



INSTRUCTION MANUAL

MODEL:



Ultimate Caption Encoder

3G/HD/SD-SDI

**Closed Caption Encoder, Decoder, with
Recovery, “Legalizer”, IP Captioning,
Audio over IP, USB Interface, USB Audio,
and USB Data**

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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 Electronics 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

WARNING



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.**

WARNINGS AND CAUTIONS CONT.

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.**
- **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.**

WARNINGS AND CAUTIONS CONT.

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.

NOTES:

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.

OPERATING INSTRUCTIONS

The Orion closed caption encoder is designed as a plug and play system, however should the need arise, there are menus that will allow you to change the settings. You should familiarize yourself with the Information Display. All six communication ports are always active so you will not have to turn them on or off. The default serial ports protocol is, a baud rate of 1200, 8 bits, parity none, stop bits 1, and flow control none. Optional external serial modems are available.

The Orion will encode captions according to the preferred method of the SMPTE 334 standard into a caption distribution packet CDP. This packet contains the CDP header, CDP closed caption data section which includes CTA-608 data and CTA-708 data, closed caption service information section (Optional), and a CDP footer. The unit will receive CTA-608 data and convert that to CTA-708 data then encode both of them into the CDP. When encoding, any pre-existing CTA-708 caption distribution packets will be deleted.

For basic encoding the commands are the same as any other Link encoder. The difference in the commands is in the fields. The CDP requires that both fields are present even if you are just encoding field 1, field 2 will have to be re-encoded or nulled (zeroes). Field encoding control is based on a controlling port so field 1 can be encoded by one port and field 2 can be encoded by another port. This would allow you to encode CTA-608 CC1, CTA-708 S1, CTA-608 CC3, and CTA-708 S2 at the same time using two ports.

Each field controlling port is automatically assigned to the last port that it received a field initialization command from, ignoring any other field data from other port(s) until the next port receives that field initialization. Up to four captioners can be connected and swap control of the encoder just by initializing it. This could be useful when doing live captioning for long periods of time.

A new mode has been added called "ready", this just means the unit is ready to receive data through its selected port and when it receives a CTA-608 captioning command it begins encoding. This way you could have voice recognition captioning software sending data to one port and a Teleprompter set on another port. If your teleprompter is set up correctly, when your teleprompter starts the Orion will start encoding the teleprompter data and when the teleprompter stops the Orion would start encoding the voice recognition data.

Two decoded outputs are available for quality monitoring. The decoder can also send caption data out (data recovery) one of its six ports. A new mode has been added to data recovery called Alternate codes. In this mode the unit sends out an alternate character instead of special character and also sends out a space, a carriage return, and a line feed for new lines instead of caption codes. This is done to make the recovered data more legible.

CAPTION DISTRIBUTION PACKET (CDP) BASICS

CTA-608-E (Formerly CEA-608 and EIA-608)

This is the current Consumer Technology Association (CTA) standard for analog closed captioning. It can have up to four channels for captioning commonly referred to as CC1, CC2, CC3, and CC4. This is a waveform that represents 608 caption data in the non-visible active video data area commonly referred to as VBI captions. This standard was developed for NTSC so CC1 and CC2 are encoded on field one, CC3 and CC4 is encoded on field two. The max total baud rate for both fields is 960 (800 PAL) bits per second. The data for CTA-608 is embedded in the waveform as two 8 bit characters. The 8th bit is a parity bit so CTA-608 data is actually only 7 bits. The two bytes either make up 608 caption commands or characters to be displayed. The commands are line based commands with fifteen lines of display available, line one being at the top of the screen and line fifteen being at the bottom. It is recommended that no more than four lines of captions be displayed at once.

CTA-708-E (formerly CEA-708 and EIA-708)

This is the current Consumer Technology Association (CTA) standard for digital closed captioning. It can have up to 63 services for captioning commonly referred to as S1 through S63. This is raw data that is in the digital video stream not a waveform. This is 8 bit data sent in packets in the vertical ancillary data area commonly referred to as VANC captions. The packets can consist of one or multiple service block(s). The max baud rate for these packets is 8640 (8800 25/50 frame rates) bps totalling 9600 bps with 608 data. The 8 bit data consists of characters to be displayed or 708 caption commands. The commands are window based commands, a window has to be defined first then lines inserted in the window. When 608 captions are converted to 708 captions this is called transcoded 708. When 708 captions are not originated from 608 captions this is called native 708. It is difficult for native 708 captions to be converted to 608 captions, since 708 captions have many commands and options that are not available in 608 captions. For 708 captions it is also recommended that no more than four lines of captions be displayed at once.

SMPTE ST 334-1:2015

This is the Society of Motion Picture and Television Engineers (SMPTE) standard for Vertical Ancillary Data Mapping of Caption Data and Other Related Data. This defines the VANC and recommends “wrapping” both 608 caption data and 708 caption data into a single packet called the CDP. The VANC is defined as the active portion of one line, it is located two lines after the vertical switching line to the last line before active video inclusive. So the VANC is the active area of the following lines inclusive; NTSC 12 through 20 and 275 through 281, PAL 8 through 22 and 321 through 335, 1080 I 9 through 20 and 571 through 583, 1080 P 9 through 41, and 720 P 9 – 25. It is a common practice to put the CDP as the first packet on the first line of the VANC; NTSC line 12, PAL line 8, and line 9 for HD formats, however this is not a requirement of SMPTE ST 334-1:2015.

SMPTE ST 334-2:2015

This is the Society of Motion Picture and Television Engineers (SMPTE) standard for the Caption distribution packet (CDP) Definition. The CDP is composed of sections, the sections should be in the following order; header, time code, CC data, service information (descriptor), future, and footer. All sections are optional except for the header and the footer, if the CDP is going to contain captions then the CC data section is required. The CC Data section will have one through three (depending on the rate of the CDP) byte pairs for 608 data, and the rest of the section will be 708 data. The sections have markers that are required to be certain values and also contain redundant information (information found in other sections or even the same section). If these markers and/or redundant information are incorrect, closed caption decoders or other devices many ignore the CDP entirely. A legalizer like the Orion can eliminate some, or all of these potential errors.

Common Misconceptions

HDMI video does not contain closed captions; a standard has not been developed for the transport of closed captioning on HDMI. To see captions on HDMI, the captions have to be burnt (opened or decoded) into the video before it is converted to HDMI. Also there is not a standard for closed captions on HD component (analog) video. To see captions on HD component video, the captions have to be burnt (opened or decoded) into the video before it is converted to HD component video.

Caption Encoder

A caption encoder is a device that embeds closed captions into a video stream. Closed captions cannot be seen on the visible part of the video. They are embedded into the video and ready to be displayed using a decoder.

Caption Decoder

A caption decoder reads the embedded closed caption data and displays the captions on the video, this is called open captions. Open captions are captions that can be seen on the visible part of the video. They are burnt into the video and generally cannot be removed (except for turning the decoder off).

AUDIO OVER IP

This device is meant to send audio over IP and receive captions over IP. The audio must be embedded on the SDI input. The audio must be AES 20 or 24 bit sampled at 48 KHz. The captioner will need a free AoIP Player (version 2.1 or higher) available on Link Electronics website. Connect an Ethernet cable from the Ethernet connector of the Orion to a gateway router. The term “gateway router” will refer to a router, firewall or device that allows internet connection.

The Player is meant to be at the captioner’s location. The Player works on Windows PCs that are Windows 7 or higher. The Player can be installed on a PC and uninstalled through the control panel, or the Player can be run from a “thumb drive” without installing it. The Player will connect to the audio port of the Orion and the captioner’s software will connect to the data port of the Orion. Please refer to the Player Instructions for more information on operating the Player, as the following information will pertain to the Orion.

The gateway router will have to be set to allow port forwarding of the audio and caption data ports. The default (LAN) IP address of the Orion is static at 192.168.1.235 and gateway at 192.168.1.1 with port 10001 for caption data and port 10002 for audio. Network settings can be changed through the appropriate GUI page or from front panel menus. Please refer to Port Forwarding for more information on this. Once the port forwarding is set at the gateway router, you will then give your captioner your IP address (not LAN) and the ports to use. You must specify audio and caption data ports.

The Orion has an audio simulated LED used for audio indication. When the LED is off no audio is present at the selected channel pair. When the LED is on the audio is present. If the audio input volume is too high, the audio that is converted to digital will be what is called “clipped”. “Clipped” audio will cause distorted or indistinguishable audio at the Player. It is better to send audio at a lower volume to the captioner rather than audio at a higher volume because of the risk of audio clipping. The player has its own volume control so the captioner can control the volume level. Once the Player has connected, the LED will be on constant (when audio present) to indicate that the unit is connected.

The Orion has an Ethernet port 1 LED used for caption data transmission indication. When the LED is off no data is being transmitted or received. When the LED is on data is being received from captioner. Normal operation will be for the Ethernet LED to be flashing and the audio LED to be on constant.

The Orion will receive a command from the Player to start or stop the audio stream. The audio is streamed through the internet as pulse-code modulated (PCM) audio sampled at 16 KHz with a packet identifier after 1024 samples. The audio is routed directly to the player and does not go through an audio server. Other than the packet identifier there is no packet checking or packet resending. This keeps the audio from being delayed. However, if a byte or packet is missing this will cause a skip in the audio, the Player knows when this happens and will indicate that audio has been skipped.

New to the Orion is an option for 16-bit audio over IP. This 16-bit audio will only work with AoIP Players that are version 2.1 or higher. This 16-bit audio will be louder, clearer, and reduced noise compared to the previous 8-bit audio. GUI and menu options will allow you to choose which one to use. The 16-bit audio does increase the internet/network bandwidth that the Orion will be using.

Now let's talk about upload and download speeds. The Orion's upload speed is about 500 Kbps (460800 bps max round up for Transport Control Protocol (TCP)) and the Orion's download speed is about 10 Kbps (9600 bps max round up for TCP). If your Internet Service Provider (ISP) uses Direct Subscribers Line (DSL) then the upload speed can range from 128 Kbps to 3 Mbps (3000 Kbps). So, as you can see some DSL services will not work at all with the Orion. As a matter of a fact, we have noticed some DSL connections (even with high upload speeds) will throttle (limit) data upload during peak internet traffic hours. We would have to discourage you from using a DSL internet connection with the Orion. Now the speeds would be just the opposite for the captioner, the download speed would be about 500 Kbps for audio and upload speed of about 10 Kbps for caption data. So, DSL might work here but not recommended because of the potential throttling issue.

The USB can be connected to a PC. Then the PC can use that audio from the Orion to be streamed over the internet. This method would require third-party software like Zoom or Meetings. This may be a preferred way to get audio to your captioner as it may not require port forwarding on your network for the audio depending on the third-party software. Also, multiple Captioners can listen to the same audio stream at one time. Not using network port forwarding (direct connection) will usually require a server on the internet. This can increase the delay of the audio that the captioner receives, however, the added buffering may reduce skipped audio samples. The IP caption data would still need to be port forwarded unless another method was used for the IP data.

IP CAPTIONS

Unlike other encoders this unit has two ports tunneled to the Ethernet connector allowing for two simultaneous IP caption connections. The Ethernet port will be connected to a gateway router that has port forwarding setup. The units default IP address is 192.168.1.235, port number 10001 is Ethernet port 1, and port number 10002 is Ethernet port 2. The Ethernet connector of the Orion has a Ethernet configuration application that is available by contacting Link for advance uses.

For IP captioning provide the Captioner your WAN (Internet) IP address, not the one listed above, unless on a LAN, and port numbers 10001 for captions and port 10002 for audio.

IP captioning is becoming the preferred method of Captioners and broadcasters for live captioning. There are many reasons that IP captioning has become the preferred method of live captioning. No need for plain old telephone (POTs) line, these types of lines are becoming less available. No modems, no phone lines, no long distant charges, and no caption server fees. This means less equipment and less cables that can fail. For the most part the captioner and broadcaster would be using Internet connections they already have.

A unique feature of the Ethernet ports is re-routing meaning that data can be redirected or resent out the serial port(s). Resending means the unit will take this data in and process it, encode it, and send that data out the selected serial port(s). See the Resending Example on page TK. Redirecting means the unit will not process the data, it will just redirect it out the selected serial port(s). See the Redirecting Example on page TK. These features allows control of multiple encoders or even to serial control some other hardware through IP.

If you have an IP address conflict from another device which has the same IP address, different network setup, or multiple Orion's on same network, the unit has a built in web page that allows you to change network settings. See the Changing IP Address section. Your network administrator should know how to setup the gateway router for port forwarding. There is a section on Port Forwarding that could be useful to your network administrator.

GENERAL DESCRIPTION

Features:

- 3G/HD/SD-SDI
- XDS RAM (V-Chip)
- Data Recovery
- GPI Remote "Legalizer"
- 2 CTA-708 Services Converted from 608
- Field Upgradeable
- VANC Line Selection
- IP Audio 8 or 16 bit
- IP Captioning
- VBI and/or VANC for SD
- USB Audio
- Decoded Black Video Output
- GUI Monitoring/Control
- Decodes CC1-CC4 or S1-S6
- Power off Bypass
- USB Serial Device

The Orion is a three gigabits, high definition, or standard definition serial digital interface closed caption encoder (3G/HD/SD-SDI CC Encoder) with audio and captions over IP. It accepts 3G/HD/SD-SDI transport streams and gives four closed caption encoded outputs of the same format as the input, with the option of two of them being decoded. The SDI outputs are re-clocked, making the SDI output eye pattern generally better than the input. It is a better re-clocker than most re-clocking Distribution Amplifiers (DA). The unit will pass ANC data untouched including audio to the output.

The Orion will take the user selected channel pair of AES audio that is embedded on the SDI input and send that audio to a Captioner via IP. A free audio over IP player is provided to monitor the audio. The streaming audio is low latency and low bandwidth, so no special Internet services are required. The unit will also receive caption data via IP from the Captioner. This allows the removal of the traditional two phone line setup without having to be connected to a captioning server. This device allows true IP captioning. The audio from this device can also be used as a USB microphone input for other streaming services (Zoom) or speech recognition software.

The Orion will encode line 21/22 CTA-608 waveform and/or encodes SMPTE 334 Caption distribution packet (CDP) for SD. The Caption distribution packet will contain a header, CTA-608 data, CTA-708 data, caption service descriptor, and a footer. For HD it will encode the caption distribution packet. It has RAM that is reserved for XDS packets, the packets will be inserted into CTA-608 field 2 based on XDS packet priority and field 2 availabilities. The unit also has XDS menus for Parental Guidelines (V-Chip) and Transmission Station Identification (TSID) packets. The RAM can be filled using V-Chip software.

The Orion has a menu that allows you to select, resend, or redirect data from the Ethernet port to the serial ports. It has a GPI remote activated Legalizer, also called Weather Lift, with a menu that allows you to select the number of lines to be lifted. The FCC has mandated that captions are not to be displayed over things like people's names, school closings, and so on. This has become a major issue with broadcasters. The Orion also has a decoded output and caption data recovery for quality monitoring. USB connection allows for web GUI to PC. Remote monitoring/controlling is also possible through the GUI.

The Orion is backed by the Link Electronics standard 10-year warranty and 24/7 customer support. It meets the innovative, high performance, flexibility, and reliability requirements of all Link Electronics products.

SPECIFICATIONS

3G/HD/SD Video Inputs:

Connectors: Two 75 Ohm BNC, One for Future Use
Embedded Audio: ... AES 48 kHz (20 or 24 bit) SMPTE ST 299-1 (HD) or SMPTE ST 272 (SD)
SMPTE: ST 424 (3GA), ST 372 (3GB), ST 274 (1080), ST 296 (720), and ST 259 (NTSC & PAL)
Equalization: Automatic, approx. 100 feet at 1.5 Gb/s, approx. 500 feet at 270 Mb/s

3G/HD/SD Video Outputs:

Connectors: Four 75 Ohm BNC's, One Power Off Bypassed
Standard: Same as input
Signal Level: 800 mV, Nominal
DC Offset: +/- 0.5 V
Rise Time: 200 ps, Nominal
Overshoot: < 10%
Timing Jitter: < 1.0 UI
Wideband Jitter: < 0.2 UI

Communications/Other Connectors:

General Purpose Interface (GPI): One DE-15 Female with 8 dry contact pins
Serial Ports: Two RS-232 DE-9 One Male and One Female
USB: One USB Type B Female
Ethernet: One RJ45 modular connector, IEEE
Power: Two, 3 Pin Circular Socket Female

Environmental:

Temperature: 0° to 50° C ambient
Humidity: 10% to 90% non-condensing

Mechanical:

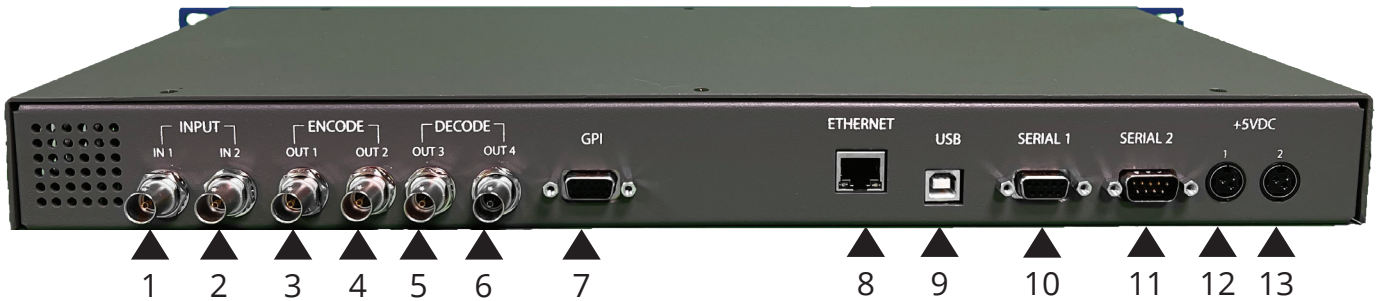
Height: 1.75 Inches
Width: 19 Inches
Depth: 7.25 Inches
Weight: 4 Lbs.

Power Supply (PWT-700):

Input: Auto Detection 100 to 240 VAC at 50/60Hz
Output: 5 VDC up to 5 A
Compliance: UL Approved
Consumption: 15 Watts
Dual Supplies: Optional

The manufacture reserves the right to change specifications without notice

REAR PANEL CONNECTIONS



1. Input In 1: 3G/HD/SD-SDI Input
2. Input In 2: Future Use
3. Encode Out 1: Encoded output of Input In 1, power off bypass.
4. Encode Out 2: Encoded output of Input In 1
5. Decode Out 3: Decoded output of Input In 1
6. Decode Out 4: Decoded output of Input In 1
7. GPI: DE-15 Female uses 9 dry contact pins for 8 GPI functions. Do not connect these pins to any voltage or ground, simply connect pin 11 to pins 1-8 to make the dry contact
8. Ethernet: 10/100 RJ45
9. USB: USB type B female 2.0 compatible
10. Serial 1: DE-9 female RS232
11. Serial 2: DE-9 Male RS232, null modem
12. +5VDC 1: 3 pin circular socket female, 5 Volts, 5 Amperes Direct Current external supply, recommend using the one provided with the unit.
13. +5VDC 2: 3 pin circular socket female, for optional dual external supplies



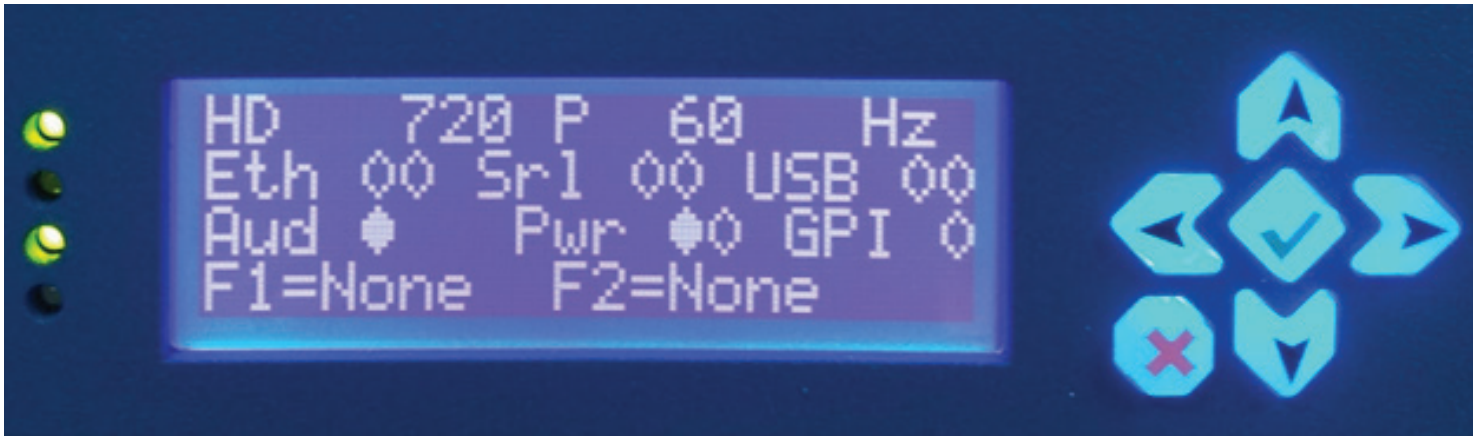
WARNING: Using power supplies that are not approved by Link Electronics will null and void any warranties.

FRONT CONTROLS



1. **Power Switch:** simply turns the unit on or off.
2. **Indicator LED Lights**
 - Lock** LED indicating video locked: green locked, red not locked
 - Data** LED indicating data has been received on one of its ports
 - Fault** LED indicating if a fault has been triggered: green no faults, red fault
 - Encode** LED indicating that the unit is encoding or re-encoding
3. **Display:** 20-characters by 4-lines display, for monitoring and menus
4. **Navigation Buttons:** 6 buttons for menu navigation

FRONT PANEL MENU NAVIGATION



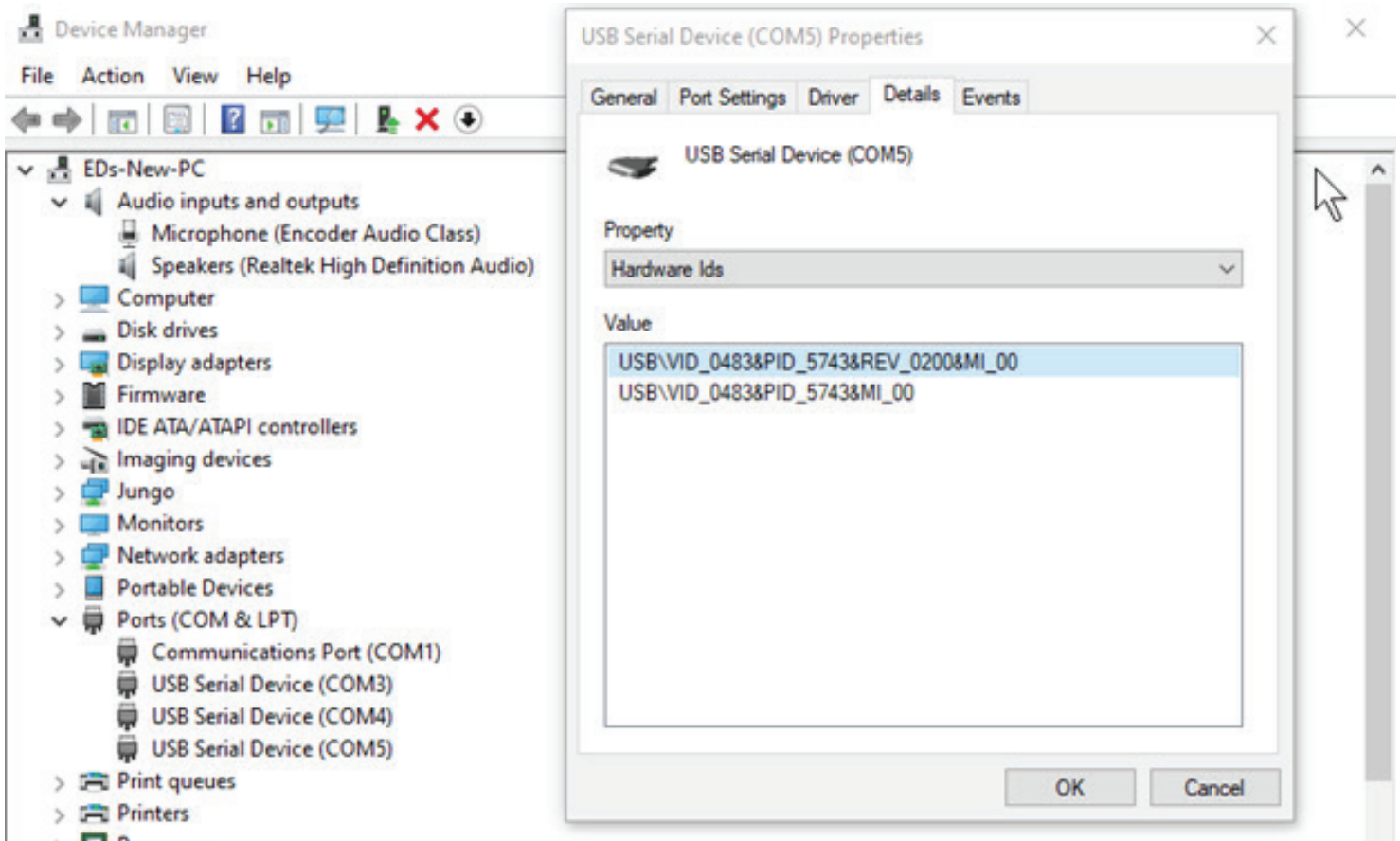
There are 6 menu navigation buttons, Enter Button (green check mark), Escape Button (red “X”), Right Button (arrow pointing right), Left Button (arrow pointing left), Up Button (arrow pointing up), and Down Button (arrow pointing down). The Enter Button applies a option change or selects main menu or Submenu. The Escape Button exits a setting or goes a menu level back. If the Escape Button is pressed before pressing the Enter Button, then no option changes will be applied. The Right Button changes to the next option when there is an open setting (brackets present “[]”). The Left Button changes to the previous option when there is an open setting (brackets present “[]”). The Down Button will open the next setting (making bracket appear) if the next setting is available. The Up Button will open the previous setting (making bracket appear) if the previous setting is available.

The Up Button and the Down Button operate a little differently when the open option is a number value that contains more than 2 digits. The Down Button will increase the multiplier by 10x until the maximum multiplier is reached then it will open the next setting. The Up Button will decrease the multiplier by 10x until minimum multiplier is reached then it will open the previous setting. The underline in the number value indicates where the multiplier is. In this case “[10002]” the multiplier is 100s the Down Button will increase the multiplier to the 1000s and the Up Button will decrease the multiplier to the 10s. In this case “[10002]” the multiplier is 10,000s and is at maximum multiplier so the Down Button will go to the next setting. In this case “[10002]” the multiplier is 1s and is at minimum multiplier so the Up Button will go to the previous setting.

USB CONNECTOR

Connecting the Orion to a PC through the USB Connector is not required. Monitoring and controlling the unit can be done through the front panel menu system. However, a USB connection will be required when a firmware (software for hardware) update is needed. The USB connection to the PC will create 3 USB serial devices and one USB microphone (Encoder Audio Class) these can be seen in Windows Device Manager.

One USB to serial device is for the OEM service to connect to, this USB serial device is not used for caption data transferring. This USB serial device for the OEM service can be determined by the hardware ID in Windows Device Manager, the ID will end in "&MI_00". The other two USB serial devices is for captioning data transfer their ID will end in "&MI_02" or "&MI_04". These 2 USB serial devices can be used by software like captioning software or port redirection software that is installed on the PC that the USB is connected to.



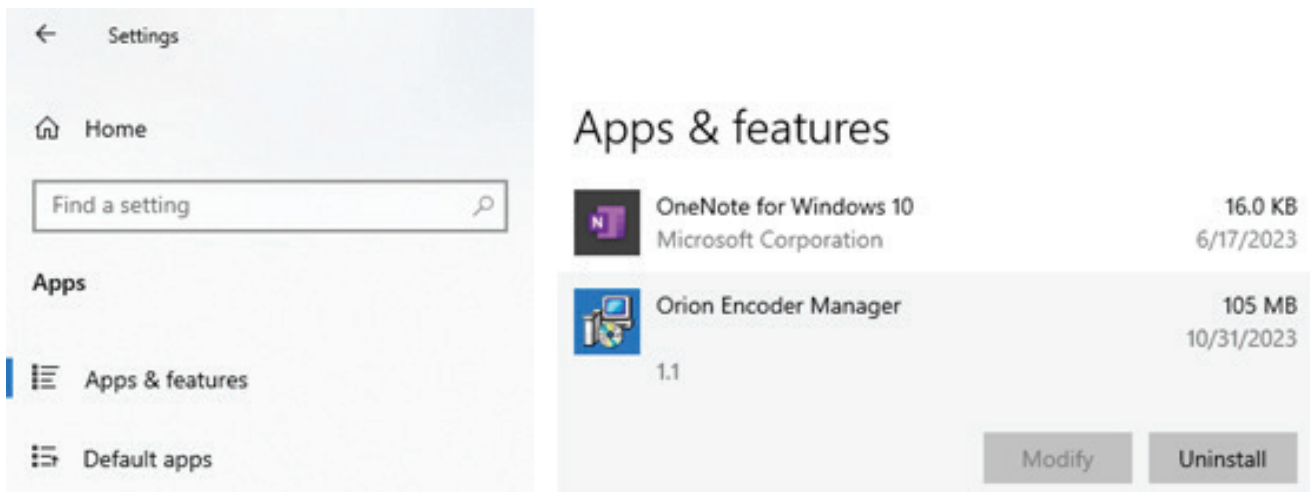
The USB microphone is just a microphone (input) that can be used to listen to the audio that the Orion is receiving on its SDI input. This audio can be used by local captioner, Automatic Speech Recognition (ASR), or it can be used to stream audio to a captioner through third party software like Zoom or Meetings.

ORION ENCODER MANAGER

The Orion Encoder Manager (OEM) is a service that runs on a separate Windows 10 (or higher) PC. This PC must be connected to the Orion Encoder through USB. The Graphical User Interface (GUI) for the OEM is web-based. Using a browser on the PC that the service is installed on is how you get to the GUI. Recommended browsers are Firefox and Chrome, Edge that is chromium based should also work. Type `http://localhost:5001` in the address bar of your browser to open the web-based GUI. Other PC's on the same network as the PC running the OEM service can connect to the GUI by using the IP address of the OEM computer and adding `:5001` to that address. This allows remote monitoring and controlling of the Orion encoder. This OEM service can connect to multiple units through USB, so several Orion encoders can be monitored or controlled though one GUI.

This OEM service will not show up in the start menu or appear as a short-cut on your desktop. However, you can make a short-cut to your browser that you will be using and have it directed to the URL mentioned above. The URL can also be added to your favorites or make it your home page in your browser.

To uninstall this service, go to settings from start menu select Apps. Then from the App list find Orion Encoder Manager and select uninstall. This must be done prior to installing a new OEM version, otherwise you will end up with two services installed. If the version of the OEM is not compatible with the version of microcontroller software that is on the Orion, then the OEM may not work. For the Orion to function the OEM is not required, however to install updates on the Orion the OEM is needed.



Through out this manual both front panel menus and the OEM will be explained at the same time. This is done to prevent duplicating the same information for both the OEM and the front panel menu. This also makes explaining the front panel menus easier. Just note you do not have to have the OEM running or even installed for this unit to work properly.

DEVICES

We will start with the Devices page of the OEM. Here we can see the devices (Orion's) connected to this PC. In the example below we have two Orion's connected. This devices page allows you to see basic stats of the connected Orion's. This page will also allow you to name individual Orion's, if you do not name the Orion connection the name will default to the serial number. In the example below we can see that the Orion named Studio One is locked to a 720P 59.94 input and that input has embedded audio on it. We can see that the Orion named Studio Two is locked to a 3G level A input has no embedded audio and is encoding or re-encoding.

Serial no.	Name	Status
3950345A3031	Studio One	<input type="radio"/> Encode <input type="radio"/> Data <input type="radio"/> Fault <input checked="" type="radio"/> Audio <input checked="" type="radio"/> HD 720P 59.94Hz
316538723138	Studio Two	<input checked="" type="radio"/> Encode <input type="radio"/> Data <input type="radio"/> Fault <input type="radio"/> Audio <input checked="" type="radio"/> 3GA 1080P 60Hz

This page is especially useful when having multiple Orion's connected. However, when you have just one Orion connected then the Information page is the page you'll likely remain on. The left-hand menu is how you navigate to different submenus in the GUI. The numbered menus in the GUI can be seen in the main menu on the front panel display. From the information display of the front panel, pressing enter will display the main menu choices.

INFORMATION

OEM Information Page

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Devices

3165386E3138

- Information**
- 1. Encoder Settings
- 2. Caption Settings
- 3. Decoder Settings
- 4. Audio Settings
- 5. XDS & Misc. Settings
- 6. Port Settings
- 7. Network Settings
- 8. Default Settings
- Manual
- Maintenance

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Information

Video Locked 1

3GB 1080I 59.94Hz

Active Data 2

Ethernet 1 Serial 1 USB1 (COM14)
 Ethernet 2 Serial 2 USB2 (COM13)

Fault and Status 3

Audio Power 1 GPI
 USB Power 2
 Player

Caption Encode 4

	Field 1	Field 2	<input type="radio"/> XDS	<input type="radio"/> Lift Lower 2 Lines
Mode	None	None		
Port	None	None		

General Purpose Inputs (GPI) 5

Lift Bypass Decode Switch Field1 Switch
 Future Future Future Future

Faults 6

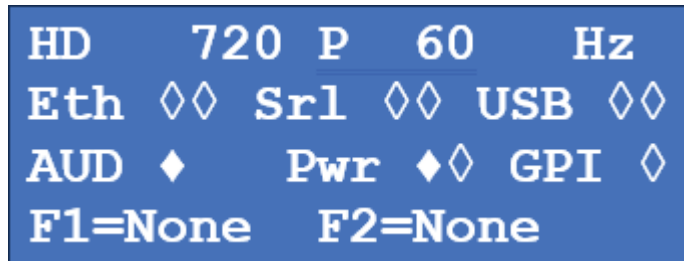
Missing Supply Fan Fault FPGA Overtemp

Versions 7

FPGA	Microcontroller	Bootloader
A1	A1	A1

INFORMATION DISPLAY

Primary Display



1. The first line of default information display corresponds with the information in area 1 of the OEMs information page. This indicates the detected video format.
2. The second line of the default information display corresponds with the information in area 2 of the OEMs information page. This indicates data input from Ethernet 1-2, Serial 1-2, and USB 1-2.
3. The third line of the default information display corresponds with the information in area 3 of the OEMs information page. This indicates Audio presence, AoIP Player ("P"), USB (audio ("U")), power indication, and GPI triggered.
4. The fourth line of the default information display corresponds with the information in area 4 of the OEMs information page. Fields encode mode and controlling ports, XDS encoding ("X"), Lift lines on (up arrow).

Secondary Information Display



5. The first line of the secondary information display corresponds with the information in area 5 of the OEMs information page. Indication of active GPIs.
6. The second line of the secondary information display corresponds with the information in area 6 of the OEMs information page. Indication of active faults.
7. The last two lines of the secondary information display corresponds with the information in area 7 of the OEMs information page. Firmware versions.

Left or Right Button from default information display will display the secondary information display. The Enter Button will display the main menu options.

Simulated LEDs filled dot means the LED light is on, a hollow dot means the LED is off.

For example:



PRIMARY INFORMATION DISPLAY

EXAMPLE

```
HD 720 P 60 Hz
Eth ♦♦ Sr1 ♦♦ USB ♦♦
AUD ♦PU Pwr ♦♦ GPI ♦
F1=InsE1 F2=Re-en X↑
```

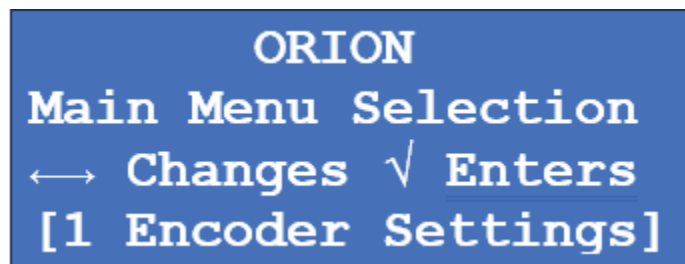
The first line displays the rate, format, and frequency of the detected video input. The possible rates are SD, HD, 3GB, or 3GA. The possible formats are 525 I, 625 I, 720 P, 1080 P, 1080 I, or 1080 S. The possible frequencies are 23.98, 24, 25, 29.97, 30, 50, 59.94, or 60. The first line of the above example displays a 720 P 60 Hz HD input.

The second line displays received data activity for two ports for Ethernet, serial, and USB. The left simulated LED of each port pair is for port 1 and the other one is for port 2. So, when the simulated LED(s) are on (filled dot) the Orion is receiving data on that port. Note these simulated LED(s) for the ports should never be continuously on they should flash on and off. The second line of the above example displays data being received on Ethernet port 1.

The third line displays audio status, power, and GPI. The audio status is present on the SDI input (simulated LED), AoIP Player connected ("P"), and USB audio active ("U"). For power the left simulated LED is for +5VDC 1 and the other one is for +5VDC 2 (optional). The GPI simulated LED indicates that any one of the 8 GPI have been activated. The third line of the above example displays audio is present, AoIP Player is connected, USB audio is being received, two power supplies are connected, and one of the GPIs has been activated.

The fourth line displays the active field modes and active field controlling ports along with active XDS and active lift lines (aka legalizer). The possible field modes are None, Null, Re-en, Byp, Re-, Nul, Rdy, Ins, NW2, or NW3. The possible field controlling ports are E1, E2, S1, S2, U1, or U2. Field modes of None, Null, and Re-en do not have to have a controlling port, all other modes must have a controlling port. Encoding or re-encoding of Extended Data Service (XDS) which can include many possible different packets, most common are "V-Chip" and TSID is indicated with an "X". an up arrow is to indicate the Orion is actively lifting captions. The fourth line of the above example displays field 1 is in Insert mode (Ins) and being controlled by Ethernet port 1 (E1), field 2 is in re-encode mode (Re-EN) and is re-encoding XDS packet(s) (X) along with active lift caption lines (up arrow).

MAIN MENU



Pressing the enter button from either of the information displays will display the main menu. The options are 1 Encoder settings, 2 Caption Settings, 3 Decoder Settings, 5 XDS&Misc Setting, 6 Port Settings, 7 Network Settings, and 8 Default Settings. These options correspond with the numbered menus you see in the OEM GUI. There are no settings on this display, so the up and down buttons do not function here. The right button will change to the next option, and the left button will change to the previous option. The escape button will return to the information display. The enter button will select the menu option and display the lower-level menus for that option.

Once in the lower-level menus, the right button will display the next menu, the left button will display the previous menu. The down button will open the next setting, the up button will open the previous setting. When a setting is open, brackets will appear like this "[option]". If a menu has only one setting, then the up and down buttons do the same thing. As previously mentioned, the up and down buttons perform a 10x multiplier when the setting option is a number larger than 2 characters. Once a setting is open the right button will change to the next option and the left button will change to the previous option. If a setting is open, pressing the enter button will apply the option(s) to the setting(s). If a setting is open and the escape button is pressed the setting will be closed and will not apply the option(s) to the setting. The escape button will return to the main menu.

Note: After a period of inactivity on the menus, the display will return to the primary information display.

1. ENCODER SETTINGS

LINK
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Devices

Studio One

- Information
- 1. Encoder Settings**
- 2. Caption Settings
- 3. Decoder Settings
- 4. Audio Settings
- 5. XDS & Misc. Settings
- 6. Port Settings
- 7. Network Settings
- 8. Default Settings
- Manual
- Maintenance

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1. Encoder Settings

- 1. Field 1 Encoder
 - Mode: Passthrough
 - Port: None
- 2. Field 2 Encoder
 - Mode: Passthrough
 - Port: None
- 3. Commands Ignored: None
- 4. Bypass: Bypass
- 5. Captions on SDI Input: Ignore
- 6. Active Caption Timer: Unavailable
- 7. Service 1 Transcoder
 - Channel: CC1
 - Language: Eng
- 8. Service 2 Transcoder
 - Channel: CC3
 - Language: Spa

Note: Front Panel Menu numbering will match the numbering in the GUI menu and numbering on the GUI pages. Options for both menu and GUI will be the same. Changes made in the menu will automatically be shown in the GUI. Changes made in the GUI will make the menu reset to the default information display. The menus and the GUI only display the current user settings. Once changes are made and saved, the user defaults are now the settings on the unit at power up.

1.1 FIELD 1 ENCODER

```
1.1 Encoder Settings
Field 1 Encoder
Mode = Passthru
Port = None
```

This displays the current user settings for field 1 encode mode and field 1 controlling port. Field 1 is for encoding CTA-608 CC1 and/or CC2.

The first setting, field 1 encode Mode options are: **Passthru**, **Re-encode**, **Null**, **Ready**, **Insert**, **Newswire2**, or **Newswire3**.

If you happen to choose the wrong mode or wrong port, it can switch mode and port automatically if it is initialized properly through one of its ports.

Passthru means the captions will pass through untouched.

Re-encode means the unit will re-encode preexisting captions this can be used to legalize the pre-existing CDP.

Null means the unit will null (blank) preexisting captions.

Ready means it is ready to accept data through the selected port, it will remain in bypass until it receives a caption command through the port.

Insert means the unit is inserting field 1, if it is not receiving captioning data then it will insert nulls.

Newswire is a CC1 special mode where it receives ASCII characters and inserts caption commands every time it receives a carriage return. The 2 or 3 of newswire means 2-line or 3-line roll-up. The newswire roll-up captions will be at the bottom of the screen unless the Lift GPI is activated.

The next setting field 1 controlling Port options are: **None**, **USB 1**, **USB 2**, **Serial 1**, **Serial 2**, **Ethernet 1**, or **Ethernet 2**.

For modes Passthru, Re-encode, and Null a port does not have to be assigned, for all other modes a port **must** be assigned.

This may not be the same as the active field 1 encode mode or field 1 controlling port that is shown on information page/display. Serial or IP command can change the active field 1 mode/port. Serial or IP commands will not change the current user field 1 encode mode/port. This is the field 1 encode mode/port that the unit will activate if a reset command is given.

Note: You cannot set the port the same for both fields. For example, both fields cannot be assigned to serial 1.

1.2 FIELD 2 ENCODER

```
1.2 Encoder Settings
Field 2 Encoder
Mode = Passthru
Port = None
```

This displays the current user settings for field 2 encode mode and field 2 controlling port. Field 2 is for encoding CTA-608 CC3 and/or CC4.

The first setting field 2 encode Mode options are: **Passthru, Re-encode, Null, Ready, Insert, Newswire2, or Newswire3.**

If you happen to choose the wrong mode or wrong port, it can switch mode and port automatically if it is initialized properly through one of its ports.

Passthru means the captions will Pass through untouched.

Re-encode means the unit will re-encode preexisting captions this can be used to legalize the pre-existing CDP.

Null means the unit will null (blank) preexisting captions.

Ready means it is ready to accept data through the selected port, it will remain in bypass until it receives a caption command through the port.

Insert means the unit is inserting field 1 if it is not receiving captioning data then it will insert nulls.

Newswire is a CC1 special mode where it receives ASCII characters and inserts caption commands every time it receives a carriage return. The 2 or 3 of newswire means 2-line or 3-line roll-up. The newswire roll-up captions will be at the bottom of the screen unless the Lift GPI is activated.

The next setting field 2 controlling Port options are: None, USB 1, USB 2, Serial 1, Serial 2, Ethernet 1, or Ethernet 2. For modes Passthru, Re-encode, and Null a port does not have to be assigned, for all other modes a port must be assigned.

This may not be the same as the active field 2 encode mode or field 2 controlling port that is shown on information page/display. Serial or IP command can change the active field 2 mode/port. Serial or IP commands will not change the current user field 1 encode mode/port. This is the field 2 encode mode/port that the unit will activate if a reset command is given.

Note: You cannot set the port the same for both fields. For example, both fields cannot be assigned to serial 1.

1.3 COMMANDS IGNORED

```
1.3 Encoder Settings
Incoming Encoder
Commands Ignored
Option = None
```

This displays the current user setting for encoder commands that are being ignored. The options are: None, Initialize, or All. This menu is to set the encoder to ignore commands from the USB, Ethernet, and serial ports. None means that no commands are ignored by the Orion and any commands received through the USB, Ethernet, or serial port(s) will override the menu setting. Initialize means that the Orion will ignore encoder initialization commands so the encoder can only be initialized thru the menus, other commands like bypass, reset, and XDS will be processed. All mean that all encoder commands are ignored. The options Initialize or All allows you to encode a CC3 data stream to CC1 or CC1 data stream to CC3 regardless of what the encoder initialization commands are. This can be particularly useful with ASR software that does not send out encoder initialization commands properly or may not be able to send out CC3 data.

1.4 BYPASS

```
1.4 Encoder Settings
Incoming Encoder
Bypass Commands
Option = Bypass
```

This displays what the current user setting for encoder bypass command action will be. The options are Bypass or Reset. This menu is to set the encoder action when it receives an encoder bypass command. Bypass means that when it receives this command in that field will go into bypass. Reset means that the Orion will reset and load defaults when an encoder bypass command is received, instead of just setting in bypass mode. Older analog encoders would glitch the video when a reset command was received so captioning software writers ended up using a bypass command instead of a reset command. This will allow the unit to receive an initialization command on one port then switch to another port (if menu set) when a bypass command is given. This menu will not have a function if the previous menu is set to ignore all commands. This can be particularly useful with ASR running all the time. A captioner can initialize the encoder and when they are done, they will put the encoder into bypass, if bypass reset set up then the encoder can start getting data from the ASR.

1.5 CAPTIONS ON SDI INPUT

**1.5 Encoder Settings
Pre-existing Caption
While Encoding
Option = Ignore**

This displays the current user setting for Captions that are on the SDI input while the encoder is in insert mode. The options are Ignore or Re-enc. This menu is to set the encoder action when it receives pre-existing captions while inserting captions. Ignore means when it receives pre-existing captions while inserting captions, it will ignore any pre-existing captions and continue to insert captions. When Re-enc is selected and pre-existing captions are present, any caption commands will be ignored, and the pre-existing captions will be re-encoded. When the pre-existing captions are no longer present, the unit will start encoding from the caption data again. The idea of this is if you are using something such as speech recognition or a teleprompter, the Re-enc mode will prevent the unit from over writing the existing captions.

1.6 ACTIVE CAPTION TIMER

**1.6 Encoder Settings
Caption Detect Timer
for Re-encoding
Option = 6 Seconds**

This displays the current user setting for active caption (presence) timer, only applicable when captions on SDI input are set to re-encode. The options are 1 through 16. This tells the unit the amount of time to wait for next active caption (via caption type command roll-up, pop-on, or paint-on) before switching back to insert mode. Setting of 1 second is generally too fast causing encoder to switch to encode and to re-encode rapidly which can cause gibberish captioning. A setting of 16 seconds for some can be too long to wait for captioning. A setting of 6 seconds seems to work the best.

1.7 SERVICE 1 TRANSCODER

```
1.7 Encoder Settings  
CTA-708 Service 1 up  
Convert from = CC1  
Dscrptr Lang = Eng
```

This displays the current user setting for Service 1 transcoder channel and language. The first setting channel options are Off, CC1, CC2, CC3, or CC4. Off will disable the transcoder for Service 1. When there is no channel data there will be no service data.

The next setting language options are Eng, Spa, Por, Fre. Ita, Ger, Dan, Fin, or Swe. If the CDP Descriptor is disabled, then the selected language does not matter.

1.8 SERVICE 2 TRANSCODER

```
1.8 Encoder Settings  
CTA-708 Service 2 up  
Convert from = CC3  
Dscrptr Lang = Spa
```

This displays the current user settings for Service 2 transcoder channel and language. The first setting channel options are Off, CC1, CC2, CC3, or CC4. Off will disable the transcoder for Service 2. When there is no channel data there will be no service data.

The next setting language options are Eng, Spa, Por, Fre. Ita, Ger, Dan, Fin, or Swe. If the CDP Descriptor is disabled, then the selected language does not matter.

Note: Transcoder is just another way of saying CTA-608 channel to CTA-708 service up converter. So, it takes one of the CTA-608 channels (CC1-CC4) and converts that caption data to a CTA-708 service (S1-S2).

2. CAPTION SETTINGS

The screenshot displays the 'LINK Captioning Solutions' interface. On the left is a dark blue sidebar with the 'LINK' logo and a list of menu items: 'Devices', 'Studio One', 'Information', '1. Encoder Settings', '2. Caption Settings' (highlighted), '3. Decoder Settings', '4. Audio Settings', '5. XDS & Misc. Settings', '6. Port Settings', '7. Network Settings', '8. Default Settings', 'Manual', and 'Maintenance'. The main content area has a dark blue header with a hamburger menu icon and the title '2. Caption Settings'. Below the header, six settings are listed, each with a corresponding control: '1. CDP Insertion Line' (dropdown menu set to 'HD line 9'), '2. Other Field' (dropdown menu set to 'Reencode'), '3. SD Encoding Mode' (dropdown menu set to 'VANC and VBI'), '4. CTA-608 Captions' (toggle switch set to 'ON'), '5. CTA-708 Captions' (toggle switch set to 'ON'), and '6. CDP Descriptors' (toggle switch set to 'ON'). At the bottom of the sidebar, it shows 'Version A1', '(C) Copyright 2023', and 'LINK Captioning Solutions'.

2.1 CDP INSERTION LINE

```
2.1 Caption Settings  
Caption Distribution  
Packet (CDP) Insert  
on VANC Line = 9
```

This displays the current user setting for CDP insertion line. The options are SD 525I 12 through 19, SD 625I 8 through 15, or 3G/HD 9 through 16. SMPTE recommends that the CDP is inserted on the second line after the vertical stitching line: NTSC line 12, PAL line 8, and 3G/HD line 9.

2.2 OTHER FIELD

```
2.2 Caption Settings  
Other Field Mode  
When Encoding Single  
Field = Re-encode
```

This displays the current user setting for encode mode of the other field when encoding only one field at a time. The options are Re-encode or Null. Because the CDP requires both field one and field two information, you will have to decide what to do with the other field when encoding a single field. Re-encode means it will take the preexisting field data and reinsert it. Null means the other field data will be blank (nulled).

2.3 SD ENCODING MODE

```
2.3 Caption Settings  
Type(s) of Captions  
When Encoding SD  
Option = VANC & VBI
```

This displays the current user setting for encode SD encoding mode. This mode is only viable when encoding on a standard definition input. The options are VBI Only, VANC Only, or VANC & VBI. VBI refers to Vertical Blanking Interval also known as line 21 (PAL line 22) captioning. VANC refers to Vertical Ancillary captions in this case the CDP.

2.4 CTA-608 CAPTIONS

```
2.4 Caption Settings  
CTA-608 Caption Data  
Field Insertion  
Option = Enabled
```

This displays the current user setting for enabling/disabling (on/off) of CTA-608 caption insertion. The options are enabled (On) or disabled (Off). When disabled the Orion will not insert any CTA-608 captioning data for either field. There will also be no CTA-608 descriptor in the CDP. SMPTE ST 334 states when no (CTA-)608 caption data that nulls (0 do nothing) need to be inserted. So, for both fields nulls are being inserted when disabled, no CC1-CC4 or XDS data. This setting will not affect the encoding of CTA-708 caption services. It is recommended to leave this enabled however circumstances may call for this to be disabled.

2.5 CTA-708 CAPTIONS

```
2.5 Caption Settings  
CTA-708 Caption Data  
Field Insertion  
Option = Enabled
```

This displays the current user setting for enabling/disabling (on/off) of CTA-708 caption insertion. The options are enabled (On) or disabled (Off). When disabled the Orion will not insert any CTA-708 captioning data. There will also be no service descriptors in the CDP. SMPTE ST 334 states when no (CTA-)708 caption data that nulls (0 do nothing) need to be inserted. So, for all services nulls are being inserted when disabled. This setting will not affect the encoding of CTA-608 caption channels. It is recommended to leave this enabled however circumstances may call for this to be disabled.

2.6 CDP DESCRIPTORS

```
2.6 Caption Settings  
Caption Service Info  
Descriptor Insertion  
Option = Enabled
```

This displays the current user setting for enabling/disabling (on/off) of CDP descriptors insertion. CDP descriptor is an optional section of the CDP, it can contain active service(s) language and wide screen bit. The options are enabled (On) or disabled (Off). When disabled the Orion will not insert any CDP descriptors. This setting will not affect the encoding of CTA-608 caption channels or CTA-708 caption services. It is recommended to leave this enabled however circumstances may call for this to be disabled.

3. DECODER SETTINGS

LINK
Captioning Solutions

Devices

Studio One

- Information
- 1. Encoder Settings
- 2. Caption Settings
- 3. Decoder Settings**
- 4. Audio Settings
- 5. XDS & Misc. Settings
- 6. Port Settings
- 7. Network Settings
- 8. Default Settings
- Manual
- Maintenance

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3. Decoder Settings

- 1. Decoder Output**
 - Channel/Service: CC1
 - Embedded Captions: Passthrough
- 2. Data Recovery**
 - Mode: Off
 - Port: USB1
- 3. Font**
 - Italics: Normal
 - Underline: Normal
 - Bold: Off
- 4. Foreground**
 - Color: Normal
 - Opacity: Normal
- 5. Background**
 - Color: Normal
 - Opacity: Normal
- 6. Window**
 - Color: Normal
 - Opacity: Normal
- 7. Decoded Video**
 - Color: Normal

Notes: Decoded output means that the closed (embedded) captions are made visible, burnt into the video. These decoder settings will not affect the captions that are being inserted. These settings are only for the decoder output. Recovered data will follow the data of the channel or service that is being decoded. When recovering data out of one of the serial ports it is recommended to have the baud rate set to 9600 bps.

3.1 DECODER OUTPUT

```
3.1 Decoder Settings
Burnt-in Captions
Channel/Srvc = CC1
Embedded = Passthru
```

This displays the current user settings for the decoder output and decoder embedded captions. The first setting decoder output channel/service options are CC1-CC4 (CTA-608), S1-S6 (CTA-708), Off, or Test. Test will make the unit display all possible characters, it also tests the character ROM and the 8-line RAM of the device.

The next setting embedded caption options are passthrough or delete. Delete will remove embedded captions VBI and VANC so they cannot be decoded downstream.

3.2 DATA RECOVERY

```
3.2 Decoder Settings
Caption Recovery
Mode = Off
Port = USB 1
```

This displays the current user settings for data recovery mode and recovery port. The first setting data recovery mode options are Off, Normal, Tokenize, No Codes, Alt Cod, or Nrml Init. In normal mode, caption codes are normally sent out, used for caption software to capture captions, or sent to another encoder. In tokenize mode, caption codes are converted to ASCII hexadecimal values and enclosed in brackets (tokenized), the data pair for a 3 line roll up is 14h 26h and will be tokenized as "[14 26]". In no codes mode, no caption codes will be sent out just text. Alternate Codes (Alt Cod) mode, the unit sends out carriage returns, spaces, and line feeds where it is appropriate. In this mode it will send out 708 standard character set which is the equivalent to the ASCII printable character set except for 0x7F which is a musical note it will also send out the 708 Latin character set. All characters and commands in this mode will be single byte. In normal initialization (Nrml Init) mode, encoder (Link) initialization commands along with normal captioning are sent out, allowing you to automatically re-encode recovered data.

The next setting data recovery port options are USB 1, USB 2, Serial 1, Serial 2, Ethernet 1, or Ethernet 2.

3.3 FONT

```
3.3 Decoder Settings
Font Bold = Off
Italic = Normal
Underline = Normal
```

This displays the current user settings for the decoder's font bold, Italic and underline. The first setting font bold options are on or off.

The next setting font italic options are normal, enabled, or disabled.

The next setting font underline options are normal, enabled, or disabled.

Note: The normal options will allow the decoder to follow the italic or underline caption commands. The enabled or disable option will bypass the caption commands for italic or underline.

3.4 FOREGROUND

```
3.4 Decoder Settings
Foreground Options
Color = Normal
Opacity = Normal
```

This displays the current user settings for the decoder's foreground (characters) color and opacity. The first setting foreground color options are Nor, Whi, Gre, Blu, Cya, Red, Yel, Mag, or Bla. These options will allow you to change the foreground color from the normal (Nor) caption command to one of the listed 8 colors.

The next setting foregrounds opacity options are Normal, Opaque, Flash, Semi-T, or Transp. These options will allow you to change the foreground opacity from the normal caption command to one of the listed 4 options.

3.5 BACKGROUND

```
3.5 Decoder Settings  
Background Options  
Color = Normal  
Opacity = Normal
```

This displays the current user settings for the decoder's Background color and opacity. The first setting background color options are Nor, Whi, Gre, Blu, Cya, Red, Yel, Mag, or Bla. These options will allow you to change the background color from the normal (Nor) caption command to one of the listed 8 colors.

The next setting background opacity options are Normal, Opaque, Flash, Semi-T, or Transp. These options will allow you to change the background opacity from the normal caption command to one of the listed 4 options.

3.6 WINDOW

```
3.6 Decoder Settings  
708 Window Options  
Color = Normal  
Opacity = Normal
```

This displays the current user settings for the decoder's CTA-708 window color and opacity. The first setting window color options are Nor, Whi, Gre, Blu, Cya, Red, Yel, Mag, or Bla. These options will allow you to change the window color from the normal (Nor) caption command to one of the listed 8 colors.

The next setting window opacity options are Normal, Opaque, Flash, Semi-T, or Transp. These options will allow you to change the window opacity from the normal caption command to one of the listed 4 options.

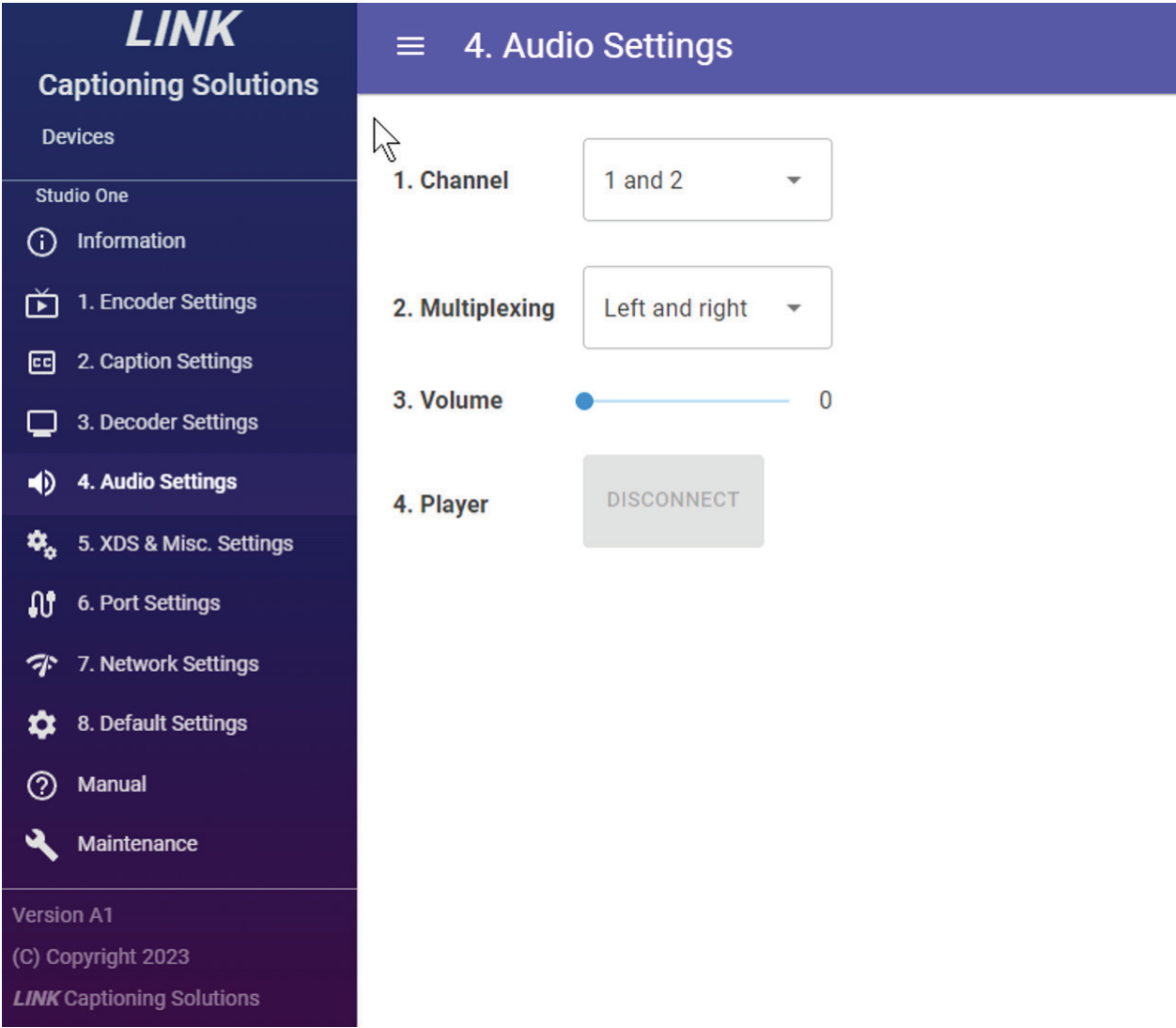
Note: These window settings are only Viable when decoding a CTA-708 service.

3.7 DECODED VIDEO

**3.7 Decoder Settings
Video on Decoder
Outputs (SDI 3 & 4)
Opacity = Normal**

This displays the current user setting for the decoder's output video. The options are normal, green, or black. In normal, the decoder's video output will be the same as the input. In the other modes the decoder's video outputs will be a static color.

4. AUDIO SETTINGS



Notes: The unit does not process audio embedded into SDI only reads audio on the SDI input. The embedded audio of the input will always be the same on the output.

4.1 CHANNEL

```
4.1 Audio Settings  
Extracting from SDI  
Audio Channel Pairs  
Option = 1&2
```

This displays the current user setting for the audio channels to be read. The options are 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12, 13 and 14, or 15 and 16. This allows the user to choose which audio pairs to use. Useful when speech or different language is on another audio pair.

4.2 MULTIPLEXING

```
4.2 Audio Settings  
Mixing of Extracted  
Audio Channel Pairs  
Option = Left&Right
```

This displays the current user setting for the audio multiplexing of the audio pair. The audio used by the unit is mono, so, need to decide how the audio pair will be multiplexed to single channel. The options are left and right, left only, or right only. Useful when the audio pair is out of phase, or when one channel is silent.

4.3 VOLUME

```
4.3 Audio Settings  
Volume (bit-shift)  
of Mixed Audio Pairs  
Option = 0
```

This displays the current user setting for the audio volume. The options are 0 through 7. This is a bit shifter not volume control, when volume (shift) is 0 the most significant bits are used. When volume (shift) is 1 the next most significant bit is used etc. Shifting the bits below the actual volume level can cause clipped and/or distorted audio at the AoIP Player or on the USB microphone. It is recommended to turn up the volume of the audio in the SDI embedded input instead of using this menu.

4.4 PLAYER

```
4.4 Audio Settings  
Disconnect Audio  
over IP (AoIP) Player  
Press Enter
```

This menu simply allows you to manually disconnect the AoIP Player. This will not only disconnect the player it will also disconnect Ethernet 1 if connected. If the player is closed properly it should disconnect from the unit. There are cases where you may need to use this, power outage at player, Internet/network interruptions, and operator errors. If the player is not connected, then this menu does not function.

5. XDS & MISC. SETTINGS

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5. XDS & Misc. Settings

- 1. V-Chip**
Mode: Disabled
Rating: Normal
Flags: V S L D
- 2. TSID**
 OFF
- 3. GPI 1 Lift(Legalizer)**
Lines: Lower two lines
- 4. GPI 2 Bypass**
Mode: Software(encoder)
- 5. GPI 3 Decoder Switch**
Channel/Service: CC1
- 6. GPI 4 Field 1 Switch**
Mode: Passthrough
Port: None
- 7. Caption Encoder Test**
 OFF

5.1 V-CHIP

```
5.1 XDS&Misc Setting
V-Chip = Disabled
Rating = Unav
Flags = Unav
```

This displays the current user settings for V-Chip insertion, rating, and flags. This is the content advisory packet that resides in XDS, commonly referred to as V-Chip. The first setting V-Chip mode options are Disabled, M.P.A., U.S. TV, Cndn Eng, or Cndn Fre. Motion Picture Association rating system (MPA), United States television parental guideline rating system (U.S. TV), Canadian English language rating system (Cndn Eng), or Canadian French language rating system (Cndn Fre). U.S TV is the most used one.

The next setting V-Chip rating will vary based on the V-Chip mode. The M.P.A. rating options are N/A, G, PG, PG-13, R, NC-17, X, or N/R. The U.S. TV rating options are None, TV-Y, TV-Y7, TV-G, TV-PG, TV-14, or TV-MA. The Cndn Eng rating options are E, C, C8+, G, PG, 14+, or 18+. The Cndn Fre rating options are E, G, 8 ans, 13ans, 16ans, or 18ans.

The next setting V-Chip flag options are V (or FV), S, L, and/or D. The V-chip flags are only available in U.S TV mode and only on certain ratings. Violence or Fantasy Violence, Sexual situations, adult Language, and sexually suggestive Dialog. Of course, when V-Chip is disabled rating and flags will be unavailable.

5.2 TSID

```
5.2 XDS&Misc Setting
Transmission Signal
ID (TSID) = Disabled
Value = 0 (0000)
```

This displays the current user settings for TSID insertion. This is the Transmission Signal Identifier packet that resides in XDS, referred to as TSID. This is a unique number assigned to a station. It is a 16-bit number 0 to 65535. Enable (turn on) this option to set the number.

5.3 GPI 1 LIFT (LEGALIZER)

```
5.3 XDS&Misc Setting
GPI 1 Lift Switch
AKA Legalizer
Lift = Lower 2 line
```

This displays the current user setting for GPI 1 lift function. The options are Lower 2 Lines, Lower 3 Lines, Lower 4 lines, or All to the Top. The lower 2-4 lines options will raise any captions on the lower 2-4 lines of the screen up to 2-4 lines. So, those 2-4 lines at bottom of screen will not have captions. All to the Top option will put all captions on the upper 4 lines of the screen. Unless GPI 1 is activated (pins 1 and 11 shorted on GPI connector) the lift will not be functional.

5.4 GPI 2 BYPASS

```
5.4 XDS&Misc Setting
GPI 2 Bypass Switch
Type of Bypass
= Software (encoder)
```

This displays the current user setting for GPI 2 bypass function. The options are software or hardware. Software bypasses the encoder (caption embedder) all outputs will be present. No video glitch in this mode. If pre-existing captions, they will be present also, no encoded or re-encoded captions on output. Hardware bypass uses the power off relays to bypass. There will be a video glitch and encode SDI 1 will be the only output. Unless GPI 2 is activated (pins 2 and 11 shorted on GPI connector) the bypass will not be functional.

5.5 GPI 3 DECODER SWITCH

```
5.5 XDS&Misc Setting
GPI 3 Decoder Switch
Burnt-in Captions
Channel/Srvc = CC1
```

This displays the current user setting for GPI 3 decoder switch function. The options are CC1-CC4, S1-S6, or off. This will allow you to turn decoded caption on or off, monitor CC1 (CTA-608) or monitor S1 (CTA-708), or monitor languages like English CC1 or Spanish CC3 at the flick of a switch. When this GPI 3 is not activated the decoder uses the first decoder setting of menu 3.1. When GPI 3 is activated (pins 3 and 11 shorted on GPI connector) the decoder will use the setting on this menu.

5.6 GPI 4 FIELD 1 SWITCH

```
5.6 XDS&Misc Setting
GPI 4 Field 1 Switch
Mode = Passthru
Port = None
```

This displays the current user settings for GPI 4 Field 1 switch function. The first setting field 1 switch encode mode options are: Passthru, Re-encode, Null, Ready, Insert, Newswire2, or Newswire3.

The next setting field 1 switch controlling Port options are: None, USB 1, USB 2, Serial 1, Serial 2, Ethernet 1, or Ethernet 2. For modes Passthru, Re-encode, and Null a port does not have to be assigned, for all other modes a port must be assigned.

When GPI 4 is activated (pins 4 and 11 shorted on GPI connector) the encoder will use the mode and port settings on this menu. When the GPI is deactivated, the encoder will use the mode and port settings on the field 1 encoder menu 1.1. You may want to change the commands ignored setting to all, on menu 1.3, this will prevent other ports from changing the field 1 encoder mode or port.

5.7 CAPTION ENCODER TEST

**5.7 XDS&Misc Setting
Orion Closed Caption
Encoder Testing
Option = Disabled**

This menu simply allows you to enable or disable the caption encoder test. When this test is on the encoder will embed a 3-line roll up test message on CC1-CC4 and on S1 and S2 (if transcoder, CTA-608 captions, CTA-708 captions, and descriptor settings are factory default). This encoder test can be useful when testing downstream equipment's ability to pass closed captions. This encoder test can also be useful for testing downstream equipment's ability to monitor captions (decode captions) like testing decoder on an SDI monitor. You will not need a captioner connected to the encoder while performing these tests. The menus will not time out and revert to the primary information display. Of course some functions will not work while the encoder is running the test.

6. PORT SETTINGS

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6. Port Settings

- 1. Serial 1 Baud Rate: 1200 bps
- 2. Serial 2 Baud Rate: 1200 bps
- 3. Ethernet 1 Reroute: Disabled Mode
- 4. Ethernet 2 Mode: Audio 16 type
- 5. Ethernet 2 Reroute: Unavailable
- 6. Serial "Daisy-Chain": Disabled Mode

Notes: Baud Rates for Ethernet ports are preset so they cannot be changed. Baud rates for USB ports are auto negotiated between PC and the Orion. So, there are no baud rate settings for these ports. The serial ports do not use flow control (none). The other parameters for all ports are set to 8 bits, parity none, stop bits 1 (8-none-1). The Orion should be able to receive 7-odd-1 but will not transmit it, so it is recommended to use 8-none-1. The USB ports are not included in the reroute options in the future they can be added.

6.1 SERIAL 1 BAUD RATE

```
6.1 Port Settings
Serial Port 1 Baud
Rate Bits Per Second
Option = 1200
```

This displays the current user setting for serial 1's baud rate. The options are 1200, 2400, 4800, or 9600. These values are in bits per second (bps). The maximum baud rate for CTA-608 captioning on either field is 480 bps, so you can see 1200 bps is more than fast enough for encoding a field. However, when doing data recovery or rerouting data out this port you may want to set the baud rate to 9600 bps if the receiving device will allow this. Sending data out at slower baud rates can slow the processor down.

6.2 SERIAL 2 BAUD RATE

```
6.2 Port Settings
Serial Port 2 Baud
Rate Bits Per Second
Option = 1200
```

This displays the current user setting for serial 2's baud rate. The options are 1200, 2400, 4800, or 9600. These values are in bits per second (bps). The maximum baud rate for CTA-608 captioning on either field is 480 bps, so you can see 1200 bps is more than fast enough for encoding a field. However, when doing data recovery or rerouting data out this port you may want to set the baud rate to 9600 bps if the receiving device will allow this. Sending data out at slower baud rates can slow the processor down.

6.3 ETHERNET 1 REROUTE

```
6.3 Port Settings
Ethernet 1 Reroute
Mode = None
Port = Unavail
```

This displays the current user settings for Ethernet 1 reroute mode and reroute port(s). The first setting Ethernet 1 reroute mode options are Disabled, Resend, or Redirect. In resend mode the unit will process (encode) the Ethernet 1 data then send it out a serial port(s) this is a one-way connection to Serial port(s) data from serial port(s) will be ignored. In redirect mode the unit will not process (not encode) the Ethernet 1 data, it just sends the data out the serial port(s) this is a bi-directional connection to serial port(s).

The next setting Ethernet 1 reroute port(s) options are Serial 1, Serial 2, or Serial 1 & 2. So, data can be rerouted out of one or both serial ports. The Ethernet 1 port baud rate is 9600 bps and default serial ports are 1200 bps so buffers can be easily overrun, and data lost if sending too much data too fast through the Ethernet.

6.4 ETHERNET 2 MODE

```
6.4 Port Settings
Ethernet Port 2
Functionality
Option = Audio 16
```

This displays the current user setting for Ethernet 2 mode. The options are Data, Audio 8, Audio 16. In data mode this port functions like any other port encoder can be initialized and caption data received. When this port is not in data mode encoder initialization and caption data are ignored, it is only looking for AoIP Player connect command and AoIP Player keep connection alive commands. In Audio 8 mode the unit will send out 8-bit audio data to the AoIP Player. In Audio 16 mode the unit will send out 16-bit audio data to the AoIP Player. AoIP Player version 2.1 and above can receive this audio. When possible, it is recommended to use Audio 16.

6.5 ETHERNET 2 REROUTE

```
6.5 Port Settings
Ethernet 2 Reroute
Mode = None
Port = Unavail
```

This displays the current user settings for Ethernet 2 reroute mode and reroute port(s). The first setting Ethernet 2 reroute mode options are Disabled, Resend, or Redirect. In resend mode the unit will process (encode) the Ethernet 2 data then send it out a serial port(s) this is a one-way connection to Serial port(s) data from serial port(s) will be ignored. In redirect mode the unit will not process (not encode) the Ethernet 2 data, it just sends the data out the serial port(s) this is a bi-directional connection to serial port(s).

The next setting Ethernet 2 reroute port(s) options are Serial 1, Serial 2, or Serial 1 & 2. So, data can be rerouted out of one or both serial ports. The Ethernet 2 port baud rate is 460800 bps and default serial ports are 1200 bps so buffers can be easily overrun, and data lost if sending too much data too fast through the Ethernet.

Note: These settings are only relevant if Ethernet port 2 mode is set to data.

6.6 SERIAL “DAISY-CHAIN”

```
6.6 Port Settings
Serial to Serial
Reroute (Daisy-Chain)
Option = Disabled
```

This displays the current user setting for serial “daisy-chain” mode. The options are Disabled or Enabled. In disabled mode the unit will treat the serial ports normally. In enabled mode the unit will process data to the serial port and send that data out the other serial port. This allows you to have a modem connected to one serial port and have that same data from the modem sent out to another encoder. When Ethernet reroute is set then this menu option should be disabled.

7. NETWORK SETTINGS

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7. Network Settings

1. MAC Address

38 3B 26 75 D6 8C

2. Address Assignment

DHCP Static

3. IP Address

192 168 1 201

4. Subnet Mask

255 255 255 0 CIDR 24

5. Gateway Address

192 168 1 1

6. Ethernet IP Port Numbers

Port 1: 10001 Port 2: 10002

7. Apply Changes, Refresh, or Reacquire

APPLY REFRESH REACQUIRE

7.1 MAC ADDRESS

```
7.1 Network Settings
Media Access Control
MAC Address of unit
38:3B:26:75:D6:8C
```

This menu simply displays the unit's MAC address. There are no settings or options here. This is the address that your IT department would use to reserve an IP address for this unit.

7.2 ADDRESS ASSIGNMENT

```
7.2 Network Settings
Assignment type for
IP Address of Device
Option = Static
```

This displays the current network setting for IP address assignment. The options are DHCP or Static. In DHCP assignment mode you will not be able to change IP address, subnet mask, or gateway address because those will be set by your router. In either mode you will be able to change the port numbers that the Ethernet ports are using.

7.3 IP ADDRESS

```
7.3 Network Settings
Internet Protocol
Address of Device
192.168.001.201
```

This displays the current network settings of the IP address. Each of the 4 octets (8-bits) that make up the IP address will be considered a setting. The setting octet options are 0 through 256. The first setting is the right most octet. The fourth setting is the left most octet. The 10x multiplier will function inside these settings (octets). Before changing these settings consult with your IT department to prevent creating an address conflict.

7.4 SUBNET MASK

```
7.4 Network Settings
Subnetwork Mask
Bits (CIDR) = 24
255.255.255.000
```

This displays the current network setting for the subnet mask. The 4 octets (8-bits) of the subnet mask will not be individually changeable. Instead, a Classless Inter-Domain Routing (CIDR) value will be used as the setting and automatically change the subnet mask octets. The options are 0 through 32. Before changing this setting consult with your IT department to match the subnet mask to the proper network.

7.5 GATEWAY ADDRESS

```
7.5 Network Settings
Device's Default
Gateway IP Address
192.168.001.001
```

This displays the current network settings of the IP address of the gateway. Each of the 4 octets (8-bits) that make up the IP address will be considered a setting. The setting octet options are 0 through 256. The first setting is the right most octet. The fourth setting is the left most octet. The 10x multiplier will function inside these settings (octets). Before changing these settings consult with your IT department to make sure that the gateway address has been assigned.

7.6 ETHERNET IP PORT NUMBERS

```
7.6 Network Settings
Protocol Port Number
Ethernet 1 = 10001
Ethernet 2 = 10002
```

This displays the current network settings of the Ethernet port numbers. The first setting is Ethernet port 1, and the next setting is Ethernet port 2. The setting options for both ports are 0 through 65535. Both ports cannot be assigned the same number. Using port numbers below 1024 is not recommended, these are known as system ports. Before changing these settings consult with your IT department as these are the ports that will be forwarded by your IT department for IP captioning and/or audio over IP.

7.7 APPLY CHANGES, REFRESH OR REACQUIRE

**7.7 Network Settings
Save Changes Refresh
Reacquire options =
Select Action**

This menu does not have a network setting. It has three options, apply changes, refresh network, or reacquire network. When reacquiring network it will reload the network settings. This can be useful if the network was changed while the unit's power was on. Any change to network settings made are not applied until apply changes have been selected, once changes are applied it will reacquire the network. Refresh will reset the network connection, it will disconnect from the network and reconnect, once refreshed it will reacquire the network. All three of these options will disconnect any connections of data and/or audio from the network.

8. DEFAULT SETTINGS

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8. Default Settings

- LOAD FACTORY DEFAULTS
- LOAD USER DEFAULTS
- SAVE USER DEFAULTS

8.1 DEFAULT SETTINGS

8.1 Default Settings What to do with the Current Settings = Select Action

This menu does not have a user setting, instead this is where you tell the unit what to do with current user settings. The options are, save as defaults, load defaults, or load factory. On power-up defaults are loaded into the user settings. User setting(s) can be changed, and setting(s) are immediately applied. The new settings are not saved until you save user settings as power-on defaults. Load user defaults will load the power-on defaults into the current user settings and replaces any unsaved user settings. Load factory will load the preset factory defaults into the current user settings replacing any user settings. To return the unit back to factory power-on defaults, load factory defaults the save current user settings as power-on defaults.

FACTORY DEFAULTS

Encoder Settings

Field 1 Encode Port	None
Field 1 Encode Mode	Passthrough
Field 2 Encode Port	None
Field 2 Encode Mode	Passthrough
Encoder Commands Ignored	None
Encoder Bypass Command	Bypass
Captions on SDI Input	Ignore
Active caption timer	6 Seconds
Service 1 Transcoder	CC1
Service 1 Language	Eng (English)
Service 2 Transcoder	CC3
Service 2 Language	Spa (Spanish)

Caption Settings

CDP Insertion Line	9(HD)12(N)8(P)
Other Field Mode	Re-encode
SD Encoding Mode	VANC & VBI
CTA-608 Captions	On
CTA-708 Captions	On
CDP Descriptors	On

Decoder Settings

Decoder Channel	CC1
Closed Caption on Output	Passthrough
Data Recovery Mode	Off
Data Recovery Port	USB 1
Font Italics	Normal
Font Underline	Normal
Font Bold	Off

Foreground Color	Normal
Foreground Opacity	Normal
Background Color	Normal
Background Opacity	Normal
Window Color	Normal
Window Opacity	Normal

Audio Settings

Audio Pairs	1&2
Audio Multiplexing	L&R
Audio Level	0

XDS and Miscellaneous Settings

V-Chip System	Disabled
V-Chip Rate	None
V-Chip Flag	None
TSID On/Off	Disabled
TSID Value	0000
GPI 1 (Lift)	Lower 2 Lines
GPI 2 (Bypass)	Software
GPI 3 (Decoder Switch)	CC1
GPI 4 (Encoder Switch) Mode	Passthrough
GPI 4 (Encoder Switch) Port	None

Port Settings

Serial Port 1 Baud	1200
Serial Port 2 Baud	1200
Ethernet 1 Reroute	Disabled
Ethernet 2 Mode	Audio 16
Ethernet 2 Reroute	Unavailable
Serial to Serial Reroute	Disabled

Note: There are no factory default settings for the network settings.

MANUAL

The screenshot displays the LINK Captioning Solutions web interface. On the left is a dark blue sidebar with the LINK logo and navigation menu. The main content area shows a PDF viewer for 'Manual.pdf' at page 1 of 41. The manual's title page features the LINK ELECTRONICS logo, the text 'INSTRUCTION MANUAL MODEL: ORION Ultimate Caption Encoder', and lists features: '3G/HD/SD-SDI Closed Caption Encoder, Decoder, with Recovery, "Legalizer", IP Captioning, Audio over IP, USB Interface, USB Audio, and USB Data'. Contact information for Link Electronics is provided at the bottom.

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Manual

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LINK ELECTRONICS

INSTRUCTION MANUAL
MODEL:
ORION
Ultimate Caption Encoder

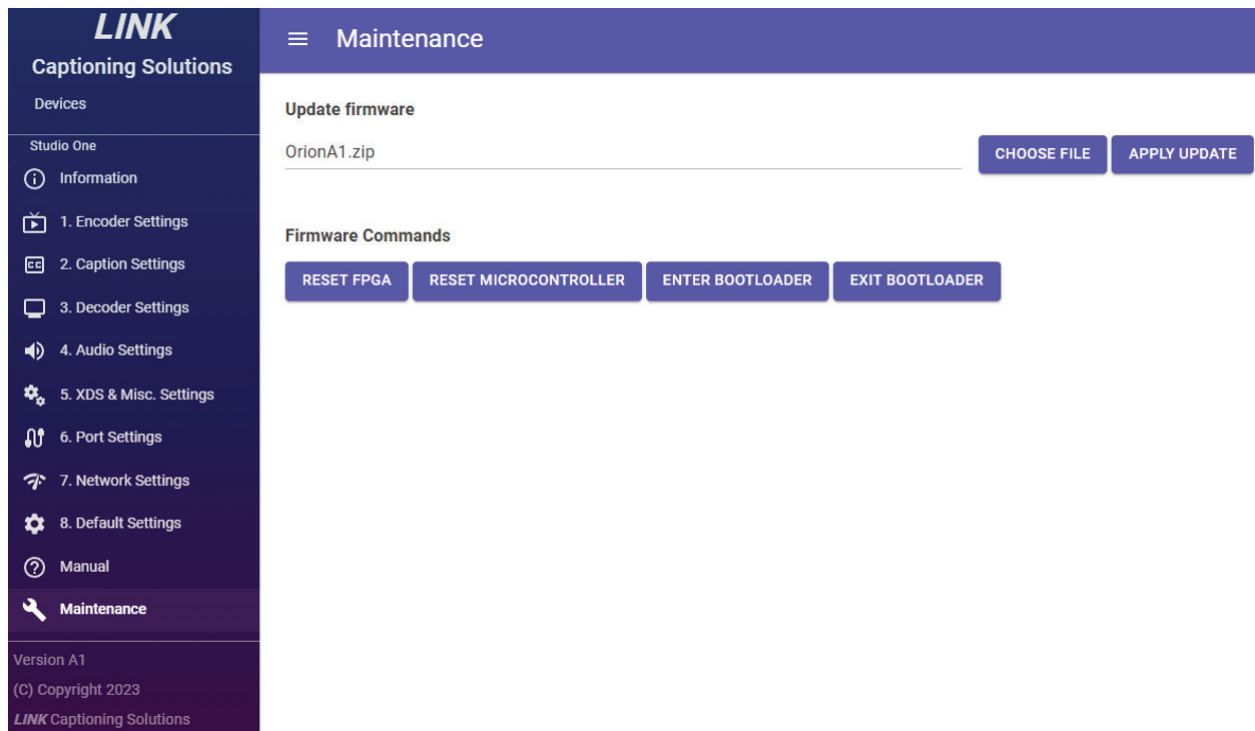
3G/HD/SD-SDI
Closed Caption Encoder, Decoder, with
Recovery, "Legalizer", IP Captioning,
Audio over IP, USB Interface, USB Audio,
and USB Data

Link Electronics
2709 State Hwy 248
Branson, MO 65616

Phone: 417-320-3438
Website: <https://linkelectronics.com>
Email: support@linkelectronics.com

This page simply opens the manual. From here you can read, print, and/or download the manual. Of course, the manual is not available from the front panel.

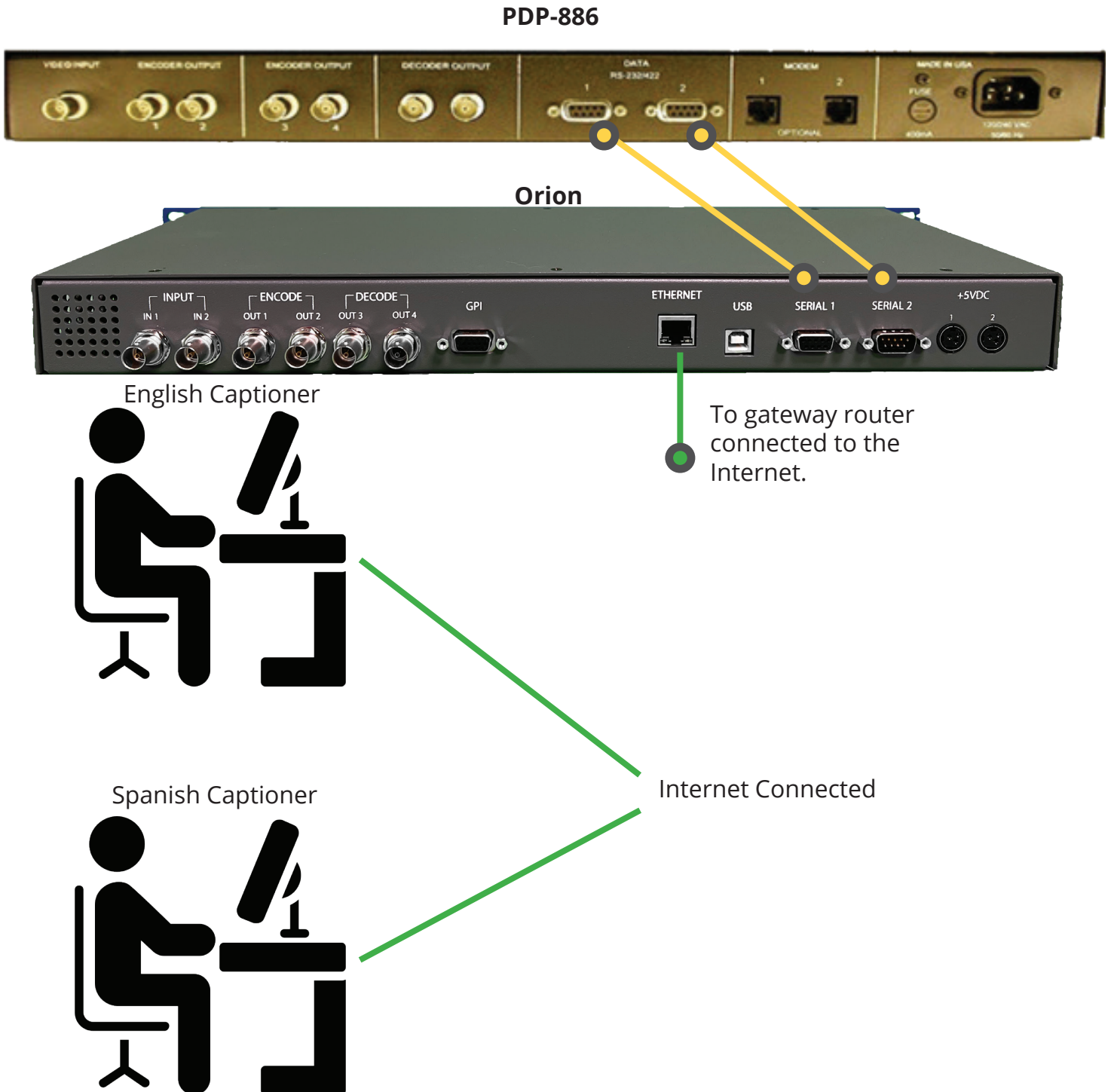
MAINTENANCE



This page allows you to update your unit if ever required. Simply choose a file, it must be one from Link and apply update. Then the OEM will update the microcontroller and/or FPGA. The microcontroller will update in about one minute and the FPGA will take about 20 minutes to update. Through this OEM and USB connection is the only way to update the unit. The firmware commands are debugging tools that can be useful if unit locks up, selecting these buttons will cause a video glitch. There may be times when updating the Orion's firmware, an update to OEM is also required. In this case update the Orion first, then uninstall the OEM and reinstall the new version.

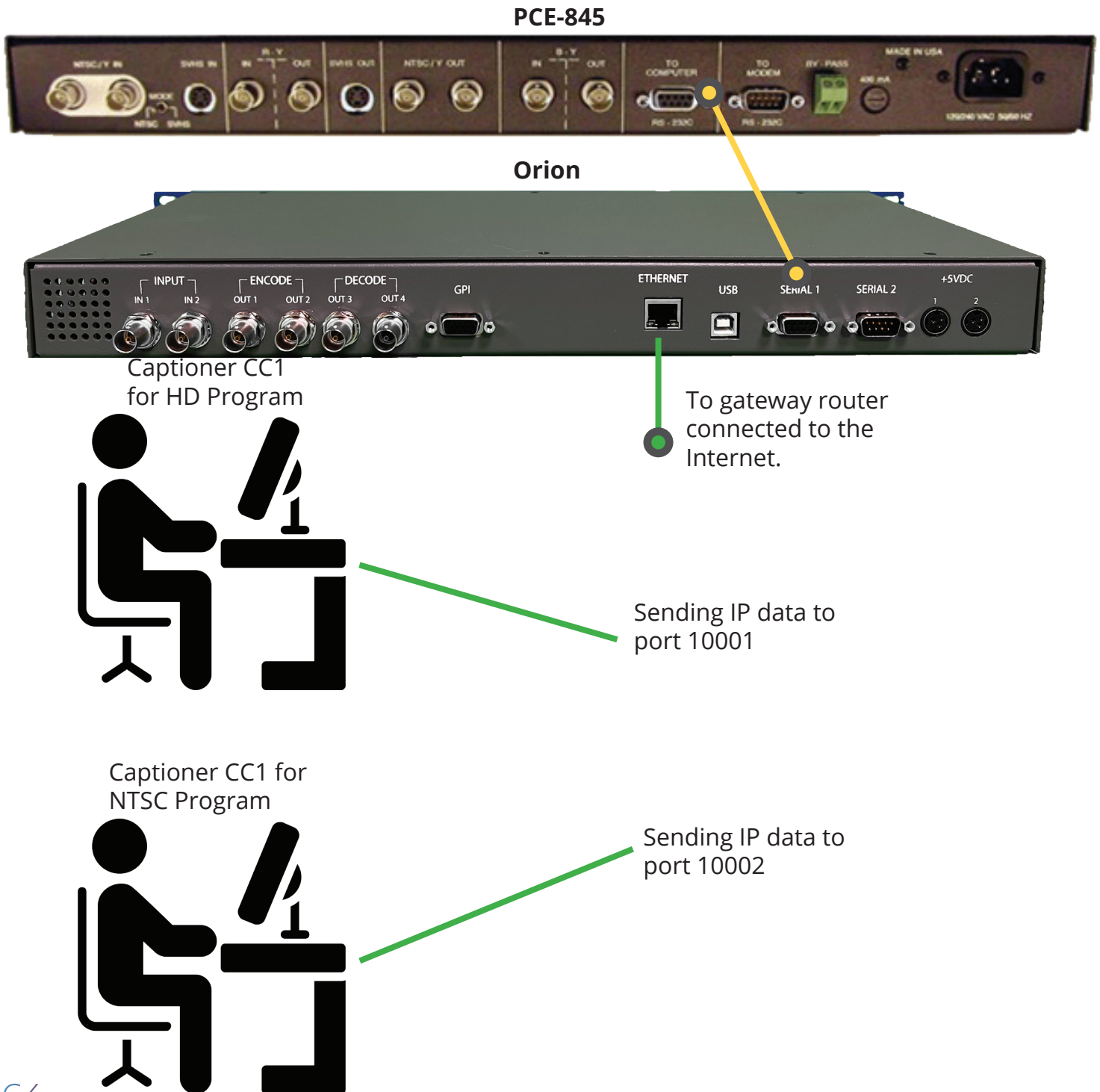
RESEND EXAMPLE

Encoding this way would result in two streams being encoded the same way. The PDP-886 would have CC1 and CC3 encoded on NTSC. The Orion would have CC1, CC3, S1, and S2 encoded on HD. On the Orion Ethernet port 1 reroute would be set to resend to serial port 1 and Ethernet port 2 reroute would be set to resend to serial port 2.



REDIRECT EXAMPLE

Encoding this way would result in two streams being encoded separately. The PCE-845 would have CC1 encoded on NTSC. The Orion would have CC1 and S1 encoded on HD. On the Orion Ethernet port 1 reroute would be set to none and Ethernet port 2 reroute would be set to redirect to serial port 2. The Orion's Ethernet port 2 is being used as a "black box". When using the redirect function of the Ethernet port the serial connection does not have to be an encoder, it could be a serial device that you want to control through the Ethernet.



PLAYER TROUBLESHOOTING

First, let's look at quiet or silent audio. Make sure your SDI stream has audio embedded on it, at adequate levels. Make sure the selected channel pairs are the ones you want to send to AoIP Player menu 4.1. If the audio pairs are out of phase with each other or one of the channels is silent noisy or low volume audio may be the result, try switching to one channel menu 4.2. If audio is too low at the AoIP Player try turning the level up menu 4.3 however if level is turned up beyond the max embedded level, then clipping and/or distortion can occur. Make sure 8-bit or 16-bit options match up on the Player (check box) with menu 6.4.

Here we will give you a brief look at different possible solutions for troubleshooting IP connection problems with the Orion. You may also want to review the Player Troubleshooting section. You can get a "bad connection" and all you can do is disconnect and then reconnect this should only be a rare occurrence. Ultimately once you have achieved a connection the quality of that connection may be at the mercy of the quality of the ISPs that are involved in the connection.

If the Player and or captioner's software will not connect, try one or more of the following. Check the port forwarding of your gateway router. Both the audio port and data port must be forwarded to the IP address that the Orion is using. At the current time the Player does not support passwords so make sure there is no password on that port. Most captioning software does support passwords but your captioner will have to be informed of this. Eliminate as many routers as possible and switchers that are in-between Orion and the gateway that you can. The more routers and switches that are in-between Orion and the gateway router the greater the chance of something that can go wrong like intermittent devices, cables, or connectors. Decreasing the number of devices can also decrease the network bandwidth.

If the player is connected but has severe audio skips check the following. Some gateway routers can have port priorities and if other ports with higher priorities are being used, they can cause the Orion's audio stream to skip or even disconnect. Set the port priorities for the audio to the highest level or change the port number that the audio uses. Network bandwidth is being exceeded, too many devices using the network at the same time. Your upload bandwidth being exceeded, some other PC or device is uploading to the internet, like uploading video for web streaming. Check with your network administrator about these issues.

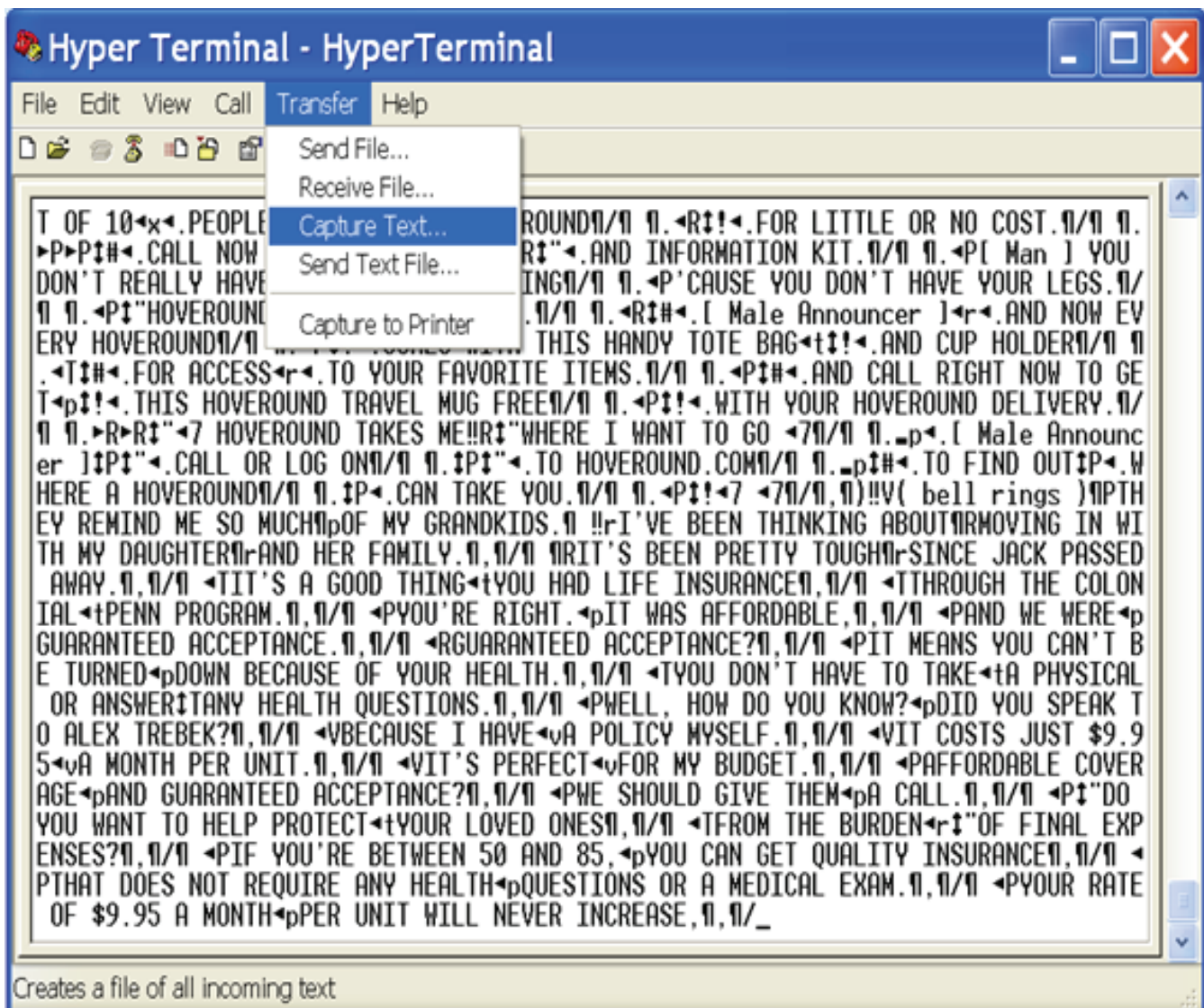
If severe audio skips only happen during peak internet traffic hours around 7pm to 9pm then your ISP maybe throttling your upload. If this happens at a regular interval, then maybe your ISP is doing service maintenance or reset during those intervals. What we experienced was an unexplained disconnect at 9:30 am every Saturday, we could immediately reconnect, and it would continue working. You will have to contact your ISP about these possibilities; however, you will probably never get an ISP to admit that they throttle uploaded data during peak hours, but it does happen. Purchasing a higher package from your ISP may fix these issues but if it does it only proves that they are throttling uploaded data. Except for lower speed DSL, most ISP packages should work with this device.

One other thing to keep in mind, PCs that are connected to the internet will do a small amount of uploading even if the PC is downloading. The Internet is a two-way street for example when browsing web pages, a small amount of data must be uploaded to move from one web page to another. When a PC gets powered up it checks the network and checks for updates for windows and other software with automatic updates on. So, if many PCs get turned on or turn off at the same time or many PCs have automatic updates at the same time this can cause a bottleneck in your network and or internet and exceed their bandwidth. Your network administrator should be able to monitor this.

CAPTION DATA RECOVERY

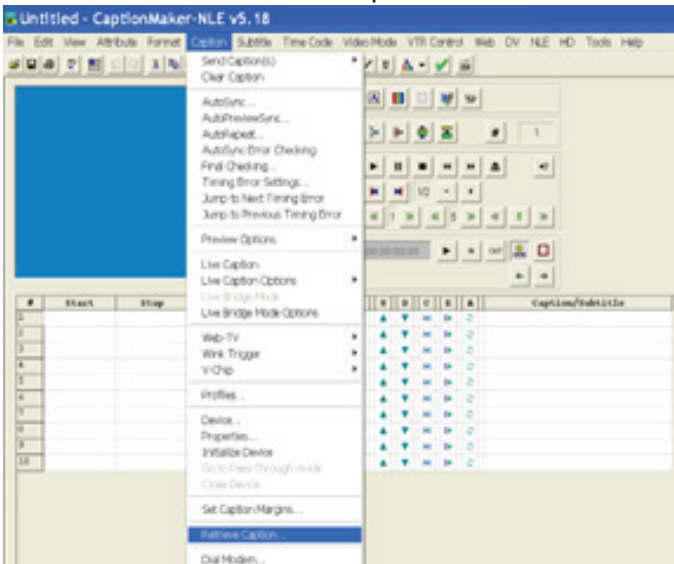
The Orion will send the caption data of the channel or service that it is decoding out the USB, Ethernet or serial port. If the decoder is on, and the unit is receiving caption data of the selected channel or service, and a data recovery port has been selected it will continuously send that data out. This data can be used for several things like caption monitoring, caption file creation, or caption data re-encoding. To get data recovery without open captions on the output video you will need to set the character, background, and window depth to transparent.

The Orion is preset at factory to be static IP at 192.168.1.235 data port number 10001, 10002 or one of the serial ports. Because the IP address is static you will not be able to connect two units to the same network at once without getting a network conflict unless you change the factory preset. Please contact Link for instructions on how to do so. The following is an example of how to capture a text file of the caption data from the Orion using Hyper Terminal: The text file will look better if you use Alternate codes mode.

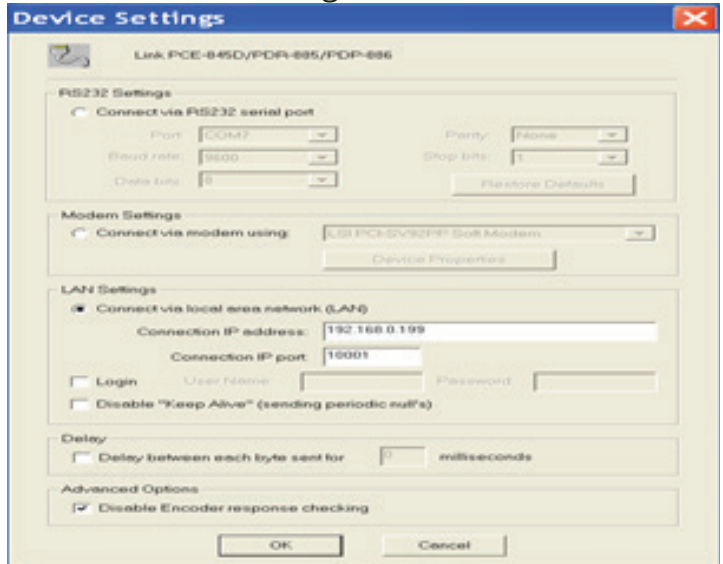


The following is an example of how to make a captioning file of the caption data from the AIP-494 using CPC CaptionMaker:

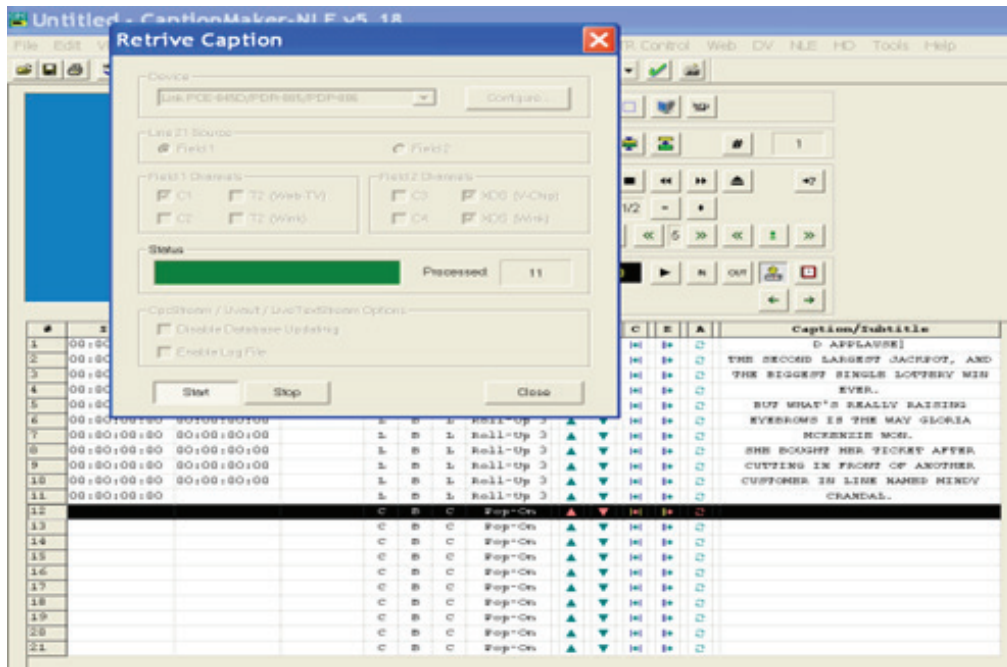
Retrieve Caption



Configure



Start



This data can also be redirected to another encoder to encode a different video stream. For example, captions from an SD video stream could be recovered using an Orion, that caption data would be sent to another encoder to encode a matching HD video stream. Another use of data recovery would be to recover the caption data with one Orion before it enters a device that losses caption data (such as a video squeezer), then re-encode the output with a second Orion.

PORT FORWARDING

Your network administrator should be able to set up port forwarding for your gateway router or firewall. We cannot tell you how to do this because it varies from device to device. Some devices will let you set up a range of ports for a local address. Some devices will only let you set one port at a time. Some devices you have to set a service to a port then assign that service to a local address. The best we can do is give you this example. First type your routers local address in your browsers address bar. Find the manual for your router to know what that address is or you may be able to use ipconfig in command prompt. You may need to know your username and password for your router. If you do not know or have forgotten your username and password refer to your router’s manual. It will show you how to reset it to a default username and password. If you need help doing this give us a call and we will work together to figure it out.

LINKSYS by Cisco Firmware Version: v7.2.06

Wireless-G Broadband Router with SpeedBooster WRT54GS

Applications & Gaming

Setup Wireless Security Access Restrictions Applications & Gaming Administration Status

Port Range Forward | Port Triggering | DMZ | QoS

Port Range Forward

Port Range					
Application	Start	End	Protocol	IP Address	Enable
SCE-492	10001 to	10002	Both	192.168.0.235	<input checked="" type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>
	0 to	0	Both	192.168.0.0	<input type="checkbox"/>

Port Range Forwarding: Certain applications may require to open specific ports in order for it to function correctly. Examples of these applications include servers and certain online games. When a request for a certain port comes in from the Internet, the router will route the data to the computer you specify. Due to security concerns, you may want to limit port forwarding to only those ports you are using, and uncheck the Enable checkbox after you are finished. More...

Save Settings Cancel Changes

CISCO

INSTRUCTIONS SET

The encoder initialization commands used for other Link encoders will work with this unit. The Orion commands are to insert (encode) on one field from one port. The port that has received the most recent field insert command will be the port that controls that field. If the encoder receives a field 1 insert command from serial port 1, it will encode serial port 1 data. Then if the encoder receives a field 1 insert command from serial port 2, it will encode serial port 2 data and ignore serial port 1 data. Keep in mind though, the CDP must have data for both fields, if field 1 only is encoded, then field 2 will have to be re-encoded or nulled.

Encode field 1 initialization commands:

^A1 (1h31h) or ^A3 (1h33h) or ^A6 (1h36h)

Encode field 2 initialization commands:

^A2 (1h32h) or ^A4 (1h34h) or ^A5 (1h35h)

CC1 newswire commands:

^ANX or AnX X = 1 - 9 or A - F (1h4EhX or 1h6EX X = 31h - 39h or 41h - 46h)

CC3 newswire commands:

^APX or ApX X = 1 - 9 or A - F (1h50hX or 1h70X X = 31h - 39h or 41h - 46h)

Newswire is a special encode mode that allows the Captioner to simply type the caption text, then every time a carriage return is received, the unit automatically encodes the caption codes for a roll up caption at the bottom of the screen. This eliminates the need for the captioning software to send out 608 commands before each line. If the command is upper case, then the captions will be a 3 line roll up, and if lower case it is a 2 line roll up. The X is for a time out bypass, the unit will go into bypass after X seconds of receiving no data. The time out is 1 to 15 seconds, if X is an invalid value it will default to 15 seconds.

Encoder bypass commands:

^A0 (1h30h) or ^A7 (1h37h)

Encoder bypass return:

^AS (1h53h)

For the bypass command to work a field must be controlled by the port receiving the command. The same is true for the bypass return command to work, the port receiving the command has to be in bypass. Any of the Encode commands will return from bypass.

Encoder soft reset commands:

^AR (1h52h) or ^F^F (6h6h)

Encoder hard reset:

^AO (1h4Fh)

A soft reset will reset the encoder and load the current settings, a hard reset will reset the encoder and load power on defaults.

Disable duplicate command:
^AQ (1h51h)

This disables the encoding of duplicate CTA-608 command codes for field 1. The CTA-608 standard states that field 1 should have duplicate command code, it is not recommended to disable them.

Run test command:
^AT (1h54h)

Encoder inquiry command:
^A? (1h3Fh)

XDS packet(s) loading:
^AV1 (1h 56h 31h)

This is immediately followed by an XDS packet. The packet should begin with the appropriate XDS class code (one byte), followed by the appropriate type of code (one byte). The actual data is loaded next and may be up to 32 characters depending upon the packet. Individual data packets are terminated by the XDS "end" control code, 0Fh. The encoder will frame the packet by adding a null byte (if necessary) and generate the required checksum. Subsequent packets are handled in the same manner, each beginning with the class/type code pair and terminating with the "end" code. The last "end" code should be followed by an ASCII carriage return (0Dh) which will terminate data loading.

XDS packet(s) removal:
^AV0 (1h56h30h)

This is immediately followed by the appropriate XDS class code (one byte) followed by the appropriate type of code (one byte) and a carriage return (0dh). To completely clear the XDS buffer, omit the class/type characters and simply transmit ^AV0 followed by a carriage return.

Error codes will be replied; "Error # 1" no data recovery commands, "Error # 2" unknown or invalid encoder command, "Error # 3" XDS already enabled on another port, "Error # 4" bad XDS command, or "Error # 5" XDS abruptly terminated bad command.

RELEASE NOTES

PRODUCT WARRANTY

Link Electronics 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 to the original customer who purchased the product. The length of the warranty may be different with some products, as noted in "Exclusion A" below, but the following restrictions apply to all products.

This warranty does not extend to products which have been subjected to misuse, neglect, accident or act of nature, 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 Link Electronics is limited to repair or replacement by Link Electronics, at its sole discretion.

The product must be shipped to Link Electronics, freight costs prepaid. Labor will be performed at the Link Electronics factory in Branson, MO. Repaired or replaced equipment shall be returned by ground/standard freight, unless customer wants to pay for expedited freight. Shipping outside of the contiguous US is at the customers expense including all duties and tax. 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 parts manufacturer. If the component part becomes obsolete and not available through distribution, Link Electronics will not be responsible for repair or replacement of a Link Electronics manufactured product.

Any repair outside of warranty will be quoted at the time of service request, if repair is possible. 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:

LINK ELECTRONICS
2709 State Hwy 248 Branson, MO 65616
Phone: 417-320-3438 Fax: 417-222-3493

EXCLUSION A

Some of the product line is affected by outside factors that LINK ELECTRONICS cannot control. These products have a limited time for the parts and labor warranty. They are, but not limited to:

ACE Series	1 year	Cable Assemblies	2 years
HCC-62	1 year	Modems for Captioning Encoders	2 years
		All through XL Series Routers	3 years