DRAKE
DIGITAL ™

EH244 Encoder Host

INSTRUCTION MANUAL

Contents

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.
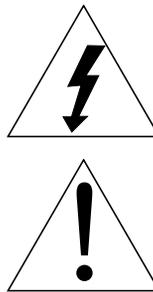
The lightning flash with arrow head symbol,
within an equilateral triangle, is intended to
alert the user to the presence of uninsulated
"dangerous voltage" within the product's
enclosure that may be of sufficient
magnitude to constitute a risk of electric
shock to persons.
The exclamation point within 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: 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
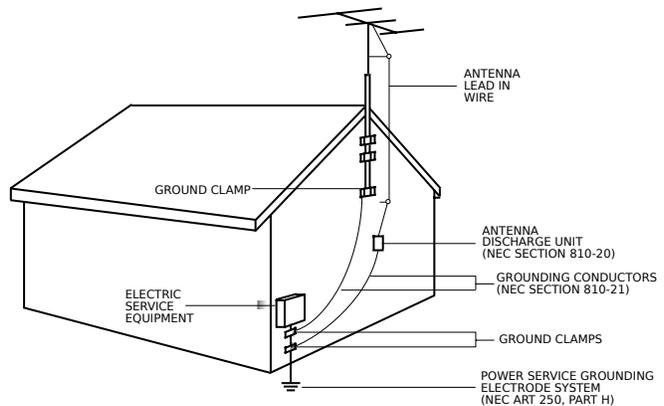AUCUNE PARTIE A DECOUVERT.

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 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.

13 **Mise à la terre ou Polarisation** Cet appareil est équipé avec un cordon d'alimentation à trois fils. Il est a brancher sur une prise ayant un connecteur a la terre. Assurez-vous que la connection a la terre ne manque pas.

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.

24 **Heat** The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

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

EH244 Specifications[1]

Multiplexer Specifications

Program Filtering and Grooming	Each encoder output can be disabled or output to any or all output channels
Multiplexer	All programs directed to each output are multiplexed into a correct multi-program transport stream
ASI Outputs	An optional ASI output board may be ordered that mirrors the 4 QAM channel output transport streams

PSIP Table Handling

PSIP Table Rewriting	Supported
MGT/VCT Table Generation	Supported
SCTE18 EAS Generation	Supported

Modulator Specifications

Modulation Modes:	64, 256QAM ITU j.83 Annex B
	16, 32, 64, 128, 256QAM ITU j.83 Annex A
Symbol Rates:	1-7Msps variable, with presets for Annex B
Frequency Coverage:	54-1002MHz, up to 4 frequency-adjacent channels
Channel Plans:	Standard CATV, HRC, IRC, Broadcast
Max Output Power:	+54dBmV
Min Output Power:	+42dBmV
Output Level Accuracy:	$\pm$2dB
Phase Noise:	< -108dBc$/$Hz@10kHz offset
Broadband Noise:	< -75dBc@12MHz offset in a 6MHz bandwidth
MER:	$>$44dB equalized
Channel Frequency Response:	$<$1dB
Carrier Suppression:	$>$80dB
I/Q Imbalance:	$<$1 degree
Spurious Emissions:	$<$-60dBc

Temperature Rating	0-50C ambient
Form Factor	2RU 19'' rack enclosure
Dimensions	14.25''D x 3.5''H x 19'' W
Weight	9.5 lbs
Power Requirements	90-260VAC 65W maximum

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[1]Specifications subject to change without notice or obligation.

General Description

The R. L. Drake model EH244 encoder host is a platform for supporting modular MPEG2 and H.264 video encoders, including the SDE24, HDE24, and SDI24. The encoder host multiplexes the encoder outputs into up to 4 output channels, configurable via a front panel interface or ethernet web server. The encoder includes provisions for emergency alert services, using either video replacement or SCTE18 control messages.

The EH244 accepts up to 6 encoder modules, and allows each encoder's output program to be assigned to any or all 4 output program streams. The EH244 can output on up to 4 frequency-adjacent QAM channels using an internal QAM modulator, and supports optional ASI outputs that mirror the QAM program streams.

Installation and Mounting

Slot Numbers: 1   2   3   4   5   6
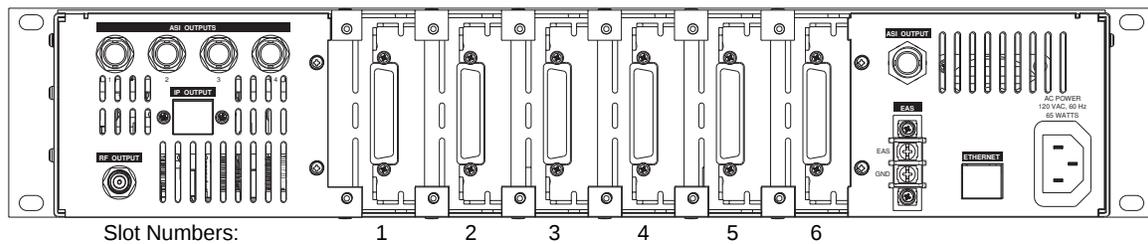
The EH244 is designed to be installed in a standard 19" rack. All encoder and interface modules must be installed in the EH244 chassis before power is applied. **DO NOT INSERT ENCODER MODULES WHILE THE UNIT IS POWERED. Doing so will void the EH244 and encoder warranties.**

The input modules on the rear of the chassis are numbered 1-6, from left to right, if you look at the rear of the unit. Each encoder's program number will be assigned based on its slot location (slot 1 will provide programs 1 and 2; slot 2 will provide programs 3 and 4; etc). HDE24 and SDI24 encoders only provide odd-numbered programs, as each of these encoders is a single-input encoder.

If the EH244 will be used in an EAS-enabled system, and the unit will be used as the master EAS unit in `Slot 6` or `Slot 6 + SCTE 18` modes, a Drake model SDE24EAS input module must be installed in slot 6 of the chassis. If the EH244 is configured for slave EAS modes `Slot 6` or `Slot 6 + SCTE 18`, a Drake model ASII module must be installed in slot 6, and wired to the `ASI Output` port of the previous EH24/EH244 in the chain.

If the EH244 will be used as a master in a DTA-enabled system, a Drake model ASII input module must be installed in slot 6 (or slot 5, if the unit is an EAS master using the `Slot 6` or `Slot 6 + SCTE 18` EAS modes). This ASII must be connected to the output of a PC that is generating the DTA control messages, created by the R. L. Drake DTA Control software. If the EH244 will be used as a slave in a DTA-enabled system, a Drake model ASII input module must be installed in slot 6, and connected to the previous EH24/EH244 ASI Output. For slave systems using both DTA- and EAS-modes, a single ASII input module will perform both functions.

Connect the AC line cord to an appropriate 120-240V, 50/60Hz AC power source. The EH244 will always be powered and running as long as it is connected to its power source.

Connect the RF output to a 75-ohm cable system. Optionally, connect the EAS terminals to the output of an EAS receiver to enable emergency alerts. Connect the ethernet control interface port to a secured network or VPN for remote system configuration.

Configuration

The EH244 is configured by either the front-panel interface or the ethernet-connected web server interface. When the unit is first installed, the front-panel should be used to configure the unit's IP settings before using the ethernet controls; most configuration of the unit may be performed from the front panel if the operator chooses to do so.

Front Panel Configuration

The front panel can display several useful status messages that can be selected by using the buttons to the right of the LCD. When pressing the button above the ENTER button, the LCD display will cycle between: the currently-installed firmware version; the IP address currently assigned to the ethernet control interface; and the MAC address of the ethernet control interface. When pressing the button below the ENTER button, the LCD display will cycle between the output channel bit-rates of the 4 outputs.

To use the front panel to change settings, press one of the two buttons labeled ENCODER SELECT until the LCD display says EH244, and then hold in the center button labeled ENTER for about two seconds (until the LCD display begins to blink). At this point, you are in configuration mode, and you can use the two buttons on either side of the ENTER button to switch between settings on the unit; pressing the buttons above or below the ENTER button will cycle through the valid values for the setting currently displayed on the LCD. When all configuration is complete, pressing the ENTER button again will save all settings and return the front panel to its normal mode.

The following settings are available from the front panel:

· **USER NAME:** Variable – this sets the username for the ethernet control interface authorization; this field is case-sensitive

· **PASSWORD:** Variable – this sets the password for the ethernet control interface authorization; this field is case-sensitive

· **HOST NAME:** Variable – this sets the display hostname for the ethernet control interface

· **DHCP:** ENABLED, DISABLED – this configures the ethernet control interface to use DHCP for its IP configuration settings when enabled, or to use the static IP configuration that follows when disabled

· **IP ADDRESS:** Variable – this sets the ethernet control interface's static IP address when DHCP is disabled

· **SUBNET MASK:** Variable – this sets the eth-

ernet control interface's IP subnet netmask when DHCP is disabled

· **GATEWAY ADDRESS:** Variable – this sets the default gateway for the ethernet control interface when DHCP is disabled

· **DTA/EAS CONTROL:** DISABLED, MASTER, SLAVE – this sets the unit's EAS and DTA control mode. When Master, the unit is the first in the daisy chain of Drake devices; when slave, the unit is not the first in the daisy chain

· **DTA MODE:** DISABLED, ENABLED – this enables the DTA control feature of the unit (which allows SCTE65 control messages to be passed out to low-cost DTA settop boxes for channel lineup and firmware update purposes)

· **EAS MODE:** DISABLED, MODULE 6, SCTE 18, MODULE 6+SCTE 18 – this sets the EAS mode in use. MODULE 6 replaces all video and audio streams with the input from the EAS encoder when an EAS alert is active. SCTE 18 sends the SCTE 18 EAS control messages when an EAS alert is active. MODULE 6+SCTE 18 performs both actions when an EAS alert is active

· **EAS RF CHANNEL:** Channel number – this configures the SCTE 18 force-tuning RF channel number that every receiver should tune to during an EAS alert

· **EAS MODULATION:** QAM-64B, QAM-256B – this configures the SCTE 18 force-tuning channel modulation method that every receiver should tune to during an EAS alert

· **EAS MPEG PROG #:** Program number – this configures the SCTE 18 force-tuning MPEG program number that every receiver should tune to during an EAS alert

· **EAS MAJOR CHAN:** Major number – this sets the PSIP major channel number of the SCTE 18 force-tuning channel

· **EAS MINOR CHAN:** Minor number – this sets the PSIP minor channel number of the SCTE 18 force-tuning channel

· **PACKET DELAY:** 0-200 usec – this sets the delay interval between encoder output packets, in microseconds. This setting may be used to enable older settop boxes with small decoder buffers to work with the SDE24 encoder's output stream. If needed, a setting around 70-100usec works well, but this setting must be tweaked for each encoder based on the deployed settop boxes

· **OUTPUTx BITRATE:** Variable – when a specific output is not being used for generating a QAM channel, the output bitrate may be varied to allow for more

flexible deployments. This allows the optional ASI outputs to run at higher than the standard QAM data rates (or lower, if they will be used in conjunction with an external lower-bitrate modulator)

· **ENCODER x:** `OUTPUT - x` – this setting allows each encoder's output program to be assigned to any or all of the output channels, by cycling through all of the options

· **MGT/VCT:** `DISABLED, CVCT, TVCT` – this sets the MGT/VCT table style to the cable (CVCT) or broadcast (TVCT) standard as needed by the deployment

· **VIRTUAL+MPEG #s:** `DEFAULT, USER DEFINED` – this setting allows the operator to override the default virtual channel numbers (which default to `RF_channel_number - encoder_index_number`). The user-defined settings must be set from the ethernet control interface

· **QAM OUTPUT x:** `ENABLED, DISABLED` – this allows each individual QAM channel to be disabled individually

· **QAM MODE:** `QAM-256B, QAM-64B, QAM-256A, QAM-128A, QAM-64A, QAM-32A, QAM-16A` – this sets the output modulation type for all 4 QAM channels

· **QAM SYMRATE:** `DEFAULT, variable` – this sets the symbol rate for all 4 QAM modulators. The `DEFAULT` choice only exists for QAM-256B and QAM-64B, for which default symbol rates exist

· **INTERLEAVER:** `Variable` – this sets the interleaver configuration when the unit is in QAM-256B or QAM-64B modes

· **OUTPUT FORMAT:** `NORMAL, STANDBY, CW` – this sets the modulator format (CW for adjusting system carrier levels, STANDBY to turn off all 4 modulators)

· **OUTPUT CHANMAP:** `CATV, BROADCAST, HRC, IRC` – this sets the RF channel number mapping style

· **OUTPUT CHANNELS:** `Variable` – this selects the 4 frequency-adjacent RF channels that the QAM modulator will use for QAM outputs 1-4

· **RF OUT:** `42-54dBmV` – this sets the output level of all 4 QAM outputs

Ethernet Control Interface Configuration

There are two options for the ethernet control interface setup. If your ethernet network has a DHCP server available, and you would like to use that to configure the IP address of your EH244, you may enable DHCP on the EH244. When the unit's front panel has exited from configuration mode, you can press the button above ENTER twice to view the IP address that was discovered by DHCP.

If your network does not have a DHCP server, or you choose not to use DHCP for configuration (this is the recommended configuration, to avoid your EH244's IP address changing in the future), you must obtain an IP address, subnet mask, and default gateway from your network administrator. Once you have determined the correct values for your particular network, set these values from the front panel.

Once the unit has an assigned IP address, you can view and change its settings from a web browser. For instance, if the unit's IP address were `10.0.0.1`, you would load `http://10.0.0.1` in your web browser to view and configure your EH244. The username and password required to log into the unit are both set from the front panel.

Once the EH244 web server has been loaded from your browser, you should see the login dialog (see Fig. 1). Enter the username and password (configurable via the front panel interface) and click `LOG IN`.

Figure 1: EH244 Login Dialog

Once you are logged in to the EH244, you will be presented with the status page (see Figure 2). Along the top edge of the page, there are five tabs listed; each tab allows you to view and configure different parts of the encoder host. The `Status` tab gives the overall status of the whole unit, including firmware versions, output bit-rates for all 4 outputs, output buffer usage, and links to the relevant encoder manuals.
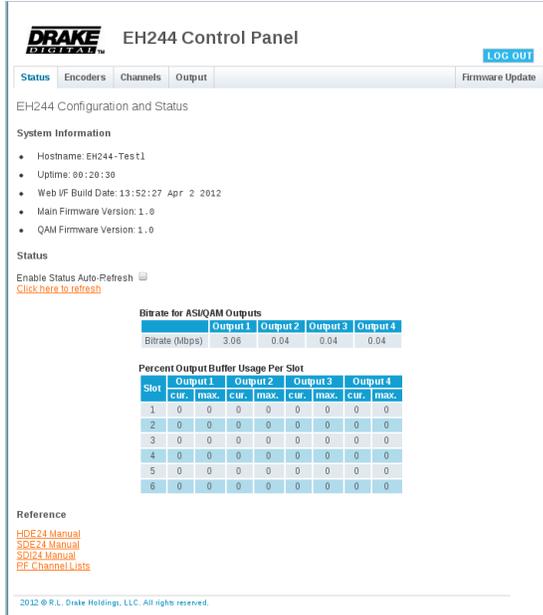
Figure 2: EH244 Status Tab

The Encoders tab allows you to set each encoder's individual parameters. Select an encoder module from the drop-down menu, and the appropriate setting selections will be displayed.

The Channels tab provides an interface to configure the virtual channel mappings for this encoder host. If PSIP is enabled, this page will display a screen that looks like Figure 3; for each encoder output, the MPEG program number can be modified, along with the Major and Minor channel numbers. If one-part virtual channel numbers are desired, the PSIP Mode must be set to CVCT and the Minor number for each channel should be set to 0.
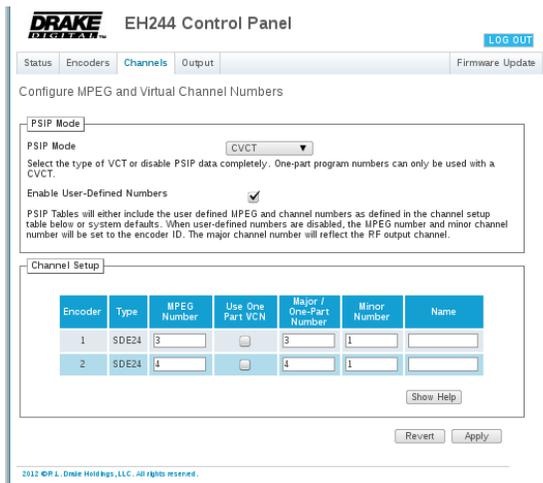

Figure 3: EH244 Channels Tab

The Output tab provides an interface to set all modulator output settings for the unit. A screenshot of this tab is shown in Figure 4. This tab selects the DTA and EAS modes, channel bitrates, QAM settings, and the mapping from encoders to output channels. For settings like the DTA/EAS options, more options appear as you enable the sub-systems.
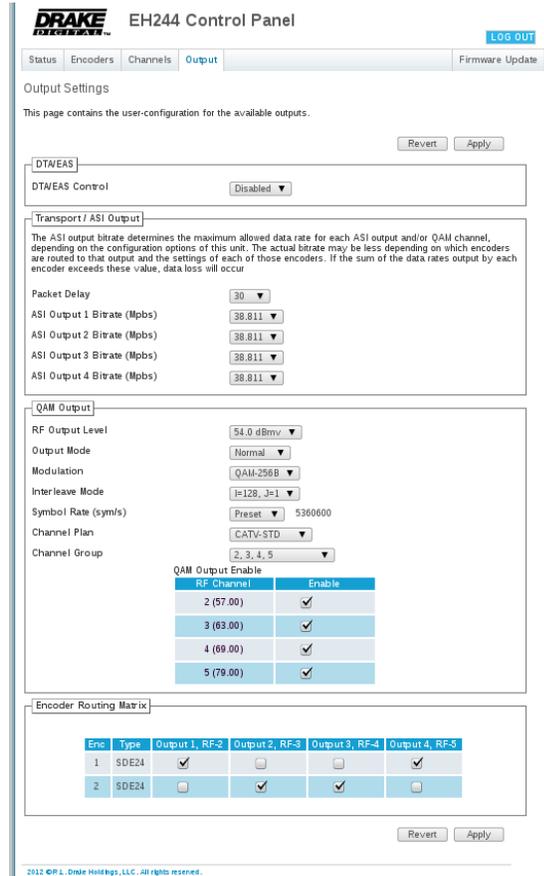

Figure 4: EH244 Output Tab

The Firmware Update tab allows you to update all of the firmware on the unit with a single upload (see Figure 5). Once you have received a new firmware image for the unit, click on the Choose File button and select the provided firmware; click Upload to initiate the update. After a few minutes, the unit will restart with the new firmware. If a power loss occurs during update, the unit will recover automatically – if the firmware upload was not completed, it may be necessary to re-initiate the update process once power is restored.
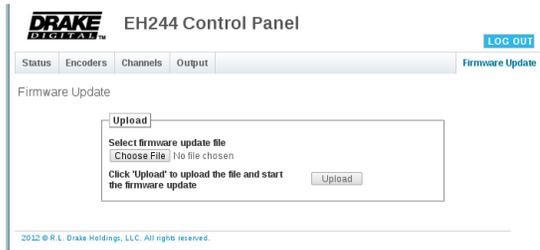
Figure 5: EH244 Firmware Update Tab

Important Notes
EAS Notes

When the EH244 is running in an EAS mode, the emergency alert state is entered when the two terminals on the rear panel labeled EAS are connected together via an external contact closure. EAS receivers should provide this contact closure output, which will be wired to the terminal block on the rear of the EH244.

If the EH244 is using the `Slot 6` or `Slot 6 + SCTE 18` EAS modes, ensure that the bit rates of the SDE24EAS encoder's two output channels are at *least* as low as all of the other encoders in the entire system. This guarantees that, during an EAS event, the output bit-rates of the system are not exceeded by the replacement video channels.

Three Year Limited Warranty

R.L. DRAKE HOLDINGS LLC warrants to the original purchaser this product shall be free from defects in material or workmanship for three (3) years from the date of original purchase.

During the warranty period R.L. DRAKE HOLDINGS LLC or an authorized Drake service facility will provide, free of charge, both parts and labor necessary to correct defects in material and workmanship. At its option, R.L. DRAKE HOLDINGS LLC may replace a defective unit.

To obtain such a warranty service, the original purchaser must:

1. Retain invoice or original proof of purchase to establish the start of the warranty period.

2. Notify R.L. DRAKE HOLDINGS LLC or the nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
   a) the model and serial number,
   b) the identity of the seller and the approximate date of purchase; and
   c) A detailed description of the problem, including details on the electrical connection to associated equipment and the list of such equipment.

3. Deliver the product to R.L. DRAKE HOLDINGS LLC or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair, and use are important to obtain proper performance from this product. Therefore carefully read the Instruction Manual. This warranty does not apply to any defect that R.L. DRAKE HOLDINGS LLC determines is due to:

1. Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.

2. Misuse, abuse, neglect or improper installation.

3. Accidental or intentional damage.

All implied warranties, if any, including warranties of merchantability and fitness for a particular purpose, terminate three (3) years from the date of the original purchase.

The foregoing constitutes R.L. DRAKE HOLDINGS LLC'S entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusions or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty shall be construed under the laws of Ohio.

For Service, contact:

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Telefax: +1 (937) 806-1576
Web Site: http://www.rldrake.com

DRAKE ®

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World Wide Web Site: http://www.rldrake.com