AT2500HM SERIES

RACKMOUNT CATV/QAM SPECTRUM ANALYZER

Lab-grade measurements and performance designed specifically for broadband requirements

The AT2500HM series rackmounted headend spectrum analyzer is a versatile and cost effective remote headend measurement solution that provides "real-time" visibility and full control of RF network performance at remote locations.

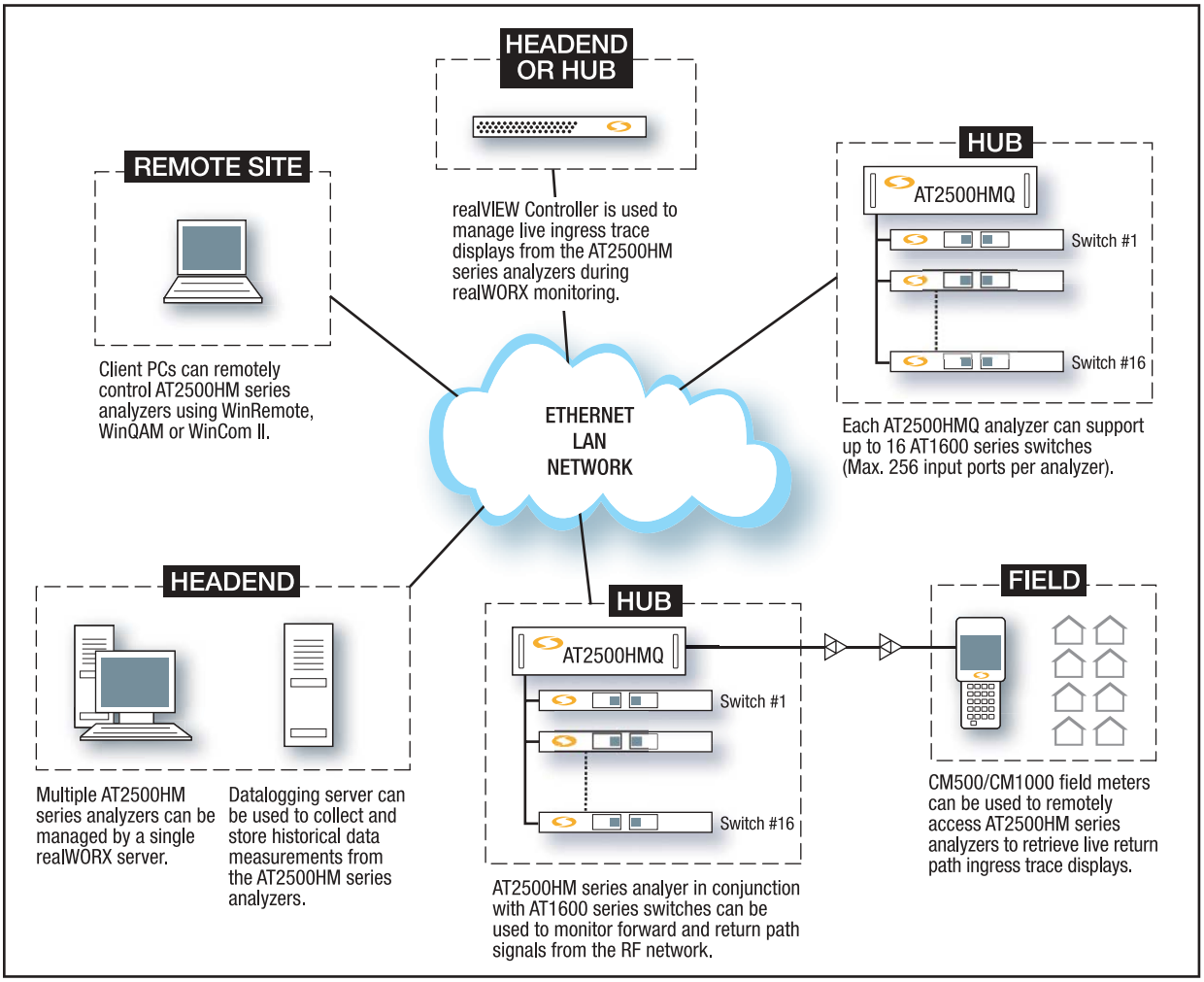
- High performance spectrum analyzer with a full 1.5 GHz bandwidth
- Fast 2 ms scanning of 500 data points on a selected span
- Sensitivity down to -65 dbmV
- Remote spectrum analyzer capabilities using realWORX, WinRemote, and WinQAM software applications.
- Performs QAM measurements (with the AT2500HMQ version)
- Remote controlled via Ethernet interface

JUST ANOTHER WAY
WE'RE UNCOMPLICATING CABLE

SUNRISE TELECOM
BROADBAND

OVERVIEW

The AT2500HM series analyzer (model HM, HMQ) is a 1.5 GHz rackmount RF spectrum analyzer designed specifically for CATV applications. Functions include basic spectrum analysis, automated tools for testing and preventative maintenance, QAM analysis, real-time remote control capability and FCC proof of performance testing. The AT2500HM is typically installed in a headend or hub site and is used with optional Sunrise Telecom software making performance monitoring easy and practical, even for multiple locations.



. . . all the tools a technician needs to respond to a situation rapidly and remotely.

HEADEND TESTING WITH SPECTRUM ANALYZER PERFORMANCE

Based on the same platform as the AT2500R series portable headend analyzers, the AT2500HM series shares almost all the unit's measurement capabilities. The AT2500HM functions as a dedicated CATV analyzer, while the AT2500HMQ adds QAM measurements and statistics to its capabilities.

The AT2500HM series headend spectrum analyzers provide lab-grade measurements and performance designed specifically for CATV/QAM requirements. Unlike reverse-only systems, the AT2500HM series analyzers provide full monitoring of signals from 1 MHz to 1.5 GHz, allowing you to monitor both return and forward path performance.

With -65 dbmV sensitivity, it allows detection of extremely low level ingress and noise. The industry-leading 2 msec scan rate assures the detection and capture of even the fastest transient ingress.

The AT2500HM series fully integrates a PC controller, VGA and NTSC video outputs, PS-2 keyboard port, four 115.2 kps RS-232 com ports and a network ready 10Base-T Ethernet connection—all in a 19" rackmount chassis, providing all the tools a technician needs to respond to a situation rapidly and remotely.

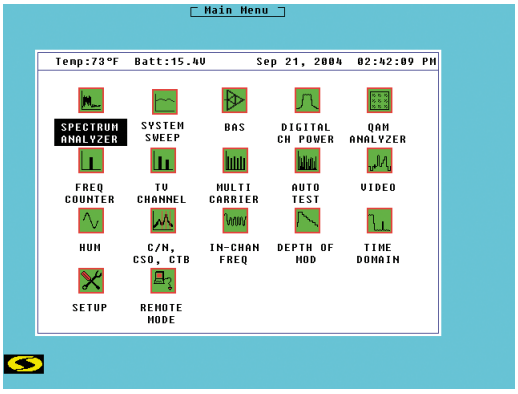
KEY FEATURES

	AT2500HM	AT2500HMQ
High Performance Rackmount Spectrum Analyzer	•	•
Measurement Capability		
1.5 GHz Forward Path Spectrum Analyzer	•	•
Return Path Ingress-2 msec sweep time	•	•
Forward and Return Path Monitoring	•	•
64 / 256 QAM Digital Performance		•
Carrier Frequency (±2 ppm)*	•	•
CATV Proof-of-Performance*	•	•
Time Domain on Bursted Carriers*	•	•
Software Compatibility		
realWORX	•	•
WinCom II	•	•
WinRemote	•	•
WinQAM		•
Added Features		
NTSC Video Output	•	•
MPEG ASI Output		•
QAM Impairment Analysis*		•

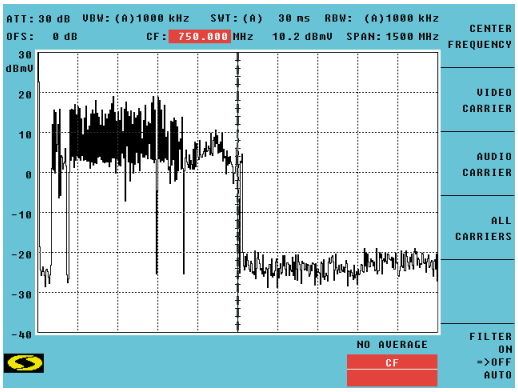
**Not available in remote or monitoring modes*

. . . measurement performance and flexibility unmatched in the industry.

HEADEND TESTING



Main Screen



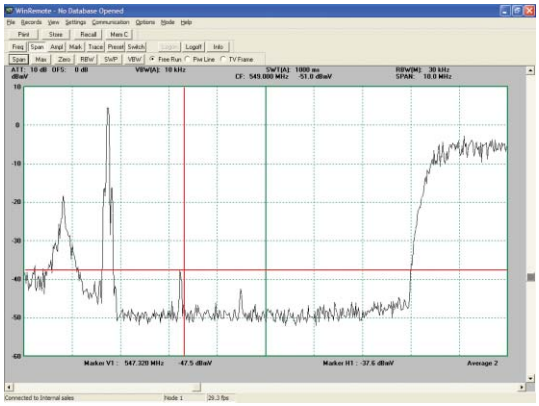
Spectrum Analyzer Screen

The AT2500 HM is the ideal solution for headend testing and return path monitoring. Its measurement performance and flexibility are unmatched in the industry. The AT2500HM can be operated either locally using an external VGA monitor and keyboard or remotely via a LAN, modem or the Internet.

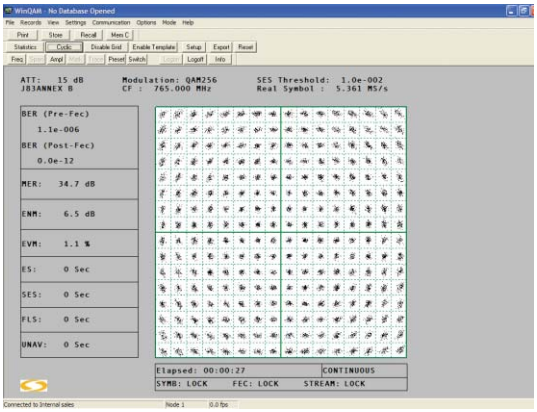
STANDARD FUNCTIONS

- SPECTRUM ANALYZER
- DIGITAL CHANNEL POWER
- QAM ANALYZER
- FREQUENCY COUNTER
- TV CHANNEL
- MULTI-CARRIER
- AUTO TEST
- VIDEO
- HUM
- CCN, CSO, CTB
- IN-CHANNEL FREQUENCY
- DEPTH OF MODULATION
- TIME DOMAIN
- SETUP
- REMOTE MODE/EXIT MODE

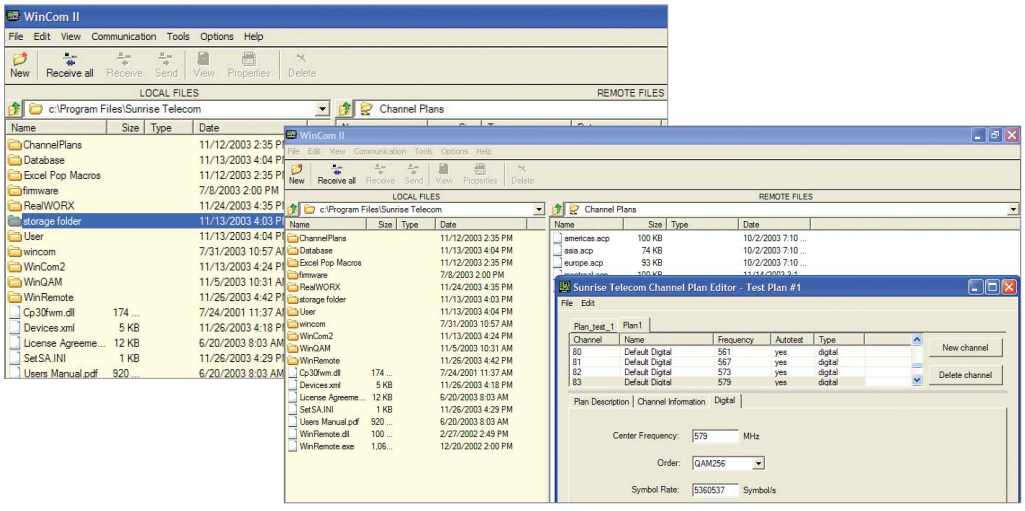
FULL REMOTE SPECTRUM ANALYZER CONTROL



WinRemote's Spectrum Analyzer Display



WinQAM's 256 QAM Constellation Display



WinCOM II's Data Management and Channel Plan Editor Display

Like the AT2500R series, the performance and flexibility of these units can be enhanced with companion applications offering Remote Control (WinRemote and WinQAM) and Remote Data Management (WinCOM II) capabilities.

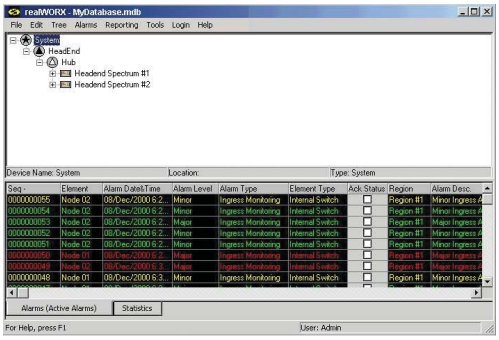
Using the optional Sunrise Telecom WinRemote Windows based PC software, the AT2500HM series analyzer can be operated remotely, eliminating the need for a technician at the headend to manually select and analyze individual ingress and CATV measurements.

Using the optional Sunrise Telecom WinQAM Windows based PC software, the technician can remotely control the AT2500HMQ analyzer to perform real time digital QAM measurements.

Using the optimal Sunrise Telecom WinCom II Windows based PC software, the technician can remotely transfer files to and from the AT2500HM series analyzer, to view stored measurement traces, print reports and create a database for archival purposes.

…monitors upstream and downstream RF network signals based on user-set limits

REAL-TIME PERFORMANCE MONITORING



realWORX Performance Verification System—Main Menu

These high performance spectrum analyzers also form the heart of the realWORX Performance Verification System, allowing you to continually perform automated measurements on downstream analog and digital signals as well as monitor your return path for ingress, even from multiple locations. Remote performance monitoring reduces the strain on technical staff requirements, ensuring continued system quality performance at a minimal cost.

RETURN ALIGNMENT AND INGRESS MAINTENANCE

Using the optional realVIEW controller to communicate with the AT2500HM series analyzers allows users to remotely view ingress traces using a PC or in the field using the Sunrise CM500/1000 test meters, realWORX continuously monitors the network. With the ability to view neighboring returns and to compare local ingress with headend measurements, technicians can quickly focus on the problem area without unnecessary travel or the need to involve additional personnel from the headend.

SPECIFICATIONS

Note: All specifications apply over the standard 0°C to + 50°C operating temperature range, after a minimum of 2.5 hours of storage within the operating temperature range. The AT2500HM meets all its specifications within 1 minute after it is turned on, providing that the unit is within the one-year calibration cycle.

FREQUENCY

Tuning Range ..... 0–1500 MHz
Specified Frequency Range ..... 5–1500 MHz, Flatness down to 5 MHz in a 100 MHz span
Frequency Reference Ageing ..... ±1 PPM / yr
Frequency Reference Temperature Stability ±1 PPM (0° to 50°C)
Frequency Counter Accuracy ..... ± 1 PPM ± 1 count
Frequency Counter Resolution ..... 10 Hz
Single Sideband Phase Noise ..... -85 dBc/Hz typical;-83 dBc/Hz minimum (at 10 kHz Offset)

Spans

Max Span ..... 1500 MHz
Variable Spans ..... 0.1 to 1500 MHz, user programmable
Zero Span

Sweep Time

Max Span and > 1000 MHz ..... 30 ms
Other spans ≤1000 MHz ..... 20 ms to 5 s In 2, 5, 10, 20 sequence
Reduced Spans ..... 10, 4, 2 ms (≤500 MHz, ≤100 MHz, ≤50 MHz)

Sweep Trigger ..... Sweep modes: Free run, Pwr Lock, TV frame (Spectrum Analyzer sweep modes)
Zero Span Horizontal Time ..... 0.05 ms to 500 ms, in 1, 2, 5, 10 sequence

Resolution Bandwidth

1 MHz ..... Selectivity 5.3 to 1, 60 dB/3 dB
300 kHz ..... Selectivity 3.1 to 1, 60 dB/3 dB
30 kHz ..... Selectivity 2 to 1, 60 dB/3 dB
10 MHz ..... Selectivity 2 to 1, 60 dB/3 dB

Video Bandwidth

1 MHz, 100 MHz, 10 MHz ..... 6 dB /octave

Amplitude

Signal Level Range	-70 dBmV min.	+70 dBmV max.
Maximum Safe Input 68 dBmV	100V AC/DC	
Level Accuracy	±0.75 dB max.	5–1500 MHz
Sensitivity	-65 dBmV typical	
Level Resolution	0.1 dB	
Input Impedance	75 Ohms nominal	
Noise Figure, 5–1500 MHz	8 dB typical	11 dB max.
Spurious Free Dynamic Range	70 dB	
Vertical Scale	10, 5, 2 dB / div	70 dB full scale
Reference Level Range	+70 / -10 dB	
Attenuator	0–65 dB	5 dB steps

MECHANICAL AND ENVIRONMENTAL SPECIFICATION

Parameter	Value
Size	482 x 133 x 355 (mm) (19"W x 5.25"H x 14"D) 3 RU [Rack Units] High
Weight	7 kg (15.5 pounds)
Temperature, Operating	5 to +40°C
Temperature, Storage	-20°C to +55°C
Pollution Degree	II
Installation Category	II
Altitude	Up to 2000 m
Humidity	80% up to 31°C (Decreasing linearly to 50% at 40°C)
Shock and Vibration	3 g maximum
Power Supply Class	II, Tolerance: 16 VDC, 4.06 A (PSU2065)
Current Consumption	2.2 A max (2 A typical at 12 VDC)

Power

Internal Battery Charger ..... Automatic Fast / Slow / Floating
Charger Protection ..... Reverse polarity, Over/Under voltage 12/18 V
Power Supply PSU2065 ..... 100V/250V, 50/60 Hz, 16 VDC, 4.06 A
Certification ..... UL1950 UL136791, CSA950 LR36665, CE TUV / IEC 1950

Battery

Battery Type ..... Rechargeable lead acid, 12 Volt 2 Ah.
Charge Time ..... Approx. 30 minutes
Operating Time on Backup Battery ..... Approx. 15 minutes

CATV MEASUREMENT SPECIFICATIONS

Channel Selection ..... Frequency, Channel Video, Channel Audio
Channel Plans ..... Custom plans, NTSC (EIA, HRC, IRC), PAL (B/G, I, D) or other. Maximum of 350 signals
Tuning Range ..... 0 MHz to 1.5 GHz
Specified Tuning Range ..... 5 MHz to 1.5 GHz
TV Channel Amplitude Range ..... -40 dBmV to +65 dBmV ± 0.75 dB for S/N > 30 dB

TV Visual Frequency

Accuracy ..... Carrier Frequency, ± 1 PPM
Resolution ..... 10 Hz

Visual/Aural Delta Frequency

Range ..... 1–10 MHz
Accuracy ..... ± 200 Hz
Resolution ..... 10 Hz
Visual/Aural Delta Amplitude ..... ± 0.75 dB for S/N > 30 dB

DIGITAL MEASUREMENT QAM 64/256 SPECIFICATIONS

Modulation

Modulation Type ..... 64/256 QAM ITU-T J.83 Annex A, B & C (DVS, DVB, DOCSIS, EuroDOCSIS)
Interleave Capability ..... In Annex B, up to 128 x 4; In Annex A/C, 12 x 17

Digital Carrier Average Power Measurement

Amplitude Range ..... -30 to +65 dBmV
Resolution ..... 0.1 dB
Absolute Accuracy ..... ± 1.5 dB
Measurement Range ..... 200 kHz to 1500 MHz

Modulation Error Ratio (MER)

Range ..... 22 to 40 dB
Accuracy ..... ± 0.5, 22 to 30 dB; ± 1.7 dB, 38 to 40 dB
Error Vector Magnitude (EVM) Range ..... 0.65% to 4.1%

Estimated Noise Margin

Range ..... 1 to 12 dB
Accuracy ..... ± 0.5 to 1.7 dB as MER

Symbol Rate

Range ..... 5 to 7 MS/s.

Specifications subject to change without notice.

FIELD-PROVEN SOLUTIONS

For detailed information on the AT2500HM, visit our website at www.sunrisetelecom.com for the name of your local Sunrise representative. Or telephone us at 1-800-297-9726 (Int'l calls: 1-514-725-6652).

Sunrise Telecom Broadband is a leader in digital broadband and DOCSIS test instruments for the broadband industry. As part of the Sunrise Telecom family, we leverage the strength of one of the world's largest communications test and measurement companies.

Sunrise Telecom Broadband's field-proven solutions include installation and maintenance instruments; portable headend analyzers; and network test systems and software. Our goal is to enable service providers to rapidly deploy television, high-speed Internet, and digital video applications.

Based on our core strength in RF testing, we have established a successful track record as a provider of leading edge solutions that incorporate innovative test methods, intuitive user interfaces, and thorough product training.

At Sunrise Telecom Broadband, we uncomplicate the cable broadband engineer's and field technician's day.

JUST ANOTHER WAY WE'RE UNCOMPLICATING CABLE

SUNRISE TELECOM
BROADBAND

ORDERING INFORMATION

AT2500HM	1.5 GHz Headend Rackmount CATV Spectrum Analyzer Includes 1.5 GHz Rackmount CATV spectrum analyzer, baseband video output, battery charger, user manual and 2-year warranty.
AT2500HMQ	1.5 GHz Headend Rackmount QAM/CATV Spectrum Analyzer Includes 1.5 GHz rackmount QAM and CATV spectrum analyzer, baseband video output, battery charger, user manual and 2-year warranty.
AT2Q6-8	64/256 QAM RQ+ Euro/Annex A/B/C, Dual 6 - 8 MHz bandwidth
AT2Q-ASI	MPEG Transport stream output, ASI formatted BNC connector
Calibration Options	
AT-W32	AT2000/AT2500 - 3 Year Annual Calibration Program
AT-W52	AT2000/AT2500 - 5 Year Annual Calibration Program
AT2-CCM	Certificate of Calibration compliance with measurement data when specified at the time of order
Warranty Option (Must be ordered with product)	
AT-W30	AT2000/AT2500 Extended Warranty (add 1 year for a total of 3 years)
AT-W50	AT2000/AT2500 Extended Warranty (add 3 years for a total of 5 years)
Windows PC Software for AT2000/AT2500 Spectrum Analyzer Series	Includes CD, User Manual (1license per PC), A65000909 Serial Null Modem Cable and A65000945 RJ-45 Ethernet Crossover Cable
A99026010	WinCOM II - Data Management Software
A99026020	WinREMOTE - Remote Control Spectrum Analyzer Software
A99026025	WinQAM - Remote Control QAM Digital Measurements Software (only for QAM Analyzer AT2500RQ & AT2500RQV)

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