Pipeline Time Code

Selecting available clock sources

Pipeline systems provide a variety of time code clock sources selections. This application note describes each one in detail, and any corresponding workflow restrictions or requirements. Use this application note to select the clock source that best fits your needs and requirements. This application note is valid for Pipeline v2.5 or later device firmware.

Auto

When selecting the ***Auto*** clock source the Pipeline channel will search for the first appropriate time code in the following order: RS422 Device, Sync Input, and Video Input Signal. If a valid time code is not found it will default to Zero Based*. See descriptions below for details of each respective clock source.

RS-422 Device

> **Note:** If your workflow requires that ***LTC*** (Linear Time Code) be used an LTC to RS-422 converter box needs to be used. The Adrienne Electronics uBOX-2 is recommended for this purpose. http://www.adrielec.com/aec-ubox.htm)

Setting the clock source to RS-422 Device will use the time code being generated by an RS-422 device connected to the Pipeline channel's RS-422 connector.

If frame accurate synchronization between multiple capture channels is required then all capture channel input signals need to be frame synced using the time source driving the ***RS-422 Device*** time code.

If a valid time code is not found on the ***RS-422 Device*** input Pipeline will default to a zero based* time code.

Sync Input (available on Pipeline Quad and Pipeline HD Dual devices only)

> ***Note***: The ***Sync Input*** needs to be a valid ***digital*** SD-SDI or HD-SDI video signal containing a valid time code in VITC or VANC respectively. Analog sources cannot be used on the ***Sync Input***.
> The following devices have been used to generate the required ***Sync Input*** signal in multiple feed workflows: Evertz 8010 and HD9010, and Ensemble Designs Avenue 7400.

Setting the clock source to ***Sync Input*** will use the time code embedded in the SDI video signal connected to the ***Sync Input*** connector.

For SD input sources on:

- **Pipeline SC** and **Pipeline Quad** the time code is obtained from the ***Sync Input's*** VITC (Vertical Interval Time Code) on lines 14, 16, 18 , 20 (NTSC) and 14, 16, 19, 21 (PAL). The Pipeline searches these lines for a valid time code starting from line 14 and will use the first valid time code found.
- **Pipeline HD Dual** the time code is obtained from the ***Sync Input's*** VITC (Vertical Interval Time Code) on lines 14, 16, 18 , 20 (NTSC) and 14, 16, 19, 21 (PAL) or from the ***Sync Input's*** ANC data. The Pipeline first searches the VITC lines for a valid time code starting from line 14 and will use the first valid time code found. If no valid time code is found in VITC the Pipeline will look for a time code in ANC data.

For HD input sources on:

- **Pipeline HD Dual** the time code is obtained from the ***Sync Input's*** VANC (Vertical Ancillary Data Space) data.

If frame accurate synchronization between multiple capture channels is required then all capture channel input signals need to be frame synced using the time source driving the ***Sync Input*** time code. If a valid time code is not found within the ***Sync Input*** signal Pipeline will default to a zero based* time code.

Video Input

Setting the clock source to ***Video Input*** will use the time code embedded in the SDI input video signal.

For SD input sources on:

- **Pipeline SC** and **Pipeline Quad** the time code is obtained from the input signal's VITC (Vertical Interval Time Code) on lines 14, 16, 18 , 20 (NTSC) and 14, 16, 19, 21 (PAL). The Pipeline searches these lines for a valid time code starting from line 14 and will use the first valid time code found.
- **Pipeline HD Dual** the time code is obtained from the input signal's VITC (Vertical Interval Time Code) on lines 14, 16, 18 , 20 (NTSC) and 14, 16, 19, 21 (PAL) or from the input signal's ANC data. The Pipeline first searches the VITC lines for a valid time code starting from line 14 and will use the first valid time code found. If no valid time code is found in VITC Pipeline will look for a valid time code in ANC data.

For HD input sources on:

- **Pipeline HD Dual** the time code is obtained from input signal's VANC (Vertical Ancillary Data Space) data.

If frame accurate synchronization between multiple capture channels is required then all capture channel input signals are required to be frame synced using a common time source. If a valid time code is not found within the ***Video Input*** signal Pipeline will default to a zero based* time code.

Computer Clock

Setting the clock source to ***Computer Clock*** will use the time of day clock generated from your operating system (Windows or Mac OS X). Using ***Computer Clock*** does not guarantee frame accurate synchronization between capture channels.

Pipeline Clock

Pipeline Clock source is generated by the Pipeline channel based on the input clock rate. The time code will start at zero at the time that the RTSP stream from the Pipeline channel to the Pipeline host system begins. Using ***Pipeline Clock*** does not guarantee frame accurate synchronization between capture channels.

Channel One or ***Pipeline Channel 1*** (available on Pipeline Quad only)

Channel One/Pipeline Channel 1 clock source is unique to the Pipeline Quad device. This clock source can be selected for use with channels 2, 3 or 4 of a Pipeline Quad. Selecting ***Channel One/Pipeline Channel 1*** clock source assumes that channel one of the respective Pipeline Quad has a currently active clock source selected (Auto, Computer Clock, Video Input, Sync Input, RS-422 Device or Pipeline Clock). ***Channel One/Pipeline Channel 1*** clock source allows all channels of a Pipeline Quad device to share the clock source used on channel one.

Generally speaking using ***Channel One/Pipeline Channel 1*** clock will result in frame accurate synchronization between capture channels if all channel's SDI input signals are frame sync'ed to the same time source.

****Zero based time code starts at 00:00:00:00 and counts up upon the establishment of a connection (RTSP stream) from the physical Pipeline channel and the Pipeline software running on the Pipeline host system. The result will be files with time codes greater than absolute zero.***