Introduction

This manual details the installation and operation of the Meta-Speed Digital Servo. The Meta-Speed Digital Servo is now standard factory equipment on all Cintel URSA Diamond and Turbo 3 telecines, and provides the technology behind the servo used in the ITK Ltd. Millennium machines.

Meta-Speed is a direct replacement for the Cintel analog servo and Frame Timebase system with a completely new and unique digital system. It adds a variety of useful features to most versions of Cintel Flying Spot Scanners.

Meta-Speed greatly enhances the utility of flying spot telecines. Major benefits of this digitally based software driven system are the ease of adjustment, easy software upgrades and discrete system adaptability. Additionally, Meta-Speed offers the benefits of expanded speed range, digital control of the servo system and improved image stability.

TECHNICAL SUPPORT
If you have questions, problems or suggestions please feel free to contact Meta-Speed Technical Support at:

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Please review the Meta-Speed features on the following pages for information on many of the features and enhancements that Meta-Speed provides to the telecine process.

Meta-Speed® Features

1. **AMD AM188 Microprocessor-based Digital Servo System:** This is a completely new, unique, and totally digital servo. It is not a modified or "tweaked" Cintel analog servo. The advantages of a truly all-digital approach include improved precision, accuracy, stability and easier upgradability. There are no critical analog alignments to drift over time.
2. **-30 to +96 fps Selectable Film Speed Range:** The servo is capable of moving 35mm, Super 35mm, 16mm, Super 16mm, Super 8mm and Regular 8mm motion picture film to produce a complete image at any speed from slightly less than -30 fps (Run Reverse) through Still frame (0 fps) to Run Forward beyond +96 fps. Actually, the film can be transported at up to +/-600 fps through the gate, but usable film images are limited by the choice of digital scan converter and by the zoom setting. There are now over 2000 different speeds available in both NTSC and PAL mode.
3. **Supports VistaVision**, **35mm 2 and 3 perf, CinemaScope**, **7012 12 perf**, **65mm IMAX**, and all **65/70mm** film formats.
4. **Multiple Serial Ports for Communication via RS-422:** There are 5 serial ports included with Meta-Speed®:
   - 1 RS-232 Port to communicate with a VT-100-type terminal up to 38.4K baud. This port is currently set to 19.2K baud to allow the use of slower terminals or terminal emulators.
   - 4 RS-422 Ports running at 38.4K baud for control and external I/O. One port is currently reserved for communication with the digital deflection systems in Turbo series telecines.
5. **Capable of Interfacing with Cintel and DDS Digital Scan Systems:** The Meta-Speed® System has been designed to communicate digitally with the digital scan systems found on the Turbo series and URSA series telecines.
6. **Software Upgradeable:** New features can be added without having to modify hardware. This universal system covers the entire range of MkIII, Turbo, and URSA telecines. The software based approach is easily adaptable and expandable to new film formats and different film perfs.
7. **DOS-related system supervisor:** A familiar DOS environment is made possible by the incorporation of Datalight ROM-DOS as the system supervisor software. Software license is included.
8. **Retrofit any MkIII, Turbo, URSA and HR1440 telecines**: Compatible with the different versions of Cintel servos, as well as Unimedia "Black Box" systems. Meta-Speed® requires a Digiscan 2 or higher version scan converter. Digiscan 4:2:2 or URSA offer the widest range of film speeds and features. **Please note that the current Meta-Speed® supports biphase tach capstans only.** Biphase tach-equipped machines have better film handling features, especially when entering into the active stop mode.

9. **No Scan foldover:** The digitally derived vertical scan eliminates the "double scan" characteristic of the Cintel MkIII analog system.
10. **Digital "S-correction":** Digital "S-correction" makes alignment of the frame timebase easier and eliminates drift. Super16mm users can switch between regular 16mm and Super 16mm film without the need for re-alignment.
11. **Adds zoom and variable speeds to non-zoom and non-Varispeed MkIII telecines:** This system includes a new digital frame timebase board that adds zoom capability to any MkIII telecine. Users can also add Cintel Varispeed operation without the need of Speedbus information for the digital frame timebase board. The digital frame timebase board can be used as a standalone unit with built-in zoom, or in conjunction with the conventional Cintel or AAV Kinesis zoom board.
12. **Extremely stable film framing:** The Meta-Speed® system has been designed to be significantly more stable than the Cintel analog servo. It incorporates its own internal quartz crystal oscillator as an accurate timebase reference.
13. **Film framing is constant and tracks at all speeds:** Once film framing is adjusted it is not necessary to readjust it when speed changes are made.
14. **Software adaptable and scaleable acceleration/deceleration:** The Meta-Speed® servo system features software adaptable and scaleable acceleration/deceleration and velocity parameters for all film formats and speeds.
15. **Locked picture playback in Shuttle Mode:** With the new servo operating in high speed shuttle you can see a locked film image for easy reference and quick scene identification.
16. **Mode transitions without going through Stop:** The Meta-Speed® servo significantly speeds up the film to tape color correction process by allowing you to change modes without forcing the servo to artificially stop during the transition. For example, you can now go directly from Fast Forward to Play Forward without going through Stop.
17. **Sprocket Run-out Detection and Correction (DeWobble):** The Meta-Speed® system corrects for any eccentricity error at the gate sprocket interrupter. This feature insures improved vertical film stability.
18. **Adaptive Active Stop Servo:** Improves still mode alignment on all formats.
19. **625/525 Operation:** Automatically switched depending on what sync signal is supplied to the telecine.
20. **Enhanced SlowScan (Scan-Track) system:** The SlowScan signal is transmitted digitally on an RS-422 serial link. The Meta-Speed® digital frame timebase board (or URSA/Turbo DDS) working in conjunction with a more accurate digital servo means that SlowScan/Scan-Track doesn't experience analog drift. No additional special alignment is necessary.

21. **Strobe Effects:** Enables the colorist to dial in a variable amount of skip frames for each displayed film frame to create interesting strobe effects during film transfer.
22. **Vertical Scan Invert (MkIII only):** The vertical scan can be inverted via a toggle switch.
23. **URSA Scan Generator support**: The Meta-Speed Phase Adapter 4 board can now control the URSA scan generator.
24. **RTS gate support**: Meta-Speed supports all Steadi-Film gates including Pin-Plus.
25. **Clrview support**: Meta-Speed supports the Clrview anti-aliasing system for URSA.

Design Goals

A major design goal of Meta-Speed was to make its installation as simple, fast and straightforward as possible on all the various versions of existing Cintel MkIII, Turbo 1, Turbo 2, and URSA telecines. On later versions of telecines that already have X-Y Zoom and the Varispeed bus, installation is virtually a swap of several printed circuit boards (PCBs) and the addition of interfacing cables. Most importantly, the installation of Meta-Speed requires no modifications that will prevent you from *swapping back* to the original Cintel boards and analog servo system, should it be deemed necessary.

The Meta-Speed servo utilizes or derives all the internal control, data and interfacing signals necessary to operate any Cintel telecine and most peripheral devices. Accomplishing this while remaining fully compatible with all the existing Servo Rack motherboards has resulted in certain design limitations.

Specifically, the 33-pin ITT edge connectors utilized by Cintel in the original Servo Rack are simply inadequate to get all the signals to and from the new digital servo processor boards that comprise Meta-Speed. In order to eliminate the need for any major modifications to the servo motherboard and rack, however, the use of these connectors was continued. Thus it became necessary to create several interconnect circuit boards whose primary purpose is to allow access to all the existing signals in the Servo Rack. Ribbon cables carry these signals to and from the new digital servo processor boards. This method was used to maintain compatibility and eliminate the time and expense of extensive modifications to the telecine.

All ribbon cables are designed to be long enough to allow the main processor boards and/or the adapter boards to be put on a standard extender card for troubleshooting or alignment.

Installation Note for All Systems

Pin 1 (the red stripe) is at the top or left on all ribbon cables throughout the Meta-Speed system.