



INSTRUCTION MANUAL

Model LEI-564

Serial Digital Interface (SDI) Active Format Description (AFD) Insert, Delete, and Monitor

For firmware version 1B

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Important Safeguards and Notices

Information on the following pages provides important safety guidelines for both Operator and Service personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear here. Please read and follow the important safety information, noting especially those instructions related to risk of fire, electric shock or injury to persons.

WARNING



Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Symbols and Their Meaning in This Manual



READ THIS MANUAL: To gain knowledge of the Link product, user must read and understand the operator's manual before using this product. There are features known to the user, only if the manual is read.



The lightning flash with arrowhead symbol, within an equilateral triangle, alerts the user to the presence of "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 alerts the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



This symbol represents a protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.



The fuse symbol indicates that the fuse referenced in text must be replaced with one having the ratings indicated.

Important Warnings and Cautions

Warnings:

Always use good engineering practice. It is highly recommended to mount this equipment in a well ventilated equipment rack. It is also recommended to use a blank one RU spacer between mounting frames.

- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water.
- Disconnect ac power before installing any options.
- This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting the product inputs or outputs.
- Route power cords and other cables so that they are not likely to be damaged.
- Disconnect power before cleaning. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.
- Do not wear hand jewelry or watches when troubleshooting high current circuits, such as the power supplies.
- During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.
- To avoid fire hazard, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacements to qualified service personnel.
- To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.
- Have qualified personnel perform safety checks after any completed service.
- If equipped with redundant power, this unit has two power cords. To reduce the risk of electrical shock, disconnect both power supply cords before servicing.
- This equipment may employ laser(s). If it does, they comply with the current construction requirements of the code of Federal regulations, title 21, chapter I, subchapter J, sections 1010.2 and 1010.3 and sections 1040.10 and 1040.11.
- Do not attempt to view light output of the laser transmitter, eye damage may result. Always use an optical power meter to verify laser output.

To prevent injury:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch un-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Cautions:

- When installing this equipment, do not attach power cord to building surfaces.
- To prevent damage to equipment when replacing fuses, locate and correct the trouble that caused the fuse to blow before applying power.
- Verify that all power supply lights are off before removing power supply or servicing equipment.
- Use only specified replacement parts and follow static precautions at all times when handling this equipment.
- Leave the back of the frame clear for air exhaust cooling and to allow room for cabling. Slots and openings in the cabinet are provided for ventilation. Do not block them.
- Front door is part of fire enclosure and should be kept closed during normal operation.
- This product should be powered on as described in the manual. To prevent equipment damage select the proper line voltage at the ac input connector as described in the installation documentation.
- To prevent damage to this equipment read the instructions in this document for proper input voltage range selection.
- To reduce the risk of electric shock, ensure that the two power supply cords are each plugged into a separate branch circuit.
- Circuit boards in this product are densely populated with surface mount and ASIC components. Special tools and techniques are required to safely and effectively troubleshoot and repair modules that use SMT or ASIC components. For this reason, service and repair of Link products incorporating surface mount technology are supported only on a module exchange basis. Customers should not attempt to troubleshoot or repair modules that contain SMT components. Link assumes no liability for damage caused by unauthorized repairs. This applies to both in- and out-of-warranty products.

North American Power Supply Cords

This equipment is supplied with molded grounding plug (NEMA 5-15P) at one end and molded grounding connector (IEC 320-C13) at the other end. Conductors are CEE color coded, light blue (neutral), brown (line) and green/yellow (ground).

Operation of this equipment at voltages exceeding 130 VAC will require power supply cords which comply with NEMA configurations.

International Power Supply Cord

This equipment is supplied with molded grounding connector (IEC 320-C13) at one end and stripped connectors (50/5 mm) at the other end. Connectors are CEE color coded, light blue (neutral), brown (line) and green/yellow (ground).

Other IEC 320-C13 type power supply cords can be used if they comply with the safety regulations of the country in which they are installed.

Notes:

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference, in which case the user will be required to correct the interference at his own expense.

General Description

FEATURES

- ◆ AFD Insertion
- ◆ AFD Deletion
- ◆ AFD Monitor (pass thru)
- ◆ Auto Insert (only if AFD is not there)
- ◆ Selectable 352M (VPID) insertion
- ◆ User Programmable Settings
- ◆ SD/HD/3G SDI I/O

The LEI-564 is a product for inserting Active Format Description (AFD) data into an SD/HD/3G, multi-definition (MD), SDI video signal. The LEI-564 automatically detects whether the input is SD-SDI, HD-SDI, or 3G-SDI and transmits a re-clocked signal out through two SDI outputs.

AFD is a system of codes used to tell DTV receivers, up/down converters, and other professional video equipment, how the video signal is to be displayed, especially if the aspect ratio has changed. AFD in video production is a versatile tool that eases workflow and preserves image quality. Properly managing AFD information is in demand for state-of-the-art digital work-flows. As video productions migrate to storing all their material in HD only and converting to SD as necessary for final transmission, the LEI-564 offers a simple and reliable solution for adding in AFD for the implementation of the up/down conversion process.

The video signal format can be a 270 Mb/s SD, 1.5Gb/s HD, or 3Gb/s HD video stream. There is automatic detection of most MD 4:2:2 video standards. The signal presence and format are indicated on the display. The AFD data is inserted as vertical ancillary data on video lines 8-21, selected by the user. The unit is controlled by an 8 character display, with menu navigation by 2 buttons and a rotary encoder.

The 4 modes of operation include; 'Detect', 'Insert', 'Delete' and 'Auto'. 'Auto' is used for inserting AFD, only if there is no AFD detected. 'Detect' mode will display the AFD already in the stream. Settings are saved in flash for easy configuration. The unit also has an option to regenerate the video payload identifier (VPID) SMPTE 352M for all outputs.

The LEI-564 is a one RU chassis that is housed in the same case as the well accepted 700 series. A black front panel distinguishes between the two series. Three 500 or 700 series can be mounted in the PRT-700 rack tray.

Specifications

SERIAL DIGITAL INTERFACE INPUT:

Format: 270 Mb/s, 1.48Gb/s, 3Gb/s future
SMPTE Standards: 259 M, 292 M, and 424 M future
Connectors: BNC
Impedance: 75Ω
DC Offset: 0.5V maxim
Signal Level: 800mv ±10%

SERIAL DIGITAL INTERFACE OUTPUT:

Format: Follows Input
Connector 2 BNCs
Impedance: 75Ω
Signal Level: 800mVp-p ±10%
DC Offset: ±100mV
Jitter Improvement: ≈ 5%
SD @ 270 Mb/s: 25ps pp, Typical
HD @ 1.48 Gb/s: 15ps pp, Typical

FRONT CONTROLS & INDICATORS:

Enter: Momentary Switch with LED
Escape: Momentary Switch with LED
Menu Options: Eight Character LED Display
Menu Select: Optical Rotary Encoder

ENVIRONMENTAL:

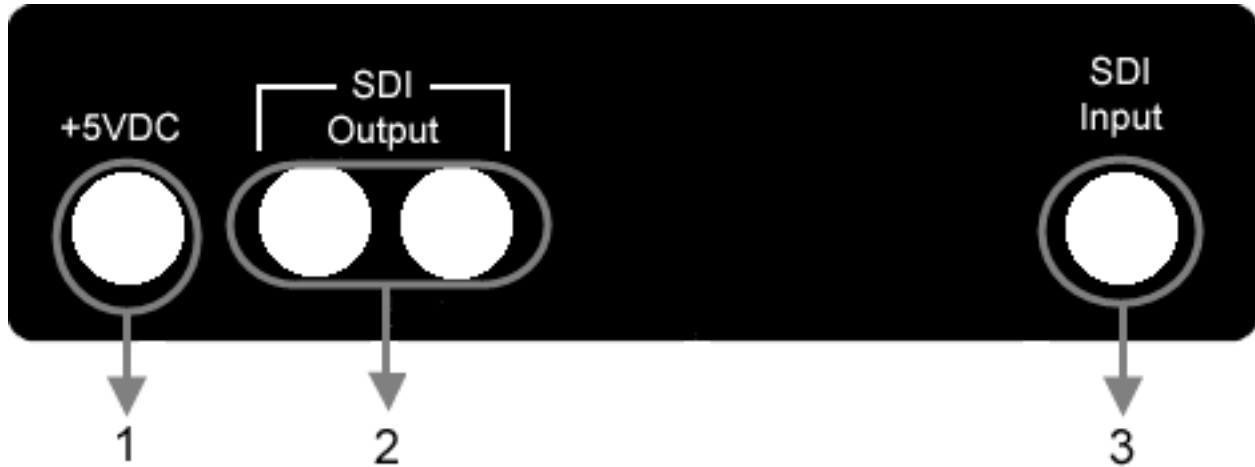
Temperature: 0° to 50°C Ambient
Humidity: 0% to 90% non-condensing
Power: 5 Watts
Voltage: 5VDC
Adapter Voltage: 100-240VAC 50-60Hz

MECHANICAL:

Height: 1.0 Inch.
Width: 5.5 Inch.
Length: 9.25 Inch.
Weight: 1.5 Lbs.

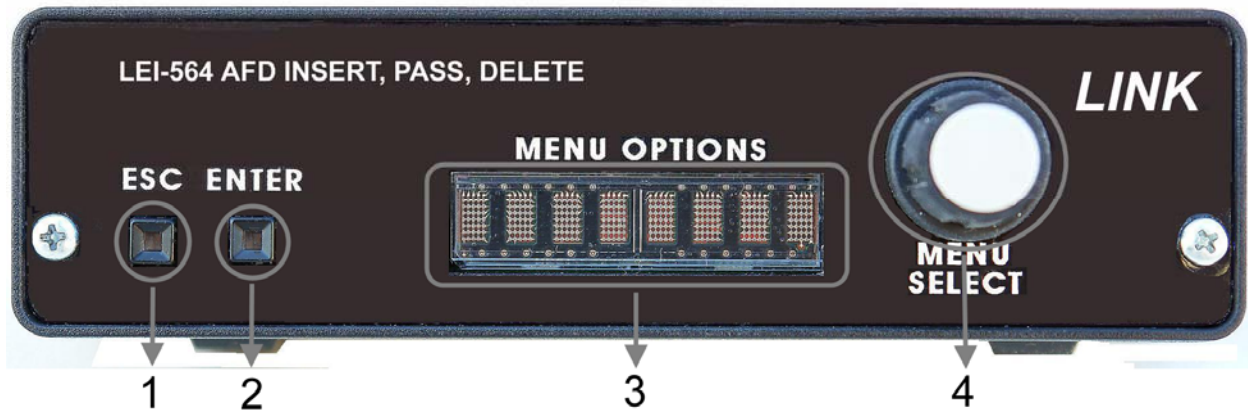
- Specifications and designs are subject to change at any time without notice.

Rear Panel Connections



1. 5 V DC input, only use the recommended supplies for this unit.
2. SDI outputs. Both of these outputs will have the same format as the input and the same AFD information on them.
3. SDI input. The unit will automatically detect SD, HD, or 3G input.

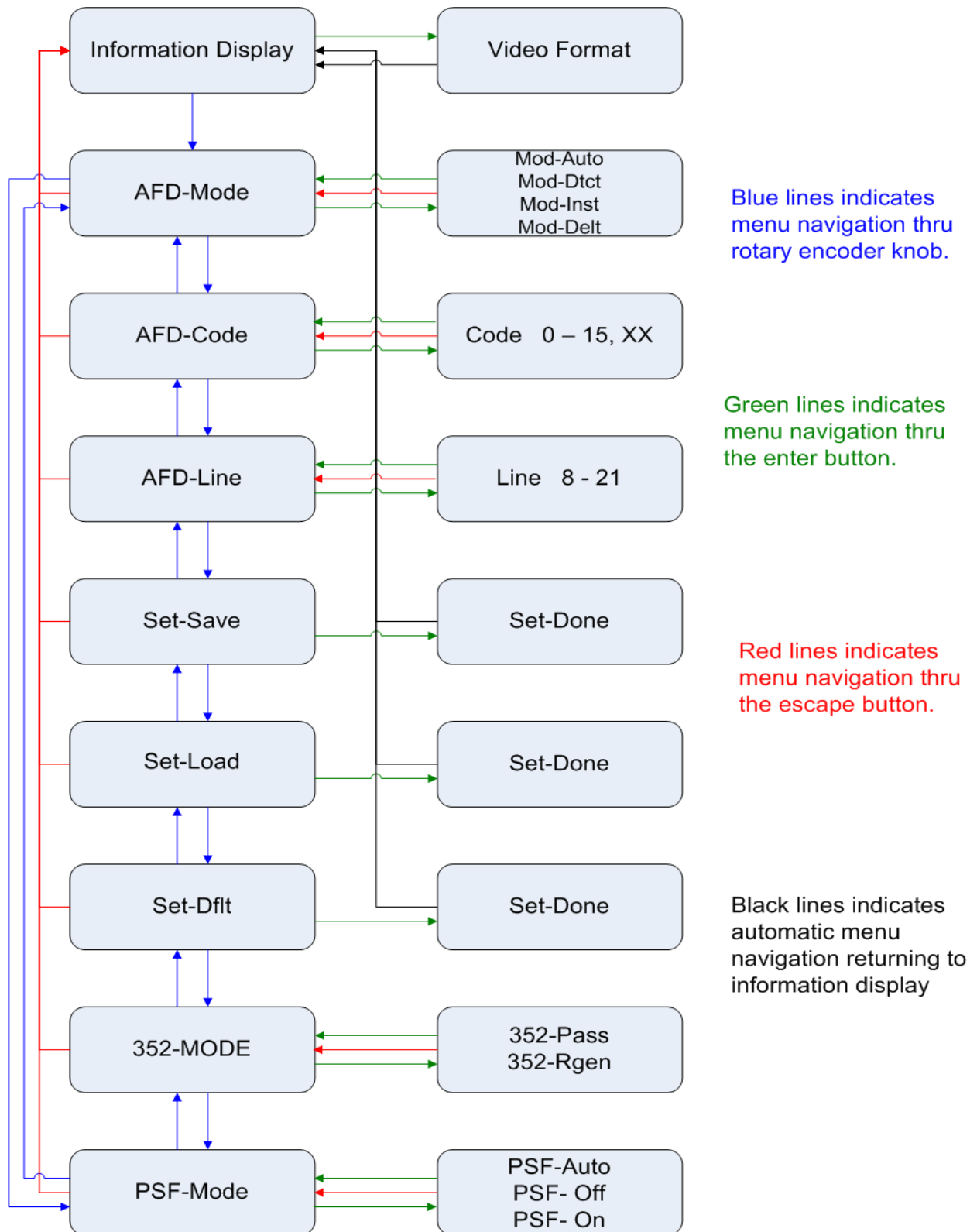
Front Panel Controls



1. Escape button, used to escape or back out of a menu selection. LED will be lit when the unit is inserting AFD and it will blink when in auto mode and not inserting AFD.
2. Enter button, used to make a menu selection. LED will be lit when AFD is present on the input and will blink when deleting the input AFD.
3. Eight character display, used to show the current menu selection.
4. Menu selection knob, used to change menu or to make setting adjustments.

Note: If both Escape and Enter LED's are blinking, this means no input or input is not locked.

Menu Tree



Information Display

The information display is used to tell the user what type of input the unit sees, the AFD mode the unit is in, and the AFD code. Pressing escape from here will temporarily bring up the model number and firmware version of the unit. Pressing enter from here will temporarily bring up the video format display. Turning the rotary encoder knob will bring up the menu options.

The information display consists of three sets of two characters. The first set is the input video standard, which are **SD**, **HD**, or **3G**. The second set is the AFD mode that the unit is in which are **AU** (auto), **DT** (detect), **DL** (delete), or **IN** (insert). The third set is the AFD code **0-15** or **XX** (none) being inserted, deleted, or detected depending on which mode the unit is in. Example:

HD IN 10

From the above information display sample, we can see that the input is high definition; the AFD mode is insert, and is inserting the AFD code 10.

The AFD code of the information display can be what the unit is detecting on the input or what the unit is inserting depending on the AFD mode and the input.

In insert mode the AFD code is what the unit is inserting. The escape LED will be lit and the enter LED will be blinking if AFD is detected on the input.

In detect mode the AFD code is the detected AFD code on the input. The escape LED will not be lit and the enter LED will be lit if AFD is detected on the input.

In delete mode the AFD code is the detected AFD code on the input. The escape LED will not be lit and the enter LED will be blinking if AFD is detected on the input.

In auto mode the AFD code is the inserted code when no AFD code is detected on the input. The escape LED will be lit and the enter LED will not be lit. However, in auto mode the AFD code is the detected code when AFD has been detected on the input. The escape LED will be blinking and the enter LED will be lit.

Menu Options

AFD-Mode

This menu allows you to change the AFD mode for the unit. The options are as follows:

Mode-Inst
Mode-Delt
Mode-Dtct
Mode-Auto

Mode-Inst

This mode makes the unit insert the selected AFD code all the time.

Mode-Delt

This mode makes the unit delete the AFD code all the time no AFD output.

Mode-Dtct

This mode makes the unit detect the AFD code on the input no change in AFD output.

Mode-Auto

This mode makes the unit automatically insert the selected AFD code when no AFD is detected on the input.

AFD-Code

This menu allows you to view the detected AFD code of the input or to select the AFD code to be inserted. The options are as follows:

0 - 15, XX

The AFD code can not be changed when in detect or delete mode. The AFD-code also can not be changed in auto mode if AFD is detected on the input. During these times the AFD code displayed will be the input detected AFD code.

AFD code chart taken from SMPTE 2016-1-2007

| AFD code | SD (4:3 coded frame) | HD (16:9 coded frame) |
|----------|---|---|
| 0 | Same as coded frame or bar data. | Same as coded frame or bar data. |
| 1 | Reserved. | Reserved. |
| 2 | Letterbox 16:9 image, at top of the coded frame. | Full frame 19:9 image, the same as coded frame. |
| 3 | Letterbox 14:9 image, at top of the coded frame. | Pillar-box 14:9 image, horizontally centered in the coded frame. |
| 4 | Letterbox image with an aspect ratio greater than 16:9, vertically centered in the coded frame. | Letterbox image with an aspect ratio greater than 16:9, vertically centered in the coded frame. |
| 5 | Reserved. | Reserved. |
| 6 | Reserved. | Reserved. |
| 7 | Reserved. | Reserved. |
| 8 | Full frame 4:3 image, the same as coded frame. | Full frame 16:9 image, the same as coded frame. |
| 9 | Full frame 4:3 image, the same as coded frame. | Pillar-box 4:3 image, horizontally centered in the coded frame. |
| 10 | Letterbox 16:9 image, vertically centered in the coded frame with all image areas protected. | Full frame 16:9 image, with all image areas protected. |
| 11 | Letterbox 14:9 image, vertically centered in coded frame. | Pillar-box 14:9 image, horizontally centered in the coded frame. |
| 12 | Reserved. | Reserved. |
| 13 | Full frame 4:3 image, with alternate 14:9 center. | Pillar-box 4:3 image with alternate 14:9 center |
| 14 | Letterbox 16:9 image, with alternate 14:9 center. | Full frame 16:9 image, with alternate 14:9 center. |
| 15 | Letterbox 16:9 image, with alternate 4:3 center. | Full frame 16:9 image, with alternate 4:3 center. |



Note: At current time the LEI-564 does not insert bar data.

AFD-Line

This menu allows you to select the line for the current format in which the AFD code is to be inserted. The options are as follows:

8 - 20

For HD the lines are 9 - 19, for SD PAL the lines are 8 - 21, and for SD NTSC the lines are 12 - 19. SMPTE states that the preferred line to insert AFD on is the fourth line from the vertical switching line, line 11 for HD, line 10 for PAL, and line 14 for NTSC.



Note: For interlaced and progressive segmented frame formats the unit places AFD on the same line for field 2 as it does for field 1.

Set-Save

This menu allows you to save the current settings as the power up settings. Pressing enter saves the settings and returns you to information display.

Set-Load

This menu allows you to load the power up settings as the current settings. Pressing enter loads the settings and returns you to information display.

Set-Dflt

This menu allows you to load the factory default settings as the current settings. Pressing enter loads the factory default settings and returns you to information display. The factory default settings are:

AFD mode: Auto
AFD code: 8
AFD line: 10 PAL, 14 NTSC, 11 HD
3G Dat: Link 1
352 mode: Pass
PSF mode: Auto



Note: To get unit to power up factory defaults you must load defaults then save settings.

352-Mode

This menu allows you to select whether the Video Payload Identifier (VPID) (SMPTE 352M) is to be inserted or passed thru. The options are as follows:

352-Pass
352-Rgen

The default for this menu is normally set to pass, which means that the VPID will pass thru the unit unchanged. However, you can set this menu to Rgen and it will generate (or regenerate) and insert the correct VPID for the format.



Note: this can be useful if the VPID is missing or wrong.

PSF-Mode

This menu allows you to select how the progressive segmented frame formats are indentified. The options are as follows:

PSF-Auto
PSF- Off
PSF- On

This menu should normally be set to auto, which means it automatically reads the VPID PsF flag, if present, to distinguish between PSF and interlaced formats. Turning the PSF-Mode on or off will manually set the PSF flag. This maybe required for 1080 PsF or interlaced formats at the frame rates of 30, 29, and 25, and the video input VPID is wrong or missing.



Note: if the PSF-Mode is set to auto, and there is no VPID present the unit will detect PsF formats with frame rates of 30, 29.97 and 25 as interlaced formats. In these cases you will need to set the PSF-Mode to on to get the unit to properly indentify these formats and to properly insert VPID.

Product Warranty

Ten Year Limited Warranty (Original Customer)

Link Electronics Inc. warrants its product to be free from defective material and workmanship for a period of TEN-YEARS from date of shipment, including parts and labor. This warranty excludes the HDE-3000 High Definition Closed Caption Encoder; note, Labor performed at the Link Electronics factory in Cape Girardeau, Missouri.

This warranty does not extend to products which have been subjected to misuse, neglect, accident, incorrect wiring, alteration, improper installation, or used in violation of instructions from Link Electronics. Link Electronics makes no other warranties, express or implied, of merchantability, fitness for a particular purpose, or otherwise. Link Electronics liability for any cause, including breach of contract, breach of warranty, or negligence, with respect to products sold by it, is limited to repair or replacement by Link Electronics, at its sole discretion.

The product must be shipped to Link Electronics, freight costs prepaid. Repaired or replaced equipment shall be shipped customer surface freight only, to be paid by Link Electronics. This warranty is in lieu of all other warranties, expressed or implied, with respect to the condition or performance of any Link Electronics products, its merchantability, or fitness for a particular purpose.

The product warranty will be null and void, if a specific component part should become obsolete by the manufacturer. If the component part becomes obsolete and not available through distribution, Link Electronics, Inc will not be responsible for repair or replacement of a Link Electronics manufactured product.

In no event shall Link Electronics be liable for any incidental or consequential damages, including loss of profits. This WARRANTY supersedes all previous warranties, whether implied, written or verbal.

SERVICE INFORMATION

In the event that the Link Electronics equipment should fail, you should contact the Customer Service Department and request a Return Authorization (RA) number. At that time, the details of how the repair should be processed will be discussed.

All inquiries relating to either parts replacement or warranty service should be directed to:

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