MEQ1000B Hybrid QAM Modulator

Multi-solution Edge QAM Platform

INSTRUCTION MANUAL
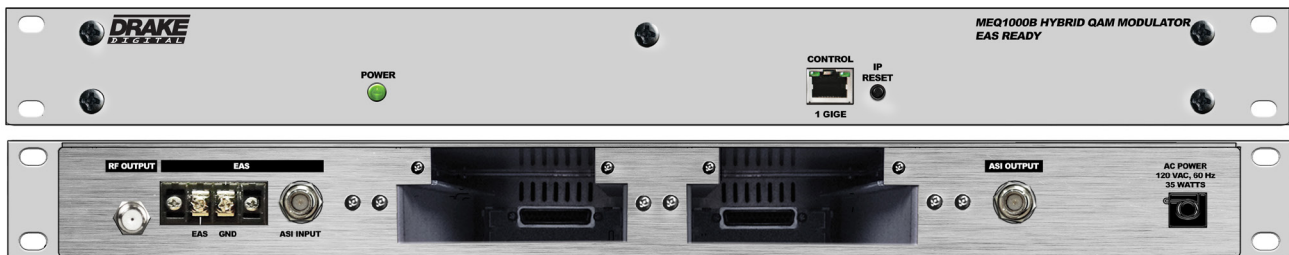
Model	Item #	Description
MEQ1000B	1002511B	Multiplexing QAM Modulator w/ dual input bays
Program Acquisition Modules		
DTD1000A	1002512A	Digital Tuner and Demodulator Module - 8VSB/QAM
SDM1000	1002576	Satellite Tuner and Demodulator Module - QPSK/8PSK
IPI1000	1002608	IP Input Module – GigE
ASII	1002397	ASI Input Module w/ loop thru
MPEG Encoder Modules		
SDE24A	1002514A	SD Dual Video Encoder Module
HDE24A	1002515A	HD Video Encoder Module
SDI24A	1002516A	SDI Video Encoder Module

We recommend that you write the following information in the spaces provided below.

Purchase Location Name:	
Purchase Location Telephone Number:	
MEQ1000B Serial Number:	

Manual Revision

This is the first release of the instruction manual for MEQ1000B using a firmware release version of 1.0.

For more information regarding product firmware releases, please visit our website at www.rldrake.com
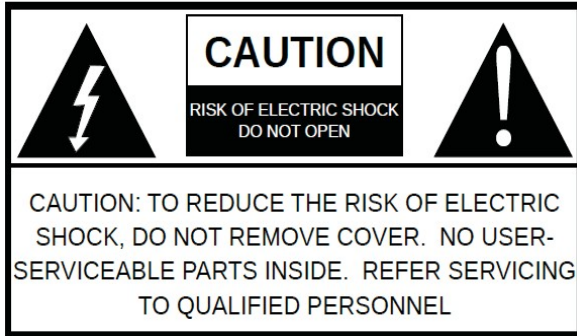**You may also contact Technical Assistance at 937-746-6990 or by email: servicehelp@rldrake.com.**

Table of Contents

Caution Statements

Caution Statements:

WARNING: TO PREVENT FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE TO RAIN OR MOISTURE.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL

A product and cart combination should be moved with care.

Quick stops, excessive force and uneven surfaces may cause the product and cart combination to overturn.

The **lightning flash with arrow head symbol, within an equilateral triangle**, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
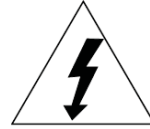
The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

WARNING: THE SOCKET-OUTLET SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES, NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Important Safety Instructions

1. **Read Instructions:** All the safety and operating instructions should be read before the product is operated.
2. **Retain Instructions:** The safety and operating instructions should be retained for future reference.
3. **Heed Warnings:** All warnings on the product and in the operating instructions should be adhered to.
4. **Follow Instructions:** All operating and use instructions should be followed.
5. **Cleaning:** Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleansers. Use a damp cloth for cleaning.
6. **Attachments:** Do not use attachments that are not recommended by the product manufacturer as they may cause hazards.
7. **Water and Moisture:** Do not use this product near water—for example, near a bathtub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool; and the like.
8. **Accessories:** Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
9. A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.
10. **Ventilation:** Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or similar surface. This product should not be placed in a built-in installation such as bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
11. **Power Sources:** This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the product's operating instructions.
12. **Grounding or Polarization:** This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug. Alternate Warnings – If this product is equipped with a three-wire grounding- type plug, a plug having a third (grounding) pin, the plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

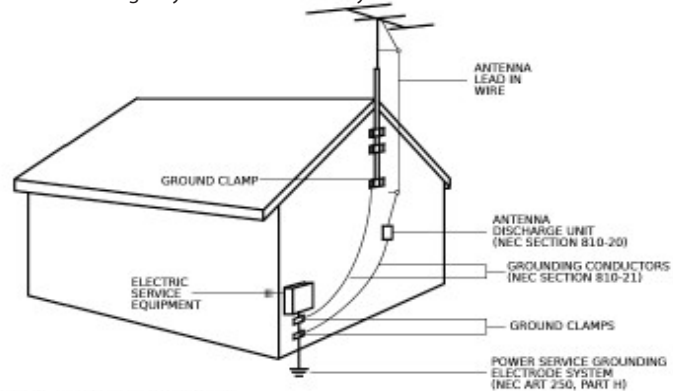# Safety Instructions continued...

13. **Outdoor Antenna Grounding:** If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

14. **Power-Cord Protection:** Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

15. **Lightning:** For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

16. **Power Lines:** An outside antenna system should not be located in the vicinity of overhead power lines, other electric light or power circuits, where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them may be fatal.

17. **Overloading:** Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

18. **Object and Liquid Entry:** Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

19. **Servicing:** Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

20. **Damage Requiring Service:** Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    a) When the power-supply cord or plug is damaged,
    b) If liquid has been spilled, or objects have fallen into the product,
    c) If the product has been exposed to rain or water,
    d) If the product does not operate normally by following the operating instructions.

    Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation, e. If the product has been dropped or damaged in any way, and f. When the product exhibits a distinct change in performance—this indicates a need for service.

21. **Replacement Parts:** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutes may result in fire, electric shock or other hazards.

22. **Safety Check:** Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

23. **Wall or Ceiling Mounting:** The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

NOTE TO CABLE INSTALLER:
THIS REMINDER IS PROVIDED TO CALL THE CATV SYSTEM INSTALLER'S ATTENTION TO ARTICLE 820-40 OF THE NEC THAT PROVIDES GUIDELINES FOR PROPER GROUNDING AND, IN PARTICULAR, SPECIFIES THAT THE CABLE GROUND SHALL BE CONNECTED TO THE GROUNDING SYSTEM OF THE BUILDING, AS CLOSE TO THE POINT OF CABLE ENTRY AS PRACTICAL.

ANTENNA LEAD IN WIRE
GROUND CLAMP
ANTENNA DISCHARGE UNIT (NEC SECTION 810-20)
GROUNDING CONDUCTORS (NEC SECTION 810-21)
ELECTRIC SERVICE EQUIPMENT
GROUND CLAMPS
POWER SERVICE GROUNDING ELECTRODE SYSTEM (NEC ART 250, PART H)

NEC = NATIONAL ELECTRIC CODE
Example of antenna grounding as per National Electrical Code, ANSI/NFPA 70

Specifications

MEQ1000B   Item # 1002511B

Multiplexing QAM Modulator Requires Input Modules

QAM MODULATOR

MODULATION MODES:	Standby, CW, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM
QUADRATURE PHASE ERROR:	< 1°
CARRIER REJECTION:	> 40dB
MER:	> 40dB

PHYSICAL SPECIFICATIONS

TEMPERATURE RATING:	0 - 50° C Ambient
FORM FACTOR:	19" Rackmount - 1RU
DIMENSIONS:	Approximately 19" W x 1.75" H x 14.5" D
WEIGHT:	8 lbs
POWER REQUIREMENTS:	100-120 VAC/60 Hz

RF UPCONVERTER OUTPUT

FREQUENCY RANGE:	54MHz to 1002MHz
CHANNEL PLAN:	Standard CATV, HRC, IRC, or Broadcast
FREQUENCY STABILITY:	+/- 5 PPM
MAXIMUM OUTPUT POWER:	+61dBmV +/- 2dB
SPURIOUS:	> -60dBc
BROADBAND NOISE FLOOR:	-80dBc in a 6MHz bandwidth
PHASE NOISE:	-95dBc @ 10KHz offset
FREQUENCY RESOLUTION:	1Hz
RETURN LOSS:	> -12dB
ATTENUATION RANGE:	15.5dB
ADJACENT CHANNEL:	Meets DOCSIS spectral mask
SIDEBAND REJECTION:	> 40dB

Module Specifications

DTD1000A Item # 1002512A

Digital Tuner and Demodulator Module - 8VSB/QAM

FREQUENCY RANGE:	54MHz to 1002MHz
CHANNEL PLAN:	Standard CATV, HRC, IRC, or Broadcast

RF INPUT LEVEL RANGE

8VSB:	-84dBm to -15dBm
64 QAM:	-78dBm to -15dBm
256 QAM:	-72dBm to -15dBm

IPI1000 Item # 1002608

IP Input Module - GigE

INPUT:	1 x RJ45 1000Base-T Ethernet
INPUT PROTOCOL:	UDP or RTP, or auto detects the appropriate protocol.
INPUT FORMAT:	1 x SPTS or 1 x MPTS (up to 20 program streams, MPTS only)
RECEIVE IP & PORT ADDRESS:	User selectable
IGMP SUPPORT:	v2 or v3, or auto responds with the appropriate version. V3 will allow up to two specific sources, or allows ALL sources if no specific sources are specified.
VIDEO INPUTS:	Accepts VBR (Variable Bit-Rate) and CBR (Constant Bit-Rate) IP Video Streams

SDI24A Item # 1002516A

High-Definition SDI Encoder with Closed Caption

VIDEO INPUTS

SD-SDI/HD-SDI:	1x 75-ohm HD-SDI capable input

AUDIO INPUTS

RCA-TYPE L+R:	1x 1Vrms nominal, 3.5Vrms maximum
SDI-EMBEDDED AUDIO:	Supports PCM (uncompressed) digital audio from SDI

VIDEO OPTIONS

INPUT VIDEO MODES: (SUPPORTED)	480i (720x480 @ 30 fps) 576i (720x576 @ 25 fps) 720p @ 69Hz (1280x720 @ 60 fps) 1080i @ 30Hz (1920x1080 @ 30 fps) 1080i @ 25Hz (1920x1080 @ 25 fps) Supports auto-scan for input resolution
ENCODER FORMAT:	MPEG-2 or MPEG-4 / H.264, selectable
VIDEO ADUSTMENTS:	Brightness, contrast, hue, and saturation
MPEG-4 PROFILE SUPPORT:	Simple, Advanced Simple, High
BITRATE:	Up to 19Mbps (depends on input format)
CLOSED CAPTIONING:	Supports Closed Captioning extraction of either EIA-608 or EIA-708 embedded data.

AUDIO OPTIONS

ENCODER FORMAT:	Dolby Digital® or MPEG-1 layer 2
OUTPUT BITRATE:	128, 192, 320, 384kbps

Specifications, price, and availability are subject to change without notice or obligation.

Module Specifications

SDE24A Item # 1002514A

Standard-Definition Dual Video Encoder

ANALOG INTERFACE

Composite Video Inputs:	2 composite inputs, one for each program/source
Component Video Input Level:	1 Volt p-p ± 3 dB
Audio Inputs, for 2 Programs::	RCA type for L + R audio channels, 2 sets
Audio Input Level:	1 Vrms audio gain:15 to 0 dB (user-adjustable)

MPEG ENCODER

ENCODE FORMAT - #1 INPUT:	MPEG-2 or MPEG-4 / H.264, selectable
ENCODE FORMAT - #2 INPUT:	MPEG-2 or MPEG-4 / H.264, selectable

Note: Each Encoder module has two sets of inputs marked 1 and 2. Number 1 input from all installed modules will appear as odd-numbered encoders in the MEQ1000B menu. Likewise, number 2 SDE24A inputs will correspond to even-numbered encoders in the MEQ1000B menu.

INPUT ENCODING BITRATE:	Constant Bitrate: 1 Mbps to 8 Mbps
ENCODING RESOLUTION:	720 X 480 (Standard Definition)
VIDEO ADJUSTMENTS:	Brightness, contrast, hue, and saturation

AUDIO ENCODER

SELECTABLE TYPES:	Dolby Digital® AC-3 or MPEG1, Layer 2
DOLBY DIGITAL® ENCODER:	Manufactured under license from Dolby Laboratories
OUTPUT BITRATE:	128, 192, 320, 384kbps

HDE24A Item # 1002515A

High-Definition Video Encoder

VIDEO INPUTS

HDMI™:	1x HDMI Input - to protect copyrighted content, this encoder does not support HDMI copy protection (HDCP)
Component Video:	1x HD Component (YCrCb) Video Input
Composite Video:	1x 1V p-p +/- 3 dB, 480i only
Closed Captioning Input:	1x 1V p-p +/- 3 dB, 480i Composite Video (used for Closed Captioning data extraction during HD encoding)

AUDIO INPUTS

RCA-TYPE L+R:	1x 1Vrms nominal, 3.5Vrms maximum
HDMI-EMBEDDED AUDIO:	Supports PCM (uncompressed) digital audio from HDMI

VIDEO OPTIONS

INPUT VIDEO MODES: (SUPPORTED)	480i (720x480 @ 30 fps) 480p (720x480 @ 60 fps) 720p @ 60Hz (1280x720 @ 60 fps) 1080i @ 30Hz (1920x1080 @ 30 fps) Supports auto-scan for input resolution
ENCODER FORMAT:	MPEG-2 or MPEG-4 / H.264, selectable Supports auto scan
VIDEO ADUSTMENTS:	Brightness, contrast, hue, and saturation
MPEG-4 PROFILE SUPPORT:	Simple, Advanced Simple, High
BITRATE:	Up to 19Mbps (depends on input format)

AUDIO OPTIONS

ENCODER FORMAT:	Dolby Digital® AC-3 or MPEG1, Layer 2
OUTPUT BITRATE:	128, 192, 320, 384kbps

SDM1000 Item # 1002576

Satellite Tuner and Demodulator Module - QPSK/8PSK

FREQUENCY RANGE:	950 MHz to 2150 MHz
INPUT IMPEDANCE:	75 Ohm, return loss = 10 dB
INPUT LEVEL RANGE:	-25 dBm to -65 dBm / transponder
MODE:	QPSK, 8PSK
FEC:	DVB-S2, DCII, advanced Turbo modes
SYMBOL RATE:	2 MS/s to 45 MS/s

NOTE: Firmware updates may be required for MEQ1000. MEQ1000s must be updated to V3.1 or later.

ASI II Item # 1002397

ASI Input Module w/ loop thru

ASI INPUT CLOCK:	270 MHz
ASI INPUT DATA RATE:	Maximum of 80 Mbps
ASI OUTPUT RATE:	Identical to the ASI Input Stream

Installation & Power-Up

Unpacking

You will find the following items in the box:

- MEQ1000B Multiplexing QAM Modulator Unit (QTY = 1)
- MEQ1000B Instruction Manual

Installation

The MEQ1000B is designed to be mounted in the close proximity to a 120 VAC – 60 HZ power plug.

> ⚠ **For safe and reliable operation, do not block airflow.**

Power-Up

Plug into the power plug (120 VAC – 60 HZ).

General Description & Features

The R.L. Drake model **MEQ1000B** is a commercial grade hybrid QAM modulator. The MEQ1000B features plug-in input modules that include an ATSC/QAM tuner, Satellite L-band tuner, GigE IP input, an ASI input, a SDI/HD-SDI input, HDMI (non-HDCP), Composite input, Component input, and analog NTSC inputs; thus the description 'hybrid' is used to describe it. A multiplexer is built in to combine the transport streams and input the filtered and groomed transport stream to the QAM modulator. This manual includes feature examples utilizing the Drake DTD1000A Digital Tuner and Demodulator Module, IPI1000 GigE IP module, SDM1000 Satellite Tuner and the ASII ASI-Input Module. Other available input modules include: SDE24A Dual SD MPEG Encoder, HDE24A High Definiton MPEG Encoder and SDI24A SDI/HD-SDI Input Encoder. In addition, the MEQ1000B also supports older versions of these modules.

The MEQ1000B has two input module slots and the outputs interface to the MEQ1000B multiplexer, internally where they are MPEG program filtered, multiplexed, and groomed. Programs among the total group from input Slot 1 and input Slot 2 may be selected or not selected by the operator to be sent to the QAM modulator. Each input must contain no more than 20 programs and a maximum of 20 programs per input may be selected. Also, the total bitrate of the selected programs must not exceed that of the output QAM channel capacity.

Some common applications include: Channel Drop/Add, cherry picking programs from ASI or IP inputs, digital channel processing, or local origination additions.

The MEQ1000B contains a high performance QAM modulator that can operate in most ITU-A or ITU-B modes up through 256QAM. The very low noise, high output, up- converter provides coverage from 54 MHz to 1002 MHz while maintaining exceptionally low phase noise and broadband noise. Output level can be selected at a value between + 46 dBmV and + 61 dBmV.

The MEQ1000B operates in a fixed output clock mode and processes null packets when required to maintain the set fixed clock rate. PCR correction is included.

Front and Rear Panel Operation
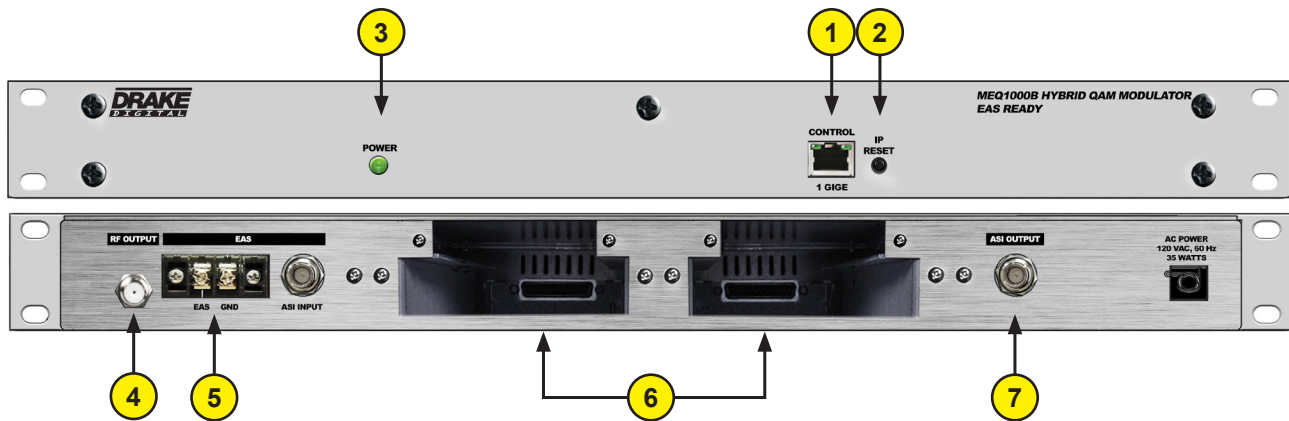
FRONT PANEL

1   **Ethernet Control:** GigE Ethernet wired connection for local and remote management

2   **IP Reset Button:** When pressed for >1 seconds, the IP address of the control port will enable to the default factory IP address (172.16.80.1, **Subnet Mask** 255.255.255.0) The login credentials will also be enabled to the default username **admin** and password **pass**.

> **Note:** The old IP address, login, and password will still be present in the encoder settings.

3   **Status LED:** The Status LED will blink continually after the IP Reset button has been held and the default IP/ credentials take effect.

> **Power:** The LED is illuminated when the power is ON.

REAR PANEL

4   **RF Output:** Single QAM channel output @ +61 dBmV maximum and adjustable from 54 to 1002 MHz

5   **EAS input:** Supplied via the ASI input and selected by contact closure of EAS terminal.

6   **Module Input Slot 1/2:** Input Slot 1 on the left and input Slot 2 to the right.

7   **ASI Output:** Matches RF QAM rate or in ASI only mode may be set from 2 to 100 Mbps

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Login Screen

To begin setup, connect the appropriate input and output video cables and plug in the MEQ1000B power cable.

ETHERNET ACCESS:

Local or remote communication with the unit is only possible through a GUI-based menu via any standard web browser Chrome or Firefox is recommended, for IE use IE11 minimum. Before you can communicate with the unit you must configure your computer's IP address to be on the same subnet as the MEQ1000B's default IP address. To do so, follow these steps:

Connect an Ethernet cable from your computer to the Control GigE port on the front panel of the MEQ1000B.

1. The following steps explain how to do this for a computer with **Windows XP** operating software:

    a) On your computer, open the "Control Panel"
    b) Double-click on "Network Connections"
    c) Right-click on the "Local Area Connection", and then click on the "properties".
    d) A dialog box entitled "Local Area Connection Properties" will appear. In this box, double-click on the "Internet Protocol (TCP/IP)".
    e) A dialog box entitled "Internet Protocol (TCP/IP) Properties" will appear. Select the "Use the following IP address" option and enter the following addresses:

        IP address: 172.16.80.2
        Subnet mask: 255.255.255.0
        No need to enter a value for the **Default Gateway** for local access.

    Click OK to close the dialog box. Now your computer is ready to communicate with the unit.

2. The following steps explain how to do this for a computer with **Windows 7** operating software:

    a) On your computer, open the "Control Panel"
    b) Click on "Network and Internet"
    c) Click on the "View network status and tasks"
    d) Click on "Change Adapter Settings" on left hand side of the window
    e) Right-click on the "Local Area Connection", and then click on the "Properties".
    f) A dialog box entitled "Local Area Connection Properties" will appear. In this box, double-click on the "Internet Protocol Version 4 (TCP/IPv4)".
    g) A dialog box entitled "Internet Protocol Version 4 (TCP/IPv4) Properties" will appear. Select the "Use the following IP address" option and enter the following addresses:
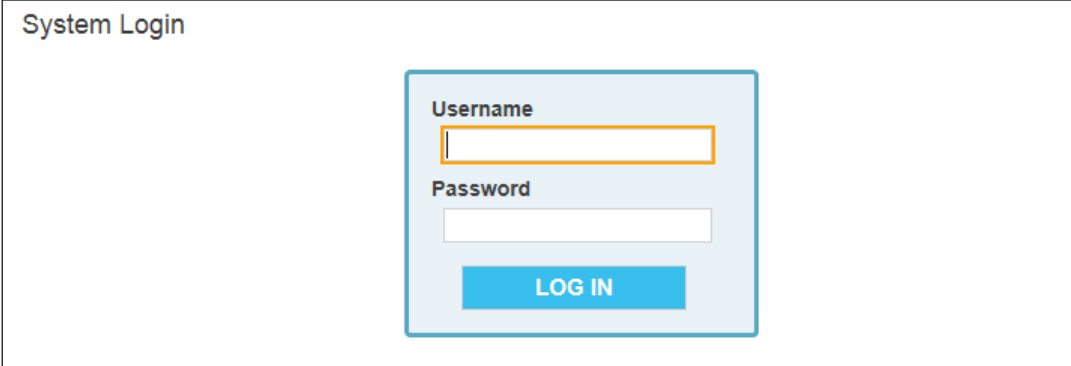
        IP address: 172.16.80.2
        Subnet mask: 255.255.255.0
        No need to enter a value for the **Default Gateway** for local access.

    Click OK.

Open a web browser on your computer and enter the following URL address (http://172.16.80.1). Once the MEQ1000B web server has been loaded from your browser, you should see the login dialog. Enter the username and password and click LOG IN. The default username is "**admin**" (in lower case letters) and the default password is "**pass**" (in lower case letters).

Status Tab

The status tab provides the following information (View only):

① **Version:** Indicates the software version of the unit

② **Uptime:** Indicates the uptime in which the unit has been operating.

Installed Modules

③ **Slot:** Two input bays per MEQ1000B.

④ **Type:** Indicates the type of input module, if any.

⑤ **Output Statistics:** Indicates the bitrate and buffer usage of the output.

⑥ **Log Messages:** Displays the 10 most recent log entries.

⑦ **Reference:** Link to MEQ1000B Product Information and RF Channel Lists.

Modules Tab

IPI10000 IP Input Module

Module Configuration

1 → Select Module [IPI1000 (Slot 1) ▼]

*When configuring multiple modules, please apply settings before selecting a different module.

2 → **Module Information**

Module Type	IPI1000
Firmware Version	1.0

IP Input

3 → Module IP Address	192.168.1.145
4 → IGMP Version	Automatic ▼
5 → Receive Protocol	Automatic ▼
6 → Receive IP Address	192.168.1.200
7 → Receive Port	1234
8 → Source IP Address 1	0.0.0.0
9 → Source IP Address 2	0.0.0.0

[Revert] [Apply]

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(1) Select Module: Indicates Input module installed in Slot 1 or Slot 2.

(2) Module Information: Indicates Module Type and Firmware Version of input module.

(3) Module IP Address: User selectable from 000.000.000.000 thru 255.255.255.255 with the exception of 224.000.000.000 thru 239.255.255.255 is not valid.

(4) IGMP Version: v2 or v3, or auto detects with the appropriate version. V3 will allow up to two specific sources, or allows ALL sources if no specific sources are specified.

(5) Receive Protocol: UDP or RTP, or auto detects the appropriate protocol.

(6) Receive IP Address: User selectable from 000.000.000.000 thru 255.255.255.255

(7) Receive Port: User selectable from 0 to 65535

(8) Source IP Address 1: Same range restriction as the Module IP Address. Only used when IGMP VERSION is set to V3 or AUTO. Not used when IGMP VERSION is set to V2.

(9) Source IP Address 2: Same range restriction as the Module IP Address. Only used when IGMP VERSION is set to V3 or AUTO. Not used when IGMP VERSION is set to V2.

Modules Tab

DTD1000A Demodulator Module

1. **Select Module:** Indicates module installed in Slot 1 or Slot 2.

2. **Module Information:** Indicates Module Type, Software Version, and Firmware Revision.

3. **Tuner Lock:** Lock or Unlocked.

4. **AGC Lock:** Lock or uUnlocked.

5. **Demodulator Lock:** Lock or Unlocked.

6. **SNR:** Indicates SNR of input signal.

7. **Signal Level:** Indicates signal level of input signal.

8. **Channel Plan:** Air/Broadcast, HRC, IRC or CATV

9. **Modulation:** VSB-8, QAM64 or QAM256

10. **Channel:** Input Channel

Modules Tab

SDI24A Encoder Module

1. **Select Module:** Indicates encoder module installed in Slot 1 or Slot 2.

2. **Module Information:** Indicates module type of encoder module.

3. **Video Lock:** Lock or Unlocked.

4. **Resolution:** 480i (720×480 @ 30 fps), 576i (720×576 @ 25 fps), 720p @ 60 Hz (1280×720 @ 60 fps), 1080i @ 30 Hz (1920×1080 @ 30 fps), 1080i @ 25 Hz (1920×1080 @ 25 fps) Supports auto-scan for input resolution

5. **Video Encoder Format:** MPEG-2 or MPEG-4 / H.264, selectable

6. **Video Bitrate:** Up to 19 Mbps (depending on input format)

Modules Tab

SDI24A Encoder Module (continued)

(7) **Audio Encoder Format:** Dolby Digital® or MPEG1, Layer 2

(8) **Audio Source:** Embedded or Analog

(9) **Audio Bitrate:** 128, 192, 320, 384 kbps

ASII ASI Input Module

(1) **Select Module:** Indicates input module installed in Slot 1 or Slot 2.

(2) **Module Information:** Indicates module type of input module.

(3) **ASI Input:** No configurable settings available for this module.

Modules Tab

SDE24A Encoder Module

MEQ1000B Control Panel

Logged in as: admin **LOG OUT**

| Status | Modules | Multiplex | Channels | Output | EAS/DTA | System | | Log | Firmware Update |

Module Configuration

1 → **Select Module** SDE24A Encoder 1 (Slot 2) ▾

*When configuring multiple modules, please apply settings before selecting a different module.

2 → **Encoder Information**

Module Type	SDE24A Encoder 1
Firmware Version	1.4

Video Settings

3 →	Video Source	Composite
4 →	Resolution	480x720 (NTSC) ▾
5 →	Video Encoder Format	MPEG-2 ▾
6 →	Video Bitrate (Mbps)	4.5 ▾

Picture Settings

7 →	Brightness	128 ▾
8 →	Contrast	192 ▾
9 →	Saturation	192 ▾
10 →	Hue	128 ▾

Audio Settings

11 →	Audio Encoder Format	AC3 ▾
12 →	Audio Bitrate	192 kbps ▾
13 →	Audio Input Limit (Vrms)	1 ▾
14 →	Audio Gain (dB)	0 ▾

Revert   Apply

Modules Tab

SDE24A Encoder Module

(1) **Select Module:** Indicates module installed in Slot 1 or Slot 2.

(2) **Encoder Information:** Indicates module type and firmware version of encoder module.

(3) **Video Source:** Composite video only.

(4) **Resolution:** 720x480 (NTSC) SD, some older set tops may prefer 480x480

(5) **Video Encoder Format:** MPEG-2 or MPEG-4 / H.264, selectable

(6) **Video Bitrate:** 1 Mbps to 8 Mbps

(7) **Brightness:** Sets the video brightness - larger values increase brightness (**Default: 128**)

(8) **Contrast:** Sets the video contrast - larger values increase contrast (**Default: 192**)

(9) **Saturation:** Sets the video contrast - larger values increase saturation (**Default: 192**)

(10) **Hue:** 0 to 255 (**Default: 128**)

(11) **Audio Encoder Format:** AC3 – Dolby Digital**®** Stereo or MPEG1, Layer 2 (MP2)

(12) **Audio Bitrate:** 128, 192, 320, 384 kbps

(13) **Audio Input Limit:** 1 Vrms or 2 Vrms, user-selectable

(14) **Gain:** User-adjustable audio gain ± 15 dB

Modules Tab

HDE24A Encoder Module

MEQ1000B Control Panel

Logged in as: admin LOG OUT

| Status | Modules | Multiplex | Channels | Output | EAS/DTA | System | | Log | Firmware Update |

Module Configuration

1 ➤ **Select Module** HDE24A Encoder (Slot 2) ▾

When configuring multiple modules, please apply settings before selecting a different module.

2 ➤ **Encoder Information**

Module Type	HDE24A Encoder
Firmware Version	1.0

Encoder Status

3 ➤ Video Lock   Unlocked
4 ➤ Audio Lock   Unlocked
5 ➤ Closed Caption Valid   Invalid

Video Settings

6 ➤ Resolution   720p @ 60 Hz ▾
7 ➤ Video Source   Component ▾
8 ➤ Video Encoder Format   MPEG-2 ▾
9 ➤ Video Bitrate (Mbps)   15.0 ▾

Picture Settings

10 ➤ Brightness   128 ▾
11 ➤ Contrast   128 ▾
12 ➤ Saturation   0 ▾
13 ➤ Hue   0 ▾

Audio Settings

14 ➤ Audio Encoder Format   AC3 ▾
15 ➤ Audio Source   RCA ▾
16 ➤ Audio Bitrate   320 kbps ▾
17 ➤ Audio Gain (dB)   15 ▾

Revert   Apply

Unit IP: 192.168.1.96

Modules Tab

HDE24A Encoder Module

(1) **Select Module:** Indicates Input module installed in Slot 1 or Slot 2.

(2) **Module Information:** Module type and firmware version of encoder module.

(3) **Video Lock:** Locked or Unlocked

(4) **Audio Lock:** Locked or Unlocked

(5) **Closed Caption Valid:** Valid or Invalid

(6) **Resolution:** 480i (720×480 @ 30 fps), 480p (720×480 @ 60 fps), 720p @ 60 Hz (1280×720 @ 60 fps), 1080i @ 30 Hz (1920×1080 @ 30 fps) Supports auto-scan for input resolution

(7) **Video Source:** HDMI (non HDCP), component or composite.

(8) **Video Encoder Format:** MPEG-2 or MPEG-4 / H.264, selectable

(9) **Video Bitrate:** Up to 19 Mbps (depending on input format)

(10) **Brightness:** Sets the video brightness - larger values increase brightness **(Default: 128)**

(11) **Contrast:** Sets the video contrast -larger values increase contrast **(Default: 128)**

(12) **Saturation:** Sets the video contrast - larger values increase saturation **(Default: 128)**

(13) **Hue:** Adjusts the video color hue - behavior varies by input mode (128 for Composite, 0 for other inputs)

(14) **Audio Encoder Format:** Dolby Digital® AC3 or MPEG1, Layer 2

(15) **Audio Source:** Analog or PCM (uncompressed) digital audio from HDMI

(16) **Audio Bitrate:** Variable; 128, 192, 320kbps

(17) **Audio Gain:** Varies audio level +/- 15dB (0, only avaliable when audio input is Analog)

Modules Tab

SDM1000 Satellite Demodulator Module

1 **Select Module:** Indicates demodulator module installed in Slot 1 or Slot 2.

2 **Module Information:** Indicates module type and firmware version of demodulator module.

3 **Demodulation Mode:** QPSK DVB SCAN, QPSK DVB 1/2, QPSK DVB 2/3, QPSK DVB 3/4, QPSK DVB 5/6, QPSK DVB 7/8, QPSK DTV SCAN, QPSK DTV 1/2, QPSK DTV 2/3, QPSK DTV 6/7, QPSK DCII SCAN, QPSK DCII 1/2, QPSK DCII 2/3, QPSK DCII 3/4, QPSK DCII 5/6, QPSK DCII 7/8, QPSK DCII 5/11, QPSK DCII 3/5, QPSK DCII 4/5, LDPC SCAN, LDPC QPSK 1/2, LDPC QPSK 3/5, LDPC QPSK 2/3, LDPC QPSK 3/4, LDPC QPSK 4/5, LDPC QPSK 5/6, LDPC QPSK 8/9, LDPC QPSK 9/10, LDPC 8PSK 3/5, LDPC 8PSK 2/3, LDPC 8PSK 3/4, LDPC 8PSK 5/6, LDPC 8PSK 8/9, LDPC 8PSK 9/10, TURBO SCAN, TURBO QPSK 1/2, TURBO QPSK 2/3, TURBO QPSK 3/4, TURBO QPSK 5/6, TURBO QPSK 7/8, TURBO 8PSK 2/3, TURBO 8PSK 3/4, TURBO 8PSK 4/5, TURBO 8PSK 5/6, TURBO 8PSK 8/9

4 **Frequency (MHz):** 250 to 2150

5 **Symbol Rate (M Sym/Sec):** 2-45

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Multiplex Tab

1 **Multiplex:** Enabled, Slot 1 only or Slot 2 only.

The following menu items are only available when multiplex is enabled.

2 **Slot 2 Offset:** Offsets Slot 2 MPEG channels # by multiples of 10 to avoid MPEG channel # conflicts. Set to zero if no conflicts are present.

3 **Program Numbers:** Select All or Select Individual.

4 **CA Filter:** Enabled or Disabled

5 **PSIP:** Disabled, Enabled or Basic MGT/VCT.

5a **Disabled** - the MEQ1000B does not process or output any MGT, VCT, or EIT tables. This can be a fine solution for cable systems that use set top boxes which operate from their own system channel map and have no need for these tables. MPEG program information is still processed. Some retail consumer QAM set tops operate perfectly in this mode and others may not.

5b **Enabled** - information from the MGT and VCT tables from both streams will be used to build a new table for the combined output signal. Both input streams must have these tables present in order for the unit to be able to perform this operation. EIT tables will be processed so as to provide program information, if present, for the next 12 hours. This selection is the only one that passes EIT table program information to the multiplexed output signal.

Multiplex Tab

(5c) **Basic MGT/VCT** - The MEQ1000B generates basic MGT/VCT tables based on infortation below.

(6) **VCT:** TVCT or CVCT

(7) **Major Channel:** Original Channel, Output Channel or User Defined.

(7a) **Original Channel** - the Major Channel from the source stream will be used.

(7b) **Output Channel** - the Major Channel will be the same as the RF output channel.

(7c) **User Defined** - the MPEG program number and the major and minor virtual channel numbers may be set to whatever number the operator chooses providing total flexibility. This is independent of the actual RF channel that the signal is distributed on. New MPEG program number and the major and minor virtual channel numbers are specified under the Channels tab.

(8) **Program Number Selection:** This is only accessible when **Program Numbers: Select Individual** is present.

Channels Tab

MEQ1000B Control Panel

Logged in as: admin **LOG OUT**

| Status | Modules | Multiplex | Channels | Output | EAS/DTA | System | | Log | Firmware Update |

MPEG and Virtual Channel Number Configuration

Channel Number Setup

*One-part program numbers can be selected using the checkboxes below. The New Major Channel Number field will be used as the One-Part Channel Number.

| Slot 1 | | | | | Slot 2 | | | | |
| MPEG Numbers | | Virtual Channel Numbers | | | MPEG Numbers | | Virtual Channel Numbers | | |
Original	New	One-Part	New Major	New Minor	Original	New	One-Part	New Major	New Minor
1	1	☐	4	1	1	2	☐	4	2
0	0	☐	0	0	2	3	☐	4	3
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0
0	0	☐	0	0	0	0	☐	0	0

MPEG Numbers

① Original: Original MPEG Number

② New: User Defined New MPEG Number

Virtual Channel Numbers

③ One-Part: One part VCN

④ New Major: User Defined Major Channel in VCT (Virtual Channel Table)

⑤ New Minor: User Defined Minor Channel in VCT (Virtual Channel Table)

Output Tab

1. **Output Mode:** Normal or ASI only.

2. **ASI Output Bitrate (Mbps):** Matches RF QAM rate or in ASI only mode may be set from 2 to 100 Mbps

   Note - ASI only mode disables the RF QAM output.

3. **RF Output Level (dBmV):** Adjustable from +46 to +61 dBmV.

4. **Output:** Normal, CW or Standby.

5. **Modulation:** 16A, 32A, 64A,128A, 256A, 64B or 256B

6. **Interleave Mode:** Sets the QAM modulator interleaver. Choose among the available selections based upon your system/set top box requirements. For typical 256B-QAM (Annex B). DigiCipher II CATV systems, I128, J1 or I128, J4 is the most commonly used interleave setting but many other choices are available. This menu does not appear in the adjust mode if the QAM mode is Annex A (DVB) as there is only one choice in the DVB standard. When not in adjust mode, this screen will display the setting in QAM-A modes as well.

7. **Symbol Rate (sym/s):** This menu allows selection of the output QAM baudrate or symbol rate. For Annex B (DigiCipher II) is 5360537 sym/s for 256B and 5056941sym/S for 64B.

8. **QAM Bitrate:** Determined by Modulation selection. For 256QAM Annex B the data rate is 38.811Mbps and for 64QAM Annex B it is and 26.970Mbps.

Output Tab

⑨ <u>**Channel Plan:**</u> CATV-STD, CATV-IRC, CATV-HRC or Broadcast

⑩ <u>**Channel:**</u> Selectable from 2 to 158.

⑪ <u>**Show Channel Lists:**</u> RF Channel Frequency Table

EAS/DTA Tab

① <u>**EAS/DTA Control:**</u> Disabled, Master (SCTE18), Slave or Demod in slot 1

    ①a **Disabled**

    ①b **Master (SCTE 18)** – SCTE18 tables will force tune SCTE18 compatible TV tuners to a designated EAS channel when EAS contact closure is made. This designated EAS channel can be internal (from an encoder in that MEQ1000B) or external.

EAS/DTA Tab

1c **Slave** – The EAS channel comes from a master unit encoder host and is input to the MEQ1000B via the EAS ASI input. The MEQ1000B will internally switch all output channels to the EAS channel when triggered by EAS contact closure.

1d **Demod in Slot 1** – The DTA information comes from a demodulator in slot 1.

DTA Control requires demodulator for DTA data in slot 1.

2 **DTA Control:** Disabled, SCTE 65, SCTE 18, or SCTE 65 and SCTE18

2a **Disabled**

2b **SCTE 65** - DTA Virtual Channel Tables are contained within SCTE-65 in-band SI data supplied from demod card slot 1.

2c **SCTE 18** - EAS Emergency Alert System Tables are contained within SCTE 18 in-band SI data from demod card in slot 1.

2d **SCTE 65 and SCTE 18** - tables contained within in-band SI data from demod card in slot 1

DTA Mode and EAS Mode applicable only when MEQ1000A is set as a slave to master encoder host.

3 **DTA Mode:** Disabled or Enabled

4 **EAS Mode:** SDE24EAS Encoder Card, SCTE 18 or both SDE24EAS encoder and SCTE18 tables.

Sections below only used when MEQ1000B is set for Master (SCTE18). The MEQ1000B generates the SCT18 EAS Emergency Alert System in-band SI data.

5 **SCTE 18 Channel Source:** Internal from the MEQ1000B or external from another designated channel on the system.

6 **SCTE 18 Channel Source Hidden:** When the SCTE 18 EAS is generated internally you can chose to hide the channel source, if desired.

7 **EAS RF Channel:** Specifies the EAS channel if EAS channel is external.

8 **EAS Modulation:** Specifies the EAS channel modulation if EAS channel is external.

9 **EAS MPEG Program:** Specifies EAS MPEG Program #.

10 **EAS Major Channel:** Specifies EAS Major Channel.

11 **EAS Minor Channel:** Specifies EAS Minor Channel.

System Configuration Tab

1. **IP Address:** IP address of control port, IP reset button returns unit to factory default of 172.16.80.1

2. **Subnet Mask:** 255.255.255.0 for local subnet

3. **Default Gateway:** Only needed for remote access and should be in the same subnet as IP Address
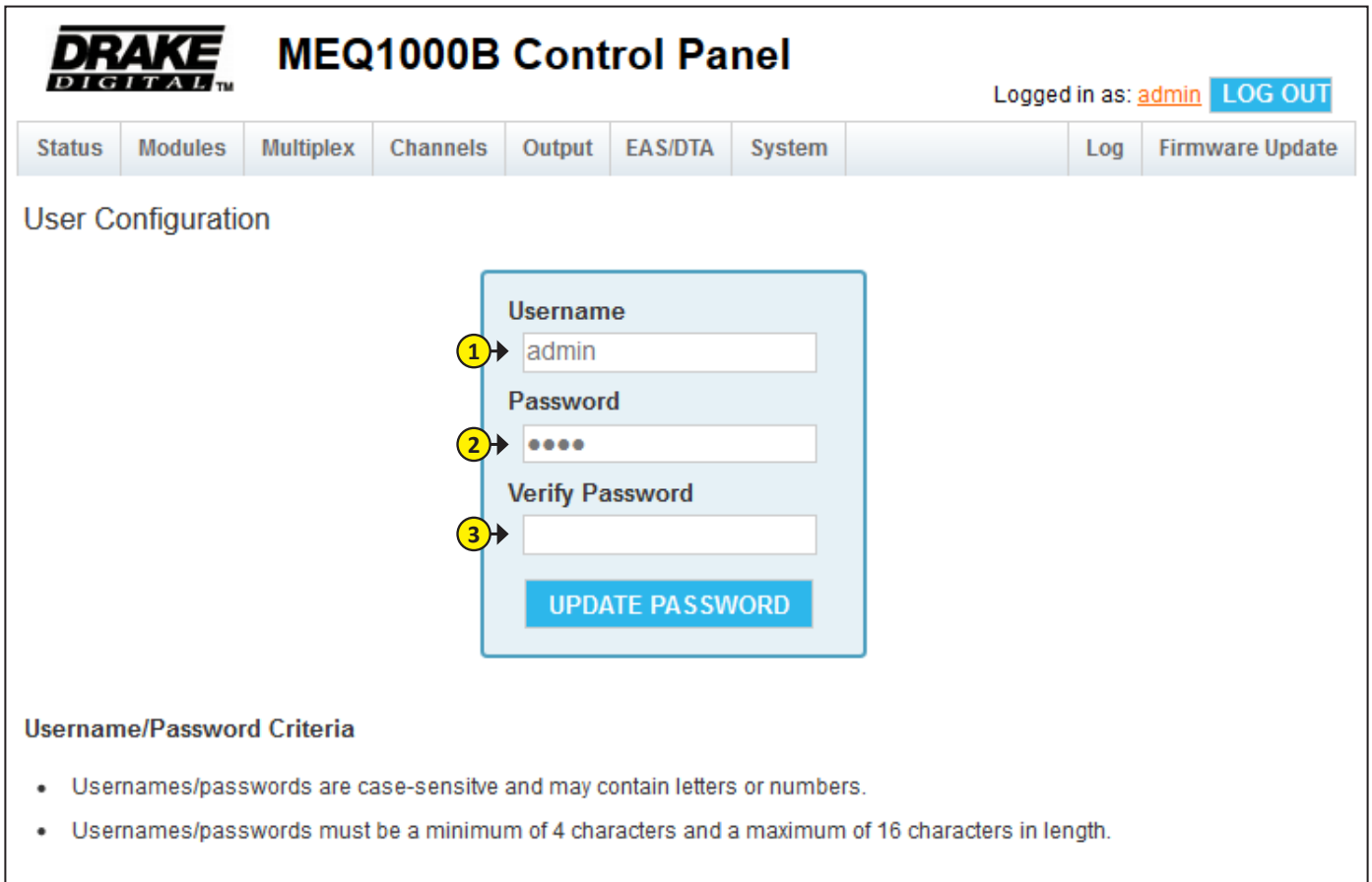
4. **Reboot:** Reboot the MEQ1000B

Log Tab

1. **Max Lines to Display:** Sets the maximum number of lines to display starting at the most recent.

Admin Screen

To change/modify the Username and Password values for the unit, you must be logged in to the unit as "Admin" to access a hidden screen shown in image below. At the top right of the screen select "Logged in as: admin".

1. **Username:** is the Administrator's login (16 characters maximum). This login allows the user to make changes to any area of the unit. The factory default Login is "**admin**". Login is case sensitive.

2. **Password:** is used only if the users wants to change the current Administrator's password (16 characters maximum). The factory default password is "**pass**". Password is case sensitive and will not be displayed.

3. **Verify Password:** is used only when the user is changing the current Administrator's password. The new password must be typed in again before it can be changed. Password is case sensitive and will not be displayed.

Firmware Update Tab

This tab uploads the newest available firmware for the MEQ1000B and deploys firmware to the unit. While the firmware update tab is actively updating; the logging information and instructions are provided. When the update is completed, a "Reboot" button will appear after the file uploads and update status gets reported. A user must refresh the page to get status updates. It is recommended to click the "Firmware Update" tab to force the refresh.

1. **Select Update File:** Select the appropriate firmware file from your computer. This file should have ".fw" or ".FW" for the file extension.

2. **Upload File:** Click the "Upload" button to transfer to the firmware update file to the MEQ1000B unit. Once the file has been uploaded, the unit will automatically update.

For more the latest firmware releases, please visit our website at www.rldrake.com. You may also contact Technical Assistance at 937-746-6990 or by email: servicehelp@rldrake.com.

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Service

A Return Material Authorization (RMA) Number is required on ALL PRODUCT RETURNS (regardless of whether the product is being returned for repair or for credit). Product that is received at the factory without an RMA Number will be returned to the sender, unopened.

RMA Numbers must be used when returning product for credit or repair. Use of RMA Numbers will ensure efficient processing. When needing to return your product to R.L. Drake Holdings, LLC., please follow these simple steps listed below (in the order that they appear).

SERVICE REPAIRS ONLY

1. Contact R.L. Drake Holdings, LLC.'s Service Department in one of three ways:
   Phone: 732-313-4256
   Email: drakerepair@rldrake.com
   Fax: 732-679-4022

2. Request from Drake Service a copy of the Product Return Authorization Form.

3. Complete the Product Return Authorization Form fully.

4. Return the completed Product Return Authorization Form to the Drake Service Department using one of the contact methods listed in Step 1.

5. After completing Steps 1 through 4, an RMA Number will be assigned to you.

6. Securely pack the product and mark the box with your RMA Number. If shipping multiple boxes, all boxes must be marked with the RMA Number. Place the RMA Number near the return address in **large, bold print** (approx. 2" in height).

CREDIT RETURNS ONLY

1. Contact R.L. Drake Holdings, LLC.'s Service Department in one of three ways:
   Phone: 937-746-6990
   Email: servicehelp@rldrake.com
   Fax: 937-806-1510

2. Request from Drake Service a copy of the Product Return Authorization Form.

3. Complete the Product Return Authorization Form fully.

4. Return the completed Product Return Authorization Form to the Drake Service Department using one of the contact methods listed in Step 1.

5. After completing Steps 1 through 4, an RMA Number will be assigned to you.

6. Securely pack the product in its **original undamaged box** (returning the product without its original packaging in good, new condition may cause the incursion of additional fees). Pack this box within another shipping container or box. Mark the shipping box or container with your RMA Number. Place the RMA Number near the return address in **large, bold print** (approx. 2" in height).

Ship your "SERVICE REPAIR ONLY" return to:

R.L. Drake Holdings, LLC.
Attn: Product Service Returns
One Jake Brown Road
Old Bridge, NJ 08857

Ship your "CREDIT RETURNS ONLY" return to:

R.L. Drake Holdings, LLC.
Attn: Product Credit Returns
One Jake Brown Road
Old Bridge, NJ 08857

*NOTE: All Credit Returns are subject to a 15% Restock Fee

*NOTE: All shipments are to be PRE-PAID by the sender. NO COD's will be accepted.

IF YOU NEED TECHNICAL HELP

Call our Customer Service/Technical Support line at +1 (937) 746-6990 weekdays between 8:00 A.M. and 4:00 P.M. Eastern Standard Time. Please have the unit's serial number available. We will also need to know the specifics of any other equipment connected to the unit. When calling, please have the unit up and running, near the phone if possible. Our technician(s) will likely ask certain questions to aid in diagnosis of the problem. Also, have a voltmeter handy, if at all possible.

DRAKE also provides technical assistance by

Email: servicehelp@rldrake.com
Fax: (937) 806-1510

Many of the products that are sent to us for repair are in perfect working order when we receive them. For these units, there is a standard checkout fee that will be charged. Please perform whatever steps are applicable from the product's Instruction Manual before calling or writing as this could save unnecessary phone charges. Please do not return the product without calling Drake Service and following the steps above first; it is preferred to help troubleshoot the problem over the phone (or by Email) first, saving you both time and money.

Limited Warranty

Seller will at its sole option, either repair or replace (with a new or factory reconditioned product, as Seller may determine) any product manufactured or sold (or in the case of software, licensed) by Seller which is defective in materials or workmanship or fails to meet the applicable specifications that are in effect on the date of shipment or such other specifications as may have been expressly agreed upon in writing: (i) for a period of three (3) years from the date of original purchase for all stock hardware products (other than those specifically referenced herein below having a shorter warranty period); (ii) for a period of one (1) year from the date of original purchase, with respect to all MegaPort™, IPTV products, test equipment and fiber optics receivers, transmitters, couplers and integrated receiver/distribution amplifiers; (iii) for a period of one (1) year from the date of original purchase (or such shorter period of time as may be set forth in the license agreement specific to the particular software being licensed from Seller) with respect to all software products licensed from Seller (other than Core Product Software) that is (a) developed for a specific function or application, (b) complimentary to and does not function without the Core Product Software, and (c) listed with a specific model number and stock number in Seller's Price List ("**Non-Core Software**"); (iv) for a period of ninety (90) days from the date of original purchase, with respect to non-serialized products and accessories, such as parts, sub-assemblies, splitters and all other products sold by Seller (other than Core Product Software and Refurbished/Closeout Products) not otherwise referred to in clauses (i) through (iii) above. The warranty period for computer programs in machine-readable form included in a hardware product, which are essential for the functionality thereof as specifically stated in the published product specifications ("**Core Product Software**") will be coincident with the warranty period of the applicable hardware product within which such Core Product Software is installed.

Software patches, bug fixes, updates or workarounds do not extend the original warranty period of any Core Product Software or Non-Core Software.

Notwithstanding anything herein to the contrary,

(i) Seller's sole obligation for software that when properly installed and used does not substantially conform to the published specifications in effect when the software is first shipped by Seller, is to use commercially reasonable efforts to correct any reproducible material non-conformity (as determined by Seller in its sole discretion) by providing the customer with: (a) telephone or e-mail access to report non-conformance so that Seller can verify reproducibility, (b) a software patch or bug fix, if available or a workaround to bypass the issue if available, and (c) where applicable, replacement or damaged or defective external media, such as CD-ROM disk, on which the software was originally delivered;

(ii) Seller does not warrant that the use of any software will be uninterrupted, error-free, free of security vulnerabilities or that the software will meet the customer's particular requirements; and the customer's sole and exclusive remedy for breach of this warranty is, at Seller's option, to receive (a) suitably modified software, or part thereof, or (b) comparable replacement software or part thereof;

(iii) Seller retains all right, title and interest in and to and ownership of all software (including all Core Product Software and Non-Core Software) including any and all enhancements, modifications and updates to the same; and

(iv) in some cases, the warranty on certain proprietary sub-assembly modules manufactured by third-party vendors and contained in Seller's products, third party software installed in certain of Seller's products, and on certain private–label products manufactured by third-parties for resale by Seller, will be of shorter duration or otherwise more limited than the standard Seller limited warranty. In such cases, Seller's warranty with respect to such third-party proprietary sub-assembly modules, third-party software and private-label products will be limited to the duration and other terms of such third-party vendor's warranty, if any. In addition, certain products, that are not manufactured by Seller, but are resold by Seller, may carry the original OEM warranty for such products, if any. The limited warranty set forth above does not apply to any product sold by Seller, which at the time of sale constituted a Refurbished/Closeout Product, the limited warranty for which is provided in the following paragraph.

Seller will at its sole option, either repair or replace (with a new or factory-reconditioned product, as Seller may determine) any product sold by Seller which at the time of sale constituted a refurbished or closeout item ("**Refurbished/Closeout Product**"), which is defective in materials or workmanship or fails to meet the applicable specifications that are in effect on the date of shipment of that product or fails to meet such other specifications as may have been expressly agreed upon in writing between the parties, for a period of ninety (90) days from the date of original purchase. Notwithstanding the foregoing, in some cases the warranty on certain proprietary sub-assembly modules manufactured by third-party vendors and contained in Seller products, third party software installed in certain of Seller's products, and on certain private–label products manufactured by third-parties for resale by Seller will be of shorter duration or otherwise more limited than Seller limited warranty for Refurbished/Closeout Products. In such cases, Seller's warranty for Refurbished/Closeout Products constituting such third party proprietary sub-assembly modules, third party software, and private-label products will be limited to the duration and other terms of such third-party vendor's warranty, if any. In addition, notwithstanding the foregoing, (i) certain Refurbished/Closeout Products that are not manufactured (but are resold) by Seller, may carry the original OEM warranty for such products, if any, which may be longer or shorter than Seller's limited warranty for Refurbished/Closeout Products. All sales of Refurbished/Closeout Products are final.

To obtain service under this warranty, the defective product, together with a copy of the sales receipt, serial number if applicable, or other satisfactory proof of purchase and a brief description of the defect, must be shipped freight prepaid to Seller at the following address: One Jake Brown Road, Old Bridge, New Jersey 08857.

This warranty does not cover failure of performance or damage resulting from (i) use or installation other than in strict accordance with manufacturer's written instructions, (ii) disassembly or repair by someone other than the manufacturer or a manufacturer-authorized repair center, (iii) misuse, misapplication or abuse, (iv) alteration, (v) exposure to unusual physical or electrical stress, abuse or accident or forces or exposure beyond normal use within specified operational or environmental parameters set forth in applicable product specifications, (vi) lack of reasonable care or (vii) wind, ice, snow, rain, lightning, or any other weather conditions or acts of God.

OTHER THAN THE WARRANTIES SET FORTH ABOVE, SELLER MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND, EXPRESS OR IMPLIED, AS TO THE CONDITION, DESCRIPTION, FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR AS TO ANY OTHER MATTER, AND SUCH WARRANTIES SET FORTH ABOVE SUPERSEDE ANY ORAL OR WRITTEN WARRANTIES OR REPRESENTATIONS MADE OR IMPLIED BY SELLER OR BY ANY OF SELLER'S EMPLOYEES OR REPRESENTATIVES, OR IN ANY OF SELLER'S BROCHURES MANUALS, CATALOGS, LITERATURE OR OTHER MATERIALS. IN ALL CASES, BUYER'S SOLE AND EXCLUSIVE REMEDY AND SELLER'S SOLE OBLIGATION FOR ANY BREACH OF THE WARRANTIES CONTAINED HEREIN SHALL BE LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT F.O.B. SHIPPING POINT, AS SELLER IN ITS SOLE DISCRETION SHALL DETERMINE. SELLER SHALL IN NO EVENT AND UNDER NO CIRCUMSTANCES BE LIABLE OR RESPONSIBLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, PUNITIVE, DIRECT OR SPECIAL DAMAGES BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT LIABILITY OR OTHERWISE OR ANY OTHER LEGAL THEORY, ARISING DIRECTLY OR INDIRECTLY FROM THE SALE, USE, INSTALLATION OR FAILURE OF ANY PRODUCT ACQUIRED BY BUYER FROM SELLER.

All claims for shortages, defects, and non-conforming goods must be made by the customer in writing within five (5) days of receipt of merchandise, which writing shall state with particularity all material facts concerning the claim then known to the customer. Upon any such claim, the customer shall hold the goods complained of intact and duly protected, for a period of up to sixty (60) days. Upon the request of Seller, the customer shall ship such allegedly non-conforming or defective goods, freight prepaid to Seller for examination by Seller's inspection department and verification of the defect. Seller, at its option, will either repair, replace or issue a credit for products determined to be defective. Seller's liability and responsibility for defective products is specifically limited to the defective item or to credit towards the original billing. All such replacements by Seller shall be made free of charge f.o.b. the delivery point called for in the original order. Products for which replacement has been made under the provisions of this clause shall become the property of Seller. Under no circumstances are products to be returned to Seller without Seller's prior written authorization. Seller reserves the right to scrap any unauthorized returns on a no-credit basis. Any actions for breach of a contract of sale between Seller and a customer must be commenced by the customer within thirteen (13) months after the cause of action has accrued. A copy of Seller's standard terms and conditions of sale, including the limited warranty, is available from Seller upon request. Copies of the limited warranties covering third-party proprietary sub-assembly modules and private-label products manufactured by third-parties may also be available from Seller on request. **(Rev 0713)**