EN537 Lexi™
ENCODER

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Introduction

Product Description

The EN537 is an affordable caption encoder for broadcasters requiring basic caption insertion features. The unit offers Automatic Captioning services through our cloud-hosted captioning service Lexi, supports a direct serial port or TCP/IP connection, and can be also be equipped with an optional telco modem.

Please note the EN537 unit does not support using iCap to connect to captioners. However, an iCap account is required for your EN537 to communicate with Lexi over a broadband connection.

List of Features

- ✓ **Connectivity to EEG's Cloud-hosted Automatic Captioning service, Lexi.**

- ✓ **Encoding of caption data sourced from previously encoded video sources**, two RS232 serial ports, or a dial-up modem *(optional)*

- ✓ **Encoding of CTA-708 standard closed captions** from native 708 or legacy 608 (SD) sources

- ✓ **Caption relocation** from configurable GPI triggers

- ✓ Modules for **web-streaming, scoreboard connectivity**, and much more.

- ✓ Local **logging of caption input** for future reference

- ✓ Relay-bypassed master video and auxiliary video paths

Encoder Setup

Quick Network Setup

To use Lexi or access further features on the encoder's web interface, you must first select **Network Settings** from the front panel LCD menu and setup the encoder on your network.

- ✓ **Use a Static IP address on your network to assign the Encoder (recommended)**. It doesn't have to be, and in most cases should not be, a publically routable IP address.

- ✓ **Program a gateway address** – the gateway address is typically the local network address of your router. This is necessary if you plan to connect out of your local network to iCap or any other application from the iCap Encoder.

- ✓ **Program a Subnet Mask** for your network

- ✓ **Lexi only: Program your network to allow outbound connections to https://eegcloud.tv on port 443**. Your encoder must also have a valid DNS server configured under the Network tab on the web portal. See additional Lexi setup instructions on Page 6.

As an alternative to these recommended steps you may also set up the encoder for DHCP – Selecting DHCP will automatically pull available IP, gateway, and subnet information from your network. *IMPORTANT: With DHCP, your encoder's assigned IP may change on its own which will affect how you access the web interface for your encoder.*

Video Input/Output

Put SDI video into the encoder. Output captions will appear on the SDI video output. Reference the Rear Panel Diagram located in the Hardware Reference for a diagram of the rear-panel connector.

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Test Captions

With video input connected to the encoder, you can send a stream of encoder-generated test captions to the output video to ensure proper initial setup of the encoder. To send test captions navigate to **Utilities > Test Captions > Enable > On** and a stream of test caption text should appear on the output of your encoder. Note that video input is required to send test captions.

Setting Audio Levels

Your program audio source is typically embedded in the standard video input to your encoder. Audio may also originate from a separate Analog or AES source (XLR connector input to encoder). To send this program audio to captioners through iCap, you must first configure the audio settings through the front panel menu of the encoder.

From the main menu go to **Audio Setup > Audio Mix** and set to *Stereo* or *Surround* appropriately. Next, visit **Audio Setup > Peak Level** and ensure the audio level peaks at around 80% and does not warn *"Clipping!"* This step is crucial for ensuring that quality audio is being sent to the captioner (quality audio = quality captions).

If your audio levels are too low, or too high – you can achieve an appropriate level by adjusting the audio source itself or simply adjusting the source audio level from the encoder front panel LCD menu **Audio Setup > Scale Audio** which allows you to scale the audio up or down in 6 decibel increments.

Accessing Your Encoder's Web Interface

Your Encoder's web interface can be accessed through any computer on your local network and controls many of your encoder's applications, configurations, and features (see *Security Settings and Password Protection* below for instructions on how to secure access to the web interface). You will see it referenced many times throughout this manual.

The encoder must be connected on your network to access the web interface (reference *Quick Network Setup* section on page 3). The web interface is accessed by entering the IP address assigned to your encoder in your computer's web browser. If you set the encoder up with a static IP address, the address for your web interface will be the same. If you set the encoder up with DHCP, the address can change at will and you should check the IP from the front panel of your encoder at **System Setup > Network > IP Address** to ensure you are using the correct IP to access the web interface.

Security Settings and Password Protection

To limit access to the encoder's web interface for security purposes, you may set up a password through the front panel of your encoder via **Setup > Security > Security Mode > Password.** This password will be for access to the encoder's web interface, not the encoder LCD menu. Many of the encoder's crucial features are controlled via the encoder's web interface.

Setting Date & Time

The Date and Time can be set by selecting Date/Time from the side menu on the web interface.
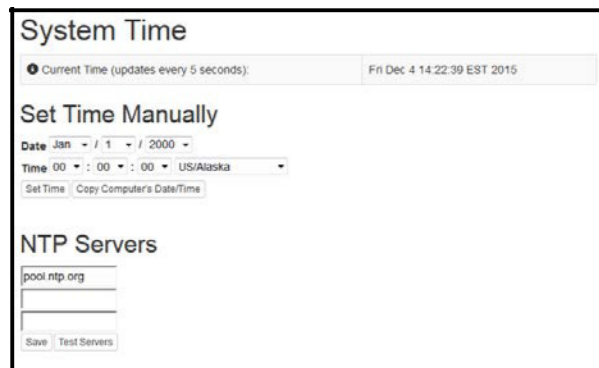

Figure 1: Date/Time Settings on the Encoder Web Interface

Updating Your Encoder

Before updating you must first download the latest update file for your encoder model from the product updates section of our website https://eegent.com/support/product_updates

Once you have downloaded the latest version for your encoder model you can apply it to the encoder either through the web interface OR the front panel USB port / LCD Menu.

- ✓ **Web Interface:** Select *Update* from the left side menu. Browse for the update file downloaded from our website, then click *Upload*, and finally click *Proceed*.

- ✓ **USB / LCD:** Transfer the update file to any USB stick. Insert the memory stick into the front panel USB port, navigate to the **System Setup > Update** from the LCD menu, and press enter to proceed and install the update. A message will appear on the LCD screen when the update has finished. **Do not remove the memory device while the update is running.**

Some updates will require a power-cycle before they take effect; in this case, the encoder will power down automatically once the update is complete.

Lexi Setup and Testing

If you did not indicate interest in Lexi at the purchase of your encoder, please contact EEG technical support at 516-293-7472 to obtain the necessary iCap and Lexi / EEG Cloud credentials. Also, be sure your EN537 is properly setup on your network prior to setting up Lexi (instructions on Page 3).

Please note the EN537 unit does not support use of iCap to connect to captioners. **However, an iCap account IS required for your EN537 to communicate with Lexi** over a standard broadband connection.

1. **Confirm iCap Connectivity and Know Your iCap Access Code:**

   ✓ **From the main page of EN537 web interface, confirm the iCap Status says *Connected to remote server.*** If inactive, contact EEG support for credentials.

   ✓ **Your iCap Access Code can be found in the shipping documentation provided with your Encoder.** This will be used in the next step to enable Lexi to access live program audio from, and return automatic captions to, your encoder over iCap.
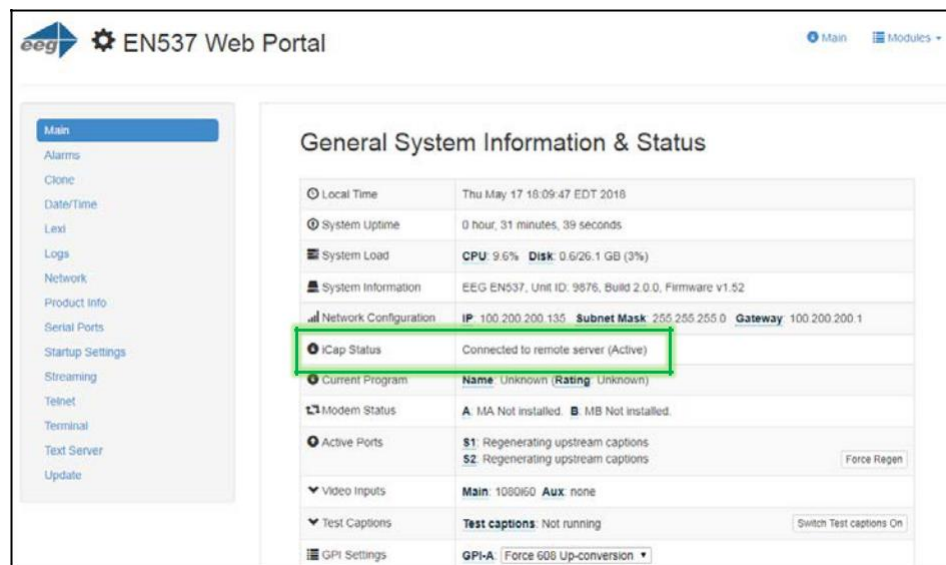

Figure 2: Active iCap Status on Encoder's Web Interface Main Page

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2. Configure Lexi on Your Encoder

✓ **Select the Lexi module from the left hand menu of the web interface. Enter your EEG Cloud Username and Password along with your encoder's Access Code.** If this information has not been preconfigured prior to shipment, noted in the paperwork that came with your encoder, or provided to you via e-mail by EEG Support contact us at 516-293-7472 to setup your Lexi account and obtain this information.

✓ **Ensure additional preferences are configured as desired.** Below are descriptions for each setting field. Once this is complete you may **click Apply Settings.**

Figure 3: Lexi Module on Encoder's Web Interface Main Page

Speech Recognition

Language   The base language models supported by Lexi currently include English-US, English-UK, and Spanish.

Custom Model   Through the EEG Cloud web site, you can manage your Lexi account and create custom language models to further improve accuracy for your unique application. This dropdown box will display all of the custom models available under your active EEG Cloud account.

Caption Display

Caption Service   Choose from primary language (CC1/S1) and secondary language (CC3/S2) options.

Number of Rows   The number of rows per roll-up caption can range from 2 to 4.

Vertical Position   CTA-608 base row options range from 2 (top of the screen) to 15 (bottom of the screen).

Horizontal Position   Choose a left horizontal offset from 0 to 28 characters.

Capital Letters   When enabled, all captions will be written in upper-case.

Lexi Client

Enable Module   Lexi must be enabled in order for the encoder to communicate with Lexi and receive captions from the cloud.

Activation Mode   When "Always active" is selected, a Lexi captioning job will be started immediately upon enabling the client module. When "Require GPI-E" is selected, a Lexi captioning job will start when GPI 5 is asserted and will run until GPI-E is de-asserted.

Inactivity Timeout   A Lexi job that that runs for this amount of time without any dialog being transcribed will be terminated automatically by the server. Set to "None" if you want jobs to be able to run indefinitely without dialog.

Block Lexi on Upstream Captions   Setting this to "Yes" will ensure that Lexi will not generate captions when upstream data is present. The time in parentheses indicates how long upstream captions will have to be absent in order for Lexi to start up again.

Monitor Service With GPO 2   When selected, GPO 2 will be active when Lexi is captioning to the selected access code, and will be inactive otherwise.

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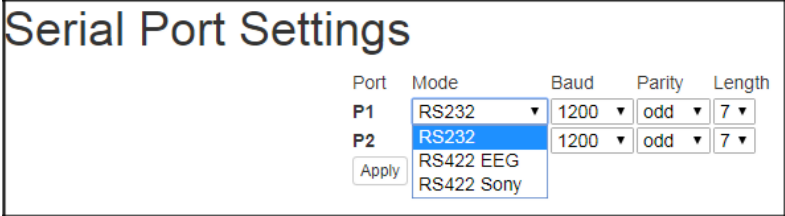# Other Live Captioning Methods

Modem (Optional Add-on)

Standard RJ-11 connection. Connect to a phone line to enable dial-up captioning and provide your captioner with the telephone number associated. Using a PBX or other digital non-POTS system is NOT recommended - many of these are not compatible with modem communications. Once connected, the LED on the front panel of your encoder labeled "MDM" will turn green.

Telnet

Enable telnet via the encoder's web interface and select a port. Configure your firewall to allow a captioner to get to your encoder on the designated port and then give your caption service provider the port number and public IP address.

RS-232 / RS-422 (Teleprompters or Other Devices)

See hardware section for cabling detail. Serial port settings are controlled through the web interface of the encoder by selecting **Serial Ports** from the left side menu or by navigating to **System Setup > P1 Mode** from the front panel LCD menu of the encoder. The EN537 supports RS-232, RS-422, and RS-422 Sony (with RS-422 and RS -422 Sony options configurable on Port 1 only). Default settings are 1200 baud, odd parity, and 7 data bits. Customized settings are sticky after power cycles. Modem will automatically take priority when active so that the prompter can be overridden as desired.

Figure 4: Serial Port Settings in the Web Interface

Common Applications

SDI Caption Bridging

Caption bridging copies captions from the source video (AUX) to the master video output. This happens automatically when you have a captioned video input connected to the AUX connector.

Dual Encoding (Two Video Paths)

The EN537 can caption to two independent video channels, embedding the same closed captions in both channels. Any two supported video standards can be combined on the inputs to produced closed-captioned video on the respective outputs. For example, if 1080i60 HD-SDI is present on the Master input and NTSC SD-SDI is present on the AUX input, the Master output will be closed-captioned 1080i60 HD-SDI and the AUX output will be closed-captioned NTSC SD-SDI.

GPI Relocation

GPI Relocation allows on-command placement control of closed captions on your output to avoid blocking essential action such as screen crawls and emergency information. You can control this feature by accessing the *Main* section of the side menu of the encoder web interface and scrolling down to the GPI settings at the bottom.

The screen is mapped into 15 regions from top to bottom that can be protected with the use of GPI settings. If you are creating a GPI switch and require a diagram of the GPIO Pinout – see the GPIO pinout / wiring detail found in the *Hardware Reference* section of the manual
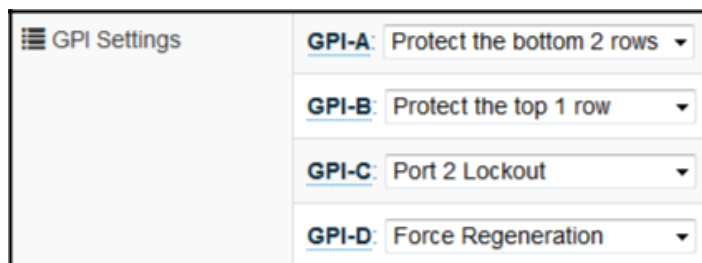

Figure 5: GPI Settings Found in "Main" Section of the Encoder Web Interface

Caption Uplink to Web Streaming Media Servers *(Streaming Add-On)*

The *Streaming* feature posts real-time caption data to external web services for delivering high-quality web-based closed captioning.

To determine if Streaming is installed on your unit, access your encoder's web interface, look for an entry that says *Streaming* on the left side menu and select it. If you are prompted for a license key, the feature is not installed and can be purchased by contacting the EEG sales team.

While the HTTP Streaming Uplink module is active, all closed captions through the encoder will be passed to the streaming server. These captions may be locally inserted to the video through iCap, telnet, or dial-up mechanisms (encoders only), or they may be present on the input video, and originally coded using either real-time/roll-up or offline/pop-on workflows.

Before using the Streaming feature, you will need a stream URL for posting captioning data (example: http://in.videolinq.net/caption), a stream ID or username, and a password.

Further instruction for this feature may be found at https://eegent.com/support/resources

Figure 6: Streaming Settings on the Encoder Web Interface

Cloning Live Data to Additional Encoders *(Clone Add-On)*

The Clone feature re-transmits all control commands and caption data to one or more additional caption encoders. The additional encoders can be connected either through RS-232, or through the Clone TCP/IP interface.

To determine if Clone is installed on your unit, access your encoder's web interface, look for an entry that says *Clone* on the left side menu and select it. If you are prompted for a license key, the feature is not installed and can be purchased by contacting the EEG sales team.

The master encoder must have the Clone port optional software installed, and then set up through clone section of the web interface. When any "Clone Server" option is enabled, the encoder will copy commands and data that are received through the dial up modem (MA), iCap, telnet, or RS-232 (P1, plus P2 if it is being used for input and not Clone output). You can also choose to copy these commands to the RS-232 port (Start RS-232).

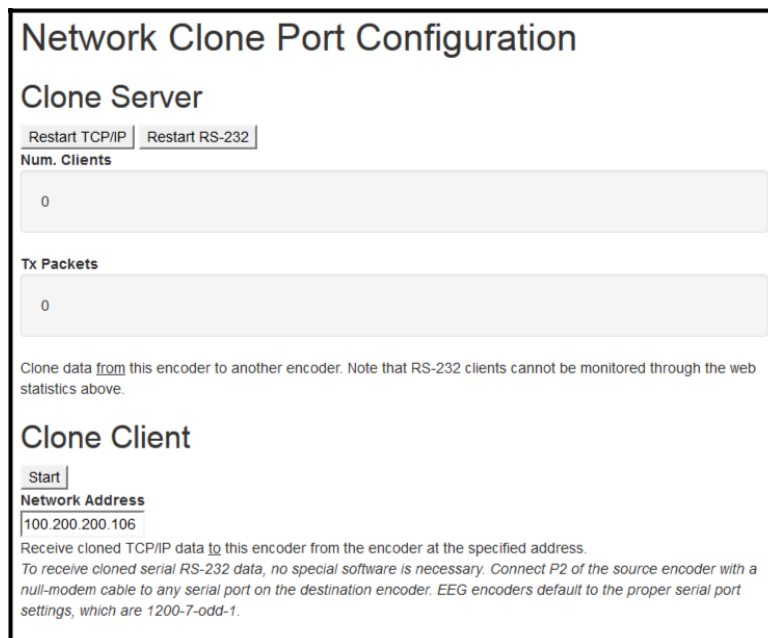Further documentation for this feature may be found at https://eegent.com/support/resources

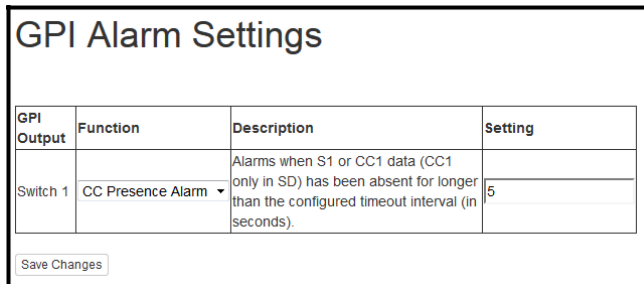Figure 7: Clone Settings on the Encoder Web Interface

XDS Insertion

Extended Data Services (XDS) is an NTSC Field 2 data channel that provides information to viewers about the program that is being aired. XDS is used to transmit FCC-mandated program ratings to allow viewer V- chip filtering. XDS is a part of the CTA-608 standard for SD broadcasts, and should be included in the 608 compatibility bytes of CTA-708 compliant HD broadcasts. *XDS insertion is typically controlled through a serial connection to an automation server and is compatible with Imagine/Harris, Snell, and EEG's XDS Xpress solution.*

XDS data packets can be loaded into the Encoder's queue with one simple command, and be held for any specified time period. Each individual packet type can be independently set for upstream or local priority, and permanent packets can be stored in Non-Volatile Memory and inserted automatically whenever the Encoder is operating. **A List of XDS commands may be found in the Command Reference section of this manual.**

Additional Features

Caption Absence Alarm

The Caption Absence Alarm feature, accessed from the Alarm section of the side menu of the encoder web interface, allows you to set alarms to automatically alert you when caption presence is not detected on the encoder for a certain amount of time. This is a useful feature for monitoring caption activity on your encoder.

Figure 8: GPI Alarm Settings on the Encoder Web Interface

Caption Input Blocking

You can block caption input to your encoder via the following non-relocation GPI functions found in the GPI Settings on your web interface. They are as follows:

- ✓ **Modem Lockout:** Blocks caption input from the Modem

- ✓ **P2 Lockout:** Blocks caption input from Serial Port 2

- ✓ **Force Regen:** Blocks caption input from Modem, P2, and iCap

Capturing Incoming VANC or 608 Data for Analysis

You can capture and save VANC data from the master video input to a USB stick for review or troubleshooting. Place a USB stick into the USB port on the front panel of your encoder and navigate to **Utilites > Capture All VANC** from the front panel LCD. Press ENTER to begin downloading the VANC data or CANCEL to exit. To stop capturing VANC data press any front panel key. Depending on the size/type of memory device used, there may be a momentary delay before the device is detected. If you see "Failed: Insert USB Disk", wait a few seconds and try again. For questions about analyzing your VANC data. Please contact our support team at 516-293-7472 or eeg.support@ai-media.tv

Hardware Reference

Front Panel
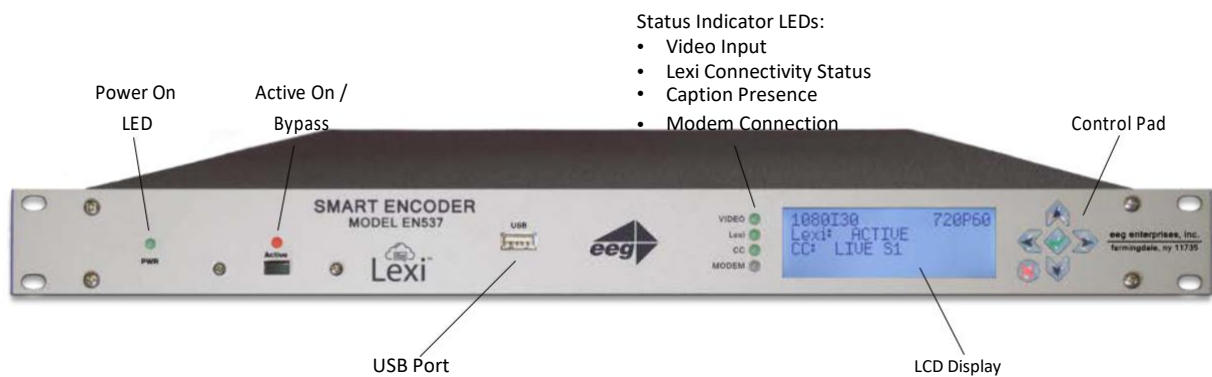
|	
Power Switch	There is one power switch on the rear panel for each power cable connected to the unit.
Power On LED	There is one power LED for each power supply connection provided with the unit
Active	Toggles the Encoder between active operations and Relay Bypass mode. In Relay Bypass mode, the signal at the master video input is routed directly through to the master video output, while the signal at the auxiliary video input is routed directly through to the auxiliary video output. Video output 2 is inactive.
Active On LED	The Active On LED will light green when the unit is in active operating mode. The LED will turn off when the Encoder is in Relay Bypass mode.
LCD Screen	The LCD Screen provides access to the unit's front panel configuration menu. Status information is displayed when the menu is not in use. Press the "check mark" button to enter the menu at any time.
Control Pad	The Control Pad provides menu navigation for the front panel configuration menus. The control pad buttons are: **ENTER** (marked by a check), **CANCEL** (marked by an 'X'), **LEFT, RIGHT, UP,** and **DOWN.**

USB Port	The front panel USB port provides firmware upgrade capability via a flash memory device. Updates can be applied through the USB port as well as the web interface. See *Updating Your iCap Encoder* section on page 5 to learn more.

Rear Panel
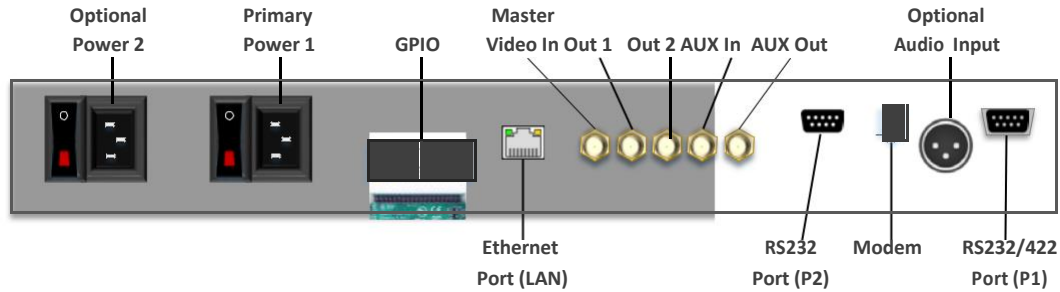
Primary Power 1	AC power input, 120 – 240 V, 50-60 Hz tolerant. Connects to the unit's AC power source. Corresponding switch powers unit on or off.
Optional Power 2	AC power input, 120 – 240 V, 50-60 Hz tolerant. Connects to the unit's AC power source (second power supply does not come standard).
GPI In & Out	Two blocks of 8 GPI input switches and 8 GPO output notifications. Switch functions vary based on software configurations.
Ethernet Port	Used to connect the encoder to your local network for access to the web interface and Lexi. The encoder will be reachable on your network using the static or DHCP IP address set in the front panel configuration menu.
Master Video In	Input for program video source - can use 3G-SDI, HD-SDI, or SD-SDI
Out 1	Relay-bypass protected primary video output.
Out 2	Non relay-bypass protected copy of the primary video output signal.

GPIO Pinout / Wiring Detail

The GPIO pins are located on the two 16-pin connectors on the rear panel of the unit. The top connector is used for the GPI switches and the bottom is used for the GPO switches, with the pins numbered in the following manner on each connector:

15	13	11	9	7	5	3	1
16	14	12	10	8	6	4	2

✓ **GPI Pin Assignments**

The GPIs use the upper 16-pin connector, which mates to a female IDC-16 connector. The pin assignments are given in the table below:

Pin(s)	Input
1,3,5,7,9,11,13,15	Ground
2	GPI-A
4	GPI-B
6	GPI-C
8	GPI-D
10	GPI-E
12	GPI-F
14	GPI-G
16	GPI-H

✓ **GPO Pin Assignments**

The GPIs use the upper 16-pin connector, which mates to a female IDC-16 connector. The pin assignments are given in the table below:

| Pins	Output
15, 16	1
13, 14	2
11, 12	3
9, 10	4
7,8	5
5,6	6
3,4	7
1,2	8

RS-232 / RS-422 Connection Detail

Both Serial ports 1 and 2 use DB-9 connectors. Only serial port 1 supports RS-422 and RS-422 Sony. See the following PIN assignments:

RS-232 Protocol		
Pin	Master	EN537
1		
2	Rx	Tx
3	Tx	Rx
4		
5	Ground	Ground
6-9		

RS-422		
Pin	Master	EN537
1	Rx-	Tx-
2	Rx+	Tx+
3	Tx+	Rx+
4	Tx-	Rx-
5	Ground	Ground
6-9		

RS-422 Sony		
Pin	Master	EN537
1		
2	Rx-	Tx-
3	Tx+	Rx+
4		
5	Ground	Ground
6		
7	Rx+	Tx+
8	Tx-	Rx-
9		

DB-9 Female connector pinout on rear of EN537 encoder:
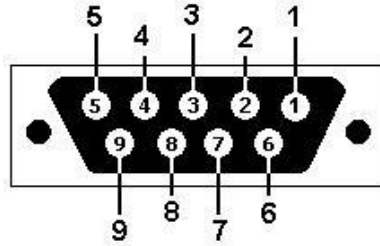
These ports can be connected directly to a standard PC serial port with a 9-pin, three wire straight serial cable. A "null modem" cable MAY NOT be used for this purpose since it will reverse the connections of pins 2 and 3. Null Modem cable may be used only when the intent is to connect two encoders together via the serial port (see *Cloning* on page 17).

Encoder Specs

HD-SDI Video Inputs

Number of Inputs	2
Connector	BNC per IEC 169-8
Format	3G (SMPTE 424M), HD (SMPTE 292M), and SD (SMPTE 259M and 344M)
Input Level	800 mV p-p ± 10%
Input Impedance	75 Ohms
Equalization	Automatic up to 100m @ 3 Gb/s with Belden 1694 or equivalent

HD-SDI Video Outputs

Number of Outputs	3
Output 1	Master (relay bypass protected)
Output 2	Master copy
Decoder Out	Auxiliary (relay bypass protected)
Connector	BNC per IEC 169-8
Output Level	800 mV p-p ± 10%
Output Impedance	75 Ohms
DC Offset	0V ± 0.5V
Rise/Fall Time	200 pS nominal
Overshoot	< 10% of amplitude
Wide Band Jitter	< 0.2 UI

DATA PORTS

LAN	RJ45 connector, 10/100/1000 Base T TCP/IP
USB	Three standard USB ports, one on front panel and two on rear
Serial Ports	Two serial DB-9 jacks, Selectable RS-232C / RS-422.
Serial Data Input Format	7 data bits, odd parity, 1 stop bit, settable between 1200-38400 baud
Modem	Paid Option. One RJ-11 telephone jacks 1200/2400 baud
GPI/GPO	Two ports which each mate to female IDC-16 connectors, Switches rated to 1A / 30 VDC

AUDIO PORTS

Port 1	LTC time code input
Port 2	Program audio input for streaming audio applications
Connector	Female XLR
Format	Balanced analog or AES balanced 110-ohm digital

FRONT PANEL

Display	Back-lit LCD display with six-button keypad and navigable menus for unit configuration
Power	Unit power switch with LED indicator
Active On	Encoder bypass switch with LED indicator

PHYSICAL

Dimensions	19" rack mount x 1 RU x 16.5" deep

ELECTRICAL

Power Supply	115/230V AC 50/60Hz
Power Consumption	Inrush: 118VA 36W Normal: 40VA 36W .31 Amps .91 Power Factor

Developer Features

Encoder Command Concept

Encoder Commands allow you to communicate with and control the operation of your encoder either manually or through your custom written software that contains any combination of the commands detailed in this section. All commands begin with a leading control code of <CTRL+A> *or the ASCII hex code 01* for developers writing software. All commands must end with a carriage return (the <ENTER> key on a keyboard *or 0D in ASCII hex*). For manual entry of commands, the three following methods may be used. A Full Command Reference may be found at the end of this section.

Telnet: Commands may be entered through a telnet connection to your encoder only after you've enabled a telnet connection through your encoders web interface (select Telnet from the side menu)

Web Terminal: The Command Terminal is found on the web interface of your encoder (select *Terminal* from the side menu). This emulates the serial port interface to your encoder and allows you to enter commands directly from your encoders web interface (see figure 19).

RS-232: Commands may be entered through an RS-232 connection to your encoder. Default settings on the encoder allow entry through RS-232 right out of the box.
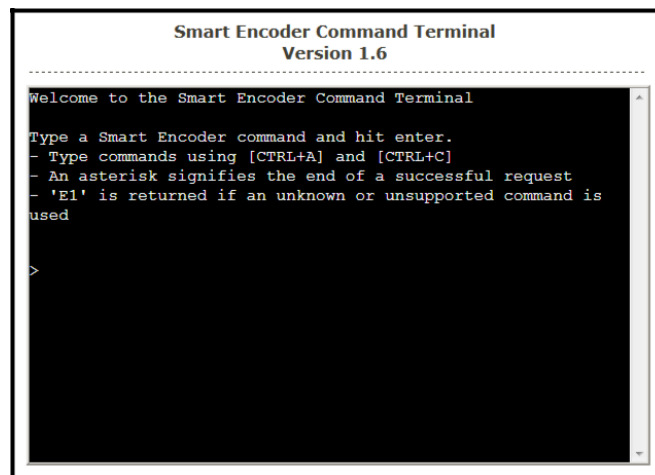
Figure 9: Command Terminal on the Encoder Web Interface

Startup Settings

The Startup Settings Editor enables entry of Encoder commands that will run every time the encoder starts up. Use Startup Settings whenever you want a setting to be "sticky"; settings entered through the Web Terminal or the serial port only are not sticky and will revert to defaults when the encoder is power-cycled. Startup Settings can be accessed via the encoder web interface by selecting *Startup Settings* from the side menu.

To use the Startup Settings editor, type any Smart Encoder command into the command box. *Omit the <CTRL+A> character entirely as this character is implied at the beginning of each line*. To add additional commands, press the '+' button and more lines will appear.

When you have entered commands for all the settings that you want to make sticky, click Update Startup Settings. The configuration changes will take the next time the encoder starts up.
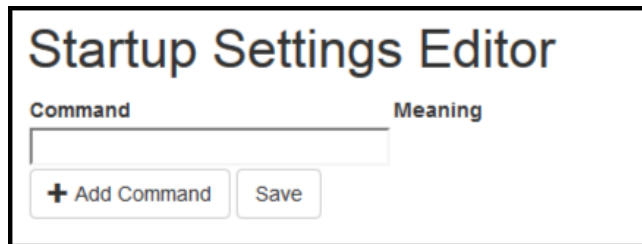
Figure 10: Startup Settings on the Encoder Web Interface

Command Reference

<CTRL+A>e [Packet] <ENTER>
<CTRL+A>P Packet <ENTER>
<CTRL+A>T -Class00 <ENTER>
<CTRL+A>T Class00 <ENTER>
<CTRL+A>T –0100 <ENTER>

[N/L] <ENTER>
<CTRL+A>4 Title [K/D] <ENTER>
<CTRL+A>9 [Channel] <ENTER>
<CTRL+A>8 [Channel] <ENTER>
<CTRL+C>
<CTRL+A>B <ENTER>

<CTRL+A>0 Title [Channel] [Repeat] [K/D] [O/H]
[N/L] <ENTER>
<CTRL+C>
<CTRL+B> Delay (delay in seconds)
<CTRL+A>0 EEG_URL T2 3 D O N <ENTER>
EEG on the Web <ENTER>
<http://www.eeg.tv>[t:p][C510]<ENTER> <CTRL+C>
<CTRL+A>1 Title [Channel] [Repeat] [K/D] [O/H]

<CTRL+A>? <ENTER>
<CTRL+A>O <ENTER>
<CTRL+A>+ [Modem] <ENTER>
<CTRL+A>A <ENTER>
<CTRL+A>b <ENTER>
<CTRL+A>S <ENTER>
<CTRL+A>5 [Channel] [I/O] <ENTER>
<CTRL+C>