

M3 PLUS

Signal Level Meter



- 5 MHz to 1 GHz Standard Frequency Coverage
- Full Scan, Single Channel, and Spectrum Modes
- Long Term BER
- Data Logging
- Digital Signal Measurements: Power, MER, Pre- and Post-FEC BER (Including Deep Interleave)
- Constellation Display



Overview

The M3 PLUS™ signal level meter is the go-to meter for CATV installations. It features a new and improved color user interface for easy navigation of a wide range of digital and analog channel measurements. This rugged design allows for easy customization, making tests more streamlined, and installation and troubleshooting more efficient.

The meter performs a complete test of all channels in the selected user channel plan to specified limits just by simply pressing one button. It can also be set to automatically perform Level, Spectrum, Tilt (Favorite), Hum, and Limit tests.

Carrier amplitudes are displayed individually, grouped with up to 12 “favorites”, or in scan mode with five levels of magnification or full channel plan scan. The meter also tests QAM channels, performs Hum measurements, provides data logging, and much more.

LEARNED CHANNEL PLANS

If contractors are working in several systems with different channel lineups, they can customize their meter with up to five user-defined channel plans. Plans can be automatically learned (from eight base plans) at a cable drop, or downloaded from PC files using the optional ToolBox™ software. The operator can select favorite channels in each user plan to be included in a Favorite/Tilt channel plan.



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M3 PLUS Signal Level Meter

DIGITAL CHANNEL MEASUREMENT

The M3 PLUS can measure the channel power of QPSK, QAM, and COFDM channels when testing or troubleshooting your digital transmission system. MER and pre- and post-BER of QAM channels (including deep interleave) can also be measured through this function.

Constellation display comes standard with the M3 PLUS. Operators can now quickly analyze 64 and 256 QAM downstream channels to verify quality or locate impairments with the meter, all right out of the box.

WIDE CHANNEL SCANS

The M3 PLUS can display up to 126 channels in a single view or a total of 170 channels in overlapping views during Channel scan. Active measurement mode settings can be easily accessed, without the hassles of nested menus. This saves valuable time for the operator by allowing fast changes to be made in the settings while being able to quickly return to measurement mode.

LEVEL MEASUREMENT

During Level measurements, the option to display the two adjacent channels to the channel being measured is available. Auto Diagnosis can also be turned on to allow the Limit display to give pass/fail results.

SPECTRUM MEASUREMENT

In Spectrum mode, the M3 PLUS has the ability to display the full spectrum. Frequency spans from 2.5 MHz to 62.5 MHz can also be displayed. The Δ MARKER function is included in Spectrum mode. MAX HOLD captures transient events. The M3 PLUS also has an Average display function for Spectrum.

HUM

The Hum measurement function is used to troubleshoot interference that may result from a defective power supply or faulty or overloaded power inserters. This mode includes 60 Hz and 120 Hz (or 50 Hz and 100 Hz) and low pass (1 to 400 Hz) measurements.

USER-DEFINED TESTS

A significant time and cost savings feature of the M3 PLUS is the capability to group tests into automatic tests that can be executed with a single keystroke. Several Auto-Tests can be stored in the meter and recalled as needed. These may include Level, Tilt, Spectrum, Hum, and Limit tests.

LIMIT TEST

Limit test data allows for test uniformity and flexible field storage, and may be automatically scored against specified limits and assembled into reports.

AUTOMATED PROOF OF PERFORMANCE

With the simple press of a button, the M3 PLUS can perform FCC Part 76 level-related tests including: Visual Carrier Levels, Δ V/A, Max Δ Visual Carrier Levels, and Δ Adjacent Visual Carrier levels. The test results can then be compared against FCC limits, or limits set by the user.

FLEXIBLE DATA STORAGE

The operator can select and save the test data of the level, tilt, spectrum, scan, hum, and limit auto-test measurements and recall them as needed. Scan, Spectrum, and Limit files can be viewed graphically. Any combination of up to 30 Level, Tilt, Spectrum, Hum, or scans, or up to 22 Limit test measurement files may be saved on the M3 PLUS. These data records may be uploaded to a PC through the optional ToolBox software for reports, analysis, and printing.

EXTENDED BATTERY LIFE, FAST CHARGING

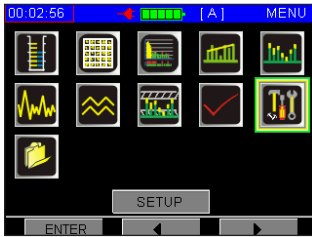
The battery in the M3 PLUS provides five hours or more of continuous use between charges. One hour of fast charging from AC or vehicle power provides nearly two hours of extended operation.



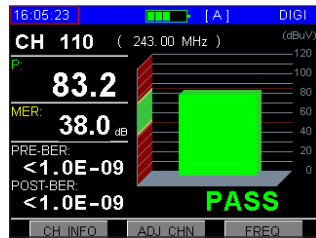
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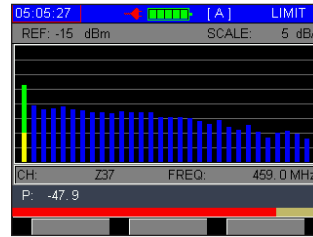
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Main Menu



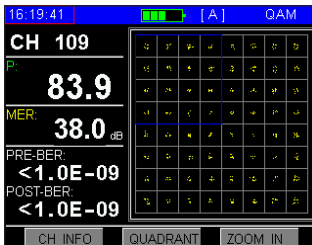
Level measurement for digital channels with pass/fail results



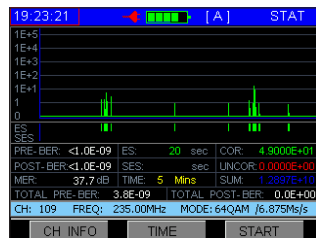
Limit Test

THE M3 PLUS SIGNAL LEVEL METER SUPPORTS A VARIETY OF FUNCTIONS, INCLUDING:

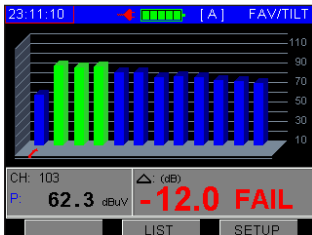
- QAM, QPSK, COFDM Test
- Level Test
- Channel Scanning
- Long Term BER
- Spectrum
- Tilt
- Hum
- Carrier-to-Noise
- Multiple User Channel Plan Setup
- File Management
- Intelligent Power Management
- Character/Numerical Input



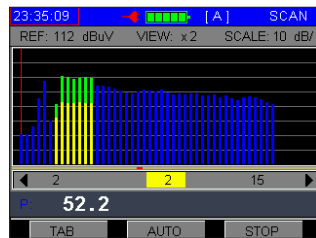
QAM display



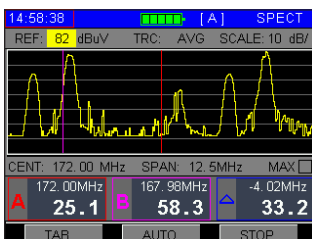
BER Statistics



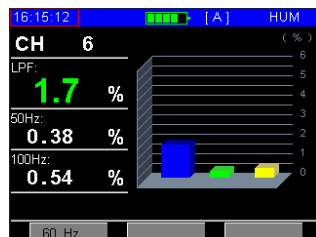
Fav/Tilt display



Channel Scan



Spectrum measurement



Hum

Specifications

Frequency	Range: 5 MHz to 1 GHz Accuracy: ± 50 ppm @ 20° C $\pm 5^\circ$ (68° F $\pm 9^\circ$) Resolution: 10 kHz	Limit Test Parameters	Any of the following may be enabled: Min video: -20 to +59 dBmV (40 to 119 dB μ V) Max video: -19 to +60 dBmV (41 to 120 dB μ V) Max Δ video: 2 to 30 dB Min Δ V/A: 0 to 15 dB Max Δ V/A: 5 to 30 dB Max Δ ADJ: 0 to 20 dB
Channel Type	Analog TV: TV Digital TV: 16/32/64/128/256 QAM, QPSK, COFDM FM channel: single frequency	Auto-Test	Number of programs: 7 (max) Tests: Level, Tilt, Spectrum, Hum, and Limit (any or all tests may be used in an Auto-Test program)
Analog Level Measurement	Range: 5 MHz to 65 MHz (-42 dBmV to +60 dBmV) 65 MHz to 1GHz (-35 dBmV to +60 dBmV) Accuracy: > -25 dBmV: ± 1.5 dB @ 50° to 86° F (10° to 30° C) ± 3.0 dB @ 14° to 104° F (-10° to +40° C) Resolution: 0.1 dB Input impedance: 75 Ω (unbalanced, BNC or F-type connector)	Power	12.6 V / 1.6 AH Li-Ion battery Provides 5 hours of continuous operation Charger: 100 to 240 VAC, 50/60 Hz, 15 VDC, 2 A (max) Charge time: Less than 3 hours
Hum	Range: 2 to 5% LPF, BPF Accuracy: $\pm 0.5\%$ (BPF)	Display	320 x 320 backlit OLED
Channel Scan	Number of channels: 170 (max) Scanning speed: 3 channels per second Scale: 1, 2, 5, 10 dB/div Zoom: 1x, 2x, 3x, 4x, 5x; five levels of magnification or full channel plan scan	Communication Port	RS-232C (Converts to USB with data cable)
Frequency Spectrum	Bandwidth: 2.5 MHz, 6.25 MHz, 12.5 MHz, 25 MHz, 62.5 MHz, and full span Scale: 1, 2, 5, 10 dB/div	Storage	512 Kb of memory Up to 30 complete scan files (170 channels, max) or 22 complete Limit test files (170 channels, max); less if other files (Level, Tilt, QAM, Hum, Spectrum) are saved
Digital Channel	Demodulation type: ITU-T J.83 Annex A/B/C standard Support: 16/32/64/128/256 QAM, QPSK, COFDM Symbol rate: 4 to 7 MS/sec Bandwidth: 0.28 TO 9.99 MHz MER: To 39 dB (QAM) Accuracy: ± 2.0 dB BER: 1E ⁻³ to 1E ⁻⁹ before and after R-S decoding (QAM) Power measurement type: QAM, QPSK, COFDM	Weight	1.54 lbs (700 g)
Digital Channel Power (Average)	Level range: -25 to +55 dBmV Accuracy: ± 2.0 dB @ 50° to 86° F (10° to 30° C) ± 3.0 dB @ 14° to 104° F (-10° to +40° C) Resolution: 0.1 dB	Dimensions (H x W x D)	8.52" x 3.74" x 1.93" (218mm x 95mm x 49mm) (dimensions do not include belt clip)
Constellation	Display size: 64 and 256 QAM Constellation with zoom capability	ACCESSORIES: CC-30 holster with belt loop P/N 2131521000 CC-17 protective sleeve P/N 2130856000 I/O-15 precision RF coaxial test cable P/N 2071527048 ToolBox software (includes PC data cable) P/N 0930180000 USB PC data cable P/N 2072084000	
Tilt Measurement	Number of channels: 4 to 12 Resolution: 0.1 dB	INCLUDES THE FOLLOWING: 5 MHz to 1 GHz signal level meter AC battery charger Protective rubber bumper User's manual Carrying case with shoulder strap	



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