

Alignment

Velocity DSP Alignment

Caution: always remove power to the telecine before removing or inserting boards.

Equipment required:

- 1 dual-channel oscilloscope
- 1 test film or loop

Procedure

1. Velocity DSP Servo board (23004) must be placed on an extender.
2. With power applied, confirm that all power supplies to the board are within specifications:

$$5V = 4.80V \text{ to } 5.20V \quad \pm 12V = \pm 11.50V \text{ to } \pm 12.50V$$

If necessary, adjust the power supplies to achieve these voltages.

Setting Sprocket LED Currents

1. Using the oscilloscope, monitor the following points:
 - a) The input side of **R10** (nearest TP1) and
 - b) The input side of **R12** (nearest TP2).
2. On the terminal keyboard, press **Ctl-R** to get to the Setup Menu. (Terminal setup is discussed on page 53.)
3. While rotating the gate sprocket by hand or by running a test loop, adjust the Sprocket LED current parameters **O** and **P** to achieve pulse levels of approximately **3 to 3.5 volts pk-pk**.

Note: If these levels cannot be achieved, this may suggest that the LED/Photo-transistor pairs in the Gate Tacho Assembly are weak and need replacement.

Set the Processed Gate Sprocket Signals

1. Monitor the processed gate sprocket signal **Sensor 2** at **TP1**. While turning the sprocket by hand or by running a test loop, adjust **VR1** for **16 volts p-p**.
2. Monitor the processed gate sprocket signal **Sensor 1** at **TP2**. While turning the sprocket by hand or by running a test loop, adjust **VR2** for **16 volts p-p**.

Set the Capstan Tach Signals

1. Monitor the processed capstan tach signal, **Tach1** at **TP3**. While turning the capstan by hand, adjust **VR3** for **16 volts p-p**.
2. Monitor the processed capstan tach signal, **Tach2**, at **TP4**. While turning the capstan by hand, adjust **VR4** for **16 volts p-p**.

OPTIONAL - Capstan Drive Signal Amplitude: Warning - this procedure may cause traction power supply fuses FS5 or FS6 to blow on some machines! (The capstan motor amplifier can supply ± 5 amps, but the traction power supply is often fitted with 4 amp fuses.) Measure capstan drive signal at **TP7**. With film running forward at normal speed, drag your hand on the front of the capstan, briefly. Adjust **VR5** for a maximum negative voltage of **-2.5 volts**. Do not completely stall the motor or continue dragging longer than necessary!

Power down the telecine and install the Velocity DSP board in the Servo Rack. Proceed to **Meta-speed[□] Frame Timebase Alignment**, if applicable, (next page) or re-apply power.

Meta-Speed[®] Frame Timebase (FTB) Alignment

Equipment required:

- 1 2 channel oscilloscope
- 1 33-pin or 74-pin extender board, per version of Frame Timebase
- 1 test film or loop

Initial Settings

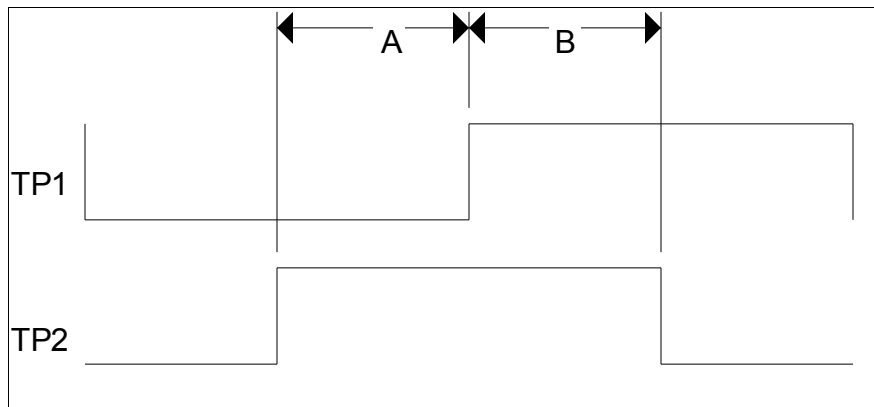
Note: Verify that jumper **J4** is **Off** before proceeding.

1. Power down the telecine and place the Frame Timebase board (23002/23012) on an extender. Re-apply power. Confirm that all power supplies to the board are within specifications:

$$5V = 4.80V \text{ to } 5.20V \quad \pm 12V = \pm 11.50V \text{ to } \pm 12.50V$$

2. Adjust PLL center frequency (see Figure 10):
 - a) Set the telecine to **24** fps (NTSC) or **25** fps (PAL).
 - b) Monitor **TP1** and **TP2** on the oscilloscope.
 - c) Adjust variable capacitor **C7** so that the signals on **TP1** and **TP2** are 90 degrees out of phase, i.e. **Period A = Period B**.

Figure 10 - Signal Timing



3. Set FTB switches as shown in Table 27 (overleaf). This is the normal position for these switches. Note that for all FTB switches, **On is Up**, and **Off is Down**.

Switch	Position	Function
SW1-1	Off	DC Offset Test Mode
SW1-2	Off	Zoom Unity
SW1-3	Off	Run/Stop compensation disable
SW1-4	Off	Y-Position Unity
SW1-5	Off	Zoom Variable Bandwidth
SW1-6	see notes	XYZ Unity in Local
SW1-7	Off	reserved
SW1-8	see notes	Internal Zoom Mode
SW2	Off	Vertical Flip
SW3	Off	Alternate Focal Length
SW4	Off	reserved

Table 27 - FTB Normal Settings

Switch Setting Notes:

SW1-6=ON forces position and size to unity whenever the telecine is in Local. It should be set to ON when no Local Zoom control panel is available.

SW1-8=ON selects internal zoom mode. This should be used when no external Zoom board is available, such as when replacing a Unimedia XYZ frame timebase. Note that jumper **J2** must be connected **1-2** for external zoom, **2-3** for internal zoom.

4. Electrically center pots RV1 through RV10 (**Initial Installation ONLY**):

Note: These pots and external control signals are time-multiplexed into **U29**.

- a) Measure **pin 1** of **U29** with an oscilloscope. Adjust **RV1**, **RV2**, **RV3**, and **RV4** for **0±0.1 volts**, in each of their respective time slots.
- b) Measure **pin 2** of **U29** with an oscilloscope. Adjust **RV5**, **RV6**, **RV7**, and **RV8** for **0±0.1 volts**, in each of their respective time slots.
- c) Measure **pin 27** of **U29** with an oscilloscope. Adjust **RV9** for **0±0.1 volts**, in its time slot.
- d) Measure **pin 3** (rightmost) of jumper **J2** with an oscilloscope. Adjust **RV10** for **0±0.1 volts**.

Power Amplifier Adjustments (Initial Installation ONLY)

1. Set Damping:
 - a) Measure **TP6** (Yoke Voltage) on an oscilloscope. Inspect the area just after vertical retrace, with scope settings of about 200ns/div and 2V/div.
 - b) Adjust **RV17** (Damping) as far clockwise as possible without more than one overshoot. See Figure 11.

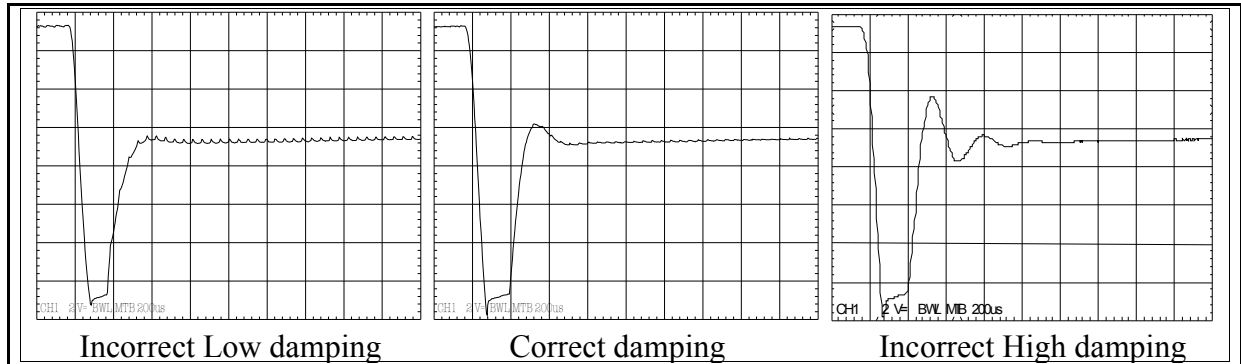


Figure 11 – Yoke Voltage

2. Set DC Offset:
 - a) Set **SW1-1** to **On** (Up). This enables the DC Offset test mode and will create a slightly darker section in the raster. This is the FTB center reference. This switch setting also disables vertical blanking, so retrace lines will be visible.
 - b) On the Blanking and Scans Protection board (452/733/836), set **S1** to enable the Blanking Cross display.
 - c) Open the lower mirror door. While directly observing the scan on the CRT, adjust **RV16** (Offset) to superimpose the Blanking Cross and the darker lines marking the center.
 - d) Set **S1** on the Blanking and Scans Protection board (452/733/836) to disable the Blanking Cross display.
 - e) Set **SW1-1** to **Off** (Down). This disables the DC Offset mode.
3. Set Gain:
 - a) Lace up a **35mm** SMPTE Television Alignment and Resolution test film loop.
 - b) Set the telecine to **30 FPS**.
 - c) Set **SW1-2** to **On** (Up). This sets Zoom Unity.
 - d) Adjust **RV15** (Gain) for correct still picture height. If there is not enough range, set it as close as possible. Additional range is available later in this alignment procedure.
 - e) Set **SW1-2** to **Off** (down). This re-enables Zoom.

Picture Height Adjustments

Note: When adjusting Picture Height, always observe the **ENCODED** output of the telecine on an under-scanned monitor. The component outputs of the telecine may have very narrow vertical blanking. These adjustments are substantially affected by the number of lines of vertical blanking. The Meta-Speed Frame Timebase assumes 20 lines of blanking in NTSC(525) and 25 lines of blanking in PAL(625).

1. Initial Settings:
 - a) Set the telecine to **30 FPS**. Set **SW1-2** to **On (Up)**. This sets Zoom to Unity.
2. Adjust 'S Correction' and 35mm still height:
 - a) Lace up a 35mm SMPTE Television Alignment and Resolution test film loop.
 - b) Adjust **RV3** for correct still picture height.
 - c) Run the film in reverse. Adjust **RV4** for correct Run Reverse picture height.
 - d) **RV3** and **RV4** interact slightly. Repeat steps b and c as necessary.
3. Adjust 16mm still height:
 - a) Lace up a 16mm SMPTE Television Alignment and Resolution test film loop.
 - b) Adjust **RV5** for correct still picture height.
4. Adjust Super-8mm still height:
 - a) Lace up a Super-8mm SMPTE Television Alignment and Resolution test film loop. Adjust **RV6** for correct still picture height.
5. Adjust Super-16mm still height:
 - a) Lace up a Super-16mm Television Alignment and Resolution test film loop.
 - b) Set **SW3** (middle toggle switch) to **On (Up)**. This selects Alternate Focal Length operation. Adjust **RV5** for correct still picture height.
6. Adjust RTS Super-16mm still height:
 - a) Make sure all Zoom controls are set at unity.
 - b) Set **SW3** (middle toggle switch) to **On (Up)**. This selects Alternate Focal Length operation. Lace Super-16mm test film.
 - c) Run the test film at 24 or 25 fps. Adjust **RV7** so that Stop and Run picture heights are the same.
 - d) Adjust **RV9** for picture height. Both Run and Stop height will be affected equally.

Line Timebase Control Adjustment (Internal Zoom ONLY)

1. Line Timebase Unity Settings:
 - a) Set the telecine control to **Local**.
 - b) Set **SW1-6** to **On** (Up). This forces XYZ to unity in Local mode.
 - c) Adjust **RV13** (X Zoom Unity) for correct unity picture width.
 - d) (LTB X Position controlled by FTB, ONLY) Adjust **RV11** (X Position Unity) for correct unity picture horizontal position. **Note:** When the FTB is set for Unimedia XYZ compatibility, the FTB does **not** control LTB X Position, and this step does **not** apply.
2. Line Timebase Range Settings:
 - a) Set **SW1-2** to **Off** (Down). This enables Zoom, if not disabled by bit 6.
 - b) Set **SW1-6** to **Off** (Down) **OR** set the telecine control to Remote. This is to enable XYZ. If there is no local Zoom control, you **must** leave **SW1-6 On** (Up) and use the Remote controls for this alignment section.
 - c) Adjust Zoom control for maximum magnification, i.e. zoom in fully.
 - d) Adjust **RV14** (X Zoom Range) for correct aspect ratio of displayed picture.
 - e) Adjust Zoom control for unity position. Verify that picture has correct aspect ratio.
 - f) (LTB X Position controlled by FTB, ONLY) Set **Pan** or **X Position** control for maximum left or right pan. Adjust **RV12** (X Position Range) for desired maximum X Position range.
 - g) Center Pan control and set **SW1-6** as required for your telecine version.

Zoom Calibration (External Zoom ONLY)

1. Set **SW1-2** to **Off** (Down). This enables Zoom from the external zoom board.
2. Set Zoom pot or switch to unity.
3. Adjust **RV2** for correct still picture height.

Vertical Shift

RV1 is provided as a user trim on vertical position. It may be set as desired to calibrate the FTB, external zoom board and color corrector. For example, a different vertical position could be entered for a Steadi-Film gate or other device without changing the standard vertical alignment.

Final Settings

1. Again, set Frame Timebase switches as shown in Table 27 (page 58) This is the normal position for these switches. Note that for all FTB switches, **On is Up**, and **Off is Down**.
2. Power down the telecine and install the FTB in the Tube Control rack. Make sure the ribbon cable is not damaged. Reapply power to the telecine.

Servo Logic 8M Board Alignment

Note: MkIIIB telecines do not include this board.

1. Place the telecine in Local. Center the Local Shuttle control on its indent position. Place the telecine in Normal. Select Shuttle mode. Adjust **RV1** (topmost pot) on the Servo Logic 8M PC board to stop the capstan motor.
2. Place the telecine in Remote1. Select Shuttle mode. Adjust **RV2** on the Servo Logic 8M PC board to stop the capstan motor when the Remote1 Shuttle control is at its mid-point position.
3. Place the telecine in Remote2. Select Shuttle mode. Adjust **RV3** on the Servo Logic 8M PC board to stop the capstan motor when the Remote2 Shuttle control is at its mid-point position.