SCTE-35 Insertion

With EEG's Alta™ System

System Overview

Alta injects SCTE-35 Digital Program Insertion triggers into UDP MPEG transport streams. Each individual SCTE-35 trigger event is requested through a LAN TCP/IP message using the SCTE-104 format from an external playout, automation, traffic, or human interface system. The trigger event is then created based on the data in the SCTE-104 message, given a unique trigger ID, and injected into Alta's outbound transport stream with a frame-accurate time binding to the transport stream Program Clock Reference (PCR).

Alta System Form Factor

Deployment: Alta is delivered as a virtual machine image in the OVF format. This image can be run in Oracle VirtualBox, VMWare, Red Hat Enterprise Virtualization, and many other virtual machine hypervisor platforms. The virtual machine uses the latest version of the Debian Linux operating system.

Configuration: The Alta software is initially configured manually through a web browser – this interface can be accessed from another computer on the same LAN as the virtual machine, or directly from inside the virtual machine. It is also possible to start and stop streams or change parameters from external software by using the HTTP REST API.

Licensing: Each input/output transport stream requires an Alta channel license. Any number of licensed channels can be managed through the same virtual machine instance. Hardware requirements vary with transport stream bitrates. For example, with a 25 Mbps transport streams, EEG recommends assigning 1 dedicated CPU core and 2 GB of RAM per licensed channel.

Alta System Connections

Input: Each Alta channel will take in one MPEG-2 Transport Stream, which can be sent to the Alta virtual machine through UDP unicast or UDP multicast. If the packets have RTP headers, these will be used for sequence re-ordering, but use of RTP is optional.

Output: The output of each Alta channel will be a matching Transport Stream with up to 8 additional user-selected PIDs mapped out for SCTE-35 triggers. The output transport stream can also be sent to a specific destination as UDP/RTP unicast, or sent to a multicast address. The input to output delay is configurable based on bitrate and buffering needs, but generally need not exceed 150 milliseconds.

Message Triggering: Each Alta channel also has a TCP/IP listen port which will accept connections from external devices according to the SCTE-104 protocol. Examples of such devices include relatively simple programmed button panel controllers (DNF is one compatible vendor), as well as full stacks of scheduling, automation, and playout software from vendors such as Imagine Communications or Crystal.

Alta supports the subset of the SCTE-104 standard called the "Simple Profile." The Simple Profile supports all basic splicing functionality but excludes advanced schedules, encryption, and component splice mode.

System Diagrams

Figure 1 depicts a standard Alta installation and data flow. Triggered SCTE-104 commands are converted to the SCTE-35 protocol and inserted directly into incoming MPEG-TS packets inside the Alta platform.

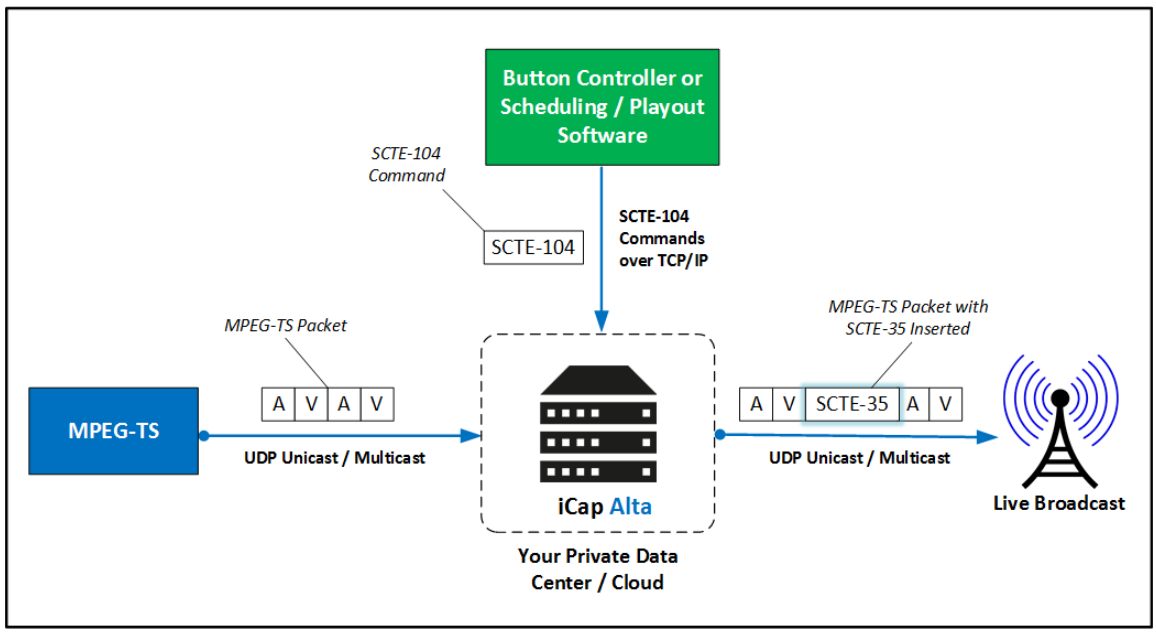

Figure 1: Alta System Workflow

(Continued on Page 3)

Figure 2 *(an excerpt from Page 41 of the 2012 SCTE 104 American National Standard)* shows how SCTE-104 messages on the TCP/IP port become SCTE-35 messages in Alta's output transport stream.

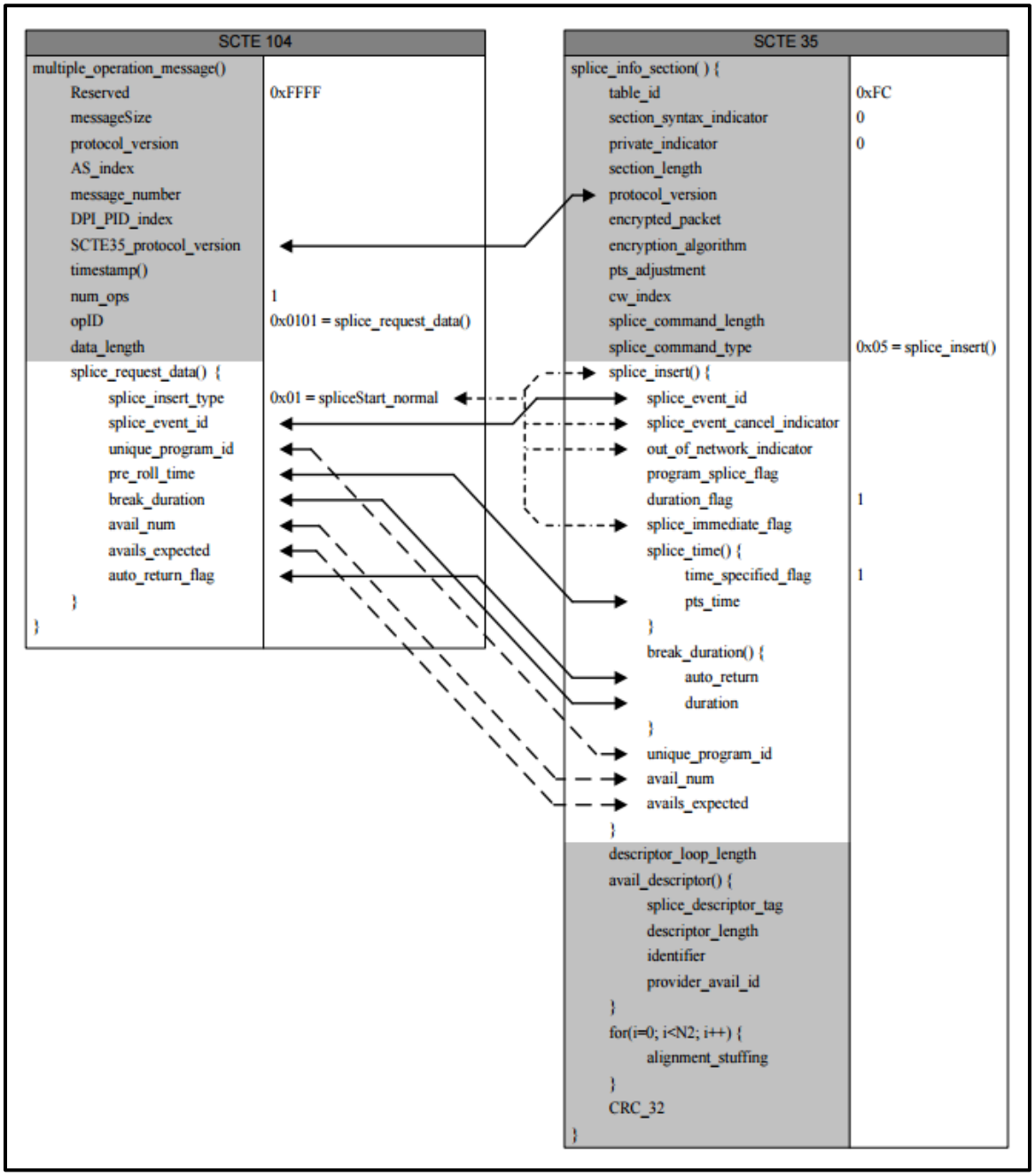

Figure 2: Alta's SCTE-104 to SCTE-35 Conversion Field Mapping

Figure 3 *(an excerpt from Page 93 of the 2012 SCTE 104 American National Standard)* depicts the one way flow of a SCTE-104 command from the trigger source, to the injector, and into the transport stream. The *"AS"* stage represents the system generating the SCTE-104 request according to the program schedule while the *"Injector"* stage represents the Alta system.

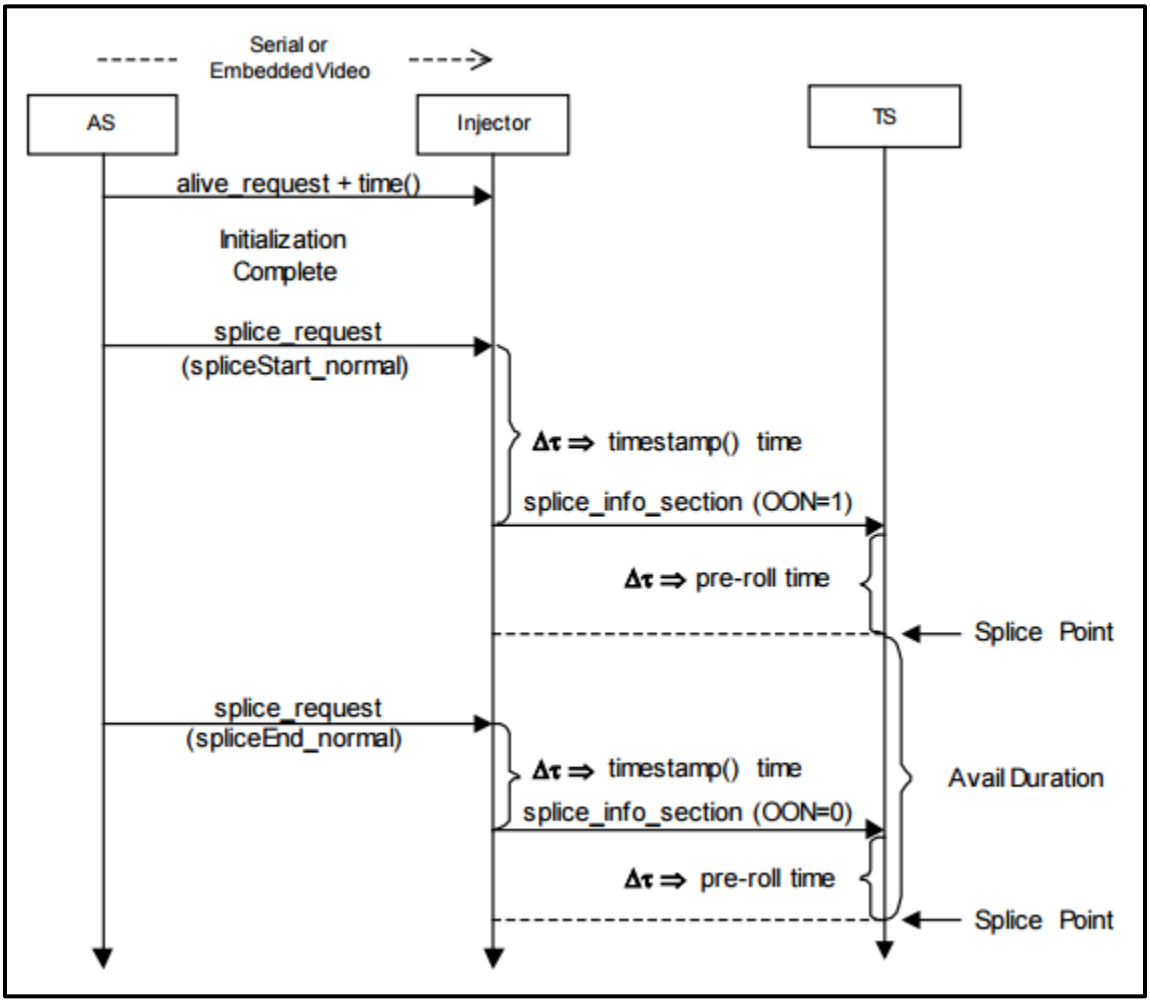

Figure 3: SCTE-104 Command One-way Flow Diagram