara	Ri2PortSparD	Linear S Parameters	
wave parameters	Ri2PortWaveD	Complex Voltages	
Phase	RiPhaseD	Degrees	
Input Power	RiPowerD	Watts	dBm and dBW
Output Power	RiPowerD	Watts	dBm and dBW
single wave	*RiFrVsPower*	*Watts*	
S11	Ri1PortSparD	linear S11	RL (dB)
Output Rec Pwr	RiPowerD	Watts	dBm and dBW
Conv Gain	RiRealD	Voltage Ratio	dB=20*log10
rec wave para	RiComplexD	Complex Voltage	

vna Amplifier			
Measurement	**Data Class**	**Default Units**	**Other Units**
GAIN	RiRealD	Voltage Ratio	dB=20*log10
VSWR	RiVswr	VSWR	
Input Match	RiReflectCoeff	Linear	RL (dB)
Harmonics	RiPowerGain	Power Ratio	dB=10*log10
Reverse Gain	RiRealD	Voltage Ratio	dB=20*log10
Output Match	RiReflectCoeff	Linear	RL (dB)
Fwd GAIN	RiRealD	Voltage Ratio	dB=20*log10

vna Uncorrected			
Measurement	**Data Class**	**Default Units**	**Other Units**
uncorrected S	Ri2PortSparD	Linear S Parameters	
relative wave	Ri2PortWaveD	Complex Voltages	
uncorrected S11	Ri1PortSparD	linear S11	RL (dB)
rec wave para	Ri2PortWaveD	Complex Voltages	
uncorrected power vs freq	RiFrVsPower	Watts	