Model HD9084
HD DTV Caption Encoder

Instruction Manual

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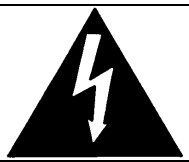
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read and keep these instructions
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOSITURE”
WARNING DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, ARE PLACED ON THE EQUIPMENT”
WARNING TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE”
WARNING THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE”

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with bother the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60065 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

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

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

NOTICE TO MODEM USERS IN THE USA

NOTE

The HD9084 Caption Encoder complies with the FCC Rules Part 68. The caption encoder is designed to be used on standard device telephone lines. It connects to the telephone line by means of a standard jack called the USOC RJ11C and should be connected to the telephone network with a FCC compliant telephone cord and modular plug.

It is not necessary to notify the telephone company before connecting the modem in the caption encoder. However, the telephone company may request the telephone number to which the caption encoder modem is connected and the FCC registration number and ringer equivalence number (REN), both of which are on the label on the rear panel.

The REN is used to determine the number of devices you may legally connect to your telephone line. In most areas, the sum of the REN of all devices connected to one line must not exceed five (5.0). You should contact your telephone company to determine the maximum REN for your calling area.

The caption encoder may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

If the modem in the caption encoder is malfunctioning, it may affect the telephone lines. In this case, disconnect the modem until the source of the difficulty is traced.

IMPORTANT INSTALLATION NOTICE

FOR A RELIABLE TELEPHONE CONNECTION TO THE MODEM IN THIS CAPTION ENCODER A DIRECT TELEPHONE LINE MUST BE USED. THIS LINE MUST NOT PASS THROUGH A PBX OR SIMILAR KEY DEVICE.

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Sep 02
0.2	Revised Preliminary versions	Oct 02
1.3	First Release version	Jan 03
1.4	Revised Edition	Jun 03
1.5	Revised Edition	Dec 03
1.8	Revised Edition	Feb 04
1.9	Updated menu structure, 708 Services	Dec 05
1.9.1	Added information on changing battery, reformatting	Aug 06

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1. OVERVIEW

The HD9084 DTVCC Caption Processor is a comprehensive, compact solution for all HD Advanced Closed Caption and SD Closed Caption requirements. Simultaneous HD-SDI and SD-SDI video I/O paths provide a one-box solution with the following functionality:

Simultaneous encoding of new captions onto HD and SD video
Transcoding and translation of captions from an SD source (EIA-608) onto HD source (SMPTE 334M)
Transcoding of captions from an HD source (SMPTE 334M) onto SD source (EIA-608)
Processing of captions from SD-SDI video source (EIA-608) to send to a compression encoder (SMPTE 333M or Grand Alliance)
Processing of captions from HD-SDI video source (SMPTE 334M) to send to a compression encoder (SMPTE 333M or Grand Alliance)

The SMPTE-292M HD-SDI video path supports 720p, 480p, or 1080i video formats. Advanced Captions are stored in the VANC of HD-SDI as per SMPTE-334M. The SMPTE-259M SDI video path supports EIA-608 captions stored on line 21 of component digital video. Both SD and HD video paths include bypass relay protection.

HD9084 supports various types of communications interface, including RS-232/422 serial, telephone modem, Ethernet TCP/IP, linear time code, and parallel GPI control. The HD9084 interfaces with all ATSC (MPEG) compression encoders and supports the following EIA-708 transfer formats: SMPTE 334M, SMPTE 333M and Grand Alliance. The built in HD closed caption decoder allows confidence monitoring of EIA-708 captions on any Analog monitor.

The HD9084 also provides caption shifting for both SD and HD captions via GPI control. This provides compliance with FCC order prohibiting obstruction of weather warning text, which often appears on the bottom of the screen.

HD9084 is easily configured using the front panel, remotely through the various communications ports, or via On-Screen display.

1.1. HOW TO USE THIS MANUAL

This manual is organised into 7 chapters: Overview, Installation, Operation, Serial Protocol, Technical Description, Troubleshooting and Glossary. There are individual tables of contents at the beginning of each chapter as well as an overall table of contents at the beginning of the manual to aid in finding the information you want.

The Overview chapter contains a brief overview of the HD9084 operation and features.

Chapter 2 gives a detailed description of the rear panel connectors, and how the HD9084 should be connected into your system.

Chapter 3 shows how to operate the menu system of the HD9084.

Chapter 4 gives a discussion the serial command protocol used for external devices to to communicate with the HD9084

Chapter 5 gives technical information such as the specifications, servicing information and how to update the firmware in the HD9084.

Chapter 6 gives a brief troubleshooting guide and answers to frequently asked questions. Consult this chapter before you call Evertz technical support.

Chapter 7 contains a glossary that define concepts and terms used throughout the remainder of the manual. We highly recommend taking the time to become familiar with the terms and concepts described here before proceeding into the rest of the manual.

This symbol is intended to alert the user to important operating instructions.

The exclamation point within an equi-lateral triangle is intended to alert the user to the presence of important safety related operating and maintenance (Servicing) instructions in this manual.

CHAPTER 2: INSTALLATION
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2. INSTALLATION

2.1. REAR PANEL

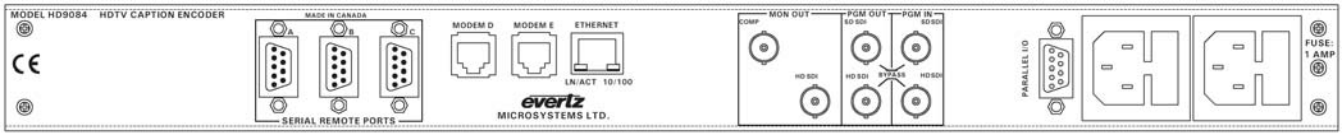

Figure 2-1: Rear Panel of HD9084

2.1.1. Program Video Inputs (PGM IN)

2.1.1.1. SD SDI

The SD SDI input is a single BNC compatible with SMPTE 259M-C format(s). This input supports upstream SD video and upstream SD video with caption information. The bypass relay comes standard with the HD9084 and is enabled using the front panel controls. Please refer to section 3.1.6 for more information regarding the SD bypass relay.

2.1.1.2. HD SDI

The HD SDI input is a single BNC compatible with SMPTE 292M 1.485 Gb/s 1080i, 720p, 480p format(s). This input supports upstream HD video and upstream HD video with 334M caption information. The bypass relay comes standard with the HD9084 and is enabled using the front panel controls. Please refer to section 3.1.5 for more information regarding the HD bypass relay.

2.1.2. Program Video Outputs (PGM OUT)

2.1.2.1. SD SDI

The SD SDI output is a single BNC compatible with SMPTE 259M-C format(s). The SD SDI outputs SD SDI video or SD SDI video with EIA 608 captions in line 21. A bypass relay comes standard with the HD9084 and is enabled using the front panel controls. Please refer to section 3.1.6 for more information regarding the SD bypass relay.

2.1.2.2. HD SDI

The HD SDI output is a single BNC compatible with SMPTE 292M 1.485 Gb/s 1080i, 720p, 480p format(s). The HD SDI outputs HD SDI video or HD SDI video with 334M captions in the VANC of the HD video signal. A bypass relay comes standard with the HD9084 and is enabled using the front panel controls. Please refer to section 3.1.5 for more information regarding the HD bypass relay.

2.1.3. Monitor Video Output (MON OUT)

2.1.3.1. COMP

1 BNC connector is provided for the output of the composite analog video signal. The **COMP** Output provides decoded EIA-708 and EIA-608 open captions burned over the video. The **COMP** output also Down Converts the incoming HD-SDI video and displays as a composite analog (PAL/NTSC) video output. The front panel menus are used to determine which data channel will be decoded. This output can be connected to any analog monitor to verify that the program data has been encoded correctly on

the program path. If the bypass relay is activated, this connector will have NO video output. Please see the DECODE SETUP menu for further setup instructions.

2.1.3.2. HD SDI

1 BNC connector for output of HD SDI digital video signals compatible with the SMPTE 292M 1.485 Gb/s 1080i, 720p, 480p standard(s). This output is identical to the PGM HD SDI output except it is not bypass protected. If the bypass relay is activated, this connector will have NO video output.

2.1.4. Serial Remote Ports

2.1.4.1. Port A

Port A is a 9-pin male 'D' connector for connection to a computer or captioning equipment. Port A functionality includes updating firmware (see section 0), and Control A functions (section 0). The front panel menus are used to set the correct baud rate, word size and parity for use with your captioning software.

As configured from the factory, the pin-out of this connector is designed for use with a readily available “null modem” cable to connect to your computer via RS-232 port. It is recommended to keep Port A free for firmware upgrades.

2.1.4.2. Port B

Port B is a 9-pin male 'D' connector for connection to a computer or captioning equipment. The front panel menus are used to set the correct baud rate, word size and parity. Ports B is used for transfer of SMPTE 333M / Grand Alliance captions, and Control A protocol.

As configured from the factory, the pin-out of this connector is designed for use with a readily available “null modem” cable to connect to your computer via RS-232 port.

Connecting the HD9084 to an ATSC encoder may require a null modem cable or straight through cable. Please check with the ATSC encoder manufacturer or ATSC manual for the correct cable type.

Do not use “gender changers” or “in house fabricated cables” to connect the HD9084 to the ATSC encoder. Always use a “store bought” Null or Straight through cable and connect directly from the HD9084 to the ATSC encoder

2.1.4.3. Port C

Port C is a 9-pin male 'D' connector for connection to a computer or captioning equipment. Ports C is used for Control A protocol. The front panel menus are used to set the correct baud rate, word size and parity for use with your captioning software.

As configured from the factory, the pin-out of this connector is designed for use with a readily available “null modem” cable to connect to your computer via RS-232 port.

2.1.4.4. Configuring Ports for RS-232

Ports A, B, and C are configured for RS-232 standard from the factory. Changing the HD9084’s serial ports to RS-232 is done by first removing the lid and locating the ribbon cables for ports A(J31), B(J30), and C(J29) on the motherboard. The connectors are located on the right hand side of the board with the front panel facing the user. Next, move the three ribbon connectors to the allocated position

marked “232” on the motherboard and set DIP switch 6,7,8 to the OFF position. Dip 6=Port A, Dip 7=Port B, and Dip 8=Port C. The port(s) are now configured for RS-232.

Serial I/O Port (A,B,C) Male (pins) Description	DB-9	DB-25	DB-9	Computer End Male (pins) Description
Shield				Shield
RS 232 Transmit	3	3	2	RS 232 Receive
Ground	5	7	5	Signal Ground
RS 232 Receive	2	2	3	RS 232 Transmit
RS 232 CTS	8	4	7	RS 232 RTS
RS 232 DTR	4	6	6	RS 232 DSR
RS 232 RTS	7	5	8	RS 232 CTS
RS 232 DSR	6	20	4	RS 232 DTR

Figure 2-2: Wiring RS-232 DTE Serial Port to Computer

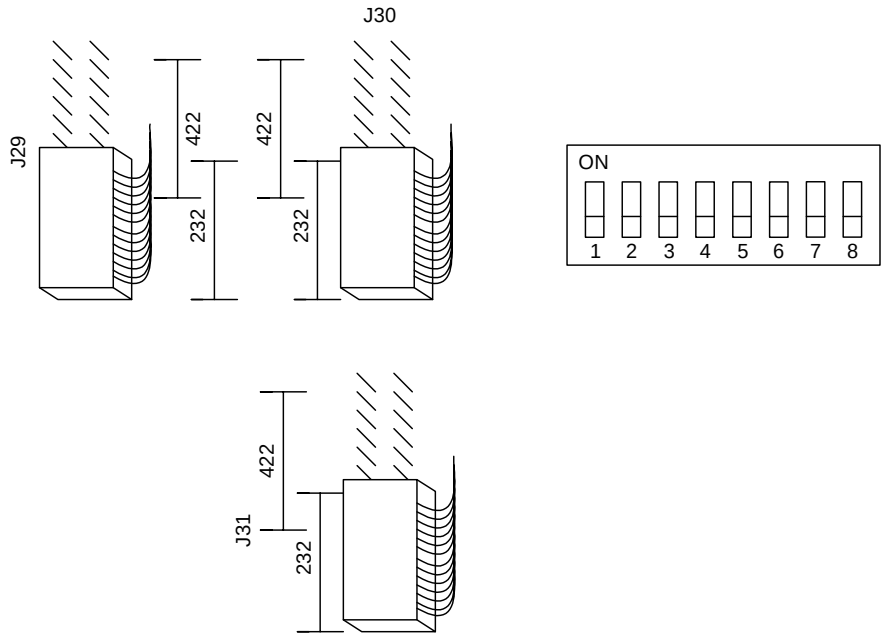

Figure 2-3: RS-232 Configuration

It is not recommended for Port A to be set to RS422 mode since this port is used for Firmware upgrades in RS232 mode

2.1.4.5. Configuring Ports for RS-422

Ports A, B, and C can be configured for RS422. Changing the HD9084’s serial ports to RS-422 is done by first removing the lid and locating the ribbon cables for ports A(J31), B(J30), and C(J29) on the motherboard. The connectors are located on the right hand side of the board with the front panel facing

the user. Next, move the three ribbon connectors to the allocated position marked “422” on the motherboard and set DIP switch 6,7,8 to the ON position. Dip 6=Port A, Dip 7=Port B, and Dip 8=Port C. The port(s) are now configured for RS-422.

Serial I/O Port (A,B,C) Male (pins)		Computer “Master” End Female	
Description	**DB-9**	**DB-9**	**Description**
Shield			Shield
Frame Ground	1	1	Frame Ground
Receive Common	6	6	Transmit Comm.
Receive A	2	2	Transmit A
Receive B	7	7	Transmit B
Transmit B	3	3	Receive B
Transmit A	8	8	Receive A
Transmit Common	4	4	Receive Common
Frame Ground	9	9	Frame Ground
not used	5	5	not used

Figure 2-4: Wiring RS-422 Tributary Serial Port to RS-422 Master

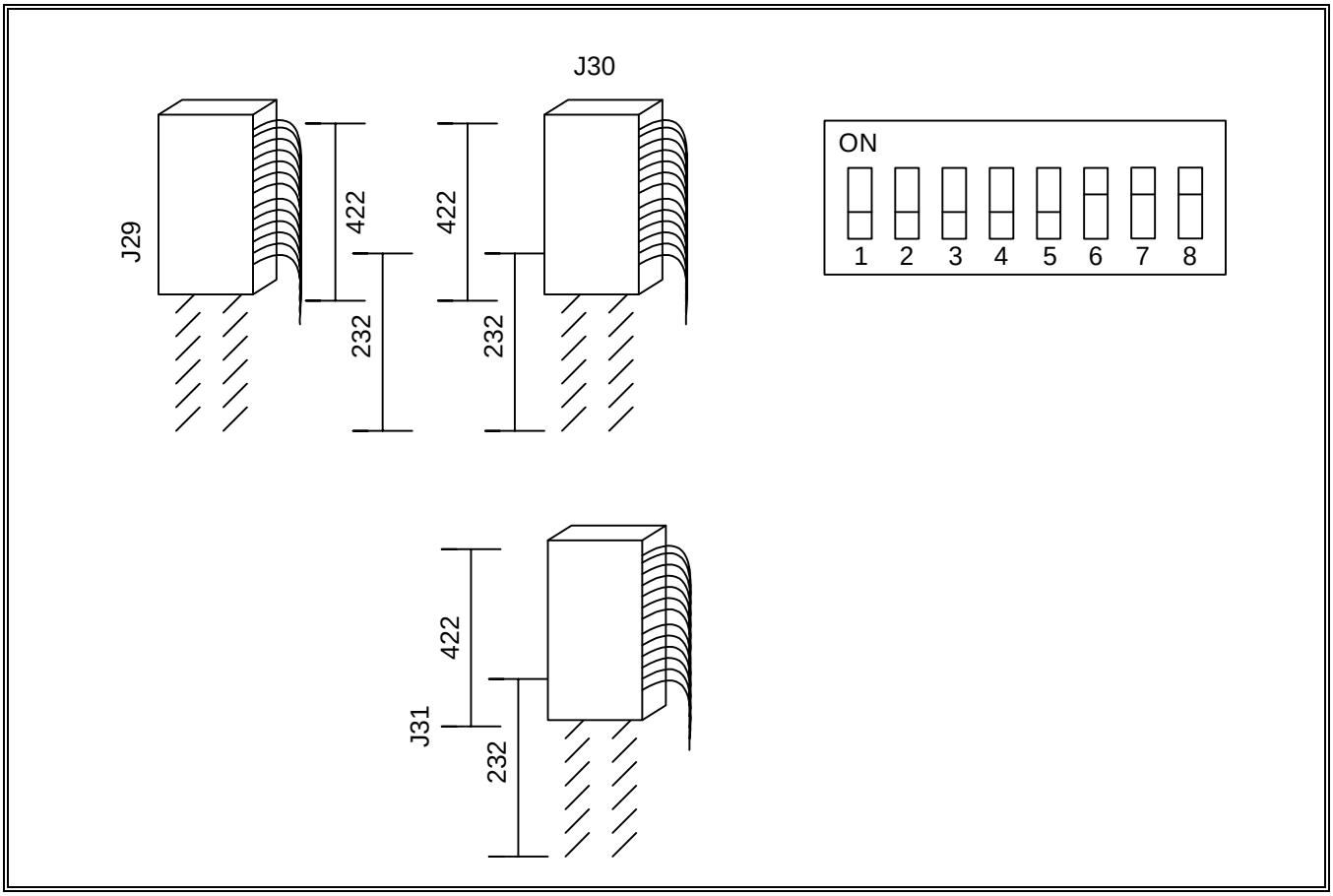

Figure 2-5: RS-422 Configuration

2.1.5. Modems

The **MODEM D** and **MODEM E** RJ11 jacks are used to connect the internal modems of the HD9084 to a telephone line, allowing computers at other locations running captioning software to communicate with the HD9084. Use of the **MODEM E** port requires the HD9084+MDM2 option to be installed in your unit. If the option is not ordered, the RJ11 jack will not be connected internally. The front panel Engineering menus are used to set the correct baud rate, word size and parity for use with your captioning software.

IMPORTANT INSTALLATION NOTICE:

For a reliable telephone connection to the modem in the caption encoder, a direct telephone line must be used. This line must not pass through a PBX or similar key device.

2.1.6. Parallel I/O- DB15 parallel I/O connector.

A DB15-15-pin female connector is used for GPI and GPO control. Each input/output is optically isolated and has an internal 47 K ohm pull-up to +5 volts. Please refer to section 2.2 for GPI/O configurations.

2.1.7. Power Supply

The HD9084 has one or two (redundant supply is optional) universal power supplies that operate on either 100-115 or 220-240 volts AC at 50 or 60 Hz and automatically senses the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry modules on the rear panel. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

The IEC 320 power entry modules combines a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter. For instructions on changing the fuses see section 5.3.1.

CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE GROUND PIN OF THE MAINS PLUG MUST BE MAINTAINED

2.2. MOUNTING

The HD9084 Closed Caption Encoder is equipped with rack mounting angles and fits into a standard 19 inch by 1 3/4 inch (483 mm x 45 mm) rack space. The mounting angles may be removed if rack mounting is not desired.

2.3. PARALLEL REMOTE CONTROL CONNECTIONS

A DB15 connector provides a method of connecting the remote control GPI signals to control the caption encoder. The GPI/O functionality of the HD9084 can be configured by the user via front panel. Each input has an internal 47K ohm pull-up resistor to +5 volts. The pin assignment of the connector is as follows:

Pin #	Name	Description
1	GND	Chassis ground
2	GPO2	General purpose output 2
3	GPO1	General purpose output 1
4	GPO3	General purpose output 3
5	GPIC	General purpose input
6	GPO4	General purpose output 4
7	GPIF	General purpose input (SD Bypass Relay)
8	GPIA	General purpose input
9	GPID	General purpose input
10	GP+3.3V	+3.3V from general purpose interface board
12	GPIE	General purpose input
13	GPIG	General Purpose Input (HD Bypass Relay)
14	GPIB	General purpose input
15	VEXT (in)	External voltage source for GPI's

Figure 2-6: GPI/O Pin Identification

Pin 10 and Pin 15 can be jumped in order to provide a VEXT (IN) voltage of 3.3v for the GPI source voltage

2.4. QUICK GPI/O SETUP GUIDE

The following features of the HD9084 can be controlled via parallel port:

2.4.1. Field 1 Keyer and Field 2 Keyer

VIDEO then **SETUP**
SD Captions
Field 1 Keyer
GPI (A-E)
Field 2 Keyer
GPI (A-E)

2.4.2. VANC Keyer Ctrl

VIDEO then **SETUP**
HD Captions
VANC Keyer Ctrl
GPI (A-E)

2.4.3. Upstream Caption selection

VIDEO then **SETUP**
Upstream Caps
HD-SDI Input SRC
GPI (A-E)
SD-SDI Input SRC
GPI (A-E)
No Input Source
GPI (A-E)

2.4.4. GPI Caption Shift

PORTS then **SETUP**
GPI Capt Shift
HD-SDI Input SRC
gpi: disabled
(A-E)

2.4.5. Port Enable/Disable

PORTS then **SETUP**
Port X Setup
Port X Enable
Enabled
Disabled
GPI (A-E)
Modem hangup

2.5. TYPICAL HD9084 CONFIGURATIONS

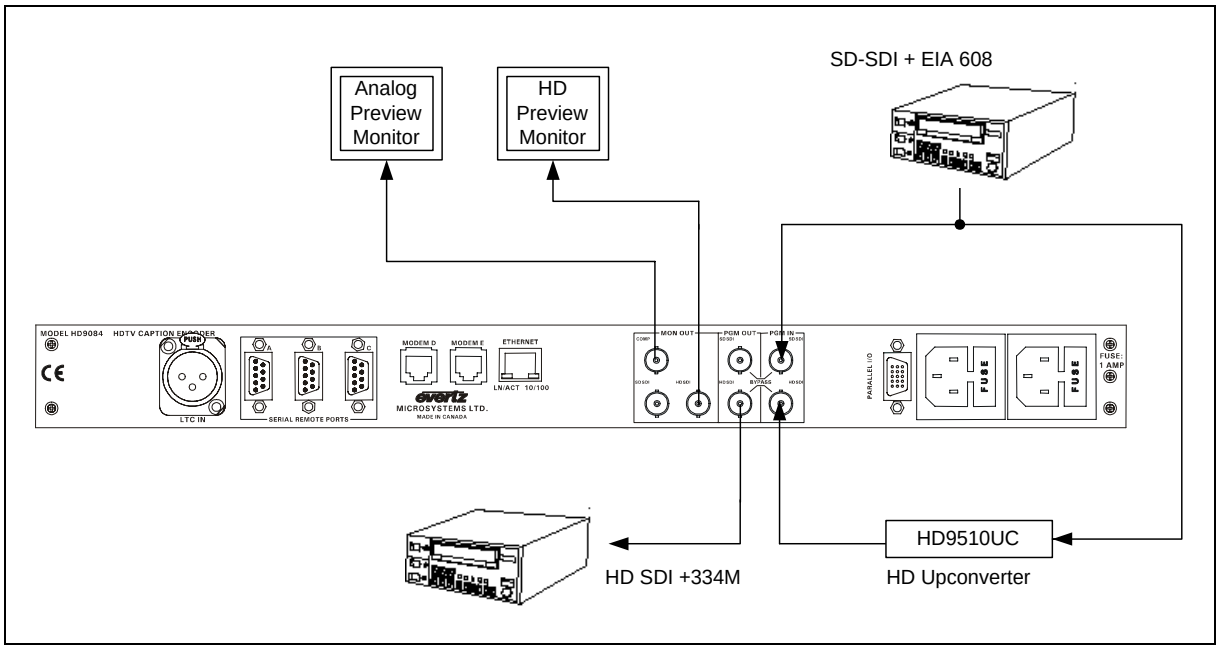

Figure 2-7: HD VANC 334M Configuration

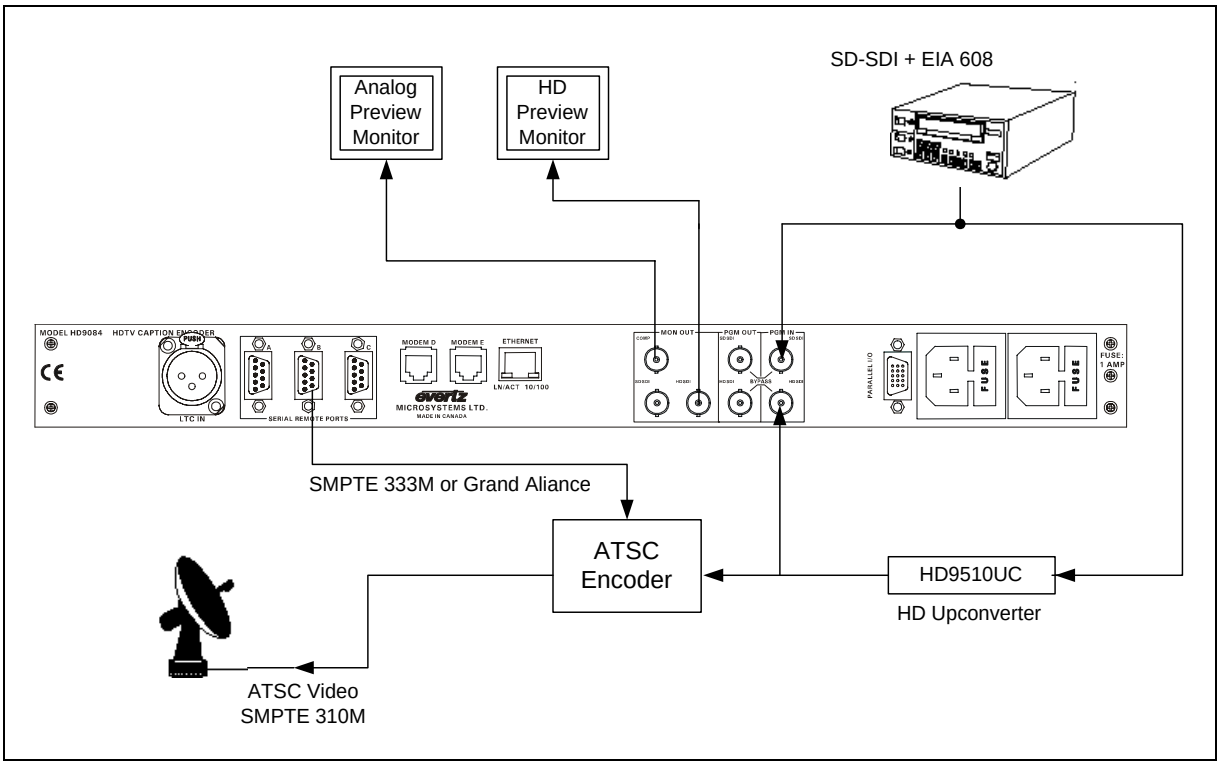

Figure 2-8: 333M or Grand Alliance Configuration

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3. OPERATION

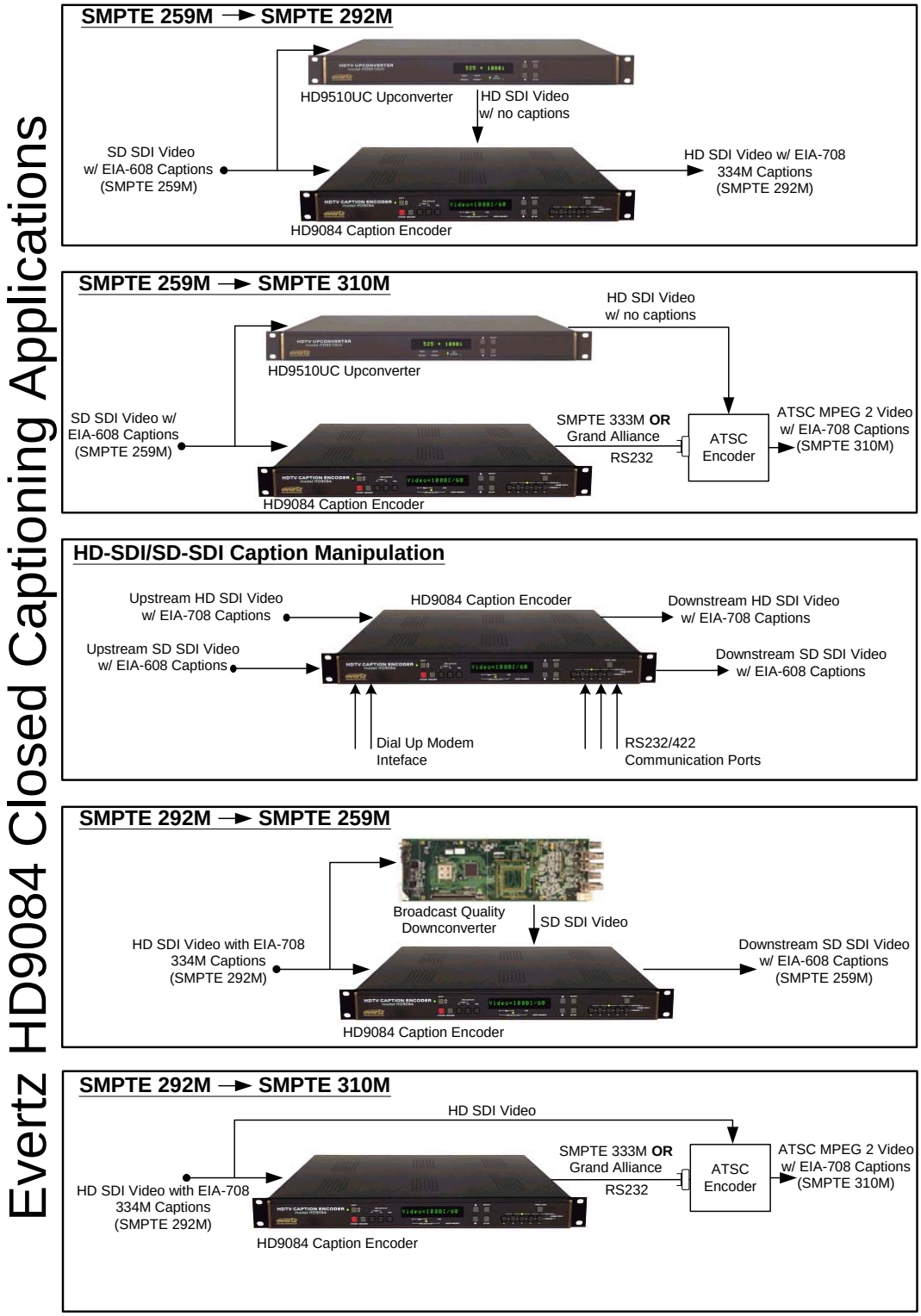


Figure 3-1: HD9084 Closed Caption Applications

3.1. NAVIGATING THE FRONT PANEL

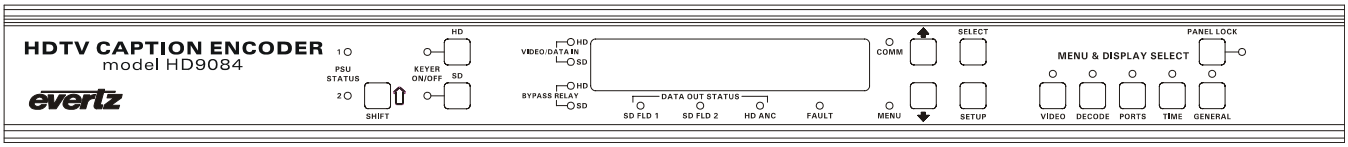


Figure 3-2: Front Panel Layout

3.1.1. Display Panel

The display panel consists of a 16 digit alphanumeric display. This allows the user to navigate through different menu systems and to see the status of the HD9084. The display panel is located on the front of the HD9084.

3.1.2. HD Keyer On/Off

The **HD KEYER ON/OFF** pushbutton toggles the High Definition Keyer on or off. When the Keyer is off, the device will clock the video through its internal registers and route it to the video output. When the Keyer is turned on, the HD ANC LED will indicate if the Ancillary data is present. The LED to the left of the push button illuminates to indicate operative status. The pushbutton is located to the left of the display on the front panel.

3.1.3. SD Keyer On/Off

The **SD KEYER ON/OFF** pushbutton toggles the Standard Definition Keyer on or off. When the Keyer is off, the device will clock the video through its internal registers and route it to the video output. When the Keyer is turned on, both the SD FLD 1 and SD FLD 2 LED's will indicate if data is present. The LED to the left of the push button illuminates to indicate operative status. The pushbutton is located to the left of the display on the front panel.

3.1.4. SHIFT⇧

Using the **SHIFT** function in combination with the KEYER push button allows the user to toggle the bypass relay(s) On/Off. (see section 3.1.5 and 3.1.6)

3.1.5. HD Bypass Relay

To toggle the HD Bypass relay on and off, hold the **SHIFT** key and press the **HD KEYER ON/OFF** Button. The **HD Bypass LED** indicates the status of the bypass relay. By default, the bypass relay is not active when the HD9084 is turned on, therefore HD processing is occurring. Once the HD bypass relay is turned on, the upstream video will be sent directly to downstream. Both the **SHIFT** and **HD KEYER ON/OFF** pushbuttons are located to the left of the front panel display.

3.1.6. SD Bypass Relay

To toggle the SD Bypass relay on and off, hold the **SHIFT** key and press the **SD KEYER ON/OFF** Button. The **SD Bypass LED** indicates the status of the bypass relay. By default, the bypass relay is not active when the HD9084 is turned on, therefore SD processing is occurring. Once the SD bypass relay is turned on, the upstream video will be sent directly to downstream. Both the **SHIFT** and **SD KEYER ON/OFF** pushbuttons are located to the left of the front panel display.

3.1.7. PANEL LOCK

The **PANEL LOCK** pushbutton locks the current front panel setup of the HD9084. The panel lock function must be turned off in order to change any settings on the unit. The LED to the right of the button illuminates indicating status. The panel lock pushbutton is located to the right of the front panel display.

3.1.8. SETUP

The **SETUP** pushbutton is used in conjunction with the menu and display pushbuttons. This allows the user to enter the 5 different menu systems in order to modify different settings on the HD9084. The menu systems are described more in detail in section 3.3. The **SETUP** pushbutton is located to the right of the front panel display, below the **SELECT** pushbutton.

3.1.9. ↑ Up Arrow

The “up arrow” is used to scroll up through the different menu systems of the HD9084. These menus will be outlined further in section 3.3. The ↑ Up Arrow is located to the right of the front panel display.

3.1.10. ↓ Down Arrow

The “down arrow” is used to scroll down through the different menu systems of the HD9084. These menus will be outlined further in section 3.3. The ↓ Down Arrow is located to the right of the front panel display.

3.1.11. SELECT

The main function of the **SELECT** pushbutton is to navigate through the menu system of the HD9084. See section 3.3. The **SELECT** pushbutton is also used in combination with other pushbuttons for added functionality. These functions will show the use of the **SELECT** pushbutton in the appropriate sections. The **SELECT** pushbutton is located to the right of the display, above the **SETUP** pushbutton.

3.1.12. VIDEO

Pressing the **VIDEO** pushbutton repeatedly allows the user to cycle through different Video front panel display options.
Pressing the **VIDEO** pushbutton, then the **SETUP** pushbutton will enter the Video menu. The user can then navigate through the menu using the **UP, DOWN, SELECT**, and **SETUP** pushbuttons. This function is outlined in further detail in sections 3.3.1 and 3.4. The LED above the **VIDEO** pushbutton will illuminate, indicating the selection. The **VIDEO** pushbutton is located to the right of the front panel display.

3.1.13. DECODE

Pressing **DECODE**, then **SETUP** will enter the Decode menu. The user can now navigate through the menu using the **UP, DOWN, SELECT**, and **SETUP** pushbuttons. This function is outlined in further detail in sections 3.3.2 and 3.5. The LED above the **DECODE** pushbutton will illuminate, indicating the selection. The **DECODE** pushbutton is located to the right of the front panel display.

3.1.14. PORTS

Pressing the **PORTS** pushbutton repeatedly allows the user to cycle through different Ports front panel displays.

Pressing the **PORTS** pushbutton, then the **SETUP** pushbutton will enter the Ports menu. The user can now navigate through the menu using the **UP, DOWN, SELECT**, and **SETUP** pushbuttons. This function is outlined in further detail in sections 3.3.3 and 3.6. The LED above the Ports pushbutton will illuminate, indicating the selection. The **PORTS** pushbutton is located to the right of the front panel display.

3.1.15. TIME

Pressing the **TIME** pushbutton repeatedly allows the user to cycle through different Time front panel displays. Pressing the **TIME** pushbutton, then the **SETUP** pushbutton will enter the Time menu. The user can now navigate through the menu using the **UP, DOWN, SELECT**, and **SETUP** pushbuttons. This function is outlined in further detail in section 3.3.4 and 3.7. The LED above the Time pushbutton will illuminate, indicating the selection. The **TIME** pushbutton is located to the right of the front panel display.

3.1.16. GENERAL

Pressing the **GENERAL** pushbutton repeatedly allows the user to cycle through different General front panel displays. Pressing the **GENERAL** pushbutton, then the **SETUP** pushbutton will enter the General menu. The user can now navigate through the menu using the **UP, DOWN, SELECT**, and **SETUP** pushbuttons. This function is outlined in further detail in section 3.3.5 and 3.8. The LED above the General pushbutton will illuminate, indicating the selection. The **GENERAL** pushbutton is located to the right of the front panel display.

3.1.17. PSU STATUS 1 LED

The PSU STATUS 1 LED indicates if power supply 1 is operational. If the LED is illuminated, power supply 1 is functional. If the LED is not illuminated, power supply 1 is not functional. Please refer to section 5.3.1 for changing the power supply fuse. The PSU Status 1 LED is located to the left of the front panel display.

3.1.18. PSU STATUS 2 LED (optional redundant power supply)

The PSU STATUS 2 LED indicates if power supply 2 is operational. If the LED is illuminated, power supply 2 is functional. If the LED is not illuminated, power supply 2 is not functional. Please refer to section 5.3.1 for changing the power supply fuse. The PSU Status 2 LED is located to the left of the front panel display.

3.1.19. Video/Data in HD LED

The Video/Data In HD Indicator is on solid when HD Video/Data is present upstream. The LED is located to the left of the front panel display.

3.1.20. Video/Data in SD LED

The Video/Data In SD Indicator is on solid when SD Video/Data is present upstream. The LED is located to the left of the front panel display.

3.1.21. Bypass Relay HD LED

The BYPASS RELAY HD indicator is on when the HD bypass relay is enabled. To enable the relay, please refer to section 3.1.5.

3.1.22. Bypass Relay SD LED

The BYPASS RELAY SD indicator is on when the SD bypass relay is enabled. To enable the relay, please refer to section 3.1.6.

3.1.23. MENU LED

The MENU LED illuminates indicating the user is in the menu system. The indicator is off when the user is at the Display Level. The MENU LED is located to the right of the front panel display.

3.1.24. COMM LED

The COMM LED is illuminated when data communication is received via serial port. Non-illuminated COMM LED indicates the HD9084 is not communicating data. The COMM LED is located to the right of the front panel display.

3.1.25. SD FLD 1 LED

The SD Field 1 LED flashes when field one data is present in the SD upstream signal. The indicator is off when field one data is not present. The LED is located below the front panel display.

3.1.26. SD FLD 2 LED

The SD Field 2 LED flashes when field two data is present in the SD upstream signal. The indicator is off when field two data is not present. The LED is located below the front panel display.

3.1.27. HD ANC LED

The HD ANC indicator is on when 334M captions are inserted into the downstream HD video. The indicator is off when 334M captions are not being inserted into the downstream HD video. The indicator is located below the front panel display.

3.1.28. FAULT LED

The FAULT indicator is on when a fault is detected by the HD9084. The indicator is off when the fault is corrected or if no faults are present. The FAULT LED is located below the front panel display.

3.2. MENU AND DISPLAY

3.2.1. Front Panel Error Messages

COMMAND ERROR (E1)	indicates the command is not recognized.
FORMAT ERROR (E2)	indicates the command parameter not recognized.
MEMORY ERROR (E3)	indicates the HD9084 is out of memory for text or XDS article storage.
ARTICLE ERROR (E6?)	indicates article name does not exist and/or article is invalid.
PERMISSION ERROR (E9)	indicates a data stream is already allocated to another port.

SMPTE333 INVALID	indicates unrecognized character from the ATSC video encoder.
SMPTE333 NAK ERR	indicates the ATSC video encoder has sent a negative acknowledgement in response to a SMPTE-333M packet sent by the HD9084
SMPTE333 OVERFLW	indicates SMPTE-333M data buffer in the HD9084 has overflowed because the ATSC video encoder is not polling fast enough for data packets.
SMPTE333 TIMEOUT	indicates that 500ms have elapsed waiting for an ACKnowledge signal from the ATSC video encoder, in response to a SMPTE-333M packet sent by the HD9084.

CDP RESERVED ERR	indicates “reserved” bits in the CDP do not have the correct value. (non-fatal error)
CDP TIMECODE ERR	indicates the Timecode section contains invalid data. (this error is non-fatal, but the time-code section will be ignored)
CDP SVCINFO ERR	indicates the Service Info section contains invalid data (this error is non-fatal, but the Service Info section will be ignored)
CDP TIME MISSING	indicates that a Timecode section was expected, but the CDP did not actually contain a Timecode section. (non-fatal).
CDP CCDATA MISSN	indicates that a Caption data section was expected, but the CDP did not actually contain a Caption data section. (non-fatal, but the CDP is fairly useless in this case).
CDP SVCINFO MSSN	indicates that a Service Info section was expected, but the CDP did not actually contain a Service Info section. (non-fatal).
CDP BAD SECTION	indicates an unknown section ID has been encountered (fatal!).
CDP BAD CDP ID	indicates a CDP does not start with the 0x9669 data ID (fatal!).
CDP DATA COUNT	indicates an invalid data count in the CDP section (fatal!).
CDP LENGTH BAD	indicates the actual CDP length does not match the data count (fatal!).
CDP CHECKSUM	indicates the calculated checksum does not match the indicated checksum (fatal!).
CDP FRAME RATE	indicates the value for the FRAME RATE in the header section is invalid (fatal!).
CDP COUNT BAD	indicates the CDP counter value in the header section is not the same as the value in the footer section. (fatal!)

SERIAL OVERFLOW	indicates that data sent via serial port or modem has exceeded the size of the buffer to hold it, and was lost.
SERIAL UNDERFLOW	indicates that the CPU attempted to get data from the serial port input buffer, but there was none available. (Should never see this; indicates an internal code problem)
SER FRAMING ERR	is similar to **SER PARITY ERROR** but encountered at a lower level in processing.
SERIAL OVERRUN	is similar to **SERIAL OVERFLOW** but encountered at a lower level in processing.
SER PARITY ERROR	indicates that communication settings of the HD9084 serial port or modem and the remote system are not identical. You may see this error if the baud rates are different as well.

PRESET LOAD ERR **PRESET SAVE ERR**	These indicate an error loading/saving presets to the non-volatile storage memory. Possibly correctable by performing a factory reset, or resetting preset storage from the bootloader.

PLD ERR NO FILE **PLD ERR DONE PIN** **PLD ERR PROG PIN** **PLD ERR FILE CRC** **PLD BAD REVISION**	These indicate errors related to Programmable Logic Devices (CPLD/FPGA) on the mainboard. These errors typically indicate hardware problems that will require service.

SD INT. LOST! **HD INT. LOST!**	These indicate that an SD or HD video interrupt has been missed. As a result, caption data may have been corrupted. These errors typically indicate hardware problems that will require service!

PARITY ERROR	indicates a parity error in EIA-608 caption data read from upstream video. You may also see this if there is excessive noise on SD line-21 or the caption level is too low.
HD INPUT OVERFLW	indicates that the volume of HD caption data coming in from upstream video has exceeded the ability to re-encode it, causing the internal buffers to overflow. This may occur as a result of the buffers being too small (code problem) or a result of oversize CDPs encoded in the upstream video (CDP/video problem).

3.2.2. Front Panel Display

The front panel of the HD9084 can be configured for different diagnostic or informative displays. To cycle through different display options, press one of the five Menu & Display pushbuttons (**VIDEO, DECODE, PORTS, TIME, GENERAL**). The HD9084 must be at the display level for the user to select a display option (MENU LED must be off).

3.2.2.1. Video Display

Press **VIDEO** repeatedly to cycle through the Video front panel displays.

Line SD=21 HD=9 (default setting)
Indicates the line number captions are encoded on the downstream video. The encoded SD-SDI line number will be displayed next to “SD=”, and the encoded HD-SDI line number will be displayed next to “HD=”. To configure these settings, please refer to section 3.4.1.

C - - - - T - - - - -
Indicates the SD-SDI services available in the upstream SD-SDI video. The dashed lines show the number indicating which service is present. “C - - - -“ indicates which caption channels, 1-4, are present. “T - - - - -“ indicates which text channels, 1-4 XDS, are present.
Example display: (C 1 - - 4 T - 2 3 - E)
The example shows caption channels 1 and 4, text channels 2 and 3, and XDS are present in the upstream SD-SDI video.

3.2.2.2. Decode Display

U1, U2

D1, D2

PA, PB, PC, PD, PE, PF

3.2.2.3. Ports Display

Press **PORTS** repeatedly to cycle through the Ports front panel displays.

C: - - - - T: - - - - -
Indicates the Caption/ Text/ XDS services received by the 5 ports of the HD9084.
Example display: (C: A B B - T: A B B D A)
This example shows: Port A is receiving Caption service 1, Text Channel 1, and XDS info. Port B is receiving Caption service 2 and 3, and Text Channel 2 and 3. Modem D is receiving Text Channel 4.

A 232 B 232 C 232 (default setting)
Indicates the configurations of ports A, B, and C. Ports A, B, and C are configured to the RS232 setting from the factory. Please refer to sections 2.1.4.4 and 2.1.4.5 to reconfigure the ports.

GPI a b c D e f G (Example Display)
This display indicates which GPI's are active. The example above shows GPI d and g are active. Please refer to section 2.3 and 3.4 for GPI configuration and setup.

3.2.2.4. Time Display

Press **TIME** repeatedly to cycle through the Time front panel displays.

Local 12:08:49 (example display)
Indicates local time. To configure local time, please refer to section 3.7.

UTC 13:15:38 (example display)
Indicates the universal coordinated time. To configure UTC time, please refer to section 3.7.

LTC in 2:34:55 (example display)
Indicates the LTC time generated from an external LTC time source. LTC will be in uppercase letters if the time source is present. ltc will be in lowercase letters if the time source is not present.

01 / 01 / 2001 Thu (example display)
Indicates month /day/year and calendar day. To configure the date display, please refer to section 3.7.

TZ = 00:00 DST DSO
Indicates the time zone offset, and indicates if the DST and DSO are enabled or disabled. If DSO or DST is displayed with uppercase letters, the function is ON/True. If the function is displayed with lower case letters, the function is OFF/False. To configure time zone, DST, and DSO, please refer to section 3.7.2.

CDP in 15:56:30
Indicates the CDP time generated from upstream CDP packets contained in the VANC space of the HD-SDI video bitstream. CDP will be in uppercase letters if the time source is present. cdp will be in lowercase letters if the time source is not present.

3.2.2.5. General Display

Press **GENERAL** repeatedly to cycle through the General front panel displays.

V: 1.2 build 1
Indicates Firmware version number and firmware build number.

PLD: 1.1 5.5 1.0 (Example Display)
The PLD display provides version numbers on the Programmable Logic Devices in the HD9084. The PLD information might be required during troubleshooting procedures when calling into the factory.

IP: 192.168.9.99
Indicates IP address that is currently set.

3.2.3. Menu System

To enter the menu system(s), select a Menu & Display button (**VIDEO, DECODE, PORTS, TIME, GENERAL**) then press **SETUP**. The LED over the corresponding button illuminates to indicate the current selection.

SELECT moves the user to the right of the menu hierarchy:
SETUP moves the user to the left of the menu hierarchy:
The ↑ UP Arrow / ↓ Down Arrow, allow the user to scroll through the different options.
To exit out of the menu system, press the **SETUP** button until the MENU LED is off.

See Section 3.4 through 3.8 for descriptions of each menu, and sub-menu function.

Letters in BOLD CAPITALS are reference to front panel push buttons.

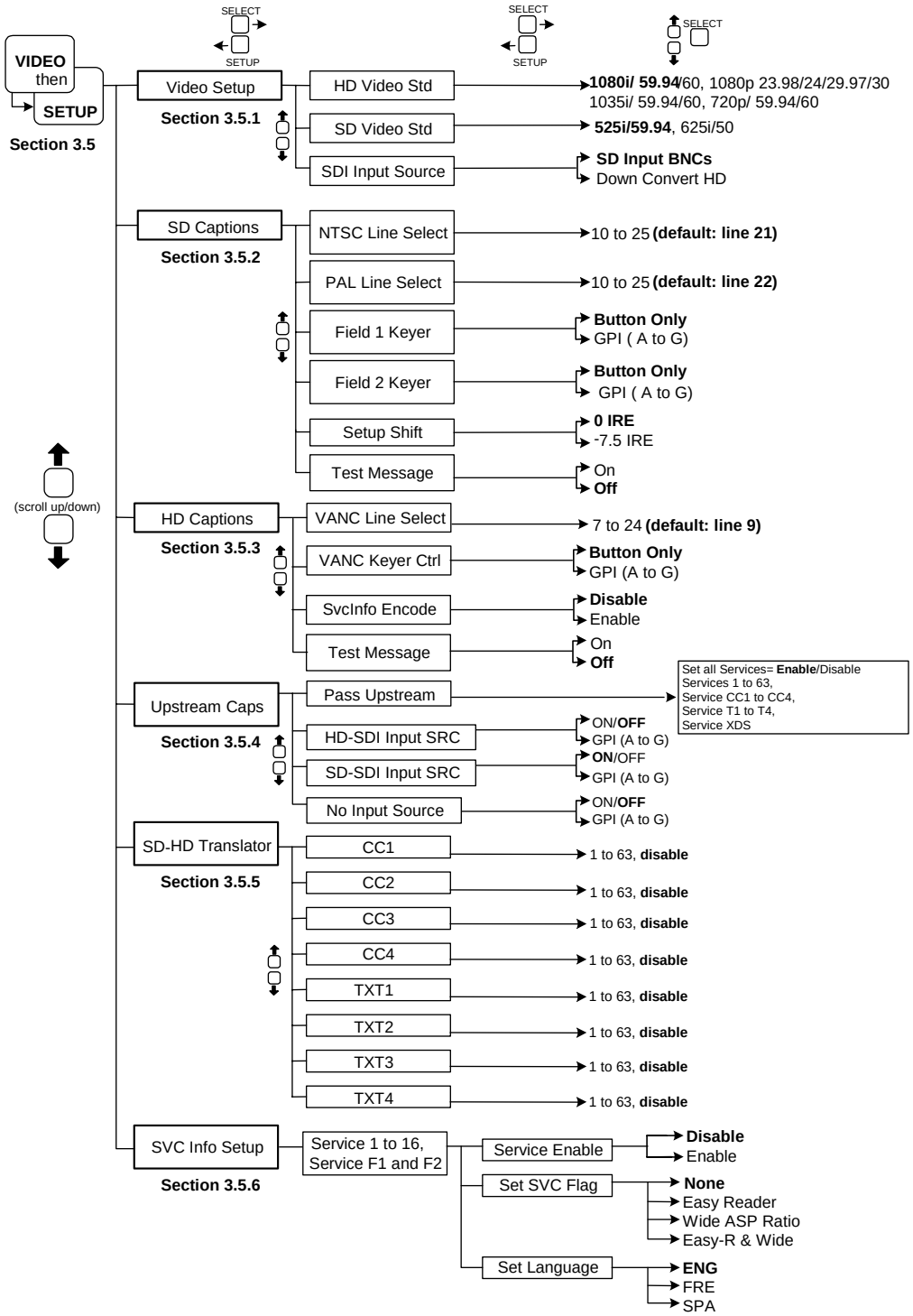
3.3. MENU OVERVIEW

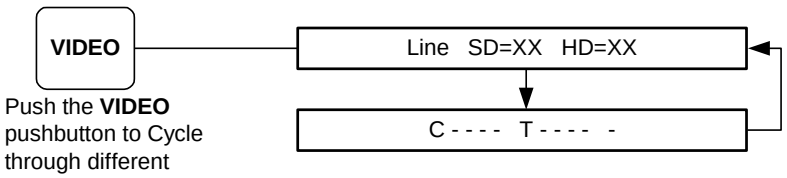
The Menu Layout is outlined on the following pages in the form of a flow chart. The menu is divided into 5 sections: VIDEO, DECODE, PORTS, TIME, GENERAL accessible by pressing the buttons of the same name followed by the **SETUP** button. Sections 3.3.1 to 3.3.5 provide a pictorial overview of each of the 5 menu sections. The buttons used for navigating the menu are also shown to give the user a quick reference guide for using the menus.

Press **VIDEO** then **SETUP**- Navigates into the VIDEO menu
Press **DECODE** then **SETUP**- Navigates into the DECODE menu
Press **PORTS** then **SETUP**- Navigates into the PORTS menu
Press **TIME** then **SETUP**- Navigates into the TIME menu
Press **GENERAL** then **SETUP**- navigates into the GENERAL menu

When in one of the menus, the following buttons are used as follows:
SELECT- Navigates down one level in the menu tree (to the right on the charts)
SETUP- Navigates up one level in the menu tree (to the left on the charts) parameter values shown when you leave the bottom level of the menu tree will be used as the control value.
UP Arrow- Scroll up through items on the same menu level
DOWN Arrow- Scroll Down through items on the same menu level

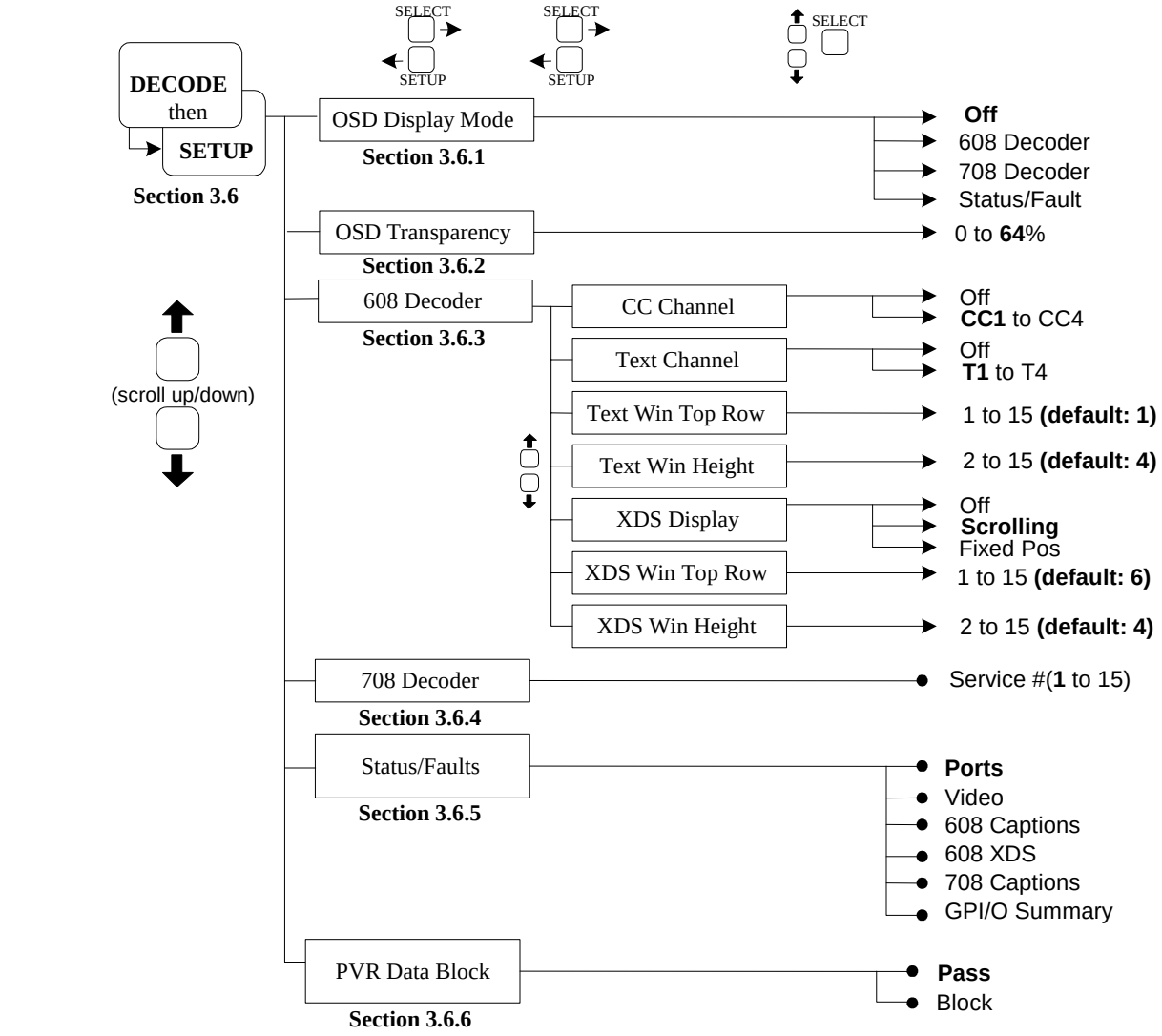
3.3.1. Video Set-up Menu Overview

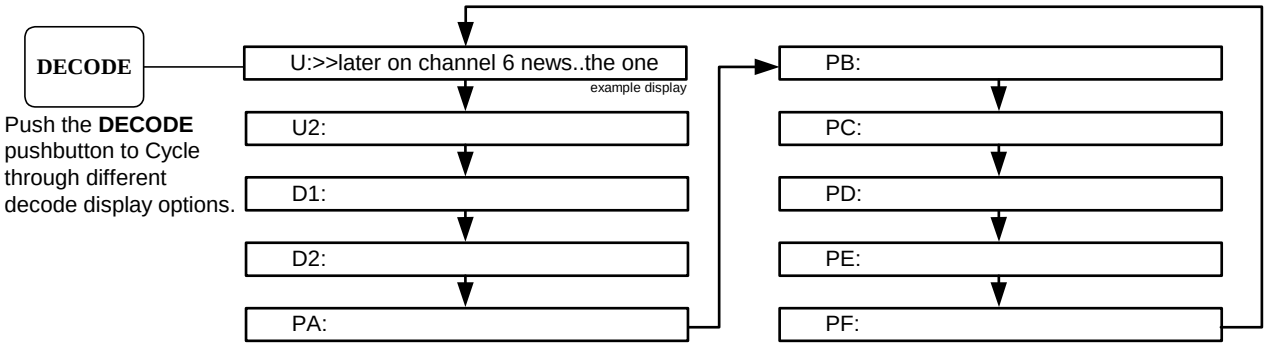




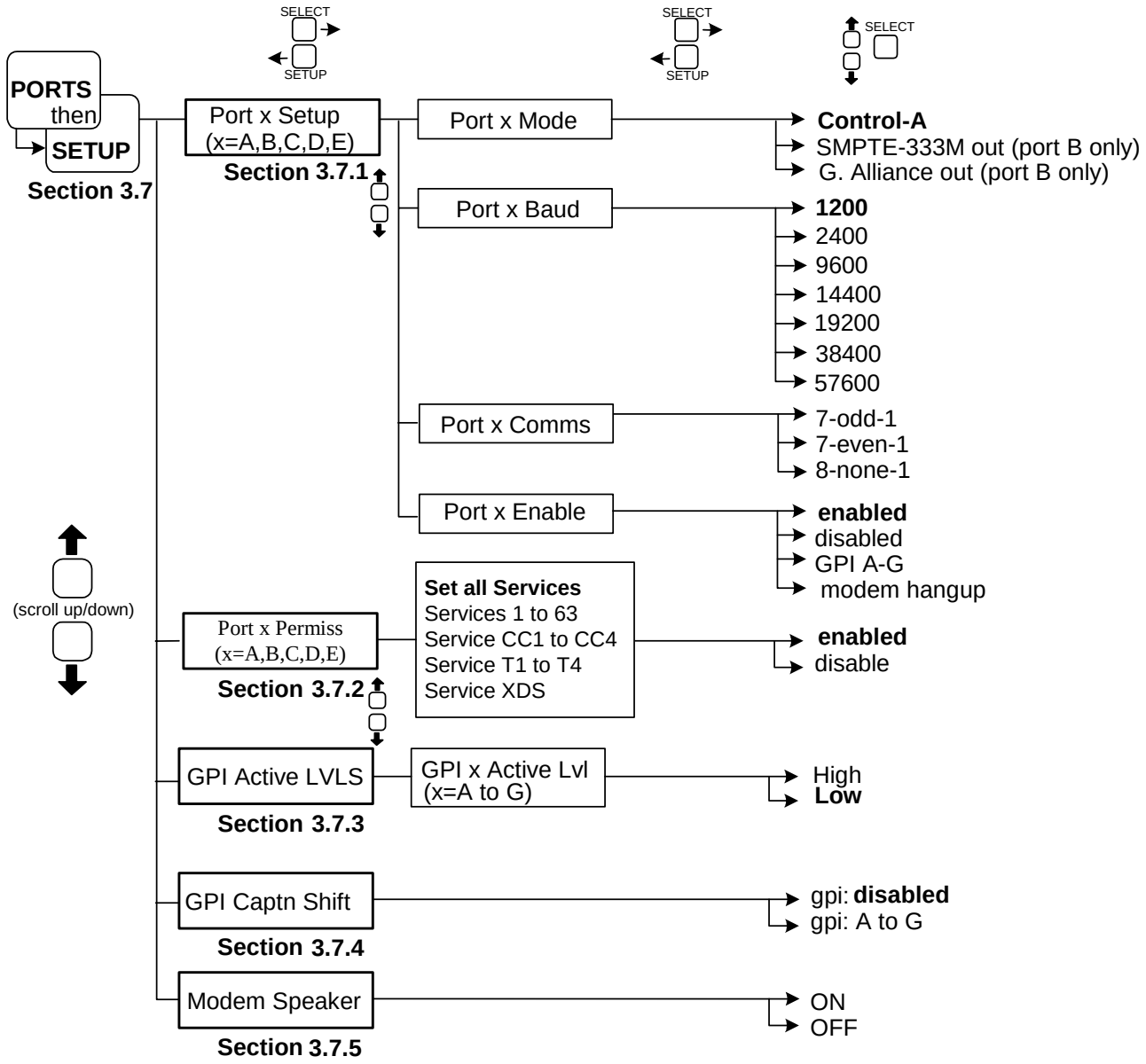
Push the **VIDEO** pushbutton to Cycle through different video display options.

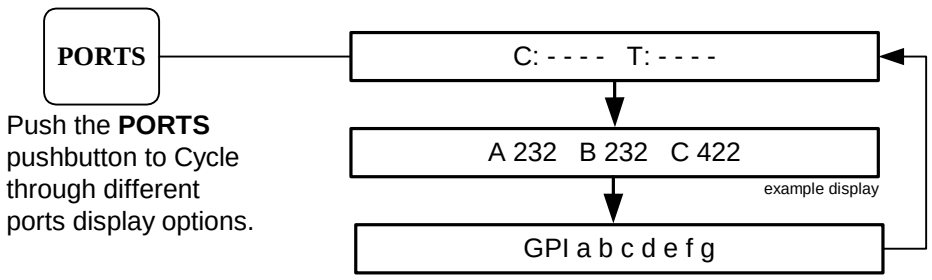
3.3.2. Decode Set-up Menu Overview





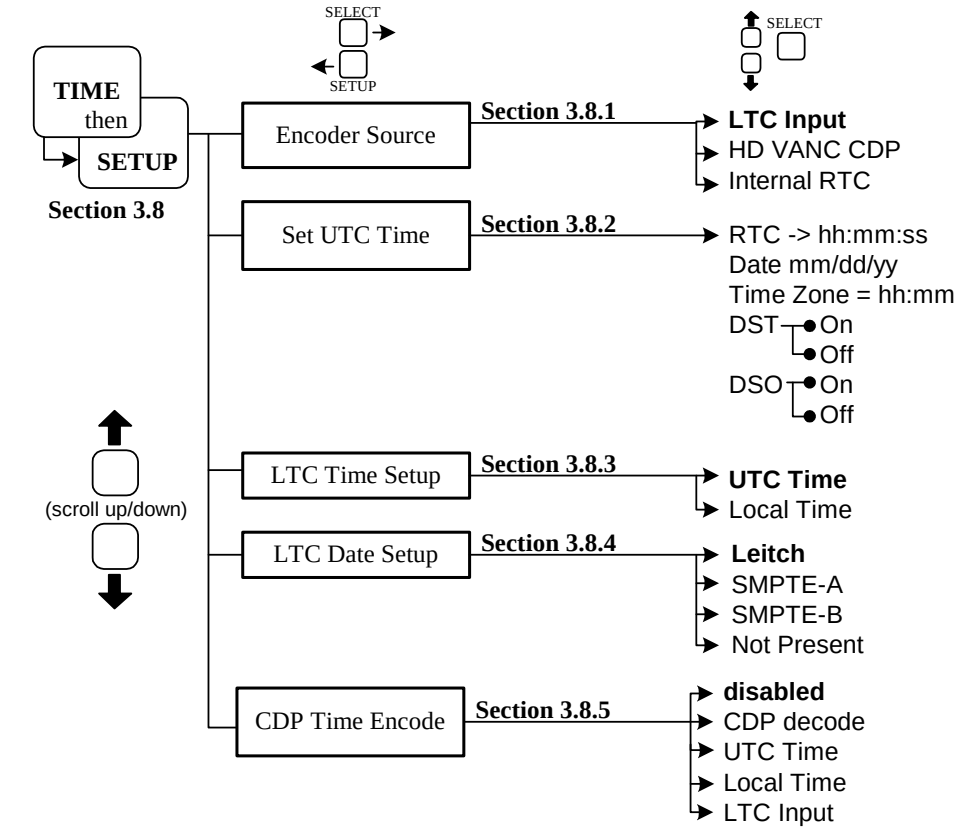
3.3.3. Ports Setup Menu Overview

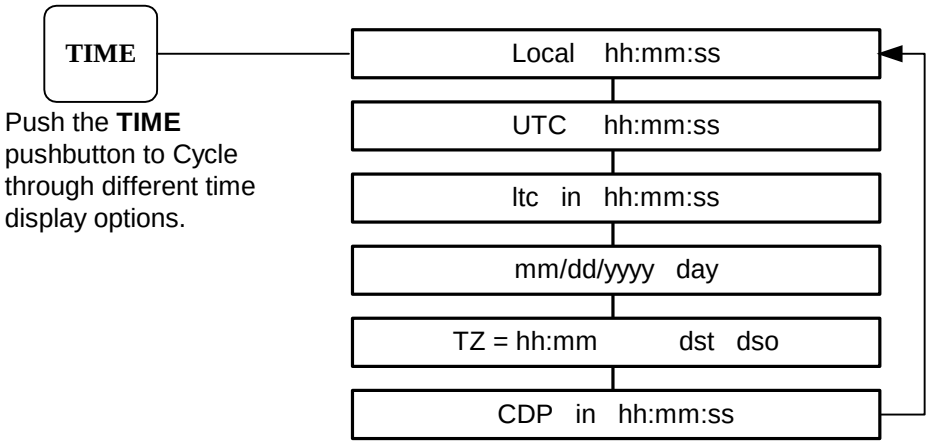




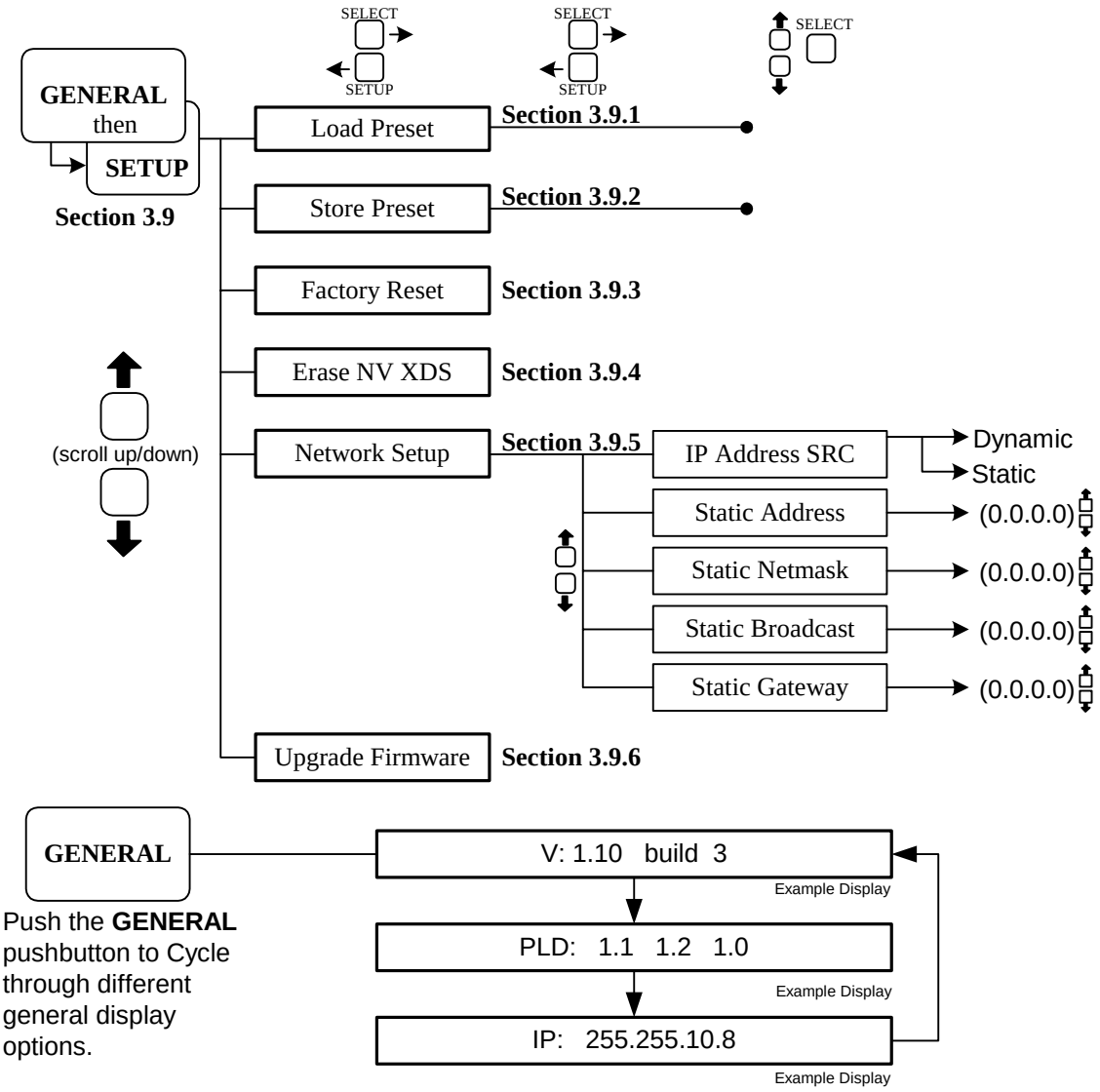
Push the **PORTS** pushbutton to Cycle through different ports display options.

3.3.4. Time Setup Menu Overview





3.3.5. General Setup Menu Overview



3.4. VIDEO SETUP MENU

The Video Setup menu allows the user to configure the upstream Video standards, SD Captions, HD Captions, Upstream Captions, and the SD-to-HD Translator. To enter the Video setup menu, press **VIDEO** then press **SETUP**. Use the **UP** and **DOWN** arrow pushbuttons to scroll through the different options as listed in (section 3.4.1 to 3.5.6). To see a "quick reference" layout of the menu system, please refer to section 3.3.1. To exit the menu system, press **SETUP** until the MENU LED is off.

3.4.1. Video Setup

To enter the Video Setup sub-menu, use the **UP** and **DOWN** arrows until VIDEO SETUP is displayed on the front panel. Press **SELECT** to enter this menu. The following options are available in the Video Setup sub-menu. To see a "quick reference" layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

3.4.1.1. HD Video Std

The HD Video Std. menu allows the user to choose the HD-SDI upstream video standard.
Enter the Video Setup sub menu and use the **UP** and **DOWN** arrows until HD VIDEO STD is displayed on the front panel. Press **SELECT** to enter this option and use the **UP** and **DOWN** arrows to select an HD standard. Press **SELECT** to enable the standard. The enabled setting will flash. Press **SETUP** to exit this level.

The HD9084 currently supports the following HD-SDI standards:

- **1080i/ 59.94 (default)**/60
- 1080p/ 23.98/24/29.97/30
- 1035i/ 59.94/60
- 720p/ 59.94/ 60

3.4.1.2. SD Video Std

The SD Video Std. Menu allows the user to choose the SD-SDI upstream video standard.
Enter the Video Setup sub menu and use the **UP** and **DOWN** arrows until SD VIDEO STD is displayed on the front panel. Press **SELECT** to enter this option and use the **UP** and **DOWN** arrows to select an SD standard. Press **SELECT** to enable the standard. The enabled setting will flash. Press **SETUP** to exit this level.

The HD9084 currently supports the following SD-SDI video standards:

- 525i/ 59.94
- 625i/50

3.4.1.3. SDI Input Source

The SDI Input Source allows the user to select which PGM input is to be viewed on the SD PGM out and Comp Mon Output. The HD9084 is equipped with a built in monitoring quality down-converter and Digital to Analog Converter. The down-converted outputs are monitoring quality only. **Evertz does not recommend using this feature for broadcast applications**. Two options are available to choose from, SD INPUT BNC's and DOWN CONVERT HD. The SD INPUT BNC's option routes the SD Program input to the SD Program Output as an SD-SDI signal and to the Com Mon Output as a composite analog output signal. The DOWN CONVERT HD option down-converts the PGM HD Input, and outputs as monitoring quality SD-SDI via SD PGM Output, and Composite Monitoring video via Comp Mon Output.
To configure these options, enter the Video Setup sub menu and use the **UP** and **DOWN** arrows until SDI INPUT SOURCE is displayed on the front panel. Press **SELECT** to enter this option and use the **UP** and **DOWN** arrows to select SDI Input BNC's or Down Convert HD. Press **SELECT** to enable the selection. The enabled setting will flash. Press **SETUP** to exit this level.

3.4.2. SD Captions

The SD Captions menu allows the user to setup and configure downstream SD captions. To enter the SD Captions sub-menu, use the **UP** and **DOWN** arrows until SD CAPTIONS is displayed on the front panel. Press **SELECT** to enter this menu. The following options are available in the SD Captions sub-menu. (section 3.4.2.1 to 3.4.2.6). To see a "quick reference" layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

3.4.2.1. NTSC Line Select

This function allows the user to select which line the EIA-608 captions will be available, on the downstream 525 line video. The default setting for EIA-608 captions is line 21 for the 525 line video

format. The HD9084 is capable of inserting EIA-608 captions on lines 10 through 25 for 525 line video format. To enter the NTSC Line Select option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu. Scroll until NTSC Line Select is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to select a line (10 through 25). Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.4.2.2. PAL Line Select

This function allows the user to select which line the EIA-608 captions will be available, on the downstream 625 line video. The default setting for EIA-608 captions is line 22 for the 625 line video format. The HD9084 is capable of inserting EIA-608 captions on lines 10 through 25 for 625 line video format. To enter the PAL Line Select option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu. Scroll until PAL Line Select is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to select a line (10 through 25). Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.4.2.3. Field 1 Keyer

The Field 1 Keyer function allows the user to control the Field 1 Keyer using the front panel **KEYER ON/OFF** pushbutton or via GPI. If the Field 1 Keyer is set to Button Only, the front panel pushbutton is enabled and will turn both Field 1 and Field 2 Keyers on or off. If the Field 1 Keyer is set to GPI mode, the user can first choose a GPI to control the Field 1 Keyer function. GPI's A through G are available. Once the GPI is set, the external trigger will now control the Field 1 Keyer. To enter the Field 1 Keyer option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu until Field 1 Keyer is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level. Both the **KEYER ON/OFF** pushbutton and GPI's cannot be used simultaneously. Please refer to section 0 for GPI/O configurations.

3.4.2.4. Field 2 Keyer

The Field 2 Keyer function allows the user to control the Field 2 keyer using the front panel **KEYER ON/OFF** pushbutton or via GPI. If the Field 2 Keyer is set to Button Only, the front panel pushbutton is enabled and will turn both Field 1 and Field 2 keyers on or off. If the Field 2 Keyer is set to GPI mode, the user can first choose a GPI to control the Field 2 Keyer function. GPI's A through G are available. Once the GPI is set, the external trigger will now control the Field 2 Keyer.
To enter the Field 2 Keyer option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu until Field 2 Keyer is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level. Both the **KEYER ON/OFF** pushbutton and GPI's cannot be used simultaneously.
Please refer to section 0 for GPI/O configurations.

3.4.2.5. Setup Shift

It is common for 4:2:2 component to NTSC video encoders to add setup to line 21 regardless of whether there is closed caption information on line 21 or not. Closed caption data generated at 0 IRE on component video will be translated to 7.5 IRE when setup is added by the video encoder.
The EIA 608-B waveform specification states there should be no setup on line 21. In order to eliminate the setup when the encoding to NTSC video takes place, it is necessary to shift the caption data down by 7.5 IRE when generated by the caption encoder. Unfortunately, in order to shift the caption data down by 7.5 IRE it is necessary to use digital video values that are not legal according to the SMPTE

125M Component Digital Video specification. Setup Shift is used to select whether the caption data encoded on the downstream SDI video will be shifted to adjust for setup on line 21.

To enter the Setup Shift option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu until Setup Shift is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level. 0 IRE will encode captions at 0 IRE on 4:2:2 video signals. The resulting closed caption signal will contain legal SMPTE 125 data values but may have 7.5 IRE of setup added when it is encoded to a composite video signal. (Depending on the video encoder) -7.5 IRE will encode captions at -7.5 IRE on 4:2:2 video signals. The resulting closed caption signal will contain illegal SMPTE 125 data values but may have the 7.5 IRE of setup cancelled out when it is encoded to a composite video signal. (Depending on the video encoder)

3.4.2.6. Test Message

The SD Test Message is used to test all fields and outputs of the HD9084. This function will provide test messages in Field 1 and Field 2 for the SD-SDI output and up-converted test messages on the HD output. The Test Message function will also produce test messages on Ports A, B, and C, which can be monitored using HyperTerminal. This function will help ensure the HD9084 is processing all information and is helpful during troubleshooting procedures. Please refer to the testing section for detailed instructions. To enter the Test Message option, use the **UP** and **DOWN** arrows to navigate through the SD Captions sub menu until Test Message is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.3. HD Captions

The HD Captions menu allows the user to setup and configure downstream HD VANC captions. (SMPTE 334M). To enter the HD Captions sub-menu, use the **UP** and **DOWN** arrows until HD CAPTIONS is displayed on the front panel. Press **SELECT** to enter this menu. The following options are available in the HD Captions sub-menu. (section 3.4.3.1 to 3.5.3.4) To see a “quick reference” layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

3.4.3.1. VANC Line Select

VANC Line Select controls the line insertion of downstream HD VANC captions. HD VANC caption (SMPTE 334M) are inserted default in line 9 of the downstream HD video. Lines 7 through 24 are available. To configure this option, use the UP and Down arrows to scroll through the menu until VANC Line Select is displayed on the front panel and press **SELECT**. Use the **UP** and **DOWN** arrows to choose the HD VANC line and press **SELECT**. The enabled setting will flash. Press **SETUP** to exit this level.

3.4.3.2. VANC Keyer Ctrl

The VANC Keyer Ctrl function allows the user to control the VANC keyer using the front panel **KEYER ON/OFF** pushbutton or via GPI. If the VANC Keyer Ctrl is set to Button Only, the front panel pushbutton is enabled and will turn the HD Ancillary data on or off. If the VANC Keyer Ctrl is set to GPI mode, the user can first choose a GPI to control the VANC Keyer function. GPI’s A through G are available. Once the GPI is set, the external trigger will now control the VANC Keyer. To enter the VANC Keyer Ctrl option, use the **UP** and **DOWN** arrows to navigate through the HD Captions sub menu until VANC Keyer Ctrl is displayed on the front panel. Press **SELECT** to enter the selection and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.
Please refer to section 0 for GPI/O configurations.

3.4.3.3. SvcInfo Encode

The SVCINFO ENCODE feature allows the user to Enable or Disable the encoding of SVC Information. The SVC Information is setup in section 3.4.6. To enter the SVCINFO ENCODE option, use the **UP** and **DOWN** arrows to navigate through the HD Captions sub menu until SVCINFO ENCODE is displayed on the front panel. Press **SELECT** to enter the selection and use the **UP** and **DOWN** arrows to scroll through the options (Enable or Disable). Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.3.4. Test Message

The HD Test Message provides captions on Services 1 through 4. Each service shows a different caption test pattern.

Service 1:
Service 1 provides a 4 window caption roll-up/down test message with the following write patterns. Service 1 provides a 4 window split test message. The caption are mirror imaged to provide a full range of decoder testing. The quadrants are divided as follows:

Top Left Window: Writes captions left to right. Scrolls Top to Bottom
Bottom Left Window: Writes captions left to right. Scrolls Bottom to Top
Top Right Window: Writes captions right to left. Scrolls Top to Bottom
Bottom Right Window: Writes captions right to Left. Scrolls Bottom to Top

Service 2:
Service 2 is a background/foreground colour cycle with transparency tests for background. The test message cycles through the different colour options as specified by EIA-708B.

Service 3:
Service 3 tests caption positioning using a "bouncing Evertz Logo" test. The Evertz Logo is moved around the screen to all possible caption position points.

Service 4:
Service 4 is an on screen hex dump of the caption character set. The hex dump is written right to left and scrolls bottom to top.

This feature helps users test downstream equipment such as HDTV decoders and ATSC encoders. Please refer to the testing section for detailed instructions. To enter the Test Message option, use the **UP** and **DOWN** arrows to navigate through the HD Captions sub menu until Test Message is displayed on the front panel. Press **SELECT** to enter the option and use the **UP** and **DOWN** arrows to scroll through the options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.4. Upstream Caps

The Upstream Caps sub menu is used to setup and configure upstream SD-SDI and HD-SDI captions. All features under this sub-menu are mutually exclusive to one another. To enter the Upstream Caps sub-menu, use the **UP** and **DOWN** arrows until UPSTREAM CAPS is displayed on the front panel. Press **SELECT** to enter this menu. To see a “quick reference” layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

The following is a configuration table of how to select the upstream captions to be processed. NO INPUT SOURCE, HD-SDI, and SD-SDI menu features are described below in sections 3.4.4.1 to 3.4.4.4.

	Source control			Effect
	NO INPUT	**HD-SDI**	**SD-SDI**	
1.	ON	don't care	don't care	All upstream captions ignored
2.	OFF	ON	don't care	HD-SDI input selected
3.	OFF	OFF	ON	SD-SDI input selected
4.	OFF	OFF	OFF	all upstream captions ignored

3.4.4.1. Pass Upstream

The Pass Upstream option allows the user to configure which upstream services to pass. Selectable services include 1 through 63, CC1 through CC4, T1 through T4, and XDS. The Set All services option enables all services. Individual services can also be configured. To configure the Pass Upstream option, use the **UP** and **DOWN** arrows to navigate through the Upstream Caps sub menu until Pass Upstream is displayed on the front panel. Press **SELECT** to enter the selection and use the **UP** and **DOWN** arrows to scroll through the settings. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.4.2. HD-SDI Input SRC

The HD-SDI Input option allows the user to enable or disable upstream 708 captions. If the HD-SDI option is enabled ON, all other upstream captions are disabled. The HD-SDI Input SRC can also be configured to control via GPI. GPI's A-G are available to trigger the option. The HD9084 cannot process multiple upstream captions. To enter the HD-SDI Input option, use the **UP** and **DOWN** arrows to navigate through the Upstream Caps sub menu until HD-SDI INPUT is displayed on the front panel. Press **SELECT** to configure and use the **UP** and **DOWN** arrows to scroll through the settings. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.4.3. SD-SDI Input SRC

The SD-SDI Input option allows the user to enable or disable upstream 608 captions. If the SD-SDI option is enabled ON, all other upstream captions are disabled. The SD-SDI Input SRC can also be configured to control via GPI. GPI's A-G are available to trigger the option. The HD9084 cannot process multiple upstream captions. To enter the SD-SDI Input option, use the **UP** and **DOWN** arrows to navigate through the Upstream Caps sub menu until SD-SDI INPUT is displayed on the front panel. Press **SELECT** to configure and use the **UP** and **DOWN** arrows to scroll through the settings. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.4.4. No Input Source

The NO INPUT SOURCE option allows the user to enable or disable upstream captions. To enable or disable upstream captions, use the **UP** and **DOWN** arrows to navigate through the Upstream Caps sub menu until NO INPUT SOURCE is displayed on the front panel. Press **SELECT** to enter the selection and use the **UP** and **DOWN** arrows to scroll through the settings. If the NO INPUT SOURCE option is set to ON, the HD9084 will not process upstream SD-SDI or HD-SDI captions. If the NO INPUT SOURCE option is set to OFF, the upstream captions processed will be dependent on the setting of the SD-SDI input or the HD-SDI input functions. The NO INPUT SOURCE can also be triggered using GPI's A through G. Proceed to section 3.6.3 to configure GPI active levels. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.5. SD - HD Translator

The SD-HD TRANSLATOR option allows the user to select the EIA-608 service (CC1, CC2.CC3, CC4, T1, T2, T3, T4) to be translated to the EIA-708 services (1 through 63). The UPSTREAM CAPS option must be configured for SD-SDI Input source. Please see section 3.4.4 for setup configurations. To configure the SD-HD Translator, use the **UP** and **DOWN** arrows until SD-HD TRANSLATOR is displayed on the front panel. Press **SELECT** to enter this menu. Use the **UP** and **DOWN** arrows to select the EIA-608 service (CC1, CC2,.CC3, CC4, T1, T2, T3, T4) to be translated to EIA-708. Press **SELECT** to configure. Use the **UP** and **DOWN** arrows to choose the EIA-708 service (1 through 63) or choose DISABLE to disable the option. To see a "quick reference" layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

Note: The SD-HD translator must be disabled in order to preserve upstream HD captions.

3.4.6. SVC Info Setup

The SVC INFO SETUP allows the user to configure the SVC Flag and SVC Language for the HD and SD video streams. Receivers use the service information generated by the HD9084 for a variety of different functions. To configure the SVC Info, use the **UP** and **DOWN** arrows until SVCINFO SETUP is displayed on the front panel. Press **SELECT** to enter this menu. Use the **UP** and **DOWN** arrows to select the service (1 to 16, F1, F2). Press **SELECT** to configure the desired service. To see a "quick reference" layout of the menu system, please refer to section 3.3.1. Press **SETUP** to exit this level.

3.4.6.1. Service Enable

To Enable and Disable the SVC Info Service, use the **UP** and **DOWN** arrows until SERVICE ENABLE is displayed on the front panel. Press **SELECT** to configure the selection. The SVC INFO can be Enabled or Disabled. The ENABLE option will enable the SVC (service). The DISABLE option will disable the SVC (service). Use the **UP** and **DOWN** arrows to scroll through the settings. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.6.2. Set SVC Flag

The HD9084 is capable of setting 4 types of service flags. The SVC Flag is used to configure downstream devices capable of "reading" service information.
NONE- Disables the service flag.

EASY READER- This feature points the receiver to a second closed caption channel which contains the "easy reader" closed captions. Easy reader captions are for viewers with a lower vocabulary level (i.e. children).

WIDE ASP RATIO- The Wide Aspect Ratio flag increases the standard length of closed caption lines to 42 characters.

EASY-R & WIDE- Combines the Easy Reader option with the Wide Aspect Ratio option.

To configure these features, use the **UP** and **DOWN** arrows until SET SVC FLAG is displayed on the front panel. Press **SELECT** to configure the selection. Use the **UP** and **DOWN** arrows to scroll through

the four settings. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.4.6.3. Set Language

The Language can be set using the HD9084. Three Language Flags are available to set. English, French, and Spanish. To configure this option, use the **UP** and **DOWN** arrows until SET LANGUAGE is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the setting options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.5. DECODE SETUP MENU

The Decode Menu allows the user to configure the On Screen Display (OSD) and closed caption decoders for the HD9084. The OSD feature is only available on the Comp Mon Output BNC. To enter the Decode Setup Menu, press **DECODE** then **SETUP**. Use the **UP** and **DOWN** arrow pushbuttons to scroll through the different options as listed in (section 3.5.1 to 3.6.6). To see a "quick reference" layout of the menu system, please refer to section 3.3.2. To exit the menu system, press **SETUP** until the MENU LED is off.

3.5.1. OSD Display Mode

The OSD DISPLAY MODE option allows the user to select which OSD feature to enable. The HD9084 is capable of displaying the following information. EIA-608 captions, EIA-708 captions, and Status/Faults. The 608 DECODER option decodes EIA-608 captions present in both the upstream SD-SDI video and HD-SDI video. The captions are displayed on the Comp Mon Output. The 708 DECODER option decodes EIA-708 captions present in the upstream HD-SDI video. The captions are displayed on the Comp Mon Output. The Status/Faults option displays all status information and fault information the HD9084 experiences. The Status/Faults information is displayed on the Comp Mon Output. To turn off the OSD, select OFF. To configure the OSD Display, use the **UP** and **DOWN** arrows until OSD DISPLAY MODE is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the setting options. Press **SELECT** to enable the desired function. The enabled function will flash. Press **SETUP** to exit this level.

3.5.2. OSD Transparency

The OSD Transparency feature allows the user to set the opacity of OSD display. The transparency can be set, 0% to 64%, 0% being most transparent. To configure the OSD Display, use the **UP** and **DOWN** arrows until OSD TRANSPARENCY is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the transparency percentage. Press **SELECT** to enable the desired transparency. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3. 608 Decoder

The HD9084 is equipped with an EIA-608 Decoder which provides on screen display of SD-SDI EIA-608 captions on the Composite monitoring output of the HD9084. The user can select which EIA-608 Caption or Text Channel to monitor. The 608 decoder is also capable of decoding all XDS packets. To configure the EIA-608 decoder, scroll to 608 DECODER and press **SELECT**. Using the **UP and DOWN ARROWS**, scroll to the desired parameter and press **SELECT**. Sections 3.5.3.1 to 3.5.3.7 describes how the configure the 608 decoder.

3.5.3.1. CC Channel

The CC channel parameter allows the user to select the caption channel the decoder will display on the OSD. The user can select caption channels 1 through 4. The caption channel can also be turned off. To change the CC Channel parameter, use the **UP** and **DOWN** arrows until CC CHANNEL is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the CC Channel options. Press **SELECT** to enable the desired CC Channel. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.2. Text Channel

The Text channel parameter allows the user to select the Text channel the decoder will display on the OSD. The user can select text channels 1 through 4. The Text channel parameter can also be turned off. To change the Text Channel parameter, use the **UP** and **DOWN** arrows until TEXT CHANNEL is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the TEXT Channel options. Press **SELECT** to enable the desired Text Channel. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.3. Text Win Top Row

The Text Window Top Row parameter sets the window placement of the text box. Rows 1 through 15 can be selected. Row 1 is at the top of the screen and row 15 is at the bottom. To set the position of the Text box, use the **UP** and **DOWN** arrows until TEXT WIN TOP ROW is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through selections 1 through 15. Press **SELECT** to enable the desired position. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.4. Text Win Height

The Text Window Height parameter sets the window size of the text box. Text box height 2 through 15 can be selected. Selection 2 will provide a 2 row high Text Box. Selection 15 will provide a text box that is 15 rows high . To set the text window height, use the **UP** and **DOWN** arrows until TEXT WIN HEIGHT is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through selections 2 through 15. Press **SELECT** to enable the desired Text box size. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.5. XDS Display

The XDS display parameter selects the format which the XDS information will be displayed. Three selections are available; OFF will remove the XDS window from on-screen. SCROLLING display will scroll the XDS information from top down. FIXED POS will display the XDS packets in a fixed window.. To configure the XDS DISPLAY, use the **UP** and **DOWN** arrows until XDS DISPLAY is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through the selections. Press **SELECT** to enable the desired display method The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.6. XDS Win Top Row

The XDS Window Top Row parameter sets the window placement of the XDS display box. Rows 1 through 15 can be selected. Row 1 is at the top of the screen and row 15 is at the bottom. To set the position of the XDS display box, use the **UP** and **DOWN** arrows until XDS WIN TOP ROW is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through selections 1 through 15. Press **SELECT** to enable the desired position. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.3.7. XDS Win Height

The XDS Window Height parameter sets the window height of the XDS display box. XDS box height 2 through 15 can be selected. Selection 2 will provide a 2 row high Text Box. Selection 15 will provide an XDS display box that is 15 rows high . To set the text window height, use the **UP** and **DOWN** arrows until XDS WIN HEIGHT is displayed on the front panel. Press **SELECT** to enter this option. Use the **UP** and **DOWN** arrows to scroll through selections 2 through 15. Press **SELECT** to enable the desired XDS box size. The enabled selection will flash. Press **SETUP** to exit this level.

3.5.4. 708 Decoder

The HD9084 is equipped with an EIA-708 Decoder which provides on screen display of HD captions on the Composite monitoring output of the HD9084. The user can select which EIA-708 service to decode (service 1 to 15) via the Decode menu. To choose the service to decode, scroll to 708 DECODER and press **SELECT**. Using the **UP and DOWN ARROWS**, scroll to the service desired and press **SELECT**. The default service is 1. The information below outlines the EIA-708 decoder capabilities.

HD9084 EIA-708-B Decoder Specifications and Limitations

Characters	• Supports parsing the entire code space as specified in section 7 of the standard, but due to font limitations, the glyphs for the G0 and G1 code spaces are not complete.
Windows	• Support for the full eight windows
	• Anchor points and relative positioning are supported
Window Attributes	• No window priorities
	• No overlapping windows
	• Only LEFT justification is supported
	• Only LEFT_TO_RIGHT print direction
	• Only TOP_TO_BOTTOM scroll direction
	• No word-wrapping support
	• No display effects
	• Support for fill colour and opacity of up to 4 simultaneous windows
	• No borders
Pen Attributes	• Only STANDARD pen size is supported
	• Only DEFAULT font style is supported
	• No text tag support
	• No offset (super-, and sub-script) support
	• Italics is supported
	• Underline is supported
	• No edge type support
Pen Colours	Foreground and background colours and opacities are supported for up to 4 simultaneous pens

3.5.5. Status/Faults

This function is displayed on the front panel but is currently not functional.

3.5.6. PVR Data Block

This function enables blocking of PVR data.

3.6. PORTS SETUP MENU

The Ports Menu allows the user to configure the input/output settings of Ports A through E. Ports A, B, and C are RS232/422 ports, and Ports D and E are modem ports. Port E is only functional if the optional second modem is ordered. Please refer to section 2.1 for rear panel layout. To enter the Ports Setup Menu, press **PORTS** then **SETUP**. Use the **UP** and **DOWN** arrow pushbuttons to scroll through the different options as listed in (section 3.6.1 to 3.6.3). To see a "quick reference" layout of the menu system, please refer to section 3.3.3. To exit the menu system, press **SETUP** until the MENU LED is off.

3.6.1. Port x Setup (x= A,B,C,D,E)

Port x Setup allows the user to set the mode, baud, and communication separately for each port. To enter the Port x Setup sub menu, use the **UP** and **DOWN** arrows until Port x Setup is displayed on the front panel. Press **SELECT** to enter the sub menu. The following options are available in the Port x Setup sub-menu. To see a "quick reference" layout of the menu system, please refer to section 3.3.3. Press **SETUP** to exit this level.

3.6.1.1. Port x mode

Port x Mode configures the output of ports A through E.
The following is a list of the available settings:
Control A
SMPTE-333M Out
Grand Alliance

Only Port B supports SMPTE 333M and Grand Alliance as an output.

To enter the Port x mode option, use the **UP** and **DOWN** arrows until Port x Mode is displayed on the front panel. Press **SELECT** to enter this option. The user can now choose the output of the port using the **UP** and **DOWN** arrows. Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.6.1.2. Port x Baud

The Port x Baud option sets the baud rate of the selected port. Baud rates for all protocols have been pre-programmed. Always check to make sure the desired baud rate is selected when a different protocol is selected. The user may change the baud rates if desired. The HD9084 can operate in the following baud rates:
1200, 2400, 9600, 14400, 19200, 38400, 57600
To enter the Port x Baud option, use the **UP** and **DOWN** arrows until Port x Baud is displayed on the front panel. Press **SELECT** to enter this option. The user can now choose the baud rate using the **UP** and **DOWN** arrows. Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.6.1.3. Port x Comms

Port x Comms configures the parity error setting of each port. The default setting for all port protocols is 8 data bits, No parity,1 stop bit. The ports can be configured for the following settings:
8-None-1 (default)
7-Odd-1
7-Even-1
To choose a different parity setting, use the **UP** and **DOWN** arrows until Port x Comms is displayed on the front panel. Press **SELECT** to enter this option. The user can now choose the communication setting using the **UP** and **DOWN** arrows. Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.6.1.4. Port x Enable

Port x Enable allows the user to enable/disable each port.

3.6.2. Port x Permiss (x= A,B,C,D,E)

The Port x Permission option allows the user to enable/disable HD-SDI and SD-SDI services on each of the ports. SD-SDI services include CC1, CC2, CC3, CC4, T1, T2, T3, T4, and XDS. HD-SDI includes services 1 through 63. Each of these services can be enabled or disabled separately. Please see sections 3.6.2.1 and 3.6.2.2 to configure these settings.

3.6.2.1. Set all Services

Set all services allows the user to enable or disable all services. The Enable setting will enable all services for both SD-SDI and HD-SDI. Disable will disable all services in both SD-SDI and HD-SDI. To enter the Set all Services option, use the **UP** and **DOWN** arrows until Set all Services is displayed on the front panel. Press **SELECT** to enter this option. The user can now choose to enable or disable all services using the **UP** and **DOWN** arrows. Press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level. The HD9084 enables all settings as default.

3.6.2.2. Service # (1-63, CC1-4, T1-4, XDS)

Each service can be individually enable or disabled. SD-SDI services are CC1, CC2, CC3, CC4, T1, T2, T3, T4, and XDS. HD-SDI contains services 1 through 63. Using the **UP** and **DOWN** arrows, scroll to the desired service and press **SELECT**. The service can now be enabled or disabled. Use the **UP** and **DOWN** arrows to choose a setting and press **SELECT** to enable the setting. The enabled setting will flash. Press **SETUP** to exit this level.

3.6.3. GPI Active LVLS

GPI Active LVLS allow the user to set the GPI active levels. To configure this option, use the **UP** and **DOWN** arrows until GPI Active LVLS is displayed on the front panel. Press **SELECT** to enter the sub menu. Press **SETUP** to exit this level. Please see section 0 for the GPI/O pin identification chart.

3.6.3.1. GPI x Active Level

GPI's A through G can be configured using this menu. The **x** represents GPI's A through G. To configure this option, use the **UP** and **DOWN** arrows until GPI x Active Level is displayed on the front panel. GPI's A through G can be configured either active High or active Low. Once the desired GPI is displayed on the front panel, press **SELECT** to configure. Use the **UP** and **DOWN** arrows to scroll through the options for the GPI, and press **SELECT** to enable Press **SETUP** to exit this level. Please see section 0 for the GPI/O pin identification chart.

3.6.4. GPI Caption Shift

The GPI caption shift feature allows the user to shift the baseline of the EIA-608 captions up by 4 lines. This feature is used when weather crawl information is keyed onto the SD-SDI video. GPI's A through G can be selected to enable or disable this function. To configure this option, use the **UP** and **DOWN** arrows until GPI Capt Shift is displayed on the front panel. Use the **UP** and **DOWN** arrows to scroll through the options and press **SELECT** to enable the desired function. Press **SETUP** to exit this level.

3.6.5. Modem Speaker

An onboard modem speaker has been provided for monitoring purposes. The speaker can be used to verify the modem is working during dial-up captioning and connecting properly. The user can turn the modem speaker on or off. To configure this option, use the **UP** and **DOWN** arrows until Modem Speaker is displayed on the front panel. Use the **UP** and **DOWN** arrows to scroll through the options and press **SELECT** to enable. Press **SETUP** to exit this level.

3.7. TIME SETUP MENU

The Time Setup menu configures all time display/encode/decode functions of the HD9084. To enter the Time Setup menu, press **TIME** then **SETUP**. Use the **UP** and **DOWN** arrows to scroll through the different options listed in sections 3.7.1 through 3.7.5. To see a "quick reference" layout of the menu system, please refer to section 3.3.4. To exit the menu system, press **SETUP** until the MENU LED is off.

3.7.1. Encoder Source

The Encoder Source sub-menu configures which time source the HD9084 will process. Three time sources are available to select from: LTC Input, HD VANC CDP, INTERNAL RTC.
The LTC INPUT option extracts time from the LTC input located in the rear of the HD9084 (LTC option must be ordered).
The HD VANC CDP option extracts CDP time packets from upstream HD-SDI video. The CDP time packets must be available in the HD-SDI video stream for the HD9084 to decode and display on the front panel.
The INTERNAL RTC option processes time generated by the internal oscillator of the HD9084. To set the internal clock of the HD9084, please refer to section 3.7.2.
To enable a setting, use the **UP** and **DOWN** arrows until ENCODER SOURCE is displayed on the front panel. Press **SELECT** to enter the sub menu. Use the **UP** and **DOWN** arrows to select the encoder source, then press **SELECT** to enable. The enabled function will flash. Press **SETUP** to exit this level.

3.7.2. Set UTC Time

The Universal Coordinated Time (UTC) is an international time standard that defines a time that doesn't depend on where we are on Earth. Universal Time (UTC), Greenwich Mean Time (GMT), and Zulu Time (Z), are based at the prime meridian (0° longitude) of Earth and are used to avoid confusion of time zones.
To set the UTC time, use the UP and DOWN arrows to scroll to SET UTC TIME and press SELECT. The user can now configure time, date, time zone, DST, and DSO. The configuration screens will cycle as followed:

RTC -> 00:00:00
DATE 00/00/0000
TIME ZONE=00:00
DST=OFF DSO=OFF

The flashing characters indicate a selection and can be configured using the **UP** and **DOWN** arrows. When the desired setting is selected, press **SELECT** to enable the setting. Repeat the process until all desired settings have been altered. Press **SELECT** to skip configuring a setting. Once the user has cycled through the UTC menu, SET UTC TIME will be displayed on the front panel. Press **SETUP** to exit this level.

3.7.3. LTC Time Setup

This feature is enabled on the front panel but is currently not functioning.

3.7.4. LTC Date Setup

This feature is enabled on the front panel but is currently not functioning.

3.7.5. CDP Time Encode

This feature is enabled on the front panel but is currently not functioning.

3.8. GENERAL SETUP MENU

The General Setup menu has the following options: Load and store presets, reset the unit, upgrade the firmware, and check the current version of firmware on the HD9084. To enter the General Setup menu, press **GENERAL** then press **SETUP**. Use the **UP** arrow and **DOWN** arrow pushbuttons to scroll through the different options. Press **SETUP** a second time to exit this level. To see a "quick reference" layout of the menu system, please refer to section 0.

3.8.1. Load Preset

To load a desired preset, enter the General Setup menu and scroll to LOAD PRESET using the **UP** and **DOWN** arrow pushbuttons. Press **SELECT** to enter the LOAD PRESET option and use the **UP** and **DOWN** arrow pushbuttons to scroll through the presets. Choose which preset you would like to load and press **SELECT**. The preset is now loaded. To save presets, please refer to section 3.8.2.

3.8.2. Store Preset

To store a preset, first set the HD9084 to the desired settings. Enter the General Setup menu and scroll to the STORE PRESET option using the up and down arrows. Press **SELECT** to enter the STORE PRESET option and use the **UP** and **DOWN** arrow pushbuttons to choose a number to store the preset. Once a preset number is chosen, press **SELECT** to store the preset configuration to the desired number. A maximum of 4 presets can be stored. To load the saved presets, please refer to section 3.8.1. Press **SETUP** to exit this level.

The user must exit out of the menu system in order for the changed settings to store into flash memory

The HD9084 is constantly monitoring the state of the system. When the user selects a particular configuration, the settings are written into flash memory. If a power outage occurs, the settings are automatically restored upon power up. The user may erase the flash by executing a factory reset. See section 3.8.3.

3.8.3. Factory Reset

The factory reset option is used to set the HD9084 back to the factory default setting. To reset the HD9084, enter the general menu and use the **UP** and **DOWN** arrow pushbuttons to scroll to the FACTORY RESET option. Press **SELECT** to enter the FACTORY RESET option. To reset the unit, the user must press **SHIFT + SELECT** in order to reset the unit to factory settings. Press **SETUP** to exit this level.

3.8.4. Erase NV XDS

The Erase NV XDS option removes XDS articles from memory. These articles would be stored in memory during a power loss. To clear the memory of articles, use the **UP** and **DOWN** arrows until Erase NV XDS is displayed on the front panel, and press **SELECT.** The front panel will instruct the user to press **SHIFT + SELECT** to complete the process. Press **SETUP** to exit this function.

3.8.5. Upgrade Firmware

The HD9084 can be upgraded in one of two ways. The first method is via the front panel menu system. Please refer to section 0 for full upgrade instructions. The user can also power cycle the unit causing the system to enter the boot loading application routine.

CHAPTER 4: SERIAL CONTROL PROTOCOL
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Figures

4. SERIAL COMMAND PROTOCOL

The following sections present the command protocol for the HD9084 closed caption encoder. Section 4.1 gives a quick cross reference to the command set. Sections 4.2 to 4.6 give a full description of the commands with examples.

4.1. COMMAND CROSS REFERENCE

Serial Command Cross-Reference			
	Command	**Function**	**Stream**
Control & Status	^A?	Report Firmware Version	4.3.6
	^Ac	Set/Report Time of Day	4.3.10
	^Ad	Set/Report Date	4.3.11
	^AE	Set Output Line	4.3.3
	^Al	Set Baud Rate	4.3.1
	^AH	Command Help Message	4.3.7
	^AM	Controlling the Caption Decoder	4.3.5
	^AA	Display System Status	4.3.16
	^AS	Report Bypass Status	4.3.8
	^AY	Report Battery Status	4.3.9
	^A5	Monitor Encoded Data	4.3.4
	^F^F	Reset Encoder	4.3.2
Captioning State	^A2	Real Time State	4.3.15
	^A3	Direct Control State	4.3.14
	^A6	Null State	4.3.13
	^A7	Transparent State	4.3.12
Text Articles	^A0	Input Article	4.4.1
	^A1	Output Article	4.4.2
	^A4	Delete article	4.4.3
	^A8	Queue Articles	4.4.4
	^A9	Display Article Status	4.4.5
	^AB	Display Output Queue	4.4.6
XDS Encoding	^AP	Input XDS Packet	4.5.1
	^AP	Block Upstream XDS Packet	4.5.2
	^A8	Queue XDS Packets	4.5.3
	^AP	Delete XDS Packets	4.5.4
Comm. Port Control	^AQ	Show Port Permission Maps	4.6.1
	^AQ	Alter Port Permission Maps	4.6.2
	^AO	Show Ports Active Maps	4.6.3
	^AO	Alter Ports Active Maps	4.6.4
	^Ar	Reset Port	4.6.5

Figure 4-1: Command Cross Reference

4.2. COMMAND SYNTAX DESCRIPTION

The Command line shows the required information in **bold underlined text**. Optional parameters are shown in **bold normal text**. The default line shows the parameter values that will be invoked if the optional parameter(s) are omitted. Many of the commands use control characters which are indicated by a carat character '^' preceding a letter. (E.g. Control-A is shown as ^A). Other special characters are shown enclosed in <brackets>. (See section 4.2.1 for a description of the control characters and special characters and their ASCII values). (All ASCII values are shown in hexadecimal notation). Parameters are shown in lower case. (See section 4.2.2 for a description of the parameters and their values). All upper case alphanumeric characters that are not preceded by the carat or enclosed in brackets are to be interpreted as individual characters. (E.g. F1 is an 'F' followed by a '1').

4.2.1. Special Characters

Most commands use control characters to communicate with the encoder. The chart below shows the designators for the control characters and other special characters that are used in the command descriptions

Designator	Name	ASCII Values (Hex)
^A	Control-A	01
^B	Control-B	02
^C	Control-C	03
^F	Control-F	06
^G	Control-G	07
^H	Control-H (backspace)	08
^X	Control-X (delete line)	18
<sp>	Space	20
<cr>	Carriage Return	0D
<xon>	Halt transmission	11
<xoff>	Start Transmission	13

4.2.2.

4.2.3. Parameters

Some commands use parameters with variable values. The command descriptions use a generic designator to indicate these parameters. The chart below shows each of the designators with their meanings and the permitted values. The values shown are the actual characters to be inserted into the command message. Normally parameters should be separated from each other by a <sp>.

Designator	Name	Values	Description
fx	Field Number	F1	Field 1
		F2	Field 2
dc	Data Channel	C1	Caption Channel 1
		C2	Caption Channel 2
		C3	Caption Channel 3
		C4	Caption Channel 4
		T1	Text Channel 1
		T2	Text Channel 2
		T3	Text Channel 3
		T4	Text Channel 4
		XD	Extended Data Services Channel
		For compatibility with older software the following designators are also used to describe caption data channels	
		CC1	Caption Channel 1
		CC2	Caption Channel 2
		CC3	Caption Channel 3
		CC4	Caption Channel 4
tc	Text Channel	T1	Text Channel 1
		T2	Text Channel 2
		T3	Text Channel 3
		T4	Text Channel 4
		For compatibility with older software the following designators also refer to the text channels	
		L1	Text Channel 1
		L2	Text Channel 2
		L3	Text Channel 3
		L4	Text Channel 4

Designator	Name	Values	Description
name	Article Name		1 to 8 alphanumeric character article name
edsid			XDS packet Id input as 2 ASCII hex digit class followed by 2 ASCII hex digit type. (cctt). Valid class numbers are: 01, 03, 05, 07, 09, 0B, OD. Leading zeros of the class numbers are optional. In cases where the class and type bytes are not sufficient to uniquely distinguish the packets, (such as for 0D05 packets) the first 2 digits of the packet data may also be appended to the end of the edsid. (ccttdd)
k/d	Keep/Delete	K	Keep article
		D	Delete article
o/h	Output/Hold	O	Place article in output queue
		H	Do not place article in output queue
n/l	Next/Last	N	Place article next in output queue
		L	Place article at the end of output queue
rc	Repeat Count	0 to 9998	Decimal number of times to repeat article
		9999	Repeat indefinitely
		FFFF	Repeat indefinitely
		hh:mm:ss	Repeat until this time is being requested by the computer (Current software treats this as equivalent to 9999)
ln	Output Line	10 to 25	
bl	Caption Base Line	1 to 15	Base line of caption rollup display
rl	Caption Rollup Lines	2 to 4	Number of lines of rollup captions
pn	Port Name	P1, PA, EN1	port A
		P2, PB, EN2	port B
		P3, PC, EN3	port C
		P4, MA, MD EN4	modem D
		P5, MB, ME, EN5	modem E (if installed)
dt	Data Type	CF1	captions field 1
		CF2	captions field 2
		TF1	text field 1
		TF2	text field 2
		XDS	extended data services

Designator	Name	Values	Description
ws	Word size	7	7 bit data word
		8	8 bit data word
par	Parity	O	Odd parity
		E	even parity
		N	no parity
tz	Time zone	0:00 to 23:59	time zone hours and minutes relative to UTC
ovr	Override	O	forces override

4.2.4. Flow Control Handshaking

When the encoder's input buffer is nearly full the device sends an XOFF for each character received. If the Caption software continues to send data and the input buffer fills completely the caption encoder will show the message BUFFER OVERFLOW on the front panel display. When the input buffer has overflowed some data may be lost. When the input buffer is nearly empty the caption encoder will transmit an XON character.
The HD9084 uses hardware flow control to prevent lost data. The unit will turn off the RS232 RTS signal when the buffer is nearly full, and will turn RTS on when the input buffer is nearly empty.

4.2.5. Break Handling

A break character can be sent to the caption encoder to cause the content of the associated input buffer to be discarded. If the break character is sent to a modem port (Modem D or Modem E), the modem character buffers will also be discarded. This allows the user to circumvent a backlog of data input, and regain immediate control of the encoder. The best way to reset a communications port is to send a break followed by a Control-F – Control-F command.

4.2.6. Command Responses

When the HD9084 accepts any of the Control-A commands it will respond by sending back an asterisk '*' prompt with the following exceptions:
When in real time mode it will respond with a colon ':' prompt.
When an article is being defined, it will respond with a '>'.

4.3. COMMON COMMANDS

4.3.1. Set Baud Rate

The caption encoder's serial remote control ports may be set to operate at any standard baud rate from 1200 to 57600. When this command is executed the new baud rate will become immediately active, and the sending computer must immediately switch to the new rate. The new baud rate is stored in non-volatile memory and will be restored when the unit is powered up.
The modem ports may have a lower maximum baud rate that is related to the maximum baud rate of the built-in modems. The baud rate for the modem ports will also limit the maximum connection rate that the modems will allow.

Command: ^AI<sp>pn<sp>baud<sp>ws<sp>par<cr>
or ^AI<cr>
Default: none

The parameter baud specifies the baud rate that will be used. The permitted values of parameter baud are shown in the table below.

Parameter	Baud rate
12	1200
1200	1200
24	2400
2400	2400
48	4800
4800	4800
96	9600
9600	9600
192	19200
19200	19200
384	38400
576	57600

If the optional port name parameter is missing, then the current control port will be assumed. If no parameters are specified, the HD9084 will respond with a report of the communication parameters of all the comm ports as shown below.

Port A: 1200 7 Odd
Port B: 9600 8 None
Port C: 1200 7 Odd
Port D: 4800 8 None

Examples:	^AI<sp>19200<cr>	Set baud rate to 19200
	^AI<sp>P1<sp>96<sp>8<sp>N	Sets Port A to 9600,8,N

4.3.2. Reset Encoder

This command immediately clears the input and output data queues and resets the HD9084 to the Transparent State in Field 1 and Field 2. Article and XDS output queues are not reset by this command. They must be explicitly reset by using the queue articles and queue XDS commands. (See sections 4.4.4 and 4.5.3.) Because other control ports may be simultaneously sending data, this command only affects the fields and data types that have not been appropriated by other control ports.

Command: ^F^F<cr>

Default: none

4.3.3. Set Output Line

The normal line for caption information is line 21 in SD-SDI. This command allows the HD9084 to output caption information on different line numbers. This command also changes the line number used by the decoder.

Command: ^AE<sp>Lln<cr>

Default: ^AE<sp>L21<cr> for SD-SDI systems

The parameter ln specifies the line number that caption information will be output on. The permitted values of parameter ln are 11 to 25.

Examples:	^AE<cr>	Reset to default
	^AE<sp>L20<cr>	Set for line 20
	^AE<sp>?<cr>	Show current line

4.3.4. Monitoring the Line 21 Data on the Serial Port

This command allows the HD9084 to extract line 21 information from the input or output video and send it out the serial port. Enter a ^G to end monitor mode.

Command: ^A5<sp>fx<sp>o<cr>

The parameter fx specifies the field that data will be extracted from
The parameter o specifies that the output data will be monitored.

Example:	^A5<sp>F1<cr>	Monitor Field 1 Input
	^A5<sp>F2<sp>O<cr>	Monitor Field 2 Output

4.3.5. Controlling the Caption Decoder

This command allows the unit to display line 21 information on the built-in caption decoder.

Command: ^AM<sp>dc<cr> Decode a specific channel
or ^AM<sp>OFF<cr> Turn off Decoder off

The parameter dc specifies the data channel that will be decoded and displayed. In addition to the dc values shown in section 4.2.2 the following additional values are supported only for this command.

dc	Data Channel	VCHIP V-Chip Decoder
XDS	XDS Decoder	
XDSG	XDS Decoder	
XDSF	XDS Decoder	

Note that there is only one XDS decoder mode so all 3 commands will accomplish the same effect. Support for the XDSG and XDSF strings added for compatibility with the EEG command set.

Examples: ^AM<sp>C1<cr>
Display Caption Channel 1

^AM<sp>VCHIP<cr> Display V-CHIP rating

^AM<sp>XDS<cr> Switches decoder to XDS display mode.

4.3.6. Report Firmware Version

The caption encoder will respond with message identifying its firmware version and port name.

Command: ^A?<cr>
Returns `Evertz HD9084 Ver:CK88D5 U000427 -- Use ^AH{return} for help`
`Port B (Example)`

4.3.7. Command Help

This command returns a help message from the caption encoder.

Command: ^AH<cr>
Default: none

Returns:
```
Cmds supported - ^C,^F,...
^A +0,1,2,3,4,5,6,7,8,9,A,B,c,,E,H,I,M,O,P,Q,r,t,u,S,Y,?
```

4.3.8. Report Bypass Switch Mode

This command returns a message that shows the status of the video bypass relay and the caption keyer.

Command: ^AS<cr>

Example results:

`REMOTE OVERRIDE`	indicates keyer is disabled but video will be passed through the HD9084
`EXTERNAL BYPASS`	indicates the SDI bypass relay has been activated by an external signal
`LOCAL BYPASS ON`	indicates the SDI bypass relay has been activated by the HD9084 menu selection.

4.3.9. Report Battery Status

This command will return the status of the internal battery

Command: ^AY<cr>

Example results: `Battery OK`

4.3.10. Set / Report Time of Day Clock

This command will return the current time of day or will allow the internal clock to be set. The unit will maintain the correct time even through power outages.

Command: ^Ac<cr>

Example results:
Local time is 13:47:39, Time zone is 05:00, DST is ON, DSO is ON

Command: ^Ac<sp>U<cr>

Example results:
`UTC is 19:47:39, Time zone is 05:00, DST is ON DSO is ON`

Command: ^Ac<sp>hh:mm:ss<sp>hh:mm<sp>dst<sp>DSO=dso<cr>

hh:mm:ss	Local time
hh:mm	Time zone offset
dst	OFF Daylight Saving Time not in effect (DST Bit Off)
	ON Daylight Saving Time in effect (DST Bit On)
dso	OFF Daylight Saving Time not observed in this region (DSO Bit Off)
	ON Daylight Saving Time observed in this region (DSO Bit On)

Although the time zone must be entered as hours and minutes, the XDS Time Zone packet will only transmit the time zone hours. This is a limitation of the definition of the time zone packet in EIA-608B

Example: ^Ac<sp>13:10:00<sp>5<sp>ON,<sp>DSO=ON<cr>
Set local time to 1:10 pm in EDT (Daylight Saving Time in effect), Daylight Saving Time observed.

^Ac<sp>13:10:00<sp>5<sp>ON,<sp>DSO=OFF<cr>
Set local time to 1:10 pm in EST (Daylight Saving Time in effect), Daylight Saving Time not observed. (e.g. as in Indiana)

^Ac<sp>06:10:00<cr>
Set local time to 6:10 am. Time zone, DST and DSO unchanged.

^Ac<sp>13:10:00<sp>4:30<sp>OFF<sp>DSO=ON<cr>
Set local time to 1:10 pm in Newfoundland Time Zone with Daylight Saving Time not in effect, but Daylight Saving time observed

The DST bit instructs the encoder whether Daylight Saving Time is currently in effect. The DSO bit instructs the encoder whether Daylight Saving Time is observed in this region. The encoder must know this information when converting between local time and UTC time internally. Most regions in North America observe Daylight Saving Time according to the following rule: ON in the summer, starting on the first Sunday in April. OFF in the winter, starting on the last Sunday in October. Other parts of the world follow different rules for DST.

4.3.11. Set / Report Calendar Date

This command will return the current calendar date or will allow the internal calendar date to be set. The encoder will maintain the correct date even through power outages.

Command: ^Ad<cr>

Example results:
Local date is: Jan/09/2000 Mon.

Command: ^Ad<sp>U<cr>

Example results:
UTC date is: Jan/10/2000 Mon.

Command: ^Ad<sp>mm/dd/yyyy<sp>day of week<sp>U<cr>

Examples: ^Ad<sp>01/26/2000<sp>4<cr>
Set local date to January 26, 2002 and day is Wednesday.

^Ad<sp>03/25/2001<cr>
Set local date to March 25, 2003. No day of week indicated.

^Ad<sp>12/21/2001<sp>7<sp>U<cr>
Set UTC date to December 21, 2003.

4.3.12. Transparent State

In Transparent state, incoming line 21 video in the respective data stream will be copied to the output.

Command: ^A7<sp>fx<cr>
^A7<sp>dc<cr>

Default ^A7<sp>F1<cr>

In the first form of the command, the optional parameter **fx** identifies the field (i.e. all streams in that field) that will be placed in the transparent state.

In the second form of the command the parameter **dc** identifies the data stream that will be placed in transparent state.

Examples:	^A7<sp>F1<cr>	Field 1 in transparent state
	^A7<sp>C1<cr>	Captions 1 in transparent state
	^A7<sp>T2<cr>	Text 2 in transparent state
	^A7<sp>TX<cr>	XDS stream in transparent state

4.3.13. Null State

In the Null state, the encoder will insert Null characters for the selected data stream into line 21. Incoming line 21 video will not be copied through on the data stream.

Command: ^A6<sp>fx<cr>
^A6<sp>dc<cr>

Default ^A6<sp>F1<cr>

In the first form of the command, the optional parameter **fx** identifies the field (i.e. all streams in that field) that will be placed in the Null state.

In the second form of the command the parameter **dc** identifies the data stream that will be placed in the Null state.

Examples:	^A6<sp>F1<cr>	Field 1 in Null state
	^A6<sp>C1<cr>	Captions 1 in Null state
	^A6<sp>T2<cr>	Text 2 in Null state
	^A6<sp>TX<cr>	XDS stream in Null state

4.3.14. Direct Control State

This command causes the encoder to enter the Direct Control state. Direct Control state is normally terminated by sending the End Of State command (^C), which will cause the encoder to revert to the Null state.

Command: ^A3<sp>n<sp>fx<cr>data . . . data^C
or
^A3<sp>n<sp>dc<cr>data . . . data^C

Default: ^A3<sp>4<sp>F1<cr>

In the first form of the command, the optional parameter **fx** identifies the field (i.e. all streams in that field) that will be placed in the Direct Control state. In the Direct Control state, caption information is inserted into the appropriate video field in one of 4 modes that are described below. All upstream caption and text data in that field will be blocked. Any articles queued for insertion to that field will also be blocked. The computer supplies all the information for that field, formatting it with the appropriate stream control codes.

In the second form of the command, the optional parameter **dc** identifies the data channel that will be placed in the Direct Control state. All upstream caption and text data in the specified data channel will be blocked. Any articles queued for insertion to that data channel will also be blocked. The computer supplies all the information for that data channel, formatting it with the appropriate stream control codes. All caption information in the non-specified data channels will be passed through.

The optional parameter **n** identifies which variation of the Direct Control state will be used.

n=1 provides the same processing as n=2.

n=2 means that legitimate line 21 control codes are aligned and delayed so that the two byte control code pairs are transmitted in the same field.

n=3 means that legitimate line 21 control codes are aligned and delayed so that the two byte control code
pairs are transmitted in the same field. Each control code pair is sent twice.

n=4 provides the same processing as for n=3. No non-line 21 codes are transmitted and the control codes are converted (if necessary) to the correct equivalent code for the current video field.

Examples:	^A3<cr>	Field 1 in Direct Control mode 4
	^A3<sp><cr>	Field 1 in Direct Control mode 4
	^A3<sp>1<cr>	Field 1 in Direct Control mode 1
	^A3<sp>F2<cr>	Field 2 in Direct Control mode 4
	^A3<sp>3<sp>F1<cr>	Field 1 in Direct Control mode 3
	^A3<sp>C1<cr>	Caption channel 1 in Direct Control mode 4
	^A3<sp>3<sp>T1<cr>	Text channel 1 in Direct Control mode 3

4.3.15. Real Time State

In Real Time state, incoming data from the caption computer is stored in the real time input buffer until a complete line of caption/text data has been accumulated. When a carriage return (<cr>) character is encountered, the line of data is transferred into the appropriate data stream. The line may be edited using ^H (backspace) or ^X (delete line) before the <cr> is input. A delay of 1 to 9 seconds can be inserted by including ^Bn into the data. (n is the number of seconds of delay desired)

If a caption data channel is specified, captions will be in rollup format with a specified number of lines. The default format is 3 line caption rollup for caption data channels, and text format for text channels.

When the data channel is put into the real time state, upstream data on the specified channel will be blocked from entering the output queue of the encoder. All subsequent data is part of the data stream until ^C is received or the encoder is reset. If the specified data stream is a text channel, articles will be suspended from the output queue while the real time state is active. All caption information in the non-specified data channels will be passed through.

Real Time state is normally terminated by a ^C. Articles will be re-enabled into the output queue starting with the suspended article. If upstream data was enabled prior to entering the Real Time State then it will be re-enabled when the Real Time state is terminated.

Command: ^A2<sp>dc<sp>rl<sp>Bbl<cr>

Default: ^A2<sp>C1<sp>3<sp>B15<cr>

The parameter **dc** identifies the data channel that will be placed in the Real Time state.

The parameter **rl** identifies the number of rollup rows and the parameter **bl** identifies the base line if the **dc** parameter is one of the caption data channels. If the base line is specified the roll up line must also be specified.

Examples:

^A2<cr>	Caption 1 in Real Time State with 3 line rollup at base line 15
^A2<sp>T2<cr>	Text 2 in Real Time State
^A2<sp>C3<sp>2<cr>	Caption 3 in Real Time State with 2 line rollup at base line 15
^A2<sp>C4<sp>3<sp>B10<cr>	Caption 4 in Real Time State with 3 line rollup at base line 10

4.3.16. Display System Status

This command displays the upstream line 21 data channels that are turned on (i.e.: upstream data being passed through to the output) and the number of bytes of memory remaining to store articles and XDS packets.

Command: ^AAcr>

Default none

Examples: ^AAcr>

Returns:
Example with all channels On:

```
Memory Status: Avail-005453  # Segments-000011 Largest Avail-005453
Channel Status:
Field 1:C1 C2 T1 T2 ON
Field 2:C3 C4 T3 T4 XD ON
```

Example with all channels On except T3:

```
Memory Status: Avail-005453  # Segments-000011 Largest Avail-005453
Channel Status:
Field 1:C1 C2 T1 T2 ON
Field 2:C3 C4 T4 XD ON
```

4.4. TEXT ARTICLES

When the Article state is active, text data can be entered and stored as complete messages. These messages can be transmitted in any order, any number of times in any of the text channels. Display attributes contained within the articles (such as colour, etc.) specifically coded for one data stream will be translated into the appropriate codes for the text channel they are ultimately inserted into.

The message can be kept in memory or deleted when you have finished transmitting it. Articles will be lost from the article memory in the event of a power loss. The HD9084 use an advanced memory allocation scheme that allow them to store a virtually unlimited number of articles at one time. The only requirement is the maximum amount of random access memory available.

The command protocol allows editing of each line of the message by use of the ^H (backspace) and ^X (delete line) characters before the <cr> is input. A delay of 1 to 9 seconds can be inserted into the article by inserting ^Bn into the article. (n is the number of seconds of delay desired)

Once a text channel is put into Article state, upstream data on that channel will be blocked from the output queue. A data channel will be in the article state as long as any article is assigned to its output queue.

4.4.1. Input Article

This command allows the user to input an article to the article memory and assign it to the output queue of one of the text data channels.

Command: ^A0<sp>name<sp>tc<sp>rc<sp>k/d<sp>o/h<sp>n/l<cr>
data<cr>data . . .data<cr>^C

Default : ^A0<sp>name<sp>T1<sp>9999<sp>D<sp>O<sp>L<cr>

The parameter **name** identifies the name of the article. The article can subsequently be referred to by its name. If the article name already exists, the previous article with that name will be replaced by the new article.

The parameter **tc** identifies the text channel number that the article will be placed into.

The parameter **rc** identifies number of times the article will be repeated. Values of 9999 or FFFF indicate that the article should be repeated indefinitely. An article's repeat count will be decremented each time the article is output in each output data stream.

The parameter **k/d** identifies whether the article should be kept or deleted when it has been transmitted the specified number of times.

The parameter **o/h** identifies whether the article should be placed into the output queue or whether it should just be held in memory for later use.

The parameter **n/l** identifies whether the article should be placed as the first article in the output queue or the last article in the queue.

All subsequent data is part of the article until ^C is received. The encoder will respond to each line of the article with a '>' prompt while the article is being defined.

Examples: ^A0<sp>Test<sp>T1<sp>5<cr>
This is the first line<cr>
and this is the last line ^C

A two line article called 'Test" which will be placed at the end of the Text 1 output queue. The article will be deleted after it is output 5 times.

4.4.2. Output Article

This command allows the user to put an existing article (defined by the Input article command) into the output queue of the specified text data channels. An article may be put into an output queue more than once.

Command: ^A1<sp>name<sp>tc<sp>rc<sp>k/d<sp>o/h<sp>n/l<cr>

Default	
tc	last text channel the article was sent to
rc	current repeat count
k/d	last keep/delete status specified for the article
o/h	O
n/l	last next/last status specified for the article

The parameters have the same meaning as for the Input article command. If the **o/h** parameter is H then this command may be used to change other attributes of the article without outputting it.

The parameter **name** specifies the name of a previously defined article.

If the parameter **k/d** is D, and the article is currently being output, it will not be removed until it has been completely output.

Examples: ^A1<sp>Test<sp>T2<sp>5<sp>D<cr>

The article called ‘Test” will be placed at the end of the Text 2 output queue. The article will be deleted after it is output 5 times.

^A1<sp>Test<sp>T2<sp>9999<sp>H<cr>

The article called ‘Test” will have its repeat count change to indefinite. It will not be placed into any of the output queues.

4.4.3. Delete Article

This command allows the user to remove an article from all output queues. If the article is currently being output, it will not be removed until it has been completely output.

Command: ^A4<sp>name<sp>k/d<cr>

Default:

k/d last keep/delete status specified for the article

The parameter **name** identifies the name of the article.

The parameter **k/d** indicates whether the article will be deleted from memory or not.

Examples: ^A4<sp>Test<sp>D<cr>

The article called ‘Test” will be removed from all output queues and deleted from memory.

4.4.4. Queue Articles

This command will delete the entire specified output queue and replace it with the articles named (if any). The user enters the names of the articles separated by <cr> in the order that they are to appear in the output queue. The encoder continues to add articles to the queue until it receives a ^C. The article names may be edited by using the ^H (backspace) and ^X (delete line) characters before the <cr> is input.

Command: ^A8<sp>tc<cr>
name<cr>name<cr>....name<cr>^C

Default : none

The parameter **tc** identifies the text channel number of the output queue the articles will be placed into.

The parameter **name** identifies the name of each article to be placed in the queue. If no article names are given, the specified article output queue is cleared and no articles will be output in that data stream.

Example: ^A8<sp>T1<cr>TEST<cr>TEST2^C

Puts the previously defined articles named TEST and TEST2 into the output queue for Text Channel 1.

4.4.5. Display Article Status

This command allows the user to view the list of articles stored in the article memory and display their status.. The status includes the article name, repeat count, (9999 if infinite) the keep/delete status, and the memory storage needed for the article. The first line of the article will also be shown. A "..." will indicate multiple lines of text.

Command: **^A9<cr>**

Default: none

Examples: ^A9<cr>

Returns:

```
Article Status:
Name       Repeat K/D size text
test1      009999 D 000031 "this is a sample" ...
test2      009999 D 000014 "second article"
```

4.4.6. Display Output Queue

This command displays the articles in all 5 output queues in the order in which they reside in the queues.

Command: ^AB<cr>

Default none

Examples: ^AB<cr>

Returns a list of articles such as the following:

```
Output Q: T1
test1
Output Q: T2
test2  test2
Output Q: T3

Output Q: T4

Output Q: XDS
```

4.5. EXTENDED DATA SERVICES

Extended Data Services (XDS) information is encoded into Field 2 and is intended to supply program related and other information to the viewer. XDS data can inform the viewer of such information as current program title, length of show, type of show, time left in show, and V-Chip-compatible program rating information.

The XDS output stream consists of a distinct XDS packet for each type of information. Each packet consists of a 1 byte class, a 1 byte type, one or more informational characters, a 1 byte end of packet code, and a 1 byte checksum.

XDS packets are stored in the article memory and output in the XDS data channel in Field 2. These packets are placed into the XDS output queue in the order specified by the user and inserted into Field 2 according to the space available. EIA-608-B specifies that when there is caption or XDS information in field 2, then there must be at least a null caption signal present in field 1 as well. When encoding into field 2, the HD9084 automatically detects whether there is a caption signal present in field 1. If necessary, It will turn on the Field 1 keyer automatically and turn it off again when upstream field 1 captions resume.

The computer uses an ASCII hex notation in describing the XDS packet id and data to the caption encoder. For example to specify the letter A enter a 4 followed by a 1 (the hex ASCII code for A is 41)

The XDS packets are deleted from memory when they have been transmitted the specified number of times. XDS packets will be lost from the encoder's memory in the event of a power loss. The HD9084 uses an advanced memory allocation scheme that allow them to store a virtually unlimited number of XDS packets at one time. The only limit is the total amount of random access memory available.

Upstream XDS packets will be blocked by packets of the same type in the output queue.

4.5.1. Input XDS

This command allows the user to input an XDS packet into the caption encoder's article memory

If an XDS packet with identical **edsid** exists it will be deleted and replaced with the new packet definition.

Command: ^AP<sp>edsid<sp>rc<sp>data...data<cr>

Default : none

The parameter **edsid** identifies the XDS packet id. The XDS packet can subsequently be referred to by its packet id. If the XDS packet already exists, the previous XDS packet with that packet id will be replaced by the new packet. The **edsid** is entered in ASCII hex notation. For example to enter a packet id with a class of 01h and a type of 23h enter a 0 followed by a 1 followed by a 2 followed by a 3. The leading zero of the class is optional.

The parameter **rc** identifies number of times the packet will be repeated. Values of 9999 or FFFF indicate that the packet should be repeated indefinitely. A packet's repeat count will be decremented each time it is output.

The parameter **data** is the information bytes of the packet. This data is entered in ASCII Hex format. For example to enter the letter A enter a 4 followed by a 1 (the hex ASCII code for A is 41)

The XDS article length is checked for the following commonly used articles: Program ID (0101), V-Chip Content Advisory (0105), Station Call Letters (0502), and Time Zone (0704). If the article length is not in the valid range for the packet type, the encoder will reject it. This length checking does not apply to XDS packets from upstream, only XDS articles that are entered using the ^AP command from a serial port.

Examples:
^AP<sp>0103<sp>10<sp>41424344<cr>
Sets the program name packet to ABCD and repeat packet ten times.

^AP<sp>0701<sp>9999<sp>456A4548474A<cr>
Time Of Day packet indicating the current UTC time is 10:05 am on Saturday, October 5th, 2002. DST is ON. The packet will be repeated indefinitely.

Time of Day and Time Zone packets behave differently than other XDS articles when defined. The defined packet contents will be ignored; the encoder will generate the time of day packet data from the current internal time.

^AP<sp>0105<sp>9999<sp>486D<cr>
Program rating packet setting the rating system to “TV Parental Guideline”, rating of TV-PG with V and L bits set. The packet will be repeated indefinitely. Other V-Chip ratings may be encoded using the information in Appendix A.

4.5.2. Blocking Upstream XDS Packets

Upstream XDS packets can be removed entirely from the data stream, without having to insert new XDS data of the same type. This is accomplished using a variation of the ^AP serial interface command. This feature is particularly useful for removing unwanted Time-of-Day packets, Time Zone packets, etc. off of pre-encoded material.

To remove a specific XDS packet, use the ^AP command to enter an XDS article with the packet id of the packet you want to remove, a repeat count of 9999 and article text consisting of the single character "R", or the equivalent ASCII HEX "52".

Examples:
^AP<sp>0701<sp>9999<sp>52<cr>
^AP<sp>0701<sp>9999<sp>R<cr>
Both variations block upstream Time Of Day packets

^AP<sp>0701<cr>
Allows upstream Time Of Day packets to be passed through

Note that the upstream XDS blocking instructions are not saved through power loss

4.5.3. Queue XDS Packets

This command will delete the entire specified XDS output queue and replace it with the packets named (if any). The user enters the packet ids of the XDS packets separated by <cr> in the order that they are to appear in the output queue. The user enters the packet id of each packet separated by <sp> in the order that they are to appear in the output queue.

Command:^A8<sp>F2 edsid<sp>edsid...edsid<cr>

Default none

The parameter **edsid** identifies the packet id of each packet to be placed in the XDS queue. If no packet id is given, the XDS output queue is cleared and no XDS information will be output.

4.5.4. Delete XDS Packet

This command allows the user to remove an XDS packet from the article memory. If the XDS packet is currently being output, it will not be removed until it has been completely output.

Command: ^AP<sp>edsid<cr>

Default none

The parameter **edsid** identifies the packet to be deleted.

Examples: ^AP<sp>0103<cr>
The program name packet will be removed from memory.

4.6. COMM PORT CONTROL COMMANDS

The HD9084 can allow simultaneous access by all the communication ports to the caption keyers. This can be the effective equivalent of multiple caption encoders, linked in series. By using a single video keyer, these encoder models provide the added advantage of minimizing the delays and the impact on the video quality.
Several commands are provided in order to prevent data conflicts and to allow the user to control which ports can affect the data.
The caption encoder maintains a permission list that indicates which ports will be allowed to alter various kinds of data. The permissions for each port can be set from the front panel menus or they may be set from the communication control ports. The permission list is maintained in non-volatile memory. The data types are denoted as follows:

Data Type	C1	captions field 1
	C2	captions field 2
	T1	text field 1
	T2	text field 2
	XDS	extended data services

When multiple ports are permitted access to a particular data type, conflicts will be resolved on a “first come, first served” basis. The caption encoder maintains a list of which ports are active for each data type.

Normally, the various keyer commands (such as ^A2, ^A3, ^A6, ^A7) will set and clear the active status automatically. To obtain maximum compatibility with existing software, these commands will exhibit the following special behavior:

> If a port does not have permission for the full field 1, but does have permission for the captions in field 1, then the command will not be denied, but will revert to the C1 form of the command.
>
> For example, if Port A has permission for CF1 only, and a ^A3<cr> or ^A3 F1<cr> is issued, then although Port A does not have permission for the full field 1, the command will not be rejected. Instead, the command will be treated as though ^A3 C1<cr> had been sent.

4.6.1. Show Port Permission Maps

This command will report the permission map for each port. The permission map controls what data types a port is allowed to become active in. (e.g., captions field 1, text field 2, XDS, etc.)

Command: ^AQ<cr>

Example result:
Permission Map
PORT A: C1 C2 T1 T2 XDS
PORT B: C1 C2 T1 T2 XDS
PORT C: C1 C2 T1 T2 XDS
PORT D: C1 C2 T1 T2 XDS OFFLINE

This example shows all ports are permitted access to all data types (the factory default setting) and the Port D modem is offline.

Permission Map
PORT A: C2 T1 T2 XDS
PORT B: C1 T1 T2 XDS
PORT C: C1 C2 T2 XDS
PORT D: C1 C2 T1 T2 ONLINE

This example shows port A is denied access to captions in field 1, port B is denied access to captions in field 2, port C is denied access to text in field 1 and port D is online and is denied access to extended data services.

4.6.2. Alter Port Permission Maps

This command will alter the permission map for any port by adding or subtracting various data types.
Command: ^AQ<sp>pn<sp>-dt…dt…dt<cr>

Default: none

Example:

> ^AQ PB – XDS –T2 –C2 C1 T1<cr>
> This command will disallow Port B from all field 2 data types, and enable Port B for captions and text in field 1.

^AQ C1<cr>
This command will allow the current port to access captions in field 1. Permissions for other data types remain as previously set.

^Au<cr>
^AQ PD – XDS –T2 –C2 –T1 C1<cr>
^AQ PB –XDS –T2 –C2 -C1 T1<cr>
^AQ PC –T2 –C2 -C1 -T1 XDS<cr>
These commands show a typical application which places the HD9084 in stream mode, allows modem Port D to process captions in Field 1, allows Port B to process text articles in field 1, and enables Port C for extended data services.

4.6.3. Show Port Active Maps

This command will report the active map for each port. The active map controls what port has control of a data type.

Command: ^AO<cr> (capital letter 'O')

Example result:
Active Map
PORT A: C1
PORT B: C2
PORT C:
PORT D: XDS ONLINE

This example shows Port A is actively controlling the captions in field 1, Port B is controlling the captions in field 2, Port C is not actively controlling any data, and the Port D modem is online and is controlling the extended data services.

4.6.4. Alter Port Active Maps

This command will alter the active map for any port by adding or subtracting various data types. The optional override parameter ('O') forces other control ports to relinquish control of the specified data type.

Command: ^AO<sp>pn<sp>-dt…dt…dt<sp>ovr<cr>

Default: none

Example:

^AO PB –C1<cr>
This command will remove the active indication for Port B from field 1 captions.

^AO C1<cr>
This command will indicate that the current port is active in the captions in field 1. Activity for other data types remain as previously set.

^AO C1 O<cr>
This command will forces the current port to be active in the captions in field 1. Activity for other data types remain as previously set. If any other control port is active in CF1 will be reset.

4.6.5. Reset Port

This command will reset a port. This command immediately clears the input and output data queues and resets the HD9084 to the Transparent State in Field 1 and Field 2. Article and XDS output queues are not reset by this command. They must be explicitly reset by using the queue articles and queue XDS commands. Because other control ports may be simultaneously sending data, this command only affects the fields and data types that have not been appropriated by other control ports.

Command: ^Ar<sp>pn<cr>

Example: ^Ar PB<cr> Resets Port B

CHAPTER 5: TECHNICAL DESCRIPTION
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5. TECHNICAL DESCRIPTION

5.1. SPECIFICATIONS

5.1.1. HDTV Serial Digital Video Input

Standard: SMPTE 292M 1.485 Gb/s
1080i, 720p, 1035i
Number of Inputs: 1
Connector: BNC per IEC 169-8
Equalization: Automatic up to 75m @1.5 Gb/s with Belden 1694 (or equivalent). 24m with bypass relay installed
Impedance: 75 ohms

5.1.2. HDTV Serial Digital Video Output

Standard: Same as HD input
Number of Outputs: 1 program out (bypass relay protected)
1 monitoring out
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ± 0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter: <0.2 UI
Impedance: 75ohms

5.1.3. SDTV Serial Digital Video Input

Standard: SMPTE 259M-C
Number of Inputs: 1
Connector: BNC per IEC 169-8
Equalization: Automatic 200m @ 270Mb/s Belden 1694 (or equivalent). 24m with bypass relay installed

5.1.4. SDTV Serial Digital Video Output

Standard: Same as Input
Number of Outputs: 1 program out (bypass relay protected)
1 monitoring out
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 470ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB
Wide Band Jitter: < 0.2 UI

5.1.5. General Purpose In/Out

Number of Inputs: 7
Number of Outputs: 3
Type: Opto-isolated, active low
Connector: Female High Density DB-15
Signal level: +5V nominal

5.1.6. Communications and Control

Serial: 3 DB-9 male
RS232 /422 selectable
1200 baud to 57.6 kbaud
7 or 8 data bits

Modem: 2 RJ-11 telephone jacks
(2nd modem optional)
1200 baud to 14.4 kbaud
V.32BIS compatible

Ethernet: IEEE 802.3 (10 BaseT)
IEEE 802.3u (100 BaseTX)
RJ-45 connector

5.1.7. Physical

Dimensions: 19”W x 1.75”H x 18.75”
(483mm W x 45mm H x 477mm D)
Weight: 8 lbs. (3.5Kg)

5.1.8. Electrical

Power: 115/230 VAC 50/60 Hz, 30 VA
Safety: ETL Listed
Complies with EU safety directive
EMI/RFI: Complies with FCC part 15, class A
EU EMC Directive

5.2. UPDATING THE HD9084 FIRMWARE

You will need the following equipment in order to update the HD9084 Firmware:
-PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
-Null Modem cable (DB9 female to DB9 female) or (DB25 female to DB9 female)
-Terminal program that is capable of Xmodem file transfer protocol. (Such as HyperTerminal)
-New firmware supplied by Evertz. (.bin file)

Make sure a null modem cable is used for the upgrade procedure. A null modem cable is provided with the HD9084 during time of shipping.

5.2.1. PART 1: Configuring the Unit for Firmware Upgrades

Connect the null modem cable to PORT A on the rear of the HD9084, and the other end of the null modem cable to the communication port on the rear of the computer.

Set PORT A baud to 57600.
Set PORT A Comms to 8-none-1

(see section 3.6 as reference)

5.2.2. PART 2: Terminal program Setup

Start the terminal program. (ex. Hyperterminal)
Configure the port settings of the terminal program as follows:

Baud	57600
Parity	none
Data bits	8
Stop bits	2
Flow Control	None

5.2.3. PART 3: Initiating Upgrade Mode

5.2.3.1. Front Panel Upgrade Procedure

Enter the General menu by pressing **GENERAL** then **SETUP**.
Using the **UP/DOWN** keys, scroll the menu to "**Upgrade Firmware**" and press **SELECT**.
Press **SHIFT**+**SELECT** to confirm upgrade.
"*Upload File Now, Control X to Cancel*" will appear on the terminal program.
You can now proceed to section 5.2.4 of this manual.
Press Ctrl x to cancel the upgrade.

5.2.3.2. Power Cycle Upgrade Procedure

Apply power to the HD9084. During power up, a banner with the boot code version information should appear in the terminal window. The cursor to the right of the word "BOOT>" should be spinning for about 5 seconds then the unit will continue to boot.

1. While the cursor is spinning, press the <CTRL> and <X> keys on your computer keyboard simultaneously which will stop the cursor from spinning. The spinning prompt will only remain for about 5 seconds. You must press <CTRL-X> during this 5 second delay. If the unit continues to boot-up, simply cycle the power off, then on, and repeat this step.

2. Hit the <ENTER> key on your computer once.

3. Type the word “upgrade”, without quotes, next to the BOOT> prompt, and hit the <ENTER> key again.

4. The boot code will ask for confirmation of upgrade. Type "y", without quotes.

5. You should now see a prompt asking you to upload the file.

5.2.4. Part 4 - Uploading the new firmware

Upload the “.bin” file supplied from Evertz using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the HD9084 Boot code will time out.

Note: Use only the Xmodem transfer protocol. Other protocols, such as X-modem-CRC or X-modem 1K, will not work.

The boot code will indicate the operation was successful upon completion of the upload.

The following is a list of possible reasons for a failed upload:
1. The supplied “*.bin” file is corrupt.
2. Wrong file specified to be uploaded.
3. The PCs’ RS-232 communications port can’t handle a port speed of 57600.
4. Noise induced into the HD9084 Serial Upgrade cable.
5. Defective HD9084 Serial Upgrade cable.
6. Improper port settings in the terminal program or HD9084.

5.2.5. PART 5: Completing the Upgrade

5.2.5.1. Front Panel Complete Upgrade

1. The system will recognize the upgrade is complete and will automatically warm boot.

2. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

3. The update procedure is complete.

5.2.5.2. Power Cycle Complete Upgrade

1. After the Uploaded file is complete, the BOOT> prompt will appear in the terminal program.

2. The user must type in “boot” without quotations for the unit to warm boot.

3. The upgrade procedure is complete.

5.3. SERVICING INSTRUCTIONS

CAUTION – These servicing instructions are for use by qualified service personnel only. To reduce risk of electric shock do not perform any servicing instructions in this section of the manual unless you are qualified to do so.

CAUTION – If the unit is fitted with dual power supplies, make sure that power is removed from both supplies before performing any work on the unit.

5.3.1. Changing The Fuses

Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use time delay 5 x 20 mm fuses rated for 250 Volts with a current rating of 1 amp. Carefully reinsert the fuse holder into the power entry module.

5.3.2. Replacing The Battery

The HD9084 is fitted with a 3V 20mm diameter Lithium battery type CR2032. This battery is used to power the system time clock while power is removed from the unit. If the unit is not keeping time properly when it is powered down, the battery should be replaced according to the procedure outlined in section 5.3.2.1.

Before attempting to change the battery remove power from the 5600MSC

CAUTION
Danger of explosion if battery is incorrectly replaced
Replace only with the same or equivalent type

5.3.2.1. Safety Guidelines and Precautions concerning the Use of 3V Lithium Batteries

Please observe the following warnings strictly. If misused, the batteries may explode or leak, causing injury or damage to the equipment.

- The batteries must be inserted into the equipment with the correct polarity (+ and -).
- Do not attempt to revive used batteries by heating, charging or other means.
- Do not dispose of batteries in fire. Do not dismantle batteries.
- Do not short circuit batteries.
- Do not expose batteries to high temperatures, moisture or direct sunlight.
- Do not place batteries on a conductive surface (anti-static work mat, packaging bag or form trays) as it can cause the battery to short.

5.3.2.2. Procedure for Replacing the Battery

- Remove the top cover of the unit.
- Carefully lift out the old battery.
- Insert the new battery with the + side facing up. Make sure it is firmly inserted into the socket.
- Replace the top cover of the unit and apply power.
- Set the system time and date using the methods described in section 3.7.

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6. TROUBLESHOOTING

6.1. ANSWERS TO FREQUENTLY ASKED QUESTIONS

6.1.1. Which serial port should I connect to?

Any serial port can be used for typical captioning functions, since they all use the same Control A serial protocol. All three serial ports are configured from the factory to work with an off-the-shelf null-modem cable. Port A, B, and C are all configurable to support both RS-232 and RS-422 communications.

If the user wishes to connect to an ATSC encoder, Port B must be used to support SMPTE-333M or Grand Alliance protocols. Port B must be configured to support the protocol using the front panel menu system of the HD9084. Please see section 3.6.

6.1.2. There is no SD-SDI video present on the SD-SDI output.

The HD9084 includes a SD-SDI video bypass relay to ensure that SD-SDI video is passed, even when the unit is powered-down. Make sure that your SD-SDI source is connected to the BNC connector marked SD-SDI PGM IN, and the primary SD-SDI video output is connected to the BNC connector marked SD-SDI BYPASS PGM OUT. If you still see no video, try the following:

1. Unplug the power from the Closed Caption Encoder.
2. Connect your SD-SDI source to the SD-SDI IN connector.
3. Look for video out of the SD-SDI BYPASS PGM OUT connector.

If there is still no SD-SDI video passing through the unit, check for presence of SD-SDI video upstream, and check for cabling problems.

6.1.3. There is no HD-SDI video present on the HD-SDI output.

The HD9084 includes a HD-SDI video bypass relay to ensure that HD-SDI video is passed, even when the unit is powered-down. Make sure that your HD-SDI source is connected to the BNC connector marked HD-SDI PGM IN, and the primary HD-SDI video output is connected to the BNC connector marked HD-SDI BYPASS PGM OUT. If you still see no video, try the following:

1. Unplug the power from the Closed Caption Encoder.
2. Connect your HD-SDI source to the HD-SDI IN connector.
3. Look for video out of the HD-SDI BYPASS PGM OUT connector.

If there is still no HD-SDI video passing through the unit, check for presence of HD-SDI video upstream, and check for cabling problems.

6.1.4. How do I check if captions are being processed?

6.1.4.1. Control A protocol test using a Terminal Program

Control A protocol can be used to determine if captions are processed and available out of Ports A, B, or C.
Please ensure the latest firmware is downloaded from www.evertz.com and installed in the HD9084. Follow the load firmware section in 5.2.

Procedure:

- Connect a null modem cable to Port A,B, or C and to the RS-232 communication port of a PC.
- Begin a Terminal Program (Windows Hyper-terminal) and configure the communication settings to the following:

Baud	57600
Parity	none
Data bits	8
Stop bits	2
Flow Control	None

- Make sure captions are present in the up-stream SD-SDI and/or HD-SDI video or enable the Test Message of the HD9084. See section 3.4.2.6.
- Turn the HD9084 on.
- Using the front panel menu system set the desired port to Control A protocol. See section 3.6.
- Set the Port settings to match the settings in Hyper-terminal as shown above.

Only Port B supports 333M / Grand Alliance protocol

- Press ENTER on the keyboard and ensure you see an *astrix prompt every time you push the ENTER key.
- If you do not see the *astrix prompt, communication has not been established between the HD9084 and PC. Begin from the beginning of this procedure and ensure all settings are correct.
- At the prompt with the *astrix in Hyper-Terminal, type in the following command:
  Ctrl + a (the control button on the keyboard plus the letter A button)
  5
  SPACE (space bar)
  f
  1
  you will not see this displayed at the promt
- Press the ENTER key
- This Control A command is further outlined in section 4.3.4
- All captions in field 1 should now be displayed in HyperTerminal.
- To turn this feature off, type in the following command
- CTRL + g (Control key on the keyboard and the G key)
- The captions will stop scrolling

This test shows the HD9084 is processing captions and allows the user to verify this through Hyper-Terminal.
If captions are not displayed, check the following:

Ensure the command was entered properly.
Are captions present in the upstream video?
Turn on the test message via front panel (section 3.4.2.6)

6.1.4.2. Composite Monitoring Output Check

The HD9084 can decode both EIA-608 and EIA-708 captions. To check if captions are present and processed, connect a BNC cable from the Comp Mon output of the HD9084 to an Analog Monitor. Make sure video is present upstream. To verify EIA-608 captions are present and processed, make sure SD-SDI video is present upstream. To verify EIA-708 captions are present and processed, make sure HD-SDI video is present upstream. Turn the appropriate decoder on, (see section 3.5) If captions are not viwed on the Analog monitor, make sure the keyers are on, and captions are present on the upstream video. The built in Test Message can also be turned on to verify if the HD9084 is working properly. . See section 3.4.2.6 to enable and disable the test message.

6.1.5. There are no captions present out of the ATSC encoder.

Make sure the correct communication cable is used between the HD9084 Port B and the ATSC encoder. A null modem cable is used in almost all cases.
Avoid using gender changers, “home made” cables, or distribution boxes between the HD9084 and ATSC encoder. Ensure a direct path is provided from the HD9084 to the encoder with a proper working cable.
Ensure Port B is set to the proper protocol and baud rate using the front panel menu. See section 3.6.1 to configure Port B.

Note: Only Port B supports SMPTE-333M and Grand Alliance protocol.

Verify Captions are present on the upstream video following the procedure outlined in section 6.1.4.2

6.1.6. What baud rate and port settings should I use?

While the unit is capable of running at 57.6kbaud on all internal serial ports, it is not necessary to run at the fastest baud rate possible for most captioning operations. NTSC captions are encoded at a maximum of 60 characters per second in each field. A serial port set to 1200 baud can transfer data at up to 120 characters per second including 7-bits of data, start, stop and parity bits. This is adequate for most captioning applications since the communications overhead is generally very low.

Some older PC’s do not function correctly at over 19.2k baud, especially when running under Windows. Many PC’s also have difficulties at 19.2k baud and above when using only the software (XON/XOFF) flow control method. Try turning on hardware (CTS/RTS) flow control on your computer if the captioning software supports it, and/or reducing your communications baud rate. Make sure that you alter your captioning computer’s serial port settings to match those of the caption encoder.

6.1.7. How do I check the logic levels and pinouts of the serial ports?

The logic levels (RS-232 or RS-422) can be checked from the front panel without removing the caption encoder from service. Push PORTS to cycle through the ports display option. See section 3.2.2.3.

6.1.8. How do I check the status of my power supplies?

Power supply status can be monitored from the front panel PSU STATUS 1 and 2 LED's. If the LED in on, the power supply is functional/present. If the LED is off, the power supply is non-functional/ not present. Note: The +2PS option (redundant power supply) must be ordered for both LED's to be on.

6.1.9. Captions are not being encoded at all.

If there is no option in the captioning/teleprompter software for the Evertz encoder, configure your software to communicate with an EEG 270, EEG 370 or EEG 470 model Smart Encoder. The Evertz caption protocol is compatible with these units.

Make sure that the caption encoder unit is set to the correct video type, 525-60 for component NTSC.

Check that the caption keyer is turned on. There are green LED's to the left of the HD/SD Keyer ON/OFF pushbuttons that indicate HD-SDI and SD-SDI caption keyers are enabled. The encoder will not encode new captions into the video if the keyers have been turned off.

Check your serial port communications settings. Make sure that these are identical between the caption encoder and the attached captioning computer.

Check that the unit is receiving data from the serial port or modem.

Try enabling the built-in test message, as described in the manual section 3.4.2.6. If you still cannot see captions, then it is likely that downstream equipment is corrupting the caption data, or your caption decoder is not functioning correctly.

6.1.10. Captions are not being encoded correctly.

If there is no option in the captioning/teleprompter software for the Evertz encoder, configure your software to communicate with an EEG 270, EEG 370 or EEG 470 model Smart Encoder. The Evertz caption protocol is compatible with these units.

Make sure that the caption encoder unit is set to the correct video type, 525-60 for component NTSC.

Check your serial port communications settings. Make sure that these are identical between the caption encoder and the attached captioning computer.

Check that the unit is receiving data from the serial port or modem.

If certain accented and special characters do not display correctly, this is likely the fault of the caption decoder being used to display the captions. Some decoders do not support the entire character set for captions.

Certain teleprompter software packages have been known to not encode accented characters correctly. Please contact your software provider for possible updates before contacting Evertz technical support.

6.1.11. How can I block upstream captions?

Depending on the user's specific needs, there are many ways to accomplish this. If all upstream captions are to be blocked, the recommended approach is to issue the serial port commands ^A6 F1 and ^A6 F2 to place both Field 1 and Field 2 into NULL STATE. See section 4.3.13.

If only a particular data channel is to be blocked, such as Text Channel 2, execute the serial command ^A6 T2 to place this particular channel in NULL STATE. To block all upstream XDS material, issuing ^A6 TX will put only the XDS stream into NULL STATE. Presently there is no way to block specific XDS packet types, unless these are being replaced with updated packets of the same type by the caption encoder. If an entire field is to be blocked, use ^A6 F2 to place all of Field 2 in NULL STATE.

6.1.12. How can I pass upstream captions?

If upstream captions are being blocked, the user's captioning software might have failed to relinquish control of the encoder so upstream captions may pass.

If captioning software is leaving the unit in DIRECT STATE or REAL TIME STATE or NULL STATE when it is sitting idle, this issue must be resolved in the caption software itself.

6.1.13. When should I use "Reset to Factory Defaults"?

Factory Reset should not be used lightly. It is intended primarily for use when Evertz technical support personnel are assisting an operator with a problem. The Factory Reset could also be used when the encoder is placed in a particular undesirable mode of operation and the operator is highly unsure as to how to resolve the situation. Note that any special features that have been enabled by the operator, such as baud rate settings, will need to be reconfigured after a Factory Reset.

6.1.14. My Modem Connection Hangs-Up Unexpectedly

The following can cause unexplained hang-ups on a modem connection:

RAIN - If there has been any significant rainfall during this time, moisture can get into the lines and cause power hums and other sorts of phenomenon. This can cause the DC level of the phone line to vary, which modems can interpret as loss of carrier.

DISTANCE - If the captioner is a long distance from the CO (Central Office) where they are near the limit of transmission, dropouts can occur if there is not a line booster in place. If there is a line booster, this can also be a problem if there are grounding issues, etc.

CAPTIONERS MODEM - If the initialization string is setup incorrectly, this can cause the modem to not function correctly. They may want to check the modem manufacturer for the recommended set-up for they're particular modem so it is capable of operating in the 1200 to 2400 baud range. Some people that use US Robotics 57.6k modems have reported difficulties connecting at lower baud rates due to these setup strings.

OTHER SOFTWARE - If there is any other software on the system that uses the modem, it may have changed the initialization string or be interfering with the modem. On computers that use a COM-port mouse, the mouse may also interfere with the modem operation if it is configured incorrectly.

READ THE MANUAL - Be sure the captioners know their system inside and out. They should at minimum, be able to supply what their system configuration is.

CALL WAITING - If this service is installed on the caption's phone line, it MUST be disabled before using the modem. If an outside caller tries to call the phone line that the modem is connected to, the tone that is generated will disrupt modem communications, resulting in loss of carrier.

ONLY CONNECT TO POTS (Plain Old Telephone System) - For a reliable telephone connection to the caption encoder a direct telephone line must be used. This line must not pass through a PBX or similar key device.

Make sure the latest Firmware is installed in the HD9084. The latest

6.2. BEFORE YOU CALL EVERTZ TECHNICAL SUPPORT

Check for any product upgrades that may address your problem at the Evertz web site (www.evertz.com) and with your software vendor.

After you have checked our web site and you call, you will be asked for specific technical information, which should be prepared in advance for speedy assistance:

- Firmware version of the caption encoder. This is displayed on the front panel display by pressing **GENERAL** on the front panel of the HD9084 encoder.
- Which serial ports and modem ports (A through E) are being used on the encoder?
- What captioning or teleprompter software is being used to control the encoder? (manufacturer, product name, revision number)
- Is this a new installation, or was the unit functioning in your system previously?
- Did the problem occur after installing some new hardware or software?

CHAPTER 7: GLOSSARY
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7. GLOSSARY

7.1. GLOSSARY OF STANDARDS

EIA (Electronic Industries Alliance): An association of trade associations representing various facets of the electronics industry. Each of these EIA Sector Associations manages its own standards-setting programs under EIA, the umbrella organization.

EIA-608-B: This EIA standard serves as a technical guide for those providing encoding equipment and/or decoding equipment to produce material with encoded data embedded in Line 21 of the vertical blanking interval of the NTSC video signal. It is also a usage guide for those who will produce material using such equipment

EIA-708-B defines the coding of DTV closed captions (DTVCC) as they are delivered in an ATSC signal, and also defines the Caption Distribution Packet (CDP). This structure contains fields that can hold: EIA-608-B data for use if the video is converted to standard definition analog; DTV captions for use in an ATSC program; Caption Descriptors; and Time Code. The CDP is the basic unit of data that is transported through the professional portion of a DTV plant. As such, it is central to the methods discussed in this document.

EIA-744-A: The EIA standard that defines the formatting of content advisory information accommodating either U.S. or Canadian systems, as well as the movie industry's MPAA rating system using the vertical blanking interval. EIA 744-A redefines the XDS Program Rating (content advisory) packet, 05h, currently contained in **EIA-608-B**, section 6.5.1, Current Class.

EIA-746-A: This document is a proposed amendment to EIA-608-A to insert Internet Uniform Resource. Locators (URLs) within the line-21 data system using the Text-2 (T-2) service. These URLs may be used by receiving devices in a variety of ways to associate Internet content with related television broadcast content

SMPTE (Society of Motion Picture and Television Engineers): A professional organization that recommends standards for the film and television industries.

SMPTE 12M: The SMPTE standard for linear time code.

SMPTE 125M: The SMPTE standard for bit parallel digital interface for component video signals. .SMPTE 125M defines the parameters required to generate and distribute component video signals on a parallel interface.

SMPTE 244M: The SMPTE standard for bit parallel digital interface for composite video signals. SMPTE 244M defines the parameters required to generate and distribute composite video signals on a parallel interface.

SMPTE 259M: The SMPTE standard for 525 line serial digital component and composite interfaces.

SMPTE 269M: This SMPTE standard defines an opto-isolated fault tally output signal for connecting to.user-defined equipment such as warning indicators.

SMPTE 291M: defines the method of multiplexing ancillary data such as audio and captions to 292M and 259M signals.

SMPTE 292M: defines the serial interface that is used for carriage of HDTV video signals. It and its standard definition equivalent 259M provide a standard transport mechanism, not only for the video signal, but also for digitized audio and data such as captions.

SMPTE 309M: The SMPTE standard for encoding date information into the user bits of linear time code.

SMPTE 333M: The SMPTE standard for serially interfacing captioning equipment with ATSC caption encoders

SMPTE 334M: assigns addresses to be used to multiplex specific data services such as captioning into the vertical ancillary (VANC) space defined by 291M. It also specifies that the payload of a VANC packet used for captioning is CDP.

7.2. GLOSSARY OF TERMS

AES: (Audio Engineering Society): A professional organization that recommends standards for the audio industries.

AES/EBU: Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union organizations.

ANALOG: An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing digits 0 and 1.

A-TO D CONVERTER (ANALOG-TO-DIGITAL): A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal.

ATSC A/65: defines information that describes the contents of an ATSC broadcast. Some of this information may pertain to the closed captioning.

BIT: A binary representation of 0 or 1. One of the quantized levels of a pixel.

BIT PARALLEL: Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE 125M, EBU 3267-E and CCIR 656.

BIT SERIAL: Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fiber optics. This standard is covered under SMPTE 259M and CCIR 656.

BIT STREAM: A continuous series of bits transmitted on a line.

BNC: Abbreviation of "baby N connector". A cable connector used extensively in television systems.

BYTE: A complete set of quantized levels containing all the bits. Bytes consisting of 8 to 10 bits per sample are typical in digital video systems.

CABLE EQUALIZATION: The process of altering the frequency response of a video amplifier to compensate for high frequency losses in coaxial cable.

CDP: caption distribution Packet, defined in EIA-708.

CCIR (International Radio Consultative Committee): An international standards committee. (This organization is now known as ITU.)

CCIR-601: See ITU-R601

CCIR-656: See ITU-R656

CLIFF EFFECT: (also referred to as the 'digital cliff') This is a phenomenon found in digital video systems that describes the sudden deterioration of picture quality when doe to excessive bit errors, often caused by excessive cable lengths. The digital signal will be perfect even though one of its signal parameters is approaching or passing the specified limits. At a given moment however, the parameter will reach a point where the data can no longer be interpreted correctly, and the picture will be totally unrecognizable.

COMPONENT ANALOG: The non-encoded output of a camera, video tape recorder, etc., consisting of the three primary colour signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats these three components have been translated into a luminance signal and two colour difference signals, for example Y, B-Y, R-Y.

COMPONENT DIGITAL: A digital representation of a component analog signal set, most often Y, B-Y, R-Y. The encoding parameters are specified by ITU-R601. ITU-R656 and SMPTE 125M specify the parallel interface.

COMPOSITE ANALOG: An encoded video signal such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

COMPOSITE DIGITAL: A digitally encoded video signal, such as NTSC or PAL video that includes horizontal and vertical synchronizing information.

D1: A component digital video recording format that uses data conforming to the ITU-R601 standard. Records on 19 mm magnetic tape. (Often used incorrectly to refer to component digital video.)

D2: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 19 mm magnetic tape. (Often used incorrectly to refer to composite digital video.)

D3: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 1/2" magnetic tape.

DSO:(Daylight Saving time Observed)

DST (DAYLIGHT SAVING TIME): The civil time observed when daylight saving time is adopted in a country or region. It is usually standard time + 1 hour. (see also *Standard Time*)

DTVCC: Digital Television Closed Captioning, defined in EIA-708.

EBU (European Broadcasting Union): An organization of European broadcasters that among other activities provides technical recommendations for the 625/50 line television systems.

EBU TECH 3267-E: The EBU recommendation for the parallel interface of 625 line digital video signal. This is a revision of the earlier EBU Tech 3246-E standard that was in turn derived from ITU-R601.

EDH: Error Detection and Handling (EDH) is defined in SMPTE RP-165 as a method of determining when bit errors have occurred along the digital video path. Check words and flags are combined into a special error detection data packet that is included as ancillary data in the serial digital signal.

EMBEDDED AUDIO: Digital audio is multiplexed onto a serial digital video data stream.

EXTENDED DATA SERVICES (XDS): XDS is a third data service in field 2 that is intended to supply program related and other information to the viewer. This information may include such items as program title, length of show, type of show and program content codes such as V-Chip program ratings.

ITU: The United Nations regulatory body governing all forms of communications. ITU-R (previously CCIR) regulates the radio frequency spectrum, while ITU-T (previously CCITT) deals with the telecommunications standards.

ITU-R601: (This document previously known as CCIR-601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. ITU-R601 defines the sampling systems, matrix values and filter characteristics for both Y, B-Y, R-Y and RGB component digital television signals.

ITU-R656 (This document previously known as CCIR-656). The physical parallel and serial interconnect scheme for ITU-R601. ITU-R656 defines the parallel connector pinouts as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces. It reflects definitions found in EBU Tech 3267 (for 625 line systems) and SMPTE 125M (parallel 525 line systems) and SMPTE 259M (serial 525 line systems).

JULIAN DATE: The Julian day number is a count of days elapsed since Greenwich mean noon on January 1, 4713B.C. January 1st, 1993 was JD 2448989; January 1st, 2000 was JD 2451545.

MODIFIED JULIAN DATE (MJD): The Modified Julian Date is a continuous count of the number of days elapsed since 17 November 1858. It is often more useful than conventional calendar dates for record keeping over long periods of time, since the MJD's of two events can easily be subtracted to determine the time difference in days. Usually, the MJD is specified as a number with 5 significant digits. As an example, the MJD for 1 January 1995 is 49718, meaning that this many days have elapsed between 17 November 1858 and 1 January 1995. The Modified Julian date is calculated by subtracting 2400000.5 days from the Julian Date. Thus the Modified Julian Day 1 begins at Greenwich midnight.

LED: Light Emitting Diode.

LINEAR TIME CODE (LTC): A digital code used for timing and control purposes on videotape and associated audiotape machines. It is recorded on a longitudinal track with audio characteristics and is referred to as LTC (Sometimes this code is also referred to as longitudinal code or SMPTE). Each 80 bit code word is associated with one television frame, and consists of 26 time bits, 6 flag bits, 32 user bits and 16 sync bits. Date information may optionally encoded into the user bits. This code is often used for distribution time of day information to station clock displays and automation systems. The SMPTE 12M standard defines LTC.

PAC: stands for Preamble Address Code. These codes are embedded into the line 21 caption data. They define the caption text position on the screen, and set special features such as colour, italics and underline.

PIXEL: The smallest distinguishable and resolvable area in a video image. A single point on the screen. In digital video, a single sample of the picture. Derived from the words *picture element*.

PSIP: Program and System Information Protocol, defined in ATSC A/65.

RESOLUTION: The number of bits (eight, ten, etc.) determines the resolution of the signal. Eight bits is the minimum resolution for broadcast television signals.

SERIAL DIGITAL (SDI): Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

STANDARD TIME: The civil time adopted for a country or region. (See also *Daylight Saving Time*)

TIME ZONE OFFSET: The difference in time between the local time and UTC

TRS: Timing reference signals used in composite digital systems. (It is four words long).

TRS-ID: Abbreviation for "Timing Reference Signal Identification". A reference signal used to maintain timing in composite digital systems. (It is four words long.)

UNIVERSAL COORDINATED TIME
UNIVERSAL TIME, COORDINATED (UTC): Universal Coordinated Time (UTC) is an international time standard that defines a time that doesn't depend on where we are on Earth. Universal Time (UTC), Greenwich Mean Time (GMT), and Zulu Time (Z), are based at the prime meridian (0° longitude) of Earth and are used to avoid confusion of time zones.

VANC: Vertical Ancillary data. Data carried in serial digital video signal (SMPTE 259M or 292M), in accordance with SMPTE 291M, in the active portion of scan lines that are outside the active picture area.

VBI: Vertical Blanking Interval. The scan lines that are outside the active picture area of a standard definition video signal (analog or serial digital). These can be used for carriage of data, including closed captioning, in analog video broadcasting.

V-Chip: Abbreviation for “Viewer Chip” (commonly misread as “Violence Chip”). V-Chip-enabled television sets extract Program Rating packets from the XDS data stream in Field 2 captions to determine the rating of a show. Also see Extended Data Services.

WebTV: The encoding of URL (Uniform Resource Locators) normally used on the Internet, into line 21 caption style data. This URL string is made up with the familiar http:// followed by a target location on the Internet. The URL must be formatted to match the Electronic Industries Association specification EIA-746-A.

XDS: See Extended Data Services.

4:2:2 A commonly used term for a component digital video format. The details of the format are specified in the ITU-R601 standard. The numerals 4:2:2 denote the ratio of the sampling frequencies of

the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.

4Fsc Four times subcarrier sampling rate used in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.