EEG DE1285 Caption Decoder/VANC Monitor

Product Manual

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1 Introduction

1.1 Product Description

The DE1285 Caption Decoder/VANC Monitor offers a highly comprehensive VANC monitoring solution in a single modular frame card operating on the openGear platform. The powerful DE1285 is an all–purpose closed caption decoder which creates an open caption display for monitoring CEA–708 data quality and full standards compliance, while also providing an extensive VANC monitoring suite. The DE1285 can be configured from the user friendly DashBoard software, which is available for Windows, Mac and Linux operating systems. In addition to producing broadcast quality open–captioned video, the DE1285 decodes a wide array of metadata types, including AFD (Active Format Descriptors), audio metadata and XDS. The DE1285 also features HANC embedded AES audio decoding with channel levels, peaks, and phase detection.

The DE1285 comes equipped with a powerful Web-based VANC Analysis Tool for viewing and capturing live VANC data, sorted by service type, DID/SDID or line number. The DE1285 Web Tools offer an efficient new way to monitor VANC packets, providing programmable triggers with logging for packet drop-outs or changes, as well as other features.

The EEG DE1285 offers a comprehensive VANC monitoring solution and closed caption decoder with the proven quality and full standards compliance of the industry's leading provider of closed caption decoding equipment.

2   Installation

2.1   Back Panel

The DE1285 rear panel is shown below, followed by a guide to the connectors located there.

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Program In	Video input for the Program video chain. The on-screen display will be burned onto this video signal.
Program Out 1	Relay-bypass protected decoder video output
Program Out 2	Non relay-bypass protected copy of the decoder output signal
LAN	100-Base Ethernet port for network features including web tools suite
GPIO	GPI and GPO connector for future development. See Appendix A.1 for GPI and GPO pinouts and instructions
P1	RS232 serial data port

3 Decoder Operation

3.1 DashBoard Menus

The DashBoard software is used to configure layout options, decoder settings, networking, and audio monitoring. Version 3.0.0 can be downloaded from the following URL: `http://www.eegent.com/download/Ross_Video/Dashboard/` Once you have successfully installed the DashBoard tool, open the program to find information about the DE1285 and to configure your card.
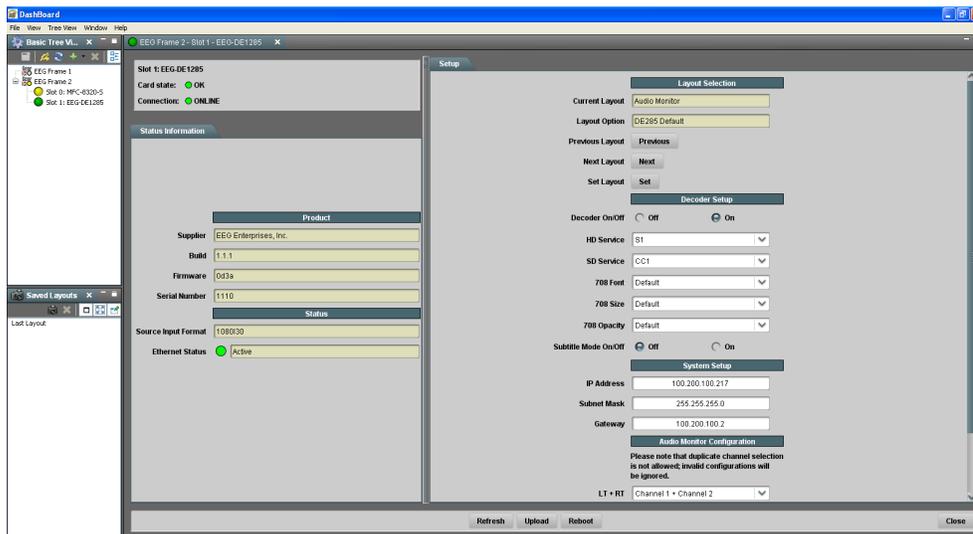
There are two main sections in the DashBoard interface: the Status information on the left side and the Setup menu on the right side. At the bottom of the DashBoard there are four general purpose buttons. The **Refresh** button updates the fields on the DashBoard to reflect the card's current state. The **Upload** button prompts the user to select an upgrade file to apply to the card. The **Reboot** button restarts the card itself. The **Close** button closes the frame card interface.

The upper section on the left shows the Card State and the Connection status, each of which has an indicator light and description to describe the card's status. There is a more detailed tab labeled Status Informa-

tion below the two basic indicators that provides information about the card's version, specifically the build number and firmware version and the status of two of the I/O ports, source input and ethernet.

The setup menu on the right half of the tool is broken up into four sub-menus: Layout Selection, Decoder Setup, System Setup and Audio Monitor Configuration.

3.1.1 Layout Selection

Current Layout   Displays the name of the current layout on the screen.

Layout Option   Displays the name of the proposed new layout. To change this selection use the **Previous** and **Next** buttons below. To make this layout the current layout click the **Set** button.

Previous Layout   Selects the previous layout and displays it in the **Layout Options** field.

Next Layout   Selects the next layout and displays it in the **Layout Options** field.

Set Layout   Updates the current on–screen layout to reflect the layout displayed in the **Layout Options** field.

3.1.2 Decoder Setup

Decoder On/Off   Turns the on-screen caption decoder display on or off.

HD Service
Selects the service that is decoded to create the HD caption display on the decoder output if HD video input is present. The DE1285 can display 708 caption Services 1 through 6, or 608 compatibility data for caption channels CC1 through CC4.

SD Service
Selects the service that is decoded to create the SD caption display on the decoder output if SD video input is present. The DE1285 can display 608 caption channels CC1 through CC4.

708 Font
Selects the display font for the decoder output. Choose "default" to see the font style as it is encoded in the 708 caption data. Fonts are only selectable when a 708 caption service is selected for decoding.

708 Size
Selects the size of the display text for the decoder output. Choose "default" to see the text size as it is encoded in the 708 caption data. Text sizes are only selectable when a 708 caption service is selected for decoding.

708 Opacity
Selects the opacity of the caption display for the decoder output. Choose "default" to see the colors and opacity as they are encoded in the 708 caption data. Opacity is only selectable when a 708 caption service is selected for decoding.

Subtitle Mode
Turns subtitle mode on or off when 708 captions are in use. Subtitle mode removes the black background and displays yellow text with a black shadowed outline. This feature is useful for creating easy–to–read subtitles.

3.1.3 System Setup

IP Address
Sets a fixed network address for the unit on your LAN.

Subnet Mask
The subnet mask should be set to match the bit mask used on your LAN.

Gateway
The gateway should be set to the address of the computer or device that the unit will use to communicate outside of your local network.

3.1.4 Audio Monitor Configuration

LT + RT
Select an audio channel pair to map to the left and right total monitors.

Center + LFE
Select an audio channel pair to map to the center and LFE monitors.

SL + SR
Select an audio channel pair to map to the side left and side right monitors.

Aux LT + Aux RT
Select an audio channel pair to map to the auxiliary left and right total monitors.

3.2   Web Tools Suite

The Web Tools module is a high-powered network-driven remote application for the DE1285 that provides new ways to view VANC data, as well as advanced configuration and monitoring tools. To use Web Configuration, the Decoder first must be connected to a 100-Base LAN, and configured with a valid IP address and subnet mask for that LAN through the front panel Network menu. Once the decoder has been given an address, access the web tools by typing the Decoder's IP address into a web browser from any computer on the same LAN.


Using an intuitive interface, the Web Tools module displays the detailed options tabs on the upper left hand side while showing the current video standard selected on the upper right hand side. Below the video standard on the right side, the error status is displayed in a continuously updated list which can be hidden or expanded by clicking on the arrow button located at the top of the error list. This list will briefly display any current video errors that appear on–screen. There is also a **Clear Errors** button that clears past errors and restarts the error count.

Below the error status display on the left is the **System Info** button,

which displays the version number of each software component of the DE1285 to make sure the current software loaded is up to date.

To the right of the **System Info** button is the **ANC Packet Key** button which provides a fully customizable reference for seeing which DID/SDID value maps to which service.Pre-defined DID/SDID values are listed in rows giving the DID value, the SDID value, the name of the data and the option to remove this mapping. These mappings determine the name of the service corresponding to a particular DID/SDID listed in the Packet Display tab. To add a new mapping you can use the top row of the chart to enter a DID value, a SDID value, and the corresponding name you would like associated with the DID/SDID and then click the **Add** button.
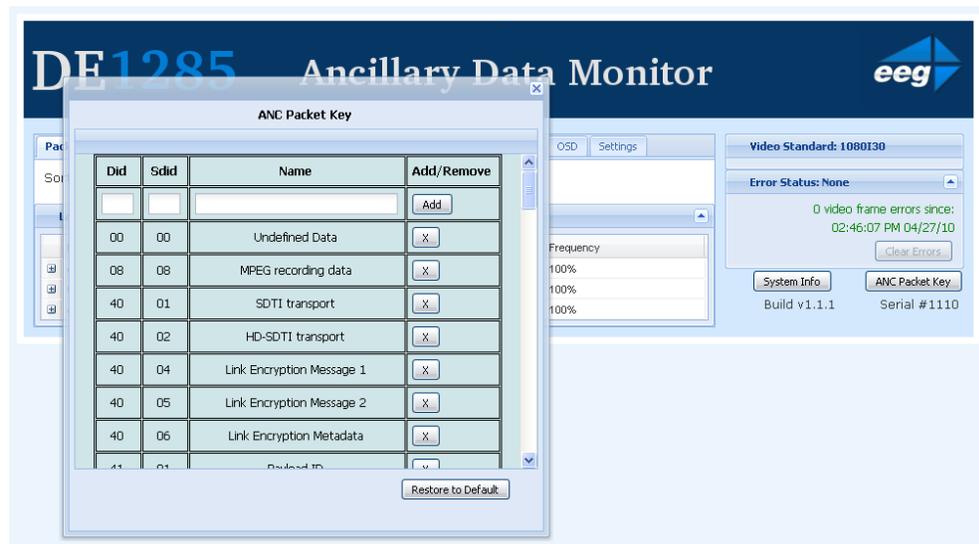
3.2.1   Packet Display Module

The Packet Display Module displays real–time VANC data on the website which can be sorted by one of four methods. This is the starting page in the main pane of the DE1285 Web Tools module and is shown on the previous page. The VANC packets can be sorted by DID/SDID, Service Type, Line Number, or Frequency (percentage of frames the sample appears in). The sorting method can be selected from the drop down menu located at the top of the packet display module.

The default viewing mode for the Packet Display Module gives an overview of which service types are present, along with their line numbers, DID/SDID values and frequency. A more detailed view is available by clicking on the '+' button located to the left of each VANC packet. The expanded view displays the hex dump, field, checksum and location/type of the data. The hex dump begins with the sample offset in the line followed by a colon and the hex value of each sample in the packet. The checksum field evaluates whether or not the checksum is valid. The Location/Type field displays whether it is VANC or HANC and which type it is. To return to the default view click on the '-' button at the top of packet line.

The VANC packets are continuously updated and displayed in the chart. If you would like the current data to remain on the screen temporarily, click the **Pause** button on the top left of the Packet Display Module. To resume seeing the live updated data, click the **Resume** button.

3.2.2 Data Decoder Module

The Data Decoder Module is a two part visualization tool which displays decoded AFD data on the top part of the screen and shows decoded XDS data alongside raw XDS packets on the lower portion of the screen.

The upper portion of the screen contains the AFD Decoder module which displays the current AFD code on the top right of the module, the decoded aspect ratio description below the code, and a visual representation of the AFD code on the left hand side. The default viewing option shows the AFD Decoder display. To hide the AFD decoder module, click on the upwards arrow at the top right hand corner. To expand the module, click the downwards arrow at the top right hand corner.

The lower section of the screen contains the XDS Decoder module which displays decoded XDS data on the left and the raw XDS packets on the right. The decoded XDS fields shown on the left include the Net Station, the Program Name, the Rating, CGMS, the Description, the Program Type and the Program ID. On the left, the raw XDS data in hex pair format can be sorted by type, name or how recently it has been updated. To view the raw XDS click on the '+' button located to the left of the packet to expand the packet and view the data. To hide the XDS decoder module, click on the upwards arrow at the top right hand corner. To expand the module, click the downwards arrow at the top right hand corner. The same hide/expand feature is also available for only the raw XDS Packet chart on the right.

3.2.3   Caption Decoder Module

The Caption Decoder Module simulates the placement of captions in the two Caption Feed sections. The Caption Feed sections have a row of radio buttons for selecting the caption service that will appear in the screen simulation below the menu. Caption services CC1 to CC4, and S1 to S6 are displayed, with the active caption services in bold.

The default viewing option shows both the Caption Feed 1 and Caption Feed 2 displays, but either Caption Feed window can be hidden by clicking on the upwards arrow at the top right hand corner of the appropriate section. To expand the module, click the downwards arrow at the top right hand corner.
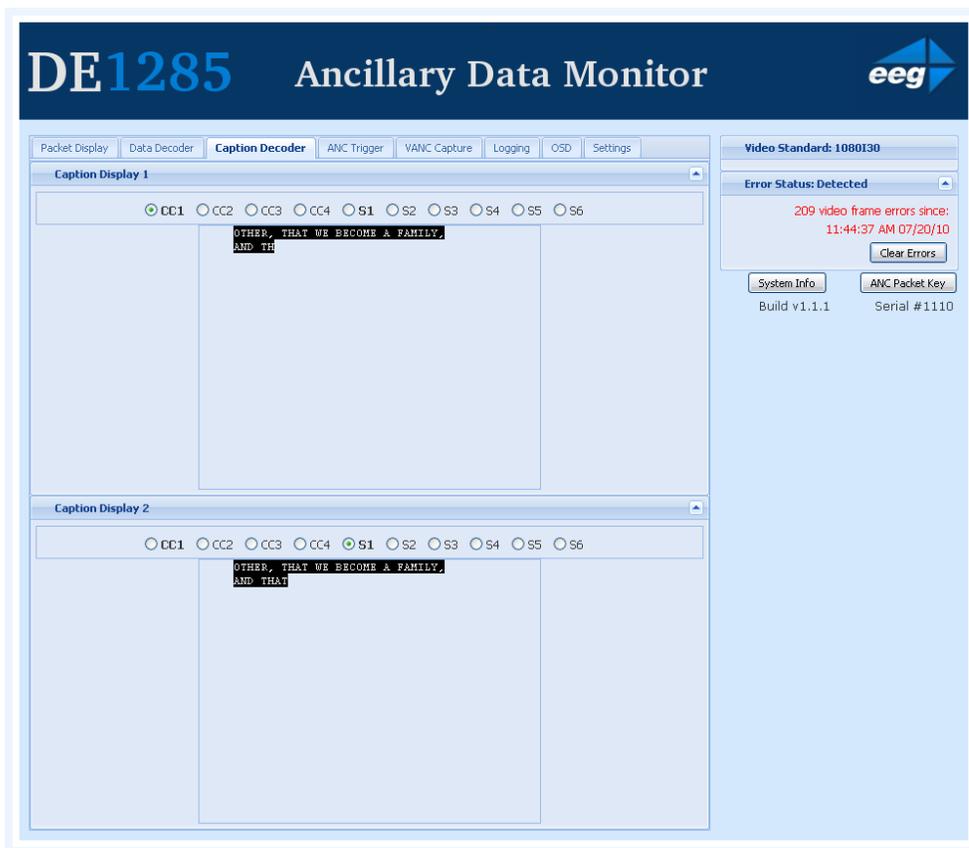
3.2.4   ANC Trigger

The ANC Trigger tab allows you to create triggers made up of two parts: the ANC data of interest, and the behavior you would like to observe. The data type is selected using the DID/SDID value, and the trigger can be set on behaviors such as Present, Absent, Change and DataChange. Setting triggers is a useful way to monitor incoming ANC data to check the frequency of events such as missing data. Using the web interface, triggers can be chosen and then monitored in a live–update pop-up window that is tied to your browser session, making the ANC analysis tool ideal for watching until an event occurs. To record triggers that will be stored on the DE1285 for detailed viewing or to view information about infrequently occurring errors, please see the next section on Logging.
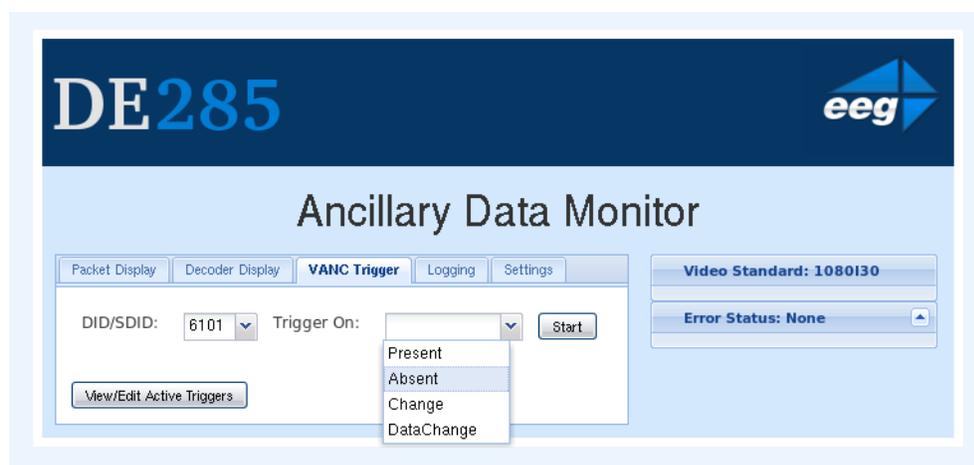
To set a trigger, select a DID/SDID value from the dropdown menu on the left and then choose a specific event type from the adjacent drop down menu. One of the following events can be chosen: "Present," which triggers when a particular packet is present in the video stream, "Absent," which triggers when a packet is not present in the video stream, "Change," which triggers when the packet presence changes from being present to not present or vice versa, and "DataChange," which triggers when the packet presence remains the same, but the data within the packet has changed. The events are evaluated on a per–field basis.

After creating an ANC trigger, click on the **Start** button to monitor the

trigger activity. A pop–up window will appear with multiple columns. The text in the upper left corner of the pop–up window indicates whether the trigger is active or has completed.

If the trigger is set to go off when the packet is absent, then the pop–up window will display the Trigger Count column and the Frame Number that the packet was missing from. If the trigger event is set to go off when the packets are present, changed or the data has changed, the pop–up window will display the Trigger Count, the Frame Number that the event has taken place in and the Line number in which the event happened.

To view the packets delivered at the trigger time, click the '**+**' button to the left of the trigger number. Regardless of the event type, the pop–up window will display up to twenty instances of the triggered event. To stop a trigger, click the 'x' button at the upper right corner of the pop–up window. To continue viewing current information about the trigger, re-set the trigger by repeating the instructions to create a trigger.

By clicking on the **View/Edit Active Triggers** button, the running triggers can be managed by viewing the triggers, removing specific triggers, or removing all triggers. This feature is useful in multi–user environments, as well as situations in which the DE1285 has unexpectedly lost power. If the message "This trigger is already in use." occurs when attempting to set a trigger that does not appear to be in use, this feature can be used to check whether that trigger is in fact in use. If the trigger is not being observed by any other user, it can be removed using the pop–up window that displays the active triggers in a list. To remove one trigger, click on the trigger in the Trigger List so that it is highlighted and then click **Remove** to remove the selected trigger. To remove all of the active triggers, click **Remove All**. To return to the main window without modifying the active triggers, click the 'x' at the top of the pop–up window.

3.2.5   VANC Capture

The VANC Capture tab provides a convenient way to capture real–time VANC data, with or without filtering, so that it can be downloaded and reviewed. To begin capturing all VANC data, click on the **Start** button. The elapsed time is displayed in the upper right hand corner. To end the VANC capture, click on the **Stop** button. If only certain VANC data is of interest, click on the checkbox to the left of 'Filter Capture by DID/SDID(s)' to reveal the filter submenu.
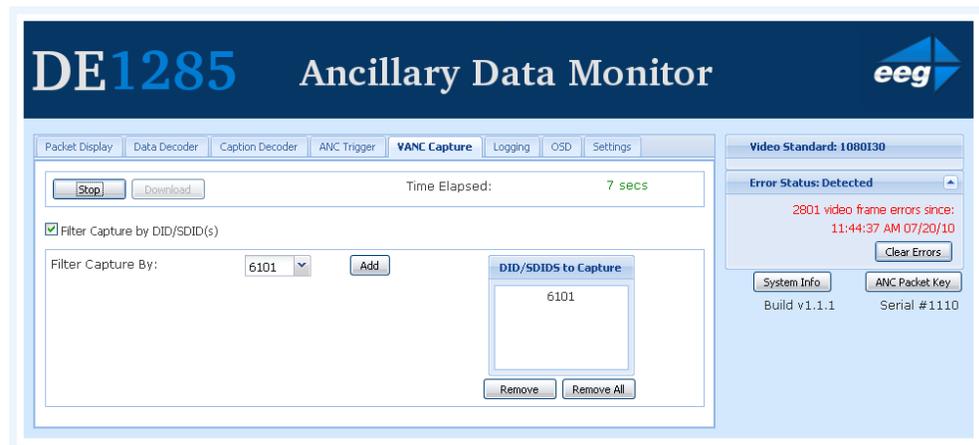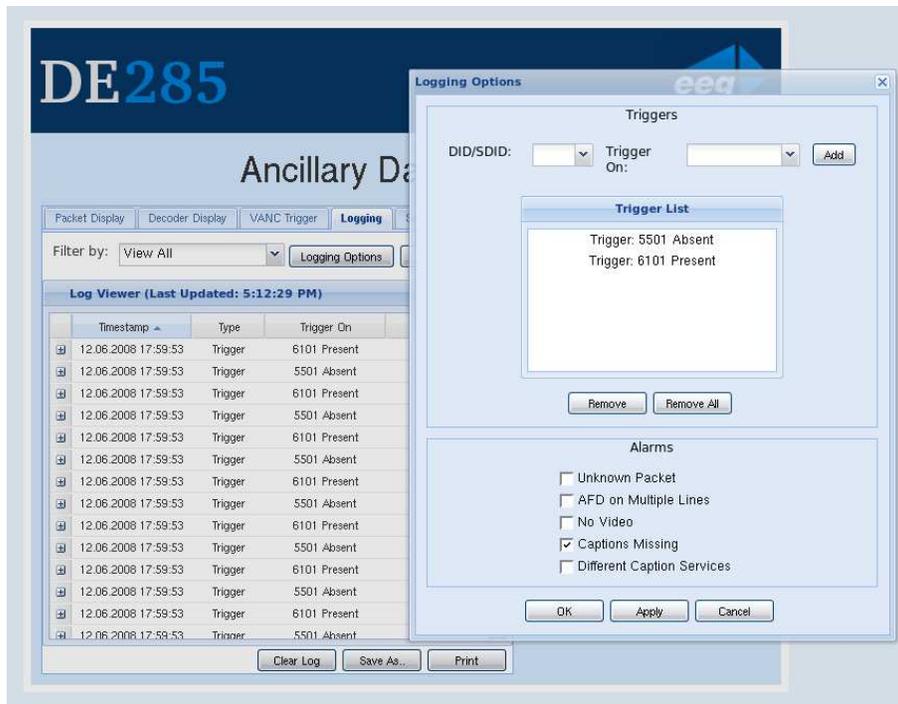
Using the dropdown menu on the left side of the submenu, choose the desired DID/SDID and click the **Add** button to the right of the dropdown menu. The added value will appear in the 'DID/SDID to Capture' area on the right part of the screen. Repeat this process until all VANC data of interest is added to the list. To remove a filter item, highlight the item by selecting the DID/SDID value in the list and then click on the **Remove** button below the list. To clear all filters, click the **Remove All** button in the lower right hand corner. After selecting filters, start and stop the VANC capture process as previously specified. To save and view the captured VANC data as a binary dump, click on the **Download** button.

3.2.6 Logging

The Logging tab provides a customizable solution for gathering VANC data for in-depth analysis and debugging. Logging is ideal for checking the behavior of triggers over a longer time period, monitoring error messages, and for any situation in which a saved copy or printout for later reference is desired.. Logs are saved in non-volatile storage on the DE1285 box.

The VANC Analysis tools can record two types of behavior, Log Triggers and Alarms. Log Triggers are similar to the normal triggers discussed in the previous section, but are intended for longer term use, when the user is not constantly watching the screen and waiting for a change. The Log Triggers operate only within the Logging tab, just as the normal triggers operate only within the VANC Triggers tab. Alarms are used to record the time and frame location of an error message. The Alarms report the content of the packet and are arranged in three categories in the **Logging Options** pop-up window.

The Logging tab displays stored information regarding triggers and alarms, allows the log to be printed or saved, and provides options for the information the log stores. The default log screen shows all alarms and triggers that appear in the Log Viewer. The events are sorted by the time at which they occurred and also contain information about the event type and when the event triggers, if applicable. To view more information about the Trigger or Alarm, click on the **'+'** button to the left of the the Trigger or Alarm of interest.

The Log Viewer display can be altered by using the "Filter By:" drop down menu to limit or expand which trigger or alarm types are being displayed. The displayed log can be updated by clicking the **Refresh** button, which is found at the upper right corner of the Logging module. To remove the current log information and start a new log, click the **Clear Log** button below the Log Viewer.

The current log can be saved or printed out to retain the information. Click on the **Save As...** button to save a copy of the log as an HTML file to a specified location. It may take 10 to 15 seconds to create the downloadable log. To print a copy of the log, click on **Print** to launch a pop–up window with print options. The printable copy can be filtered by what is present in the log, much like the drop–down filter menu used for viewing the log. There is also an option to select the range of log entries printed, or the option to print all. After selecting the desired print options, click **OK** to choose a printer and print the log, or **Cancel** to discard the print options and return to the main window of the log viewer.

To begin monitoring and storing Log Triggers and Alarms, click on **Logging Options** which will bring up a window in which Triggers and Alarms can be assigned or removed. The pop–up window may take a few seconds to load. Log Triggers can be assigned in the top half of the pop–up window. Alarms can be selected in the lower half of the pop–up window by checking the desired boxes.

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To set a Log Trigger, select a DID/SDID value from the dropdown menu on the left and then choose a specific event type from the adjacent drop down menu. One of the following events can be chosen: "Present," which triggers when a particular packet is present in the video stream, "Absent," which triggers when a packet is not present in the video stream, "Change," when the packet presence changes from being present to not present or vice versa, and "DataChange," which triggers when the packet presence remains the same, but the data within the packet has changed. The events are evaluated on a per–field basis. After selecting a value for DID/SDID and Trigger On, click **Add** to begin logging occurrences of the Log Trigger.

To set any of the Alarms, click the box to the left of the desired Alarm. After selecting all Log Triggers and Alarms of interest, click **Apply** and then **OK** to begin logging the selected Log Triggers and Alarms and to return to the Log Viewer. To disregard the changes made, click **Cancel** to return to the Log Viewer.

The available alarms are grouped into three categories: General Alarms, Caption Pair Alarms and Error Alarms. There are five alarms in the General Alarms category that can be used to get an overview of possible problems.

Alarm Name	Description
Unknown Packet	Sets an alarm to go off when a packet cannot be recognized by the DE1285 as a known type.
AFD on Multiple Lines	Sets an alarm that goes off when there is more than one AFD packet in a single video field.
No Video	Sets an alarm that goes off when there is no video signal or the video cannot be displayed.
Invalid V-Chip Rating	Sets an alarm that goes off when the V-Chip rating is not present or is not valid.
No Captions	Sets an alarm that goes off when there is no 6101 VANC packet present.

There are five alarms in the Caption Pair Alarms category that can be used to detect when certain combinations of caption channels are active. For each selected alarm, the two channels are checked over a 10 second period for data presence. If data is present in one channel but not the other, the alarm goes off.

| Alarm Name	Description
CC1 && S1	Sets an alarm that goes off when there is a mismatch between the presence of primary language SD captions and HD captions.
CC3 && S2	Sets an alarm that goes off when there is a mismatch between the presence of secondary language SD captions and HD captions.
CC2 && S2	Sets an alarm that goes off when there is a mismatch between the presence of secondary language SD captions and HD captions.
CC1 && CC3	Sets an alarm that goes off when there is a mismatch between the presence of primary and secondary language SD captioning.
S1 && S2	Sets an alarm that goes off when there is a mismatch between the presence of primary and secondary language HD captioning.

There is one alarm in the Error Alarms category that can be used for specific troubleshooting.

Alarm Name	Description
Video Error	Sets an alarm that goes off when there is an error involving the video signal.

3.2.7 OSD

The OSD tab allows for a fully customizable screen configuration using the tools on the upper part of the OSD tab and a user specified audio monitor configuration on the lower half of the screen.
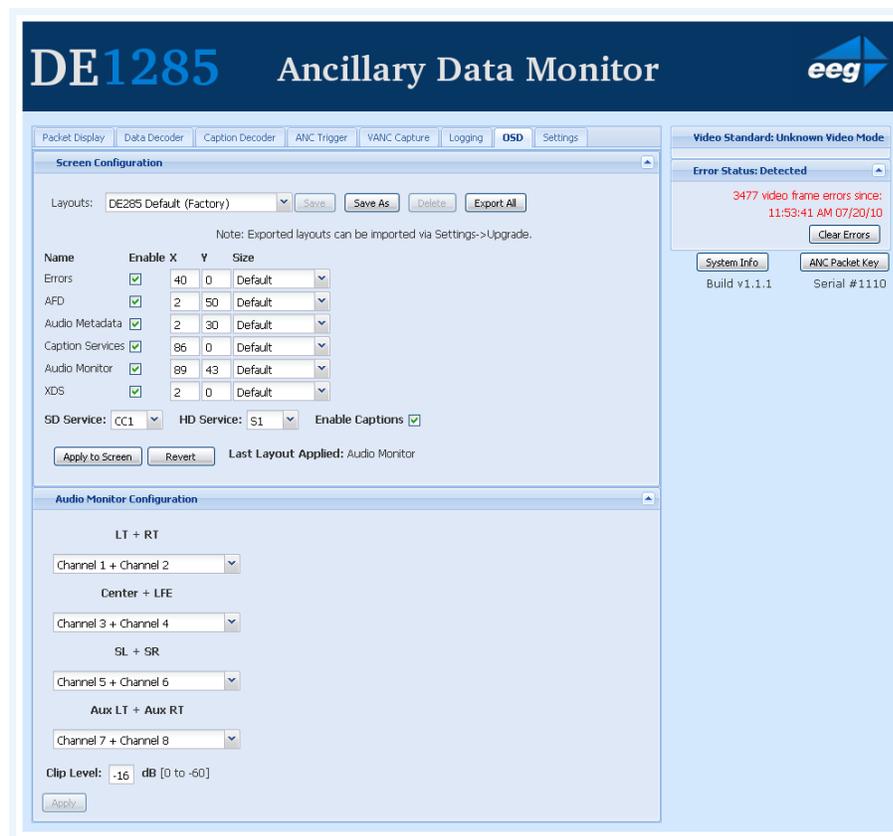
The upper part of the OSD tab provides a tool for customizing the screen configuration by allowing the user to choose the presence and screen location of Caption Services, XDS data, AFD data, Audio Monitor, Audio Metadata and Errors/Alarms. The DE1285 comes pre-loaded with several default layouts. To apply a default layout, use the pulldown menu next to Layouts to view the available options and choose the desired layout. If you are satisfied with the factory layout, click on the **Apply to Screen** button at the bottom of the Screen Configuration section to load the selected layout.

To manually configure the screen there is a check box to the right of each data type's name that can be checked in order to display the data, or unchecked to hide the data. To the right of the checkbox are the 'X' and 'Y' fields that control the horizontal and vertical positioning of the

data, respectively. Both fields have a range of 0–100, with X=50, Y=50 signifying the center of the screen. The text size can also be specified for each data type by using the dropdown list in the size column to select the desired size. Below the checkboxes is the caption enabling section where you can choose a 608 channel or 708 service using the dropdown lists, as well as using the rightmost checkbox to enable or disable all captions. Once you are satisfied with the newly configured layout, click **Apply to Screen** to put the specified screen configuration into effect, or **Revert** to discard any changes made and return to the last applied settings. The most recent layout applied to the screen is shown to the right of the **Revert** button for reference.

The lower section of the OSD tab allows the user to customize the mapping of audio channels to the audio monitor. Using the four dropdown lists, you can select which audio channel pair you would like to map to which audio monitor pair. Below these dropdown lists you can specify a clip level in decibels in the range of 0 to -60 dB. To put changes into effect, click the **Apply** button at the bottom of the screen.

3.2.8   Settings

The Settings tab contains several subsections that allow the user to customize various aspects of the 285 website and screen configuration. The top section of the Settings tab is the Systems Settings subsection, which allows the user to restore the factory defaults on the box by clicking the **Reset To Factory Defaults** button.

The Upgrade subsection provides an easily accessible way to update the firmware that comes pre-installed on the DE1285. The DE1285 can be upgraded through the USB front panel as discussed in the System Setup Menu section or the upgrade can be performed through the website. Begin by downloading the most recent firmware update file from the EEG website or from the 'Download DE1285 Upgrade' link on the website and saving it to a location on your computer. After downloading the firmware upgrade, click on the **Browse** button to the right of the File

field, select the EEG firmware update and then click **Submit** to update the firmware.

The Alarm Settings subsection allows the user to set a value in seconds that captions can be missing for before a GPIO alarm is triggered on pin 1. To change this value, enter a new value into the text field and click the **Apply** button to update the No Captions Timeout. If you would like to see this alarm on the logging section of the website you must set the 'No Captions' alarm by going to the Logging tab, clicking on the **Logging Options** button and selecting the 'No Captions' checkbox.

The lower part of the Settings tab is the Log Settings subsection, which provides a way to set the date, time and time zone for accurate trigger and alarm logging. The current date, time, and timezone can be seen to the right of the **Set Date/Time** button. To change the Date/Time, simply use the dropdown menus to select the month, day and year and then set the local time and time zone that you are in. Alternatively, you can set the date and time by clicking on the **Copy Computer's Date/Time** button, which uses the date and time from your current machine to set the date and time. When using this option be aware that the timezone is not copied along with the date and time information. To confirm the settings, click the **Set Date/Time** button at the bottom of the Log Settings section. The triggers and alarms will now have the correct timestamp when viewed in the Logging module.

A GPI/GPO

The four GPI inputs, labeled GPI-1 to GPI-4, each consist of one pair of pins. Each GPI switch is ON when its two pins are connected to each other, and OFF when open or floating.

The GPO outputs also have two pins each, labeled GPO-1 to GPO-4. Each pair of successive pins forms a switch that is ON when closed and OFF when open. GPI-1 is used as an alarm for missing captions. The missing captions timeout time can be set in the middle section of the Settings tab on the website.

B Video/Connector Specifications

SDI Video Inputs	
Number of Inputs	1 (Program In relay bypass protected)
Connector	BNC per IEC 169–8
Format	1.485 Gb/s SMPTE 292M (HD) or SMPTE 259M 270 Mb/s (SD)
Input Level	800 mV p–p $\pm$ 10%
Input Impedance	75 Ohm
Equalization	Automatic up to 100m @ 1.5 Gb/s with Belden 1694 or equivalent
SDI Video Outputs	
Number of Outputs	2 (Program Out 1 relay bypass protected)
Connector	BNC per IEC 169–8
Output Level	800 mV p–p $\pm$ 10%
Output Impedance	75 Ohm
DC Offset	0V $\pm$ 0.5V
Rise/Fall Time	200pS nominal
Overshoot	$<$ 10% of amplitude
Wide Band Jitter	$<$ 0.2 UI
Data Input Characteristics	
Data Ports	1 serial RJ-45 connector
GPI/GPO	8–pin GPIO
Serial Data Format	7 data bits, odd parity, 1 stop bit, settable from 1200-9600 baud
LAN	RJ45 connector, 10/100 Base T TCP/IP
Electrical	
Power	115/230V AC 50/60Hz
Power Consumption	$<$ 20 W
Physical	
Dimensions	12" long x 4" wide x 2" tall
Weight	$<$ 1 lb.