

Effects Loop - The 8150 and the Dveous

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There has been some confusion about what just what an Effects Loop is, and how convenient and easy it is to take advantage of this feature. Simply put, an Effects Loop lets you "break out" video and key signals from the switcher processing paths and send them to a DVE for processing. The loop returns the processed video and key to the same keyer, at the same point from which they left, for final compositing. Other manufacturers call it FXLoop™, KeyLink™, Digi-Loop™, etc. The Abekas 8150 switcher uses the term "Effects Loop" for this very useful feature. This paper explains how the 8150 uses Effects Loop technology.

An Effects Loop is analogous to "Insert Patches" on many audio consoles. When you press the Insert button, it breaks out the audio signal feeding that fader. You can then send it to a reverb unit, EQ device, or other audio processing equipment. The processed audio is reentered to the same fader from which it left. The same concept applies to video and key signals in an Effects Loop.

Since the Effects Loop process is internal to the switcher, it is nearly transparent to the user. In most situations, the Effects Loop can replace external routing equipment for sending video and key signals to a DVE. An additional convenience is the ability to use the optional Aux Buses to feed the DVE.

There are four points in the 8150 signal path where processed video and key can be broken out and routed to the DVE: M/E Keyer 1, M/E Keyer 2, M/E Background, and the DSK. The signals pass out of the 8150 on the Aux Buses. With a single channel DVE, only two Aux Buses are needed: one for the video signal and one for the key. With a two channel DVE, you need to use four Aux Buses. If you need to have different video and key signals on the backside or "B" side of the channel with only two Aux Buses, you can use the GPI interface and the Front/Back input selection on the 8150 to switch the Aux buses when the channel is rotated on-edge.

SINGLE CHANNEL/Combiner

Figure 1 shows a simple Effects Loop. It uses a single channel Dveous and the 8150 Aux 1 and Aux 2 Buses. Aux 1 carries the video signal, Aux 2 the key. When in the Video/Video mode or Effects Loop, both Aux 1 and Aux 2 carry video. The Dveous's video and key outputs return to two 8150 inputs. The 8150's Aux Ref 1 output provides reference for the DVEOUS.

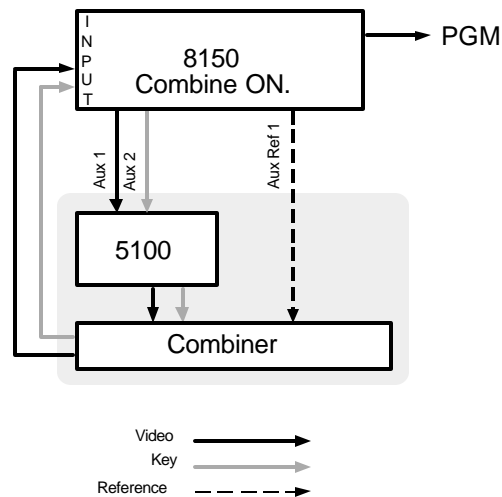


FIGURE 1 — Effects Loop with a single channel DVEOUS& Combiner

There are controls for key clip and gain, among others, that let us perfect the key. Now we are told to fly the title. On a switcher without the Effects Loop feature, we would have to select the CG video and key outputs on a router and send them to the DVEOUS. After selecting the DVEOUS on Keyer 1, we must adjust the key again.

Using an Effects Loop saves several steps. When we select Keyer 1 as the source for the Effects Loop, the 8150 routes the processed video and key signal from Keyer 1 to the Aux Buses, which in turn feed the DVEOUS. It then routes the returning DVEOUS Combiner signals, to the same point in the circuitry from which they left. This loop effectively uses the Keyer 1 Bus as the router to the DVEOUS, and uses the same keyer to key the DVEOUS.

TWO CHANNELS WITH COMBINER

To use two DVEOUS channels, we need four Aux Buses for the Effects Loop. See *Figure 2*. Aux 1 and 2 feed video and key to the first DVEOUS channel. Aux 3 and 4 feed the second channel.

This lets us fly a CG for example, and move another video and key composite. By keying these signals with Keyer 2 or the DSK and selecting the keyer on Aux Buses 3 and 4, we can route them to the DVEOUS's second channel. You must use four Aux Buses to route signals to the DVE. See *Figure 2*.

The DVEOUS output will use only two switcher inputs instead of four, and the 8150 Combiner Mode must be turned on.

The 8150's Combiner Mode is a setting in the Engineering Input submenu. When turned on, it forces the output timing of Aux Buses 1 through 4 to be identical. In a two channel DVE with a combiner, this lets both channels to remain zero-timed to each other, which is usually required by a combiner. When the Combiner Mode is turned off, only the timing of each Aux Bus pair will match (Aux 1 and 2 are identical—Aux 3 and 4 are identical).

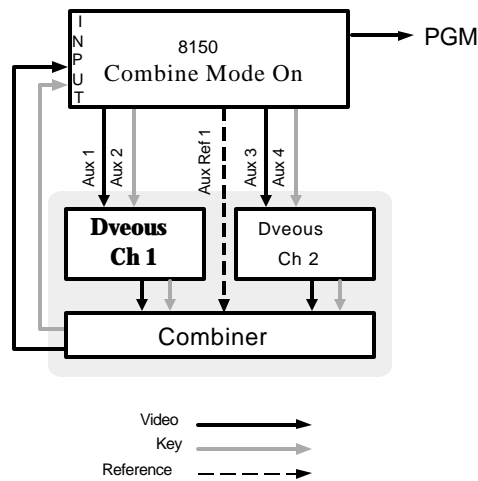


FIGURE 2 — Effects Loop with a two channel DVEOUS & Combiner

INTERNAL TIMING

Figure 3 shows the processing delays in different sections of the 8150. The two line delay out of the crosspoint matrix is due to the automatic input timing circuitry's $-1/+2$ line window. This window lets every source be in time with the latest possible source entering the switcher. This delay also applies to internally generated signals (Black, SuperMatte, and Framestores 1 and 2).

The next section has a 16 line delay. This is because of the extra processing needed in the M/E to add borders to keys and/or defocus the source. At this point in the processing, then, we are up to 18 lines of delay (two from the crosspoint matrix and 16 in the M/E). Even if a source does not pass through the M/E, it still has 18 lines of delay when it enters the PGM/PST. This lets you transition from a direct source to the M/E without shifts. Remember that every source must be timed to the latest possible source.

The last 8150 section also has a 16 line delay, for the same reason the M/E does. When added to the 18 lines of total delay from the M/E, this gives a total of 34 lines of delay through the switcher.

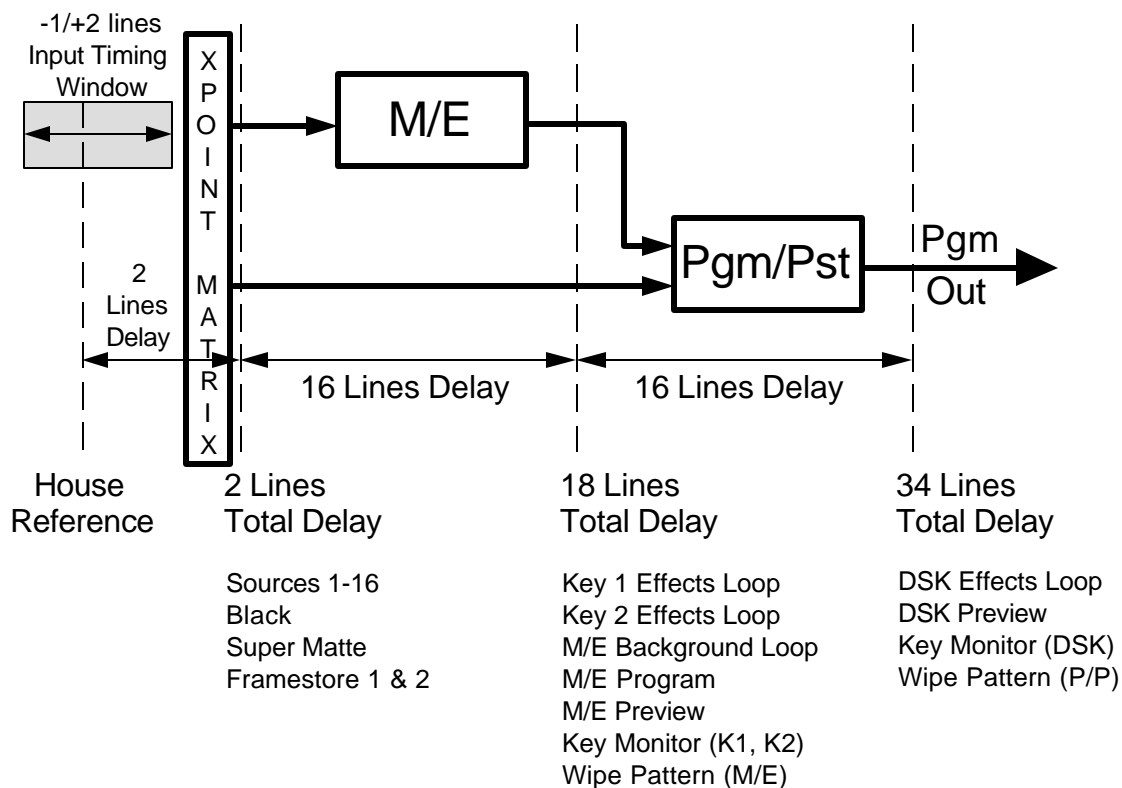


FIGURE 3 — ASWR8150 Signal Delays

NOTE: The 34 line delay does not cause problems when pre-reading on D5 or Digital Betacam tape decks. These units have a minimum 40 line automatic input timing window, which the 8150 falls well within (D5 can have up to a 100 line window). D2 and D3 decks have only a 16–20 line window, so pre-reads are not possible when using them with the 8150. Also, since D2 and D3 record and playback composite video, this would require decoding the switcher's input signal and encoding the output signal, which would add even more delay to the original 34 lines.

In this discussion, we used the 8150's optional Aux Ref outputs in the example Effects Loops. These outputs carry the reference signal that the DVE needs when using the Aux Bus outputs as its video and key sources. Because of the different amounts of delay in the signals feeding the DVE (depending on where

they leave the 8150's internal signal path), the reference signal to the DVE must be delayed by the same amount. Feeding house reference (which is zero timed) to the DVE shifts the video coming from the 8150 down either 2, 18, or 34 lines.

You can think of the 8150's Aux Buses as "floating routers." When you select an Aux Bus to route a signal from the 8150, the Aux Bus timing "floats" to that spot and takes its reference from there. This lets the Aux Ref change to match the video feeding the DVE.

These sources cause the Aux Bus video and reference to be delayed two lines from house reference:

- Any direct source feeding the 8150
- Black
- SuperMatte
- The optional Framestores

These sources cause the Aux Bus video and reference to be delayed 18 lines from house reference:

- Key 1 Effects Loop
- Key 2 Effects Loop
- M/E Background Effects Loop
- M/E Program
- M/E Preview
- Key Monitor (if Keyer 1 or 2 is active)
- Wipe Pattern (if M/E Wipes are selected)

These sources cause the Aux Bus video and reference to be delayed 34 lines from house reference:

- DSK Effects Loop
- DSK Preview
- Key Monitor (if DSK is active)
- Wipe Pattern (If PGM/PST Wipe is selected)

There are a couple of things required of the 5100 used in an Effects Loop. First, it must be able to advance its output timing by 1 line (approximately -.5 lines if using Aux Ref 2). Also, it must be able to handle shaped video (linear key channel), and it must be able to accept reference with no subcarrier.

With any DVE, you must be able to advance its output timing. This is because the 8150 Aux Bus outputs are always slightly later in time than the end of the input auto-timing window. When you set up the 8150, the Effects Loop Input setting determines the sources routed to the Effects Loop. This lets the 8150 know that these inputs have different timing requirements and it can then shift the center of the input timing window on these sources to match the timing of the Aux Bus outputs.

From these examples, it should be clear that the Effects Loop feature offers significant advantages. Using it to route video and key signals out from the switcher to a DVE for processing saves time and hardware resources. Your production suite can be more productive, and therefore more profitable when you take advantage of this feature.

Digi-Loop is a trademark of Ampex Corp.

KeyLink is a trademark of Grass Valley Group, Inc.

FXLoop is a trademark of BTS, Broadcast Television Systems, Inc.

