

MkIIIB Installation

Note: Installation of the Meta-Speed[®] digital servo modification kit should be undertaken only after confirming that the present analog servo, scan, and zoom systems are working properly and are aligned correctly.

Inserting and Removing Circuit Boards

ALWAYS TURN OFF THE POWER before inserting or removing Meta-Speed[®] circuit boards. These boards contain CMOS chips that could be damaged or erased if this procedure is not observed. Additionally, when working on the spooling motors, be sure to unplug the Supervisor board from the rack to avoid damaging the software.

Servo Identification

Before starting installation of Meta-Speed[®], please confirm that the servo is a MkIIIB version. The MkIIIB Servo Rack can be identified by:

- Motherboard type 100558.
- The speed bus is not present on the motherboard.
- No Write/Freeze signal present.

Note: For the purposes of this manual, **any** telecine with a Servo Rack **Motherboard 100558** is considered to be a **MkIIIB**, even if other modifications, such as Unimedia Turbo, have been applied to the telecine.

Framework Wiring Modifications

MkIIIB telecines require some Framework Wiring modifications to be compatible with Meta-Speed[®]. These may include:

- Add the Speedbus signals to the Servo Rack on connector **BPL1**.
- Add FreezeIn* and FreezeOut* signals to the Servo Rack on connector **ASK6**.
- Add the second biphase tach signal to the Servo Rack.

Add Speedbus

MkIIIB telecines do not have the Speedbus wired to the servo rack. Meta-Speed[®] must drive this six-bit bus to control the Digiscan in Varispeed mode. If the Speedbus is not already installed, complete the following modification. This results in wiring that is the same as the MkIIIC and Turbo 2, except that the Meta-Speed[®] Frame Timebase does not require the Speedbus.

1. Add six wires to the Framework wiring. Refer to Table 16 (overleaf).

Signal	Digiscan	Servo Rack
Speedbus5	BSK3-11	BPL1-1
Speedbus4	BSK3-12	BPL1-2
Speedbus3	BSK3-13	BPL1-3
Speedbus2	BSK3-14	BPL1-4
Speedbus1	BSK3-15	BPL1-5
Speedbus0	BSK3-16	BPL1-6

Table 16 - Speedbus

Add FreezeIn* and FreezeOut*

MkIIIB telecines do not have the Freeze* (or Write/Freeze) signal routed to the servo rack. Meta-Speed[□] must intercept and process this signal for slow speed operation, as well as start freeze. On these older machines, the Freeze* signal goes from Termination Panel **SK4-23**, **SK9-23**, **SK14-23**, and Local Control Panel **SK3-18**, directly to Digiscan **PL20-21**. This change requires the addition of two wires to the framework wiring between the Servo Rack and the Digiscan Rack. This results in wiring that is the same as the MkIIIC and Turbo2. Refer to Figure 6.

1. Open the McMurdo connectors at Servo Rack **ASK6** and Digiscan **PL20**.
2. Unsolder the wire on Digiscan **PL20-21**.
3. Add 2 wires into the framework wiring from Servo Rack **ASK6** to Digiscan **PL20**.
4. Connect one new wire from Servo Rack **ASK6-18** to Digiscan **PL20-21**.
5. Connect the other new wire from Servo Rack **ASK6-17** to the wire that was previously connected to Digiscan **PL20-21**.
6. Close the two McMurdo connectors.

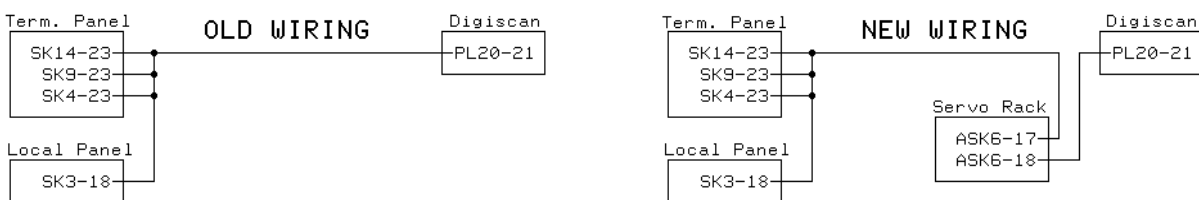


Figure 6 - Freeze Wiring

Add Capstan Biphase Tach2

MkIIIB telecines do not have biphase capstans as original equipment, but some have been retrofitted. Cintel biphase capstans are part number (48598 or 48598A). If a biphase capstan has been installed, but the Tach2 signal is not wired from the capstan to the Servo Rack, complete the following modification:

1. Add a mini-coax cable (RG-174\U or equivalent) into the framework wiring from the Servo Rack to the capstan motor, according to Table 7.

Servo Rack	Signal	Capstan Motor Connector
ASK1-16	Tach2	SK1-H (inner)
ASK1-25	Ground	SK1-C (shield)

Table 17 - Tach2 Framework Wiring

Servo Rack Modifications

Remove Servo Rack

1. Disconnect all cables to the Servo Rack after checking that they are properly marked.
2. Remove the Servo Rack from the telecine and place it on a stable work surface.

Remove Servo Rack Boards

1. Remove the six Cintel boards from the Servo Rack indicated in Table 8.

Cintel Board Name	Cintel Board #
Framing Board	100472
Capstan Servo Control 1/3	100471
Capstan Servo Control 2	100474
Velocity Servo	100470 or 100852
Phase Servo	100473 or 100845
Gate & System Coding	100467 or 100851

Table 18 - MkIIIB Servo Rack boards to remove

Add Capstan Biphase Tach2

Cintel biphase capstans are part number 48598 or 48598A. If a biphase capstan is installed, but the Tach2 signal is not connected, it may be added to the Servo Rack as follows:

1. Cut the two motherboard traces between Velocity Servo (470/852) **PL1-3** and Phase Servo (473/845) **PL1-3** and Capstan Servo Control 2 (474) **PL1-3**.
2. Solder a jumper wire on the motherboard from Phase Servo (473/845) **PL1-3** to Capstan Control 2 (474) **PL1-3**.
3. Remove existing wire, if any, on **APL1-16**, fold back and insulate.
4. Add mini-coax cable (RG-174\U or equivalent) from the motherboard at Velocity Servo (470,852,745) **PL1-3** to **APL1-16** (Tach2). Attach shield to **APL1-25**.

Install Servo Rack Connector Panel 2 (23017)

The Servo Rack Connector Panel 2 (SRCP2) will be mounted on the rear rails of the Servo Rack, approximately 1 inch to the right of McMurdo connectors **ASK4**, **ASK5**, and **APL6**. Perform the following modifications:

1. If a TLC Connector Panel is installed on the back of the Servo Rack, relocate it to the back of the PEC Rack.
2. Install the SRCP2 Power Cable (19001). Solder the cable to the pins of **PL1** of the Servo Logic 7 board (544 or 640) on the backside of the Servo Rack motherboard as shown in Table 9. Secure this cable to the main wiring bundle at the bottom of the Servo Rack.

Note: The choice of the Servo Logic 7 board (544 or 640) is merely a suggestion, as all that is required is to provide the needed voltages to the SRCP2.

DE9S Pin	Wire Color	100640 pin	Signal
1	violet	PL1-17	GND
4	red	PL1-2	+5V
6	yellow	PL1-4	+12V
8	white	PL1-29	-12V

Table 19 - SRCP2 Power Cable (19001)

3. Solder Speedbus/Freeze cable (19007) to the Servo Rack connectors according to Table 20 (next page), making sure that the **DE9S** connector will reach **P11** on the SRCP2 when it is mounted on the rear rails of the Servo Rack. Secure this cable to the main wiring bundle at the bottom of the Servo Rack.

Install Servo Rack Connector Panel 2 (23017) (cont.)

Pin	Color	Connection	Signal
1	brown	BSKT1-1	Speedbus5
2	red	BSKT1-2	Speedbus4
3	orange	BSKT1-3	Speedbus3
4	yellow	BSKT1-4	Speedbus2
5	green	BSKT1-5	Speedbus1
6	blue	BSKT1-6	Speedbus0
7	violet	APL6-17	FreezeIn
8	gray	APL6-18	FreezeOut

Table 20 - Cable 19007 Signals

4. Position the SRCP2 next to the rear of the Servo Rack to use as a reference for connector locations. Do not attach it to the Servo Rack at this time.
5. Connect 26-conductor ribbon cable (19016) to SRCP2 **P15**. Route the cable from the Phase Servo slot (473 or 485) near the edge connector, around the right end of the motherboard and connect to **P15** of the SRCP2.
6. Connect 10-conductor 'twist-n-flat' ribbon cable (19004) to SRCP2 **P16**. Make sure pin 1 (brown wire) is to the top of the ribbon cable. Route this cable between the slots for the Velocity Servo (470 or 852) and the Phase Servo (473 or 845). This cable goes above the motherboard and between the edge connectors, but under the metal crossbar if possible. It will be connected to the front of the Velocity DSP in a later step.
7. Connect 10-conductor ribbon cable (19008) to SRCP2 **P17**. Route this cable between the slots for the Capstan Servo Control 2 (474) and the Velocity Servo (470 or 852). This cable goes above the motherboard and between the edge connectors, but under the metal crossbar if possible. It will be connected to the Capstan Control 2 Adapter (23006) in a later step.

Install Servo Rack Connector Panel 2 (23017) (cont.)

8. Connect 26-conductor ribbon cable (19003) to SRCP2 **P13**. Route this cable as shown in Figure 7. This cable goes above the motherboard and between the edge connectors, but under the metal crossbar, if possible, and re-enters the rack between the Servo Control 2 (474) and Velocity Servo (470 or 852) slots. It will be connected to the Supervisor in a later step. This routing is to ensure that the Supervisor board (23021) can be withdrawn from the Framing slot (472) without disconnecting or entangling its associated cables.

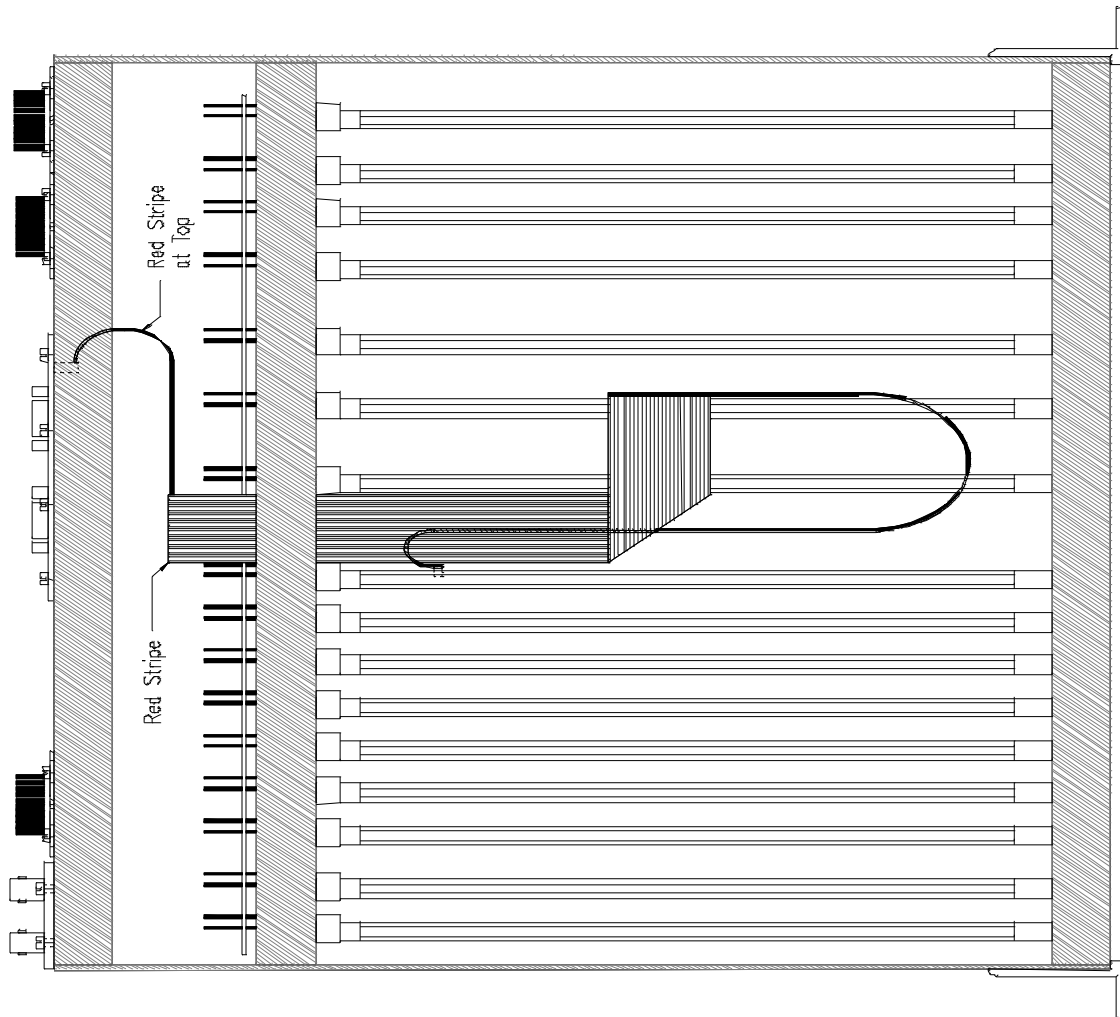


Figure 7 - SRCP2 Cable Routing (Top View)


9. Connect cable (19001) (installed in step 2 above) to **P10** on the SRCP2. Note that pin 3 is a coding pin.
10. Connect cable (19007) (installed in step 3 above) to **P11** on the SRCP2.
11. Using the screws and washers provided, mount the Servo Rack Connector Panel 2 on the rear rails of the Servo Rack, approximately 1 inch to the right of McMurdo connectors **ASK4**, **ASK5**, and **APL6**. It may be necessary to loosen the screws attaching the other connector panels to the rear rails of the Servo Rack. This will allow the nut bars to slide sideways, so that the holes will line up with the mounting holes in the SRCP2.

Install Meta-Speed Boards

1. Set the jumpers on the Meta-Speed Servo Rack boards as shown in Table 21. For more detailed information, refer to the Jumper Setting Charts in the Detailed Board Descriptions section beginning at page 83.

Capstan Servo Control 2 Adapter (23006)		
J1-J6	out	No Speedbus

Capstan Servo Control 1/3 Adapter (23008)		
J1	out	Shuttle not present
J2	out	No TLC
	1-2 (up)	FSOSlow* on Phase Servo PL1-25
	2-3 (down)	FSOSlow* on Phase Servo PL1-27

Velocity DSP (23004)		
J1	out	WVD Hi-Z input
J2		Standard Interrupts
J3	out	WHD Hi-Z input
J4	2-3 (down)	FP negative pulse
J5	2-3 (down)	WHD negative pulse
J6	out	WDT disabled
J7	out	SCLK Master
J8	in	SFRAME Master
J9	2-3 (right)	PLL Ref is WHD
J10	out	MkIII Gate Codes

Note: J2 depends on the pins used by TLC

Phase Adapter 4 (23019)		
J1-J8	out	MkIIIB (100558)
J9- J12	1-2 (up)	normal
J13	1-2 (up)	FP positive pulse
J14	1-2 (up)	FP positive pulse
J15-J16	1-2 (up)	normal
J17-J18	1-2 (up)	normal

Table 21 - Typical MkIIIB Servo Boards Jumper Settings

2. Connect ribbon cables to the Supervisor and the two associated adapter boards. These adapter boards are **NOT INTERCHANGEABLE** and must be assembled as follows:
 - a) Connect the long end of 50-conductor ribbon cable (19011) to **P2** of the Supervisor board (23021).
 - b) Connect the center connector of 50-conductor ribbon cable to **P2** of the Capstan Control 1/3 Adapter (23008).

Install Meta-Speed Boards (cont.)

- c) Connect the short end of 50-conductor ribbon cable to **P2** of the Capstan Control 2 Adapter (23006).
 - d) Connect one end of 40-conductor ribbon cable (19012) to **P3** of the Supervisor board (23021). The other end will be connected in a later step.
3. Install this Supervisor assembly (all 3 boards) in the Servo Rack as follows: (Refer to Table 22 for board arrangement).
- a) Connect the free end of the 10-conductor ribbon cable (19008) (installed earlier) to **P3** of the Capstan Control 2 Adapter (23006).
 - b) Install the Capstan Control 2 Adapter (23006) in the Capstan Servo Control 2 slot (474).
 - c) Install the Capstan Control 1/3 Adapter (23008) in the Capstan Servo Control 1 slot (471).
 - d) Connect the free end of the 26-conductor ribbon cable (19003) installed earlier to **P5** of the Supervisor board (23021).
 - e) Install the Supervisor board in the Framing slot (472).

Supervisor 2 (23021) Left-most	Capstan Servo Ctrl 1/3 (23008) Middle	Capstan Servo Control 2 (23006) Right-most
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Table 22 - Supervisor 2 Group

4. Install ribbon cables to the Velocity DSP board (23004) and the two associated adapter boards. These adapter boards are **NOT INTERCHANGEABLE** and must be assembled as follows:
- a) Connect one end of 50-conductor ribbon cable (19014) to **P2** of the Velocity DSP board (23004).
 - b) Connect the other end of the 50-conductor ribbon cable to **P2** of the Phase Adapter 4 (23019). Note that this connector is on the solder side of the Phase Adapter 4 (23019).
 - c) Connect one end of 50-conductor ribbon cable (19018) to **P4** of the Phase Adapter 4 (23019).
 - d) Connect the other end of 50-conductor ribbon cable (19018) to **P2** of the Gate/Sys Adapter (23005).

Install Meta-Speed Boards (cont.)

5. Install this Velocity DSP assembly (all 3 boards) in the Servo Rack as follows: (Refer to Table 23 for board arrangement).
 - a) Install the Gate/Sys Adapter (23005) in the Gate & System Coding/Shrinkage 1 slot (467 or 851).
 - b) Connect the free end of the 26-conductor ribbon cable 19016 installed earlier to **P3** of the Phase Adapter 4 board (23019).
 - c) Install the Phase Adapter 4 (23019) in the Phase Servo slot (473 or 845).
 - d) Connect the free end of the 10-conductor 'twist-n-flat' ribbon cable 19004 installed earlier to **P4** of the Velocity DSP board (23004). Make sure pin 1 (brown wire) is to the left.
 - e) Install the Velocity DSP board (23004) in the Velocity Servo slot (470 or 852).
 - f) Connect the free end of the 40-conductor ribbon cable 19012 (installed earlier) to **P3** of the Velocity DSP board . Note that this connector is on the solder side of the Velocity DSP board.

Velocity DSP (23004) Left-most	Phase Adapter 4 (23019) Middle	Gate/System Adapter (23005) Right-most
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Table 23 - Velocity DSP Group

MkIIIB Frame Counter Modification

Description

This procedure describes the modifications required for the Meta-Speed[□] to drive the telecine Frame Counter and associated devices (color correctors, TLC, etc.). The advantages of this approach include:

- Selectable perfs-per-frame on a particular gate (such as 3-perf 35mm on a 4-perf gate), with correct frame count to color corrector and other external devices.
- Adjustable timing of the count pulses
- More consistent editing with TLC and other edit controllers

Discussion

In Cintel telecines, the frame count is derived from the slots on the sprocket encoder cylinder, on the rear of the film gate. The slots are arranged in a pattern that generates a biphas pair of signals, when sensed with phototransistors and LEDs. These signals indicate the position of the film, and are referred to as 2ØA and 2ØB. The analog phototransistor signals go first to the Counter Board (100853), where they are level-shifted to TTL, conditioned by the Gate Code information to maintain consistent count direction for different gate types, and decoded to drive the local counter display. The TTL versions of the signals then go to the Sep Mag & Counter board (100585), where they are buffered by transistors, and sent out to external devices, such as Color Correctors.

The purpose of this modification is to replace the signals generated by the encoder cylinder slots with signals from the servo. The servo signals are derived from the encoder cylinder castellations. After performing this modification procedure, the source of 2ØA and 2ØB will be the Meta-Speed[□] Servo System.

Procedure

In MkIII and Turbo telecines, a pair of wires must be added from the Servo Rack to the PEC Rack. The Sep Mag & Counter board (100585) requires no modification.

Disable Frame Counter TTL outputs.

Note: Some machines may have a 100594 board rather than a 100853.

On the Frame Counter board (100594), remove **IC33** and **IC34**.

On the Frame Counter board (100853), remove **IC7** and **IC8**.

Add 2ØA and 2ØB Signals to Servo Rack

Add a cable between the PEC Rack and the Servo Rack as indicated in Figure 8. This cable must have a disconnect to allow removal of the racks. Suggested connectors are XLR 3-pin.

Suggested cable is **Belden 9451** or equivalent shielded 1-pair 'audio' cable. Note that there will be wires already present on some of the pins indicated. The new wires should be added to the existing wires, leaving the old signal paths intact.

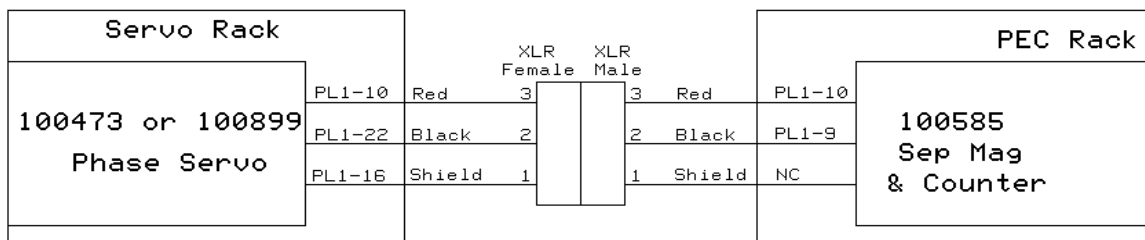


Figure 8 - Servo Rack to PEC Rack Interconnect

Add 2ØA and 2ØB Signals to Servo Rack (cont.)

1. ONLY if the telecine is a **MkIIIB** with a **100558** Servo Rack Motherboard, perform the following motherboard modification to isolate and jumper around pin 22 of the Phase Servo socket:
 - Cut the motherboard trace between (100467) Shrinkage-1 pin 22 and (100473) Phase Servo pin 22.
 - Cut the motherboard trace between (100473) Phase Servo pin 22 and (100470) Velocity Servo pin 22.
 - Solder a jumper wire between (100467) Shrinkage-1 pin 22 and (100470) Velocity Servo pin 22.
2. Solder a shielded 1-pair cable to the Phase Servo socket as follows:
 - Shield to Phase PL1-16
 - Black to Phase PL1-22 (2ØA Signal)
 - Red to Phase PL1-10 (2ØB Signal)
3. Cut the cable to an appropriate length for the layout of your telecine and terminate it with a female 3-pin XLR connector as follows:
 - Shield to pin 1
 - Black to pin 2 (2ØA Signal)
 - Red to pin 3 (2ØB Signal)
4. Re-install the Servo Rack and reconnect all cables.
5. Disconnect and remove the PEC Rack.
6. Solder a shielded 1-pair cable to the Sep Mag & Counter (100585) socket as follows:
 - Shield – no connection. This is to avoid ground loops, while still shielding the cable.
 - Black to PL1-9 (2ØA Signal)
 - Red to PL1-10 (2ØB Signal)
7. Cut the cable to an appropriate length for the layout of your telecine and terminate it with a male 3-pin XLR connector as follows:
 - Shield to pin 1
 - Black to pin 2 (2ØA Signal)
 - Red to pin 3 (2ØB Signal)
8. Re-install and re-connect the PEC Rack.
9. Connect the two XLR connectors.

Enable and Adjust Meta-Speed 2ØA and 2ØB Drivers

1. On the Phase Adapter 4, set bit 4 of **SW2** to **On**. This enables the drivers for the 2ØA and 2ØB signals.
2. On the Phase Adapter 4, bits 1 and 2 adjust the timing of the 2ØA and 2ØB signals, in 1/4 frame increments. Set these bits so that the Color Corrector frame count changes when the frame line passes the center of the picture monitor.

Digiscan 4:2:2 WVD Problems

Digiscan 4:2:2 has excessive droop and low levels on its Write Vertical Drive (WVD) signal. To reduce the droop rate and increase the signal level, perform the following modification to the Store Control 2 board (101133) (See page 1 of the Cintel schematic):

1. Change capacitor **C62** from **0.1uF** to a **2.2uF** tantalum, **16** volts or higher. Orient this capacitor with the **positive** side towards the **lower** edge of the circuit board. On page 1 of the Cintel Store Control 2 (101133) schematic, the positive side of the capacitor is to the left (towards **IC24** pin 10).
2. Add a **10K8** resistor from **IC24 pin 16** to **IC24 pin 10**. This will increase the voltage swing of the WVD signal.

SlowScan Disable GPI Input

Some users (especially those with Kinesis units) have requested a GPI input to disable SlowScan. This is available at PL1-6 of the Meta-Speed[□] Gate/System Adapter (23005). If this line is pulled low, SlowScan will be turned OFF. This input overrides any selection made at the VT100 terminal or CTM control panel.

Time Logic Controller

Note: Meta-Speed software versions 1.98 and above require TLC **RK3.44** or later software.

To use the Time Logic Controller with Meta-Speed[□], the TLC Buffer Electronics Assembly must be modified and **J2** on the Capstan Control 1/3 Adapter (23008) must be set to select the Film Speed Override (FSO*) signal.

1. Remove **U6** and **U7** (both are chip type HI-5043) from the TLC Buffer Electronics Assembly.
2. Replace **U6** with the supplied header marked **U6** (this header connects pin 1 to pin 10).
3. Replace **U7** with the header marked **U7** (this header connects pin 1 to pin 15).
4. Set **J2** on the Capstan Control 1/3 Adapter (23008) to select the pin on **PL1** which is the source of the FSO* (Film Speed Override) signal from the TLC Buffer Electronics Assembly. See Table 24, which shows the customary location of this signal.
5. After installation is complete, TLC will need to be enabled in the software **Setup Menu** under **Film Speed Override Type**.

J2	FSO* signal	Telecine
1 to 2	PL1-25	MkIIIB, Turbo 2, most URSAs
2 to 3	PL1-27	MkIIIC, some URSAs

Table 24 - TLC Film Speed Override

Frame Timebase or Digital Deflection System (DDS)

Depending on the telecine configuration, the next step is to either install a MetaSpeed[□] Frame Timebase board (Page 49) or complete the necessary connections to interface to a DAV DDS (Page 51).

Removal of Meta-Speed[□] from MkIIIB

Should it be necessary to remove the Meta-Speed[□] system from the telecine, the ribbon cables and connector panels can be left installed, but disconnected. The old boards can be re-installed without modifications, other than replacing the chips that were removed from the Varispeed, Zoom, and TLC boards, if any.

There is one exception to this in MkIIIB telecines: After the Framework Wiring modifications have been performed, the FreezeIn* line from the Termination Panel no longer goes directly to the Digiscan and must be jumpered at the Speedbus and Freeze cable (19007) which was added to the Servo Rack internal wiring. If this is not done, the Digiscan will be in Freeze mode at all times.

The following steps summarize the removal procedure:

1. Power down the telecine.
2. Replace the Meta-Speed[□] boards with the original Cintel boards.
3. Replace the chips on the Varispeed Board, if applicable.
4. Replace the chips on the Zoom Board, if applicable.
5. Replace the chips on the TLC Buffer Electronics Assembly, if applicable.
6. Replace the chips on the Frame Counter board and disconnect the XLR connectors used for the Frame Counter modification.
7. Disconnect the Speedbus and Freeze cable (19007) from connector **P11** of the Servo Rack Connector Panel.
8. Jumper together pins 7 and 8 of the **DE9S** female connector on the Speedbus and Freeze cable (19007).
9. Reapply power