VIAVI

MSQ-900 MicroStealth QAM

QAM Signal Level Meter

Viavi Solutions® provides a new level of value and performance in a QAM signal level meter (SLM). The MicroStealth QAM SLM is an ideal tool for field technicians seeking a single tool to quickly ensure the quality of digital cable services.

The MSQ-900 is simple and compact, yet packs an impressive feature set with remarkable performance. It provides all the necessary tests for verifying digital and analog cable services up to 1 GHz. The digital measurements include digiCheck digital signal level, modulation error ratio (MER), and pre- and post-FEC bit error ratio (BER). The MSQ-900 also possesses the features expected in a good SLM including analog channel video level, video-to-audio level, carrier-to-noise (C/N), full scan, and tilt.

In addition to verifying digital and analog services, the MSQ-900 can also accomplish its tasks quickly and efficiently. Users can reach all tests with one button press from the main menu, making training an issue of the past. An automated test feature lets users execute a set of user-defined tests with Pass/Fail indication to ensure that tests are performed consistently at each installation without wasting time.

The MSQ-900 addresses the traditionally difficult task of configuring an instrument to perform digital measurements, including MER and BER. The new AutoPlan functionality automatically detects channel type (analog or digital), the QAM type (64, 128, or 256 QAM), symbol rate, Annex (A, B, or C) and spectral inversion. Users only need to select the correct channel plan template and the MSQ will automatically build a channel plan based on the live signals it discovers.

Don't let the compact form factor of the MSQ-900 fool you; inside it contains a performance measurement engine of the highest quality and accuracy. Achieving this level of performance in a highly portable instrument is a technical achievement that only a brand with an outstanding track record, heritage, and technical expertise can achieve.

Key Features

- Complete 5 to 1000 MHz analog and digital measurement
- MER, pre- and post-FEC BER, digiCheck™ digital power level
- Analog video level, V/A, C/N, line voltage
- AutoTest, fast automated testing to qualify multiple digital and analog channels with Pass/Fail indication
- AutoPlan™, industry-leading automatic channel plan builder with digital QAM detection
- Scan and Tilt measurements show network frequency distortion problems
- Simplified icon-based user interface reduces training time from days to hours

Applications

- Accelerate the digitization of cable services while ensuring quality of service
- Reduce service call rates with proper testing of digital services quickly at every install
- Troubleshoot analog and digital services faster by isolating problems quickly
- Increase the consistency of field technician performance
- Cost-effectively deploy your QAM SLM to the field workforce with confidence in quality and performance

Signal Level Measurements

The MSQ-900 can measure signal levels of both analog and digital carriers. For analog signals the meter will display the video carrier level, video frequency, C/N, and video-to-audio delta. For digital channels the MSQ-900 measures the digital average power of the digital carrier and displays the center frequency. To allow additional flexibility, users can choose to tune the MSQ-900 by either the programmed channels in the channel plan or by frequency.

Full Scan Mode

The MSQ-900 lets users see all the channel levels on one screen, letting them quickly verify if certain channels are missing or if the network has other issues, such as roll-offs or suck-outs. An adjustable marker is available to identify specific channels and to troubleshoot issues.

Users can view the upstream band using the ingress scan to look for ingress signals present in the customer premises. They can use peak hold detection to visually identify ingress issues over prolonged timing that when reset can locate reoccurring ingress.

Tilt Mode

The MSQ-900 can show if the network being tested has a positive or negative tilt over channel frequencies. Users can quickly choose which tilt channels to measure to help identify proper tilt settings.

MER/BER Mode

MER/BER mode lets users test digital QAM Annex A, B, or C channels for digital quality measurements and display their MER and Pre- and Post-BER. They can also display the digital carrier's modulation information (QAM-64/128/256 and Msps).

Autotest Mode

Technicians can perform automated testing with the MSQ-900 using the Autotest mode. They can perform Pass/Fail tests and upload results via an MSQ-PC software application for recordkeeping, which simplifies verification testing and maintains consistent testing parameters.
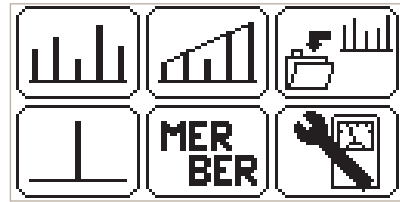
The icon-based Main Menu of the MSQ-900 displays the top five tests most commonly performed for ease of use and to simplify training.
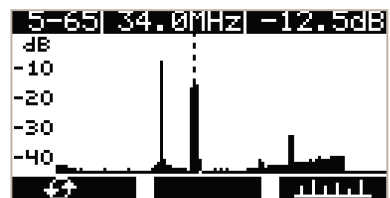

The MSQ-900 performs SLMs on both analog and digital signals.
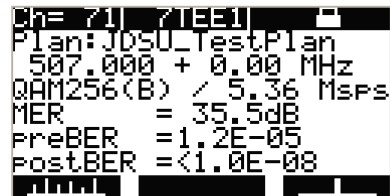
The The MSQ-900 performs QAM Annex A/B/C testing on QAM-64/128/256 providing results for MER and Pre/Post-BER measurements.

The MSQ-900 can also perform full channel plan scans and Tilt measurements to easily identify problems in the network.

The upstream scan is used to identify ingress in the network.

MSQ-PC

MSQ-PC is the computer software application included with the MSQ-900 that is used to quickly and efficiently configure the MSQ-900. The MSQ-PC, connected via USB to the MSQ-900, helps users configure settings, channel plans, limit plans, and facilitate updates to the MSQ-900. It is also used to extract Autotest results for recordkeeping and archiving and performing live measurements when connected to RF signals.

Channel Plans

Users can create Channel Plans using the AutoPlan method on the MSQ-900 device, creating them entirely on the MSQ-PC, or using the MSQ-900 in combination with the MSQ-PC to make final edits and modifications. The ability to transfer channel plans between the MSQ-PC and the MSQ device allows for making modifications quickly as channel plans evolve.

Autotests

Easily upload results from Autotests on the MSQ-900 to the MSQ-PC for printing or recordkeeping. As technicians finish jobs they can use the MSQ-PC to connect test results to their jobs or to print Autotest files or electronically attach them to other files.
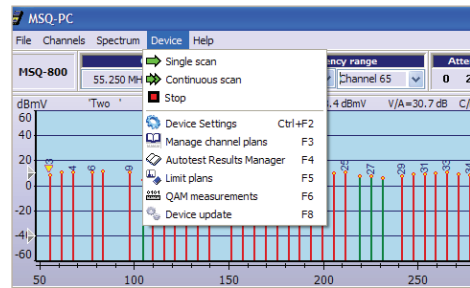
Channel Scan

Connecting the MSQ-900 to both the MSQ-PC and an RF signal allows for taking live measurements from cable plant, such as a Fullscan of the active Channel Plan, which shows graphical representations of video levels in the top window. Users can see information on individual channels by simply clicking on the desired channel.
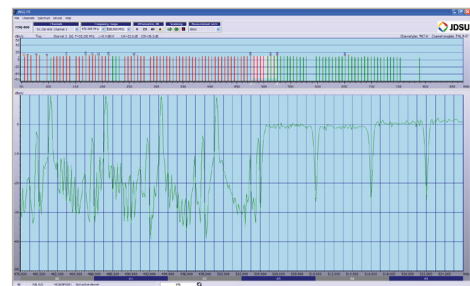
Spectrum

Connecting the MSQ-900 to the MSQ-PC software also provides a live view of the active spectrum. Users can specify the frequency span desired by clicking and dragging a start and stop marker to the desired frequencies.
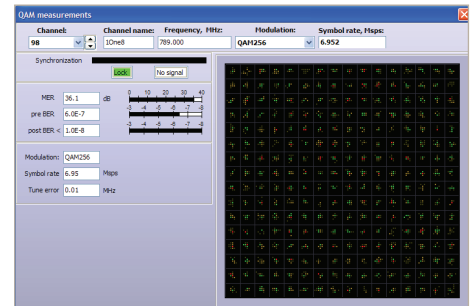
QAM Measurements

Using the MSQ-900 connected to the MSQ-PC also lets users view QAM measurements such as MER, Pre- and Post-BER, and a constellation diagram of a specific QAM-64, -128, or -256 channel.

With the MSQ-900 connected to the MSQ-PC, users can access meter settings, channel plans, limit plans, and Autotest results.

The MSQ-PC main screen shows the Fullscan levels of the active channel plan and individual channel measurements. On the lower panel the MSQ-PC lets users view the downstream spectrum of live RF signals.

The MSQ-PC also provides users with access to more QAM measurements, such as the constellation diagram of the QAM signal, which is not visible on the MSQ-900 meter itself.

Specifications

Frequency	
Measurement range	5 to1000 MHz
Channel level measurement range	48 to 1000 MHz
Level tuning resolution	125 kHz
Ingress scan frequency range	5 to 65 MHz
Ingress tuning resolution	625 kHz
Annex A channel bandwidth (nominal)	8 MHz
Annex B/C channel bandwidth (nominal)	6 MHz

Level Measurement, Analog	
Video types	ITU Systems B/D/G/H/I/K/M/N NCTA
Audio types	FM, Single audio
Audio offset per template	+6.0 MHz (I); +5.5 MHz (B/G/H); +6.5 MHz (D/K); +4.5 MHz (M/NTSC)
Resolution bandwidth (nominal)	230 kHz
Measurement resolution	0.1 dB
Display range	− 45 to +60 dBmV
Maximum total integrated RF power	+60 dBmV
Accurate range	−10 to +50 dBmV
Accuracy	±1.5 dB, 25ºC ±2.5 dB, −10 to +50ºC
C/N algorithm[1]	Peak video to RMS noise
Resolution bandwidth (nominal)	230 kHz
C/N offset	±8 MHz
C/N Selectable	On/off per channel

Level Measurement, Digital	
Algorithm	digiCheck
Measurement bandwidth	5.0 to 8.0 MHz
Measurement resolution	0.1 dB
Display range	−35 to +50 dBmV
Maximum total integrated RF power	+60 dBmV
Accurate range	−10 to +50 dBmV
Accuracy	±1.5 dB, 25ºC ±2.5 dB, −10 to +50ºC

Ingress Scan	
Algorithm	digiCheck
Measurement bandwidth	625 kHz
Measurement resolution	0.1 dB
Display range	−45 to +60 dBmV
Maximum total integrated RF power	+60 dBmV
Accurate range	−10 to +50 dBmV
Accuracy	±2.0 dB, 25ºC ±3.5 dB, −10 to +50ºC

Full Scan and Tilt	
Tilt	A/B delta, dB
Resolution	0.1 dB

QAM Measurements[2]	
Encoding	ITU J.83 Annex A (DVB-C) ITU J.83 Annex B (MCNS) ITU J.83 Annex C
Modulation types	Annex A: 64, 128, 256 QAM Annex B: 64, 256 QAM Annex C: 64, 128, 256 QAM
QAM parameters	AutoChan™
Minimum lock level (256 QAM)	−12 dBmV
Maximum total integrated RF power	+50 dBmV
MER units	dB MER or %EVM
MER display range	21 to >39 dB (64 QAM) 24 to >39 dB (128 QAM) 28 to >39 dB (256 QAM)
MER + 2.0 dB accuracy range	22 to 35 dB (64 QAM) 25 to 35 dB (128 QAM) 29 to 35 dB (256 QAM)
MER resolution	0.1 dB
Algorithm	Sliding Window
Minimum Pre-FEC BER	1.0E-4 to 1.0E-8
Minimum Post-FEC BER	1.0E-4 to 1.0E-8
Symbol rates	Annex A: 5.00 to 7.00 Msps Annex B: 5.056 or 5.361 Msps Annex C: 5.00 to 5.40 Msps
Frequency offset resolution	0.01 MHz

Channel Templates	
Channel templates available:	China; PAL B/G; PAL UK; France; Ireland; OIRT D/K; NCTA
Channel type algorithm	AutoChan

Channel Plans	
Plan creation algorithm	AutoPlan
Plan index	1 to 16 (maximum)
Plan name	15 characters (maximum)

Channels	
Channel index	1 to 160 (maximum)
Channel identifier	3 characters (maximum)
Channel name	6 characters (maximum)

Interfaces	
RF input	75Ω
F connector	F81 replaceable barrel
Protection	Max. sustained 140 VAC Max. sustained 140 VDC
USB interface	v2.0, CDC device
USB connector	USB-B receptacle

MSQ-PC Capabilities	
Additional Measurements	5 MHz to 1 GHz Spectrum display QAM Constellation diagram
Asset management	Firmware upgrade Serial number
Configuration	Settings management Channel Plan management Autotest management Limit Plan management

General	
Display	White on blue, reversible
Language support	English, French, German, Spanish, Portuguese, Chinese
Dimensions	147 x 82 x 43 mm (5.8 x 3.2 x 1.7 in)
Device weight	0.35 kg (0.77 lbs)
Storage temperature	−20 to +50ºC (−4 to +122ºF)
Operating temperature	−10 to +50ºC (+14 to +122ºF)
Charge temperature	+0 to +40ºC (+32 to +104 ºF)
Power	Four 1600 mAh NiMH AA cells 6 hours (typical)
Charge time	7 to 10 hours (typical)
Power supply input	90 to 240 VAC 50 to 60 Hz
Power supply output	12 VDC 600 mA (maximum)

Ordering Information

Description	Part Number
MSQ-900 Unit	MSQ900
MSQ-900 5 Pack	MSQ9005PK

1. C/N measurement is optimized for most networks. However, tightly spaced channel lineups may cause inaccurate noise measurements that could possibly alter the C/N result. Systems with 7 MHz channel spacing or dual audio channels may show a lower than desired C/N ratio measurement on these tightly spaced channels.

2. Measurement channel   < -5 dBmV
   Measurement channel   < +40 dBmV
   Analog first adjacent channels   ≤ +10 dBc
   Digital first adjacent channels   ≤ +6 dBc
   Total analog power (64+ channels)   ≤ +20 dBc
   Total digital power (100+ channels)   ≤ +20 dBc

VIAVI

viavisolutions.com

MSQ-800 MicroStealth QAM
QAM Signal Level Meter

Key Features

- Complete analog and digital measurement solution
- MER, pre- and post-FEC BER, digiCheck™ digital power level
- Analog video level, V/A level, C/N
- AutoTest, fast automated testing to qualify multiple digital and analog channels with Pass/Fail indication
- AutoPlan™, industry-leading automatic channel plan builder with digital QAM detection
- Scan and Tilt measurements show frequency distortion problems
- Simplified icon-based user interface reduces training time from days to hours

Applications

- Accelerate the digitization of cable services while ensuring quality of service
- Reduce service call rates with proper testing of digital services quickly at every install
- Troubleshoot analog and digital services faster by isolating problems quickly
- Increase the consistency of field technician performance
- Cost-effectively deploy your QAM SLM to the field workforce with confidence in quality and performance

JDSU, home of Wavetek™ field meters, provides a new level of value and performance in a QAM signal level meter (SLM). The MicroStealth QAM SLM is an ideal tool for field technicians seeking a single tool to quickly ensure the quality of digital cable services.

The MSQ-800 is simple and compact, yet packs an impressive feature set with remarkable performance. It provides all the necessary tests for verifying digital and analog cable services. The digital measurements include digiCheck digital signal level, modulation error ratio (MER), and pre- and post-FEC bit error ratio (BER). The MSQ-800 also possesses the features expected in a good SLM including analog channel video level, video-to-audio level, carrier-to-noise (C/N), full scan, and tilt.

In addition to verifying digital and analog services, the MSQ-800 can also accomplish its tasks quickly and efficiently. Users can reach all tests with one button press from the main menu, making training an issue of the past. An automated test feature lets users execute a set of user-defined tests with Pass/Fail indication to ensure that tests are performed consistently at each installation without wasting time.

The MSQ-800 addresses the traditionally difficult task of configuring an instrument to perform digital measurements, including MER and BER. The new AutoPlan functionality automatically detects channel type (analog or digital), the QAM type (64- or 256-QAM), symbol rate, and spectral inversion. Users only need to select the correct channel plan template and the MSQ will automatically build a channel plan based on the live signals it discovers.

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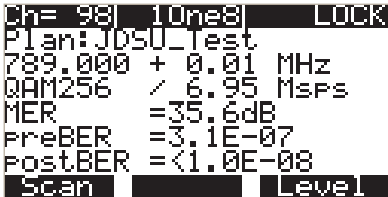
2
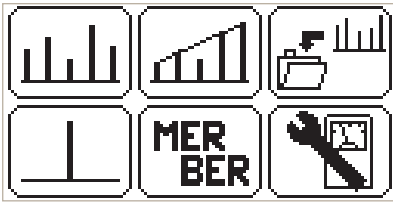
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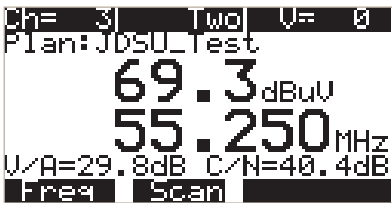
The MSQ-800 performs SLMs on both analog and digital signals and displays the information on one screen.

The The MSQ-800 performs QAM testing on QAM-64/256 providing results for MER and Pre/Post-BER measurements.

The MSQ-800 can also perform full channel plan scans and Tilt measurements to easily identify problems in the network.

Signal Level Measurements

The MSQ-800 can measure signal levels of both analog and digital carriers. For analog signals the meter will display the video carrier level, video frequency, C/N, and video-to-audio delta. For digital channels the MSQ-800 measures the digital average power of the digital carrier and displays the center frequency. To allow additional flexibility, users can choose to tune the MSQ-800 by either the programmed channels in the channel plan or by frequency.

Full Scan Mode

The MSQ-800 lets users see all the channel levels on one screen, letting them quickly verify if certain channels are missing or if the network has other issues, such as roll-offs or suck-outs. Two adjustable markers are available to identify specific channels and to troubleshoot issues.

Tilt Mode

The MSQ-800 can show if the network being tested has a positive or negative tilt over channel frequencies. Users can quickly choose which tilt channels to measure to help identify proper tilt settings.

MER/BER Mode

MER/BER mode lets users test digital QAM Annex A (DVB-C) channels for digital quality measurements and display their MER and Pre- and Post-BER. They can also display the digital carrier's modulation information (QAM-64/256 and Msps).

Autotest Mode

Technicians can perform automated testing with the MSQ-800 using the Autotest mode. They can perform Pass/Fail tests and upload results via an MSQ-PC software application for recordkeeping, which simplifies verification testing and maintains consistent testing parameters.
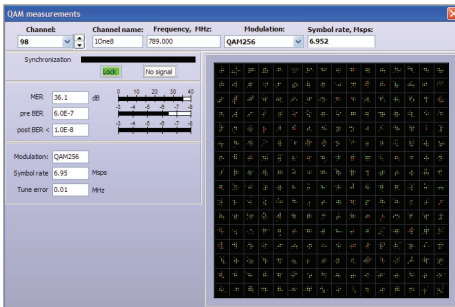
3
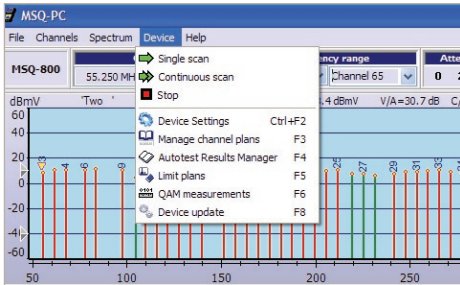
With the MSQ-800 connected to the MSQ-PC, users can access meter settings, channel plans, limit plans, and Autotest results.
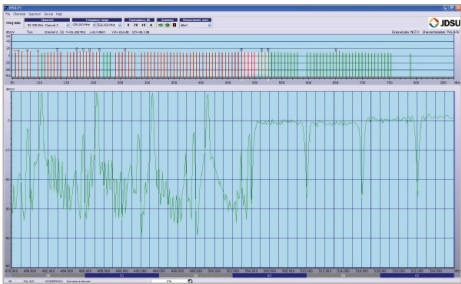
The MSQ-PC main screen shows the Fullscan levels of the active channel plan and individual channel measurements. On the lower panel the MSQ-PC lets users view the downstream spectrum of live RF signals.

The MSQ-PC also provides users with access to more QAM measurements, such as the constellation diagram of the QAM signal, which is not visible on the MSQ-800 meter itself.

MSQ-PC

MSQ-PC is the computer software application included with the MSQ-800 that is used to quickly and efficiently configure the MSQ-800. The MSQ-PC, connected via USB to the MSQ-800, helps users configure settings, channel plans, limit plans, and facilitate updates to the MSQ-800. It is also used to extract Autotest results for recordkeeping and archiving and performing live measurements when connected to RF signals.

Channel Plans

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Autotests

Easily upload results from Autotests on the MSQ-800 to the MSQ-PC for printing or recordkeeping. As technicians finish jobs they can use the MSQ-PC to connect test results to their jobs or to print Autotest files or electronically attach them to other files.

Channel Scan

Connecting the MSQ-800 to both the MSQ-PC and an RF signal allows for taking live measurements from cable plant, such as a Fullscan of the active Channel Plan, which shows graphical representations of video levels in the top window. Users can see information on individual channels by simply clicking on the desired channel.

Downstream Spectrum

Connecting the MSQ-800 to the MSQ-PC software also provides a live view of the downstream spectrum. Users can specify the frequency span desired by clicking and dragging a start and stop marker to the desired frequencies.

QAM Measurements

Using the MSQ-800 connected to the MSQ-PC also lets users view QAM measurements such as MER, Pre- and Post-BER, and a constellation diagram of a specific QAM-64 or -256 channel.

Specifications

Frequency

Measurement range	48 to 870 MHz
Tuning resolution	125 kHz
Channel bandwidth (nominal)	8 MHz

Level Measurement, Analog

Video types	ITU Systems B/D/G/H/I/K
Audio types	FM, Single audio
Audio offset per template:	+6.0 MHz (I);
	+5.5 MHz (B/G/H);
	+6.5 MHz (D/K)
Resolution bandwidth (nominal)	230 kHz
Measurement resolution	0.1 dB
Minimum detectable	−35 dBmV
Maximum total integrated RF power	+60 dBmV
Accurate range	−10 to +50dBmV
Accuracy	±1.5 dB, 25ºC
	±2.5 dB, −10 to +50ºC
C/N offset	±8 MHz

Level Measurement, Digital

Algorithm	digiCheck
Measurement bandwidth	5.0 to 8.0 MHz
Measurement resolution	0.1 dB
Minimum detectable	−25 dBmV
Maximum total integrated RF power	+60 dBmV
Accurate range	−10 to +50dBmV
Accuracy	±1.5 dB, 25ºC
	±2.5 dB, −10 to +50ºC

Full Scan and Tilt

Tilt	A/B delta, dB
Resolution	0.1 dB

QAM Measurements[1]

Encoding	ITU J.83 Annex A (DVB-C)
Modulation types	64- and 256-QAM
QAM parameters	AutoChan™
Minimum lock level (256-QAM)	−15 dBmV
Maximum total integrated RF power	+50 dBmV
MER units	dB MER or %EVM
MER	21 to 35 dB (64-QAM)
	28 to 35 dB (256-QAM)
MER resolution	0.1 dB
Algorithm	Sliding Window
Minimum Pre-FEC BER	1.0E-8
Minimum Post-FEC BER	1.0E-8
Symbol rate	5.00 to 7.00 Msps
Resolution	0.01 Msps
Frequency offset resolution	0.01 MHz

Channel Templates

Channel templates available:	China; PAL B/G; PAL UK;
	France; Ireland; SECAM D/K
Channel type algorithm	AutoChan

Channel Plans

Plan creation algorithm	AutoPlan
Plan index	1 to 16 (maximum)
Plan name	15 characters (maximum)

Channels

Channel index	1 to 112 (maximum)
Channel identifier	3 characters (maximum)
Channel name	6 characters (maximum)

Standards Compliance

Shock and vibration	IEC 60068
Drop	EC 61010
Safety—emissions	EN55022
Safety—immunity	EN 61000

[1]
Analog first adjacent channels	≤ +10 dBc
Digital first adjacent channels	≤ +6 dBc
Total analog power (64+ channels)	≤ +2 dBc
Total digital power (100+ channels)	≤ +24 dBc

Interfaces

RF input	75Ω
F connector	F81 replaceable barrel
Protection	Max. sustained 140 VAC
	Max. sustained 140 VDC
USB interface	v2.0, CDC device
USB connector	USB-B receptacle

MSQ-PC Capabilities

Measurements	Downstream spectrum
	Constellation diagram
Asset management	Firmware upgrade
	Serial number
Configuration	Settings management
	Channel Plan management
	Autotest management

General

Display	White on blue, reversible
Language support	English
Dimensions	147 x 82 x 43 mm
	(5.8 x 3.2 x 1.7 in)
Device weight	0.35 kg (0.77 lbs)
Storage temperature	−20 to +50ºC
	(−4 to +122ºF)
Operating temperature	−10 to +50ºC
	(+14 to +122ºF)
Charge temperature	+0 to +40ºC
	(+32 to +104 ºF)
Power	Four 1600 mAh NiMH AA cells
	6 hours (typical)
Charge time	12 hours (typical)
Power supply input	90 to 240 VAC
	50 to 60 Hz
Power supply output	12 VDC
	600 mA (maximum)

Ordering Information

Description	Part Number
MSQ-800 Unit	MSQ800
MSQ-800 5 Pack	MSQ8005PK
Replacement Protective Sleeve	MSQ800SLEEVE
Replacement Charger	MSQ800CHGR

Test & Measurement Regional Sales