

RADIODETECTION®

# 6100-Gfast™ & 6100-Gfast™ -Bond

Handheld solutions for ultra-broadband installation and maintenance  
Specifications

Multifunction TDRs



SPX®

# 6100-GFast

HANDHELD SOLUTIONS FOR ULTRA-BROADBAND INSTALLATION AND MAINTENANCE

## THE PERFECT TOOL FOR VOICE AND BROADBAND DEPLOYMENTS

The 6100-GFast products are complete DSL & copper test sets featuring the latest in ADSL2+, VDSL2, and G.Fast chipset-based, connectivity technologies covering ITU-G Series 9700 and 9701 recommendations for fast access to subscriber terminals.

Featuring traditional copper measurements (voltage, resistance, capacitance and time domain reflectometry) as well as highly-automated scripted and customizable tests, the 6100-GFast units offer nearly everything a technician requires.

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



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G.FAST/DSL CHIPSET SPECIFICATIONS		
DSL chipset	Broadcom 63138	
Standards compliance	ADSL1/2/2+	ITU-T G.992.5 (ADSL2+ including Annexes A and M) ITU-T G.992.3 (ADSL2 including Annexes A and L) ITU-T G.992.1 (G.DMT including Annex A) ITU-T G.994.1 ATIS/ANSI T1A13 Issue 2 IEEE 802.3ah (PTM) ITU-T G.998.1, 2 (ATM, Ethernet bonding) ITU-T G.998.4 (G.INP) ITU-T a992.5 (INP Amendment 3)
	VDSL2	ITU-T G.993.2 Annexes A, B, C1 and Y Profiles: 8a/b/c/d, 12a/b, 17a, 30a, 35b Band Plan: 997, 998, USO IEEE 802.3ah (PTM) ITU-T G.998.2 (Ethernet bonding) ITU-T G.998.4 (G.INP) ITU-T G.993.5 (G.vector)
	G.fast	ITU-T G.9700, G.9701
DSL parameters	Maximum attainable bit rates	Interleave depth
	Actual achieved bit rates	Interleave delay
	Actual bonded achieved rates	Trellis coding
	Latency mode: fast, interleaved	Bit swapping
	Data modes: ATM, PTM	INP value
	Capacity (%)	PhyR, G.INP state, performance counters
	SNR margin	Vectoring state, performance counters
	Output power	LOS, FEC, CRC, HEC, SES
	Attenuation	LATN per band
	Bits/tone	SATN per band
	Hlog/tone (attenuation/tone)	EWL
	OLN/tone	kI0 and kI0 per band
	SNR/tone	KLO
	Vendor code, revision	

MULTIPLAY TESTING SPECIFICATIONS		
Test interfaces	G.fast	ADSL1/2/2+
	VDSL2	Ethernet 10/100/1000 BT
Encapsulation methods	RFC 2684/Bridged Ethernet/IPoE (IPv4 and IPv6)	PPPoE (RFC 2516)
	IPoA (RFC 1577)	PPPoA/LLC and PPPoA/VC-MUX (RFC 2364)
Operating modes	DSL Terminate	Ethernet Terminate
	DSL to Ethernet pass through	Ethernet to Ethernet bridged pass through
Login format	User name and password using PAP/CHAP	
Connectivity support	IPv4 and IPv6 LAN/WAN status	VLAN ID, VLAN tagging
	IPv4 and IPv6 DNS, gateway	VPI/VC1
	IPv4 DHCP client/server, DHCP vendor class	IP release
	IPv6 DHCP client	Multi-VLAN support
	NAT	
Throughput test	Methods supported: Speedtest by Ookla, iPerf3	
	Address: auto-configured for Speedtest, URL or IPv4 address for iPerf3	
	Direction: upload and/or download	
Ping test	Speedtest results displayed: download and upload speed in Mbit/s, ping in milliseconds (ms), host, location, country and sponsor	
	iPerf results displayed: download and upload speed in kbit/s	
	Ping destination: gateway, IPv4 or IPv6 address or URL	
Traceroute test	Number of pings: 1 to 99	
	Packet size: 32 to 1200 bytes (32 is default)	
	Timeout period: 1 to 10 s	
	Results displayed: packets sent/received and average round-trip delay (ms)	
	Traceroute destination: gateway, IPv4 address or URL	
FTP test	Timeout period: in seconds, default is 1 s, maximum is 10 s	
	Packet size: 32 bytes	
	Number of hops: 1 to 32 (default is 30)	
HTTP test	Results displayed: indicates IPv4 address of hop and round-trip time in ms	
	Address: IPv4 address or URL	
	Direction: upload and/or download	
WiFi scanning (option)	Results displayed: time, kB transferred, bit rate in kbit/s	
	Address: URL	
	Direction: download	
Web browser (software option)	Simultaneous download sessions: 1 to 4	
	Results displayed: kB transferred, bit rate in kbit/s	
	2.4 GHz support	
Web browser (software option)	View channel number, SSID, MAC address, RSSI value	
	Sort by channel number or RSSI value	
	Address: IPv4 address or URL	
	Bookmarks: user-definable	

MULTIPLAY TESTING SPECIFICATIONS (continued)	
VoIP testing (software option)	Protocol support: SIP (IPv4)
	Codecs: G.711 u-Law, G.711 A-Law
	Interface support: ADSL1/2/2+, VDSL2, G.fast, Ethernet
	Parameter/functionality:
	- Test duration timer
	- MOS (current, average)
	- R-Factor (current, average)
	- Latency (current, average, maximum)
	- Jitter (current, average, maximum)
	- Packets (lost, total)
IPTV testing (software option)	Supported video standards: MPEG2, MPEG4 part 2 and 10 (H.264/AVC), Mediaroom/WM9/VC1
	Operating modes: DSL Terminate and Ethernet Terminate
	IPTV parameters/functionality:
	- IGMP version 2 and 3 (IPv4) join/leave requests with STB emulation
	- Automatic tests to join/leave and analyze up to 5 (five) simultaneous streams
	- Programmable channel list for storage of commonly used channels
	- Bandwidth usage per channel
	- IGMP (IPv4) packet and rate information per line and channel
	- Multicast RTP/UDP IP stream support
	- Key IP video QoS parameters, packet loss, zap time, PID statistics
- Graphical results	
	- Transport

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
		-90 dBm to -50 dBm, uncertainty (accuracy) ±2 dB
		-50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB
<b>POTS dialer</b>	Impedance (Ω)	100, 120, 135, 150, 600
	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

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 Q	
<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 Q
<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
Plot (kHz)		Up to 10
Distance range (m)		Up to 8000 (up to 27 000 ft)

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

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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: ±2.0 dB, from 0 to 90 dB
		8 MHz: ±2.0 dB, from 0 to 80 dB
		12 MHz: ±2.0 dB, from 0 to 75 dB
		17.6 MHz: ±3.0 dB, from 0 to 75 dB
		30 MHz: ±3.0 dB, from 0 to 68 dB
	Terminations	100, 120, 135, 150 Q
<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)	±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 Q
	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
Termination		Bridging (Hi-Z), 100, 120, 135, 150 Q
Counter maximum		65 000 000
Test duration		Maximum 100 hours
Uncertainty (accuracy) (dB)		±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: ±2.0 dB, from 0 to 55 dB
		8 MHz: ±2.0 dB, from 0 to 45 dB
		12 MHz: ±3.0 dB, from 0 to 45 dB
		17.6 MHz: ±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)	±(50 ppm + 1 digit)

**Notes**

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- 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. Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.
- e. For double faults only.

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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 K�pfm�ller (K-test)
	Fault detection (MQ)	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 (kQ)	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 Q)
		Total length, distance to fault, distance from fault to strap (three significant digits, least significant digit 1 m)
	Single fault uncertainty (accuracy)	±(0.1 Q + 1% RTS)
K-test uncertainty (accuracy) <sup>e</sup>	±(1 Q + 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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- 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 range	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 (all GFast models)	RJ11 to RJ11 and red/black crocodile clips (Part number: 10/6100-CABLE-RJ11-4MM) Yellow/Blue 2mm banana plugs to 4mm crocodile clips (Part number: 10/6100-CABLE-M4MMYB) Red/Black & Green 2 mm banana plugs to 4 mm crocodile clips (Part number: 10/6100-CABLE-M4MMRBG)
Test cables (GFast-Bond models only)	RJ11-WAN Adapter for ADSL 1/2/2+ Annex B testing (Part number: 10/6100-RJ11-WAN-ADPTR) DSL Bonding Test Cable, RJ-14 to four 4 mm plugs with crocodile clip (Part number: 10/6100-CABLE-BOND-4MM) DSL Bonding Test Cable, RJ-14 to dual RJ-11 (Part number: 10/6100-CABLE-BOND-RJ14-RJ11X2)
AC power adapter	Part number: 10/6100-MCHARGER
Certificate of Compliance	

OPTIONAL ACCESSORIES	
Teletch TS125 Far-End Device	Part number: 10/6100-TS125
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

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