



## EEG App Note

# SCTE-104 Insertion and Monitoring

Last Revised: June 2018

SCTE-104 messaging provides a valuable mechanism for signaling advertising avails, program splice points, and DRM signals for television production, broadcast and distribution. EEG's suite of SCTE-104 solutions includes VANC insertion of SCTE104 data from LAN and GPI sources, monitoring, and modular receiving and conversion to HTTP data. Figures 2 and 3 in this document show suggested full system configurations using the EEG tools.

### Trigger Insertion

EEG encoders support an add-on module for SCTE-104 insertion into HD-SDI VANC. The encoders insert SCTE-104 packets on a user-configurable VANC line using the 4107 DID/SDID (as per SMPTE 2010). SCTE-104 messages can either be authored using a built-in preset editor and triggered via GPI (see Figure 1), or can be sent from an external source using the SCTE-104 network protocol over TCP/IP. This function can be used separately or in tandem with closed caption encoding and other encoder functionalities.

To enable the SCTE-104 module on the encoder, first ensure this option is set to **Yes** under **Settings**. Once enabled, upstream SCTE-104 messages will be removed and can now be replaced with local messages – otherwise, if turned off, upstream SCTE-104 will pass through. This can be changed through both the website or through the GPI settings. *(See Figure 1 on next page)*

### SCTE104 Trigger Insertion

Version 5.1

Save Revert

Status (updates every 5 seconds)	enabled
Enable SCTE104 Module?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Strip Upstream SCTE104?	Always ▾
VANC Insertion Line	9
Allow LAN Connections?	<input checked="" type="radio"/> Yes <input type="radio"/> No
LAN Port Number	5167
Insert LAN Messages?	Immediately ▾

	Enable?	Group	Repeat	Mode
GPI A	<input checked="" type="checkbox"/>	2 ▾	0	Preset ▾
GPI B	<input checked="" type="checkbox"/>	1 ▾	0	Preset ▾
GPI C	<input checked="" type="checkbox"/>	1 ▾	0	Preset ▾
GPI D	<input checked="" type="checkbox"/>	2 ▾	0	Preset ▾

#### Preset Editor

GPI #	A ▾
Insert Type	End Immediate ▾
Program ID	4
Break Duration (1/10 sec)	0
Preroll Time(1/1000 sec)	4000

**Figure 1: SCTE-104 Trigger Insertion Module Interface for HD492 Encoders**

## GPI Triggering on HD492 Encoders

When triggering SCTE-104 presets over GPI, four of the encoder’s GPI inputs can be set to trigger a separate SCTE-104 splice request packet created using the **Preset Editor** section of the web configuration tool. Each splice request message can be configured to any of the standard insert types (Start Normal, Start Immediate, End Normal, End Immediate, or Cancel), with configurable Program ID and Break Duration fields.

Ensure SCTE-104 is enabled by verifying that **Enable SCTE104 Module** is set to **Yes** and that the desired GPIs have been selected. If left unchecked, the SCTE-104 presets noted will not be applied. If GPI A, B, C or D is required for an alternate function on the encoder then leave the corresponding **Enable** box unchecked.

The GPI switches can be configured to any one of the following modes.

**Preset:** Automatically defaults to the specifications set in the Preset Editor.

**Use LAN Message:** Causes the GPI to trigger a VANC insertion of the most recent SCTE-104 message loaded over the TCP/IP interface, rather than the message created in the Preset Editor.

**Toggle SCTE-104 Module:** Selecting this mode gives the ability to toggle on/off the SCTE-104 Module. When triggered, it allows the encoder to pass upstream SCTE104 without inserting messages of its own, either by LAN or by GPI. To re-enable insertion and block upstream again, simply hit the toggle again, or use the Enable/Disable button found on the web interface.

Each GPI preset also has Group and Repeat settings. The repeat settings enable a single message or flag to be repeated on a periodic basis after it is first triggered, until it is canceled, or disabled by another switch in the same group. Setting more than one switch into the same group number links those triggers so that triggering any of the messages in the group will cancel repeats of the others.

## TCP/IP Triggering on HD492 Encoders

The TCP/IP interface for sending SCTE-104 data to the encoder is enabled through the “Allow LAN Messages” setting on the web configuration interface. When enabled, the encoder will listen for TCP/IP connections on a configurable port. Automation clients should connect to this port, and once the connection is accepted should begin handshaking with the “init\_request\_data” single operation message, as defined in the SCTE-104 standard. Once the handshake is complete, the encoder will begin inserting all properly formatted SCTE-104 multi operation messages it receives over the network into the VANC space.

If the “Insert LAN Messages Immediately” check box is unchecked then the SCTE-104 messages will only be inserted into VANC when triggered through a GPI set to “Use LAN Message”. This operational mode enables timing-insensitive pre-loading of future messages over the LAN interface, followed by real-time GPI insertion triggering.

When inserting SCTE-104 messages from the LAN into VANC, the EEG encoder fits in the role of “SDI embedder” as shown in Figure 12-1 of the SCTE-104 specification. Since VANC embedding is a one-way communication protocol, the system design considerations found in Section 12.1 (“One Way Protocol– Automation System to Injector”) regarding supported messages and time synchronization should be applied to all authoring interfaces communicating with the EEG VANC inserter, and to the downstream SCTE-35 injector (which maybe integrated into the MPEG transport encoder).

## Trigger Monitoring

EEG's VANC Monitor products (such as the DE291 unit or 1285 OpenGear card) include a number of useful features for SCTE-104 monitoring, including VANC packet captures, a non-screen burn-in decoder for splice requests, an XML-based log, and SNMP reporting with full message details. For full details on the operation of these features, please see the product manual for your respective product.

## Trigger Recovery and HTTP Post

Some widely used SCTE-35 injection tools, such as the Motorola DigiCipher Event Manager (DEM), do not accept SCTE-104 input directly from HD-SDI VANC data. In the case of the DEM, the required interface to generate SCTE-35 data uses physical GPI switches and/or virtualized GPI switches accessed through an HTTP POST interface.

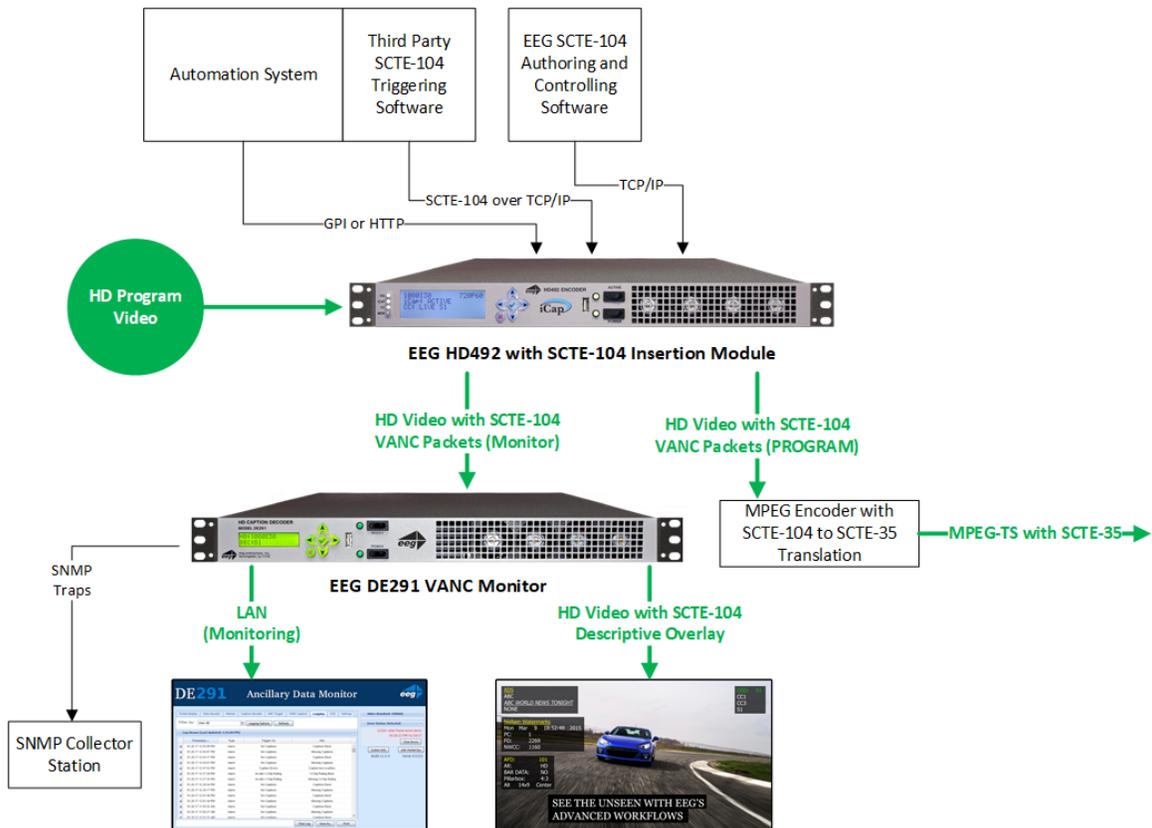
The EEG A1450 OpenGear SCTE-104 Receiver can be used to disembed SCTE-104 data from an HD-SDI video signal. When messages are received, the A1450 will post program ID data or other selected fields from the SCTE-104 message into the DEM to trigger the creation of SCTE-35 messages.

The A1450 also supports configurable GPO tallies in response to SCTE-104 data, enabling an additional option for communication with the DEM or other SCTE-35 injection or monitoring equipment.

## System Block Diagrams

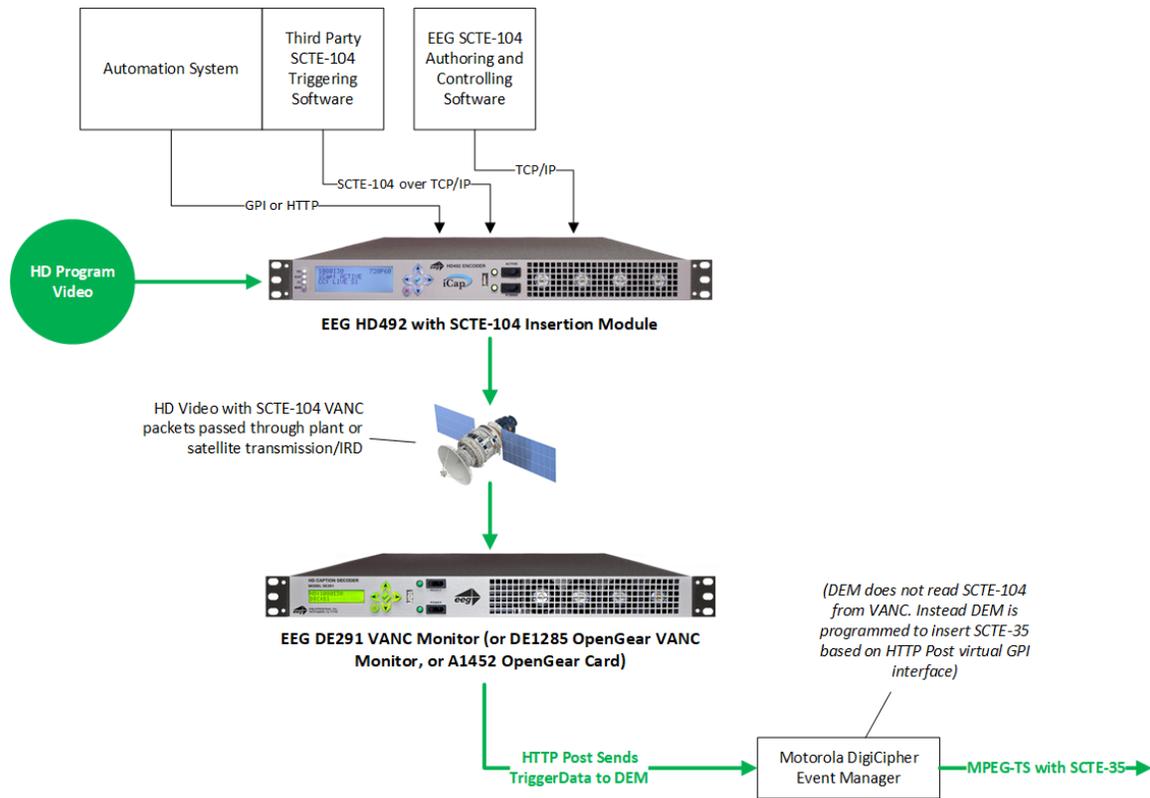
Figure 2 shows insertion of SCTE-104 data from a variety of sources into HD-SDI VANC using the HD492 encoder. A DE291 is used for monitoring of the encoded data, while the master video chain is routed through an MPEG transport encoder that reads the embedded SCTE-104 data and translates it into SCTE-35 splice cues. Figure 3 shows a system where the A1450 Receiver card is used to disembed SCTE-104 from HD-SDI VANC, and to POST the message data to a standalone Motorola DEM SCTE-35 injector.

## SCTE-104 Embedding and Monitoring with EEG's HD492 and DE291



**Figure 2: SCTE-104 Embedding and Monitoring**

## SCTE-104 Embedding and Monitoring with EEG's HD492 and DE291



**Figure 3: SCTE-104 Embedding, Recovery, and HTTP Posting System**