

# Tobin TVT-16PHD E Progressive Scan *HD* High Definition Telecine

## Cautionary Notes:

1. The light emitter should not be looked at directly as it is small and can be very bright.
2. Keep your fingers away from the shutter blade to prevent personal injury.
3. Keep your fingers and hair away from potentially moving parts.

## Basic Operation

**NOTE:** The TVT-16PHD E models are computer dependent. You must have a computer and computer monitor connected in order to see and record the picture. The computer must be the correct type with suitable software already installed.



A variety of similar Eiki slot-load projectors are the basis for conversion to the TVT-16PHD E models. Many do not have an overall power switch, so we suggest using a power strip with switch for controlling the power.

Switch the unit so it is running with the light turned on, and note that there are no hairs or lint visible in the picture on the monitor. If there are any, stop, open the film gate and brush or blow out the hairs. For threading:

If the reel is correctly prepared, the perforations (sprocket holes) in the film will be towards you, with the emulsion side (the side with the picture) facing to the right, while the film is hanging down from the right-hand side of the reel. Film prints (copies) might instead be correctly oriented with the emulsion side facing to the left. There should be about 6 feet (2m) of leader before the first picture. If any of this is not the case, return the film reel to the preparation department for correction.

For running **silent** film, you can optionally turn the Amplifier switch off by turning the Volume knob counter-clockwise until it clicks, saving the exciter lamp.

Place the full reel of film on the right-hand "Supply Reel" spindle, matching up the square side of the reel center hole with the square inner portion of the reel spindle. If the reel is correctly prepared, the perforations (sprocket holes) in the film will be towards you, with the emulsion side (the side with the picture) usually facing to the right, while the film is hanging down from the right-hand side of the reel. There should be about 6 feet (2 m) of leader before the first picture. If any of this is not the case, return the film reel to the preparation department for correction. (A film print or duplicate may have the emulsion facing to the left instead.)

Draw the film leader from the Supply reel and lead it to the left and through the slot-loading path. Pull enough film through that you can insert the beginning of the leader in the slot in the take-up reel, and turn the reel clockwise a few turns.

Note that the **camera** is continuously triggered by the TVT only when it is running, usually at 24 FPS (frames per second.) You can preview the picture's exposure level etc. when the film is stationary by going to the camera's Settings menu and temporarily switching to Free Run. For viewing and recording the running film, switch back to the Trigger mode to prevent blurring as described below.

**Audio** reproduction: The TVT-16PHD E is intended primarily for capturing silent film. You can capture sound film in a separate pass, or with a separate recording method, then match up the picture and sound files in later editing. The running speed will vary slightly so you may need to adjust the running time of the audio file. To minimize sync drift, make both passes at the same time of day, with the same film reels, and with the same degree of warm-up of the motor and mechanism.

**Note** that the final running time of the picture file will not be affected by the running speed of the film when transferring, as one frame of film will always result in one frame of video file. Film that was photographed originally at say 16, 18 or 24 FPS will still be 16p, 18p or 24p in the file, and will need additional processing in the computer to be viewed at the correct video rate, such as 24p for a DVD or 50i/60i for video tape.

Refer to the camera and computer program instructions for how to start recording a file from the film. Generally you will assign a file name and recording duration, and it starts capturing. You can exit the program to stop recording earlier than expected. You can use AVI 1.0 for short recordings or AVI 2.0 for longer ones.

The film should be inspected, repaired, cleaned and lubricated before it comes to you for transfer. In case bad film causes loss of the lower film loop, this will be corrected right away with the automatic loop restorer. If this doesn't work, turn back to Stop momentarily to restore the threading path. Then resume the transfer. A severe jam also causing loss of the upper loop will turn off all power to the mechanism and prevent damage.

At the end of the film, switch to "Stop" and stop recording. Attach the end of the film straight across to the supply reel, and turn the reel a couple of turns counter-clockwise. Or if you prefer you can leave the film threaded in the film path slot before the leader runs out. Switch to Reverse until the film is fully rewound, then turn the main switch back to Stop. Remove the supply reel, and you are now ready to transfer the next reel.

## Other Needs

Film will be received from the public in various states of disrepair, with bad splices, winding turned over on the reel, being mounted on the wrong type reel or the wrong way out, no leaders, etc. and a facility must be provided for making the footage ready for transfer. This requires at the minimum a pair of film rewinds, a supply of film leader and empty reels, a film splicer, and a way of cleaning excess dirt off the film. Ideally there will be a light box for looking through the film, and a light above the editing bench to reflect light off the film.

Refer to the first section of these instructions for a description of how the film should be wound on the reel. There should be 6 feet of leader on the start for proper threading of the TVT, and enough leader on the end to thread the film cleaning device. Torn film sprocket holes and crooked splices should be removed to prevent transfer problems.

Small rolls should be spliced together for efficient transfer. A properly made cement splice, using fresh cement, is preferred. The smoothest transit of splices occurs when you have made a beveled splice using an (unfortunately discontinued) Agfa or Bolex splicer, where the total thickness at the splice is about the same as unspliced film. When making tape splices, ensure that the sprocket holes are not covered up and the tape is on straight, on both sides of the film.

We suggest using 400 foot (122 meter) or larger reels and cans. Usually if 4 small 100' rolls, or 8 small 50' rolls, of film is wound on each reel, this will give more efficient transfer by minimizing threading operations, and attaching and detaching the spring belt as previously described. Mark the leader on the head (beginning) of the reel with the customer's name or job number, and the reel number, to avoid mixups. Leader with a matte finish can be written on with pencil, while shiny leader can be marked with a Sharpie or India ink. Ensure that that the cleaning step does not remove the reel identification. Storage cans should be ventilated for slight air circulation, to prevent film deterioration from "vinegar syndrome." Advise the customer to keep his film in a cool, dry, dark place to prevent fungus growth. You want the film to be in good condition so you can transfer it again when the next super generation of video equipment formats makes the present transfer obsolete. :-)

After each reel is spliced and repaired, it is rewound through your film cleaner device on to the proper reel, which restores the reel to being heads out instead of tails (foot or end) out, and sent to the transfer room. Note: When using a liquid cleaner, view the rewinding film by reflected light to make sure it is dry again before it is wound up, or else the film may dry with "shoreline" marks on it. You can wind quite fast if not using an excessive amount of solvent.

### Note on lubrication:

Some film types are not lubricated in processing and may give an unsteady image and noisy running until lubricated. The Eiki projector design however is more forgiving than other brands in this respect. The cleaning fluid should have a small amount of wax dissolved in it to provide lubrication for smooth transport through the TVT or through the customer's projector. A suggested amount is a lump of candle wax or beeswax the size of a pea ground up and dissolved in a pint (half litre) of solvent.

Cleaning solvents that are widely used include methyl chloroform (*toxic fumes*), perchloroethylene (dry cleaning fluid) (*toxic fumes*), Freon TF (*ozone depleting*), or 99% isopropanol (isopropyl alcohol) (*flammable*). There are also commercially mixed film cleaners with lubricant. Cleaning must take place in a ventilated area.

## TVT Installation

Plug the TVT-16PHD E into a source of AC (alternating current) at 50 or 60 Hz (Hertz, or cycles per second.) For safety and minimum hum the third wire should be grounded (earthed.) The machines can be used with line (mains) voltage of 120 on USA 60 Hz power, and operation may be satisfactory on 100 volt 50 Hz Japanese current. Running speed will be about 24 FPS (frames per second) on 60 Hz current, and 20 FPS on 50 Hz current.

For a line (mains) voltage higher than 120, you must obtain locally the correct step-down transformer. Connect the USB 3.0 cable to the computer only if the software has already been installed, see the

software installation instructions.

Audio output is through a 1/4" (6.35mm) standard phone jack. Use the supplied 1/4" phone to RCA phono cable to connect from the Speaker jack to the audio input of your consumer recorder. If connecting to a stereo recorder, also use an RCA phono Y-cord to send the signal to both Left and Right inputs. Be sure the amplifier is turned on. A starting point for the Volume and Tone settings is about 10:00 if you imagine the hour hand of a clock. Use the Speech position if there is one, to prevent boosting the bass and making voices sound too boomy. (NOTE: The built-in speaker has been removed to make room for the added electronics.)

## Computer Requirements

You should have a modern computer with Intel dual-core processor i3 or better, running Windows XP, Vista, 7 or 8 and with a factory original USB 3.0 jack. Also, 2 GB RAM, a Graphics card with 24 or preferably 32 bits and DirectX 9.0c or higher. The Linux operating system may also work with the Imaging Source software for that operating system, but we have not tried it.

If you plan to do Uncompressed recording, you may need a RAID array to accept the huge resulting files.

## Software Installation

The included disc is used to install the Imaging Source viewing and recording software on your Windows computer. If the disc is missing, or if you want an updated version, you can download it from the Imaging Source website: [http://www.theimagingsource.com/en\\_US/products/cameras/usb-cmos-ccd-color/dfk23u445/](http://www.theimagingsource.com/en_US/products/cameras/usb-cmos-ccd-color/dfk23u445/). Follow the instructions on the paper sheet. Do not let the computer install generic software or drivers. Run the Usbcam driver program first after connecting the camera, then the IC Capture program. Use the X86 version for a 32-bit computer and the X64 version for 64-bit.

Linux software can also be downloaded from The Imaging Source.

You will also need editing, mastering or "burning" software for making a DVD or Blu-Ray disc, or tape.

## Mandatory Camera Settings

Following are the initial settings that **must** be programmed into your computer for proper operation of the Imaging Source camera. Otherwise you will get flickering, blurred or skipped frames. Later you can experiment with different Gamma, Gain, Shutter and other settings.

### □ Activate External Trigger

- Maintain All Property Automations
- OK

**Additional Settings:** (NOTE: Available settings depend on camera model and software version. Set if appropriate. If it does not show, disregard.)

These appear at the top of the program's screen: File, Device, Capture, Effects, View, Window, Help and:

Model & Serial Number: (This is automatically received from the camera.)  
Video Format: RGB32, 1280 x 960 for DFK23U445 and 1600 x 1200 for DFK23UX174.  
Frame Rate: Set to the highest available value, 30-50 FPS or more. This governs the speed of the computer processing so it can keep up, and is NOT the actual transfer speed which is 20 or 24 FPS, determined by the line (mains) frequency.

The following tabs under **Device** are not used initially:

Binning: Not used  
Drive Control: Not used  
Noise Reduction: Disabled (to prevent frame blending)  
Rotation: Not used  
DeBayering: Not used  
ROI (Region of Interest): Not used

The following appear under the **Device Properties** tab.

### Color

Hue: 0  
Saturation: 100

White Balance: You can try:  Auto (Continuous automatic for wildly varying film quality OR One Push (Balances to an overall average grey if within range.) You can enter manually based on the Histogram graphs (turned on by clicking on  above) showing R G B (red, green, blue) levels of the blank white screen.  
White Balance Mode: Grey world  
Auto Preset: Not used  
Temperature Preset: Not used  
Temperature: Not used  
Color Enhancement:  Enable

### Exposure

Brightness: 0  
Contrast: 0  
Gain: 0 dB (Can increase, OR click on  Auto, for very dark film)  
Exposure: 1/50 second to 1/10,000 second (typically 1/600) to manually control brightness level, OR click on  Auto for automatic exposure control  
Auto Reference: 50 (Change if Auto results are consistently light or dark)  
Auto Max Value: 1/200, or 1/50 if running very dark film (Do not select Auto.)  
Highlight Reduction: (Seems to look better if you do not click on Enable)

### Image

Sharpness: 0  
Gamma: 70  
Denoise: 0  
If the camera is mounted right way up with the USB3 micro connector at the top rear, instead of being upside down with the connector at the bottom rear:  
 Flip Horizontal  Flip Vertical

### Special

Trigger:  Enable  
Software trigger: (not used)  
 Polarity (leave unchecked)  
Delay: 15  $\mu$ s  
GPIO (Section not used)  
Strobe (Section not used)

WDR (Wide Dynamic Range): (not used)

**Effects:** (not used)  
**View:**  Status Bar  
**Window:** (not used)  
**Help:** (If you need help about the program)

To **save** all these settings, go to **File: Save Configuration**. The software will pick a general location, you enter the camera model, TVT-16PHD E model, or some other identifier. Click OK.

You can reduce the image size so the whole video frame will show on the monitor, for adjusting the framing, or you can enlarge the image to check focus and grain. Use the + / - buttons at the top.

If a lot of image processing is being done, you might need to use a faster shutter speed of say 1/500 or 1/1000 etc. to give the computer enough time to do it, especially if able to run above 24 FPS.

You will note that the automatic color and automatic exposure changes occur in discrete steps, unlike the smoother looking changes of most analog cameras. To avoid this, stop running, do a manual change, and resume the transfer from the start of the scene.

## After You've Captured the Film

When finished you have an AVI file that defaults to 29.97 fps where each video frame is an individual film frame, with no pulldown, interlace artifacts or blurred frames. If you play back the file in Windows Media Player or VLC, it will play back too fast. You can either change the frame rate with a free program like AVIFrameRate or change it in your video editing software. You would change it to play at the original frame rate

of the film camera, such as 16 FPS for home movies or 24 FPS for commercially shot material.

The AVI file isn't the same aspect ratio as 16:9 HDTV, because the film frame is 4:3 shape. To fill the 16:9 frame, you would insert pillars on left and right in editing. When displayed on an HDTV monitor, the image will then be pillarboxed but nothing has been cropped or stretched. You can also capture in RGB32 1920 x 1200 which will increase the width of the blank edges of the image, however this will increase the file size.

## Other Information

### Routine service:

The Eiki Slotload mechanism is said to be permanently lubricated.

The **Exciter Lamp** for audio will last a long time as it is operated below its rated voltage. When it no longer lights up in the On position of the amplifier, it must be replaced with another same type lamp. The replacement is with another ANSI code **BRK** lamp, 4 volt .75 amp C-8 filament, SC prefocus base. (Do not confuse the BRK lamp with the BAK lamp as its filament is oriented the wrong way and will give muffled and distorted sound.) For replacement:

Turn the power off. Make sure the Take-up reel arm is raised. Loosen the screw holding the lamp cover in place. Hinge the cover out and up. Turn the lamp counter-clockwise so it will lift out. Scrape the center contact of the new lamp lightly with a screwdriver or knife to remove any oxidation. Clean any dust or fingerprints off the glass bulb. Place the lamp over the guide pins, which are unevenly spaced so the lamp will only fit one way. Push and turn it clockwise to the stop. Replace the cover without pinching the USB cable and tighten the screw.

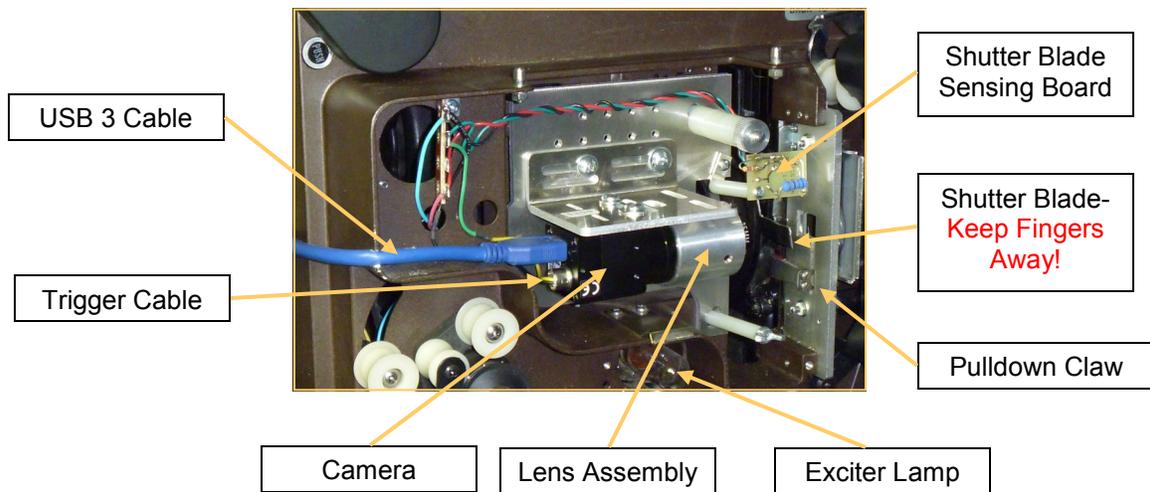
### Service adjustments:

- Focus, centering and magnification are factory set and locked in place, and should not be disturbed. We very highly recommend not touching any of the optical adjustments, as with 1:1 imaging you may never get the focus, alignment and image size all correct again since they interact in odd ways.
- Check the output voltage of the regulated switching power supply module. It should be 15 volts DC,  $\pm 5\%$ . The voltage should change little no matter what settings are made to the operating controls. This supply only controls the picture exposure and the camera triggering and is completely independent from the motor and amplifier circuits.
- Note that the camera actually receives DC power from the computer through the USB 3.0 cable, not from the TVT's internal power supply. The large high resolution cameras can get quite hot with the TVT motor's fan not running; to extend its life turn off the computer when the TVT is not in use.
- If dust accumulates on the optics it should be removed with a clean camel's hair brush or air blower. Fingerprints must be removed immediately with lens cleaner and lens tissue, following the instructions included with them.
- With some models, the mechanism may sometimes stall when switched to Forward. Turn the Threading Knob past the stiff part of the pulldown cycle and try again. In a severe case you may need to replace the main drive belt if it is slipping. Match the original style as they have been made several different ways.

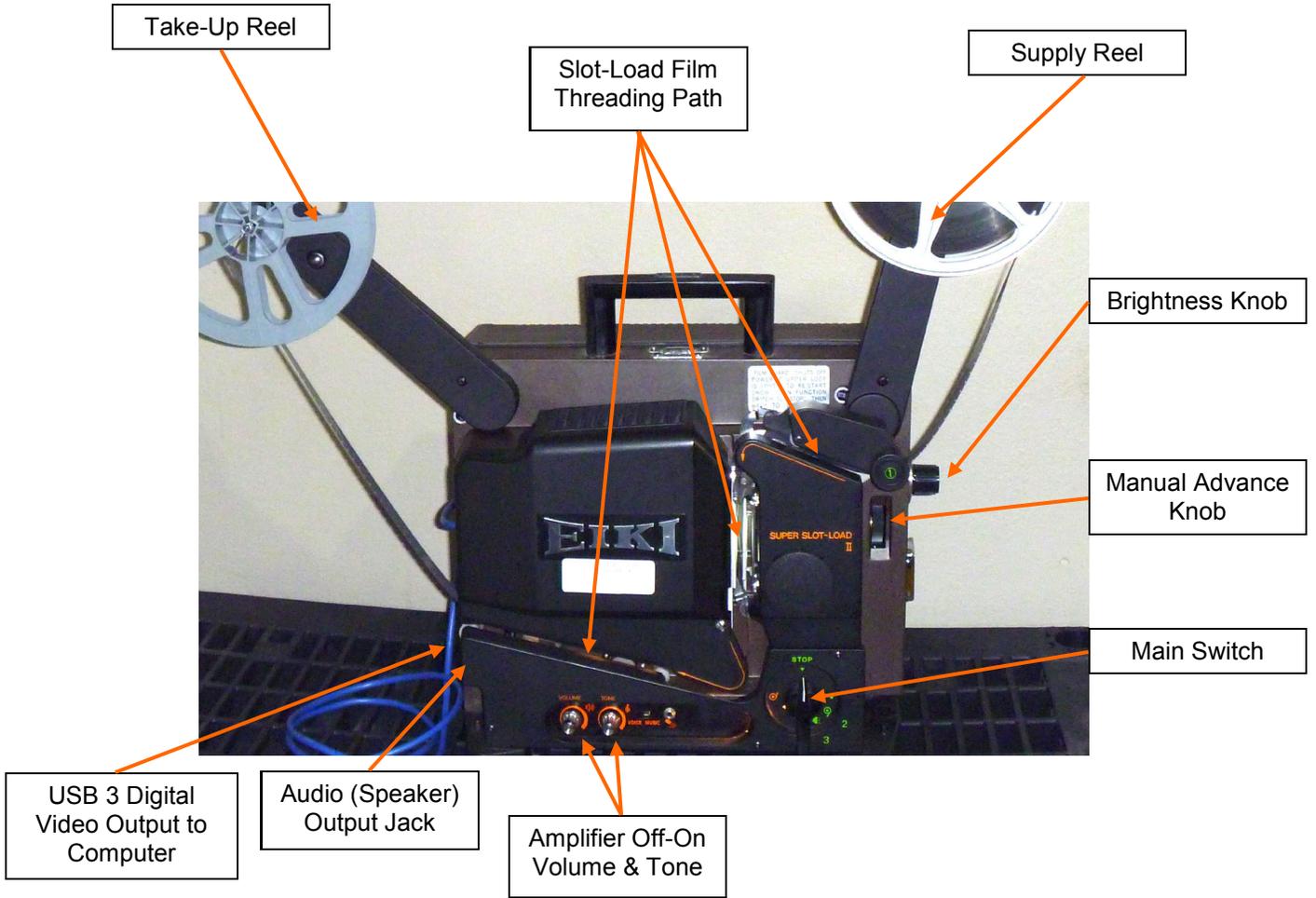
## Suggested Sources of Supplies

<http://www.urbanskifilm.com>

## TVT-16PHD E—View Inside Lamp Cover



TVT-16 PHD E TIS.pub rev 11-16-15



Original Focus and Framing controls and speaker have been eliminated, see text.

## Tobin Cinema Systems Inc.

<http://www.urbanskifilm.com>