

RADIODETECTION®

# 6100-Cu™

The Smarter Copper Tester  
Specifications

Multifunction TDRs



# 6100-Cu

The smarter copper tester

## THE PERFECT TOOL FOR COPPER NETWORK TESTING

The 6100-Cu is designed for the installation, maintenance and repair of voice and DSL circuits. Its easy-to-use menus, rugged design and small form factor make it the ideal tool for network technicians. The large, color, touch-screen display and multiple connection options add to its ease of use and the optional TDR and RFL/K-test allow service providers to scale the product based on existing or new methods and procedures.

With the 6100-Cu, the testing process is highly automated, enabling technicians to close jobs off quickly and efficiently.

*To automate, standardize and simplify the job of the installation and repair technician for all copper broadband networks*



COPPER SPECIFICATIONS <sup>a, b, c</sup>		
<b>Transmitter characteristics</b>		
Frequency range 200 Hz to 20 kHz	Frequency resolution	1 Hz steps
	Frequency uncertainty (accuracy)	± (50 ppm + 1 Hz)
	Level range (dBm)	-20 to 10 at 600Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
	Impedance (Ω)	600
Frequency range 20 kHz to 2.2 MHz	Frequency resolution	1 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 100 Hz)
	Level range (dBm)	-20 to 10 at 100 Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
	Impedance (Ω)	100, 120, 135, 150
Frequency range (2.2 MHz to 30 MHz)	Frequency resolution	1 kHz steps
	Frequency uncertainty (accuracy)	± (50 ppm + 100 Hz)
	Level range (dBm)	-20 to 0 at 100
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
	Impedance (Ω)	100, 120, 135, 150
<b>Receiver characteristics</b>		
	Reception Frequency range	200 Hz to 20 kHz
		20 kHz to 35 MHz
	Frequency uncertainty range (accuracy)	±(50 ppm + 1 digit) for 20 kHz to 30 MHz
	Vf reception level range (dBm)	-90 to 15 at 600Ω
	Vf level uncertainty (accuracy)	200 Hz to 20 kHz
		-90 dBm to -50 dBm, uncertainty (accuracy) ±2 dB
		50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB
	WB reception level range (dBm)	-90 to 15 at 100Ω and 135Ω
	WB level uncertainty (accuracy)	20 kHz to 2.2 MHz
		-90 dBm to -50 dBm, uncertainty (accuracy) ±2 dB
		-50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB
		2.2 MHz to 30 MHz
		-90 dBm to -50 dBm, uncertainty (accuracy) ±2 dB
		-50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB
	Impedance (Ω)	100, 120, 135, 150, 600
<b>POTS dialer</b>	DTMF	0 - 9, #, *
	Phonebook	25 entries
<b>Digital multimeter (DMM)</b>	Test type	Snapshot and continuous
	Impedance selection (for voltage measurement)	100 kΩ, 1 MΩ

Measurement	Range	Resolution	Uncertainty (accuracy)
DC voltage	0 to 400 V	0.1 V for 0 to 99.9 V	±(1% + 0.5 VDC)
		1 V for 100 V to 400 V	
AC voltage	0 to 280 Vrms	0.1 V for 0 to 99.9 V	±(1% + 0.5 VAC)
		1 V for 100 V to 280 V	
Isolation resistance (stress/leakage)	0 to 1 GΩ, auto-ranging	Three digits	±(2% + 1 digit)
	1 kΩ to 99 MΩ		
	100 MΩ to 999 MΩ		
Resistance	0 to 100 MΩ	Three digits	±(1% + 5 Ω)
	0 to 999 Ω		
	1 kΩ to 100 MΩ		
Capacitance	0.1 nF to 2 uF	Four digits	±(2% + 50 pF)
DC Current	0 to 110 mA	0.1 mA	±( 2%  + 1 mA)
AC Current	0 to 110 mA	0.1 mA	±( 2%  + 1 mA) d
Station ground	0 to 1 MΩ	Up to three digits	±(1% + 3 Ω)
	0 to 999 Ω		
	1 kΩ to 1 MΩ		

**Notes**

- a. Subject to change without notice.
- b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.
- c. Specifications based on 24 AWG (PE 0.5 mm) cabling.
- d. From 10 mA to 110mA

COPPER SPECIFICATIONS <sup>a, b, c</sup> (continued)		
<b>Isolation resistance (stress/leakage) (continued)</b>	Source	50 to 500 VDC (current safety limited to 2 mA)
	Soak timer (s)	1 to 60
<b>VF noise measurement</b>	Frequency range	200 Hz to 20 kHz
	Level range (dBm)	-90 to 20
	Resolution (dB)	0.1
	Uncertainty (accuracy)	-90 dBm to -50 dBm, uncertainty (accuracy) ±2 dB
		-50 dBm to +20 dBm, uncertainty (accuracy) ±1 dB
Filters	ITU: none, psophometric, P-notched, 3.4 kHz, D-filter, 15 kHz	
	ANSI: none, C-message, C-notched, 3.4 kHz, D-filter, 15 kHz	
	Impedance	600 Ω
<b>VF impulse noise</b>	Low threshold (dBm)	-40 to 0, in 1 dB steps
	Mid threshold	Low threshold plus separation
	High threshold	Mid threshold plus separation
	Separation (dB)	1 to 6, in 1 dB steps
	Dead time (ms)	125
	Filters	None, 3 kHz flat, C-message, psophometric, notched and D filter (IEEE 743-1995)
	Counter	Maximum 999 for each threshold
	Timer	Maximum 100 hours
<b>Power influence (noise to ground)</b>	Noise range (dBm)	-60 to 10
	Uncertainty (accuracy)	-60 dBm to -50 dBm ± 2 dB
		-50 dBm to 10 dBm ± 1 dB
<b>VF longitudinal balance</b>	Frequency (Hz)	1004
	Level range (dB)	0 to 100
	Level uncertainty (accuracy) (dB)	±1
	Impedance	600 Ω
<b>Time-domain reflectometer (TDR)</b>	Modes	Automatic, Manual, Peak, Xtalk (Crosstalk), Differential
	Distance range (m)	0 to 6700 (0 ft to 22 000 ft)
	Pulse width	15 ns to 20 us
	Amplitude	7.5 V p-p on cable, 9 V p-p open circuit
	Velocity of propagation (VOP)	0.400 to 0.999
	Distance uncertainty (accuracy) <sup>d</sup> (m)	±(0.5 m + 1 % x distance)
	Units	Meters and feet
<b>Load coil detection</b>	Count	Up to 5
	Plot (kHz)	Up to 10
	Distance range (m)	Up to 8000 (up to 27 000 ft)

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- d. Qualified up to 300 m (1000 ft) and does not include the uncertainty due to VOP.

COPPER SPECIFICATIONS <sup>a, b, c</sup> (continued)		
<b>Near-end crosstalk (NEXT)</b>	Frequency range	10 kHz to 30 MHz
	Level range	0 to 90 dB
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	2.2 MHz: $\pm 2.0$ dB, from 0 to 90 dB
		8 MHz: $\pm 2.0$ dB, from 0 to 80 dB
		12 MHz: $\pm 2.0$ dB, from 0 to 75 dB
17.6 MHz: $\pm 3.0$ dB, from 0 to 75 dB		
	30 MHz: $\pm 3.0$ dB, from 0 to 68 dB	
	Terminations	100, 120, 135, 150 $\Omega$
<b>Return loss</b>	Test type	Single, Sweep
	Frequency range	20 kHz to 2.2 MHz
	Dynamic range	0 dB to 40 dB
	Resolution	0.1 dB
	Uncertainty (accuracy)	$\pm 0.5$ dB, for dynamic range 0 dB to 20 dB
	Horizontal scale	4.3125 kHz to 2.2 MHz, in 4.3125 kHz steps
	Vertical scale	0 dB to 50 dB
<b>Power spectral density (PSD)</b>	Test type	Continuous with peak-hold
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 $\Omega$
	Vertical scale	15 dBm/Hz to -140 dBm/Hz or 20 dBm to -90 dBm
	Horizontal scale	4.3125 kHz to 17 MHz, in 4.3125 kHz steps or
		8.625 kHz to 35 MHz, in 8.625 kHz steps
Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17, VDSL2-30 and VDSL2-35b	
<b>Wideband impulse noise</b>	Threshold	-50 dBm (40 dBm) to 0 dBm (90 dBm) in 1 dB steps
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 $\Omega$
	Counter maximum	65 000 000
	Test duration	Maximum 100 hours
	Uncertainty (accuracy) (dB)	$\pm 2$
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
<b>Wideband longitudinal balance</b>	Level scale	0 to 100 dB
	Level range uncertainty (accuracy)	2.2 MHz: $\pm 2.0$ dB, from 0 to 55 dB
		8 MHz: $\pm 2.0$ dB, from 0 to 45 dB
		12 MHz: $\pm 3.0$ dB, from 0 to 45 dB
		17.6 MHz: $\pm 3.0$ dB, from 0 to 40 dB
	Level resolution	0.1 dB
Frequency scale	ADSL2+: 8.6 kHz to 2.2 MHz, in 8.6 kHz steps VDSL2-8: 17.25 kHz to 8 MHz, in 17.25 kHz steps VDSL2-12: 17.25 kHz to 12 MHz, in 17.25 kHz steps VDSL2-17: 34.5 kHz to 17.6 MHz, in 34.5 kHz steps	
Frequency uncertainty (accuracy)	$\pm(50$ ppm + 1 digit)	

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COPPER SPECIFICATIONS <sup>a, b, c</sup> (continued)			
Single-ended frequency response (attenuation) <sup>d</sup>	Distance range (m)	100 m to 5000 m (300 ft to 16 000 ft)	
	Frequency range (Hz)	4.3 kHz to 35 MHz	
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit) for 20 kHz to 30 MHz	
	Level uncertainty (accuracy) (dB)	±2.0 dB typical for 2.2 MHz and 8 MHz ranges	
		±3.0 dB for VDSL2-12 and VDSL2-17	
		±4.0 dB for VDSL2-30 ranges	
	Resolution (dB)	0.1	
	Horizontal scale (MHz)	ADSL2+ = 2.208, VDSL2-8, VDSL2-12 = 12, VDSL2-17 = 17.66, VDSL2-30 = 30, VDSL2-35 = 35	
	Vertical scale (dB)	0 to +100	
Resistive fault location (RFL)	Test type	Single pair (two wire), separate good pair (four wire) and Küpfmüller (K-test)	
	Fault detection (MΩ)	0 to 20 for single faults; up to a total fault resistance of 30 for K-test double faults only	
	Resolution	Three digits	
	Loop resistance (kΩ)	10 maximum	
	Multiple cable sections	Five (includes gauge and temperature setting)	
	Fault location		Total resistance, near-end to fault resistance, fault to strap resistance (three significant digits, least significant digit 0.1 Ω)
			Total length, distance to fault, distance from fault to strap (three significant digits, least significant digit 1 m)
		Single fault uncertainty (accuracy)	±(0.1 Ω + 1% RTS)
	K-test uncertainty (accuracy) <sup>e</sup>	±(1 Ω + 1% RTS)	
Stressed Balance	Level range	0 to 82 dBmC	
	Resolution	0.1 dBmC	
	Longitudinal excitation	135 VDC (0 dBm, ±1 dB reproducibility)	

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- c. Specifications based on 24 AWG (PE 0.5 mm) cabling.
- d. Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.
- e. For double faults only.



GENERAL SPECIFICATIONS	
Display	Touchscreen TFT LCD with backlight
	152 mm (6 in) diagonal
	800 x 480 resolution, WVGA
Test connections	Five-color banana connector for T/A, RIB, G, T1/A1, R1/B1
Results management	> 2 GB internal memory
	Single and bulk file export to USB memory devices
Temperature	operating: 0 °C to 40 °C (32 °F to 104 °F)
	storage: -20 °C to 60 °C (-4 °F to 140 °F)
Humidity	5 % to 95 % relative, non-condensing
Shock	1 m (39 in) drop per GR-196-CORE
Altitude	3000 m (9842 ft)
Input power	12 VDC, 4.16 A, 48 W via 90-220 VAC adapter or 12 V vehicle adapter
Battery	Internal rechargeable Lithium polymer, with battery-state and level indications, adjustable auto-power down
Safety	CE and CSA marked
Size (H x W x D)	254 mm x 124 mm x 62 mm (10 in x 4 7/8 in x 2 7/16 in)
Weight (with battery)	1.5 kg (3.3 lb)
Water/dust ingress	Designed to comply with IP54
Differential voltage protection	354 Vrms or 1000 VDC max
Common mode voltage protection	354 Vrms or 1000 VDC
Voltage detection	>20 V will trigger alarm message
Self-test	Routine on power-up
Connectivity	Two USB 2.0 client ports
	One USB Type B host port
	Optional WiFi support
Languages	English, French, German, Spanish, Dutch

STANDARD ACCESSORIES	
Test cables	Three-color (black, red, green) 4 mm banana plugs terminated with 4 mm plugs with crocodile clips Part number: 10/6100-CABLE-M4MMRBG
AC power adapter	Part number: 10/6100-MCHARGER
Certificate of Compliance	

OPTIONAL ACCESSORIES	
Teletch TS125 Far-End Device	Part number: 10/6100-TS125
Copper test cables	Yellow/blue banana connectors to 4 mm plugs/croc clips Part number: 10/6100-CABLE-M4MMYB
RFL strap	Part number: 10/6100-RFL-STRAP
High Impedance (Hi-Z) test cable	Requires WBAND software option. Part number: 10/6100-CABLE-PSD-NOISE-HIZ
2.4 GHz WiFi Pico Adapter	Part number: 10/6100-WIFI-ADAPT
12 V vehicle charger	Part number: 10/6100-ACHARGER
USB host/client cable	Part number: 10/6100-HOST-CLIENT-USB
MAX-600 screen protector film (Pack of 2)	Part number: 10/6100-SCREEN-PROTECT

Visit [www.radiodetection.com](http://www.radiodetection.com)

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