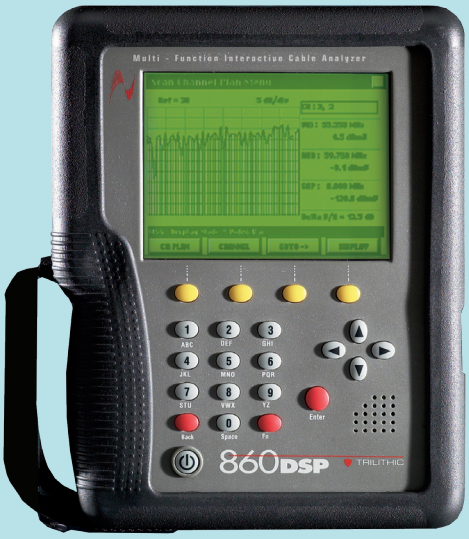
860 DSPi

Multifunction Digital Analyzer



- 1 GHz frequency range
- Adaptable signal analysis platform with easy field upgrades lowers cost of ownership
- SpeedSweep FS-1 Option extends application range to include forward sweep testing
- Quick, accurate measurements through DSP technology tests DOCSIS cable modem performance, VoIP call and connection quality internet browser and server functions integrate with OSS and workforce management systems
- Large, easy-to-read display and simple user interface

Fast, versatile & comprehensive

The 860 DSPi™ quickly and efficiently performs all of the critical transmission and signal quality tests needed to install and maintain analog, digital, HSD and VoIP services.

Fast boot-up and quick test mode transition improve technician productivity. Powerful options add high-resolution spectrum analysis, QAM and QPSK constellation displays and a wide range of return path tests, all without impacting size or weight. Thanks to the efficiency of its digital signal processing technology, the battery life of the 860 DSPi can be up to five times as long as that of competing instruments.

The 860 DSPi works with Guardian System II reverse path monitoring equipment, and can be equipped with options to provide an extensive range of reverse path test capabilities.

With the SpeedSweep™ FS-1 option, the 860 DSPi receives forward sweep from the 8300 FST™, and generates reverse sweep with SR-1 option to be received by the 9581 RSA™ and displayed on its easy-to-read LCD display.

Adaptable for the future

The 860 DSPi is the first portable instrument platform capable of evolving over time to meet emerging measurement and data communication requirements. It can be upgraded as new services are introduced, usually through Trilithic's free update website.

The 860 DSPi achieves this adaptability by employing "virtual instrument" design, including cutting-edge digital signal processing (DSP) technology. The flexibility of DSP means that applications that were not even available when the analyzer was originally purchased can be added later, usually by simply downloading firmware. Through simple online updates, the operator can keep the 860 DSPi ready for new challenges and as up-to-date as currently shipped analyzers.

Quick measurement

Ready to perform measurements within two seconds after turn-on, the 860 DSPi lets techs perform tests quickly. It provides test data to the operator up to 10 times faster than competing analyzers, so performance problems can be identified faster and trouble calls are shortened.

Complete testing capabilities

- Measure system frequency response with SpeedSweep System compatibility.
- Measure latency, jitter, packet loss and other VoIP parameters in seconds.
- Analyze VoIP performance from end-to-end and from the subscriber to the CMTS. When testing end-to-end, the 860 DSPi displays separate test results for upstream and downstream paths and even calculates an MOS score for each.
- Test throughput, packet loss, reverse transmit levels, MER, BER and more.
- Use the 860 DSPi's Average BER function to estimate BER up to 10 times faster than any alternative.
- Use the Impulse BER function to detect and count individual lost packets. BER data is displayed with values and a convenient graph that shows how pre and post BER changes over a user-settable interval.

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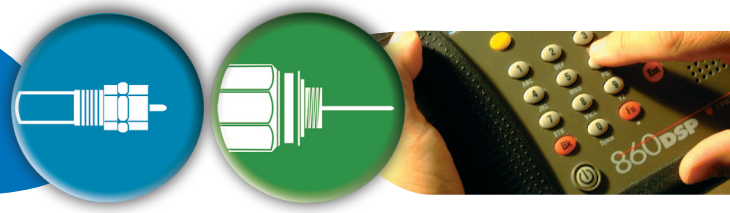


860 DSP

Part of the 860 family, the 860 DSP is for applications that do not require a modem-equipped meter.

It performs physical measurements only. For technicians not required to maintain DOCSIS services, the 860 DSP is a cost-effective alternative.

Designed for Convenience and Durability

- Fast boot up, fast operation
- Simple, direct keyboard functions
- Large, widely spaced buttons useable with gloves
- Single keystroke measurement functions or soft keys for simple navigation
- Autotest up to 16 functions, limit comparison and pass/fail results
- Long battery life (operate your 860 DSPi for 4-6 hours on a single charge, even with the display backlight turned on, without intrusive battery-saving methods)
- High resolution 4.6" x 3.5" backlit Transflective LCD display
- Strong, shock-resistant construction, with integral rubber boot; padded bag included
- Lightweight, with convenient carrying straps

Standard Measurements

- Signal levels: one channel to full span, analog and digital; total power
- "Mini-scans" of up to 10 selected channels (video and digital carriers)
- Forward tilt
- Reverse spectrum scan to -40 dBmV
- Numerical values of forward BER/MER
- Digital power
- Lost packet rate
- DOCSIS modem upstream transmit level
- DOCSIS speed, throughput
- PC substitution
- VoIP jitter, latency upstream and downstream
- Lost/discarded packets upstream and downstream
- Calculated MOS score, upstream and downstream

Options

The 860 DSPi options are *a la carte*, but the prerequisite option is the Power Pack, which must be purchased in order for the instrument to be fitted with other DSPi options.

Power Pack Adds full 5 MHz - 1 GHz channel scan and monitoring; C/N; Hum; FM Deviation; Depth of Modulation; CSO/CTB; Forward (Sweepless) Sweep Balancing; Internet browser. Enhanced digital video feature equips the analyzer to perform impulse BER measurements on deep interleave digital video channels, and enhances constellation graphs if the 860 DSPi also includes Option QA-2. (Prerequisite for all other 860 DSPi options).

QA-2 Constellation and equalizer display capability.

SA-1 Spectrum Analysis, full-featured DSP alternative to analog analyzers, adds multiple resolution bandwidth settings from 10 kHz to 3 MHz.

FS-1 Forward Sweep Option – compatible with the SpeedSweep System for forward sweep balancing and troubleshooting.

SR-1 Return Sweep Receiver, compatible with the 9581 SST and/or 9581 RSA, useful for return path balancing and troubleshooting.

VP-1 Adds RSVP^2 Installer's Return Tester functions to the 860, expanded to allow testing of eight frequencies at once. Compatible with 9581 SST and/or 9581 RSA.

SPECIFICATIONS

Frequency Range	5 MHz to 1 GHz

Level Measurement

Range	Range -40 to +50 dBmV
Resolution	Resolution 0.1 dB
Accuracy	@25˚ C: ±0.75 dB Over temp (-18 to +50˚ C) : ±2.0 dB (Analog), ±2.5 dB (Digital)

Carrier-to-Noise (In-service, non-scrambled standard channels only)

Min Input Level for Full Range	+10 dBmV
Dynamic Range	50 dB
Resolution	< 0.5 dB

Hum (In-service, non-scrambled standard channels only)

Minimum Input Level	0 dBmV
Range	0 to 5%
Resolution	0.1%
Accuracy	±0.5%

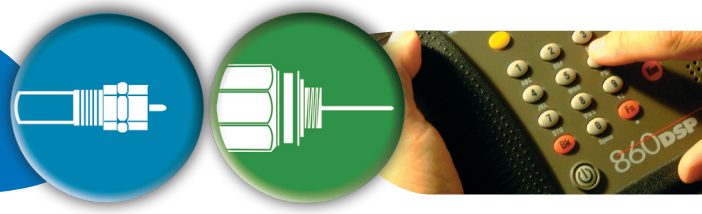
Depth of Modulation (In-service, non-scrambled standard channels only)

Range	50 to 100%
Resolution	0.5%
Audio Demodulation	FM Carriers

Tilt

Max Number of Carriers	10
Hi / Lo Delta Resolution	0.1 dB

Scan	Video, Audio, Pilot, and Digital Carriers; includes total power measurement



Forward (Sweepless) Sweep Mode

Frequency Range	4 MHz to 1 GHz
Display Span	User definable
Display Scale	1, 2, 5, or 10 dB/division
Display Range	6 vertical divisions
Sweep Rate (78 channels)	~ 500 ms

Spectrum Mode

Spans	User selectable in 10 kHz steps
Display Scale	1, 2, 5, or 10 dB/division
Range	7 vertical lines
Detection & Dwell	Selectable Detector Modes (Narrow or Wide) and Dwell Time
Spurious Free Dynamic Range	60 dB @ 25˚ C (+50 dBmV)
Sensitivity	- 40 dBmV (5 MHz to 1 GHz)

Zero Span Mode

Video Bandwidth	Digital averaging
Resolution Bandwidth	10, 30, 100, & 300 MHz; 1, 3 MHz
Pulse Measurement Accuracy	Nominal level in < 7ms, ±2 dB from nominal in 4ms (300 kHz RBW)
Sweep Times	50 ms to 20 sec in 1, 2, 5 settings

Intermodulation Distortion (CSO/CTB)

Range	≥ 60 dB
Resolution	0.1 dB

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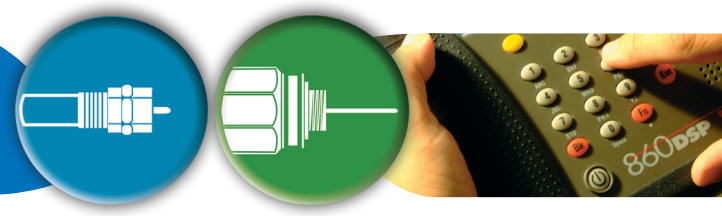

QAM Measurements

Modulation Types	ITU J.83 Annex A, B, C QPSK, 16, 32, 64, 128, & 256 QAM (at symbol rates from 2 MSPS to 6.9 MSPS)
Measurable Input (Lock) Range	64 QAM: -20 to +50 dBmV (typical) 256 QAM: -15 to +50 dBmV (typical)
Frequency Tuning	5 MHz to 1 GHz
BER (64 & 256 QAM, pre & post FEC)	10^{-4} to 10^{-9}
MER	**64 & 256 QAM, 6 MHz Channel Bandwidth:** Range: 21 to 38 dB, Accuracy (typical): ±1.5 dB **64 & 256 QAM, 8 MHz Channel Bandwidth:** Range: 21 to 35 dBAccuracy (typical): ±2.0 dB
EVM	**64 QAM, 6 or 8 MHz Channel** Range: 1.1% to 8.1% Accuracy: ±0.5% (1.1 to 2.0%) ±1.0% (2.1 to 4.2%) ±1.6% (4.3 to 8.1%) **256 QAM, 6 or 8 MHz Channel** Range: 1.1% to 5.3% Accuracy: ±0.5% (1.1 to 2.0%) ±0.8% (2.1 to 4.2%)

QAM Level Measurement

Signal Types	QPSK; QAM (16, 32, 64, 128, & 256)
Range	-40 to +50 dBmV
Accuracy @ 25˚ C	± 1.25 dB

Power Source

Charging Time	4 hours
Operating Time, Continuous Use	~4 hours

Physical

Weight	4.75 lbs.
Operating Temperature Range	-18 to +50˚ C (0 to 122˚ F)

INCLUDES THE FOLLOWING:

5 MHz -1 GHz Analyzer (customer specified options)

Protective Carrying Case

Shoulder Strap

Universal Charger 90-220 VAC U.S. Plug

Users Manual

OPTIONAL ACCESSORIES:

External Battery Charger
P/N 2010986000

Vehicle Power Adaptor (CL-5)
P/N 2070704002

Precision Test Cable I/O-15
P/N 2071527048

VoIP RTP Server Software
P/N 0930110000

Protective Display Shields
P/N 2230521001

I-Stop Probe
P/N 2010838001

TLB-60 Filter
P/N 20110666000

BD-1 Probe
P/N 2011065000

Utility Bag (CC-23)
P/N 2131221000

WorkBench Software
P/N 0930083000