

Broadband/CATV Testing



SUNRISE TELECOM®
We Make Networks Work



As the demand for voice, data and multimedia applications over cable increases, service providers face major deployment challenges that can affect service delivery and reliability. These new applications make it necessary to fully characterize every aspect of the cable network from headend to the home. Sunrise Telecom's outstanding broadband cable product portfolio enables network operators to quickly deliver next-generation services and ensure network quality and reliability.



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CM2000™ & CM2000E™



Cable Modem Network Analyzer

The CM2000™ is a powerful cable modem network analyzer that sets a new standard for testing high-speed data, VoIP telephone, and digital and analog video services. The unit's comprehensive set of customizable test functions (analog and digital SLM, VoIP, and DOCSIS® 2.0 cable modem) speed installations and reduce repair time, while increasing quality of service. A range of automated test programs ensure consistency of tests performed, pass/fail limits, and results. Other features include 5 to 1000 MHz tuning, a field replaceable long-life battery pack, and an integrated MTA – all in a weatherproof, rugged, field-ready package.

- Up to 30 Mb/s throughput
- Customizable verification and troubleshooting capabilities
- Validates networks capacity for increased bandwidth and high QoS demands of next-generation services
- Easy-to-use interface and best display of any instrument in its class
- Open architecture provides flexibility for future service requirements
- Windows CE® operating system offers user familiarity and flexibility for future expansion
- Internet Explorer® browser provides web access to back office and diagnostic systems
- PC emulation and Ethernet testing tools eliminate the need for PCs in the field
- CM2000 supports DOCSIS 2.0, Annex B and Annex C Digital Video (6 MHz)
- CM2000E supports DOCSIS, Euro DOCSIS and Annex A, B and C Digital Video (6 and 8 MHz)

CM2 OPTIONS

CM2-QAM™ *(field upgradable firmware option)*

The CM2-QAM option adds the Spectrum Display, QAM Constellation, Equalizer and Frequency graphic displays with measurements of Pre & Post Errored Sec & Severely Errored Sec along with a STATs mode for measurements over time (not required to make MER & BER digital measurements).

CM2-USG™ *(hardware option)*

The CM2-USG's QPSK to 64 QAM Upstream Generator provides a test signal which can be analyzed by an AT2500 Spectrum/QAM Analyzer, to fully qualify return path performance. Verify, test and troubleshoot up to 64 QAM upstream deployments with AT2500RQ measurements of:

- MER and BER
- Group Delay
- Frequency Response

Includes CM2-ATremote. Remote control software allows the CM2000 user to remotely control the AT2500 and view the test results in the field on the CM2000 display.

CM2-VoIP *(field upgradable firmware option)*

The VoIP option provides advanced voice telephony testing capability to ensure that the quality of voice services exceeds your subscriber's expectations.

- Analyze MOS and R-Factor
- DOCSIS/BPI+ and Cable Labs MTA digital certificates
- Dynamic QoS (DQoS) without provisioning or Static QoS with provisioning
- Determine independent upstream and downstream MOS, R-Factor, packet loss, latency, and jitter

CM2-RPG Return Pilot Generator *(field upgradable firmware option)*

The return pilot generator option provides a way to perform return path alignment, test drop cables, and check passives by inserting return path test signals.

- Single or Alternating two-tone mode with independent frequency and level control
- CW to 64 QAM modulation (no PRBS)

CM2-CAD: Strand Map Viewer *(field upgradable firmware option)*

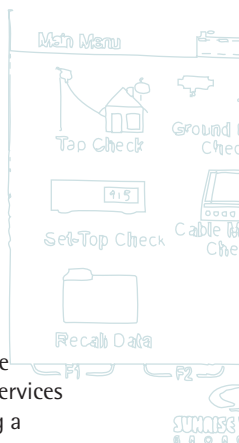
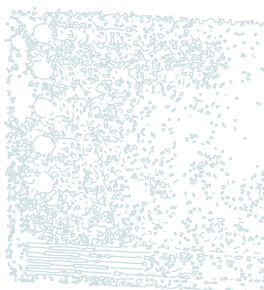
The CM2-CAD option allows the user to view DWG or DXF drawing files right on the CM2000 display. Scroll and zoom controls are provided, along with "red-line" mark up and Save feature to make notes on the strand map for updates.

CM1000™



The CM1000 is an analog and digital SLM with an integrated cable modem that provides comprehensive troubleshooting of modern cable TV, data and VoIP services carried on DOCSIS cable modem networks. Emulating a cable modem, it characterizes a network's digital performance in both directions. The VoIP+ option measures network call quality, providing Mean Opinion Scores (MOS), packet loss, latency and jitter. The CM platform offers rugged portability for the field and modularity for future upgrades.

- Full analog/digital SLM with cable modem testing plus digital video tests including: MER, BER and constellation
- Deep interleave, BPI+ with manufacturer certificates and SNMP are standard features
- VoIP+ option for verifying and testing VoIP network services, QoS voice and best effort signaling. Includes MOS, R-Factor, lost packets, latency and jitter (realMOS Server software required)
- Web browser option for web-based applications such as workforce management
- Proprietary BkER test characterizes the upstream path without a headend unit
- Plug-in modules include 16 QAM Upstream Signal Generator and TDR options
- CM1000 supports Annex B and Annex C



CM1000™ MODULES

CM-USG™ Module

The CM-USG Module's 16 QAM Upstream Generator provides a test signal to be analyzed by an AT2500 Spectrum/QAM Analyzer, to fully qualify return path performance. Verify, test and troubleshoot 16 QAM upstream deployments with AT2500RQ measurements of:

- MER and BER
- Group Delay

CE4000™ TDR Module

When troubleshooting cable TV or DOCSIS modem installations, the CE4000 Module identifies and locates cable faults that contribute to ingress, leakage, and level problems. TDR functions:

- Distance, cable loss, return loss, and total loss measurements
- Auto-test or manual-test mode

CM1000™ OPTIONS

CM-VoIP+

The VoIP+ option provides advanced voice telephony testing capability to ensure that the quality of voice services exceeds your subscriber's expectations.

- Analyze MOS and R-Factor
- DOCSIS/BPI+ digital certificates ensure operation with dynamic QoS (DQoS) without provisioning or Static QoS with provisioning
- Determine independent up and downstream MOS, R-factor, packet loss, latency, and jitter

CM-RPG *(Return Pilot Generator)*

The return pilot generator option provides a way to perform return path alignment, test drop cables, and check passives by inserting return path test signals.

- Single or Alternating two-tone mode with independent frequency and level control
- CW or 16 QAM modulation

CM-realVIEW

realVIEW™ option to provide field view of selected return paths from realWORX™ Ingress Monitoring.

realMOS™ Software

realMOS software application for use with CM1000-CM-VoIP+ Option. Installation of PC running realMOS is required at the headend near media gateway or PSTN demarcation.

realMOS™ Server

PC rackmount server with realMOS Server application installed for use with CM1000-CM-VoIP+ Option.

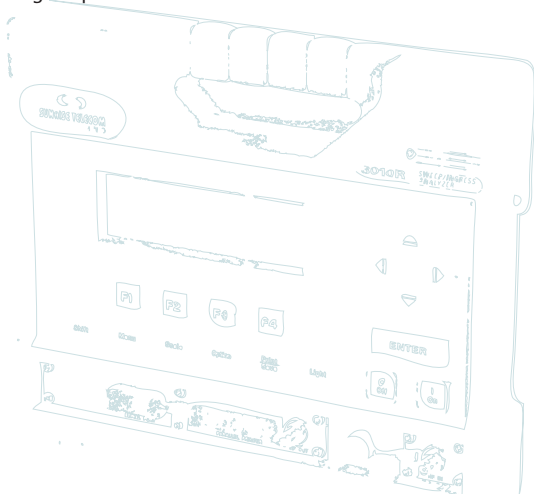
3010R™

Field Sweep Instrument



This portable battery-operated instrument includes forward sweep, return sweep, and signal-level meter (SLM) capabilities. With option 052 (forward sweep transmitter) installed it can also function as a headend unit for troubleshooting intermittent problems in specific network segments. It incorporates Digisweep technology, the fastest high-resolution sweep, allowing placement of sweep points close to digital signals without interference.

- Ingress measurements
- Return path alignment and return sweep measurements
- Forward and return sweep measurements
- Digital power measurements



3010H™

Headend Sweep Instrument



The Calan 3010H is a rack-mounted headend unit that supports up to ten 3010R field instruments simultaneously on the return path alignment, and an unlimited number of 3010R field units as a forward sweep transmitter. These functions may be dedicated or combined to allow forward and return sweep in a single unit. The Calan 3010H gives you confidence that your broadband system is operating reliably and that you're delivering quality, distortion-free signals to your subscribers.

- Forward and Return Path Alignment
- AT160x switch compatible
- Dual Path feature
- Ingress measurements



AT1600™ series RF Switch



The AT1600 broadband multiplexer provides broadband RF switching and multiplexing for the headend environment. Paired with an AT2000/2500 spectrum analyzer or 3010H, it is the ideal solution for remote headend testing and return path monitoring.

- Full 1 GHz performance
- 16 RF inputs and 1 (AT1601) or 2 RF outputs (AT1602)
- Switch rate of up to 100 microseconds
- AT2500 supports up to 16 switches
- 3010H supports up to 8 switches



AT2500HMx™ Rack-mount Spectrum Analyzer



The AT2500HMx 1.5 GHz rack-mounted analyzer system provides real-time remote visibility into headend and hub performance. Functions include basic spectrum analysis, automated CATV tools and QAM analysis. The AT2500HM, with a frequency range of 5 MHz to 1.5 GHz, can monitor both forward and return path ingress. The AT2500HMQ monitors 16, 64 and 256 QAM signals, downstream analog channels and return path ingress.

Optional software packages, such as realWORX WEB, WinRemote II and WinCOM II offer remote control measurements and data analysis management.

- AT2500HM: 5 MHz to 1.5 GHz frequency range for forward and reverse path (in combination with realWORX WEB monitoring software packages) can help detect and notify you on laser nonlinear operation.
- AT2500HMQ: Headend 16/64/256 QAM signal testing, forward and reverse path (equalizer stress, frequency response, group delay, micro reflections)
- Spectrum analyzer with fast scan speed (2 ms acquisitions of 500 data points) in combination with realWORX WEB monitoring software packages scans 80 return nodes per second
- High sensitivity measurements can detect ingress and other impairments such as common path distortions down to -65 dBmV.
- Real-time remote control capabilities over Ethernet connectivity

AT2500RQv™ Portable Spectrum Analyzer



The AT2500RQv is a spectrum analyzer designed specifically for cable applications. In addition to its enhanced spectrum analysis, the AT2500RQv features CATV, QAM, and video analysis. Its advanced capabilities make it perfect for headend use while its portability and ruggedness make it a powerful tool for field technicians needing a high performance instrument.

- Spectrum analysis with fast scan speed and high sensitivity to detect bursty transient and low-level ingress
- Digital 16/64/256 QAM measurements including MER, BER, QIA (QAM Impairment Analysis), equalizer stress and group delay
- Frequency response, micro-reflections, and more
- CATV testing for FCC proof-of-performance (in-house report or family ware)
- Video demodulation and analysis, vector scope and color tests
- Time Domain Measurement mode for measuring bursty return signals
- Real-time remote control to reduce the need for expensive truck rolls

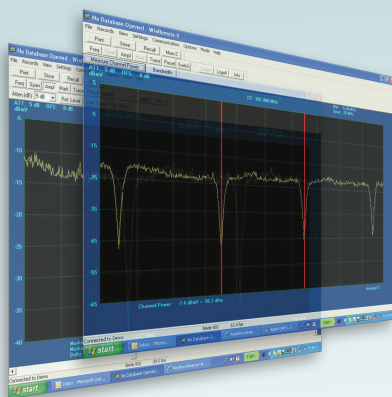
realWORX® WEB



realWORX WEB is a fully-automated and completely web based broadband performance verification system that allows operators to monitor both upstream and downstream RF signal quality on a continuous basis from a central server. Based on the AT2500 spectrum/QAM analyzer and the AT1600 broadband multiplexer, realWORX compares and verifies the quality of live RF performance conditions against user-set limits and takes a proactive approach to plant maintenance.

- Completely web based modular and scalable distributed architecture
- Monitors RF signal and ingress, as well as laser non-linear operation
- Monitors ingress, analog and digital QAM measurements (levels, frequency, channel power, CCN/CSO/CTB/depth of modulation, MER, digital compression/phase noise, etc.)
- Supports multiple analyzers/switches; no limit on size of system
- Automatic alarm notification by e-mail, pager or cell-phone
- Sends SNMP Traps notification to a remote Network Operations Center (NOC)
- Sends return path spectrum traces from multiple analyzers to multiple field personnel simultaneously.
A function called realVIEW sends ingress traces to a web browser, to WinRemote II or to a CM2000/1000/500 series meter in the field.
- Store and view historical RF measurements for trend analysis

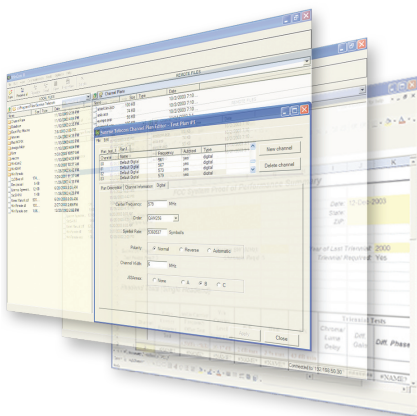
WinRemote II™



WinRemote II is a Windows® based software package that provides powerful real-time spectrum analyzer remote control capabilities from a PC. WinRemote II can control both portable and headend versions of the AT2500 series spectrum analyzers. Using a network ethernet connection or RS-232 link, users can log onto a remote analyzer from any location and perform measurements remotely.

- Remote control of all AT2500 spectrum analyzer and QAM functions from any location
- Measure signal quality in 16/64/256 QAM constellation display with zoom capabilities
- Capture up to 7 days of QAM performance statistics
- Time stamp of transient events down to one second accuracy
- Enhanced adaptive equalizer mode helps you identify micro reflections
- Remotely select RF test points (up to 256 per analyzer with the Sunrise Telecom AT1600 series RF switch)

WinCOM II®



The WinCOM II Windows® based software provides powerful capabilities of analysis and record keeping of stored measurement data. Using a network Ethernet connection or RS-232 link, users can transfer files to and from an AT2500 series spectrum analyzer, to view stored measurement traces, to print reports, to perform firmware upgrades and to create a PC based WinCom II database for archival purposes.

- View copy, export and/or generate your own FCC report
- Create and edit customized channels plans
- View video waveform and vector scope traces downloaded from the AT2500 spectrum analyzer
- View color test measurements (differential gain and phase, Y/C gain and delay, modulation linearity and video S/N measurements)



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