

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

Cautionary Notes:

1. The motor is electronically switched and circuit failure could cause it to run prematurely. If working near potentially moving parts, first turn off the power with the rear switch.
2. The light emitter should not be looked at directly as it is small and can be very bright.

Basic Operation

NOTE: The TVT-16PHD 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.

Turn on the power with the switch on the right rear of the TVT. Ensure the Exposure knob is advanced somewhat, to illuminate the film.

Note: see page 7 for identification of the items on the unit.

Switch the unit to "Still" and note that there are no hairs or lint visible in the picture on the monitor. If there are any, open the film gate and brush or blow out the hairs. (If the screen is dark, rotate the Thread knob a partial turn clockwise to open the shutter.) Switch back to "Stop." 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 Sound Lamp switch off.

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.)

If the leading edge of the film has not yet been trimmed, use the Film Trimmer ② on the right side of the sound lamp cover. If it is excessively bent or curled, flatten it.

Push the Autoload lever ③ towards the right until it locks into position.

Start the TVT running Forward. Insert the film leader into the film channel ④ until it engages the sprocket.

After about 3 feet (1 m) of leader has passed completely through the mechanism, turn to Stop. **Pull** on the leading end of the leader until you hear a "click" and the Autoload lever ③ jumps back to its left position.

An empty takeup reel of the appropriate size must be installed on the Takeup reel spindle. A 200' (5" diameter) or smaller reel can be installed with the takeup arm horizontal. Larger reels, up to 2200' (15" diameter) capacity, must be installed with the takeup arm in the raised position.

Attach the film to the takeup reel, turning the reel clockwise a couple of turns.

If there is any doubt about proper threading, turn the Manual Advance knob counter-clockwise a few turns to ensure that the film advances intermittently through the film gate.

When running: Turn **Frame** Knob to hide the dividing line between film pictures.

If the film itself is badly shrunken compared to the film leader, it may thread excessively tight around the Sound Drum, causing the film perforations to audibly complain. If this happens, stop, open the lower film sprocket shoe, manually slacken the film by one perforation, then close the sprocket shoe.

Note that the **camera** is continuously triggered by the TVT at the selected frame rate, usually 18 or 24 FPS (frames per second.) This is so you can see the image on the computer monitor and make any needed



adjustments to exposure, framing, etc. The actual recording is started and stopped with the radio buttons on the computer screen. The exposure level is set manually with the Brightness knob, modified by the camera's gain and shutter speed settings. Color balance can be manual or automatic, controlled by the computer software.

Switch to "Reverse" and run until the picture is all back on the supply reel and there is about 1 foot (.3m) of leader film between the supply reel and the film gate, then switch to "Stop." Push the "Reset" button to zero the footage counter. Note that in Reverse the image may have frame blending or some flicker, depending on camera settings; this is normal as the shutter is correctly synchronized only in Forward.

NOTE: You have a choice of running speeds, either 9, 18 and 24 FPS (frames per second). The 24 speed is marked Sound, the 18 speed is marked Silent, and there is a third position to the left of Silent for 9 FPS which is not marked. If you select a faster speed than the camera and computer can support, you may experience skipped, black or flickering frames in the file. Also be sure the program is set for Triggered mode, and not Free Run. In most cases we think you will be using 18 or 24 FPS with the standard resolution 1024 x 768 camera. At 24 FPS you can digitize up to 1080 feet per file.

With a higher resolution 1600 x 1200 camera you may be able to digitize successfully at 9 or 12 FPS. If you have specified the higher resolution camera, we will install a Speed Range switch marked 100% and 50%. In this case you will use the 50% range for digitizing the picture at 9 or 12 FPS, and the 100% range switched to Sound for copying the sound separately at 24 FPS. At 12 FPS you can digitize up to 540 feet per file.

Audio reproduction: It will be advantageous to reproduce the audio separately at normal 24 FPS sound speed, if the picture is being digitized at 18 FPS or less, as better fidelity is possible because of the then higher inertia of the sound drum flywheel. Then match up the picture and 24 FPS audio with the time or rate corrected on the computer. A separate recorder or pass is required to digitize the audio, using another program.

Note that the final running time of the file will not be affected by the running speed of the film when transferring, as one frame of film will still result in one frame of video file. Film that was photographed originally at say 16 or 24 FPS will still be 16p 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 click on the Start button to start recording. (While recording, a Stop button will appear.) Switch the TVT-8 to "Forward" and you will now be recording the film on the computer.

The film should be inspected, repaired, cleaned and lubricated before it comes to you for transfer. In case a bad splice or multiple damaged perforations causes loss of the lower film loop, this will cause a chattering noise and the picture will start jumping, this should be corrected right away with the automatic Loop Restorer. If this doesn't work, manually push the System Restorer arm. Failing that, turn to "Stop" and also stop the computer recording. Turn the Thread Knob until the claw retracts, and you can slide the film up or down in the gate. You can also open one or both sprocket shoes to restore the loops. Then resume the transfer.

At the end of the film, switch to "Stop" and stop recording. Write down the film length count for billing purposes, if your company charges by the foot or meter. Attach the end of the film straight across to the supply reel, without going through the sprockets and gate, and turn the reel a couple of turns counter-clockwise. Switch to Reverse and then push down the Rewind button. When the film is fully rewound 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 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.

Important note on lubrication:

Some film types are not lubricated in processing and will give an unsteady image and noisy running until lubricated. This includes the current Ektachrome 100D films as well as some private brand films made by other manufacturers. 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-16 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.) Turning on the unit will cause the footage counter to light up. The machines can be used with any line (mains) voltage, 100 to 240 volts.

Connect the USB 2.0 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" to RCA phono cable to connect 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 Sound Lamp is turned on.

If you have ordered the optional Balanced Audio output, this is through a 1/4" 3-conductor TRS (Tip Ring Sleeve) jack. This accepts the same type connector as used for stereo headphones. Tip is +, Ring is — and Sleeve is Ground. If there is an XLR connector instead, pin 2 is +, pin 3 is — and pin 1 is ground.

Computer Requirements

You must have a fast computer to keep up with the high data rate and demanding processing needs of the camera. It is suggested to have an Intel Core 2 Dual processor, with 2 GB of RAM, and an AGP 128 Mb video card. Suitable operating systems include Windows XP SP3, Windows Vista SP2, or Windows 7. It must have at least one USB 2.0 socket, and for connection use a high grade USB2.0 cable; generally a short and "fat" cable (rather than a small diameter long one) will be lower loss and the most suitable.

Software Installation

The included disc is used to install the Sensor Technologies viewing and recording software on your Windows computer. Follow the instructions in the 88-page manual, which is included on the supplied disc under file name `sofm_USB_en_v1.10.pdf` or can be downloaded from http://www.sentechamerica.com/content/files_docs/sofm_USB_en_v1.10.pdf. The software itself is included on the disc with file name `StCamSWARE (v3.02)` or a ZIP version can be downloaded from [http://www.sentechamerica.com/content/files_software/StCamSWARE\(v3.02\).zip](http://www.sentechamerica.com/content/files_software/StCamSWARE(v3.02).zip). Use the X86 version for 32-bit Windows or X64 version for 64 bit Windows. Do not connect the camera for the first time until the software is installed. You may need to separately install the Driver software with an XP computer. With some Intel i3, i5 and i7 processor computers you may need to revise the power saving settings as described on page 5 of the supplied disc's 26 page specifications manual under file name

spec_STC-MC_MB_en_v1.02.pdf or which can be downloaded from http://www.sentechamerica.com/content/files_docs/spec_STC-MC_MB_en_v1.02.pdf. Additional drivers and foreign language manuals can be downloaded from Sentech.

You will also need editing and “burning” software for making a DVD or Blu-Ray disc.

Mandatory Camera Settings

Following are the initial settings that **must** be programmed into your computer for proper operation of the camera. Otherwise you will get flickering or skipped frames and other problems. Later you can experiment with different Gamma, AGC, Shutter and other settings. The settings only need to be entered once and then Saved; after that they will be loaded automatically when you start the program with this camera connected.

Option; Settings; then click on Advanced tab at bottom of screen.

If access is forbidden, under Help enter password of: sentechcamera

Gain/Shutter

ALC Mode: for fully automatic exposure select Auto Shutter On/AGC On

Later you can experiment with other settings

Target Brightness: 74

Later you can experiment with other settings

Weight: You can choose equal exposure weighting of all picture regions as supplied

Later you can experiment with other settings

Brightness Tolerance: 5

Brightness Threshold: 5

AGC Range: 0 to 255 initially to be sure to see an image

Later you can experiment with other settings; *note*:

A lower number will reduce the maximum video noise level

Shutter Range: No upper limit

Lower limit 1/50 or 1/60 second; *note*:

If the computer has trouble keeping up, and there is enough light available, increase the lower limit to say 1/250 which will give the computer extra time to finish the calculations for each frame

Digital Gain: 64 normally

Later you can experiment with other settings; *note*:

A higher number will lighten the picture while perhaps coarsening gradation

White Balance

Full Auto to begin with

You can also pick Push To Set when no film is in the gate for a neutral balance, or to help the color when badly off-color film is present

Manual is not recommended without instrumentation to judge its effect

Y (Luminance)

Gamma Mode: On

Setting 180

Later you can experiment with other settings; *Note*:

If the computer has trouble keeping up, and Gamma can be corrected later in editing, then you can record now with Gamma Off instead. Screen image will look harsh and dark until corrected in editing. *Note*:

Reverse will invert brightness values for experiments with negative film.

Sharpness Mode: Off

Later you can experiment with other settings

Color

Hue/Saturation Mode: On

Saturation setting 150 or according to film appearance

Later you can experiment with other settings

Hue: 0

Later you can experiment with other settings

Color Matrix: No Change

Color Gamma

No changes

Later you can experiment with other settings

Trigger

Trigger: On

Trigger Source: Hardware

Trigger Mode: Edge Preset

Soft Trigger: not used

Soft Sub Trigger: not used

Auto Sub Trigger: not used

Readout Source: not used

Noise reduction: not used

Exposure End Signal: Disable

Exposure Readout: Immediate

Exposure HD: Immediate

I/O (Input/Output)

IO0: Input

Trigger Input 10

Polarity Negative

IO1, IO2, IO3 not used

Exposure Delay 0

Strobe Start Delay 30

Strobe End Delay 0

Output Pulse Delay 0

Output Pulse Duration 32

Readout Delay 0

Other

Scan Mode Normal

Can select Partial or Variable Partial to crop off top and bottom of image, and possibly record at a higher FPS setting

Clock Speed Normal

If computer is slow, can select 1/2 and also reduce the running speed of the TVT

Still Image Picture Format BGR24

Color Interpolation Bilinear

Mirror Mode Off

Can be changed if running film incorrectly oriented

Rotation Normal

Display Mode GDI

When all data is entered, click “Save” tab to remember the settings for next time. Then, when you start the program you will immediately be able to see the picture.

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.

Other Information

The TVT has a “Mechanism Hours” timer to measure how long the main drive motor and the mechanism have been running. This only advances in the Forward and Reverse modes. The count is remembered without need for batteries when the unit is turned off.

Routine service:

The Bell & Howell Autoload 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 Sound Lamp switch, it must be replaced with another same type lamp. The replacement is with another ANSI code **BAK** lamp, 4 volt .75 amp C-6 filament, SC prefocus base with Krypton gas fill to extend its life. We have a large quantity in stock of this lamp. In a pinch you can substitute the **BRS** lamp which will not last as long as it is an older vacuum type version. (Do not confuse the BAK lamp with the BRK lamp as its filament is oriented the wrong way and will give muffled and distorted sound.) For replacement:

Turn the power off. Loosen the thumb screw holding the lamp cover in place. Pull the cover straight out and note the alignment pins. Swing the lamp lock lever counter-clockwise to release the lamp, and rotate the lamp so it will lift off.

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. Turn it clockwise to the stop. Rotate the lock lever clockwise to clamp the lamp in position. Replace the cover.

Service adjustments:

- Focus, centering and magnification are factory set and locked in place, and should not be disturbed.
- In case of odd symptoms, first check the output voltage of the regulated switching power supply modules. These should be 5, 12 and 24 volts DC, $\pm 5\%$. The voltage should change little no matter what settings are made to the operating controls. The 24 volt supply may sag momentarily while the drive motor starts running.
- Note that the camera actually receives DC power from the computer through the USB 2.0 cable, not from the TVT power supplies. It is continuously triggered at divided crystal frequencies of 9, 18 or 24 Hz when the TVT is turned on. When the TVT is running, the mechanism is phase-locked to that same signal.
- 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.

Suggested Sources of Supplies

16mm 400' and larger reels and cans in bulk quantity:

Taylorreel Corp. www.taylorreel.com 770-503-1612

16mm Kodak White Movie Leader, single perf (one edge) for sound film: in 1000' rolls: # 821 0445

16mm Kodak White Movie Leader, double perf (both edges) for silent film: in 1000' rolls: # 800 1901

Standard order quantity of each is 7 1000 foot rolls on cores, for use with split (come-apart) reel.*

Kodak Professional Film Cement 16 oz: #195 6176, 1 gallon: #195 6150, both plus \$20 hazardous shipping fee.

Kodak ordering toll-free number: 1-800-621-3456 (1-800-621-FILM)

* If this is too much, several retail sources will sell you a single roll.

Kodak Presstapes are now sold by Urbanski Film, (708) 460-9082 <http://www.presstapes.com>

Other suppliers may have editing equipment and sometimes have leader. Some kinds of leader cannot be cement spliced. Ask before buying.

Christy's (equipment, leader, reels in small quantity) 800-468-6391

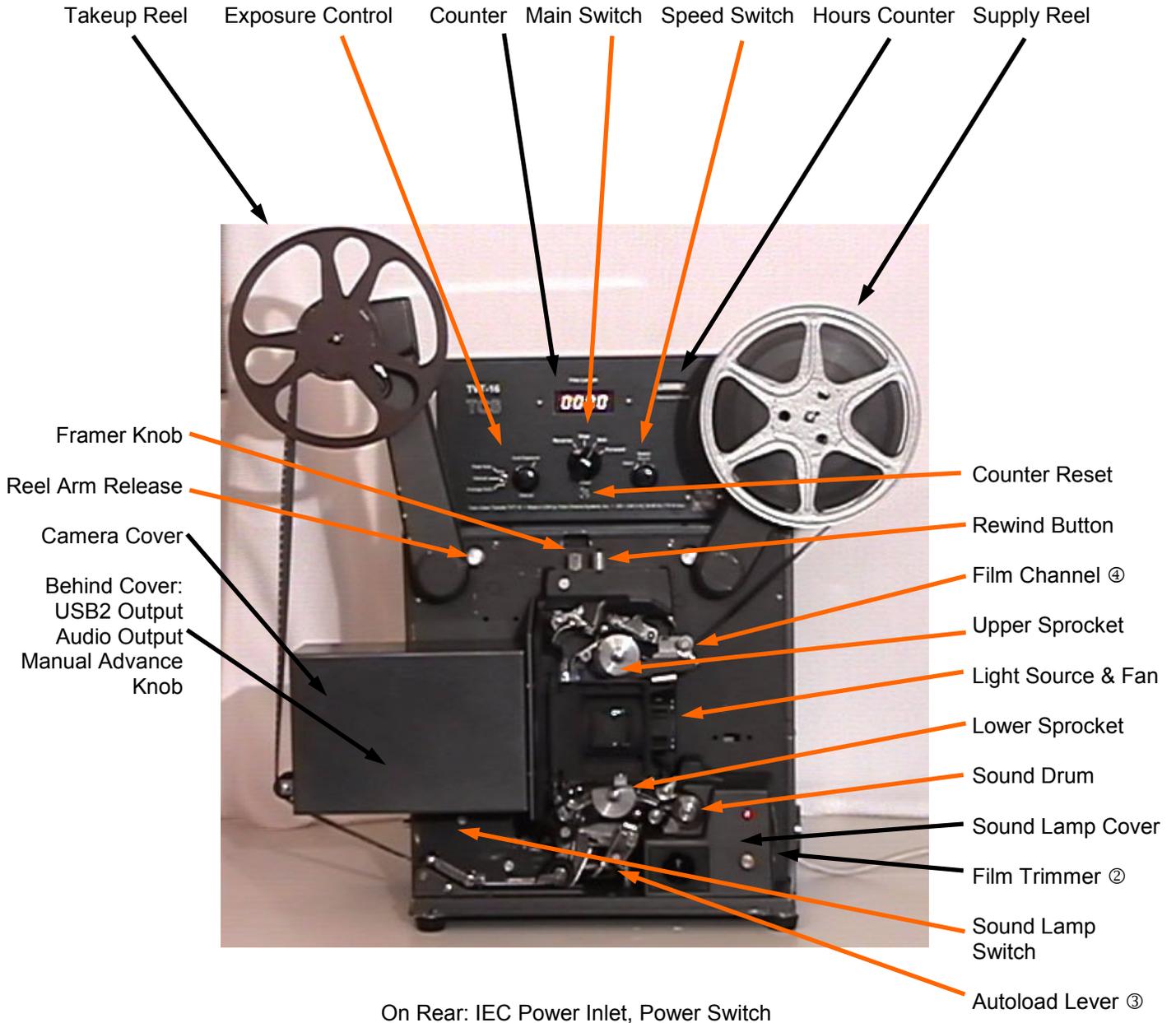
Neumade (manufacturer of rewinds, leader) 203-270-1100

MPE (equipment, leader, reels in small quantity) 212-245-0969

Starex (leader) 201-997-1555

FCA (leader) 818-845-7651

ECCO once made a film cleaning device that is mounted between a pair of rewinds. These are sold by several dealers. Film cleaning fluid is made by several companies or else you can use Freon TF, 99+% isopropyl alcohol, etc. with a small amount of wax dissolved in it for lubrication. TCS might manufacture a similar device in future.



Tobin Cinema Systems, Inc.
<http://www.TobinCinemaSystems.com>