# TASCAM

*TASCAM Series 40 tape machines draw on TEAC's broad experience in storage technology: MR-30 7-channel portable cassette data recorder, SR-70 21-channel 1/2" reel-to-reel data recorder, MT-1000 1/2" digital memory system, XR-50 14-channel portable data recorder, FD-30A 3" 250 kilobyte compact floppy disk drive and FD-55 5-1/4" 1.6 megabyte mini floppy disk drive.*

## TASCAM SERIES 40—Built by a World Leader in Information Storage Technology

TASCAM is the professional products division of TEAC Corporation (Tokyo Electro-Acoustic Company), founded in 1956. In the early 1970s, when 8-track recording was in its infancy, TASCAM built the first affordable multitrack tape machines and mixing consoles (most of which are still in use). Today's modern TASCAM mixers, recorders, signal processors and accessories enjoy an enviable reputation for reliability and value.

In addition to TASCAM professional audio products and TEAC consumer audio products, we make and sell a number of specialized products under the TEAC label: multichannel precision instrumentation recorders, ultra-reliable airborne video recorders (which have been used for pilot training and the Space Shuttle program), and computer data storage including cassette drives, high density floppy disk drives, winchester hard disk drives, and a new DRAW (direct read after write) optical disk system that can store gigabytes in the space of yesterday's megabytes. Over the past 3 decades, as TEAC and TASCAM have grown steadily, our goals have always remained in sharp focus; our products are ultimately concerned with the accurate recording and reproduction of sound, pictures or data. So, when you compare the Series 40 to similar tape machines, there is no real competition.

- Industry standard 2, 4 and 8 track formats
- Balanced +4 dBm and unbalanced −10 dBV, compatible with all professional equipment
- 24 dB of headroom ensures low distortion and allows more leeway in mix levels
- Sync playback response equal to repro response saves time by allowing critical judgments during recording
- Capstan drives the back of the tape, eliminating tape scuffing & dropouts
- Full servo system, including capstan and reel motors, for faster and more precise control of tape motion
- All servo adjustments accessible from front panel
- Manual and Dump Edit for fast and convenient editing, and a splicing block in front of the heads where it belongs
- A custom microprocessor ensures rapid yet gentle tape handling in all modes
- Out-of-the-carton, plug-in compatibility with all leading (SMPTE) controller/synchronizers; no extras to buy
- Exceptionally low crosstalk means no wasted "guard band" track needed to isolate SMPTE time code
- Multiple power supplies prevent heat build-up for longer service life
- Premium components and exceptionally stable circuit design contribute to superb long-term stability
- Heavy duty chassis construction and motors explain why Series 40 machines weigh as much as a third more than other brands

## Compatible with All Modern Systems and Studio Standards

To interface with either balanced or unbalanced systems, Series 40 machines have two types of input and output connections: electronically balanced XLR connectors that operate at +4 dBm nominal level (+28 dBm maximum) and unbalanced RCA jacks that operate at −10 dBV (+18 dBV maximum). Thus, they are plug-in compatible with all modern, professional systems.

Series 40 VU meters are calibrated so that 0 VU equals the nominal level, −10 dBV or +4 dBm, corresponding to the industry standard reference flux levels on tape. That means that tapes made on these



*Balanced and unbalanced connectors for compatibility with all professional systems.*

machines are interchangeable with those made on all other manufacturers' equipment.

## Plenty of Headroom to Avoid Distortion and Noise

Headroom is the "space" between the maximum level (above which distortion occurs) and the nominal or average signal level at a given point. Since the maximum level at the XLR's is +28 dBm and the nominal level is +4 dBm, the headroom is 24 dB. With a maximum of +18 dBV and a nominal of −10 dBV, the RCA outputs have 28 dB headroom. This is ample to ensure that a sharp transient will not drive the circuitry into clipping, which generates distortion. Tape machines with less headroom often tempt operators to mix at lower levels to avoid clipping, but that places the average signal closer to the noise... an unacceptable trade-off in our opinion. Because Series 40 machines are designed with more "forgiving" of incorrect mixing levels

without sacrificing signal-to-noise ratio.

XLR INPUT OR OUTPUT

$$\begin{array}{r} +28 \text{ dBm maximum} \\ -) \quad + \ 4 \text{ dBm nominal} \\ \hline 24 \text{ dB headroom} \end{array}$$

RCA INPUT OR OUTPUT

$$\begin{array}{r} +18 \text{ dBV maximum} \\ -) \quad -10 \text{ dBV nominal} \\ \hline 28 \text{ dB headroom} \end{array}$$
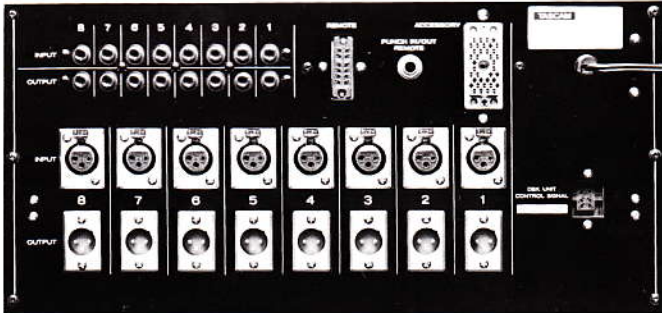
## Multi-Output Bipolar Power Supply for Quiet Reliability

There are some dozen different voltages for powering the Series 40 reel motors, the capstan motor, the solenoids, the servo logic, the audio amplifiers and the lights. Audio, control and motor signals are not only shielded to prevent interaction, they are fed from separate power supply outputs. This internal power isolation is one of the reasons why Series 40 machines are quiet, yet there are other benefits to multiple supplies.

Since heat is the enemy of electronic components, we use dual voltages to minimize heat build-up and eliminate premature ageing.

Series 40 solenoids are fed two different supply voltages: +24 volts when first activated, then +12 volts. The higher voltage ensures positive engagement, while the lower voltage keeps them engaged with minimum heating. Again, separate 12 and 24 volt outputs drive the reel motors; the higher voltage provides the needed torque for quickly reaching the target speed, while the lower voltage maintains speed with minimal heating. Elsewhere in the machines, dual voltages serve another purpose. A bipolar +15 volt supply for the audio circuitry allows the use of complementary push-pull amplifiers that minimize distortion and provide excellent headroom.

Because the capstan motor doesn't "share" the reel motor supply, changes in tape pack or reel size cannot load down the capstan supply, preventing unwanted fluctuation in the record/play speed. Another way we avoid interaction is by using a 5 volt supply for logic and a separate 6 volt supply for the lamps, rather than one supply for both. We also include a sensor circuit that automatically places the transport in STOP mode if the AC mains voltage is momentarily interrupted, preventing tape spillage or accidental erasure. The same sensor circuit briefly mutes the audio output when power is turned off or on to prevent clicks and pops from reaching the output.
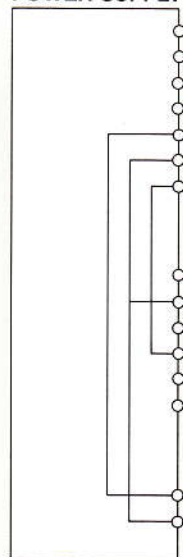
| POWER SUPPLY | | AMPLIFIER |
|---|---|---|
| +15 V | | Rec/Repro Amp, Bias OSC |
| −15 V | | |
| +20 V | | Balanced Amp. |
| −20 V | | |
| +24 V | | Relay |
| +15 V | | Amp, Control, Function LED |
| +6 V | | VU Lamp |
| | | **TRANSPORT/CONTROL** |
| +24 V (UR)/+12 V (UR) | | Reel Motor (L, R) |
| +15 V | | Reel Servo, LED |
| +5 V | | Transport Control |
| +6 V | | Reset, Power Mute |
| AC 6 V | | |
| +24 V (UR)/+12 V (UR) | | Solenoid (Pinch Roller, Brake, Lifter) |
| | | **CAPSTAN MOTOR** |
| +24 V | | Capstan Motor |
| +15 V | | Capstan Servo, Sync Interface, Speed SW (Pitch Control), LED |

*Ground circuit not included.
*Unregulated +24 V (UR) and +12 V (UR) power supplies are switchable.

# THREE MOTOR SERVO CONTROL FOR FLAWLESS TAPE HANDLING

### A Full Servo System that Includes the Capstan Motor and the Reel Motors

While some so-called "servo" transports (those with a "hi-fi" design approach) place only the capstan motor under servo control, the Series 40 "servo loop" includes everything: the reel motors, capstan motor, tape tension control, and digital tape counter. This makes it possible to maintain ideal tape tension, reduce stretch and tape wear, and improve positional accuracy. A custom programmed microprocessor continuously monitors the reel and capstan motor speeds, and compares them to an internal crystal, a variable speed control circuit or an external reference (as from a SMPTE-based controller). If necessary, the servo instantaneously adjusts motor supply voltages to maintain the exact speed. Because the same microprocessor that governs the servo system is responsible for all commands, whether from the front panel, the remote controller, or a controller/synchronizer, tape is always handled gently regardless of the command sequence.

In SMPTE (Society of Motion Picture and Television Engineers) time code based editing systems, the Series 40's fully servoed capability is extremely valuable: no more runaways, hunting for time code or excessive delays while the motors fight SMPTE controller signals. With the reel motors under servo control, you don't have to hand cue the audio transport just to get a rapid "lock and run".

Because it relies upon a quartz crystal to govern motor speed, and metal-glazed trimmers that don't drift with environmental variations, the Series 40 servo system is very stable. Of course, any electronic circuit may require adjustment from time to time, so we've made it easy to get to the trimmers. By removing two screws and lifting the splicing block from the front of the transport, you gain immediate access to the tension servo adjustments. If the transport is rack or console mounted, it can be adjusted in place.
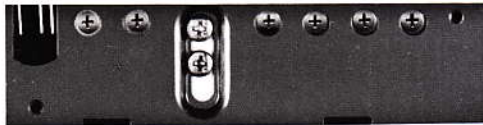


*Servo adjustment trimmers are located under the splicing block for easy access and fast maintenance.*
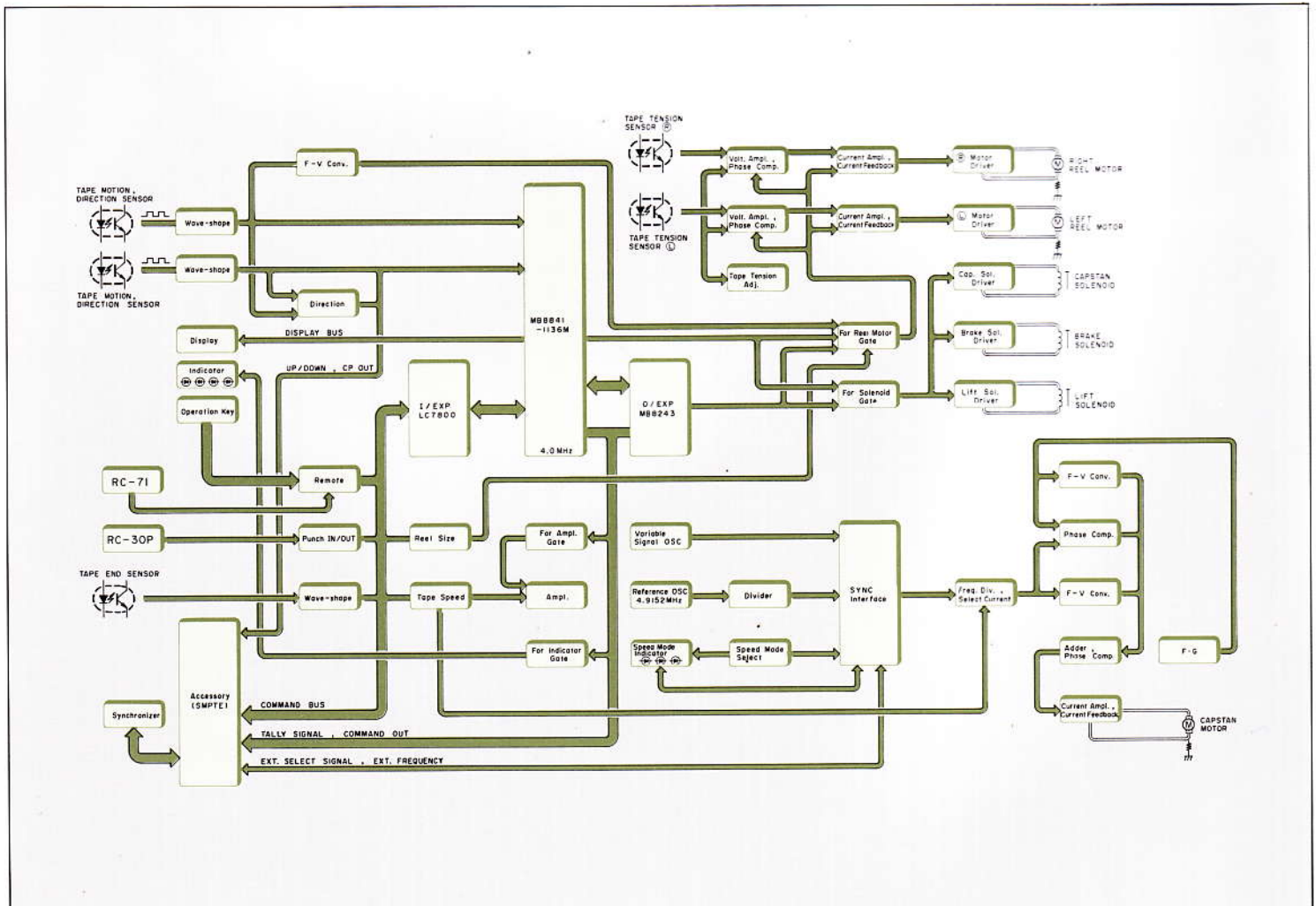


*Microprocessor-controlled servo system ensures optimum transport performance.*

### A Highly Effective, Non-Magnetic Capstan/Pinch Roller System

One of the most critical areas of any tape transport is the means by which tape speed is controlled in the record and play modes. Sophisticated servo systems, such as the one used in the Series 40, are a major step in the right direction. Direct drive capstan motors, like those used in the Series 40, are also a big plus. However, no amount of sophistication in the servos or motors can overcome problems in the mechanical parts that actually drive the tape: the capstan and pinch roller. That's why we pay special attention to the drive system in Series 40 transports.
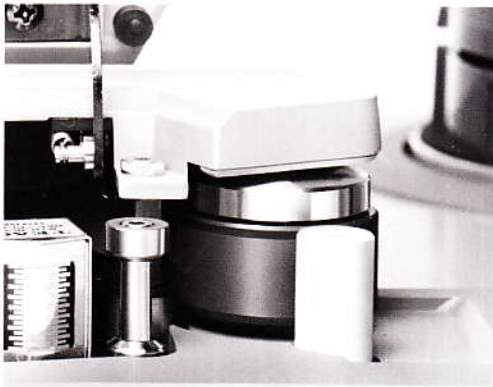


*Pinch roller and non-magnetic ceramic capstan shaft drive tape on backing side eliminating dropouts.*

The capstan must be perfectly round in order to assure smooth tape motion. Its surface must be able to "grip" the tape (to avoid slippage), yet must be smooth enough that it does not abrade the tape. We have used a special ceramic capstan to achieve these characteristics. It is exceptionally hard so it will not be polished over the years as it pulls miles of abrasive tape. An added benefit is that the capstan cannot become magnetized so there is less danger of degraded tapes and the time spent doing preventive maintenance (demagnetizing) is further reduced.

To further protect the tape itself, we designed the transport so the capstan drives the back of the tape and the pinch roller rides on the front. This "mirror image" of conventional front-driven designs totally eliminates oxide scuffing, which eliminates a major cause of dropouts in front-driven designs. Since the capstan is

attached to the capstan motor shaft, with no pulleys or drive belts to cause "wobble", it remains in perfect, stable alignment.
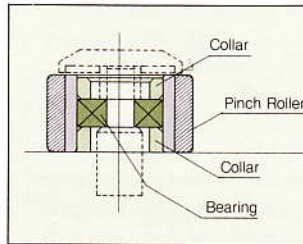


With the capstan portion of the drive system "idealized", we turned our attention to the other half... the pinch roller. The typical pinch roller is constructed with ball bearings at each end. As the normal "play" in such bearings increases, or as transport parts shift and deform slightly, the conventional pinch roller can move out-of-alignment with respect to the capstan. In the Series 40 we constructed the pinch roller with a single heavy duty bearing located in the geometric center. This design automatically forces the pinch roller to ride parallel to the capstan, ensuring proper alignment at all times so pressure will be evenly distributed and tape will not tend to skew.

### A Professional Transport that Saves Time and Effort

This TASCAM transport is optimized for its job because we're not restricted to a single technology or a single approach. To meet a target performance level and price range, we build audio tape recorders utilizing many different designs. Take the capstan motor and capstan, for example; some of our machines have a synchronous motor, belt-coupled to the capstan. Others, like these Series 40 machines, utilize a servo-controlled DC direct drive capstan motor. TASCAM transports also utilize a variety of tape paths from the traditional "zig-zag" around tension arms and guide rollers, to the "omega" drive of the Series 50, to the nearly straight path of these Series 40 machines. (Some of our instrumentation recorders even utilize an "isoloop" path—which we felt was not suitable for the rapid shuttling required of an audio recorder built to be used in SMPTE-interlocked applications.)

Series 40's near-straight tape path simplifies threading and reduces

strain on the tape. With TASCAM's "systems approach" to electro-mechanical design, you'll enjoy tape motion and editing that is not only fast and accurate, it's smooth and gentle. This precision is obvious when Search-to-Zero actually parks tape at zero without "chasing" back and forth. A second search function (Search-to-Cue) remembers the actual tape position so resetting counter zero doesn't destroy the cue. In fact, so you can keep track of the program at all times, the tape counter displays positive or negative "real time" (a major convenience for back-timing cues and editing). These benefits are made possible by the Series 40's advanced microprocessor control of all transport functions.

The Series 40 transport, with its full servo system, provides a wide range of tape speed control. Normal play/record speed can be fixed via an internal crystal, externally controlled, or adjusted over a full ±12% range with the Pitch control. To avoid the uneven pack of high speed winding, yet save considerable time over "playing out" a tape at the end of a session, the transports have a rapid spooling mode. Spooling "splits the difference" by winding tape forward or reverse at about 5 times normal play/record speed and provides tight, uniform tape packs.

Tape path stability is further enhanced because all parts are machined to precise tolerances. We utilize proportional, non-contacting servo sensors which avoid friction and offer greater accuracy than purely mechanical sensors. As part of our "systems approach" to design, we make certain that the type of motors used complement the type of control circuit. For example, in our Series 50 transports, we use direct drive high-mass outer rotor capstan motors in conjunction with FG (Frequency Generator) servo control. In the Series 40, we utilize low mass DC direct drive capstan motors, which are the optimum design for use with the PLL (phase locked loop) control circuitry. A pair of slotless DC reel motors provides controlled record/play tension and reliable fast winding without generating stray 60 Hz fields that might contribute to audio noise.

# SINGLE CONNECTOR COMPATIBILITY WITH TIME CODE-BASED SYSTEMS

## Fully Compatible with Leading SMPTE Editors, Controllers and Synchronizers

- Rear panel "accessory" connector provides all the logic/control inputs and outputs necessary for plug-in compatibility with modern SMPTE equipment

- Tachometer output for accurate control during fast wind without the problems of older wideband amplifier systems

- Reel motors, as well as capstan motor, in servo loop for faster and more positive "lock up" regardless of offset

- Low crosstalk means you don't need a "guard band" between SMPTE code track and audio tracks

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*A simplified explanation of SMPTE control systems*

*SMPTE time code (a digital representation of hours, minutes, seconds and film or video frames) is recorded on one track. A SMPTE controller or synchronizer is fed the audio output from that track and it "reads" code while the tape is moving at or near normal record/play speed. The controller or synchronizer thereby detects the exact tape position and, via the Series 40's Accessory connector and similar connectors on other equipment, it commands the tape machines' capstan and reel motors so that "lock up" between the video tape recorders or film chains and the audio tape recorder(s) can be maintained.*

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SMPTE time code-based operation is essential when doing audio production for video or film. It provides accurate editing control for purely audio applications. Series 40's rear panel accessory connector offers plug-in compatibility with most SMPTE controllers and synchronizers. You don't have to add "cost extra" options to our machines to gain this compatibility. Full SMPTE capability is standard, allowing for simple interface with those systems made by Adams Smith, Audio Kinetics, BTX, CMX, Convergence, Fernseh, ISC, United Media, Videomedia, and many others.

In the past, in order to ascertain tape position during fast winding, audio tape machines were fitted with wideband amplifiers and the tape lifters were defeated so tape rested against the heads at all times. This greatly accelerated head and tape wear. Modern technology has made it unnecessary to modify the Series 40 for reading the time code during fast winding. Instead, Series 40 machines output a tachometer signal whose frequency is interpreted by modern SMPTE controller/synchronizer equipment, which counts Tach pulses so it "knows" the approximate tape position without reading code. Then, after tape slows down and contacts the heads, SMPTE code is again read to ensure precise cueing. As a result, Series 40 gives faster access and more accurate positioning with much lower maintenance costs (less head cleaning and far less frequent head replacement).

Some tape machines that claim SMPTE compatibility have servo controlled capstan motors so they can maintain "lock up" in record or play mode. However, their reel motors are not part of the servo system. The controller/synchronizer therefore has to "learn" the approximate acceleration, winding and deceleration characteristics of the audio tape machine in order to "guess" at the next cue point. This can waste a lot of time "hunting" for a cue. The Series 40 avoids this wasted time because the reel motors are also under servo control, so the SMPTE controller/synchronizer can "tell" the transport to go directly from one point to the next with a high degree of accuracy.

Many professional tape machines have so much crosstalk at high frequencies that SMPTE time code "leaks" into program on an adjacent track; the typical solution is to "skip" a track, creating a guard band. A major benefit offered by TASCAM's careful head and electronics design is low crosstalk. With Series 40 you don't have to waste a track to keep SMPTE time code out of the program if you record it at −7 to −10 VU.

## Reliable Electronics with Long-Term Stability

Series 40 transports use a master bias oscillator to prevent the "beating" that can occur with independent oscillators. Because each channel has an independent bias amplifier which is slaved to the master oscillator, stable levels and quiet punch in/out operation are assured.

The record and play electronics for each channel are mounted on one circuit card. These cards plug into a common mother board for maximum reliability and ease of service. The EQ, bias and level calibration trimmers are clearly labeled, provide a wide range of control, and don't require that you use a mirror to see the VU meters while you make an adjustment—which is an infrequent occurence. Because Series 40's multiple power supply design generates less internal heat to cause component ageing, and because all trimmers are metal glazed for electro-mechanical stability, about the only time you'll need to trim the alignment is when you change to a new batch of tape.

The illuminated meters have true VU ballistics so you can see average levels, and they also have PEAK LEDs in the meter face, where they belong. The LEDs detect brief, high level transients that are too fast for a VU meter. Independent adjustments allow you to set the LEDs' threshold of activation for whatever headroom you wish. You'll never have to guess when you're in danger of tape saturation from percussive or other sounds with a high crest factor (peak-to-average ratio).
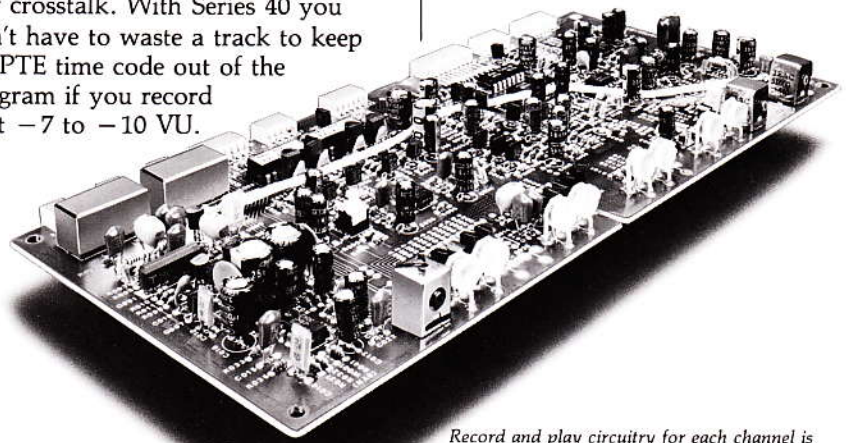
*Record and play circuitry for each channel is mounted on one rugged, glass-epoxy circuit board.*

### Better Heads

In TASCAM recorders, we always use the right part for the job, including the heads themselves. Because we build our own, we can custom tailor the magnetic and physical properties of the heads to precisely suit the application—whether it's a 1/2" 40-track thin film data recorder head, a 1" 16-track audio head, or a 1/2" 2-track audio head. There's more to head performance than the head itself.
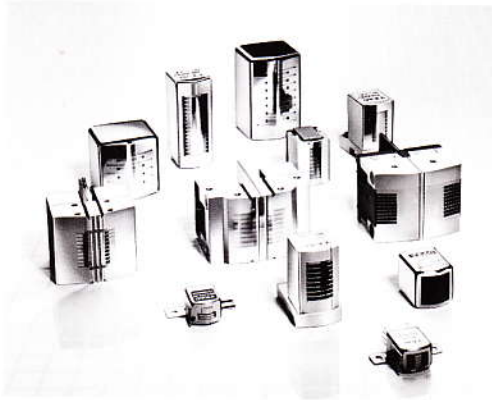


*We build hundreds of custom heads, for digital and analog instrumentation and audio applications.*

### Precision Mounted Heads for More Stable Performance

Machines built with a "Hi-Fi" approach "hang" the heads from a top plate, and hold them in place with springs and screws. This method of assembly is used because it permits loose manufacturing tolerances to be "adjusted out" after assembly. The problem with using springs is that changes in ambient temperature can affect head alignment. The Series 40 machines rely upon a more costly, higher quality construction technique. The heads are manufactured to strict tolerances and fastened to a solid, precision machined base plate. This
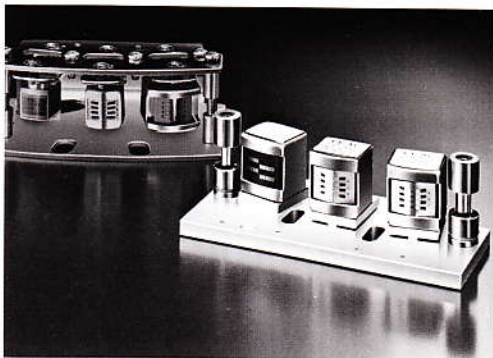


*Series 40 heads are mounted on a solid base plate for perfect alignment unlike the "hi-fi" approach.*

complete assembly is checked for correct alignment at the factory, and thereafter the Series 40 heads remain in perfect alignment. There are no spring-loaded screws to work themselves loose, and tapes made this year will play back perfectly next year without the need for azimuth, zenith or other mechanical adjustments.

### Sync Response Equal to Repro Response

On Series 40 machines, the Sync playback response (from the record/sync head) is equal to the Repro response (from the repro head). This means that, during overdubbing and inserts, your mixing and performance values are not "colored" by a missing top end, as is the case with some machines. You'll never have to switch tracks out of sync to the repro head to check the quality of a transfer. Instead, you'll enjoy consistent results throughout all phases of production. In fact, it now becomes technically feasible to make real-time "direct" transfers between tracks in sync mode... something previously impractical due to unacceptable signal degradation.
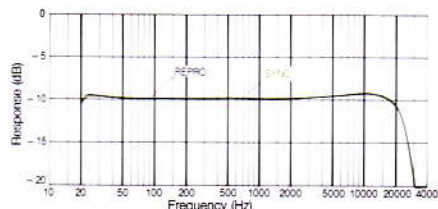


*Sync response is equal to reproduce response.*

This excellent sync performance is made possible because we have total control over everything that goes into these tape machines. We build the heads with narrower gaps to extend high frequency response. Then we match the heads' "Q" and impedance to suit the record amps and the FET differential playback preamps so noise does not increase. This matched design establishes flat record/play response to 22 kHz, and also maintains an excellent signal-to noise ratio with low distortion.

Sync playback response from the record head is so good you don't even have to switch to the repro head for mixdown. The repro head is there primarily so you can check record/play response in real time, and can verify record azimuth alignment.

### Easy Operation Even for a Single Operator

Series 40 machines are built for fast, easy operation. LEDs signal the status of all selected transport and electronics functions so you know at a glance what is happening. We mounted a precision splicing block immediately below the head stack where it belongs, so whether making splices or editing you get the job done quickly. And because we understand creative instincts, night schedules and tight budgets, we built Series 40 so that a separate engineer is not strictly necessary. Installation is simple, and a single operator can handle the machine. There's even a jack for an optional foot switch so you can punch in or out of record mode when you're not able to punch buttons on the front panel.

### Delivered with Complete Documentation

At TASCAM, we think you DESERVE TO KNOW not only how your tape machine operates, but also all the other details you want to know. Every Series 40 machine is delivered with a complete manual covering not only operation, but all aspects of maintenance. We know that if you're doing serious work with a tape machine, you need it working RIGHT NOW. That's why, in addition to thorough instructions, we provide complete service information in the manual—parts lists, alignment and calibration instructions, assembly drawings and large, clear schematic drawings. If your TASCAM dealer isn't available to help you at 3am, your own technician will have the information to do the job. You won't find better documentation with any tape machine at any price, and this is included at no extra cost.
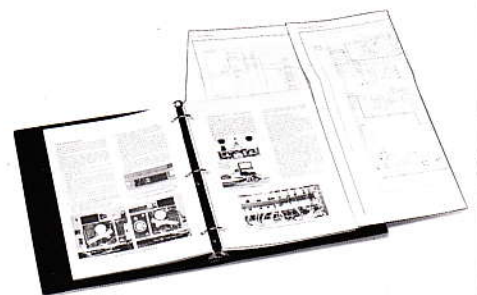


*TASCAM provides complete documentation with each machine.*

# THE 48—IDEAL AUDIO FORMAT FOR FILM AND VIDEO PRODUCTION

### The Preferred Multitrack Production Format

The TASCAM 48 is a high quality 8-track 1/2" recorder/reproducer designed for audio and video production work where flexibility, reliability and synchronized operation are primary requirements. The 48 operates at 15 ips with industry standard IEC equalization, and can be set for flux reference levels of 250 or 320 nanoWebers per meter. This compact, solidly built machine is the natural successor to our famous 80-8 (most of which are still in use after nearly a decade). However, the 48 includes improved audio electronics and a microprocessor controlled servo system which, among other benefits, permits single plug compatibility with popular SMPTE-based controller/synchronizer systems. It is ideal for building multi-track master tapes through conventional overdub and insert techniques, although all 8 tracks may be recorded at once in live situations.

### Programmable Recording and Monitoring Functions

Controls and functions are provided for just about any production requirement you're likely to encounter. You get independent, user-programmable track control; each track has its own Function selector (Ready/Safe) and Input/Sync selector that help you rehearse overdubs or make inserts with exactly the right signal in the monitors.

## Maximum Creativity

One track may be used as playback during production, to provide cues for the actors or musicians while recording their performances on the remaining tracks. Isolated feeds of the individual elements will later enable maximum creativity in mixdown, since each source is under independent control. The accuracy of sprocketed film-style editing is duplicated by using time code to synchronize audio to videotaped action. And technology now exists to resolve film edge numbers to time code, so that the speed of video-styling editing is available to the producer who will release on film. Flexibility. Speed. Accuracy. These are the bywords of the TASCAM 48.

For the "simulcast" production, or for any application where the final product must contain high quality audio material, consider the 48 in place of multiple mono or two-track recorders. One piece of equipment to set up, maintain, and control during the shoot. Original rather than transferred multitrack material, ready for immediate mixdown. In sweetening, remix, or predub, isolated track recording provides unlimited creative flexibility.

| 1 Guide (production) Track |
|---|
| 2 Dialogue one |
| 3 Dialogue two |
| 4 Dialogue three |
| 5 Ambience |
| 6 Effects one |
| 7 Effects two |
| 8 Time Code with User Bits |

*One approach to track layout during production recording*

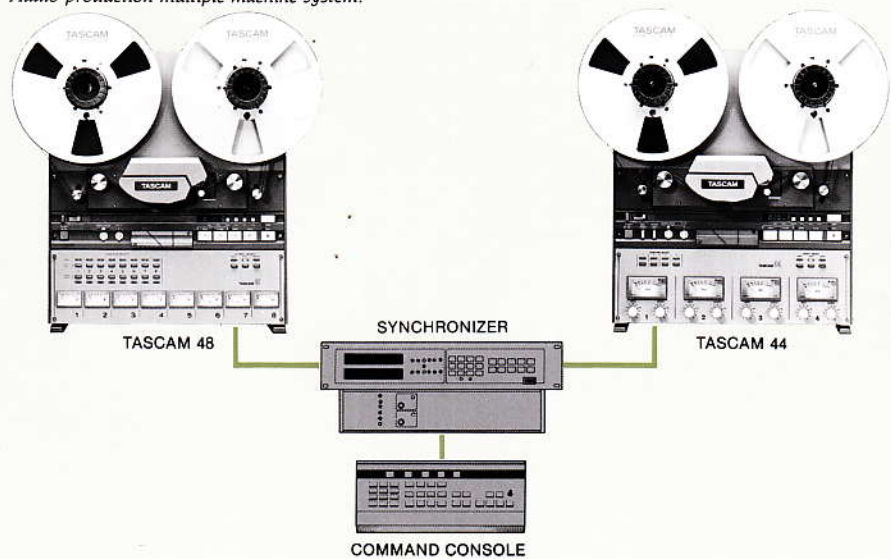| 1 Narration—English |
|---|
| 2 Music—Left |
| 3 Music—Right |
| 4 Effects |
| 5 Ambience |
| 6 Narration—Spanish |
| 7 Narration—French |
| 8 Time Code with User Bits |

*Possible track layout for eventual multilingual release*

| Pin # | IN (put)—OUT (put) signals | | Function |
|---|---|---|---|
| A | PLAY | IN | Inputs PLAY signal at L level. |
| B | FF | IN | Inputs FF signal at L level. |
| C | REW | IN | Inputs REW signal at L level. |
| D | open terminal | | |
| E | STOP | IN | Inputs STOP signal at L level. |
| F | REC | IN | Inputs REC signal at L level. |
| H | LIFTER CONT | IN | Inputs LIFTER shift cancellation signal at L level. |
| J | open terminal | | |
| K | UP/DOWN | OUT | Outputs tape running control signal at H or L level. |
| L | CP | OUT | Outputs open-collector signal (12 Hz pulse at 15 ips.) |
| M | PLAY TALLY | OUT | Outputs open-collector signal (LOW level during PLAY mode.) |
| N | FF TALLY | OUT | Outputs open-collector signal (LOW level during FF mode.) |
| P | REW TALLY | OUT | Outputs open-collector signal (LOW level during REW mode.) |
| R | STOP TALLY | OUT | Outputs open-collector signal (LOW level during STOP mode.) |
| S | REC TALLY | OUT | outputs open-collector signal (LOW level during record mode.) |
| T | SHUT-OFF TALLY | OUT | Outputs open-collector signal (LOW level during tape stop) |
| U | RESET SW | IN | Inputs electronic counter reset signal at low level. |
| V | open terminal | | |
| W | REW COMMAND | OUT | Outputs open-collector signal (Low level when REW is pressed) |
| X | FF COMMAND | OUT | Outputs open-collector signal (Low level when F. FWD is pressed) |
| Y | PLAY COMMAND | OUT | Outputs open-collector signal (Low level when PLAY is pressed) |
| Z | STOP COMMAND | OUT | Outputs open-collector signal (Low level when STOP is pressed) |
| AA | REC COMMAND | OUT | Outputs open-collector signal (Low level when REC is pressed) |
| BB | | | |
| CC | | | |
| DD | | | |
| EE | open terminal | | |
| FF | | | |
| HH | | | |
| JJ | | | |
| KK | EXT FREQ | IN (HOT) | Inputs speed control signal at input signal level of 2.0 V or more. (HOT side) |
| LL | EXT FREQ IN (COLD) | | Inputs speed control signal (COLD side) |
| MM | INT/EXT | IN | Inputs internal/external speed control select signal Internal: LOW level (0 V) External: HIGH level (2.0 V or more) |
| NN | open terminal | | |
| PP | +15 V supply OUT voltage | | Maximum: 50 mA |
| RR | 0 V terminal | | |
| SS | +5 V supply OUT voltage | | Maximum: 50 mA |
| TT | Main unit GND | | |


*Post production system for audio editing and sweetening.*

1" C-FORMAT VTR

3/4" U-MATIC VCR

SYNCHRONIZER

TASCAM 48
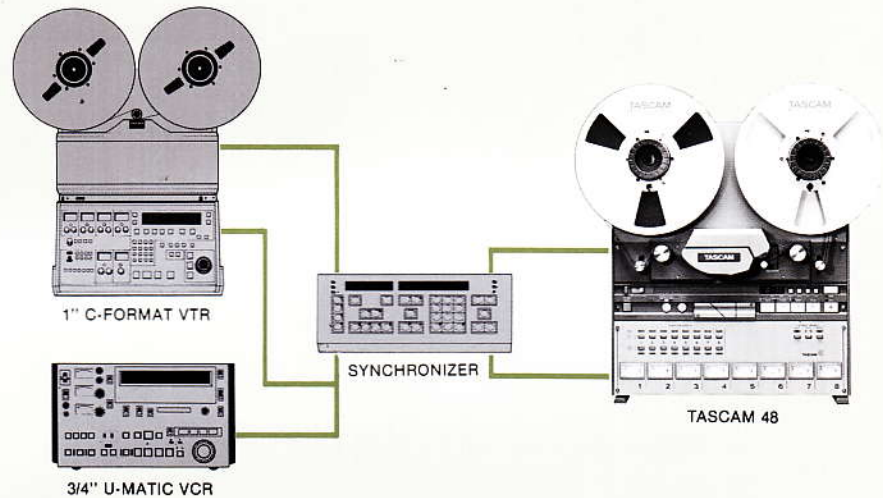

*Audio production multiple machine system.*

TASCAM 48

SYNCHRONIZER

TASCAM 44

COMMAND CONSOLE

# THE 42 AND 44 —
# IDEAL FOR MASTERING
# AND EDITING

## Two Common Tape Track Configurations for Mastering

It used to be that "mastering" meant mixing down a multitrack tape to mono or stereo. Today, mastering does not necessarily imply the use of a mono or 2-track recorder. Different formats are used for various applications, and we make a Series 40 machine to meet your needs.

The TASCAM 42 is a 2-track 1/4" recorder/reproducer that operates at 7-1/2 or 15 ips with NAB or IEC equalization. It accomodates 7 or 10-1/2 inch tape reels, and can be calibrated so the 0 VU reference level is 250 or 320 nanoWebers per meter. This machine's track format has long been a studio standard for stereo mastering (recording the stereo mixdown from a multitrack tape). It is also useful for recording a mono program (such as an industrial film soundtrack) plus a SMPTE time code track. Unlike the other Series 40 models, the 42 includes a pair of microphone inputs so it may be used for field recording of a stereo program without external mixer or mic preamplifiers.

The TASCAM 44 is a 4-track 1/4" recorder/reproducer which is similar to the 42, minus the mic inputs. This 4-track format is rapidly gaining popularity for video and multi-image mastering.

## Monaural Audio for Video

The 42 offers all of the performance you need for stereo recording, with an extra advantage for video production. Since time code may be recorded at −7 to −10 VU on either track without leaking onto the adjacent program track, editing can be performed accurately and consistently, with a frame-accurate reference to the video material. The result is highest possible audio quality, because only the final edited version of the sound

track is transfered to the videotape master.

## Stereo Audio for Video and Multi-Image

Video technology has advanced to include hi-fidelity stereo reproduction from videotape. Your audio post-production capability must keep pace. The 44 allows you to mix down to a stereo master, while retaining time code on a third track. Time code enables the precise positioning of the audio material against the visual, and means that you can take full advantage of the sophistication of today's computerized editing controllers. Again, editing time is cut significantly with the elimination of the trial and error method of locating in-and out-points. In multi-image work, two of the tracks can be used for a master stereo program (or separate narration and music tracks); the third track can be used for automation equipment cues, and the fourth track for SMPTE time code. Alternately, two tracks can be used for stereo program, a third for a mono mix of the stereo program, and the fourth track for time code or cue control.

## Using a Sync Track

Unless you have the proper synchronizing equipment to use time code to control machine speed, it may not be possible to synchronize audio to video without the presence of a sync track on the audio tape. The 44 permits recording a sync track (whether it's a 59.94 Hz video sync signal or a 60 Hz pilot tone) without sacrificing either stereo or time code. With the video playback locked to the same signal frequency, editing and mastering efficiency is uncompromised.

## Specialized Applications

For specialized application such as the requirement for two languages, or the need to edit dialogue after the master has been recorded, the 44 provides a fourth useable track. No longer do you need to build two versions of the audio master. Imagine what the flexibility of multi-track capability can mean to you in terms of time and money saved in post-production.

| 1 Mono Audio |
| 2 Time Code with User Bits |

*Audio with Time Code*

| 1 Audio—Left |
| 2 Audio—Right |
| 3 |
| 4 Time Code with User Bits |

*Stereo Audio with Time Code*

| 1 Audio—Left |
| 2 Audio—Right |
| 3 Sync (59.94 Hz or 60 Hz) or Cue Track |
| 4 Time Code with User Bits |

*Stereo Audio and Sync or Cue Track with Time Code*

| 1 Music—Left |
| 2 Music—Right |
| 3 Dialogue |
| 4 Time Code with User Bits |

*Stereo Audio and Separate Dialogue Track with Time Code*

## Nobody Builds More Models of Professional Tape Machines

With TASCAM, you have a clear choice. We let you buy what you need, but don't force you to buy more than you need. For example, our Series 50 machines have a 60 Hz tach (2 pulses per frame or 1 pulse per field) as well as the same 12 Hz output found in Series 40. Series 50 may be the logical choice if you're in a production environment that requires very high resolution at very slow speeds (for "creep" and "crawl") where the higher resolution tachometer is necessary. In keeping with that application, Series 50 is also built to withstand hours of high-speed shuttling over the same portion of tape for automatic dialogue replacement ("looping") and similar tasks. If you're not involved in that kind of 24-hour super heavy-duty work, why pay for more machine than you need? Series 40 recorder/reproducers combine advanced features, SMPTE capability, and top notch performance. Take a hard look at Series 40—the machines that set new standards for performance and value in audio and video production.

# SERIES 40 SPECIFICATIONS

## MECHANICAL CHARACTERISTICS

| | | |
|---|---|---|
| **Tape:** | 48: | 1/2 inch, 1.5 mil |
| | 44/42: | 1/4 inch, 1.5 mil |
| **Track Format:** | 48: | 8-track, 8-channel, 1.0mm |
| | 44: | 4-track, 4-channel, 0.91mm |
| | 42: | 2-track, 2-channel, NAB; 2.0mm, DIN; 2.7mm |
| **Reel Size (max.):** | 44/42: | 10-1/2", NAB, EIA |
| | 48: | 10-1/2", NAB |
| **Tape Speed:** | 48: | 15 ips (38 cm/s) |
| | 44/42: | 15 ips (38 cm/s), 7-1/2 ips (19 cm/s) |
| **Speed Accuracy[1]:** | | ± 0.2% deviation |
| **Pitch Control:** | | ± 12% |

**Wow and Flutter[1]**

| | |
|---|---|
| **15 ips:** | 0.05% (NAB weighted) |
| | 0.07% (NAB unweighted) |
| | ± 0.08% peak (DIN/IEC/ANSI weighted) |
| | ± 0.12% peak (DIN/IEC/ANSI unweighted) |
| **7-1/2 ips:** | 0.06% (NAB weighted) |
| | 0.08% (NAB unweighted) |
| | ± 0.09% peak (DIN/IEC/ANSI weighted) |
| | ± 0.14% peak (DIN/IEC/ANSI unweighted) |

| | | |
|---|---|---|
| **Fast Wind Time:** | | 120 seconds for 10-1/2" reel, 2,400 feet |
| **Spooling Wind Time:** | | 370 seconds for 10-1/2" reel, 2,400 feet |
| **Start Time:** | | Less than 0.8 sec. to reach standard Wow and Flutter |
| **Capstan Motor:** | | PLL (Phase Locked Loop) DC direct drive motor |
| **Reel Motors:** | | Slotless DC motor × 2 |
| **Head Configuration:** | | 3-heads; erase, record/sync and reproduce |
| **Tape Cue:** | | Manual and automatic (RTZ and STC) |
| **Dimensions (W × H × D):** | | 17 × 19-7/8 × 12-7/16 inch (432 × 505 × 315.5mm) |
| **Weight (net):** | 48: | 81-9/16 lbs. (37 kg) |
| | 44: | 74-15/16 lbs. (34 kg) |
| | 42: | 70-9/16 lbs. (32 kg) |

## ELECTRICAL CHARACTERISTICS

**Mic Input (42 only)**

| | |
|---|---|
| **Input impedance:** | 1.2 k ohms, balanced |
| **Applicable Mic Impedance:** | 150 ohms or more |
| **Minimum Input Level:** | −72 dBm (0.195 mV) |
| **Maximum Input Level:** | −20 dBm (77.5 mV) |

| **Line Input** | Balanced | Unbalanced |
|---|---|---|
| **Input Impedance:** | 10 k ohms | 50 k ohms |
| **Maximum Source Impedance:** | 2 k ohms | 10 k ohms |
| **Nominal Input Level:** | +4 dBm (1.23 V) | −10 dBV (0.3 V) |
| **Maximum Input Level:** | +28 dBm (19.5 V) | +18 dBV (8.0 V) |

| **Line Output** | Balanced | Unbalanced |
|---|---|---|
| **Output Impedance:** | 20 ohms | 60 ohms |
| **Minimum Load Impedance:** | 200 ohms | 600 ohms |
| **Nominal Load Impedance:** | 600 ohms | 10 k ohms |
| **Nominal Output Level:** | +4 dBm (1.23 V) | −10 dBV (0.3 V) |
| **Maximum Output Level:** | +28 dBm (19.5 V) | +18 dBV (8.0 V) |

| | |
|---|---|
| **Bias Frequency:** | 150 kHz |
| **Equalization:** | 48: IEC (CCIR); ∞ + 35μsec. |
| | 44: NAB; 3,180 + 50μsec. at 15 & 7-1/2 ips |
| | 42: NAB; 3,180 + 50μsec. at 15 & 7-1/2 ips |
| | IEC (CCIR); ∞ + 35μsec. at 15 ips, |
| | ∞ + 70μsec. at 7-1/2 ips |

| | | |
|---|---|---|
| **Record Level Calibration:** | 48/44: | 250 nWb/m tape flux level |
| **(0 VU reference)** | 42: | 250 nWb/m tape flux level |
| | | 320 nWb/m tape flux level |

**Power Requirements**

| | |
|---|---|
| **USA/CANADA:** | 120 V AC, 60 Hz |
| **EUROPE:** | 220 V AC, 50 Hz |
| **UK/AUSTRALLIA:** | 240 V AC, 50 Hz |
| **GENERAL EXPORT:** | 100/120/220/240 V AC, 50/60 Hz |

| | | |
|---|---|---|
| **Power Consumptions:** | 48: | 140 W |
| | 44: | 90 W |
| | 42: | 80 W |

## TYPICAL PERFORMANCE

**Frequency Response**

**Record/Reproduce[3]:**

| | | |
|---|---|---|
| **15 ips** | 48/44: | 40 Hz—20 kHz, ± 3 dB at 0 VU |
| | | 40 Hz—22 kHz, ± 2 dB at −10 VU |
| | 42: | 30 Hz—22 kHz, ± 3 dB at 0 VU |
| | | 30 Hz—24 kHz, ± 2 dB at −10 VU |
| **7-1/2 ips** | 44: | 40 Hz—16 kHz, ± 2 dB at 0 VU |
| | | 40 Hz—20 kHz, ± 2 dB at −10 VU |
| | 42: | 30 Hz—16 kHz, ± 2 dB at 0 VU |
| | | 30 Hz—20 kHz, ± 2 dB at −10 VU |

**Sync Reproduce[2]:**

| | | |
|---|---|---|
| **15 ips** | 48/44: | 40 Hz—22 kHz, ± 2 dB |
| | 42: | 30 Hz—22 kHz, ± 2 dB |
| **7-1/2 ips** | 44: | 40 Hz—20 kHz, ± 2 dB |
| | 42: | 30 Hz—20 kHz, ± 2 dB |

| | |
|---|---|
| **Total Harmonic Distortion[3]:** | 0.8% at 0 VU, 1,000 Hz, 250 nWb/m |
| | 3% at 13 dB above 0 VU, 1,000 Hz, 1,120 nWb/m |

**Signal-to-Noise Ratio[3]:**
**(Reference 3% THD at 1kHz)**

| | | |
|---|---|---|
| **15 ips** | 48/44: | 69 dB A weighted (NAB) |
| | | 62 dB unweighted (0—100 kHz) |
| | 42: | 70 dB A weighted (NAB) |
| | | 62 dB unweighted (0—100 kHz) |
| **7-1/2 ips** | 44: | 67 dB A weighted (NAB) |
| | | 60 dB unweighted (0—100 kHz) |
| | 42: | 68 dB A weighted (NAB) |
| | | 60 dB unweighted (0—100 kHz) |

| | |
|---|---|
| **Adjacent Channel Crosstalk[3]:** | Better than 55 dB down at 1,000 Hz, 0 VU |
| **Erasure[3]:** | Better than 70 dB at 1,000 Hz, +10 VU |
| **Recording Amplifier Headroom:** | Better than 28 dB above 0 VU at 1,000 Hz |

*Specifications were determined using TEAC Test Tape:
44/42 (1) YTT-2004 (15 ips)/YTT-2003 (7-1/2 ips)
　　　(2) YTT-1004 (15 ips)/YTT-1003 (7-1/2 ips), NAB
　　　　　YTT-1044 (15 ips)/YTT-10432 (7-1/2 ips), IEC
　　　(3) YTT-8063
48　　(1) STL-62 (2) YTT-1144SP (3) YTT-8163

*In these specifications: 0 dBV is referenced to 1.0 Volts rms; 0 dBm is referenced to 0.775 Volts rms.
*Changes in specifications and features may be made without notice or obligation.

## SERIES 40 OPTIONS

\*Remote Transport Control Unit RC-71
\*Remote Punch In/Out Footswitch RC-30P
\*19 inch EIA Standard Console CS-607B
\*Rack Mount Kit RM-501
\*dbx Unit DX-4D (4-channel) DX-2D (2-channel)

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