12-Mar-07

Alternate Startcode “DD”

Streaming ACN Per-Channel Priority Support

TABLE OF CONTENTS

1. References

Draft .2 of the DMX512-A Streaming Protocol E1.31 (streaming ACN):)

2. Document Conventions

The following acronyms are used:
sACN. Streaming ACN. Also known as streaming DMX.

3. Introduction

The Streaming ACN protocol specification details DMX-style control over TCP/IP networks. While this provides a fast and efficient mechanism to transport the well-understood DMX protocol, it also introduces a problem that may not be as well-understood by the industry: multiple sources. Unlike DMX over RS485, multiple sources may easily provide overlapping sets of universe data, and may only be interested in controlling subsections of different universes. While sACN currently has a priority in the start code 0 packet (the DMX standard packet), this does not correctly cover cases where a controller wants to explicitly control a small subsection of values without disturbing the rest – and HTP doesn’t help when that controller wants to force a subset of the channels to 0.

To better handle multiple source control scenarios, the 0xDD sACN start code was obtained by ETC from ESTA to allow setting a source priority for each individual channel of a universe, with the option of having values for a particular channel ignored by the end devices. This document details how all “DD” supporting sACN devices will use this start code.

4. Rules for using the 0xDD start code

4.1. “DD” supporting sources will support per-channel priority via the alternate start code “DD”, which will be used to identify the DMX data block as carrying per channel priority and not DMX levels.

4.2. The data payload is a 1 byte value for each DMX channel indicating the source’s current priority for that channel. That priority can be 0 – 200 (201-255 being available for the sink to use for internal priorities), where 200 is the highest priority and 1 is the lowest priority. A priority of 0 means that any data from the source for

that channel is to be ignored by the sink. In the case where gaps exist in the DMX universe as a result of the use of the 0 priority, where effectively no source is providing data, values for the channels in these gaps shall be assumed to be zero. This is important in the case where a gateway is generating DMX from the streaming ACN data stream. DMX requires that data be provided for all channels up to the maximum channel provided.

4.3. The source follows the e1.31 sACN rules for non-changing data for 0xDD packets as well, so the last change of priorities for a universe is sent for 3 extra frames and then sent once every second.

4.4. When a source wants to take control of a channel, it sets the priority to a non-0 value and starts sending the DMX values for that channel.

4.5. When a source wants to give up any control of a channel, it sets the priority to 0 and subsequently sends out a DMX value of 0 for that channel when controlling other channels in that universe. Note that setting a priority to zero may result in data loss behavior for the corresponding channel. It may be desirable for sources to provide a user configurable option to also set the data to 0 before setting the priority to 0.

4.6. For some compatibility with sinks that don't support the 0xDD start code, sources shall also provide a packet level priority that applies to all channels. The default value for this priority shall be 100. This packet level priority allows an emergency take-over of the universe for sinks that do not support the 0xDD start code.

4.7. When a sink detects a source, it waits for a 0xDD start code packet for up to 1.5 seconds for that universe before processing DMX data from that source.

4.8. If a sink does not detect a 0xDD packet, it uses the standard e1.31 sACN priority until a 0xDD packet is detected. "DD" supporting products shall use the priority field according to the standard ACN priority rules which specify that 0 is the lowest priority and 200 is the highest priority. However, 0 in the E1.31 priority field has a special meaning that no priority is being specified for the data being sent in the packet. In this case, "DD" supporting products shall assume the data is being sent with a priority of 100. When multiple sources provide data for a particular channel at the same highest priority, HTP is applied among their values to determine the correct value to use.

4.9. If a sink does not detect a 0xDD packet in 2.5 seconds (standard e1.31 sACN data loss), it reverts to standard e1.31 sACN priority as specified in 4.8

4.10. When a sink detects that a source has given up control of a channel (by setting the priority for that channel to 0), the sink may go into data loss behavior for that channel. This includes giving control to other sources with lower priority, or if there are no other sources, implementing an application specific hold last look, fade to black, or cross-fade.

4.11. When a sink detects that a source has reached e1.31 sACN timeout for the DMX universe (e.g. no DMX packets in 2.5 seconds), the sink shall act as if the source has given up control of its channels as stated in 4.10.

5. Summary

In summary, priority may be specified on a per packet basis in E1.31. In addition, an ETC extension allows priorities to be provided on a per channel basis using the alternate start code of 0xDD. With this extension, take control is done via setting a non-zero priority for a channel. Giving up control is the reverse, setting the priority to 0. Overall, sinks wait for a short period on start up to see if the alternate start code priority information is being provided before they start accepting data. If no alternate start code priority information arrives, they use the E1.31 per packet priority. If the packets specify that they are not carrying a priority, by placing a zero in the field, a priority of 100 is assumed for all channels.