SONY®

SERVICE MANUAL

AV-3620CE

VIDEOCORDER

SONY CORPORATION

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SECTION 1
GENERAL DESCRIPTION

1-1. INTRODUCTION

This manual provides service information for the SONY AV-3620CE Videocorder. It does not include information pertaining to special equipment applications, nor does it include instructions for performing factory-type repairs.

1-2. SPECIFICATIONS

Type CCIR monochrome video tape recorder

Video Recording System

Recording system:	Rotary two-head slant-track scanning
Recording signal:	2 : 1 interlace composite video signal based on European TV standards using CCIR or industrial sync.
Modulation system:	Frequency modulation
Interchangeability:	Recordings made on all AV-3620CE Videocorders are interchangeable.

Operating Characteristics

Tape:	1/2 inch (12.7 mm) width on 7-inch reel maximum.
Tape speed:	16.32 cm per second.
Recording time:	60 minutes (continuous) using SONY V-62 tape 30 minutes (continuous) using SONY V-61 tape
Rewind time:	Within 7 minutes for a full 7-inch reel
Operating position:	Horizontal only

Video Characteristics

Input:	0.5 to 2 V (p-p), sync negative, 75 ohms unbalanced, internally terminated
Camera input:	0.5 to 2 V (p-p), sync negative, 75 ohms unbalanced, internally terminated, for SONY AVC series cameras (CCIR).
Output:	1.0 V (p-p), sync negative, for a 75-ohm load, unbalanced.
Resolution:	Greater than 300 lines
Signal-to-noise ratio:	Greater than 40 dB

Audio Characteristics

Microphone input:	−65 dB, 600 ohms, unbalanced
TV input:	−20 dB, high impedance, unbalanced
Auxiliary input:	−0 dB, high impedance, unbalanced
Line output:	0 dB, 10 k ohms, unbalanced
Frequency range:	80 to 10,000 Hz
Signal-to-noise ratio:	Greater than 40 dB
Flutter and wow:	Less than 0.2% wrms

Camera Control Signal

V D :	50 Hz, negative pulse, 2 V (p-p, with 75 ohm load), unbalanced

General

Semiconductors:	7 IC s, 60 transistors (including 4 FETs) and 26 diodes
Power requirements:	240 V ac (±10%), 50 Hz (±0.5%)
Power consumption:	95 watts
Ambient temperature:	0°C to 40°C
Dimensions:	400 mm (W) x 233 mm (H) x 335 mm (D)
Weight:	16.5 kg

1-3. OPERATING INSTRUCTIONS

PRECAUTIONS

1. To prevent accidental damage or [illegible] the video heads, observe the following.
   a. Do not operate the motor (Function Lever in FAST FORWARD, PAUSE, FORWARD, or REWIND position) unless tape is threaded properly on the machine.
   b. Never attempt to thread the tape while the motor is running.
   c. At the end of record or playback operations, set the Function Lever to STOP.
   d. Avoid leaving the motor running for extended periods while the tape is stationary.
   e. Do not operate the Function Lever if the tape is slack anywhere in the tape path.
2. To prevent erasure of a prerecorded tape, do not put the VTR in the record mode while the prerecorded tape is on the machine. Tape erasure takes place when the RECORD button is down and the Function Lever is in the FORWARD position.

Preliminary Setup

1. Press the POWER button. The pilot lamp will light.
2. Set the Tape Counter to 000 by pressing the reset button at the right of the counter.
3. Set the CAMERA/LINE/TV Selector according to the input signal.

Record Mode

1. To put the VTR into the "E-to-E" mode, press the red RECORD button down until it locks in the "down" position. The red RECORD indicator button will light.
2. To start the recording, hold the RECORD button down while moving the Function Lever to FORWARD. This locks the RECORD button down in the record position. The automatic gain control system adjusts video and audio input levels automatically.
3. To stop the recording, move the Function Lever to the STOP position. The RECORD button is released and the VTR reverts to the playback mode.

Playback Mode

1. The VTR operates in the playback mode as long as the RECORD button is not depressed. Note that the monitor will display a snowy raster as the playback circuits have no input signals.
2. To play a prerecorded tape, set the Function Lever to FORWARD. The monitor will display the pictures previously recorded on the tape.
3. For stop-action, set the Function Lever to PAUSE. The tape transport will stop and the monitor will display a still picture.
4. To skip over a portion of tape, move the Function Lever to the FAST FORWARD position. The tape will advance rapidly. To resume normal playback, set the Function Lever to PAUSE and then to FORWARD. Tape will move again at the normal playing speed.
5. To stop the playback operation, set the Function Lever to STOP.

SKEW Control

Picture distortion in the upper part of the screen may be corrected by turning the SKEW control. This knob automatically returns to its center position when the RECORD button is pressed.

TRACKING Control

Noise in the picture due to improper tracking may be corrected by turning the TRACKING control. For normal playback, turn the knob fully counterclockwise to the FIX position.

Sound Dubbing

To insert (dub) new sound onto a prerecorded tape, proceed as follows.

1. Connect a microphone (or other audio source) to the VTR. Refer to Section 1-4 for audio input connection.

   Note: When a microphone is connected, the auxiliary input at the AUX. IN jack is disabled.

2. Set the CAMERA/LINE/TV selector to CAMERA or LINE.
3. Play back the prerecorded tape. When the portion on which the new sound is to be added is seen on the monitor screen, push the AUDIO DUB switch down. Sound dubbing will start.

4. At the end of the dub, set the Function Lever to STOP.

1-4. INPUT/OUTPUT CONNECTIONS

Figure 1-1 shows all input and output terminals, and output-signal characteristics. Normal connections to the monitor are made at 8-pin jack marked TV. Normal camera connections are made at the 6-pin CAMERA receptacle. Signal and power connections to other accessory equipment are as shown.

A. Power Cord Receptacle [AC IN 240V 50 Hz]. Connects to a three-wire (parallel-ground) ac receptacle.

B. Voltage Selector. Any of the four voltages can be selected; AC 110, 127, 220 and 240V.

C. TV-Monitor Jack [TV]. Provides all signal connections to and from the monitor. See detail.

D. Audio Out Jack [LINE OUT]. Provides an additional audio-output feed to supply playback monitors or other audio components. Signal level: 0 dB (0.775V) across high impedance. This jack is in parallel with pins 1 and 5 (5 grounded) of the TV jack.

E. Auxiliary Input Jack [AUX. IN]. Provides an alternative audio input for high impedance microphones, studio feeds, record players, and other audio sources. Signal level requirements: -20 dB across high impedance.

F. Microphone Input Jack [MIC IN]. Signal feed point for a SONY microphone or other microphone with similar characteristics. Signal level requirements: -60 dB, 600 ohms, single ended.

G. Camera Jack [CAMERA]. Provides video and sync connections to the camera. See detail.

H. UHF Input Connector [VIDEO OUT]. Provides video input connection for a camera or TV monitor equipped a video-output UHF connector.

I. UHF Output Connector [VIDEO IN]. Provides an additional video-output feed to supply a monitor having a video-input UHF connector.

J. RF Output Jack [RF OUT]. Supplies output to the antenna terminals of a conventional TV receiver when the RF unit is used.

K. RF Unit Compartment [RF UNIT]. The RF Unit (optional) is inserted into this compartment.

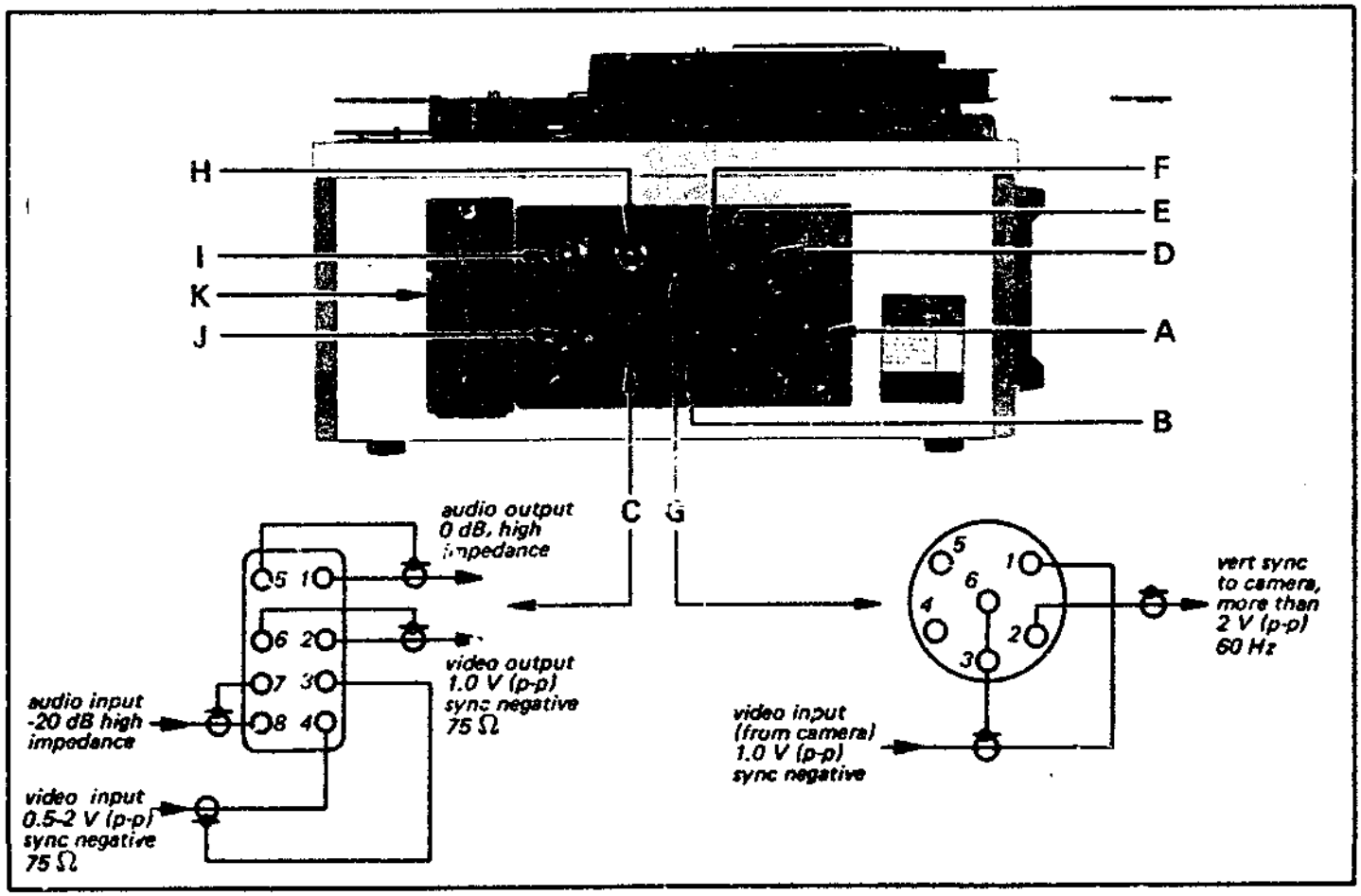


Fig. 1-1. Input/Output connections

SECTION 2

CIRCUIT DESCRIPTION

Refer to the block diagram on page 2-7 and the schematic diagram on page 9-15.

2-1. VIDEO CIRCUITS

Video information is recorded on the tape in the form of a frequency-modulated carrier. The video circuits on the V1 and V3 Boards process the video signal during record and playback operations.

In the record mode the video input is supplied to the V3 Board, where it is gain-controlled automatically, clamped, pre-emphasized, white-clipped, dark-clipped, fm modulated, and supplied to the record amplifier.

The video output signal from the record amplifier is supplied to the video heads through the slip rings and is recorded on the tape.

In the playback mode the recorded signals from the rotary heads are fed to the playback preamplifier on the V3 Board. The amplified video outputs are mixed together and these continuous fm signals are fed to the V1 Board.

The circuits located on the V1 Board include a limiter, differentiator, rectifier and demodulator. The video output from the V1 Board is a reproduction of the original video signal.

Video Input

PIN 4 of the TV (8-pin) jack for TV recording.
PIN 1 of the CAMERA (6-pin) jack for camera recording.
UHF connector for LINE (auxiliary) video input.

Video Amplifiers and AGC–Q101 to Q104

The incoming video signal is supplied to the first video amplifier Q202 through a pre-emphasis circuit consisting of R201 and C201. The input signal level for Q202 is controlled by AGC amplifier Q201 (FET), without manual video level control. Q202 and Q203 amplify the video signal and feed it to Q204. A sample of the video signal at the emitter of Q204 is fed to the peak detector consisting of C210, D201, and D202. The output of the rectifier is a positive dc voltage that is proportional to the peak white component of the video signal. This dc voltage controls the conduction of AGC amplifier Q201 and this controls the amount of input signal to Q202. R201 and C201 accomplish pre-emphasis so that the AGC circuit is effective for high frequency signals.

Low Pass Filter–L201, L202, C212

The low-pass filter rejects the video signals at the high end of the band, such as the 4.43 MHz color subcarrier and the 5.5 MHz audio i-f signal.

Deviation Setting and Clamp–Q205, R221, D203, R228

The output of the low pass filter is supplied to Q205 through R221.

R221 sets the video signal level to Q205 so that the following fm modulator produces an fm signal of 1.4 MHz deviation, from 3.8 MHz to 5.2 MHz. D203 clamps the sync tip of the composite video signal to the reference voltage picked off at the arm of R228. This reference voltage sets the sync tip (or no-signal) frequency of the fm modulator. R228 is set to establish the sync tip carrier frequency of 3.8 MHz.

Pre-emphasis and amplifiers–Q207, Q219, R231, R232, C217

The dc clamped video signal is applied through Q207 to the pre-emphasis circuit consisting of R231, R232, and C217 to improve the signal-to-noise ratio of the video information, and then to grounded-base amplifier Q219. Base-bias voltage for Q219 is supplied from the arm of R228.

White Clipper, Dark Clipper, and Mod. Driver–Q208, D204, R237, D205, R238

The pre-emphasized video signal contains overshoot in both the positive and negative directions. D204 limits the maximum positive signal (white peaks) of Q219 to the voltage picked off at the arm of R237. D205 clips negative spikes. Video from D204 is fed to the modulator through modulator driver Q208.

Modulator–Q209, Q210

The modulator is a free-running symmetrical multivibrator. Frequency control is achieved by returning both bases to the low-impedance source of modulating voltage–the emitter of Q208–through R241. Frequency varies from the tip-of-sync value of 3.8 MHz to a maximum 5.2 MHz for peak white signals. R248 and C251 are adjusted to obtain a symmetrical output waveform (equal pulse durations and slopes for each half cycle). Waveform symmetry is important as it determines the extent to which carrier

energy can be removed from the demodulated signal. The modulator output is approximately 0.5 V (p-p) at TP-204. The push-pull modulator output is converted to a single-ended feed by T201.

Record Amplifiers–Q212, Q213 and Q215, Q216

The fm signals from the modulator is applied to record amplifiers Q212, Q213 and Q215, Q216. Q212 and Q215 driver the video heads through driver transformer T202, 203. The record amplifiers operate in the Record mode only, as B+ is switched off in all other modes. R260, R269 adjusts the recording current applied to the video heads for optimum recording level. Video Heads A and B are connected in parallel to the secondary of transformer T202 and T203.

Video Heads

A slip-ring and brush assembly couples recording current to Video Heads A and B. The Video Heads supply signals during playback operations. The angle between the heads is 180°±20".

Playback Amplifiers–Q220, Q222, Q223, Q225

Outputs from the video heads are coupled through T204 and T205 (load ratio 1 : 1) to their respective playback amplifiers. The low-noise cascode amplifier Q220 (Q223, FETs) and Q222 (Q225) amplify the weak signals. A resonant circuit in the gate of Q220 (Q223), consisting of T204 (T205), R283 (R285), and C237 (C240), resonates with the reactance of the head and increases the output from the head at the resonant frequency to provide high frequency compensation for head-to-tape characteristics.

Switchers and Mixer–Q221, Q224, Q226

The Channel A switching transistor, Q221, is employed in the source of Q220. Similarly, Channel B employs switching transistor Q224 in the source of Q223. The states of Q221 and Q224 are always opposite. For example, when Q221 is saturated, Q224 is cut off by the opposite-phase rectangular switching pulses from FF401 (hybrid IC). When Q221 is ON, the source of Q220 is shorted to ground, so that Q220 can amplify rf signals. Output from Head A is amplified by Q220 and Q222, and routed to the following playback amplifiers during positive excursions of the switching waveform. While output of Video Head A is gated, the output of Video Head B is blocked from the playback amplifiers. This is done as follows:
When Q224 is cut off (Q221 ON), the cascode amplifier of Channel B can not amplify Head B output because of the high impedance (L204) in the source of Q223. The conditions described above are reversed with each 180 rotation of the head drum by the signals from two 30 PG coils mounted on the scanner (In practice, 25 PG coil B is positioned −15 degrees apart from 180 positioned CCW, the time interval corresponding to −15 difference is compensated by a monostable multi-vibrator module MM405 on Servo Board.). Thus, the output of each head is alternately coupled to Q226 and combined into a continuous rf signal without any noise. The timing relation of the switching pulses is shown in Fig. 2-1.

Equalizing amplifiers–Q227, Q228

The rf signal from Q226 is amplified by Q227 and fed to the limiters through Q228. The collector circuit of Q227 contains a resonant circuit consisting of R293, L205, and C249 which provides playback equalization. R293 and L205 set the resonant frequency to about 4.0 MHz for correct playback equalization.

Limiters–IC301

The limiter stages eliminate amplitude fluctuations caused by variations in head-to-tape contact. Limiting is accomplished by IC 301. R304 of IC 301 is adjusted for a correct operating point to produce a symmetrical limiter output waveform.

Demodulator–Q302, Q303, LPF

The input to the demodulator is differentiated by R310 and the primary winding of T301. The push-pull output of T301 is applied to a frequency doubler consisting of a pair of pulse detectors Q302 and Q303. They conduct on alternate half cycles to produce two positive output pulses per input cycle. Thus, carrier frequency is effectively doubled and placed outside the video passband. By integrating the pulse output in the low-pass filter that follows Q302, 303 a video output is obtained that is proportional to pulse frequency. R315 is set to balance the pulse output of the frequency doubler. R323 and C317 reduce high-frequency gain to provide de-emphasis.

Video Amplifiers–Q312 to Q315

Video output from the low-pass filter is amplified by Q312 and Q313 and then supplied to the video output stages (to Q314, Q315) R319 adjusts the video output level and is adjusted to provide 1.0 V (p-p) at the output terminals.

2-2. SERVO CIRCUITS

Basic principles of the servo and pulse system of the AV-3620CE are shown in Fig. 2-1.

The rotational speed and angular position of the heads are controlled by means of a magnetic-brake servo system. In this system the head table is belt-driven at a speed greater than 30 rps by a synchronous motor. The servo system controls a magnetic brake that slows the head table to precisely 30 rps.

Each video head begins to scan the tape about 10 H (horizontal lines) before the vertical sync interval (rf signal) supplied to the video head and ends its scan about 10 H after the next vertical sync interval.

During TV record operations, separated 50-Hz sync signals serve as the timing reference for the servo. The arrival of every other 50-Hz sync pulse is compared with a 25-Hz pulse generated by 25 PG coil B (the Rotary-Head Drum Assembly. See Fig. 2-1. The comparator system of the servo controls brake current to maintain the correct time reference between the sync pulse and the 25 PG pulses.

In playback, the recorded control track pulses serve as the reference for the servo system.

Sync Separator and Pulse Amplifier–Q402, Q403

A sample of composite video signal from Q104 on the V3 Board is fed to Q402. Sync is separated from the composite video signal by Q402, and horizontal sync pulses are removed by the following integrator circuit (R424 through R426, C412 through C414). The separated vertical sync pulse is amplified by Q403 and then triggers monostable multivibrator MM402. During playback, Q401 amplifies control pulses from the recorded tape.

Frequency Divider–MM402, R433

A negative sync pulse from Q403, coupled through D404, flips the monostable multivibrator MM402 (hybrid IC) into the unstable state. Pulse duration, determined by R433, is about 24 milliseconds, long enough for the circuit to ignore the next 50-Hz sync pulse. Thus the multivibrator runs at 25-Hz and is triggered by every other pulse. The 50-Hz sync pulse is fed to Pin 2 of MM402, and the divided 25-Hz pulse is obtained at the same Pin 2. Since the sync signal is referenced to the 25-Hz signal from 25-PG coil B, 50-Hz sync pulses must be halved.

Waveshaper–MM404, R441

During playback, the output from MM402 is supplied to monostable multivibrator MM404 via SW7-4 and D406, and triggers MM404 (hybrid IC). This multivibrator shapes the 25-Hz pulse from MM402 to form 25-Hz pulses with a 50% duty cycle so that a reference dc level may be obtained for the following gate circuit. R441 sets the duty cycle (pulse duration).

When the TRACKING control is ON (in playback) the output of MM403 triggers MM404.

Integrator and Gate–R446, C425, C427, Q405

The output from MM404 is integrated by R446 and C426 (or C427 in playback) to form the wave-shape shown at TP-410 of Fig. 2-1. The integrated pulse is fed to the gate circuit, Q405. The gate is turned on by the 25 PG pulse (from Q404) applied to its base. For the duration of 25 PG pulse, the integrated pulse applied to the emitter of Q405 is sampled and appears at the collector, and charges C432. Thus, the output of the gate is a function of the arrival time of the 25 PG pulse. The integrated pulse is gated on its leading edge by the 25 PG pulse as shown in TP-410 in Fig. 2-1. If the 25 PG pulse is early (servo too fast) the output of the gate is less. A late 25 PG pulse (servo too slow) results in greater output. During record the integrated 25-Hz pulse rises with a short time constant (R446 x C426) as shown by the solid line in TP-410 in Fig. 2-1. Therefore, a slight deviation of the 25 PG pulse from its stable position on the 25-Hz integrated pulse ramp causes a large variation in gate output for the servo. This results in quick servo response, and also minimizes the variation of control track signals recorded on the tape.

In playback, the integrated 25-Hz pulse rises with a faster time constant (R446 x C427) as shown by the dotted line in TP-410 in Fig. 2-1. A deviation of 25 PG pulses (from control track signals on the tape) on the ramp causes less of a variation in the gate output resulting in a slower servo response compared with that in record and absorbs control track signal deviations caused by wow and flutter.

25 PG Coils A and B

Two PG coils are mounted on the scanner (upper drum) 180° apart. 25 PG coil A is at the front of the scanner and 25 PG coil B at the rear. Both PG coils are connected between B + and ground through R401 and R402 respectively, and biased at about 2 V dc. Their fields are cut once per revolution by a single vane (pole piece) mounted on the rotating head platform. Each 25 PG coil produces a pulse shown in Fig. 2-1.

Switching Pulse Former and 25 PG Pulse Shaper–FF401

Negative going pulses of the two 25 PG coils are coupled to bistable multivibrator FF401 (hybrid IC) through D401 and D407 (In practice, 25 PG coil B output pulse is introduced by D402 to trigger a monostable multi-vibrator MM405 where pulse is delayed for the time interval corresponding to -15°, since the 25 PG coil B is positioned -15°CCW from 180 position. MM405 output conducts D407.). A pulse supplied to Pin 1 flips FF401 and a pulse supplied to Pin 4 flips it back. The outputs from Pins 2 and 3, identical 25-Hz square waves opposite in phase, are applied to switchers Q221 and Q224 through integrators R406/C242 and R407/C239, respectively. A sample of the output from Pin 2 is supplied to a differentiator consisting of R408 and C404. The negative spike from the differentiator, which is in phase with the pulse generated by 25 PG coil B, triggers MM401 to supply the gate circuit.

25 PG Delay Multivibrator–MM401, R412, R413

Monostable multivibrator MM401 (hybrid IC) delays the 25 PG pulse (from 25 PG coil B) and sets the timing interval between the vertical sync signal (during record) and the 25 PG pulse from coil B. Since the sync signal serves as the timing reference, the time delay advances the angular position of the rotating-head platform with respect to the video signal. MM401 produces a positive pulse of 1ms duration during record and one of 1.8 msec duration during playback for each input pulse. This output pulse is differentiated by C428 and R448 and the negative spike, delayed by an amount equal to the pulse duration of MM401, is supplied to the gate circuit. The pulse duration, i.e. the delay time of MM401, is selected by SW7-8 according to the mode of operation. Thus, the differentiated pulse is able to gate the integrated reference 25-Hz pulse at the proper position on the ramp to produce the same gating output in record or playback regardless of the difference in 25-Hz pulse waveshapes. See Fig. 2-1. R412 and R413 adjust the pulse duration (delay time) of MM401 in record and playback operations respectively.

Delayed 25 PG Pulse Shaper

The delayed 25 PG negative pulse is amplified and shaped by Q404. Output of Q404 feeds the gate circuit.

Dc Holder and Amplifiers–C432, Q406, Q407, R451, R454

Gate output appears across C432, which holds the level until the following gate output. C432 sets the gate-to-source voltage of Q406 and thus establishes Q406 output. Direct coupled dc amplifiers Q406 and Q407 supply control current to the servo brake coil. R451 sets the response time of the servo system by controlling the amount of feedback current from Q407 to Q406 and is adjusted for minimum response time without servo hunting . A large amount of feedback reduces the ac gain of the amplifiers and prevents servo hunting but it increases the response time. R454 adjusts the dc gain of Q406 to obtain optimum braking current.

Control Track Head–CTL Head

During record, an output from monostable multivibrator MM404 is applied to the Control-Track Head (CTL Head). This records a 25-Hz timing reference to be used during playback in place of the vertical sync pulse.

Control Track Pulse Amplifier–Q401

In playback, control track pulses picked up by the CTL head are amplified by Q401 and coupled to Q402 through a noise filter consisting of R418, C409, and C410.

Tracking Control Multivibrator–MM403

When the TRACKING control (R007) on the Control Panel is pulled out during playback, the 30-Hz pulse from MM402 is coupled to MM404 via the tracking multivibrator, MM403 (hybrid IC). Monostable multivibrator MM403 compensates for (a) variations in control track information between recorders, (b) tape stretching, and (c) tolerances in physical placement of the CTL head. For this purpose, MM403 delays the control track pulse and adjusts the timing interval between the video information and the recorded control track pulse. The delay time can be varied with the TRACKING control R007, which varies the pulse duration of MM403.

2-3. AUDIO CIRCUITS

Record

Audio input feeds through C503 to preamplifiers Q501 and Q502. R512 and C510 provide negative feedback. Output of Q502 is applied

to the audio output stage Q506, Q507. A sample of the output is fed to the audio level detector consisting of C526, D503 and D504. The output dc voltage of the detector controls the conduction of AGC amplifier Q504 and Q505. Q505 controls the input signal level to be supplied to the LINE OUT AMP Q506.

Output from Q508 is applied to the audio record/play head. In addition, bias current produced by the bias/erase oscillator Q513 is applied to the head through trimmer capacitor C530. This adjusts the bias signal level supplied to the head. Bias trap L502 and C535 eliminates the high-frequency bias signal from the audio output circuit. L501, C517 and C518 in the collector of Q507 provide pre-emphasis.

Playback

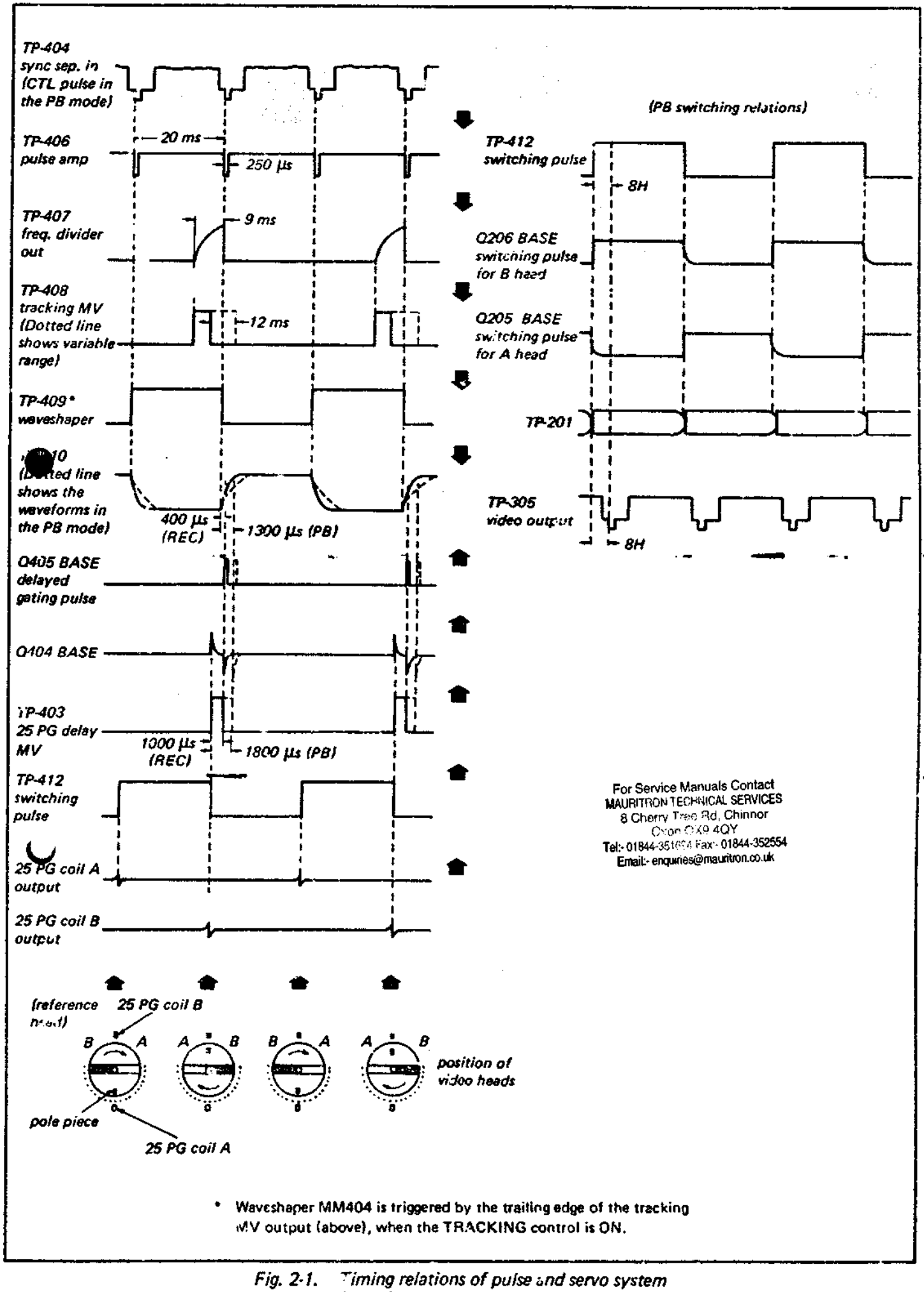
In playback, the feedback network in the preamplifier is altered to take the path through R513, R514, and C511, This network changes preamplifier characteristics to provide de-emphasis and equalization. Preamplifier output appears across R518 which sets the drive to the output stage for playback. The driver and output stages, Q506 and Q507, function in the same way for both record and playback. The bias/erase oscillator Q513 is not energized as B + to this stage is switched off in playback.

2-4. CAMERA CONTROL CIRCUITS

The sync pulse former on the SY3 Board shapes the 50-Hz ac sine wave into vertical sync pulses to lock the horizontal deflection oscillator in the camera. The sine wave signal from the secondary winding of T001 is supplied to R912. Negative peaks are clamped to ground by D901 and R912. The clamped signal is amplified by Q901, differentiated by R905 and C904, and supplied to the pulse amplifiers Q902 and Q903. Q903 feeds negative vertical sync pulses through the CAMERA connector CN4 to the camera.

2-5. POWER SUPPLY CURCUITS

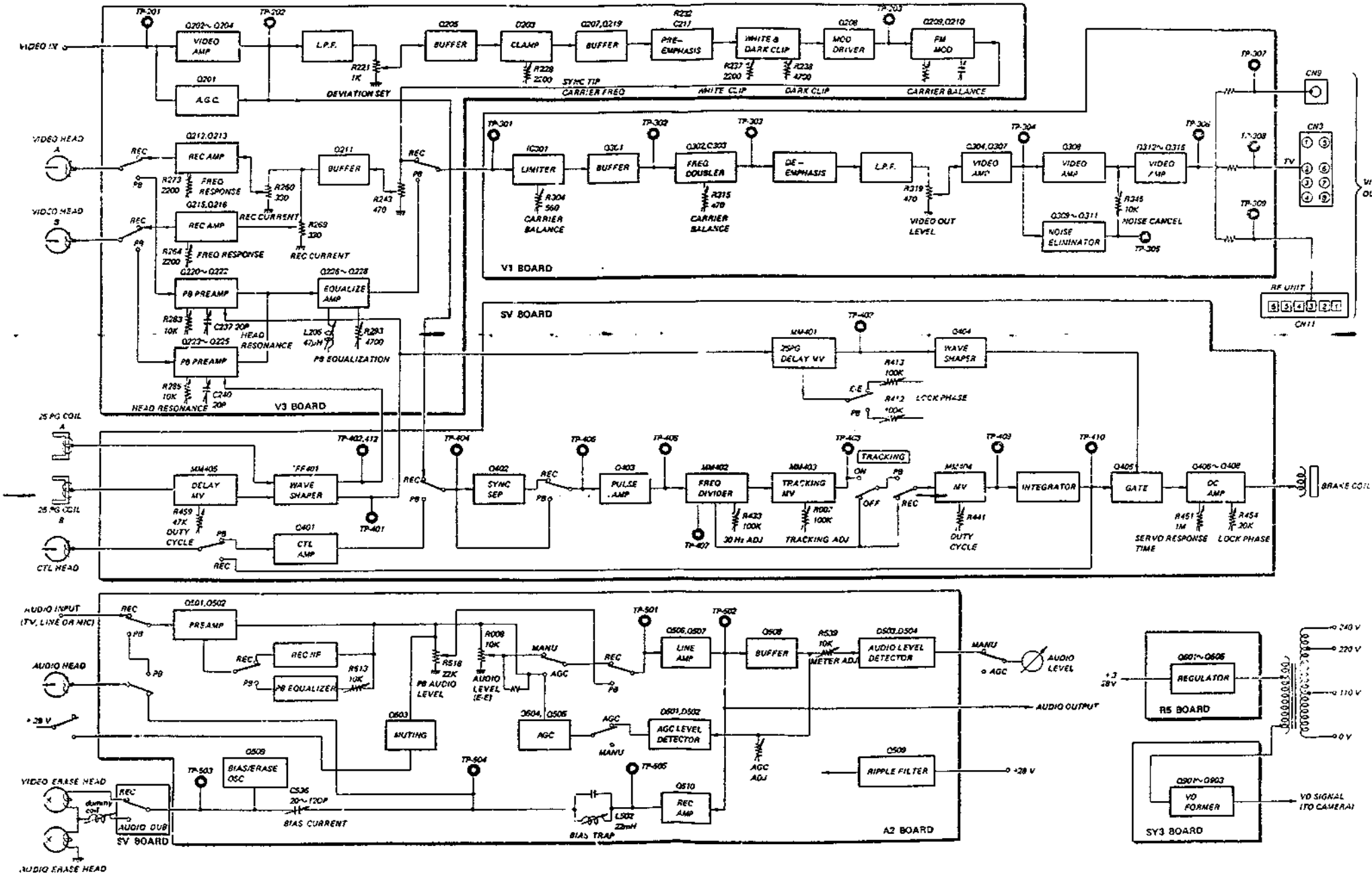
The ac line voltage is stepped down by the power transformer T001 and supplied to full wave rectifiers D601 and D602. Dc output from the rectifiers is filtered by C601 and applied to the series regulator Q601. Transistor Q603 compares a sample of the output voltage, picked off at R604, with a reference voltage supplied by Zener diode D603. A change in output voltage, detected by Q603, results in a change in conduction of Q602 and Q601 that offsets the original voltage shift.



* Waveshaper MM404 is triggered by the trailing edge of the tracking MV output (above), when the TRACKING control is ON.

Fig. 2-1. Timing relations of pulse and servo system (waveforms are not drawn to scale)

BLOCK DIAGRAM



SECTION 3
DISASSEMBLY

3-1. CABINET REMOVAL

1. Turn the VTR (with cabinet lid) upside down on a padded bench as shown in Fig. 3-1.

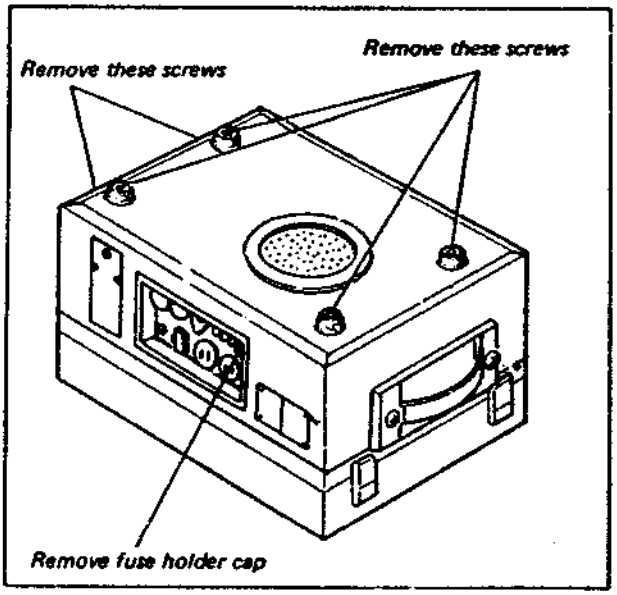


Fig. 3-1. Cabinet removal

2. Remove the four Phillips-head screws from the bottom of the cabinet as shown in Fig. 3-1. Also, remove the two Phillips head screws on the side of the cabinet.
3. Remove the fuse holder cap (and fuse) on the connector panel.
4. Lift off the cabinet.

3-2. REMOVAL OF CONTROL AND REEL PANELS

1. Pull out the SKEW control and the TRACKING control knobs.
2. Loosen the two screws at the back of the Head Cover. It is not necessary to remove these screws completely. Lift off the Head Cover.
3. Loosen the set screw in the Function Lever (Allen wrench, 0.1" across the flats). Pull off the lever.
4. Remove the screw securing the Pinch Roller Retainer. Remove the Pinch Roller. Be careful not to lose the Pinch Roller Spacer.
5. Loosen the two screws "A"* and remove the four screws "B" as shown in Fig. 3-2.
6. Lift off the Control and Reel Panels.

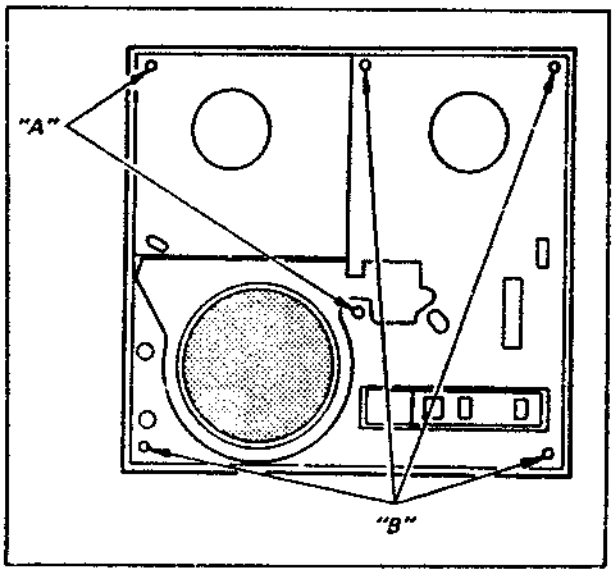


Fig. 3-2. Removal of Control and Reel Panel

*These are captive screws and need not be removed completely.

SECTION 4
MECHANICAL MAINTENANCE

4-1. PRECAUTIONS

Machine compatibility (interchangeability of tapes between machines) depends upon very close mechanical tolerances in the tape path. The tape path is factory-adjusted and should not require realignment under normal circumstances. Do not attempt adjustment of the tape guides or the tapered guides. If mechanical damage requires replacement and/or adjustment of the guides in the tape path, return the unit to a SONY FACTORY SERVICE CENTER for repair.

4-2. CLEANING HEADS AND SLIP RINGS

Noise in the picture during playback is usually caused by an accumulation of debris in the video heads. In some cases, half the picture may be noisy (split screen); in severe cases, video output may be lost.

To clean the heads, stop the machine, remove the tape and move one of the heads to the cleaning position near the left tapered guide. See Fig. 4-1.

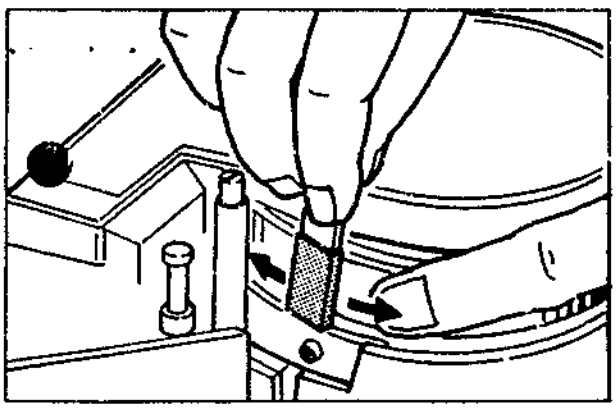


Fig. 4-1. Video head placed at the cleaning position

CAUTION

NEVER TRY TO CLEAN THE HEADS WITH THE MOTOR RUNNING

Saturate a cleaning tip with SONY cleaning fluid or methanol. (Spray cleaner, such as M/S-brand magnetic head cleaner, gives excellent results.) Rub the cleaning tip across the head tip from side to side. Avoid vertical motion, which might damage the video head.

Clean the erase and audio/control heads with SONY cleaning fluid, if necessary. Move the cleaning tip vertically across that part of the head surface that normally contacts the tape.

Noisy slip rings cause intermittent dark horizontal lines in the playback picture. To clean the slip rings, remove the upper drum cover on the top of the rotary-head drum assembly. Remove the tape from the tape path. Apply a few drops of SONY cleaning fluid to the slip rings. Turn on the motor for 10 to 20 seconds. Carefully wipe excess fluid from the tape path around the rotary head drum assembly.

If slip-ring noise persists, clean the slip rings directly with a head-cleaning tip saturated with SONY cleaning fluid. Rotate the head assembly by hand to avoid contacting the brushes.

4-3. LUBRICATION

Five major lubrication points are:

1. Supply-Reel Table Bearing.
2. Take-Up Reel Table Bearing.
3. Capstan Bearing.
4. Take-Up Reel Idler Bearing.
5. Pinch Roller Bearing.

To lubricate the reel table bearings, remove the screw and washer at the top of the spindle. Lift the reel table slightly so that the hollow shaft of the table rises above the spindle. Apply one or two drops of SONY oil, OL-1K, to the inner surface of the reel table shaft. Seat the reel table in its proper position and replace the screw and washers.

To lubricate the Capstan Bearing, pull up the Capstan by hand, and apply a few drops of oil to the Oil Ring of the Capstan Bearing. See Fig. 4-2. Be careful not to get oil on the surface of the Pinch Roller. Wipe off excess oil.

Note: Capstan Bearing lubrication is important. Oil as directed every 200 operating hours.

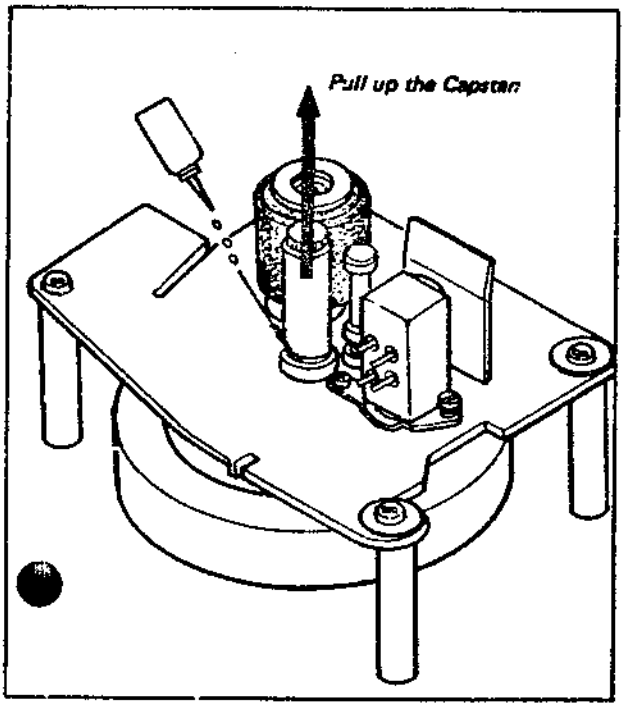


Fig. 4-2. Lubrication of capstan bearing

To lubricate the Take-Up Reel Idler, remove the Tape-Up Idler Cap. Apply a drop of oil to the shaft of the idler. Wipe away excess oil from the rubber driving surfaces.

Note: A lack of oil on this part sometimes causes bearing noise in Play and Fast-Forward modes.

To lubricate the Pinch Roller Bearing, remove the pinch roller retainer. Apply a few drops of oil directly to the pinch roller oil ring.

Sliding Parts. All sliding parts of the tape-transport mechanism are lubricated with grease which, in normal use, need not be replenished. However, if new parts are installed or lubrication is obviously needed, apply a high-temperature grease at points of contact. Avoid excessive lubrication.

4-4. DRIVE-BELT REPLACEMENT

A worn or stretched drum drive belt results in excessive slippage and loss of servo control.

Check the belt by inspecting the inner (bearing) surface. Look for cracks and streaks along the long dimension of the belt. Replace the belt if it is badly scored along its length. To check belt length, remove the belt from the machine and compare its total length (flattened) with that of a new belt from stock. Replace the belt if it is ¼-inch or more longer than a new belt.

To install the video-drum belt, stand the VTR on its left side. Loop the belt over the motor pulley, with the shiny side of the belt inside (against the pulley). Grasp the bottom of the loop, turn it one-half turn clockwise, and wrap around the pulley of the rotary head drum assembly. See Fig. 4-3.

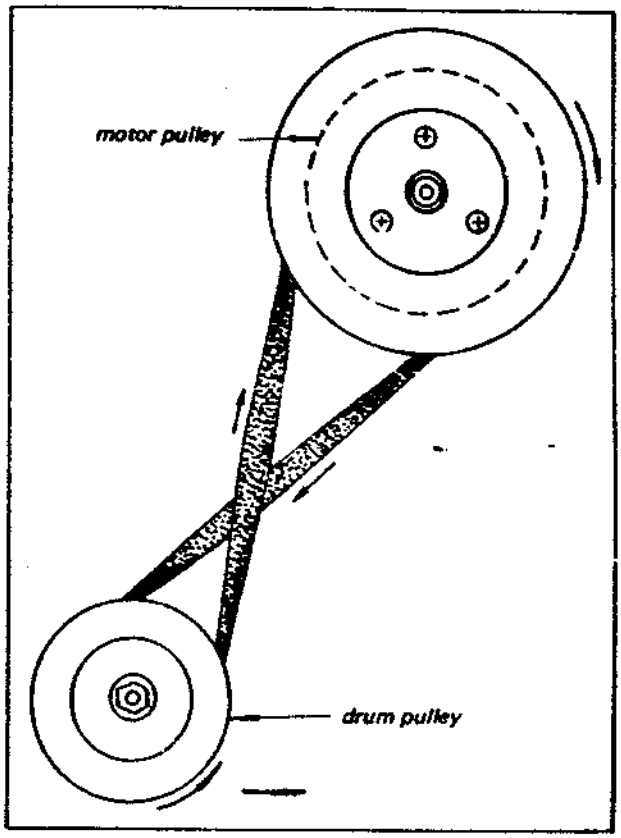


Fig. 4-3. Drive belt installation

4-5. DRIVE PULLEY ADJUSTMENT

The lower motor pulley requires adjustment if the head-drum drive belt slips off the pulley or rides against the upper or lower shoulder of the pulley. Adjust the pulley as follows. Remove the drive belt. Loosen the set screw on the motor pulley and adjust its height by eye until it is parallel to the pulley on the rotary-head drum assembly. Reinstall the belt. (See Section 4-4). Place the VTR in the normal horizontal position. Thread and play the tape. Observe the position of the belt on the pulleys. Stop the machine and readjust pulley position to make the belt run in the center of the pulleys.

Check final pulley position by starting and stopping the tape several times. Rewind the tape and try the fast-forward mode a few times. Make sure that the belt does not drift towards the edge of the pulley or slip off when changing speeds.

4-6. VIDEO HEAD REPLACEMENT

Video Head Replacement is required when the heads are damaged or have open coils. In addition, insufficient tape penetration, resulting from head wear after long periods of operation may necessitate replacement. To remove and replace the rotary head assembly (the beam on which the two video heads and the slip-rings are mounted), proceed as follows.

CAUTION

The video head assembly and the surrounding machined parts are very precisely made. Use utmost care when performing any work on the rotary head-drum assembly.

Removal

1. Turn off the power. Loosen the screws that hold the head-drum cover. A coin will serve as a screwdriver for these screws. Loosen only half a turn; do not try to back the screws all the way out. Lift off the head-drum cover.
2. Remove the two Phillips-head screws that hold down the cover plate. Loosen the brush pressure adjusting screws and remove the brush from the spring as shown in Fig. 4-4.
3. Remove the two upper 5 x 20 Hex-Head Bolts and washers with a 4 mm Allen wrench. Hold the upper drum with one hand so that it does not fall as you withdraw the two screws.
4. Carefully lift the top of the drum assembly and hold it back. Place the drum top carefully on the reel panel. See Fig. 4-5.

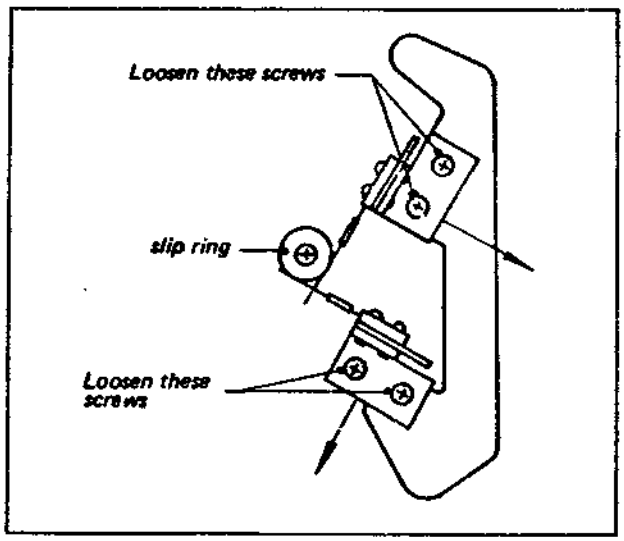


Fig. 4-4. Preparation for video head replacement

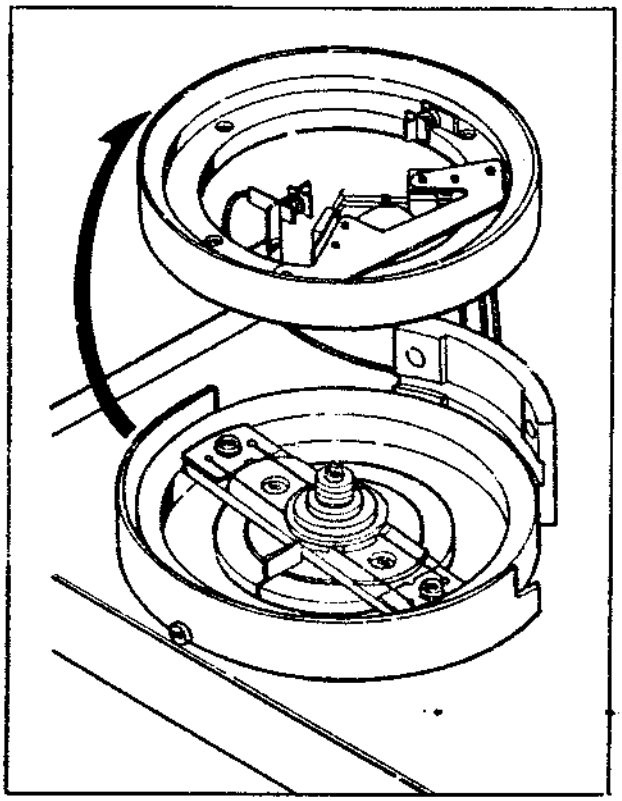


Fig. 4-5. Video head assembly removal

CAUTION

Do not touch the PG pole pieces.

Position the rotary head platform by turning the aluminum beam on which the heads are mounted. Slight pressure on the pole pieces can affect pole piece alignment.

5. Hold the Video Head Assembly to keep the platform from rotating and loosen the two P 4x8 screws that hold the head assembly to the platform. Do not exert too much downward pressure on these screws; loosen the locking compound with Methyl Ethyl Ketone. Remove the screws and the washers.
6. Using both hands, carefully lift the Video Head Assembly off the platform.

Replacement

7. Clean the bottom of the new Video Head Assembly. Do not scratch or remove the spacer on the bottom of the Video Head Assembly.
8. Position the platform so that the 30 PG pole piece is at the 12 o'clock position.
9. Carefully place the Video Head Assembly on the platform with the B head (identified by the red paint) to your left (9 o'clock position). See

Fig. 4-6. The head assembly should fit down snugly against the platform without using force.

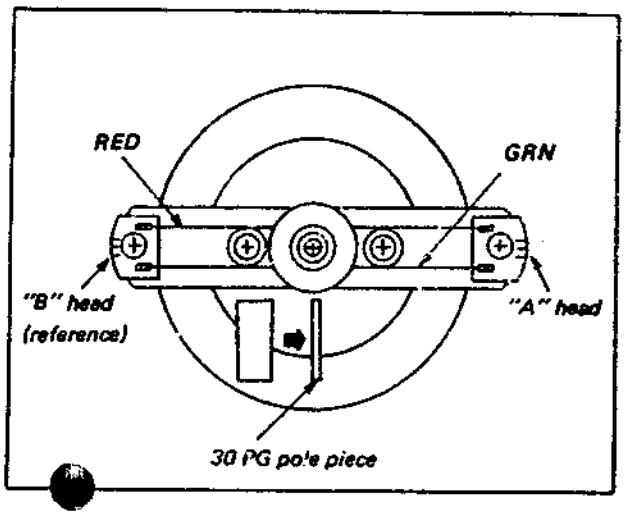


Fig. 4-6. Position of the head assembly

10. Install the two P 4 x 8 screws and washers. Rotate the head assembly gently to the left and right until it is approximately in the center of the angular "play" permitted by the mounting screws. Tighten the screws alternately, applying torque gradually until the screws are tight.

11. Carefully swing the top of the Rotary Head Drum Assembly back into place, support the top with one hand while inserting the two Hex-Head bolts and washers. Do not tighten the screws all the way.

12. Grasp the top of the Rotary Head Drum Assembly and push it back and down against the drum holder so that top surface of the upper drum is even with that of the drum holder.

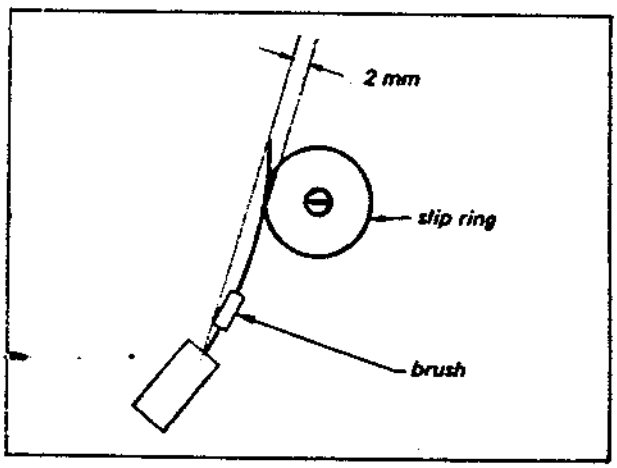


Fig. 4-7a. Brush pressure adjustment

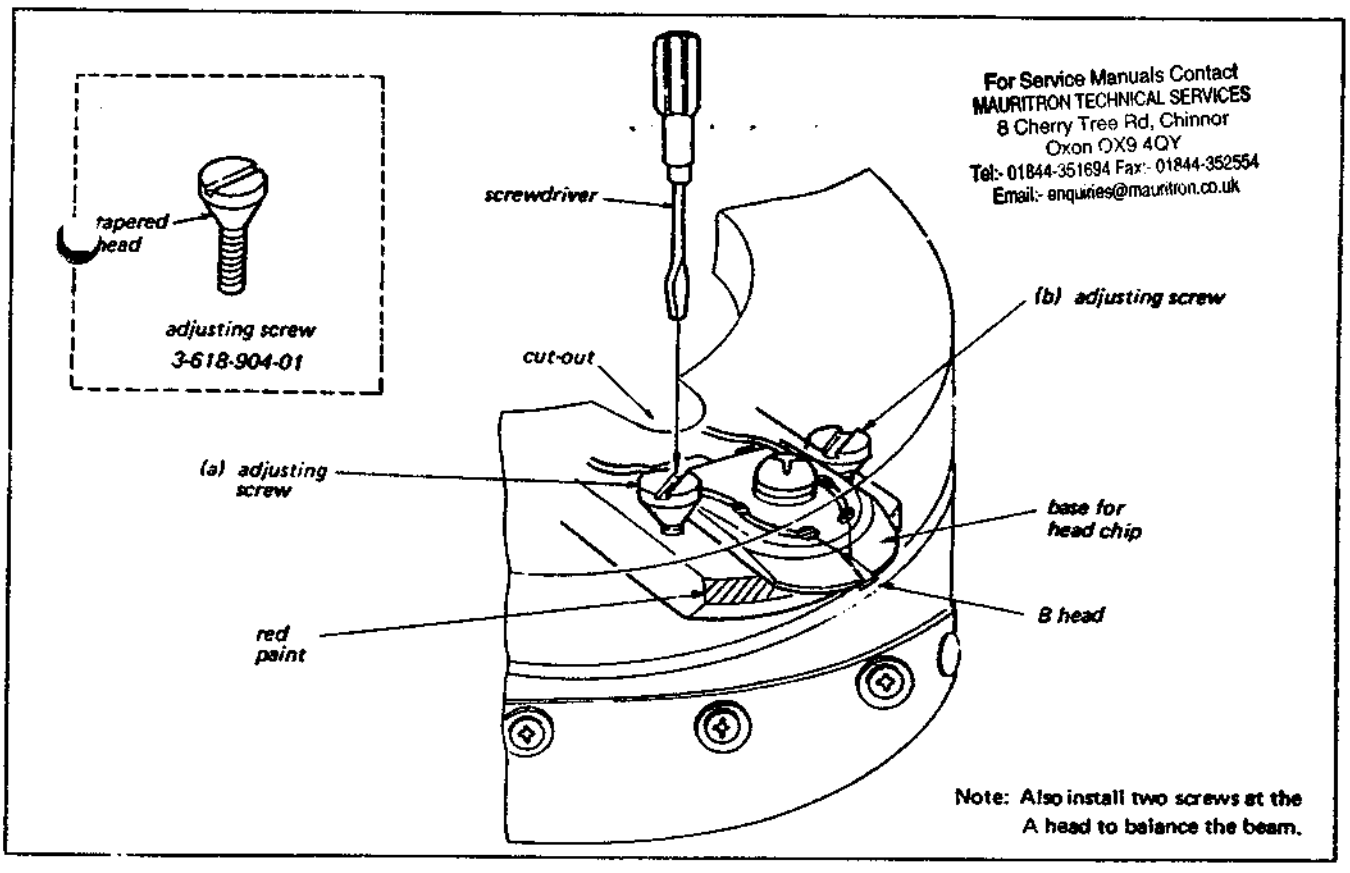


Fig. 4-7b. Video head dihedral adjustment

13. Tighten the two bolts alternately, applying torque gradually until all are tight.

14. Tighten the brush pressure adjusting screws to obtain a 2 mm bend (approximately) as shown in Fig. 4-7a. Inspect the brush and slip-ring assembly to make sure that the brushes are centered in the slip rings.

Video Head Dihedral Adjustment

Normally, if the video heads have been replaced according to the foregoing procedure, dihedral need not be adjusted. If the dihedral setting has been disturbed, however, or readjustment is otherwise indicated, proceed as follows.

The two video heads should be displaced exactly 180° apart measured at the head gap. If they are not, interchangeability can not be maintained. Video Head B (*not* A) should be adjusted so that it is correctly aligned with respect to Video Head A.

This adjustment requires the use of the SONY Alignment Tape and the four adjusting screws shown in Fig. 4-7b. The adjusting screw has a tapered head which bears against the base of the head when turned clockwise, thus forcing the head to move laterally. The thread of this screw is different from that of any other conventional screw.

CAUTION

Do not use conventional screws for the dihedral adjustment as damage to the thread in the head beam will result. Adjusting screws for the video head are available for all AV-Series Videocorders.

Proceed as follows.

1. Thread a SONY Alignment Tape onto the Videocorder.

2. Play back the tape with a monitor connected.

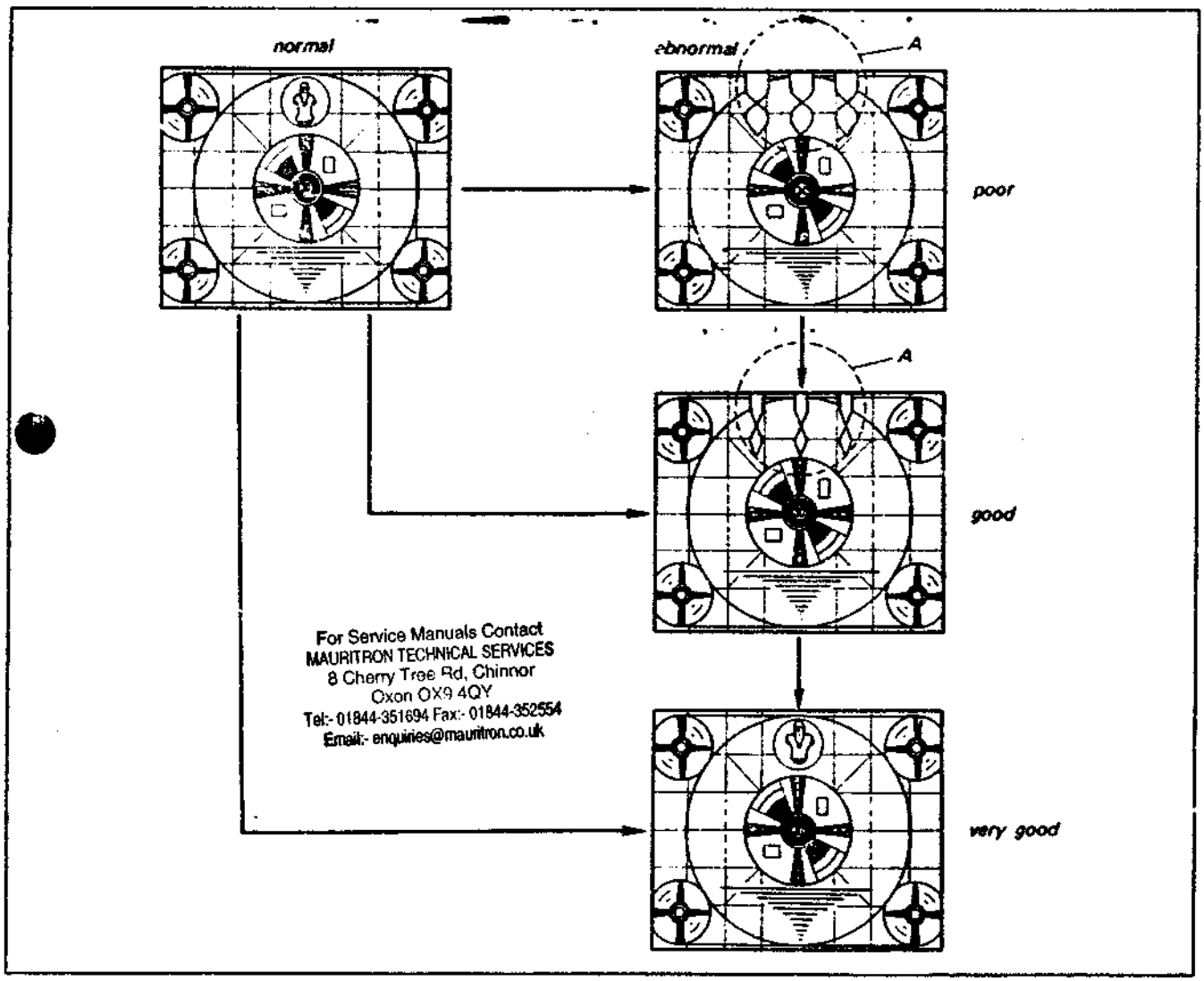


Fig. 4-7c. Picture detail for dihedral adjustment

3. Observe the picture on the monitor. (DO NOT USE A MONITOR SET FOR A SHORT HORIZONTAL AFC TIME CONSTANT.)
   If the top of the picture is as shown by "A" in Fig. 4-7c (it appears as horizontal jitter), adjust Video Head B as follows.
4. Stop the Videocorder and remove the tape.
5. Position the B head so that the threaded adjusting-screw holes are accessible through the cut-out in the upper head drum. See Fig. 4-7b.
6. Install the adjusting screws into the threaded holes at either side of the head base until the tapered part just touches the head base.
7. Similarly, install adjusting screws into the two threaded holes at either side of the A head. These two screws serve only as weights to counterbalance the head-mounting beam.
8. Play back the tape and observe the top of the picture shown at "A" in Fig. 4-7c.
9. Stop the Videocorder. Position Video Head B (identified by red paint on the outer edge of the beam) to the adjusting position shown in Step 5.
10. First, loosen the (a) adjusting screw about a quarter turn counterclockwise and tighten the (b) adjusting screw a quarter turn clockwise. See Fig. 4-7b.
11. Play back the tape. Check the picture on the monitor screen.
12. If the dihedral error does not change, repeat Steps 9, 10, and 11 until a change is visible.
13. If the dihedral error decreases, repeat Steps 9, 10, and 11 until a normal picture is obtained.
14. If the dihedral error increases, reverse the direction of rotation of the adjusting screws and repeat Steps 9 to 12 until the distortion in the picture is minimized.
15. Thread a blank tape and make a recording using a video camera focused on a test pattern (or using a telecast test pattern).
16. Check the dihedral error in the picture and trim up the position of Video Head B as described in Steps 9 to 14.
17. Remove the four adjusting screws from the head assembly.

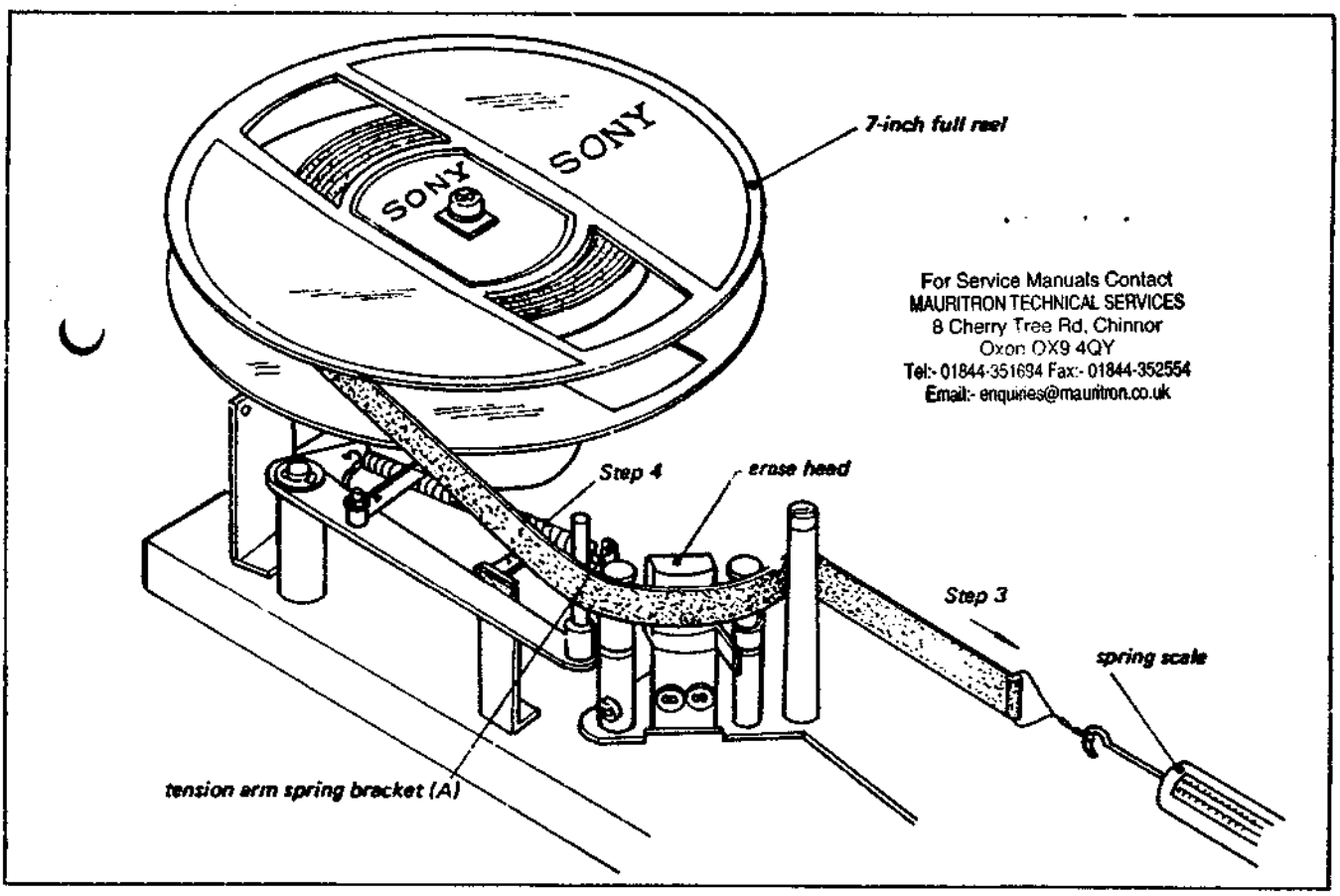


Fig. 4-8. Tape tension check

4-7. TAPE TENSION BRAKE CHECK

This adjustment corrects the back tension applied by the Tension-Brake Servo to the Supply Reel.

1. Place a full reel of tape on the Supply-Reel Table. Set the Function Lever to the FORWARD position. Set the SKEW Lever in the middle position.
2. Make a loop in the tape and attach a spring scale as shown in Fig. 4-8.
3. Pull the scale in the direction indicated – a steady pull at approximately the correct tape speed should give a reading of 30 to 45 grams.
4. If not, remove the Reel Panel and adjust the position of spring bracket (A) to obtain a correct reading. See Fig. 4-8.
5. Repeat the tension check using a supply reel with a few turns of tape on it. It should yield a reading of 65 grams or less. If it does not, proceed to Steps 6 through 10 and then repeat Steps 1 to 3.
6. Set the Function Lever to the FORWARD position.
7. Check the distance between the Tape Guide Pin on the Tension Arm and the extreme left edge of the drum deck as shown in Fig. 4-9. It should be about 1 mm. Swing the Brake Band as needed to obtain the correct spacing.
8. Check for clearance between the hole in the chassis and Item ① shown in Fig. 4-9. If the correct clearance cannot be obtained, bend Part A with a pair of pliers to obtain the gap. (Don't bend it too much.)
9. Check the distance between the rod and the Tension Arm as shown in Fig. 4-9. It should be 2 mm. Bend the end of rod as needed to obtain the correct spacing.
10. Set the Function Lever to the STOP position. Check the position of the Tape Guide Pin shown in Fig. 4-9. Reposition the Tension Arm Spring Bracket to obtain the correct position.

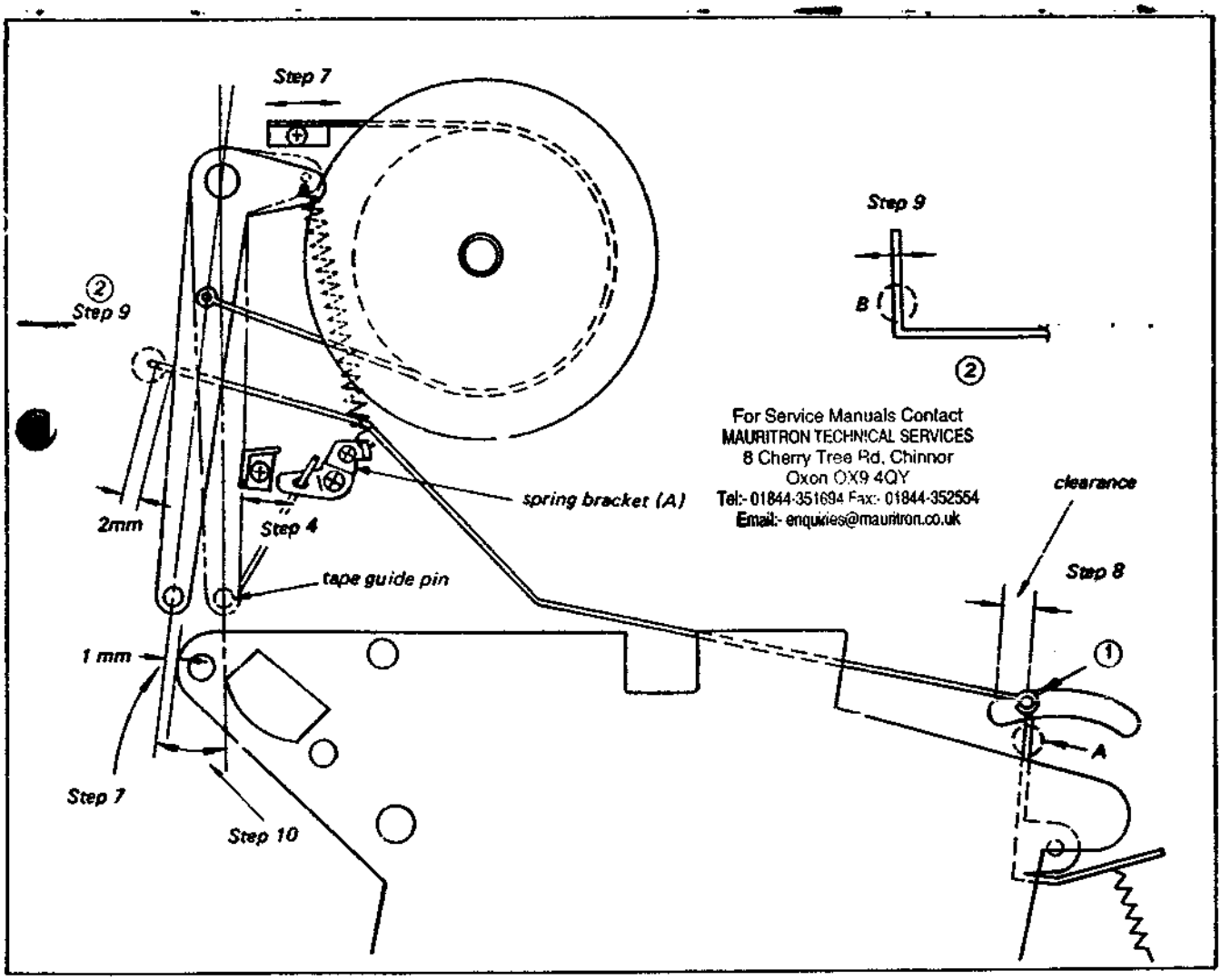


Fig. 4-9. Tension arm adjustment

4-8. REEL TABLE HEIGHT

1. Run a tape in the FORWARD mode.
2. Check both reels to see that tape does not rub against the edges of the reels.
3. If the tape is not centered in either reel, adjust reel height by adding or removing the fiber washers (Thrust Bearing Washers, Part Number 3-601-037-01) beneath the Reel-Table Assembly.

4-9. AUDIO/CONTROL HEAD REPLACEMENT

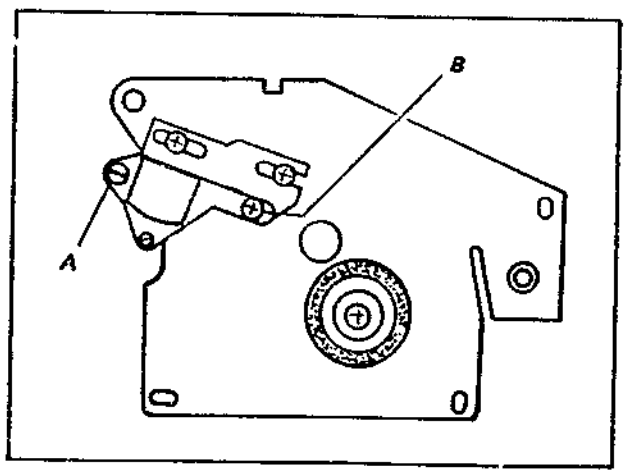
A malfunctioning Audio/Control Head can be replaced without disturbing servo tracking by the following procedure.

1. Unsolder the leads at the rear of the Audio/Control Head.
2. Remove the screws labelled A and B in Fig. 4-10 (a). Be careful not to lose the spring on the left screw (A). Do not loosen the screws in the long slots.
3. Lift the head assembly off the mounting plate.
4. Turn the head upside down and remove the two screws that hold the head assembly to the mounting plate.
5. Place the new head assembly on the mounting plate and install the two screws from the bottom.
6. Install the Head Mounting Plate Assembly using the original screws A and B in Fig. 4-10(a). The spring on screw A goes between the head of the screw and the top of the mounting plate. Tighten screw A and adjust screw B (azimuth adjust) as follows.
7. Thread the SONY Alignment Tape and play the first section (Test Pattern). Connect an AC VTVM to the LINE OUT connector on the Connector Panel and terminate this connector with a 100 kΩ resistor. Adjust the azimuth screw (Screw B in Fig. 4-10 (a) for maximum indication on the VTVM (maximum output at 7 kHz).
8. Play the tape and check that the core of the head extends an equal amount above and below the edges of the tape. See Fig. 4-10 (b). Adjust the tilt screw at the rear of the mounting assembly, if necessary, until this condition is achieved.
9. Recheck the azimuth adjustment.
10. Check audio bias voltage. See Section 7-5.

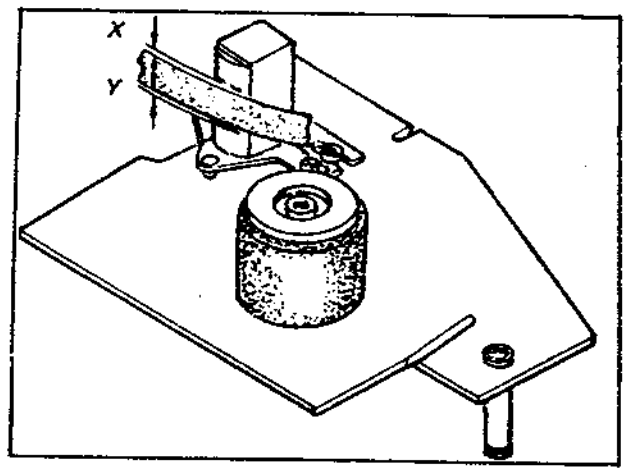
4-10. TAKE-UP IDLER ADJUSTMENT

Capstan Motor Pulley Height Check

1. Make sure the Capstan Belt is clear of the Pause Brake Push Rod by 0.5 to 1 mm. See Fig. 4-11.
2. Check that the Capstan Motor Pulley is clear of the Take-Up Idler by more than 1 mm. See Fig. 4-11.



(a)



(b)

Fig. 4-10. Audio/Control head replacement and adjustment

3. Adjust the height of the Capstan Motor Pulley, if necessary.

Take-Up Idler Height (Fast Forward Mode)

1. Set the Function Lever to the FAST FORWARD position. The Take-Up Idler is lifted by the Take-Up Cam. Make sure that the lower surfaces of the Take-Up Idler and the Take-Up Reel Table (lower) are in line or that the lower surface of the Take-Up Idler is slightly higher.
2. If this condition does not exist, place the Function Lever in the FORWARD position. Bend Finger A with a pair of pliers as shown in Fig. 4-12. to obtain the correct Take-up Idler height.

4-11. REWIND IDLER REPLACEMENT

1. Check the Rewind Idlers if the machine is noisy or does not wind up tape smoothly and rapidly during rewind, or if the Supply Reel is not braked properly when going from FORWARD to STOP.
2. Inspect the driving surfaces of both Rewind Idlers for excessive or uneven wear. Inspect the driving surface of the Supply Reel Assembly. Clean away any oil or debris from all driving surfaces.
3. Set the Function Lever to STOP. Check that the Right Rewind Idler is clear of the Idler Stopper by 0.5 to 1 mm. See Fig. 4-13. If this condition does not exist, bend the Idler Stopper with a pair of pliers.
4. Check that the contacting surfaces of the Right and Left Rewind Idlers are parallel. If they are not, bend them by hand.
5. Set the Function Lever to STOP. Check that the Supply Reel Table, Left Rewind Idler, and Right Rewind Idler are contacting securely. Make sure at this time that the Right Rewind Idler is disengaged from the Take-up Reel Table by more than 1 mm. See Fig. 4-13. To replace the Rewind Idlers proceed as follows.
6. Set the Function Lever to FORWARD. Pry the Retaining Ring (E5) from the top of the Left Rewind Idler shaft using a screwdriver. Remove the fiber washer. Lift the Left Rewind Idler off its shaft.

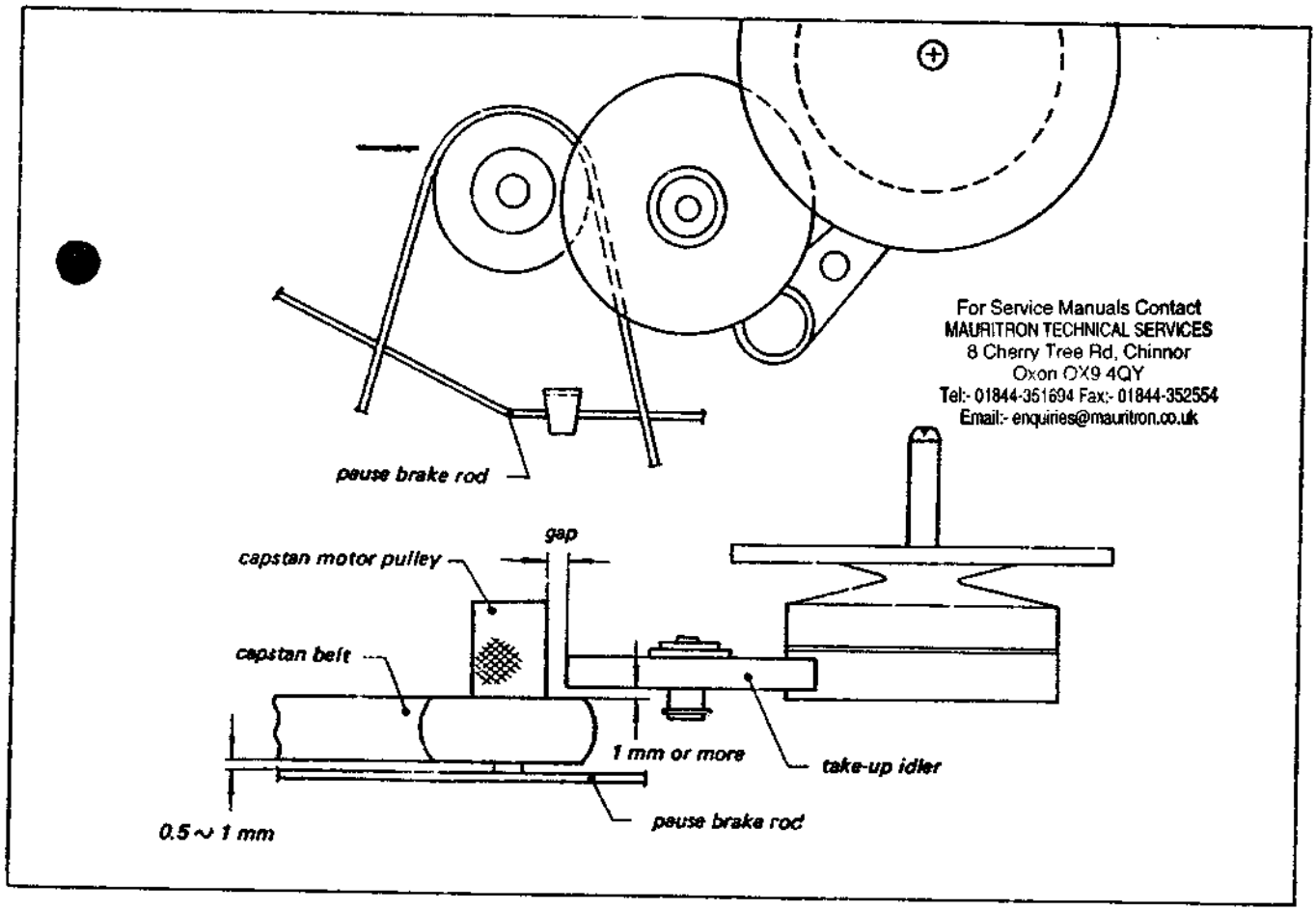


Fig. 4-11. Capstan motor pulley height

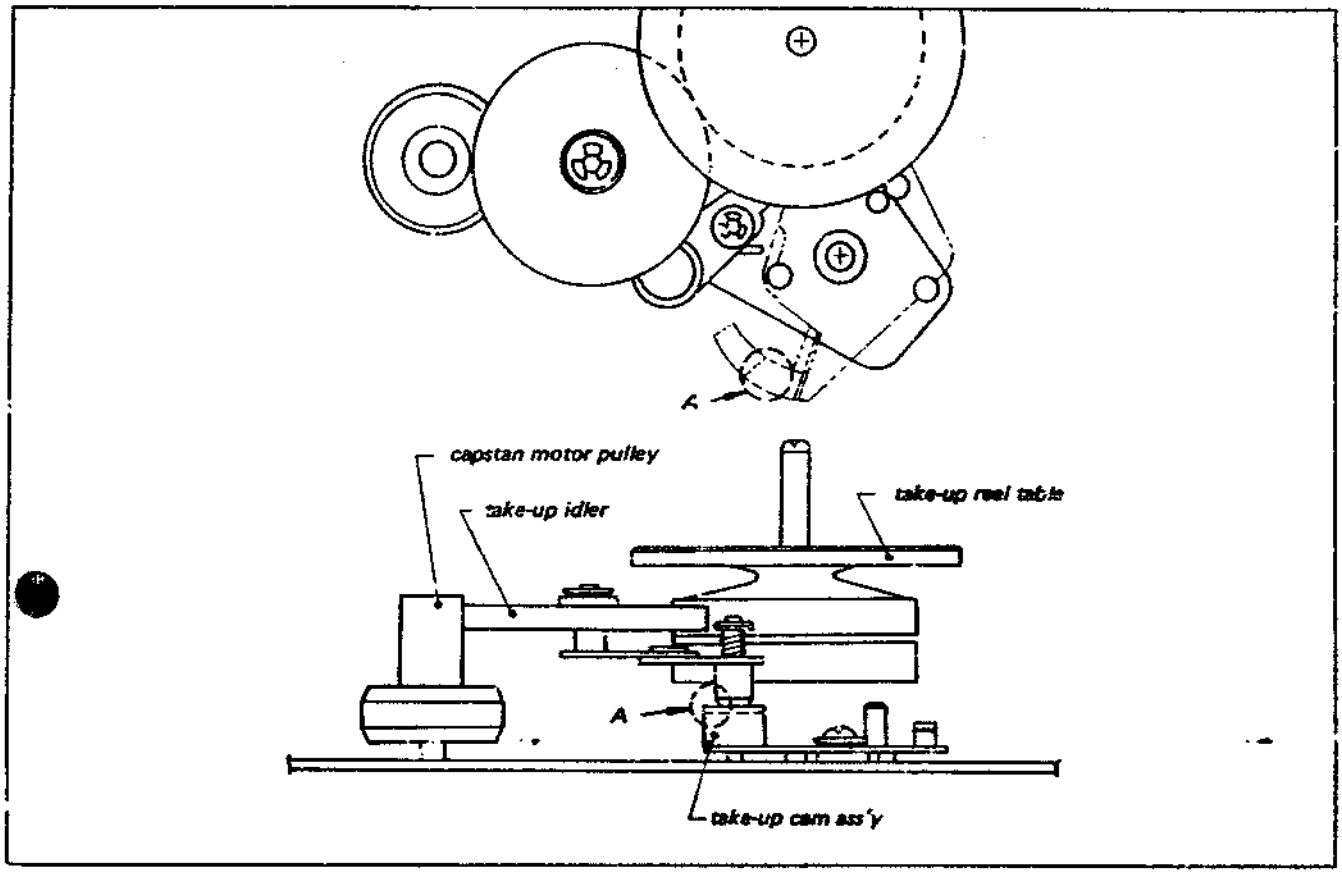


Fig. 4-12. Take-up idler height

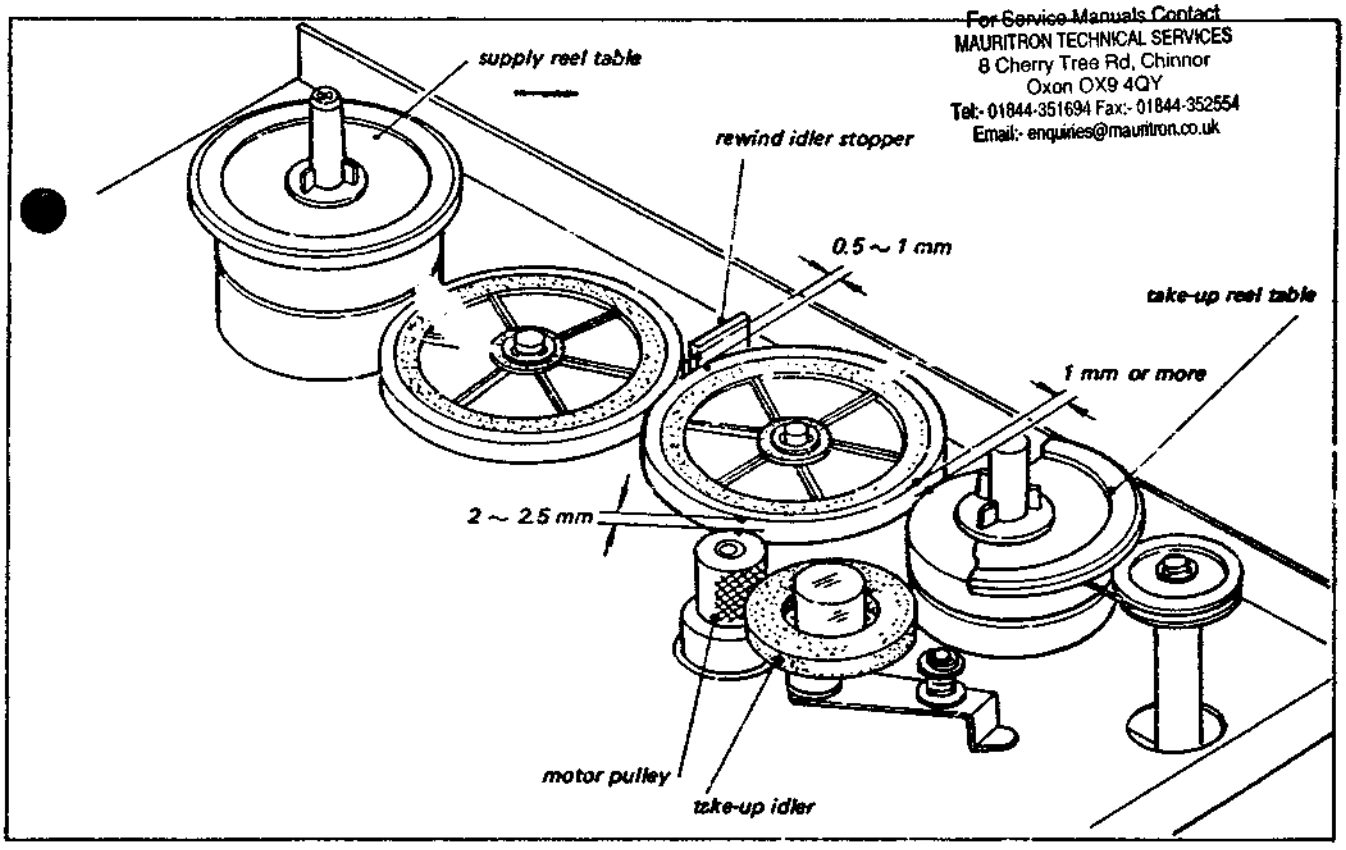


Fig. 4-13. Rewind idler replacement

Note: The directional brake will spring back counterclockwise when the idler is removed.

7. Inspect the idler to identify top and bottom so that the replacement will be installed correct side up.

8. Pry the Retaining Ring (E5) from the top of the Right Rewind Idler. Remove the fiber washer and push rod. Lift the Right Rewind Idler off its shaft.

9. To replace the Left Rewind Idler, first place one drop of oil on the idler shaft. Next, rotate the directional brake clockwise until the point faces to the right (3 o'clock). Position the idler shaft so that the idler can be dropped onto the shaft. Release the directional brake. Install the fiber washer and the Retaining Ring.

10. Place a drop of oil on the shaft of the Right Rewind Idler. Install the Right Rewind Idler, the fiber washer, the push rod, and the Retaining Ring in that order.

4-12. BRAKE-SYSTEM ADJUSTMENT

System braking requires attention if:

a. The Supply Reel exerts too much back tension during FORWARD and FAST FORWARD operations.

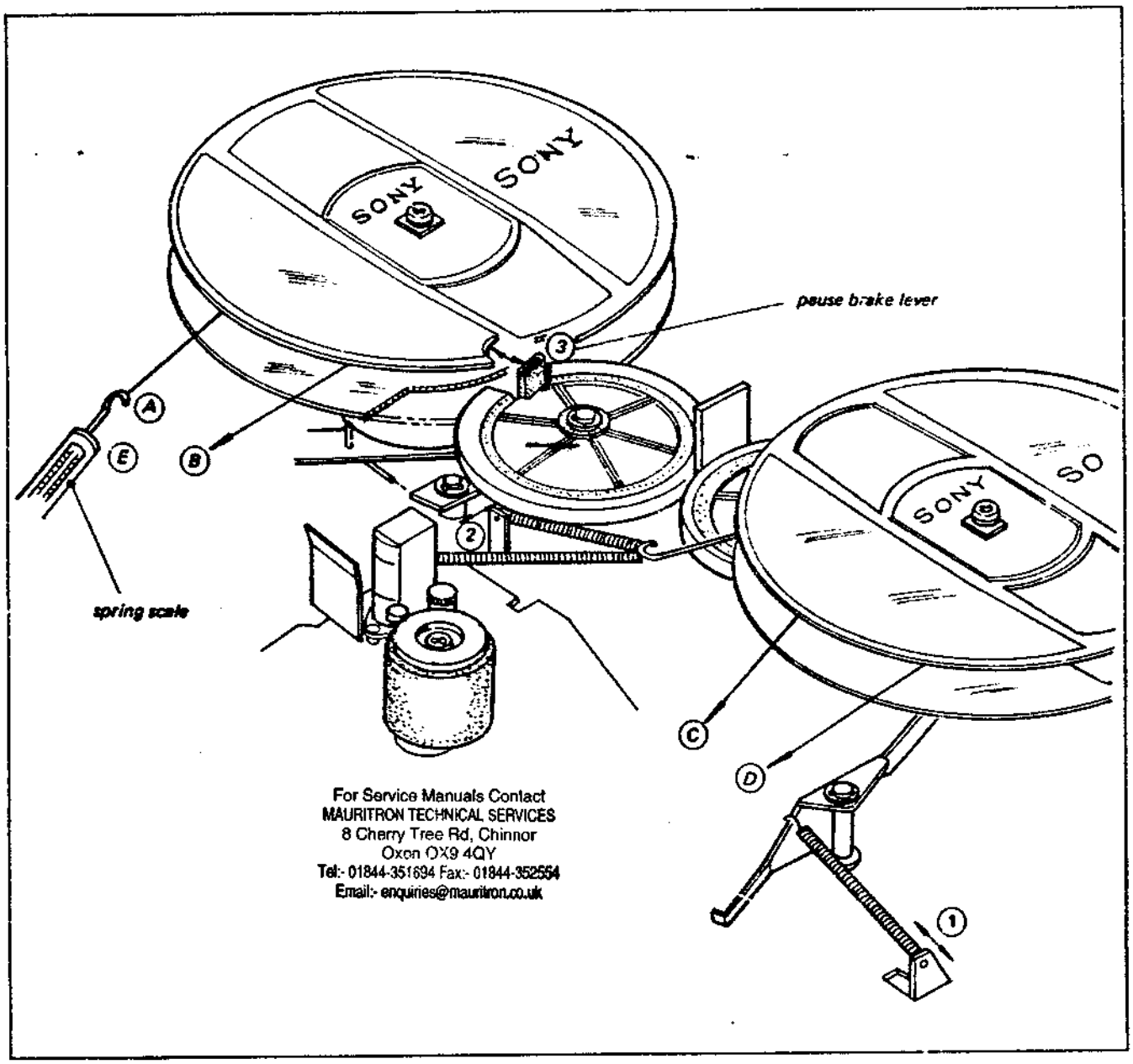


Fig. 4-14. Brake torque adjustment

b. The Supply Reel pays out and slackens tape when going from FORWARD or FAST FORWARD to STOP.

c. The Take-Up Reel exerts too much back tension during Rewind.

d The Take-Up Reel pays out too much tape when going from REWIND to STOP.

e. The Supply Reel rotates during Pause operation.

Brake Torque Adjustment

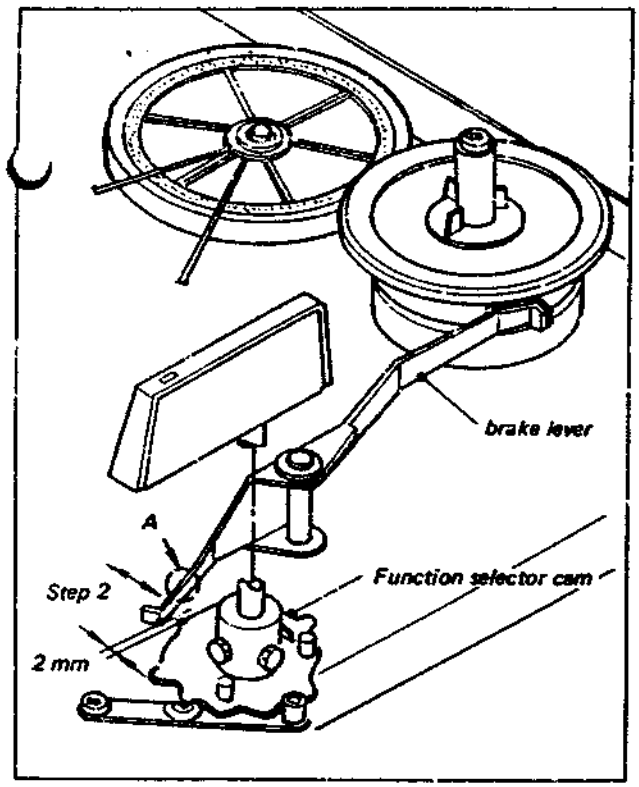
1. Set the Function Lever to STOP.
2. Place an empty reel (RH-7V) with several turns of string wrapped around the hub onto the Supply Reel Table as shown in Fig. 4-14. Tie the reel to the spring scale. Pull the scale at a speed of approximately 4 inches/sec. Check the reading for brake torque. It should be more than 800 g-cm.
3. Repeat the above brake-torque checks for Ⓑ, Ⓒ and Ⓓ as indicated in Fig. 4-14. The brake torques should be less than 400 g-cm for the direction of Ⓑ and Ⓒ and more than 800g-cm for the direction of Ⓓ.
4. Bend Spring Supporting Brackets ① and ② with a pair of pliers, if necessary, to obtain the correct brake torques.
5. Set the Function Lever to PAUSE.
6. Repeat the procedure described in Step 2 for the direction indicated by Ⓔ in Fig. 4-14. It should be more than 800 g-cm.
7. If necessary bend the portion of the Pause Brake Lever identified by ③ with a pair of pliers.

Take-Up Brake Lever Check

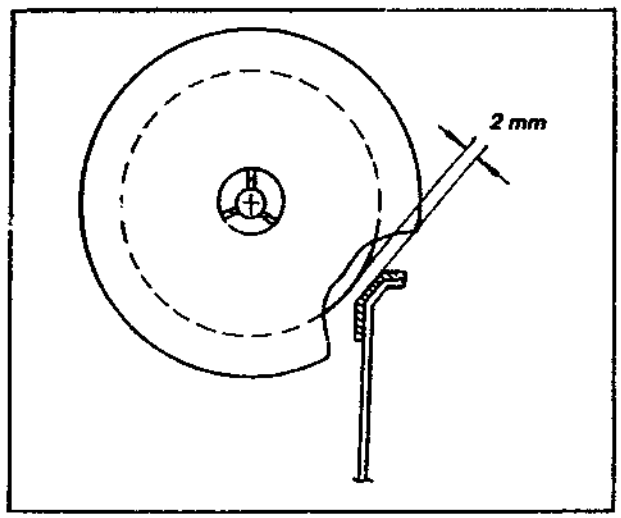
1. Set the Function Lever to STOP.
2. Check that the top end of the Brake Lever is disengaged from the Function Selector Cam by approximately 2 mm. Refer to Fig. 4-15 (a).
3. Set the Function Lever to REWIND.
4. Check for a clearance of approximately 2 mm between the Brake Lever and the Take-Up Reel Table.
5. If necessary, bend the portion of the Brake Lever identified by "A" with a pair of pliers.

Pause Brake Lever Check

1. Set the Function Lever to REWIND.
2. Check for a clearance of approximately 1 mm between the Pause Brake Lever and the Supply Reel Table.
3. If this condition does not exist, turn nut "A" shown in Fig. 4-16.
4. Advance the tape. Check that the tape stops running in the PAUSE mode.
5. In the PAUSE mode, check for play between the Brake Lever and the nut.



(a) STOP mode



(b) REWIND mode

Rig. 4-15. Take-up brake lever check

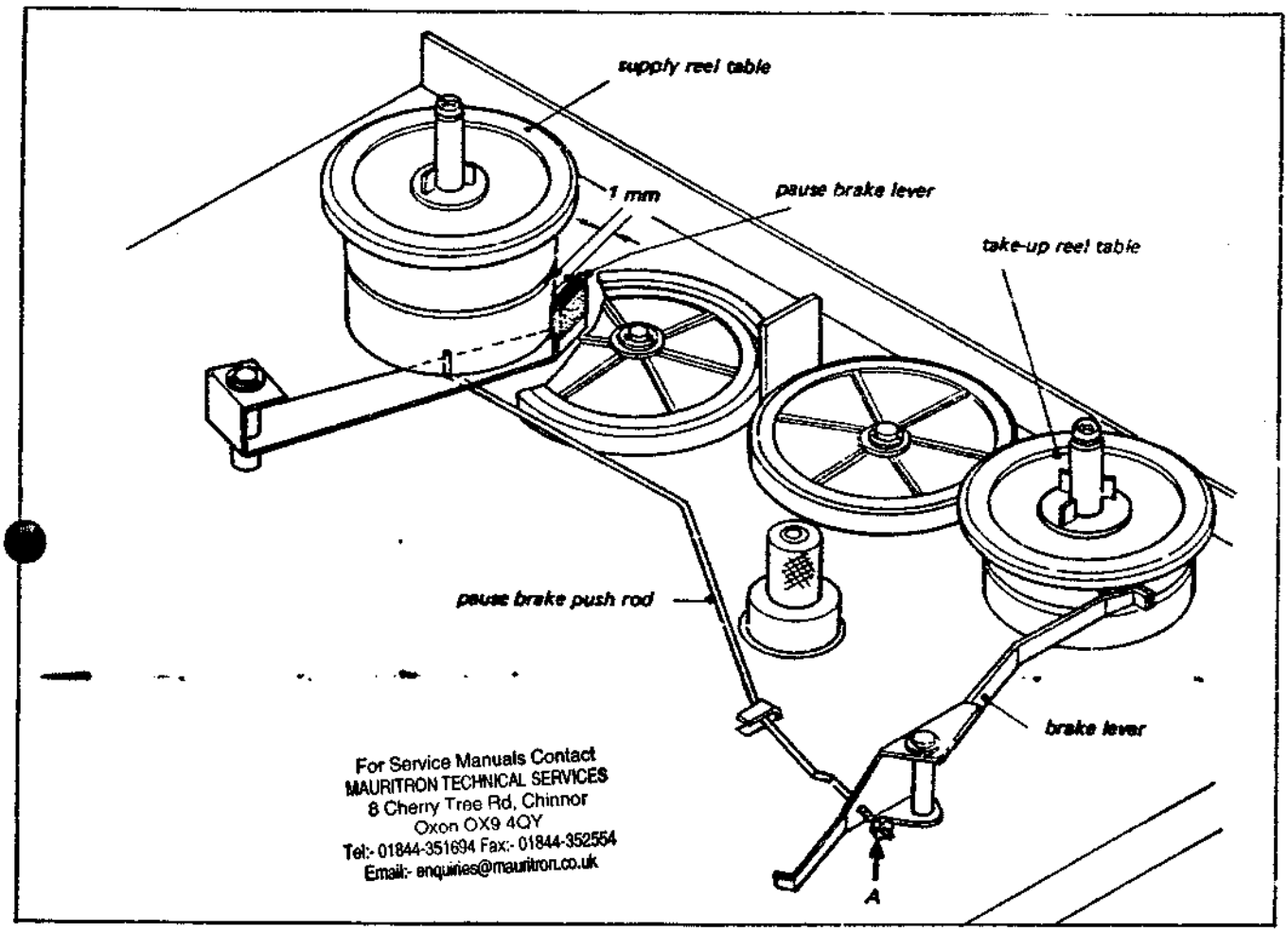


Fig. 4-16. Pause brake lever check

6. Place the Function Lever in all the modes except PAUSE. Check for clearance between the Pause Brake Lever and the Supply Reel Table. The clearance should be more than 0.5 mm.

Brake Timing Adjustment

1. Set the Function Lever to STOP. Check for a 2-2.5 mm clearance between the Capstan Motor Pulley and the Right Rewind Idler. Bend Take-Up Cam Push Rod A with a pair of pliers as needed to obtain the correct spacing. See Fig. 4-17.
2. Move the Function Lever from REWIND to STOP very slowly. Check that the Take-Up Reel Table braking is applied before the Right Rewind Idler stops rotating.
3. Move the Function Lever from FAST FORWARD to PAUSE very slowly. Check that Supply Reel Table braking is applied before the Take-Up Reel Table stops running.
4. Thread a tape on the VTR and advance it until all the tape is on the Take-Up Reel Table. Move the Function Lever from REWIND to STOP. Check that the tape stops without excess slack. If it does not, bend the Brake Lever with a pair of pliers. There should still be at least 0.5 mm clearance between the Brake Lever and the Takeup Reel Table.
5. Place a full reel of tape on the Supply Reel Table. Move the Function Lever from FAST FORWARD to PAUSE. Repeat the procedure described in Step 4. If necessary, bend the Pause Brake Lever with a pair of pliers. Refer to "Pause Brake Lever Check" on page 4-12.

4-13. MOTOR REPLACEMENT

If the motor is suspected to be defective, check the mechanical load on the motor to make sure that the Capstan and Rotary Head Drum Assembly turn freely. Check for line voltage between the black and white leads of the motor (set the Function Lever to FORWARD). Also check phasing capacitor C001 in

series with the green lead of the motor. If line voltage is present and the phasing circuit is correct, but the motor does not turn, replace the motor as follows.

1. Stand the machine on its left side.
2. Cut the white and black motor leads at the terminal strip. Cut the green motor lead at the terminal of phasing capacitor C001. Leave 1/8" insulation on the stubs of the leads remaining on the terminal strip and the phasing capacitor. The colored insulation will aid in locating the correct tie points for the new motor.
3. Remove the drive belt for the Rotary Head Drum Assembly.
4. Inspect the lower drive pulley on the motor shaft and note the position of the fan on the shaft. The bottom of the fan hub should be almost flush with the lower end of the motor shaft.
5. Loosen the set screw in the lower drive pulley and remove the drive pulley and fan.

   Note: Do not remove the gray plastic fan from the lower drive pulley.

6. Remove the Terminal Block Bracket for the Motor Assembly.
7. Set the Function Lever to PAUSE. Hold the motor with one hand and back out the four Phillips-head screws from the top of the chassis. See Fig. 4-18.
8. Remove the upper (knurled) drive pulley (Capstan

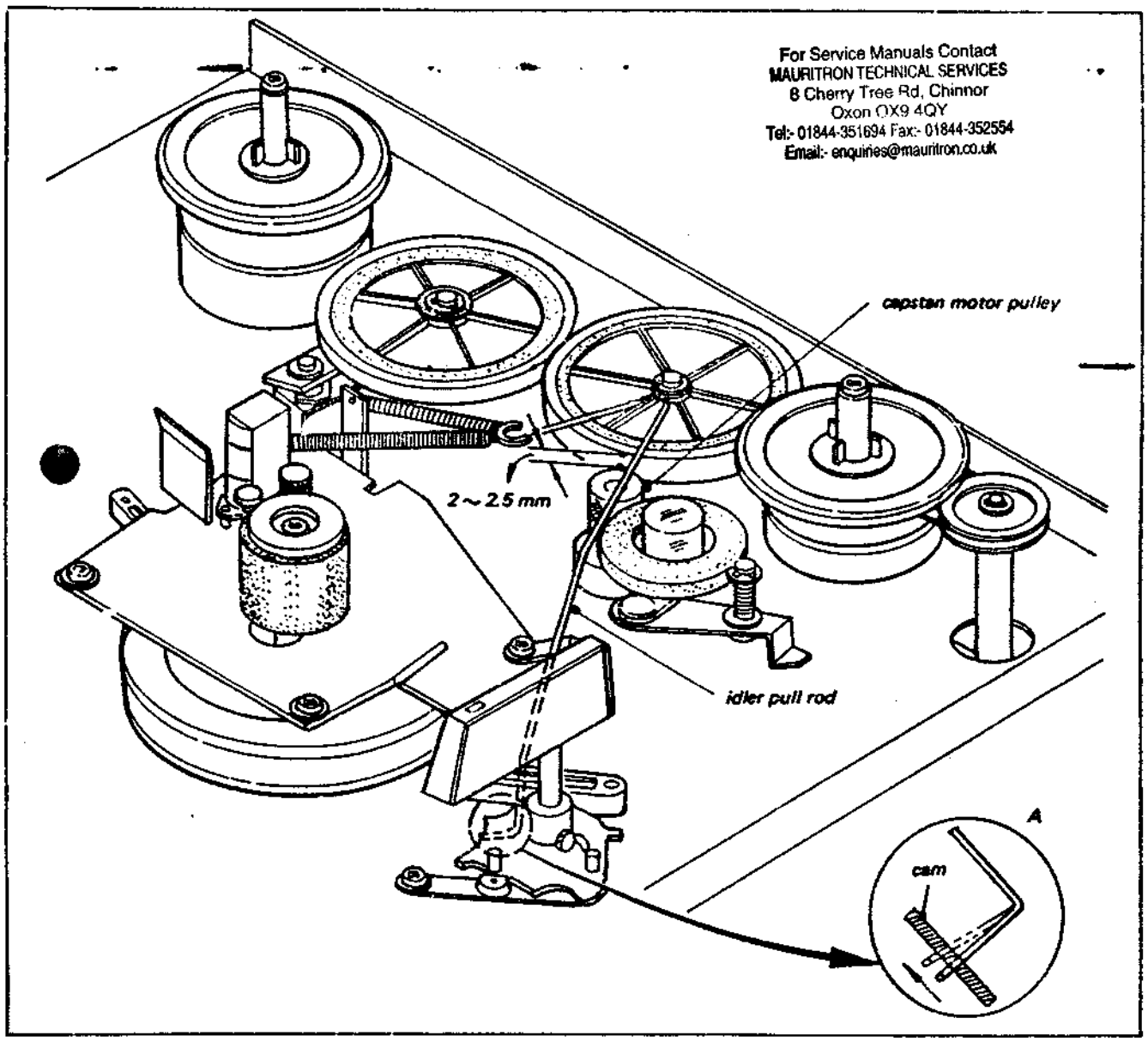


Fig. 4-17. Brake timing adjustment

Pulley) from the top of the motor shaft.

9. Note the position of the hum belt (the steel band that surrounds the motor). Loosen the two screws that apply tension to the hum belt and remove the belt.

10. Install the hum belt on the new motor. Position the mounting screws as shown in Fig. 4-18. Make sure that the hum belt straddles the two end bells equally.

11. Install the top (knurled) drive pulley on the upper motor shaft. Space the bottom edge of the pulley about 4 mm from the top of the motor.

12. Insert the screws with spring washers (PS 4 x 8) through the mounting holes at the top of the chassis.

13. Put the motor in place beneath the chassis with the leads coming out toward the bracket. Make sure that the upper pulley is inside the loop of the capstan drive belt. Thread the screws installed in Step 12 into the motor end bell.

14. Install the screws in the Terminal Block Bracket (into the lower end bell).

15. Tighten all screws.

16. Check the Capstan Drive Belt to make sure it is placed properly on the Flywheel.

17. Install the lower drive pulley. Refer to Step 4 for the proper position.

18. Slide the plastic sleeve over the motor leads. Solder the motor leads to the following tie points:
    black . . . . . terminal 3 of the terminal strip
    white . . . . . terminal 5 of the terminal strip
    green . . . . . common lug of C701

19. Install the Rotary Head Drum Assembly drive belt.

20. Operate the motor and check the FORWARD, PAST FORWARD, and REWIND operations. Check the running position of the lower drive belt as directed in Section 4-4.

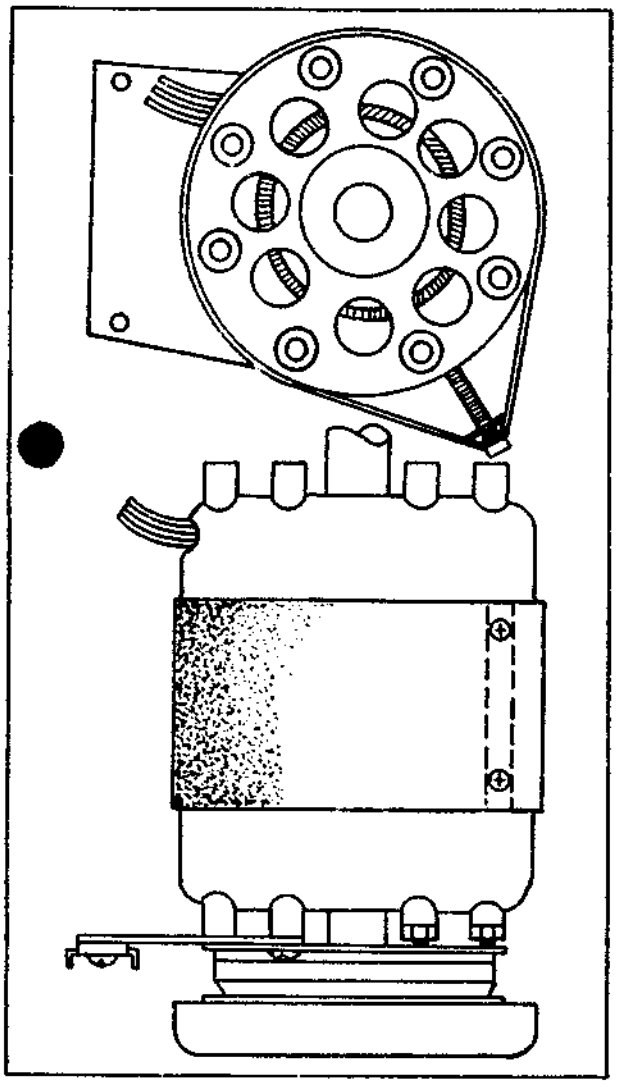


Fig. 4-18. Installation of the motor hum belt

5-14. RECORD BUTTON LATCH LINKAGE

1. Check that the RECORD and AUDIO DUB buttons can be pushed and locked only in the STOP and the PAUSE modes.

2. If the latch does not operate correctly, proceed as follows.

3. Make sure that the Record Button is clear of the Audio Set Lock Bar. Clearance should be between 0.1 and 0.3 mm. Bend "A" with a pair of pliers as needed to obtain the correct spacing. Refer to Fig. 4-19.

4. Push the RECORD Button. Check that the slide switches on the V2, A, and SV circuit boards are actuated.

5. Push the AUDIO DUB Button. Check that the slide switch on the A circuit board is actuated. If the switches do not operate correctly, proceed as follows.

6. Check for 2 mm clearance (or less) between Slide Plate B and the split nut with the AUDIO DUB Button released.

7. Turn the split nut of the Slide Switch Lever to adjust the stroke of Slide Plate C. If necessary, bend the Slide Switch Lever with a pair of pliers.

8. Adjust the Slide Switch Springs if necessary until

the clearance between the ends of the slide switches on V2, A, and SV, circuit boards and the Slide Switch Springs F, F, and C is approximately 1 mm. The Slide Switch Springs are wire leaf-type springs.

9. Actuate and release the RECORD and AUDIO DUB Buttons a few times. Check that the slide switches operate correctly.

4-15. AUTOMATIC SHUTOFF SWITCH ADJUSTMENT

To check the operation of the Automatic Shut-Off Switch, turn on the power and proceed as follows.

1. Remove the tape from the normal tape path. Set the Function Lever first to FORWARD, then to PAUSE, FAST FORWARD, and REWIND. The motor should shut off in each position after about 1 second. Repeat this check with tape threaded properly. The motor should remain on when the Function Lever is set to FORWARD, PAUSE, FAST FORWARD, and REWIND.
2. Set the Function Lever to STOP, and depress the RECORD button. The motor should turn on.
3. Thread the tape on the VTR. Make sure that the motor is not shut off by a slight overshoot of the tape sensing wire. If the aforementioned conditions are not met, proceed to the following steps.
4. Set the Function Lever to STOP. Check for approximately 5mm clearance between the tape surface and the sensing wire.

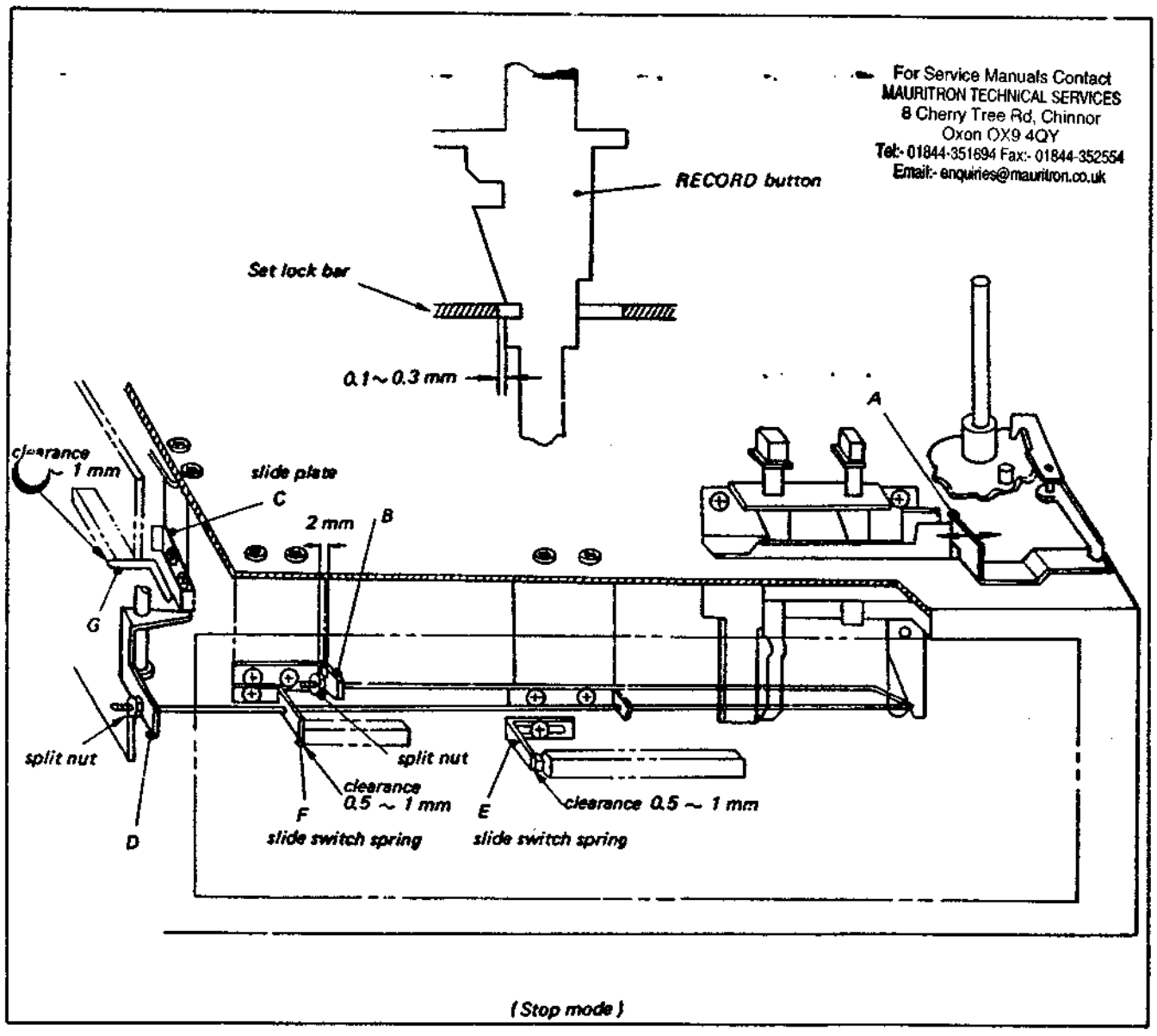


Fig. 4-19. RECORD button latching mechanism and adjustment

If not, bend the Section "A" of the sensing wire with a pair of pliers or turn the split nut at "B" shown in Fig. 4-20.

5. Set the Function Lever to the REWIND mode. Check that the microswitch turns off before the sensing wire is more than 3 mm beyond the tape running surface. If not, reposition the microswitch as follows:
6. Loosen the two screws that secure the microswitch to the mounting bracket or the two screws that fasten the mounting bracket to the chassis. Slide the bracket or microswitch to obtain the correct condiction. See Fig. 4-20.
7. Make sure that the microswitch turns off the [illegible]or correctly in each mode.
8. Make sure that the sensing wire operates smoothly without touching the Tape Guide or the Tapered Guide.

4-16. CAPSTAN BEARING AND SHAFT REPLACEMENT

A worn Capstan Bearing results in noisy operation (a squealing sound from the capstan). When it becomes necessary to replace the Capstan Bearing, the Capstan Shaft (assembly including the Flywheel) must be replaced as well.

Proceed as follows.

1. Remove the Reel Panel.
2. Remove the screw securing the Capstan and pry off the Capstan.
3. Remove the retaining washer holding the Pull Rod to the Right Rewind Idler Shaft. Remove The Pull Rod from the Idler Shaft.
4. Remove the two springs from the Rewind Idler Push Rod.
5. Remove the four screws securing the Capstan Deck Ass'y to the support on the chassis.

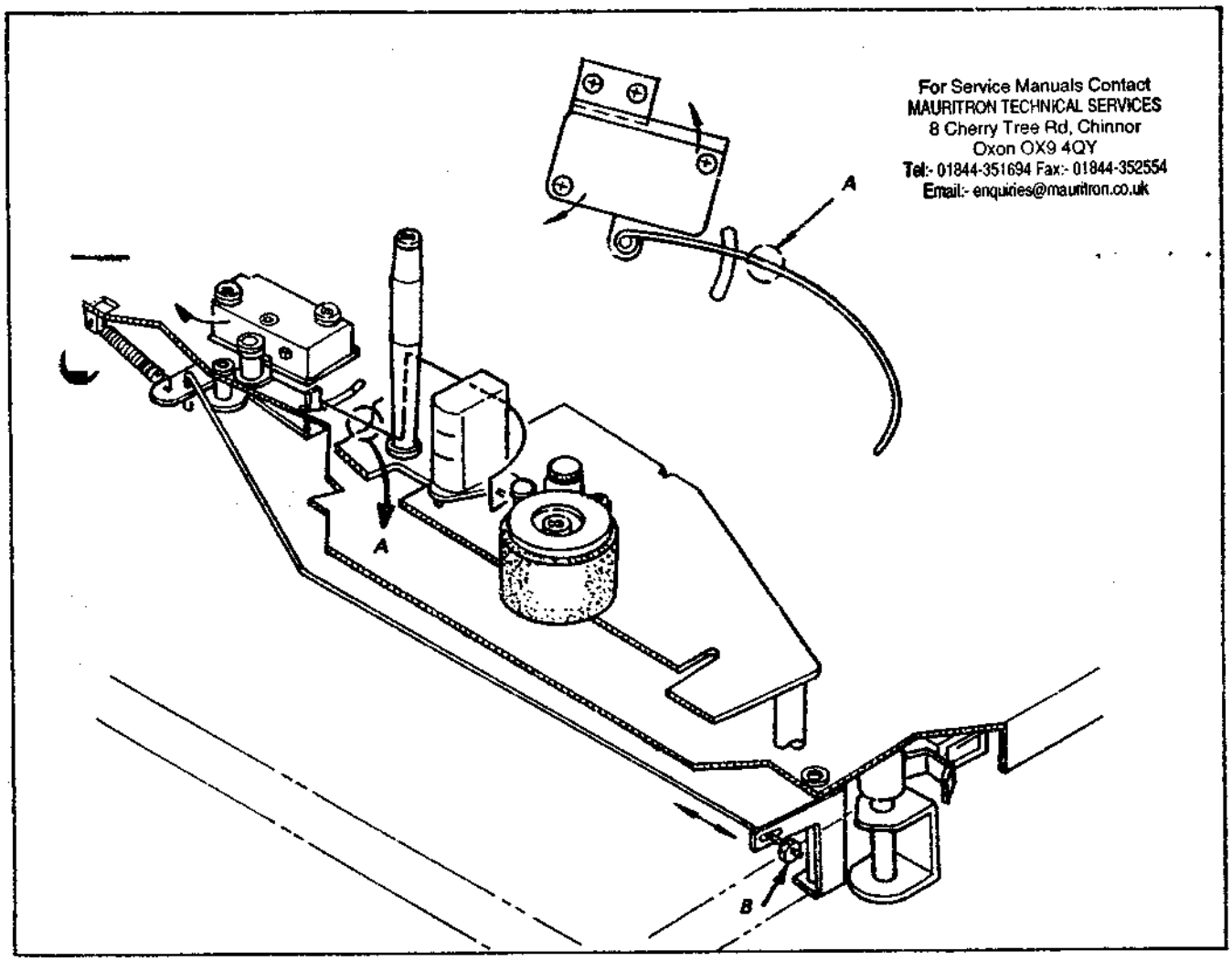


Fig. 4-20. Automatic shutoff switch adjustment

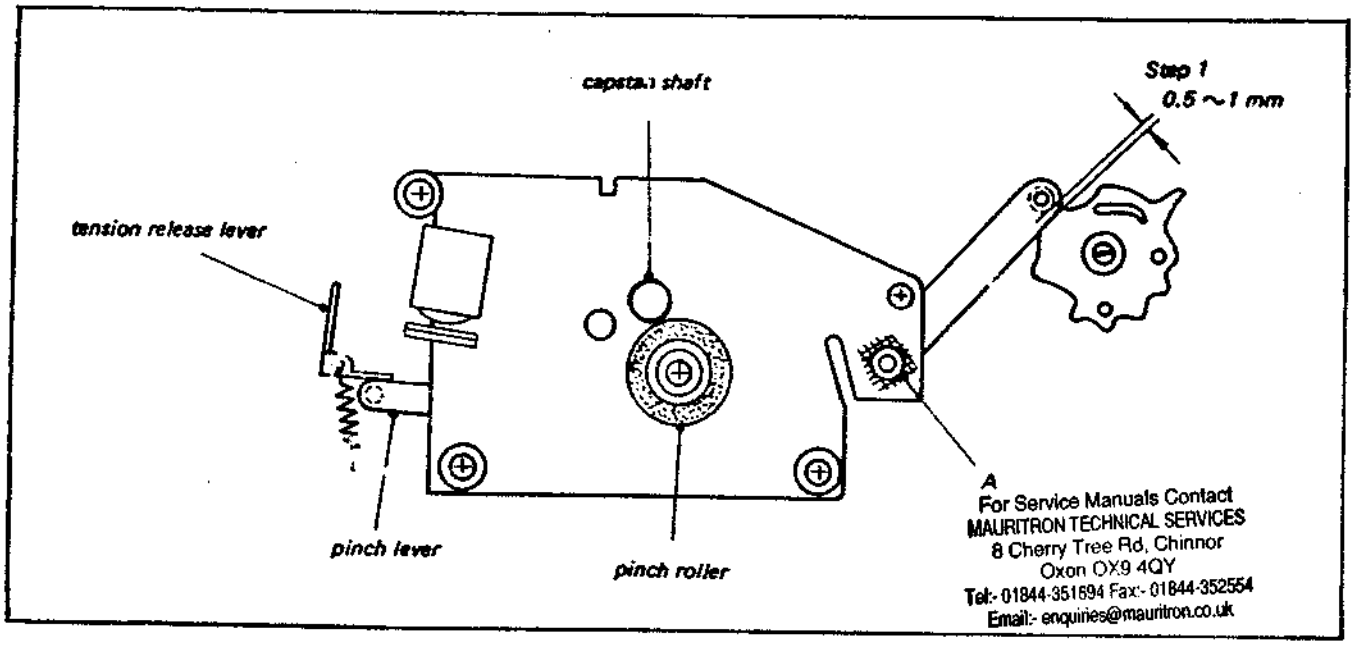


Fig. 4-21. Capstan deck adjustment

6. Lift up the Capstan Deck Ass'y. Take the drive belt off the Flywheel.
7. Pull the Capstan Shaft Ass'y (Flywheel) off the Capstan Bearing on the Capstan Deck.
8. Fold the Capstan Deck Ass'y back and remove the Capstan Bearing Retainer by removing the three screws.
9. Remove the Capstan Bearing Cap from the Capstan Bearing Oil Ring and Oil Ring Retainer using a screwdriver. Remove the Capstan Bearing.
10. Before installing the new Capstan Bearing inspect the replacement. Pass a clean lint-free cloth through the capstan hole, and inspect the inner surfaces for dirt or foreign matter.
11. Inspect the new Capstan Shaft Assembly. Handle the Capstan Shaft carefully to avoid scratches or nicks on the bearing surface.
12. Insert the Capstan Bearing into the Capstan Deck and put the Capstan Bearing Retainer on the Capstan Bearing. Tighten the three screws that secure the retainer to the chassis.
13. Place a few drops of oil on the inner surface of the bearing.
14. Put the Spacer on the Capstan Shaft. Insert the shaft into the Capstan Bearing.
15. Hold the Flywheel with one hand and slip the Oil Ring Retainer and Oil Ring onto the shaft. Place a few drops of oil on the Oil Ring, then put the Bearing Cap on the Capstan Bearing.
16. Reinstall the capstan drive belt. Reinstall the new Capstan and replace the mounting screw.
17. Put the Capstan Deck Assembly with Flywheel on the four posts of the chassis. Position the Pinch Lever with relation to Tension Release Lever as shown in Fig. 4-21.
18. Tighten the four screws that secure the Capstan Deck Assembly to the capstan deck supports.
19. Reconnect the Pull Rod Spring to the Pull Rod.
20. Install the Pull Rod and retainer onto the Rewind Idler Shaft.

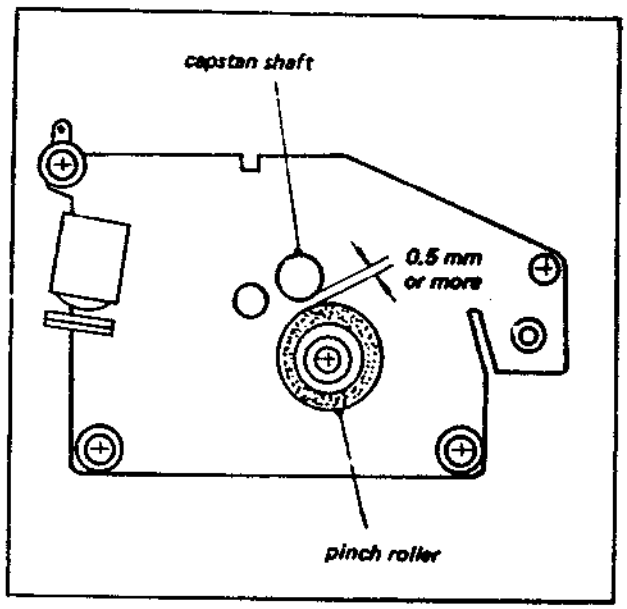


Fig. 4-22. Capstan deck adjustment

21. Operate the machine. Check servo tracking and Audio/Control Head Adjustment. See Section 4-9.

4-17. CAPSTAN DECK ASSEMBLY ADJUSTMENT

1. Set the Function Lever to FORWARD. Check that the clearance between the Pinch Lever and the Function Selector Cam is 0.5 to 1 mm. If necessary, readjust the position of the Capstan Deck Assembly. See Fig. 4-21.
2. Set the Function Lever to PAUSE. Make sure that the clearance between the Capstan Shaft and the Pinch Roller is more than 0.5 mm. If necessary, recheck Step 1.
3. Set the Function Lever to FORWARD. Check that the clearance between the upper end of the Pinch Lever and the lower end of the Drum Mounting Deck is more than 1.5 mm. See Fig. 4-23. If it needs adjustment, bend "A" in Fig. 4-21. with a pair of pliers. Recheck Pinch Roller Pressure as described in Section 4-18.
4. Switch the Function Lever through all modes. Check the tape motion.

4-18. PINCH ROLLER

Pinch Roller Replacement

Replace a worn or damaged Pinch Roller as follows.

1. Place the VTR in the STOP mode.
2. Remove the Pinch Roller Retainer and mounting screw from the top of the Pinch Roller.
3. Lift off the Pinch Roller.
4. Remove the Pinch Roller Spacer and the Pinch Roller Oil Ring from the top of the Pinch Roller.
5. Install the Pinch Roller Spacer and the Pinch Roller Oil Ring on the top of the replacement Pinch Roller.
6. Place the Pinch Roller Assembly on the Pinch Roller Shaft.
7. Install the Pinch Roller Retainer and mounting screw.

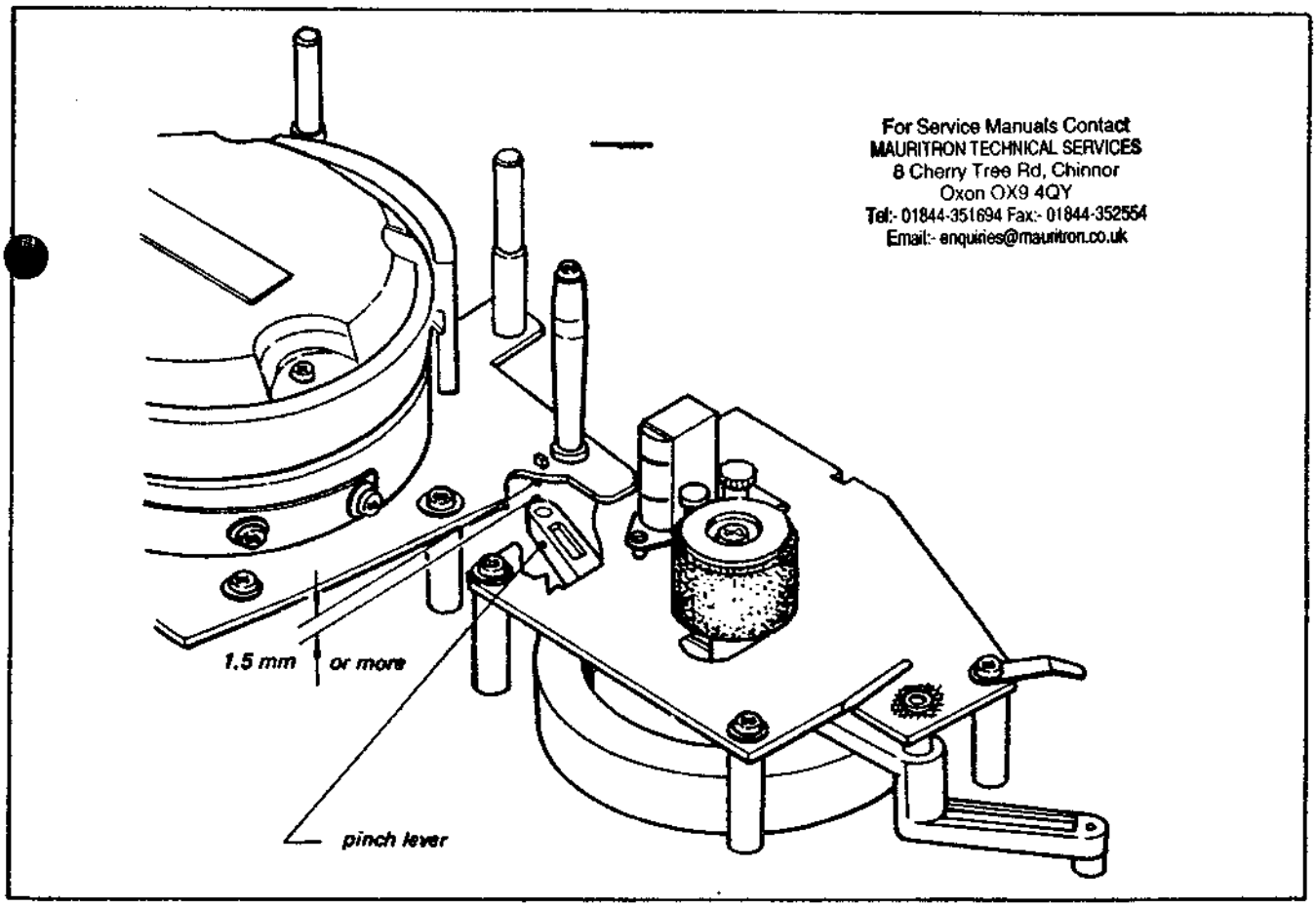


Fig. 4-23. Pinch lever adjustment

8. Test the Pinch Roller to see that it spins freely.

Pinch Roller Pressure Adjustment

1. Set the Function Lever to FORWARD. Check for 0.1 mm clearance between the lower end of the Pinch Roller and the Capstan Shaft when the upper end of the Pinch Roller contacts the Capstan Shaft. See Fig. 4-24. Bend "A" in Fig. 4-21 with a pair of pliers as needed to obtain the correct spacing.

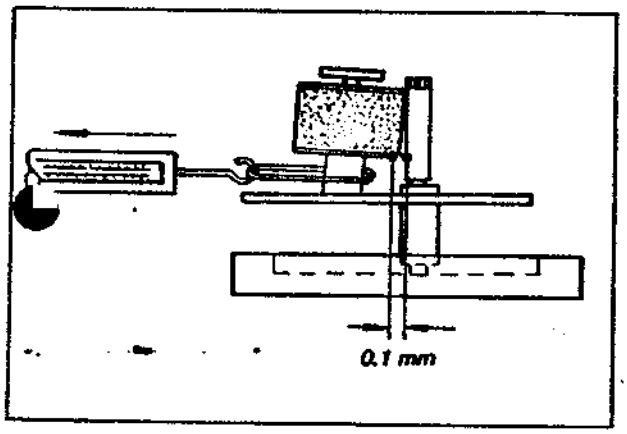


Fig. 4-24. Pinch roller adjustment

2. Place the Function Lever in the FORWARD position. Make a loop in a piece of string and attach the spring scale around the base of the Pinch Roller Shaft. See Fig. 4-24. Pull the scale in the direction indicated by the arrow. Check the reading when the Pinch Roller just leaves the Capstan Shaft. It should be between 1.5 and 2.2 kg.

4-19. MICROSWITCH MAINTENANCE AND ADJUSTMENT

1. Set the Function Lever to the STOP mode. Make sure that the switching button of the microswitch (SW 4, under the chassis, beneath t. Function Lever) is in the center of the Cam. See Fig. 4-25. Note, the microswitch (SW 4) turns off with the pushbutton pressed.
2. If it does not operate normally, loosen the mounting screw and readjust the position of the Microswitch Assembly within the slot of the Microswitch Mounting Bracket. After adjustment, apply a suitable locking compound to the mounting screw.
3. Coat the Cam contacting surface with grease.

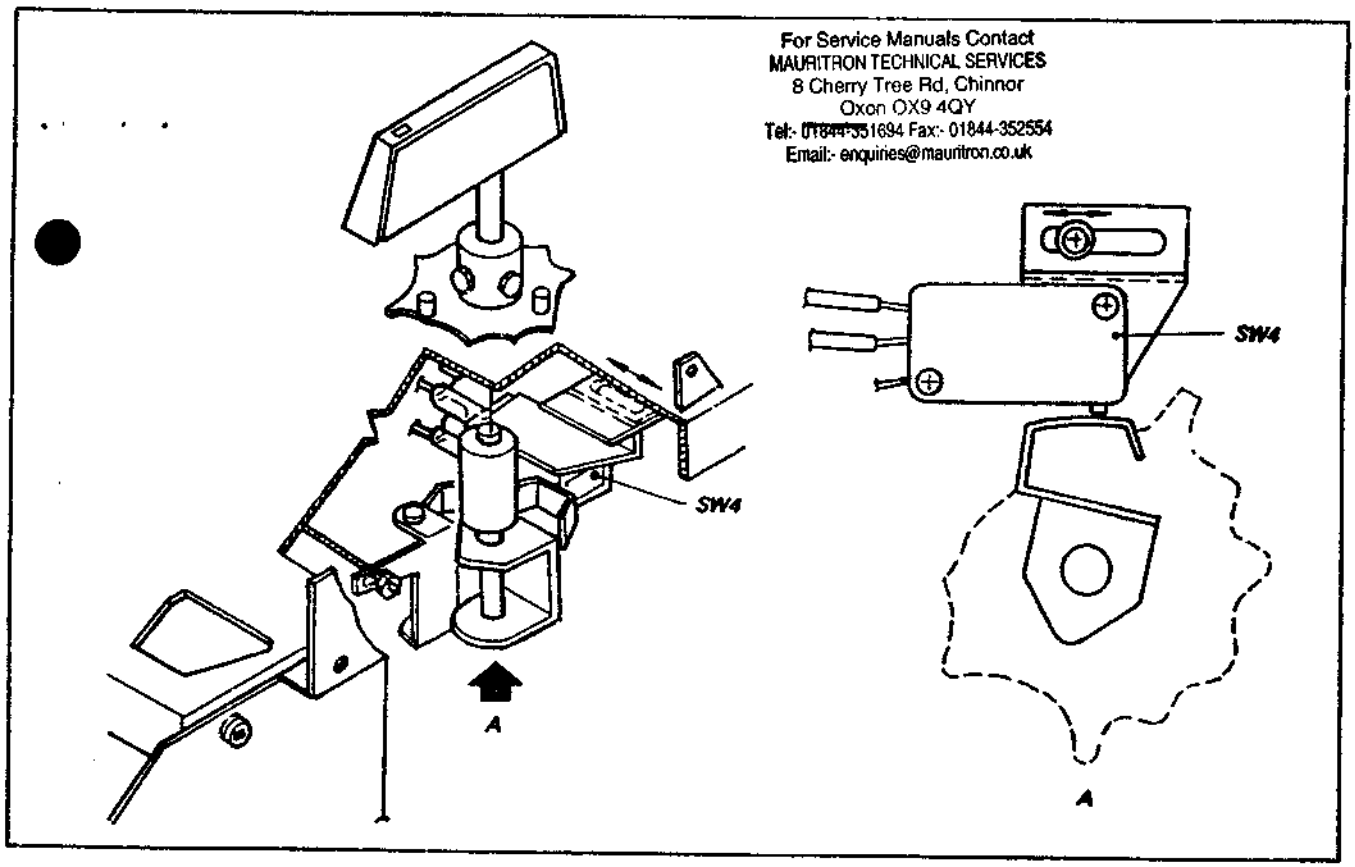


Fig. 4-25. Microswitch adjustment

SECTION 5
VIDEO SYSTEM ALIGNMENT

EQUIPMENT REQUIREMENTS

The following test equipment is suggested for use in SONY Authorized Service Stations.

a. TV monitor –SONY CVM-Monitor or equivalent
b. Oscilloscope –Nord-Mende SO 367/1
c. Audio Generator –Nord-Mende SRG 389
d. ACVTVM (Audio)–Nord-Mende URV 356/1
e. Volt-Ohm-Milliammeter –Nord-Mende TVM 396/1
f. Prerecorded Test Tape –SONY Part Code No. 8-9 3-505-80
g. Video Signal Generator –Nord-Mende EG 387 *off the air test pattern video signal is available
h. R-F Signal Generator–Philips PM 5321

The following test equipment is required for use at Factory Service Stations.

a. TV monitor –SONY CVM Monitor or equivalent
b. Oscilloscope –Tektronix 422, 561A with 3A1, 3B3 plug-ins or equivalent
c. Audio Generator –Nord-Mende SRG 389
d. AC VTVM (Audio)–Nord-Mende URV 356/1
e. Volt-Ohm-Milliammeter–Nord-Mende EG 387
f. Prerecorded Test Tape –SONY Alignment Tape, 7" reel Part No. 8-943-505-80
g. Video Signal Generator–Nord-Mende EG 387
h. R-F Signal Generator–Philips PM 5321

5-1. MAXIMUM DEVIATION ADJUSTMENT (Sync Tip Carrier Frequency, Deviation, Dark Clip, & Video Output Level)

Test Point/Board: TP-203/V3 (Modulator video input)
TP-302/V1 (Limiter output)
TP-306/V1 (Video output)

Adjust for: 1.0 V (p-p) video output with 3.8 MHz to 5.2 MHz modulator input.

Adjustment/ Board:
R228/V3 (Sync Tip Carrier Frequency)
R237/V3 (White Clip)
R238/V3 (Dark Clip)
R221/V3 (Deviation Set)
R319/V1 (Video Output Level)

Signal Source: (1) Camera or telecast signal, preferably a test pattern.

Equipment Required:
(1) Oscilloscope
(2) Video camera
(3) SONY Alignment Tape

Procedure

1. Play back the SONY Alignment Tape.
2. Connect a scope to TP-306.
3. Adjust R319 (Video Output Level) for 1.0 volt (p-p).
4. Set up the E-to-E mode with no input signal.
5. Connect the scope to TP-302.
6. Adjust R228 (Sync Tip Carrier Freq.) for 3.8 MHz as indicated on the scope screen.
   3.8 MHz can be measured as follows.
   a. Adjust scope time base for 0.5 μsec per division (calibrated)*.
   b. Set scope controls to obtain a stable trace. A correct carrier frequency of 3.8 MHz is indicated when there are 19 complete square waves in ten divisions. Set R228 to produce this indication.
7. Set up the E-to-E mode using a telecast signal of 1.0 volt (p-p).
8. Connect the scope to TP-306.
9. Set R221 (Deviation Set) to produce 1.0 volt (p-p).
10. Set up the E-to-E mode using a telecast signal, preferably a test pattern.
11. Connect the scope to TP-203. Set the time base to 2 msec/cm.
12. Adjust R238 so that the negative spike in the vertical blanking pulse falls 30% below sync tip amplitude. See Fig. 5-1.
13. Adjust R237 (White Clip) so that extreme peak-white parts of the waveform are $A+\frac{A}{2}$ volts (p-p) as shown in Fig. 5-1.

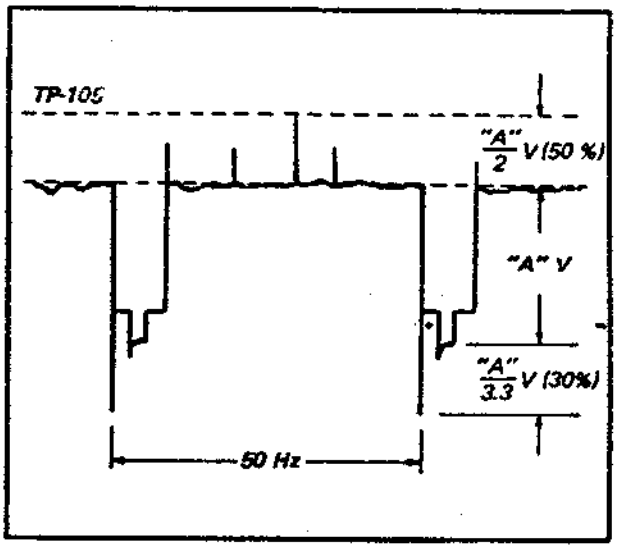


Fig. 5-1. White clip and dark clip levels

5-2. CARRIER LEAK ADJUSTMENT

The fm signal waveform must be symmetrical throughout the rf system, from the modulator to the demodulator or carrier energy will appear in the picture as a herringbone pattern.

Test Point: Monitor screen

Adjust for: Minimum carrier leak in the picture.

Adjustment/ Board:
R305/V1 (Limiter Carrier Balance)
R315/V1 (Freq. Doubler Carrier Balance)
R248/V3 (Modulator Carrier Balance)
C251/V2 (Modulator Carrier Balance)

Signal Source: Camera signal or telecast signal

Equipment Required:
(1) TV monitor
(2) SONY AV-Series camera

* Check the scope time-base calibration before making this adjustment.

Procedure:

1. Check carrier frequency and maximum deviation. See Sec. 5-1.

   Note: Because the procedure in Sec. 5-1 is lengtiy and somewhat complicated, it may be checked and, if necessary, re-adjusted after Sec. 5-2. If the procedure in this section does not yield correct results, however, carrier frequency and maximum deviation must be set (Sec. 5-1).

2. Set up the E-to-E mode using a camera or telecast signal.

3. Adjust R305 (Limiter Carrier Balance)* and R315 (Freq. Doubler Carrier Balance)** for minimum carrier leak (herringbone). Repeat both adjustments.

4. Adjust R248 (Modulator Carrier Balance) and C251 (Modulator Carrier Balance) for minimum carrier leak. Repeat both adjustments.†

5. Repeat Steps 3 and 4.

6. Make a recording.

7. Play back the tape and observe the picture. If carrier leak is still visible, trim up R305 and R315 to minimize carrier leak in the playback picture.

5-3. RECORD CURRENT ADJUSTMENT

The following adjustment sets the level of signal applied to the video heads for recording.

Procedure:

1. Set up the record mode using a camera or telecast signal.
2. Connect the scope to TP-208/V3 Board. Set the time base to 2 msec/cm.
3. Adjust R243 for a 0.5 V(p-p) ±0.05 V output.
4. Connect the scope to TP-205. Connect the microphone to the VTR.
5. Adjust R260 to change record level in 0.2 V steps and call the level into the microphone.
6. Connect the scope to TP-206.
7. Adjust R269 to change record level in 0.2 V steps and call the level into the microphone.
8. Re-connect the scope to TP-207 and play back the tape. Note the voltage level (as indicate by the voice recording) at which output is greatest.
9. Adjust R260 and R269 for the record level that produced maximum playback output level.

5-4. PLAYBACK PREAMPLIFIER ADJUSTMENT (Head Resonance and Playback Equalization)

Frequency characteristics of the playback amplifiers are adjusted to equalize head-to-tape characteristics and to obtain the desired overall frequency response.

Test Point/ Board: TP-207/V3 (PB rf output)

Adjust for: Correct frequency response as shown in Fig. 5-4.

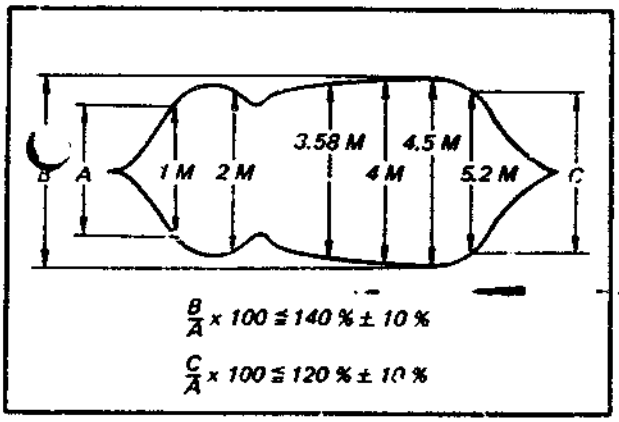


Fig. 5-4. Playback preamplifier frequency response

Procedure

1. Play back the rf sweep portion of the SONY alignment tape.
2. Connect the scope to TP-207/V3 Board. Sync the scope externally from TP-401/SV Board. Set the scope time base to 2 msec/cm. Four peaks in the playback rf signal indicate the 1 MHz, 2 MHz, 3.58 MHz and 4.5 MHz points.
3. Set R283 (resonance gain) fully counterclockwise.
   Set R285 (resonance gain) fully clockwise. Adjust C237 (Ch A) and C240 (Ch B) for a resonant frequency of 5.2 MHz.
4. Adjust R283 and R285 for the correct playback rf envelope as shown in Fig. 5-4.
5. Set R293 (equalize gain) fully clockwise. Adjust L205 for equalize frequency of 4.0 MHz. Adjust R283, R285 and R293 for correct rf envelope as shown in Fig. 5-4.

SECTION 6
SERVO SYSTEM ALIGNMENT

The servo system alignment procedure and sequence is shown in Chart 6-1.

Drum-Speed Control System

FREE-RUNNING SPEED CHECK (Sec. 6-1)

↓

VERTICAL SYNC SEPARATOR CHECK (Sec. 6-2)

↓

2 : 1 FREQUENCY DIVIDER CHECK (Sec. 6-3)

↓

25-Hz PULSE ADJUSTMENT (Sec. 6-4)

↓

25-PG PULSE LOCK PHASE ADJUSTMENT (Sec. 6-5)

↓

SERVO RESPONSE-TIME ADJUSTMENT (Sec. 6-6)

↓

PLAYBACK SERVO CHECK (PB) (Sec. 6-7)

Phase Control System

Complete Drum-Speed Control System

↓

25 PG PULSE POSITION CHECK (25 PG Coil Position) (Sec. 6-8)

↓

25 PG PULSE PHASE CHECK (Sec. 6-9)

↓

SERVO REFERENCE DELAY MV(REC) (Sec. 6-10)

SERVO REFERENCE DELAY MV (PB) (Sec. 6-11)

↓

TRACKING CONTROL CHECK (Sec. 6-12)

Camera Control System

VERTICAL SYNC FORMER CHECK (Sec. 6-13)

Chart 6-1. Servo system alignment

6-1. FREE-RUNNING SPEED CHECK

This test shows if the Rotary-Head Assembly rotates at the correct speed without servo correction.

Test Point/ Board: TP-412/SV (Shaped 30 PG pulse output)

Adjust for: 25.20 Hz to 25.29 Hz

Adjustment: Check the Rotary Head Drum Belt or refer to a SONY FACTORY SERVICE BRANCH.

Signal Source: None required

Equipment Required: (1) Frequency counter

Procedure A:

1. Unsolder the brake coil lead (red) where it connects to TP-411 on the SV Board.
2. Set up the E-to-E mode.
3. Connect a frequency counter to TP-412.
4. Check the drum speed. The counter reading should be 25.20 Hz to 25.29 Hz.
5. If it is not correct, inspect the Rotary-Head-Drum Belt. Other causes of incorrect free-running speed should be referred to a SONY FACTORY SERVICE BRANCH.

6-2. VERTICAL SYNC SEPARATOR CHECK

The test checks the output of the sync separator.

Test Point/ Board: TP-404, TP-405, TP-406/SV

Check: Waveforms shown in Fig. 6-1.

Adjustment: None

Signal Source: Telecast signal

Equipment Required: (1) Oscilloscope
(2) TV monitors

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-404, TP-405, and TP-406 and check that the waveforms shown in Fig. 6-1 are correct.
3. If they are incorrect, check and troubleshoot the sync separator circuit.

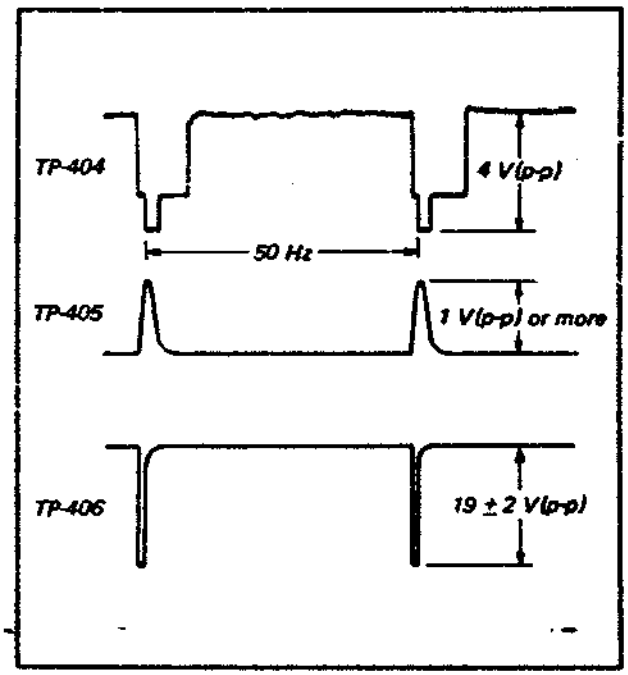


Fig. 6-1. Sync separator check

6-3. 2 : 1 FREQUENCY DIVIDER CHECK

Test Point/ Board: TP-407/SV (Separated sync pulse/ CTL pulse)

Adjust for: The waveform shown in Fig. 6-2.

Adjustment/ Board: R433/SV (25 Hz adjustment)

Signal Source: Telecast Signal

Equipment Required: (1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-407.
3. Adjust R433 so that the interval "T" in Fig. 6-2 is 9 ± 1 msec.
4. Confirm that pulse amplitude is 15 ± 2 volts as shown in Fig. 6-2.

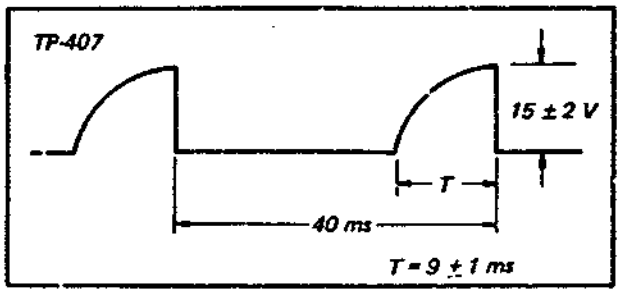


Fig. 6-2. Frequency divider check

6-4. 25-Hz PULSE ADJUSTMENT

This adjustment shapes the output of MM404 into a 50% duty cycle.

Incorrect duty cycle may cause servo hunting or slow lock up.

Test Point/
Board: TP-409/SV (MV output)

Adjust for: 25-Hz pulse with a 50% duty cycle

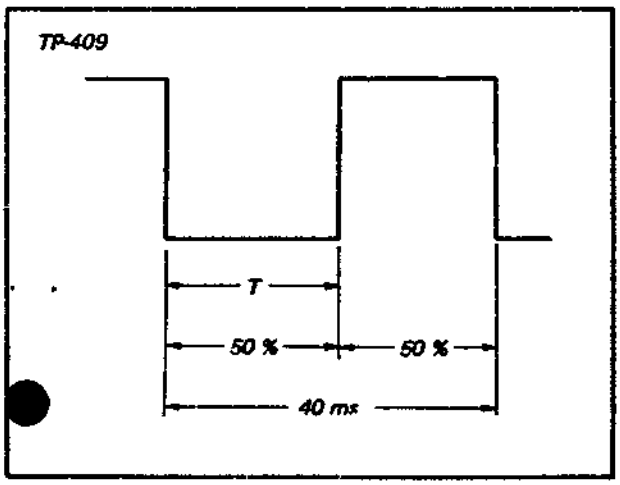


Fig. 6-3. 25-Hz pulse adjustment

Adjustment/
Board: R441/SV (Pulse Duty Cycle)

Signal Source: Telecast signal

Equipment Required:
(1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-409. Set the time base to 5 msec/cm.
3. Adjust R441 so that the interval "T" in Fig. 6-3 is 20 ± 0.5 msec, i.e., a duty cycle of 50%.

6-5. 25 PG PULSE LOCK PHASE ADJUSTMENT

This gain adjustment determines the location of the 25 PG feedback pulse on the 25 Hz MV output ramp.

Test Point/
Board: TP-410/SV (Integrated 25 Hz pulse)

Adjust for: See Fig. 6-4.

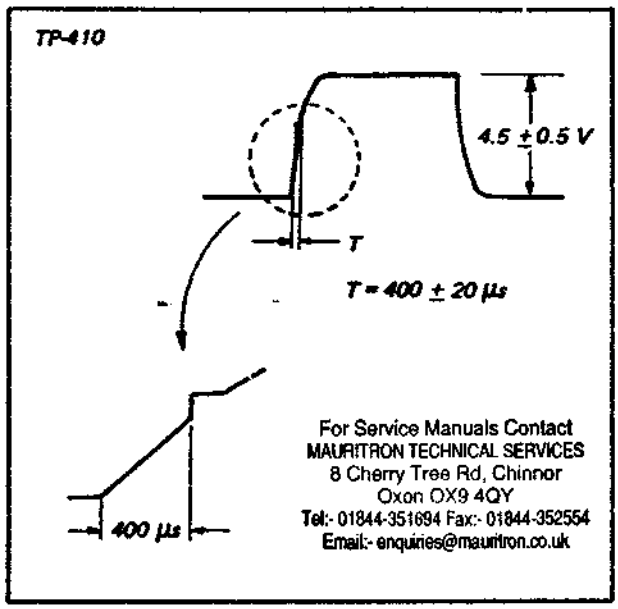


Fig. 6-4. Lock phase adjustment (REC/E-E mode)

Adjustment/
Board: R454/SV (Lock Phase)

Signal Source: Telecase signal

Equipment Required:
(1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-410.
3. Set the scope for 5 ms/cm horizontal sweep and pull out the 5X magnifier.
   Each division on the time-base now represents 1 msec.
4. Adjust the POSITION control on the scope to observe the interval "T" in Fig. 6-4.
5. Adjust R454 to set the position of the 25 PG pulse with respect to the 25 Hz multivibrator ramp as shown by "T" in Fig. 6-5.

6-6. SERVO RESPONSE-TIME ADJUSTMENT (Hunting)

Test Point/ Board: TP-410/SV (Integrated 25 PG pulse output)

Adjust for: Minimum lock-in time when the Videocorder is set to the REC/E-E mode from a complete stop.

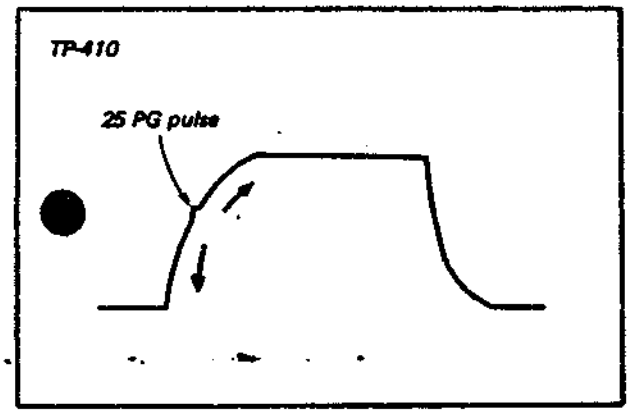


Fig. 6-5. Servo response-time adjustment

Adjustment/ Board: R451/SV (Servo Response Time)

Signal Source: Telecast signal

Equipment Required: (1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-410.
   Set the time base to 5 msec/cm.
3. Set the Function Lever to STOP (release the RECORD button) and wait until the rotating head stops turning completely. Then, depress the RECORD button.
   Observe the waveform on the scope. The PG pulse will move up and down a few times and then lock on the 25 Hz multivibrator ramp as shown in Fig. 6-5.
4. Adjust R451 for minimum lock-in time without hunting. Repeat Step 3 after each adjustment of R451.

Note: Clockwise rotation of R451 shortens the lock-in time, but increases hunting. Counterclockwise rotation decreases hunting but lengthens lock-in time.

6-7. PLAYBACK SERVO CHECK

Check that the correct CTL (Control track) pulses are reproduced for the servo system in the Playback mode.

Test Point/ Board: TP-406/SV (CTL pulse output)

Check: Waveforms in Fig. 6-6.

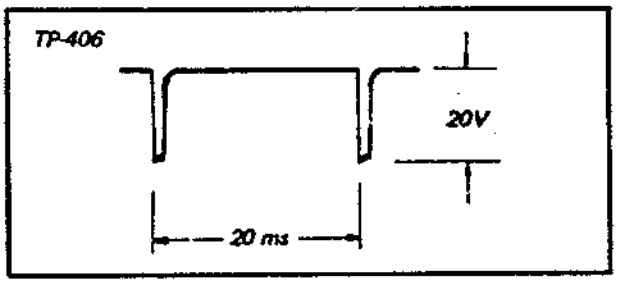


Fig. 6-6. Control track pulse check

Adjustment: None

Signal Source: Telecast Signal

Equipment Required: (1) Oscilloscope
(2) TV monitor

Procedure:

1. Make a recording of a telecast signal.
2. Play back the tape.
3. Connect the scope to TP-406 and check the waveform shown in Fig. 6-6.
4. Confirm that the picture locks up correctly in the Playback mode. If the servo system does not stabilize, troubleshoot the CTL pulse amplifying circuits.

The following adjustments in Secs. 6-8 and 6-9 are necessary only when either one of 30 PG coils has been replaced or repositioned.

6-8. 25 PG PULSE POSITION CHECK (25 PG Coil Position)

Correct coil positions ensure proper switching between video heads, and also ensure switching at the proper time with respect to vertical sync.

CAUTION

Avoid adjustment of 25 PG coils unless tests indicate that adjustment must be made.

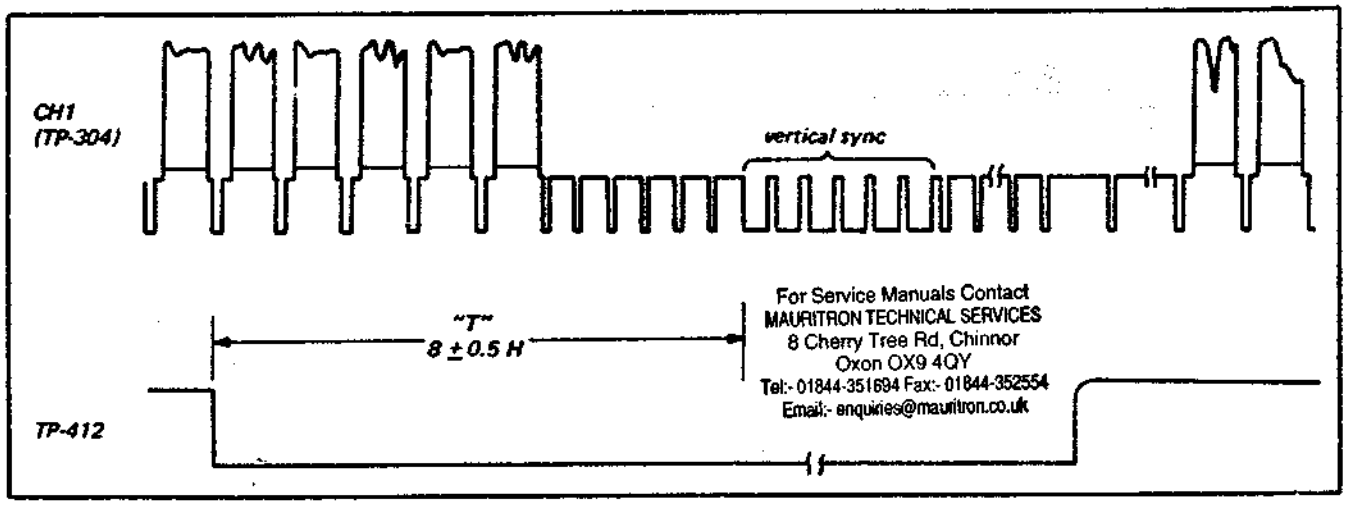


Fig. 6-7. 25 PG coil position

Test Point/ Board: TP-304/V1 (Video signal output)
TP-412 (Wave-shpaed 25 PG output)

Check: 8 ± 0.5 H phase difference
See Fig. 6-7

Adjustment: 25 PG Coil A

Signal Source: Alignment Tape

Equipment Required: (1) Oscilloscope
(2) SONY Alignment Tape

Procedure:

1. Play back the SONY Alignment Tape.
2. Connect a dual-trace scope CH-1 probe to TP-304 and CH-2 probe to TP-412. Set the time base to 2 ms/cm and the MODE select switch to CHOP.
3. Sync the scope externally from TP-403.
4. Pull out the 5X magnifier and adjust the POSITION control to observe the second vertical blanking interval as shown in Fig. 6-7.
5. Check that the interval "T" shown in Fig. 6-7 is 8 ± 0.5 H (horizontal lines).
6. If it is correct, proceed to the "25 PG PULSE PHASE CHECK" in Sec. 6-9. If it is not correct, reposition 25 PG Coil A, which is mounted at the front of the scanner, at the six o'clock position. See Fig. 6-8. Be sure the motor is off when making this adjustment. Proceed as follows.
7. Stop the motor (release the RECORD button) and allow the heads to stop turning.

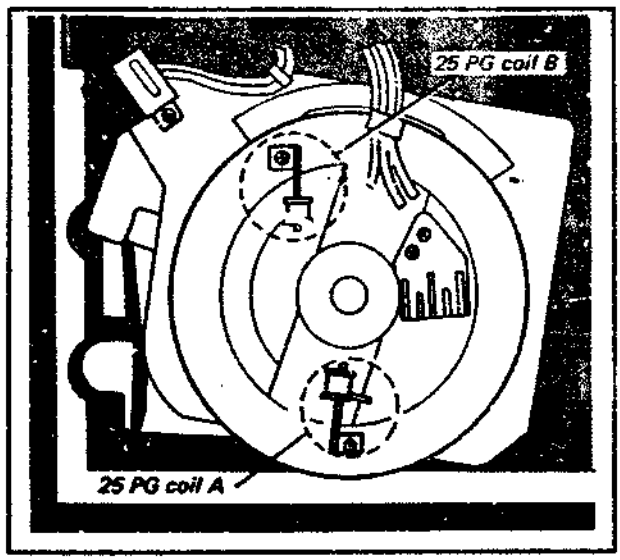


Fig. 6-8. 25 PG coils A and B

8. Loosen the screw securing 25 PG Coil A, and reposition the coil. If "T" in Fig. 6-7 is more than 8 ± 0.5 H, move the coil slightly to the left (in the direction of scanner rotation). If "T" is less than 8 ± 0.5 H, move the coil to the right. Be very careful when adjusting coil position. Make sure that the gap between the coil poles and the rotating pole piece remains the same. Also, make sure that the coil poles and the rotating pole pieces line up when viewed from above.
9. Before turning on the motor again, rotate the video heads by hand to check that the pole piece clears both 25 PG coils.
10. Start the motor again and check the waveform.
11. Repeat Steps 5 to 10 until the interval "T" of 8 ± 0.5 H is achieved.

Interaction:

This adjustment may interact with those described in Sections 6-5, 6-9, and 6-11. Whenever 25 PG coil A is adjusted, check and, if necessary, readjust these sections.

6-9. 25 PG PULSE PHASE CHECK

This procedure sets up the precise angular displacement between the two 25 PG coils. One 25 PG coil should be exactly 180° from the other (In practice 25 PG coil B is positioned 180°-15°CCW. −15° is compensated by MM405 on SV Board.). When properly adjusted, correct interlace is achieved in the playback picture and vertical jitter is minimized. This adjustment follows "25 PG Pulse Position Check" in Sec. 6-8.

CAUTION

Avoid adjustment of the 25 PG coil unless tests indicate that the adjustment must be made.

Test Point/ Board: TP-412/SV (Shaped 25 PG pulse output)

Adjust for: Minimum phase difference

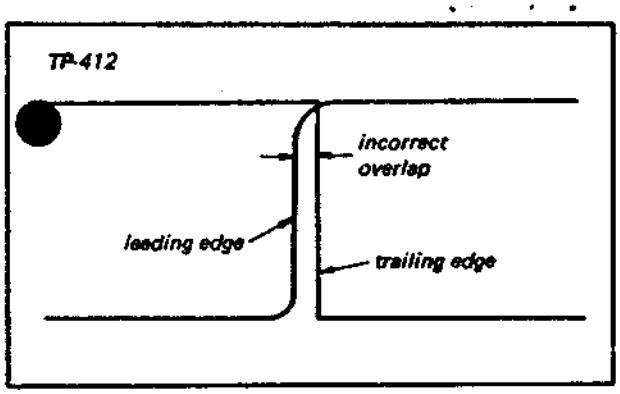


Fig. 6-9. 25 PG Pulse phase check

Adjustment: 25 PG Coil B

Signal Source: Telecast Signal

Equipment Required: (1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-412.
3. Sync the scope externally from TP-406. Set the time base to 5 ms/cm.
4. Turn the VARIABLE control of the scopes time-base counterclockwise (from the CALIBRATED to the UNCALIBRATED) until two pulses can be seen at the same time on the scope.
5. Pull out the 5X magnifier and adjust the HORIZONTAL POSITION control to observe the leading edge of either pulse. See Fig. 6-9.
6. Check that the leading edge of a pulse does not overlap the trailing edge of the previous pulse.
7. If it does adjust R459 on SV Board.

6-10. SERVO-REFERENCE DELAY MV (REC)

The servo-reference delay multivibrator (MM401) adjusts the precise angular position of heads with reference to the vertical sync pulse.

Test Point/ Board: TP-403/SV (Delayed 25 PG pulse output)

Adjust for: A pulse width of 1 msec. See Fig. 6-10.

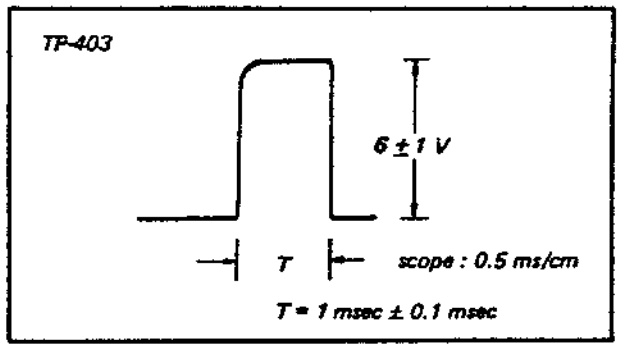


Fig. 6-10. Delay multivibrator adjustment (REC mode)

Adjustment/ Board: R413/SV (Lock Phase)

Signal Source: Telecase signal

Equipment Required:
(1) Oscilloscope
(2) TV monitor

Procedure:

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-403.
3. Adjust R413 to obtain the pulse width (T) of 1 msec as shown in Fig. 6-10.
4. Confirm that the pulse amplitude is 6 ± 1 V. If it is not, and the servo system does not stabilize, check MM401 and, if necessary, replace it.

6-11. SERVO-REFERENCE DELAY MV (PB)

The servo-reference delay multivibrator adjusts the precise angular position of the heads with reference to the playback video signal in the Playback mode.

Test Point/ Board: TP-403/SV (Delayed 25 PG pulse output)

Adjust for: A pulse width of 1.8 msec. See Fig. 6-11.

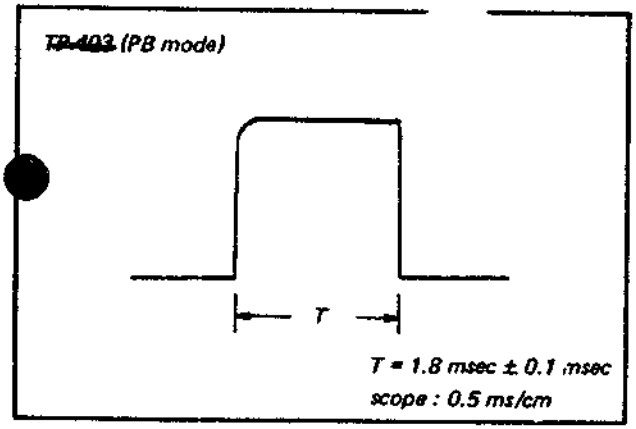


Fig. 6-11. Delay multivibrator adjustment (PB mode)

Adjustment/ Board: R412/SV (Lock Phase)

Signal Source: Telecast signal

Equipment Required:
(1) Oscilloscope
(2) TV monitor

Procedure:

1. Make a recording of a telecast signal.
2. Play back the tape.
3. Connect the scope to TP-403.
4. Adjust R412 (PB Lock Phase) to produce 1.8 ms pulse width as shown in Fig. 6-11.

6-12. TRACKING CONTROL CHECK

This test checks the range of the variable tracking control.

Test Point/ Board: TP-408/SV (Tracking MV output)

Check: See Fig. 6-12.

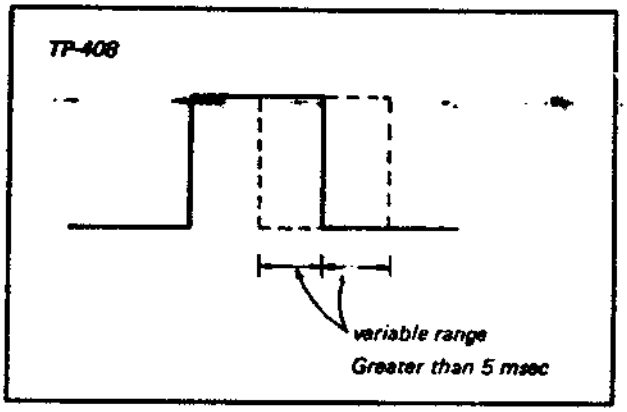


Fig. 6-12. Tracking control check

Adjustment: R007 (TRACKING control)/Control Panel

Signal Source: Telecast signal

Equipment Required:
(1) Oscilloscope
(2) Blank tape
(3) TV monitor

Procedure:

1. Make a recording of a telecast signal.
2. Play back the tape.
3. Connect the scope to TP-408
   Set the time base to 2 msec/cm.
4. Pull and turn the TRACKING control (R007) and confirm that the output pulse shifts greater than 5 msec as shown in Fig. 6-12.

6-13. VERTICAL SYNC FORMER CHECK

Test Point: 6-Pin CAMERA Receptacle

Check: Waveform shown in Fig. 6-13.

Adjustment: None

Signal Source: None required

Equipment Required: Oscilloscope

Procedure:

1. Turn on the Videocorder with or without an input signal.
2. Connect a 75-ohm resistor between Pin 2 and Pin 6 of the 6-pin CAMERA receptacle.
3. Connect the scope to Pin 2.
4. Check that the output is as shown in Fig. 6-13.
5. If it is not, check and troubleshoot the SY3 Board mounted behind the connector panel.

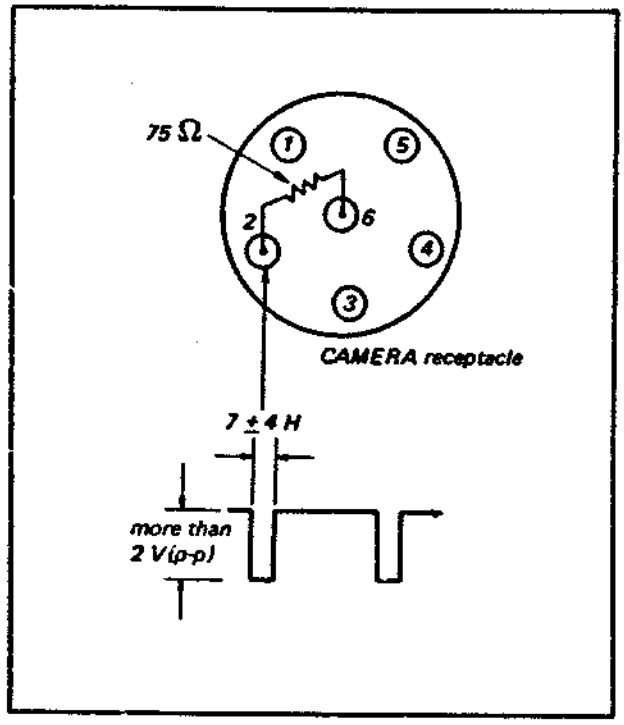


Fig. 6-13. Vertical sync for camera

SECTION 7

AUDIO SYSTEM ALIGNMENT

7-1. AUDIO HEAD AZIMUTH ADJUSTMENT

1. Connect a sccpe or a VTVM to TP-502 on the A Board.
2. Play back the 7 kHz part of the SONY Alignment tape.
3. Adjust the Azimuth and Tilt Adjusting Screws shown in Fig. 7-1 for maximum output.

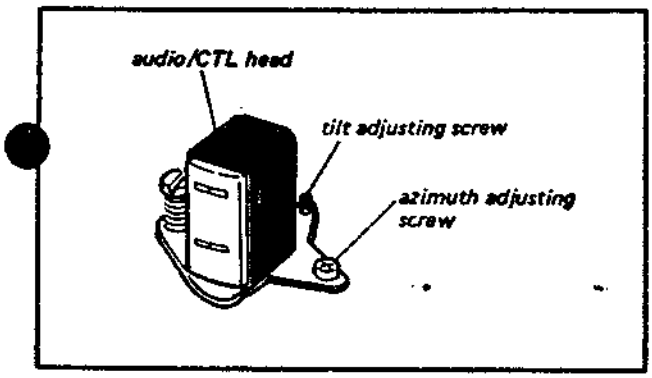


Fig. 7-1. Azimuth and tilt adjusting screws

7-2. LEVEL METER SETTING

1. Set the VTR to Manual in the E-to-E mode.
2. Feed a 1 kHz signal, −65 dB to the MIC IN jack in CAMERA or LINE mode or a 1 kHz signal, 0 dB to the AUX IN jack. Terminate the LINE OUT jack with a 10 kΩ resistor and connect a VTVM. Adjust the LEVEL control on the control panel so that the LINE OUT level is 0 dB.
3. Adjust R532 so that the pointer of the level meter read between the blue zone and the red zone.

7-3. AGC LEVEL SETTING

1. Set the VTR to AGC in the E-to-E mode.
2. Terminate the LINE OUT jack with a 10 kΩ resistor and connect a VTVM.
3. Feed a 1 kHz signal, −65 dB to the MIC IN jack in the CAMERA or LINE mode or a 1 kHz signal, 0 dB to the LINE IN jack.
4. Adjust R538 to obtain a meter reading of 0 dB.

7-4. AUDIO BIAS SETTING

1. Feed a 1 kHz, −65 dB signal to the MIC IN jack or a 1 kHz, 0 dB signal to the LINE IN jack.
2. Thread a tape onto the Videocorder. Connect a camera and a monitor to the recorder and a VTVM to TP-504 on the A Board.
3. Point the camera at the VTVM so that the meter indication is visible on the monitor in the Record mode.
4. Make a recording of the input audio signal while varying C530 (on the A Board) throughout its range very slowly.
5. Rewind and play back the tape. Watching the monitor, note the level on the meter (the playback picture) at which output is greatest, as indicated by the playback sound level.
6. Set the VTR to the Record mode again and adjust C536 for the reading that gave maximum output during playback.
7. Set the VTR to the Audio Dub mode and adjust L401 on the SV1 Board for the same reading (at TP-504/A Board) that gave maximum output during playback.

7-5. PLAYBACK LEVEL SETTING

1. Connect the VTVM to the LINE OUT jack using a 10 kΩ load resistor.
2. Playback the 1 kHz part of the SONY Alignment tape and adjust R518 so that the line out level is 0 dB ± 2 dB.

7-6. OVERALL FREQUENCY CHARACTERISTICS

1. Connect a VTVM to the LINE OUT jack using a 10 kΩ load resistor.
2. Feed a 1 kHz signal, −65 dB to the MIC IN jack and make a recording. Play back the tape and confirm that the output is 0 dB ± 2 dB.
3. Record 100 Hz and 10 kHz, −65 dB signals and play back the tape. Check that the frequency response conforms to the following specifications. If it does not, adjust R513. Repeat Section 7-5. PLAYBACK LEVEL SETTING.

Specifications:

1 kHz	0 dB ± 2 dB
100 Hz	0 dB $\pm \frac{1\ dB}{3\ dB}$
10 kHz	−1 dB ±0.5 dB

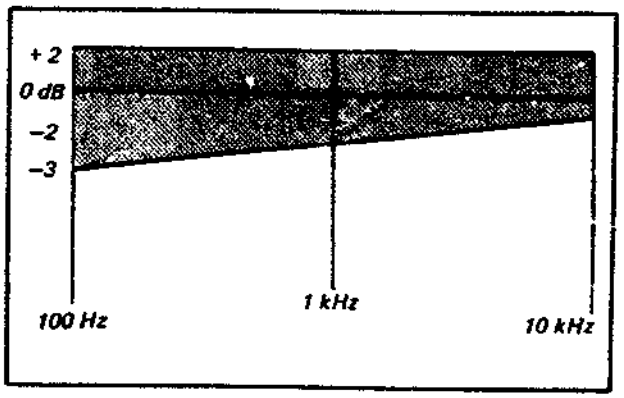


Fig. 7-2

SECTION 8

POWER SUPPLY ALIGNMENT

8-1. POWER SUPPLY ADJUSTMENT

Test Point: TP-601 , (+28 V) TP-602 (+9 V)

Adjust for: +28V dc , +9 V dc

Adjustment: R604 (+28 V), R610 (+9 V)

Signal Source: None required

Equipment Required: (1) VOM

(2) Variac or adjustable transformer

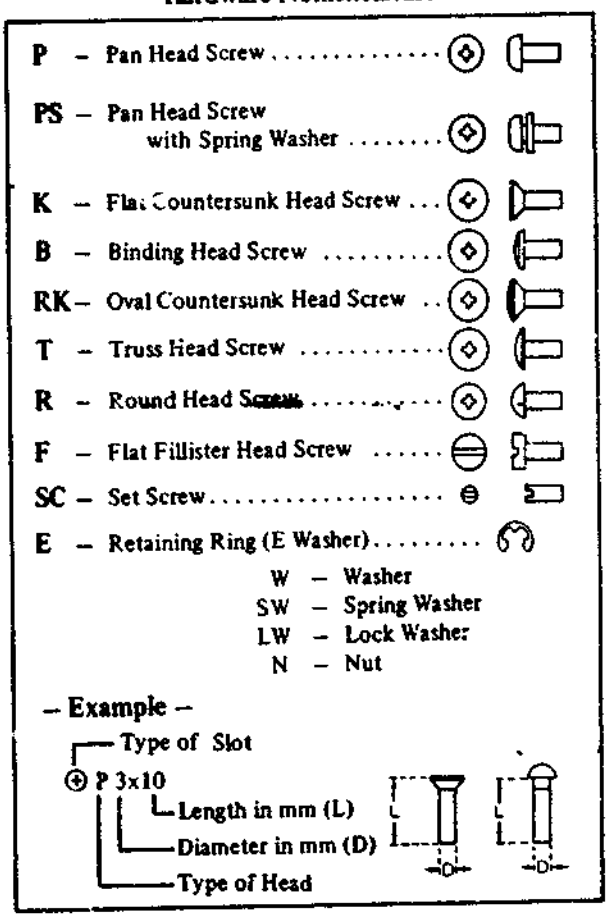
Procedure:

1. Set the ac input voltage to 117 volts, using the Variac or adjustable transformer.
2. Connect the VOM between TP-601 and ground.
3. Adjust R604 for a reading of 28 volts dc.
4. Connect the VOM between TP-602 and ground.
5. Adjust R610 for a reading of 9 volts dc.

SECTION 10

EXPLODED VIEWS WITH PART NUMBERS

Hardware Nomenclature

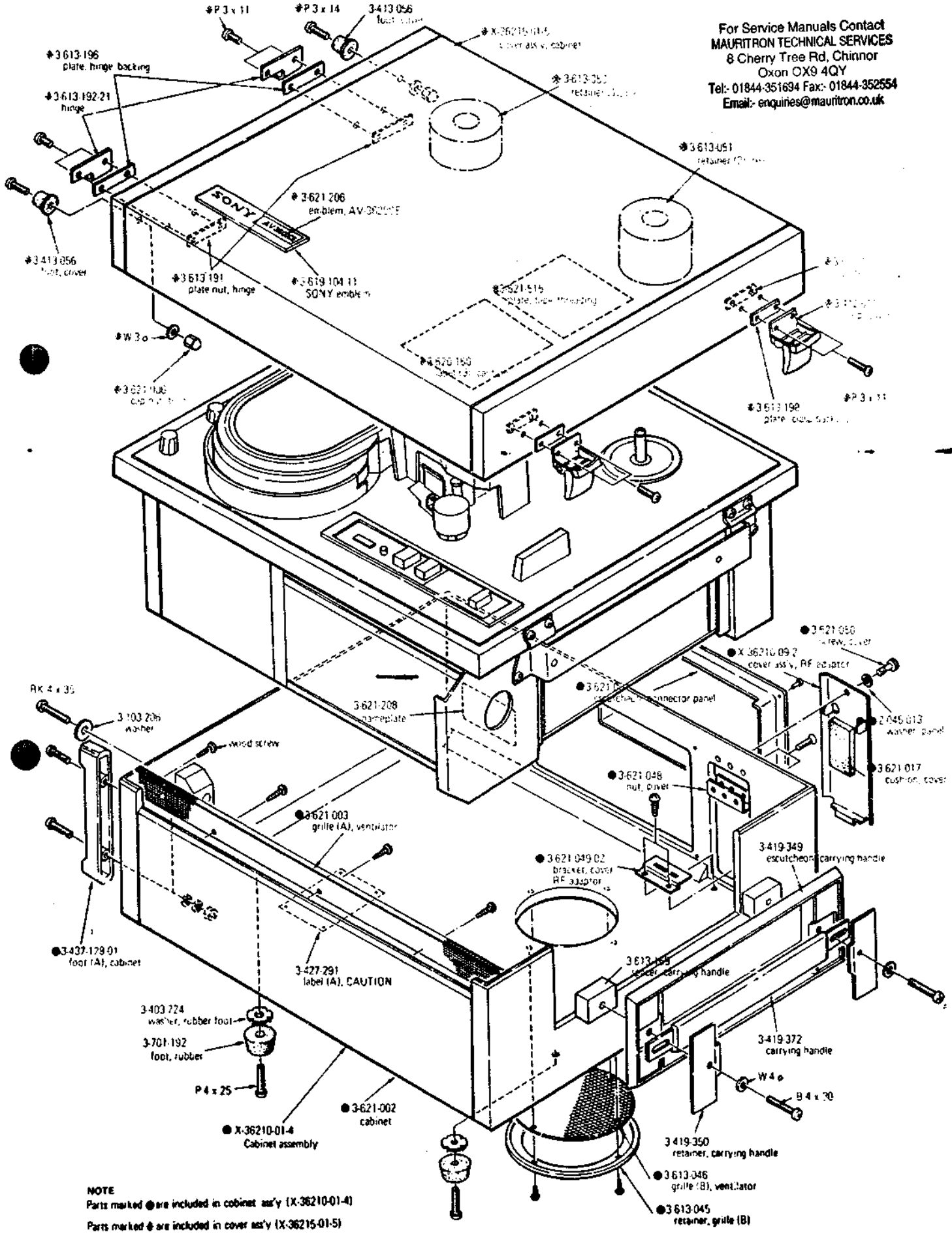


All screws conform to ISO standards, unless otherwise noted

Scale: 25.4 millimeters

1 inch

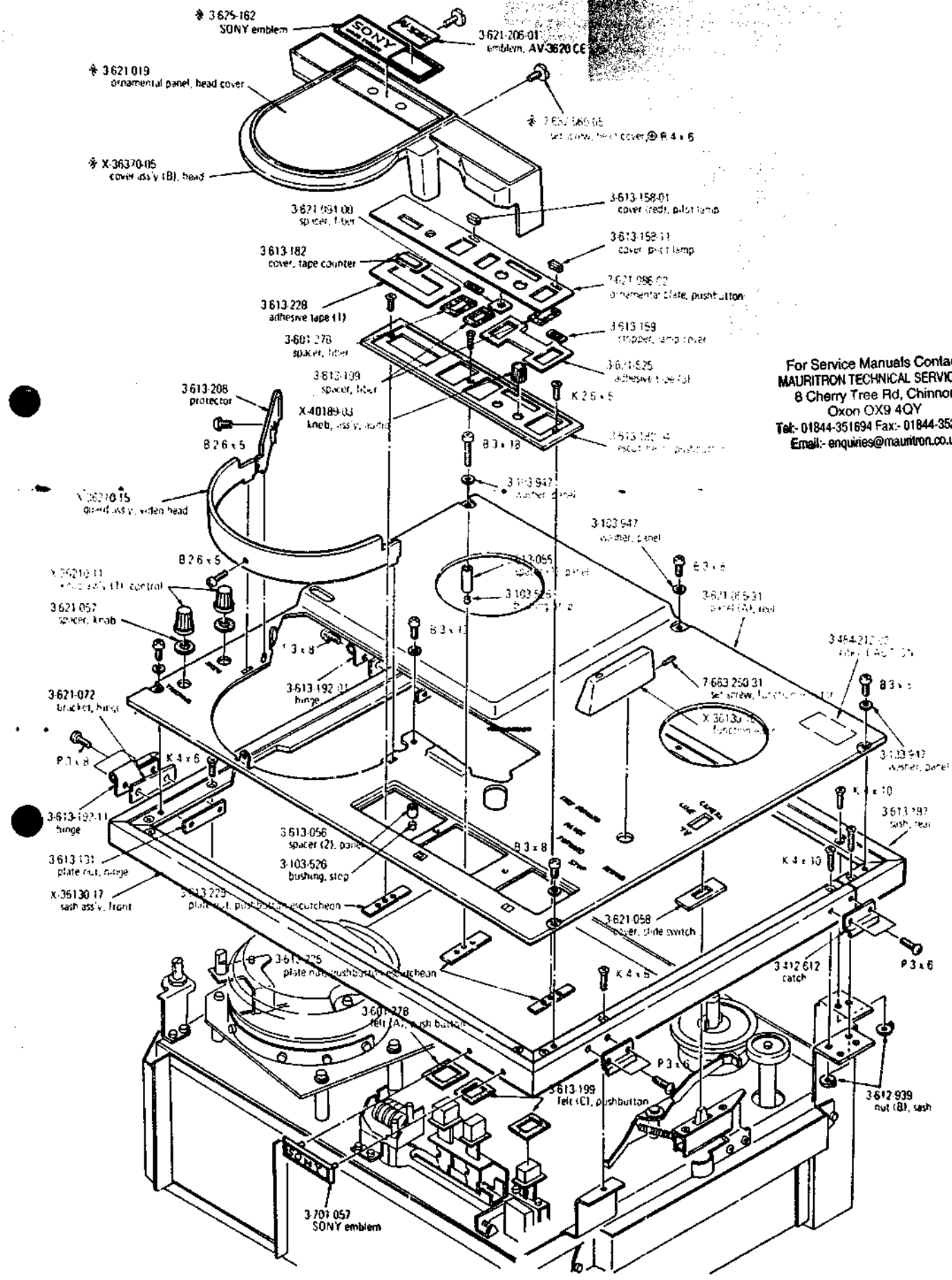
10-1. CABINET ASSEMBLY EXPLODED VIEW



NOTE
Parts marked # are included in cabinet ass'y (X-36210-01-4)

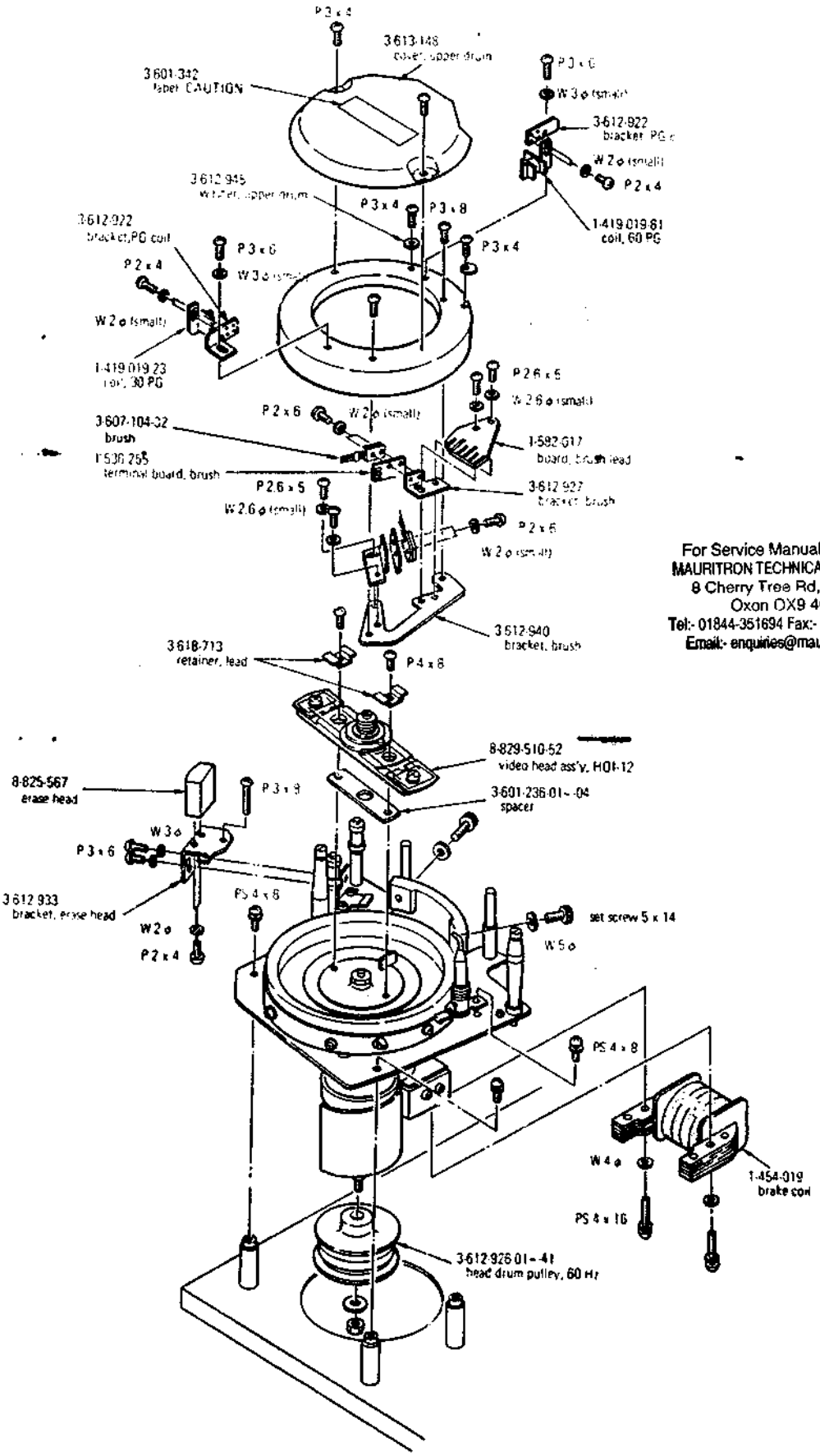
Parts marked # are included in cover ass'y (X-36215-01-5)

10-2. REEL PANEL AND SASH EXPLODED VIEW

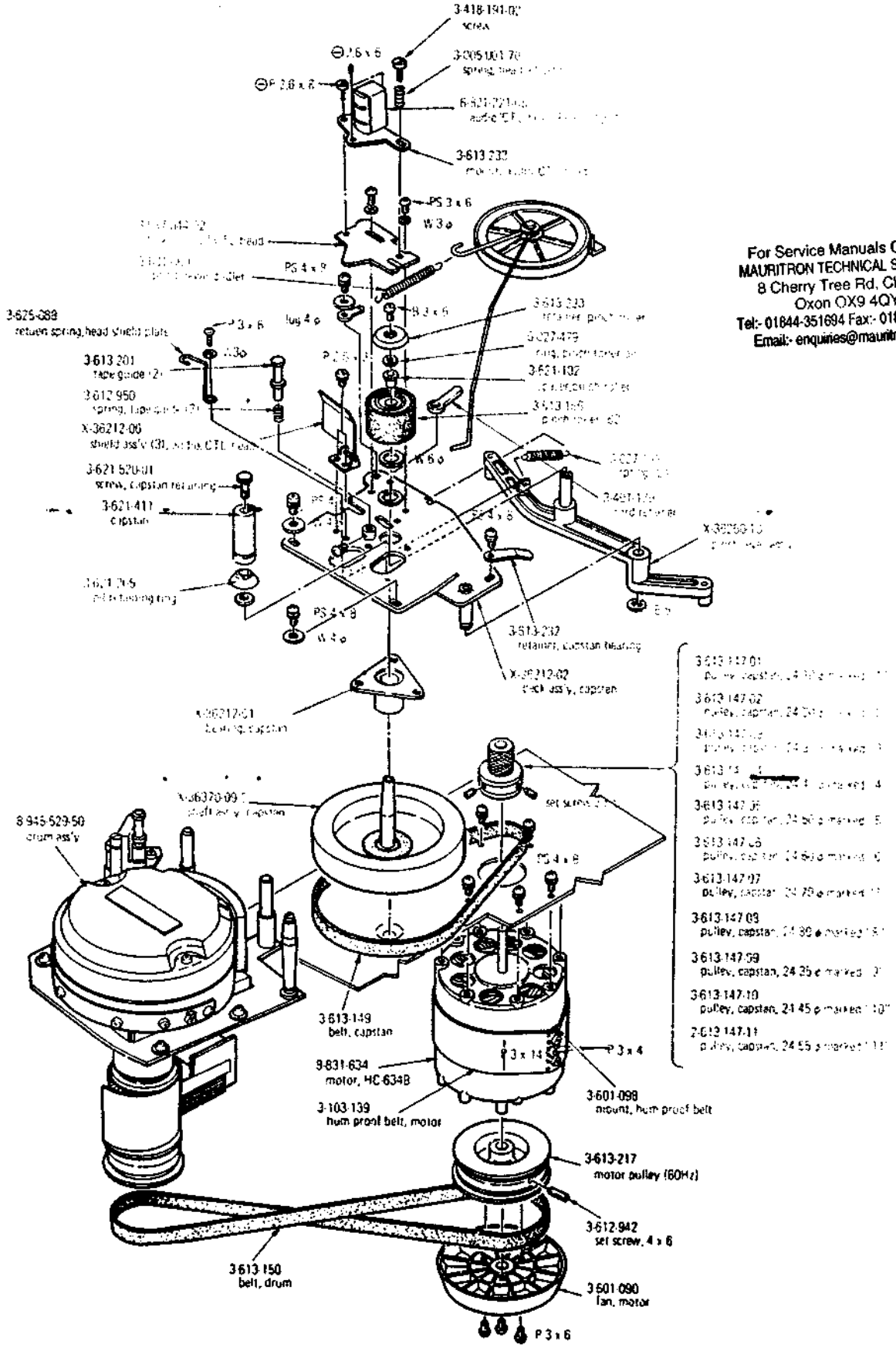


10.3. HEAD DRUM ASSEMBLY EXPLODED VIEW

(Video Head Drum Assembly 8-945-532-00 (50 Hz))



10-4. CAPSTAN DECK ASSEMBLY AND MOTOR EXPLODED VIEW



For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

10-5. TAPE TRANSPORT 1 EXPLODED VIEW

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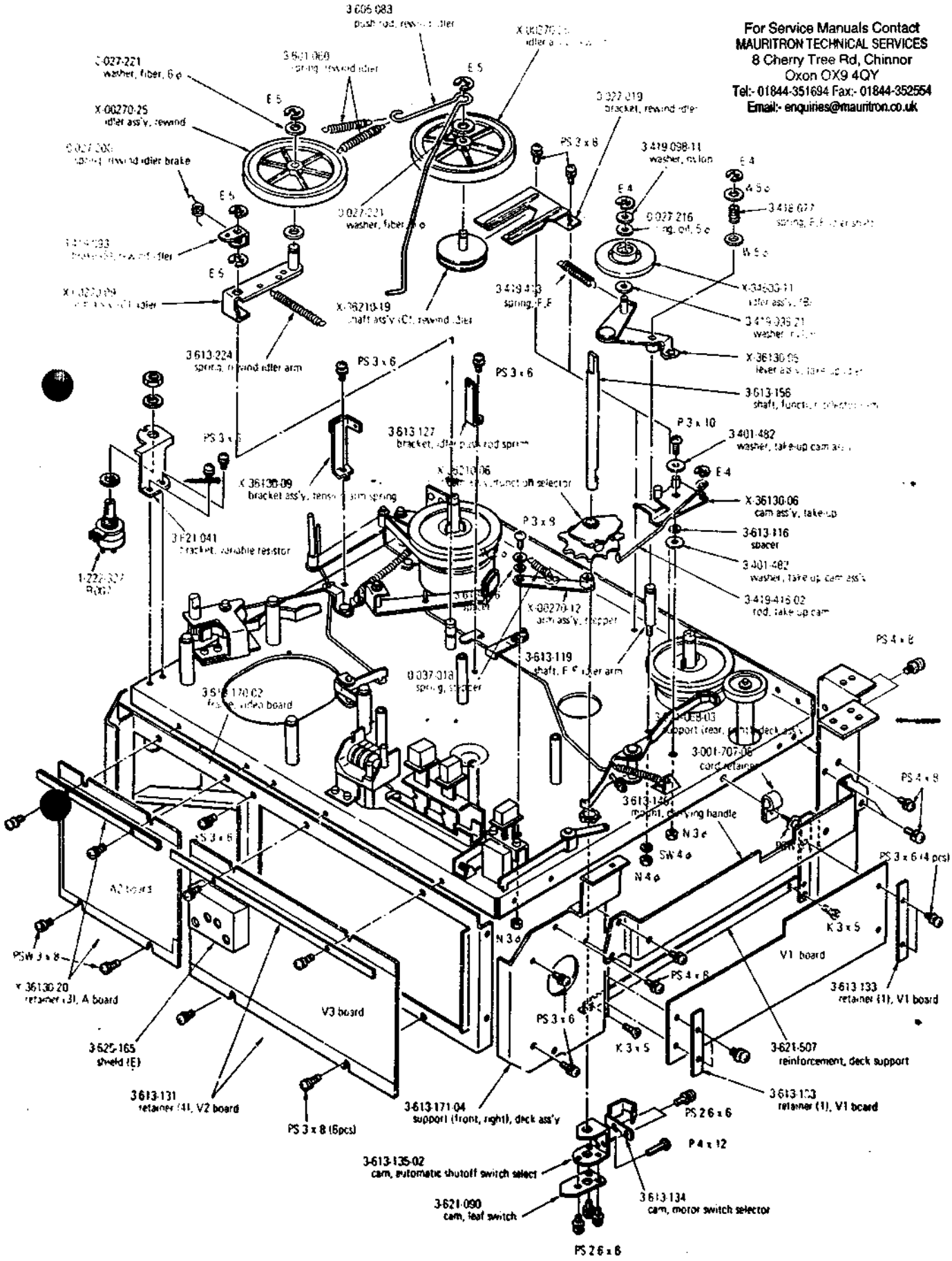
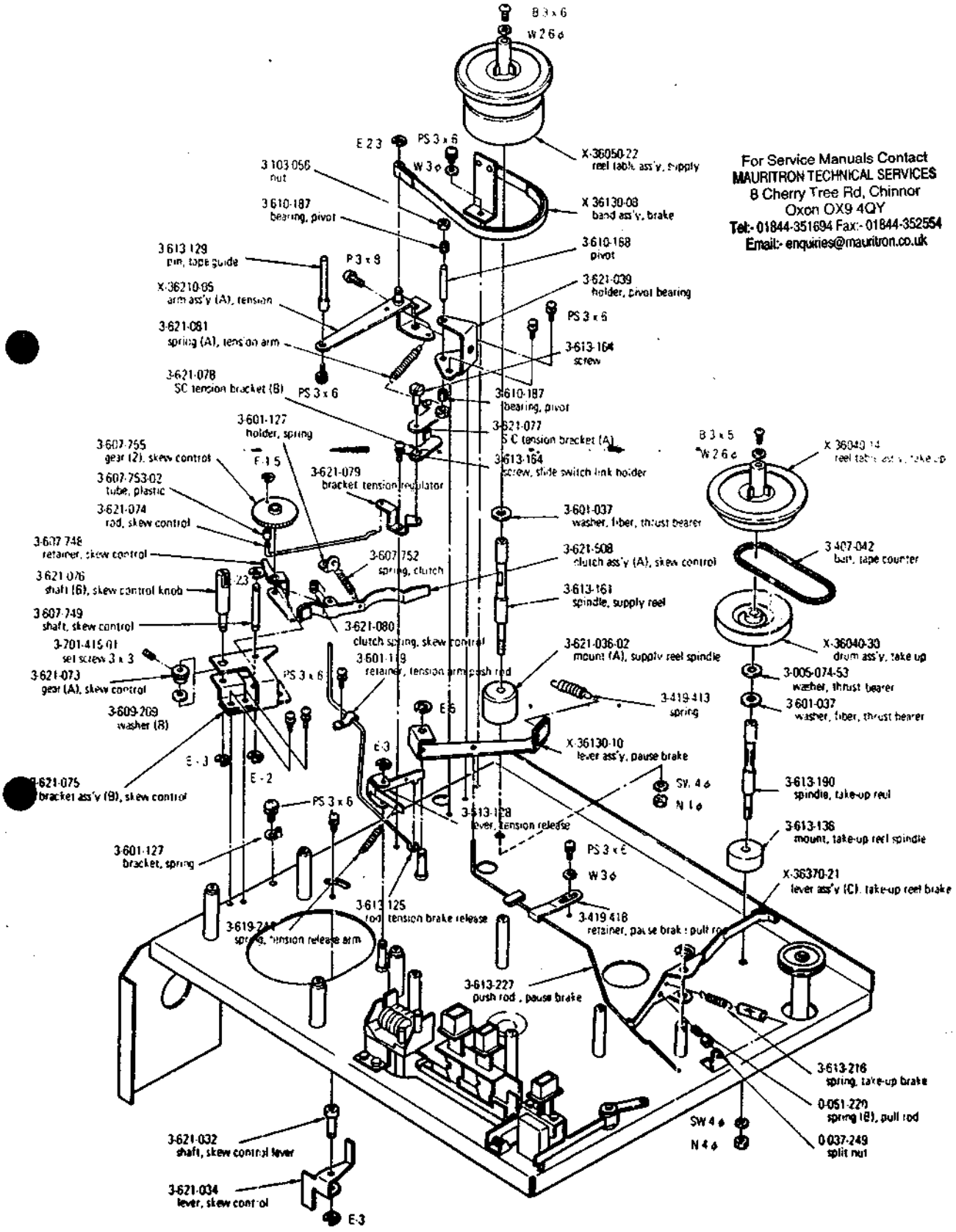
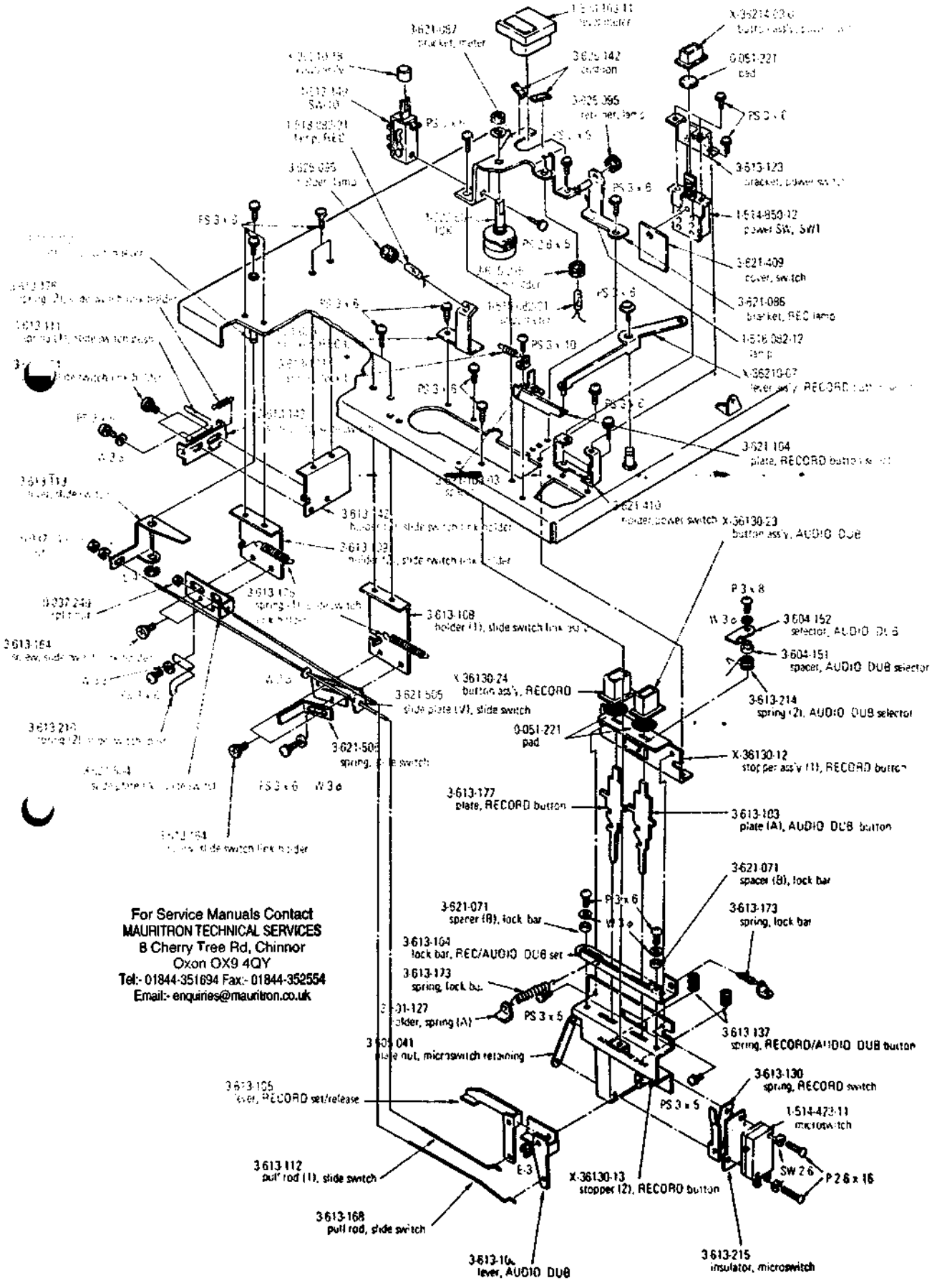
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk



10-6. TAPE TRANSPORT 2 EXPLODED VIEW



10-7. RECORD SWITCH LINKAGE EXPLODED VIEW



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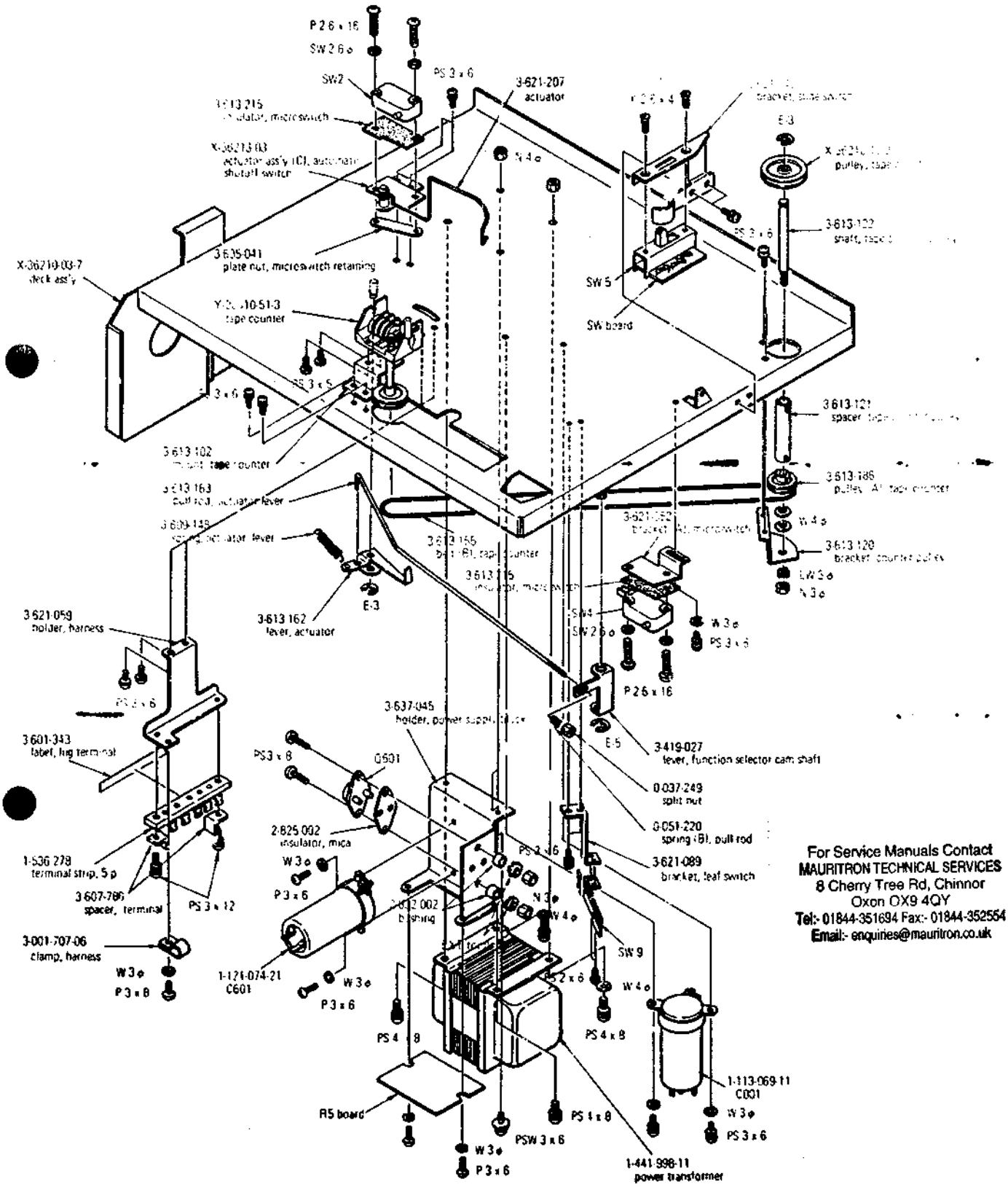
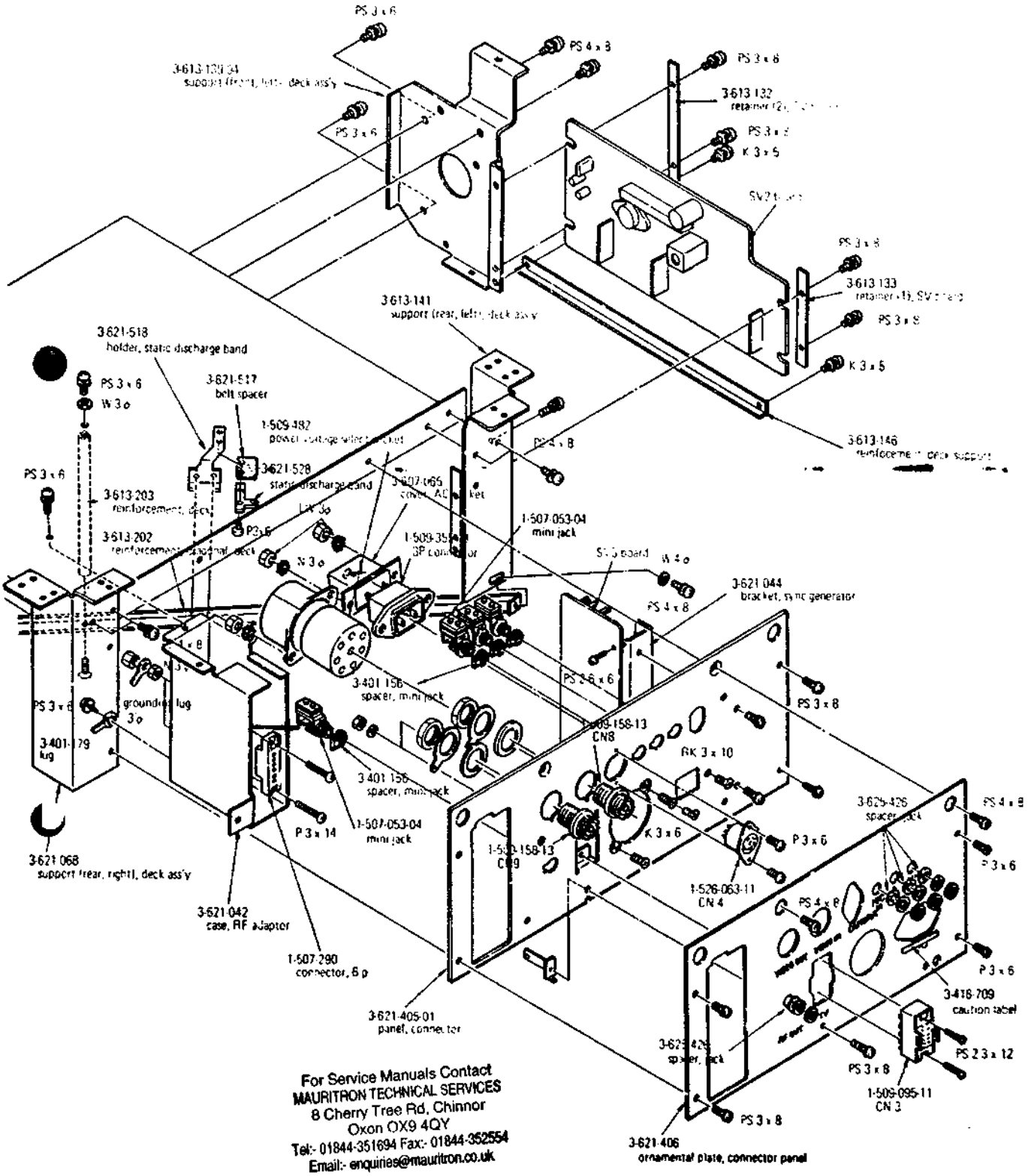
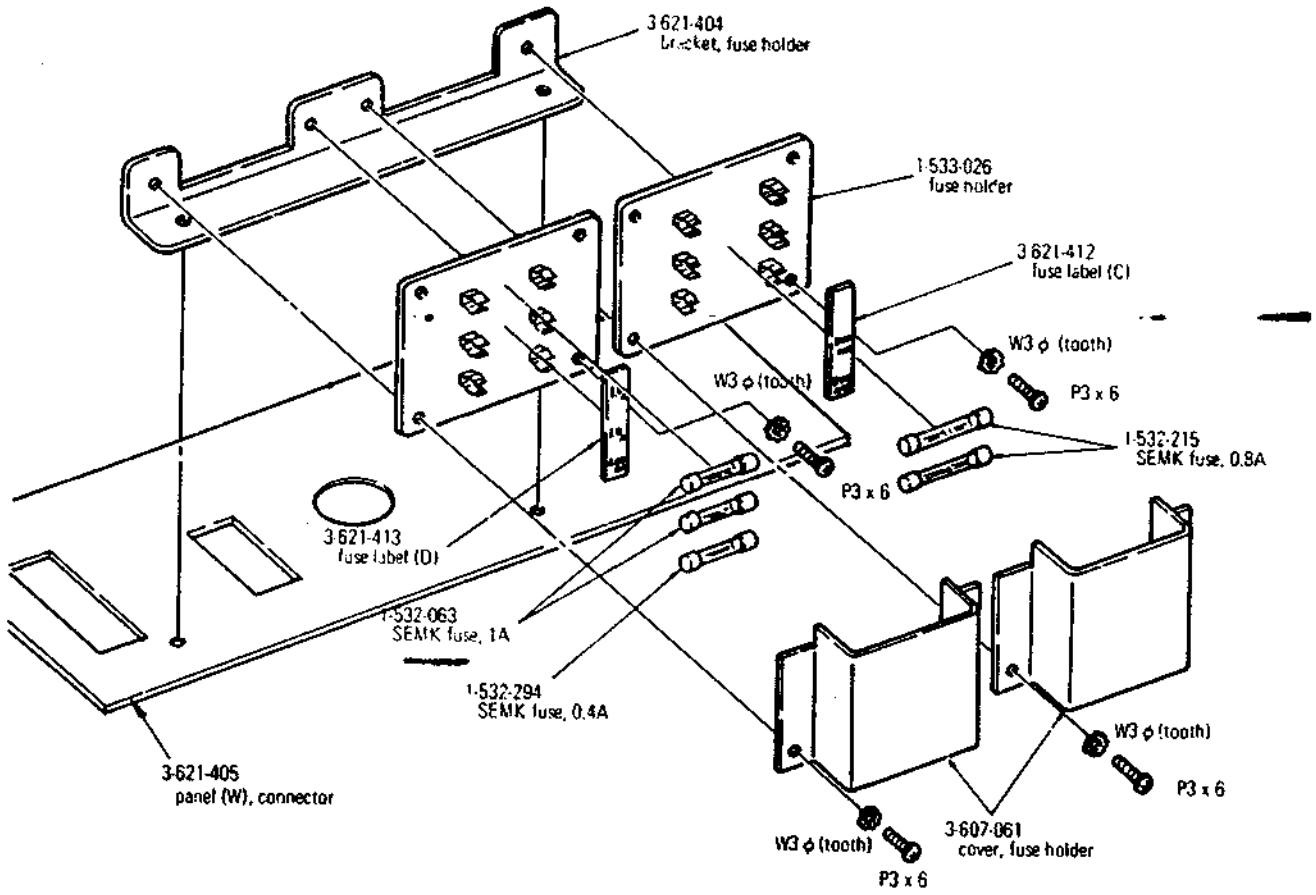
10-8. POWER SUPPLY BLOCK AND MICROSWITCHES EXPLODED VIEW



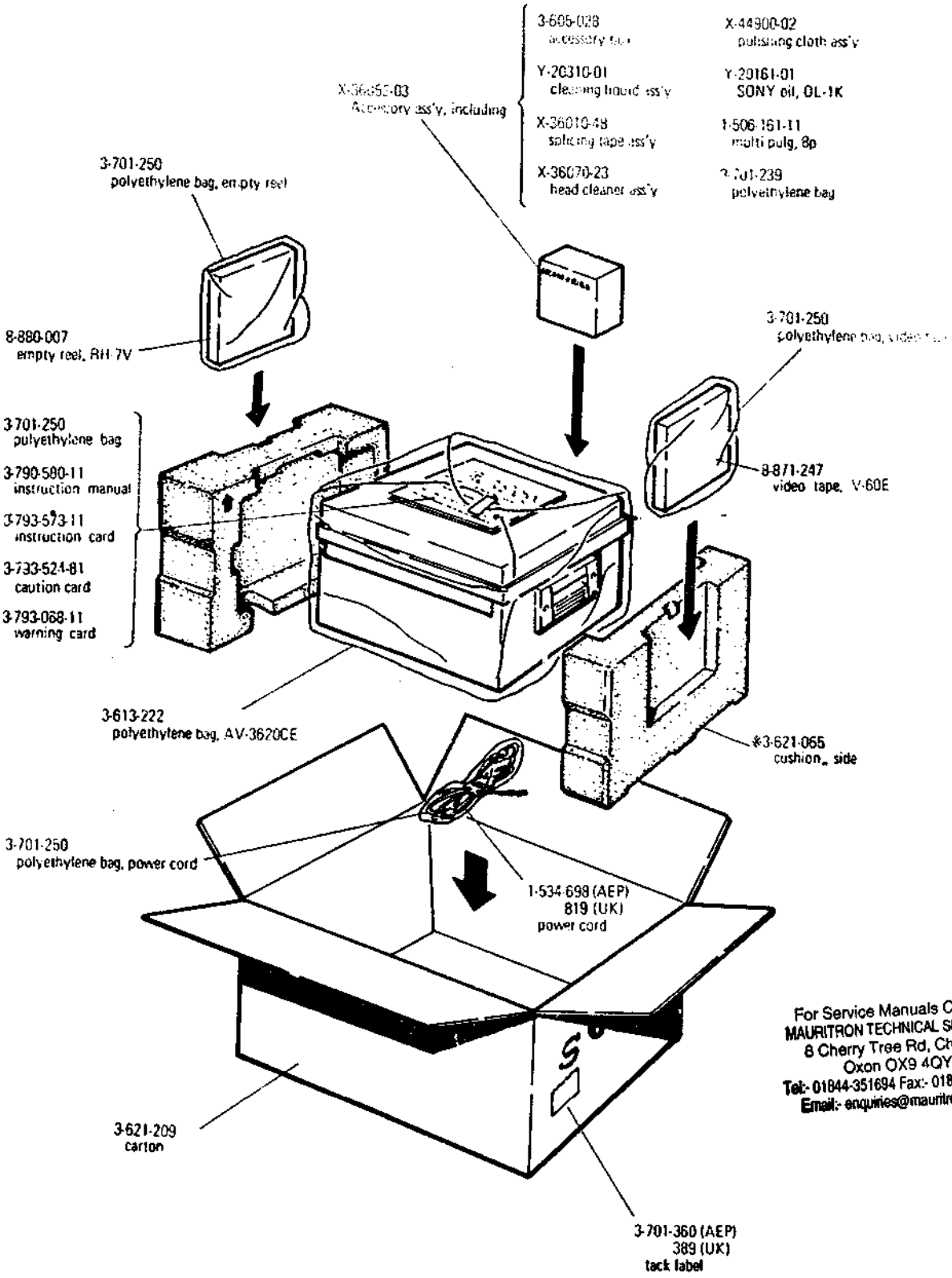
10-9. CONNECTOR PANEL AND OTHERS EXPLODED VIEW



10-10. FUSE HOLDER ASSEMBLY EXPLODED VIEW



10-11. PACKING



NOTE

Parts marked * are included in carton ass'y (X-36212-05-1)

10-12. HARDWARE PARTS LIST

Part No.	*Description*
	SCREWS
7-621-259-25	(+) P 2.6 x 4
7-621-259-45	(+) P 2.6 x 6
7-621-260-05	(+) P 2.6 x 16
7-621-559-25	(+) K 2.6 x 4
7-621-559-35	(+) K 2.6 x 5
7-621-773-60	(+) B 2.6 x 5
7-682-144-01	(+) P 3 x 3, tape guide
7-682-145-01	(+) P 3 x 4, upper drum washer
7-682-145-14	(+) P 3 x 4
7-682-147-01	(+) P 3 x 5, PG coil bracket
7-682-148-01	(+) P 3 x 8
82-148-14	(+) P 3 x 8 (connector panel)
7-682-149-01	(+) P 3 x 10, brush mt'g board
7-682-151-01	(+) P 3 x 14
7-682-160-01	(+) P 4 x 6
7-682-163-01	(+) P 4 x 12, stator
7-682-166-01	(+) P 4 x 20
7-682-246-01	(+) K 3 x 5
7-682-247-01	(+) K 3 x 6
7-682-248-01	(+) K 3 x 8
7-682-260-01	(+) K 4 x 6
7-682-262-01	(+) K 4 x 10
7-682-369-04	(+) RK 4 x 35 (carrying handle)
7-682-546-14	(+) B 3 x 5
7-682-546-15	(+) B 3 x 5
7-682-548-05	(+) B 3 x 8
7-682-568-04	(+) B 4 x 30
7-682-589-01	(+) PS 3 x 8
7-682-647-01	(+) PS 3 x 6 (with spring washer)
82-661-01	(+) PS 4 x 8 (with spring washer)
7-682-147-14	(+) P 3 x 6 (connector panel, hinge)
	WASHERS
7-623-105-22	2 mm dia (large)
7-623-107-22	2.6 mm dia (large)
7-623-108-12	3 mm dia (medium)
7-623-110-12	4 mm dia (medium)
7-623-112-12	5 mm dia (medium)
7-623-113-12	6 mm dia (medium)
7-623-207-22	Spring Washer, 2.6 mm dia
7-623-208-22	Spring Washer, 3 mm dia
7-623-210-22	Spring Washer, 4 mm dia
7-623-407-05	Star Washer, external, 2.6 mm dia
7-623-408-05	Star Washer, external, 3 mm dia
7-623-908-02	Fiber Washer, 3 mm dia
7-623-908-04	Plastic Washer, 3 mm dia
7-624-102-01	E Washer, 1.5

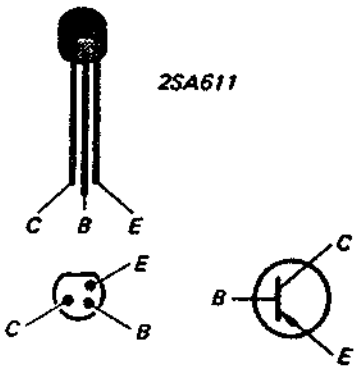
Part No.	*Description*
7-624-105-01	E Washer, 2.3
7-624-106-01	E Washer, 3
7-624-108-01	E Washer, 4
7-624-109-01	E Washer, 5
	LUG
7-623-510-01	4 mm dia
	NAIL
7-629-100-19	1 x 6
	NUTS
7-622-105-01	2 mm dia
7-684-013-01	3 mm dia
7-684-014-01	4 mm dia.

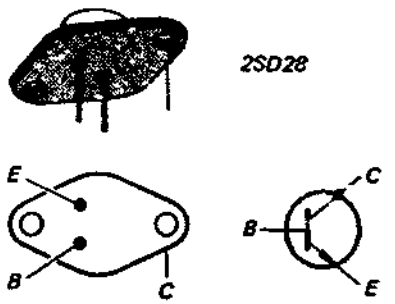
The following items are used for the Head Drum Ass'y.

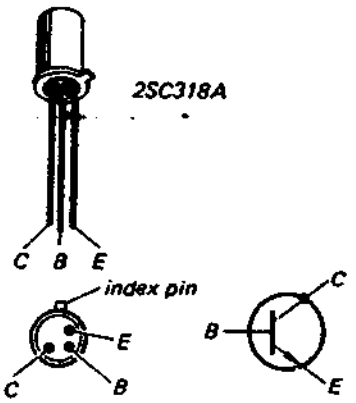
	SCREWS
7-621-255-25	(+) P 2 x 4
7-621-255-45	(+) P 2 x 6
7-621-259-12	(+) P 2.6 x 3
7-621-259-32	(+) P 2.6 x 5
7-621-309-32	(+) F 2.6 x 5
7-682-144-01	(+) P 3 x 3
7-682-145-01	(+) P 3 x 4
7-682-146-13	(+) P 3 x 5
7-682-147-01	(+) P 3 x 6
7-682-148-01	(+) P 3 x 8
7-682-160-01	(+) P 4 x 6
7-682-161-13	(+) P 4 x 8
7-682-645-13	(+) PS 3 x 4
7-682-647-01	(+) PS 3 x 6
7-682-648-01	(+) PS 3 x 8
7-682-649-01	(+) PS 3 x 10
7-682-663-01	(+) PS 4 x 12
7-682-665-01	(+) PS 4 x 16
	WASHERS
7-623-105-02	2 ϕ (small)
7-623-107-12	2.6 ϕ (medium)
7-623-108-12	3 ϕ (medium)
7-623-110-12	4 ϕ (medium)
7-623-112-12	5 ϕ (medium)
7-623-212-22	Spring Washer, 5 ϕ

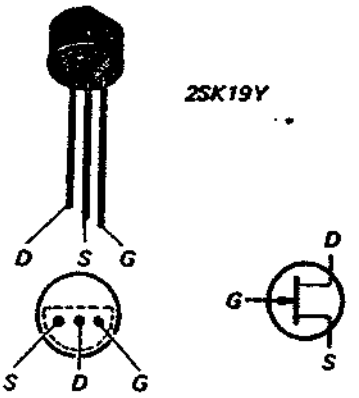
SECTION 9
PRINTED CIRCUIT BOARD AND SCHEMATIC DIAGRAMS

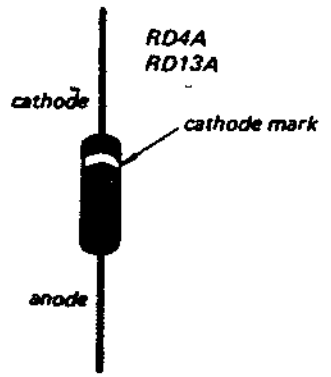
Semiconductor Electrodes

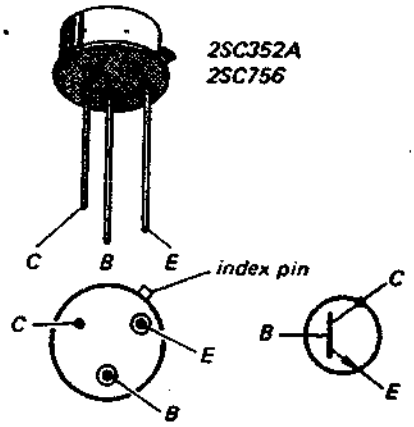


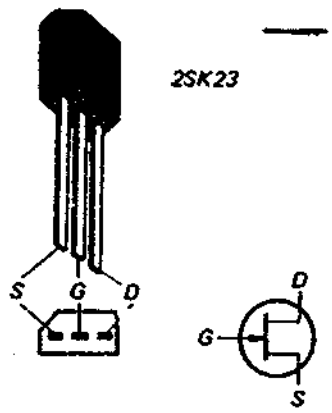


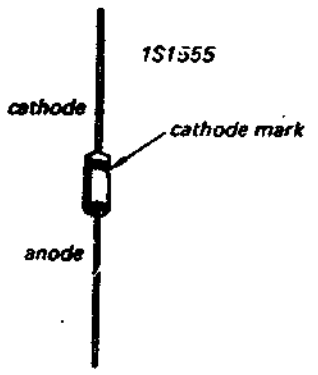


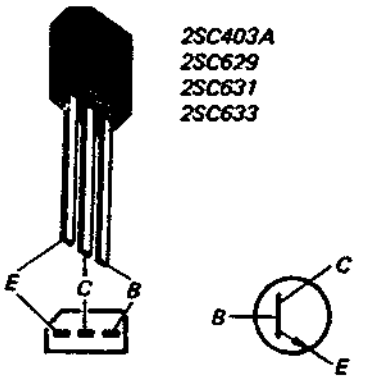


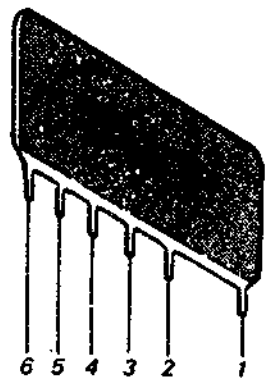












For Service Manuals Contact
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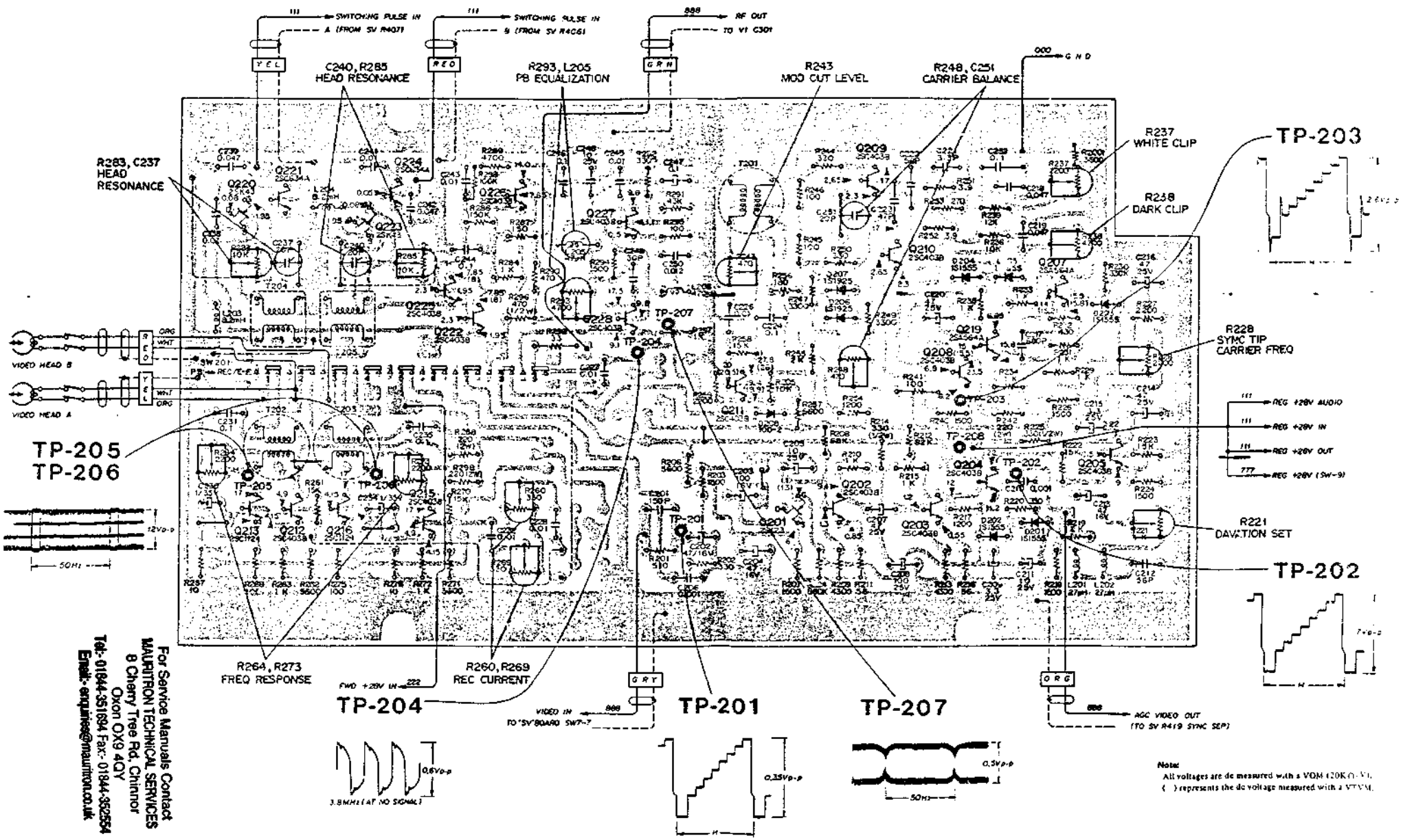
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

9-1. V3 (MODULATOR, REC/PB AMP) PRINTED CIRCUIT BOARD



Note:
All voltages are dc measured with a VOM (20KΩ/V).
( ) represents the dc voltage measured with a VTVM.

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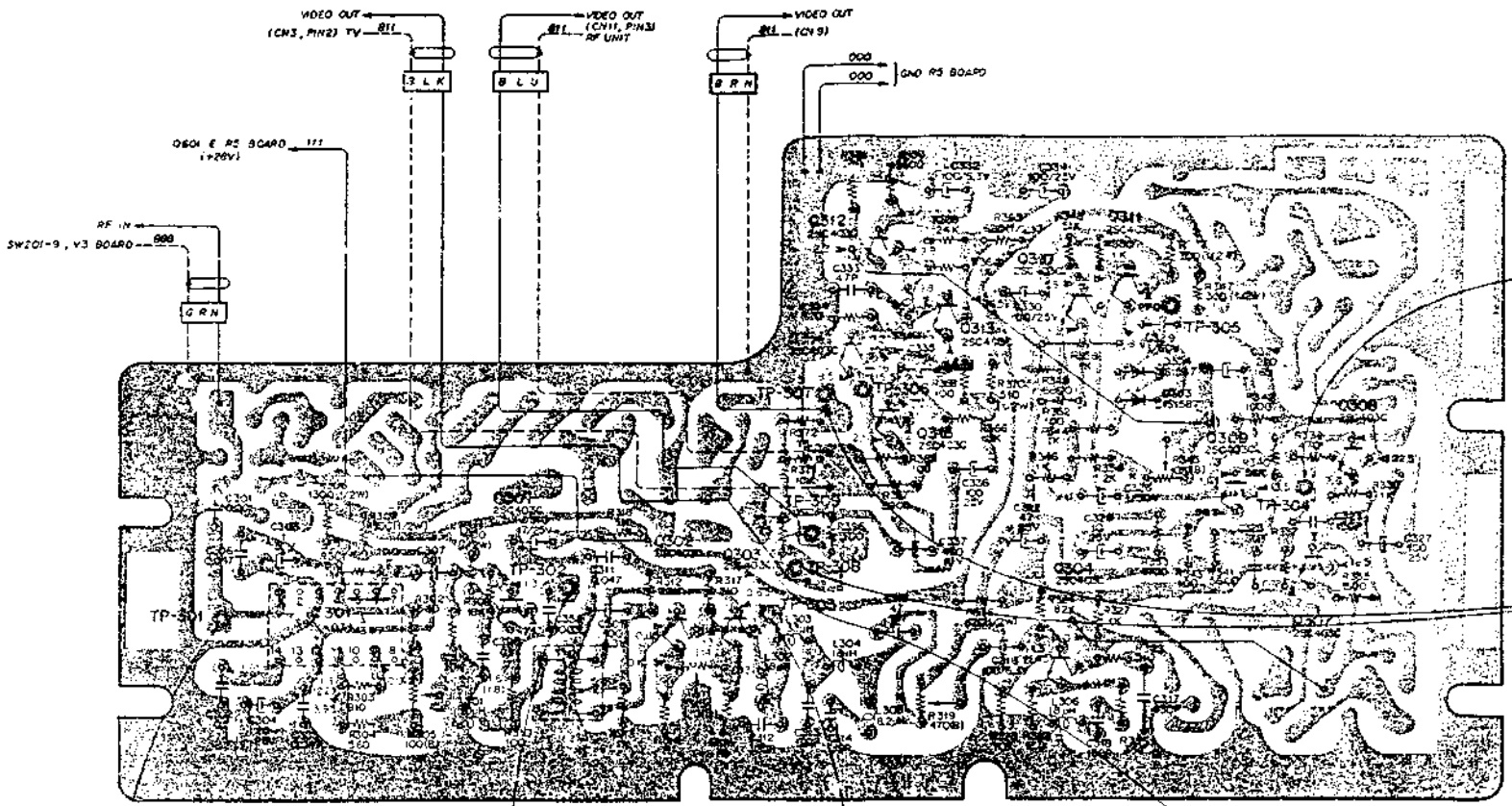
X-36212-56

9-2. V1 (DEMODULATOR) PRINTED CIRCUIT BOARD



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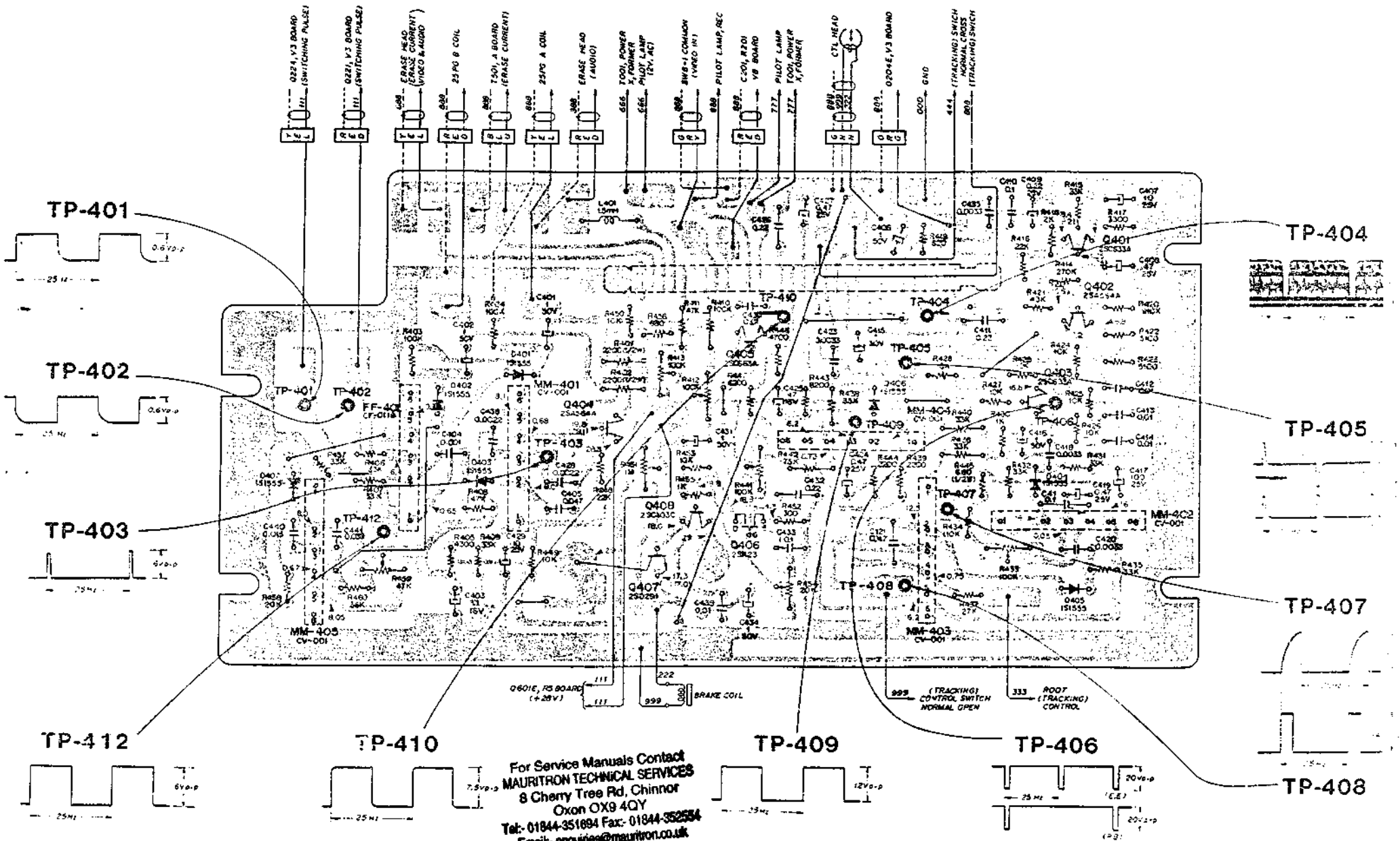
Email:- enquiries@mauritron.co.uk

Note:
All voltages are dc measured with a VOM (20K Ω/V).
( ) represents the dc voltage measured with a VTVM

9-3. SV (SERVO) PRINTED CIRCUIT BOARD



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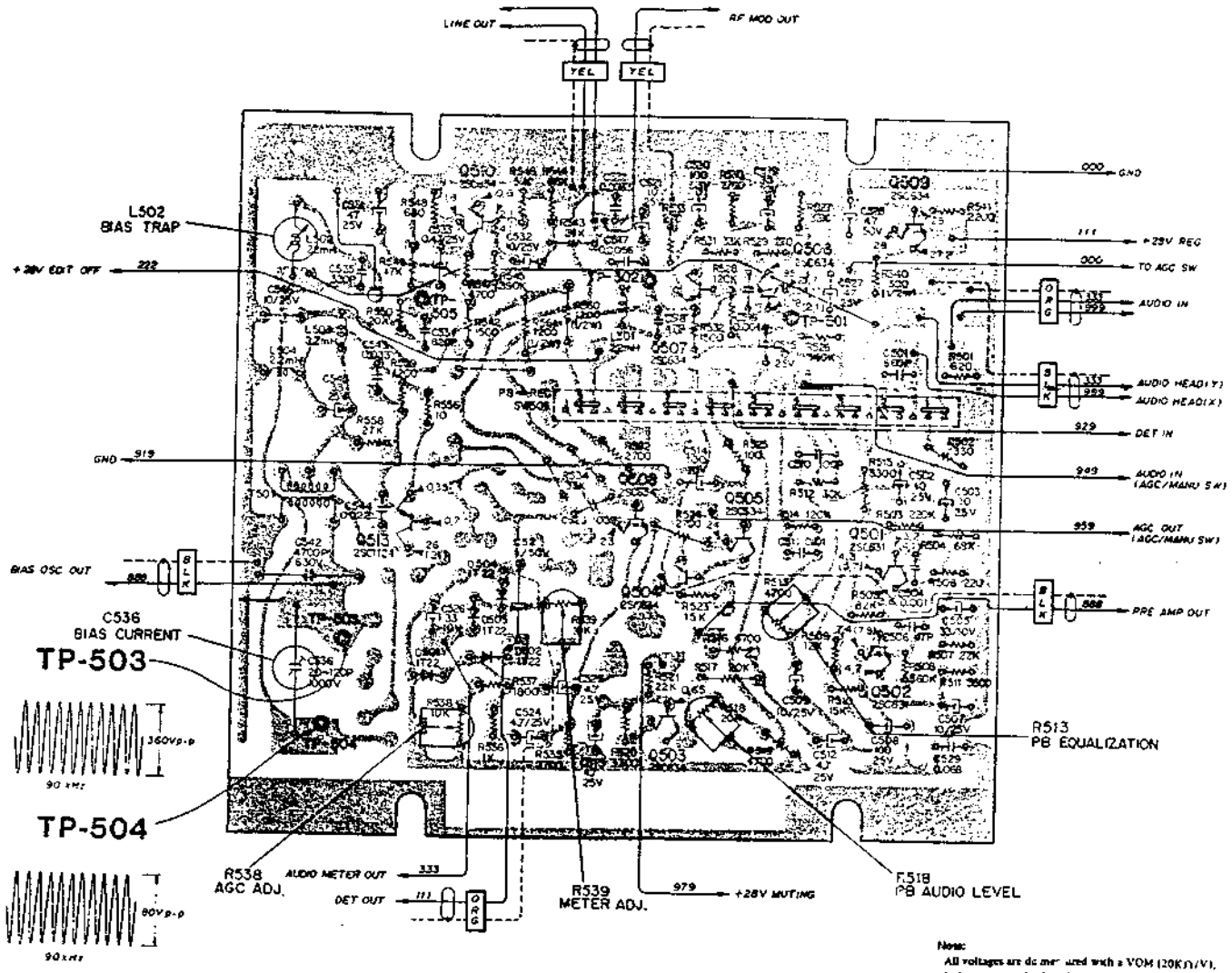
Email:- enquiries@mauritron.co.uk

Note:
All voltages are dc measured with a VOM (20kΩ/V DC).
( ) represents the dc voltage measured with a CVTVM.

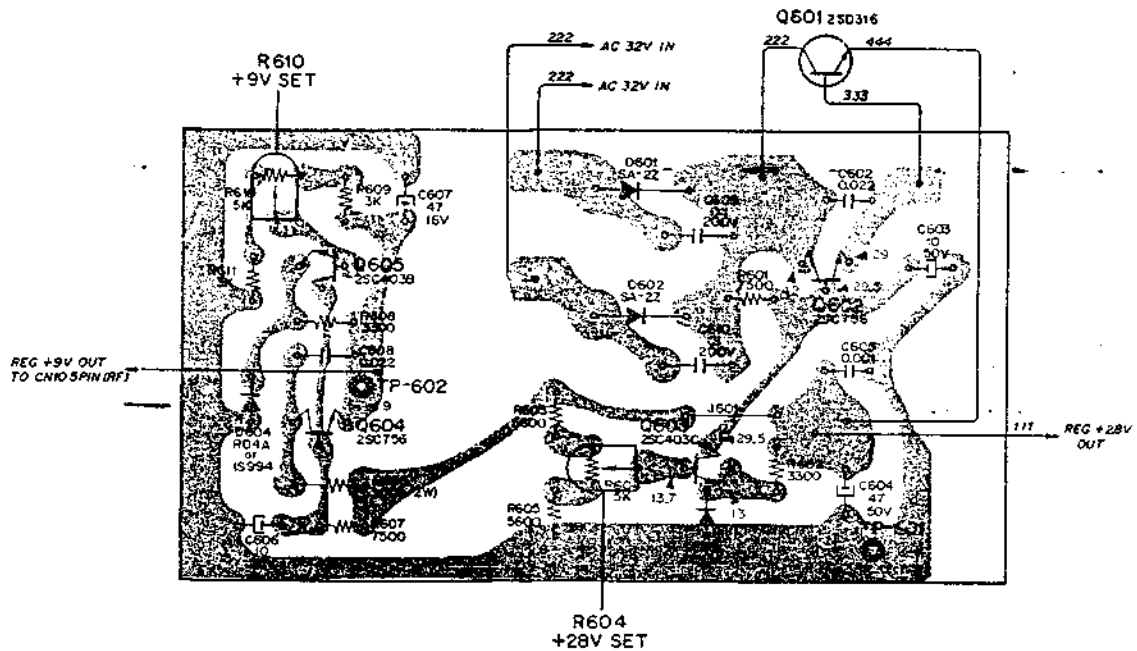


Note:
All voltages are dc measured with a VOM (20KΩ/V).
( ) represents the AC voltage measured with a VTVM.

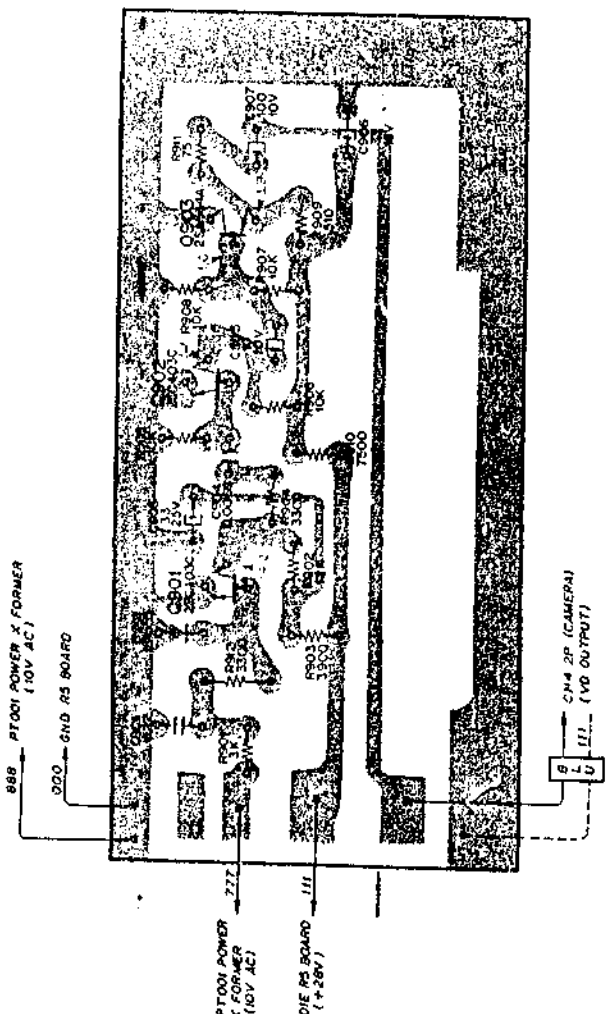
X-36212-55

9-5. R5 (REGULATOR) PRINTED CIRCUIT BOARD

X-36212-52

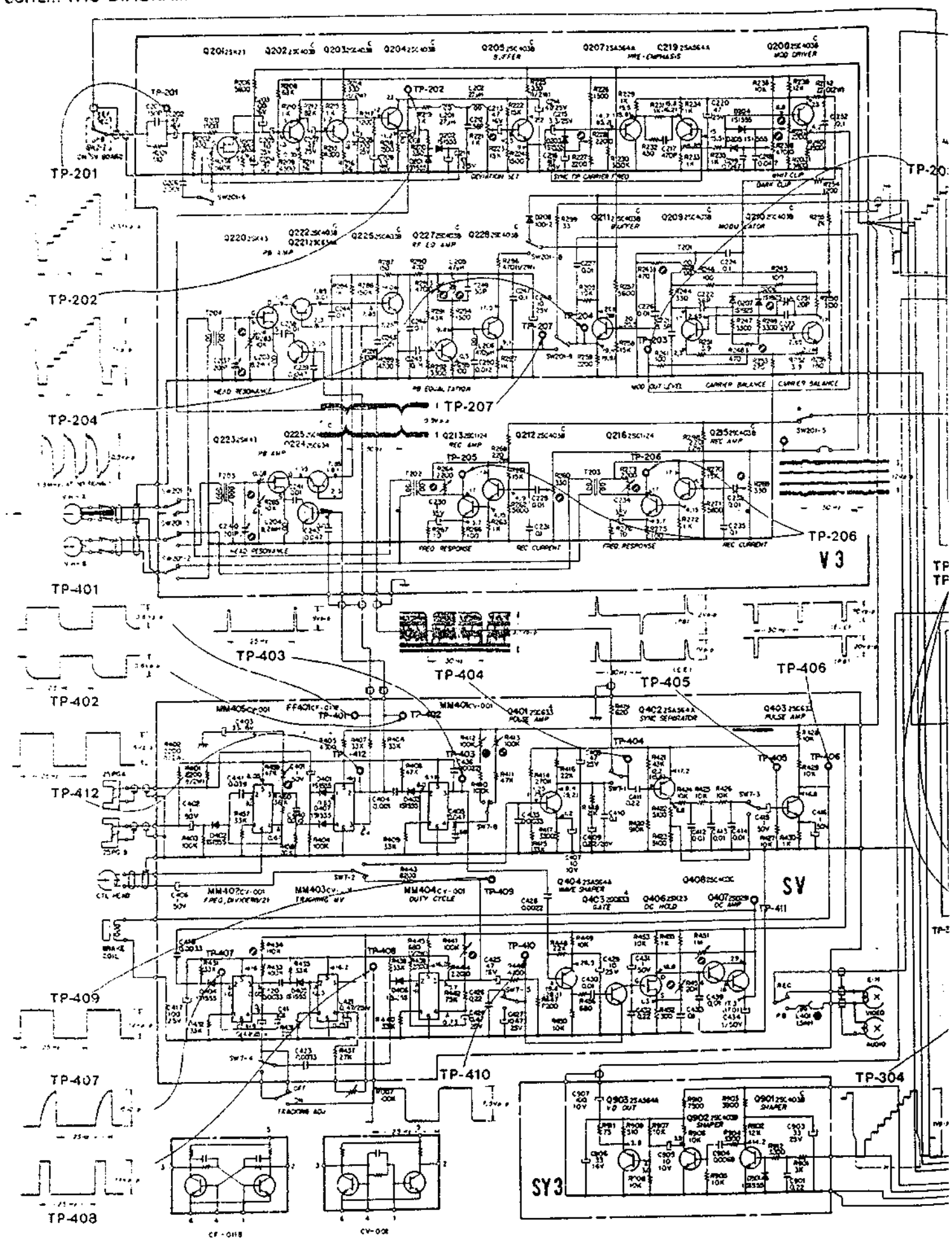


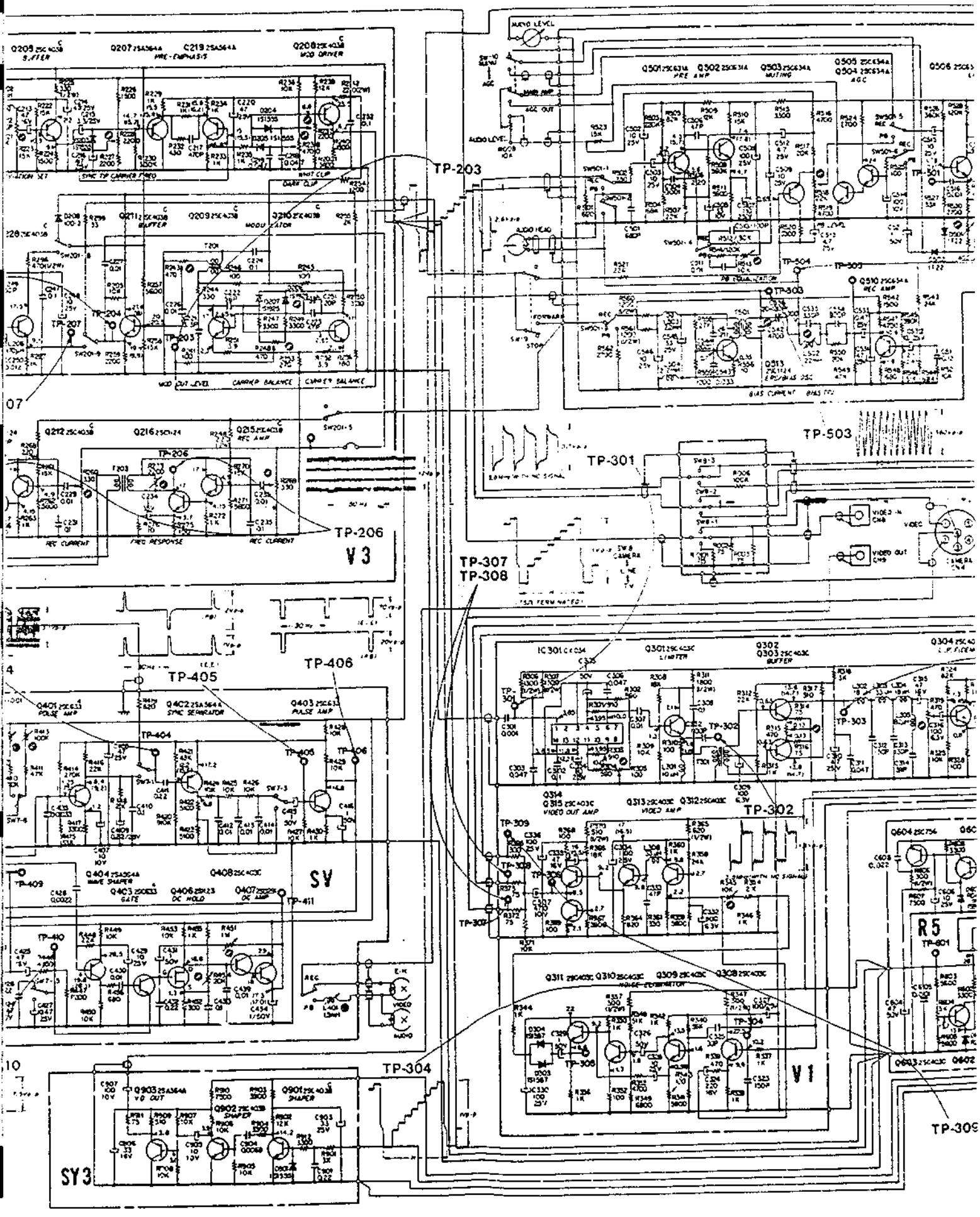
9-6. SY3 (VERTICAL SYNC FORMER) PRINTED CIRCUIT BOARD

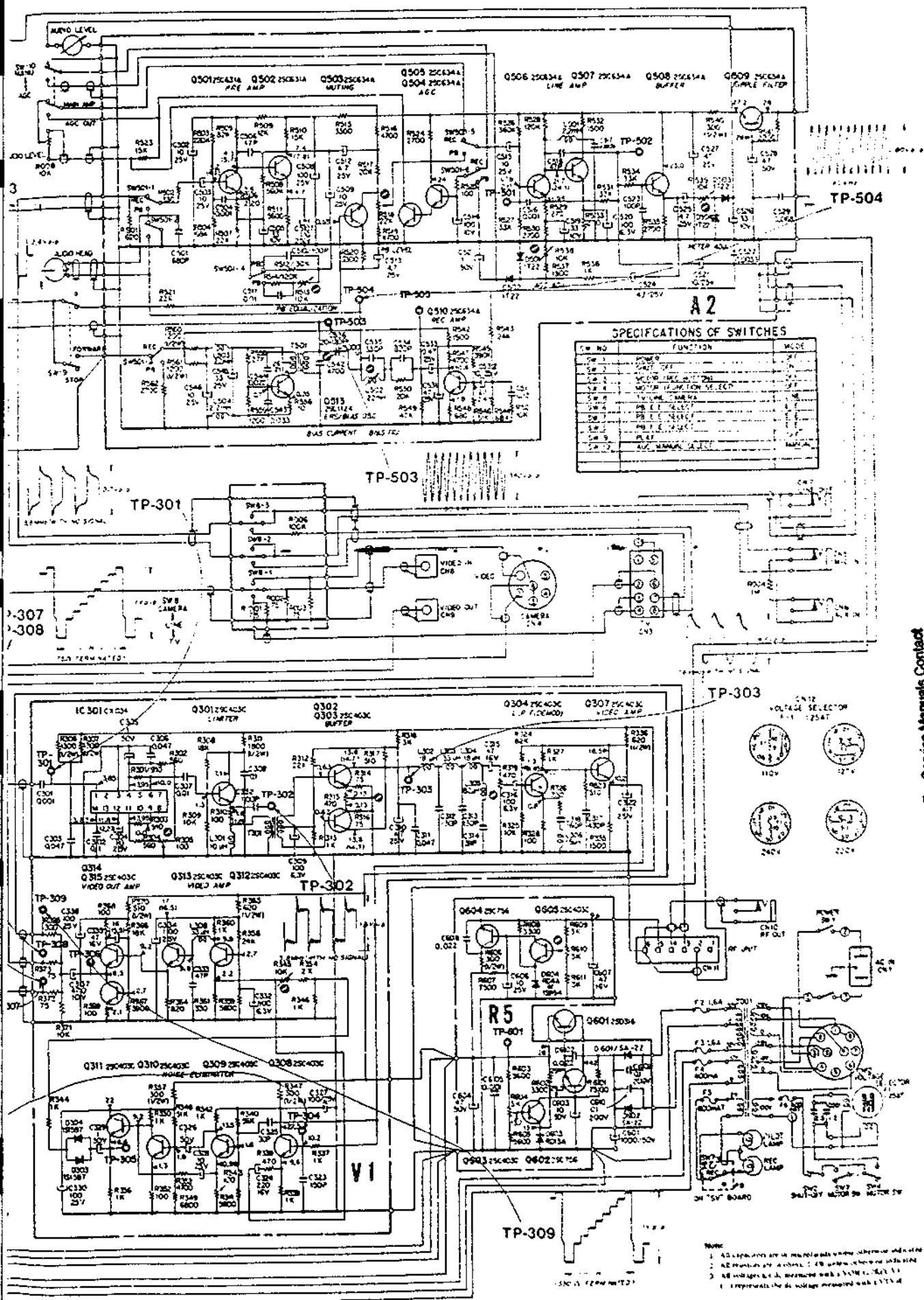


X-30212-67

SCHEMATIC DIAGRAM




TP-203
TP-206
V3
TP-307
TP-308
TP-406
TP-405
TP-404
TP-405
TP-406
SV
TP-411
TP-304
SY3
TP-301
TP-503
TP-302
TP-309
V1
R5



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SONY®

Complete Spare Parts List

AV-3620CE

IMPORTANT

When ordering parts, be sure to furnish the following information:

1. Part Number
2. Model Number
3. Description as contained in this parts list

Due to our use of an electronic data processing system, your orders are processed by the PART NUMBER specified by you.

Please order carefully-wrong part numbers result in wrong parts.

NOTE:
Prices are subject to change without notice.

January 1973

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
	X-00270-09	Arm Ass'y (C), idler
	X-00270-12	Arm Ass'y, stepper
	X-00270-25	Idler Ass'y, rewind
	X-34600-11	Idler Ass'y (B)
	X-36040-14	Reel Table Ass'y, take-up
	X-36040-30	Drum Ass'y, take-up
	X-36050-22	Reel Table Ass'y, supply
	X-36130-05	Lever Ass'y, take-up idler
	X-36130-06	Cam Ass'y, take-up
	X-36130-08	Band Ass'y, brake
	X-36130-09	Bracket Ass'y, tension arm spring
	X-36130-10	Lever Ass'y, pause brake
	X-36130-16	Function Lever Ass'y, including
	7-683-250-31	Set Screw, function selector
	X-36130-17	Sash Ass'y, front
	X-36130-20	Retainer (3), A board
	X-36210-01-4	Cover Ass'y, including
	X-36210-09-2	Cover Ass'y, RF adaptor, including
	3-621-016	Cover, RF adaptor
	3-621-017	Cushion, cover
	2-045-013	Washer, panel
	3-437-128	Foot (A), cover
	3-613-045	Retainer, grille (B)
	3-613-046	Grille (B), ventilator
	3-621-001	Escutcheon, connector panel
	3-621-002	Cover
	3-621-003	Grille (A), ventilator
	3-621-048	Nut, cover
	3-621-049	Bracket, cover
	3-621-050	Screw, cover
	3-621-095	Bracket, Shield (A)
	X-36210-03	Deck Ass'y
	X-36210-05	Arm Ass'y (A), tension
	X-36210-06	Cam Ass'y, function selector
	X-36210-07	Lever Ass'y, RECORD button select
	X-36210-11	Knob Ass'y (1), control
	X-36210-15	Guard Ass'y, video head
	X-36210-17	Pully Ass'y, tape counter
	X-36210-18	Knob Ass'y
	X-36210-19	Shaft Ass'y (E), rewind idler
	X-36212-01	Bearing, capstan
	X-36212-02	Deck Ass'y, capstan
	X-36212-03	Ass'y, Actuator
	3-497-200	Rod, Actuator Linkage
	3-605-041	Plate, Microswitch
	3-613-215	Shield, Microswitch
	X-36212-06	Shield Ass'y (3), audio/CTL head
	X-36214-03	Button Ass'y, power switch
	X-36215-01-5	Cover Ass'y, including
	3-412-611	Clasp, cover
	3-413-056	Foot, cover
	3-613-050	Retainer (1), reel
	3-613-051	Retainer (2), reel

Ref. No.	Part No.	Description
	3-613-191	Plate Nut, hinge
	3-613-192-21	Hinge
	3-613-196	Plate, backing, hinge
	3-613-197	Plate Nut, clasp
	3-613-198	Plate, backing, clasp
	3-619-104	SONY Emblem
	3-620-160	Label (3), caution
	3-621-006	Cap Nut, foot
	3-621-515	Plate, tape thread indication
	X-36250-10	Pinch Lever Ass'y
	X-36215-03	
	X-36370-05	Cover Ass'y (B), head
	X-36370-09	Shaft Ass'y, capstan
	X-36370-21	Lever Ass'y (C), take-up reel brake
	X-40189-03	Knob Ass'y, control
	Y-20410-51-3S	Tape Counter
	8-945-529-50	Rotary Head Drum Ass'y, DA-2014
	0-027-019	Bracket, rewind idler
	0-027-193	Spring (D)
	0-027-200	Spring, rewind idler brake
	0-027-216	Ring, oil, 5 mm dia
	0-027-221	Washer, fiber, 6 mm dia
	0-027-479	Ring, oil, pinch roller
	0-037-018	Spring, stepper
	0-037-249	Split Nut
	0-051-220	Spring (B), pull rod
	0-051-221	Pad
	2-825-001	Insulator, TC-5E mica
	2-285-002	Insulator, mica
	2-832-002	Bushing, insulating
	3-001-706-05	Clamper, harness
	3-001-707-06	Cord Retainer
	3-005-001	Spring, head azimuth adj.
	3-005-074-53	Washer, thrust
	3-103-056	Nut
	3-103-139-03	Hum-Proof Belt, motor
	3-103-206	Washer
	3-103-526	Bushing, stop
	3-103-947	Washer, panel
	3-401-156	Spacer, mini jack
	3-401-179	Lug
	3-401-482	Washer, take-up cam ass'y
	3-403-724	Washer, rubber foot
	3-407-042	Belt, tape counter
	3-412-612	Catch
	3-418-077	Spring, F.F idler shaft
	3-418-191-02	Screw, Audio/CTL head
	3-418-709	Caution Label
	3-419-027	Lever, function selector cam shaft
	3-419-093	Brake (S), rewind idler
	3-419-098-11	Washer, nylon
	3-419-098-21	Washer, nylon
	3-419-349	Escutcheon, carrying handle
	3-419-350	Retainer, carrying handle

Ref. No.	Part No.	Description
	3-419-372	Carrying Handle
	3-419-413	Spring, F.F
	3-419-416	Rod, take-up cam
	3-419-418	Retainer, pause brake pull rod
	3-427-291-04	Label (A), CAUTION
	3-429-902	Washer, insulator
	3-465-184	Cushion
	3-484-212	Label (C), CAUTION
	3-601-037	Washer , fiber, thrust bearer
	3-601-060	Spring, rewind idler
	3-601-090	Fan, motor
	3-601-098	Mount, hum-proof belt
	3-601-119	Retainer, tension arm push rod
	3-601-127	Bracket, spring
	3-601-278	Felt (A), pushbutton
	3-601-291	Spacer, Audio/CTL head
	3-601-342	Label, CAUTION
	3-601-343	Label, lug terminal
	3-601-345	Check Lug
	3-605-088	Push Rod, rewind idler
	3-607-061	Cover, fuse holder
	3-607-065	Cover, AC socket
	3-607-748	Retainer, skew control
	3-607-749	Shaft, skew control
	3-607-752	Spring, clutch
	3-607-753	Tube, plastic
	3-607-755	Gear (2), skew control
	3-607-786	Spacer, terminal
	3-609-148	Spring, tension arm
	3-609-209	Washer (B), adj.
	3-610-187	Bearing, pivot
	3-610-188	Pivot
	3-612-939	Nut (B), sash
	3-612-942	Set Screw, 4 x 6
	3-612-950	Spring, tape guide (2)
	3-613-002	Shaft, slide switch lever
	3 613-055	Spacer (1), panel
	3-613-056	Spacer (2), panel
	3-613-102	Mount, tape counter
	3-613-108	Holder (1), slide switch link ass'y
	3-613-109	Holder (2), slide switch link holder
	3-613-111	Spring (1), push, slide switch
	3-613-112	Rod (1), pull slide switch
	3-613-113	Lever, slide switch
	3-613-116	Spacer
	3-613-119	Shaft, F.F idler arm
	3-613-120	Bracket, counter pulley
	3-613-121	Spacer, tape counter pulley
	3-613-122	Shaft, tape counter pulley
	3-613-125	Rod, tension brake release
	3-613-127	Bracket, idler push rod spring
	3-613-128	Lever, tension release
	3-613-129	Pin, tape guide

Ref. No.	Part No.	Description
	3-613-131	Retainer (4), V2 board
	3-613-132	Retainer (2), SV board
	3-613-133	Retainer (1), V1 board
	3-613-133	Retainer (1), SV board
	3-613-134	Cam, motor switch selector
	3-613-135	Cam, automatic shut-off switch select
	3-613-136	Mount, take-up reel spindle
	3-613-139	Support (fornt, left), deck ass'y
	3-613-141	Support (rear, left), deck ass'y
	3-613-142	Holder (3), slide switch link holder
	3-613-143	Slide Plate, slide switch
	3-613-145	Mount, carrying handle
	3-613-146	Reinforcement, deck support
	3-613-147-01	Pulley, capstan, 24.10φmarked"1"
	3-613-147-02	Pulley, capstan, 24.20φmarked"2"
	3-613-147-03	Pulley, capstan, 24.30φmarked"3"
	3-613-147-04	Pulley, capstan, 24.40φmarked"4"
	3-613-147-05	Pulley, capstan, 24.50φmarked"5"
	3-613-147-06	Pulley, capstan, 24.60φmarked"6"
	3-613-147-07	Pulley, capstan, 24.70φmarked"7"
	3-613-147-08	Pulley, capstan, 24.80φmarked"8"
	3-613-147-09	Pulley, capstan, 24.35φmarked"9"
	3-613-147-10	Pulley, capstan, 24.45φmarked"10"
	3-613-147-11	Pulley, capstan, 24.55φmarked"11"
	3-613-148	Cover, upper drum
	3-613-149	Belt, capstan
	3-613-150	Belt, drum
	3-613-155	Belt (B), tape counter
	3-613-156	Shaft, function selector cam
	3-613-158-01	Cover (red), pilot lamp
	3-613-158-11	Cover, pilot lamp
	3-619-159	Stopper, lamp cover
	3-613-161	Spindle, supply reel
	3-613-162	Lever, actuator
	3-613-163	Rod, pull, actuator lever
	3-613-164	Screw, slide switch link holder
	3-613-166	Pinch Roller (60)
	3-613-168	Rod, pull, slide switch
	3-613-169	Spacer, carrying handle
	3-613-170	Frame, video board
	3-613-171	Support (front, right), deck ass'y
	3-613-173	Spring, lock bar
	3-613-175	Spring (1), slide switch link holder
	3-613-176	Spring (2), slide switch link holder
	3-613-182	Cover, tape counter
	3-613-186	Pulley, (A), tape counter
	3-613-187	Sash, rear
	3-613-189	Escutcheon, pushbutton
	3-613-190	Spindle, tape-up reel
	3-613-191	Plate Nut, hinge
	3-613-192-01	Hinge
	3-613-192-11	Hinge
	3-613-199	Felt (C), pushbutton

Ref. No.	Part No.	Description
	3-613-201	Tape Guide (2)
	3-613-202	Reinforcement, diagonal deck
	3-613-203-03	Reinforcement, deck
	3-613-208-03	Protector
	3-613-210-05	Spring (2), push, slide switch
	3-612-214	Spring (2), AUDIO DUB selector
	3-613-215	Insulator, microswitch
	3-613-216	Spring, tape-up brake
	3-613-217	Pulley (60), motor
	3-613-224	Spring, rewind idler arm
	3-613-225	Plate Nut, pushbutton escutcheon
	3-613-227	Rod, push, pause brake
	3-613-228	Adhesive Tape (1)
	3-613-230	Retainer, pinch roller
	3-613-232	Retainer, rewind idler pushrod
	3-613-233	Mount, audio/CTL head
	3-619-244	Return Spring, skew
	3-619-279-01	Set Screw 3 x 6
	3-621-032	Shaft, skew control lever
	3-621-034	Lever, skew control
	3-621-036	Mount (A), supply reel spindle
	3-621-039	Holder, pivot bearing
	3-621-041	Bracket, variable resistor
	3-621-042	Case, RF adaptor
	3-621-043	Bracket, slide switch
	3-621-044	Bracket, sync generator
	3-621-052	Bracket (A), microswitch
	3-621-055-31	Panel (A), reel
	3-621-057	Spacer, knob
	3-621-058	Cover, slide switch
	3-621-059	Holder, harness
	3-621-068	Support (rear, right), deck ass'y
	3-621-072	Bracket, hinge
	3-621-073	Gear (A), skew control
	3-621-074	Push Rod, skew control
	3-621-075	Bracket (B), skew control
	3-621-076	Shaft (B), skew control knob
	3-621-077	Rubber (A), skew control
	3-621-078	Rubber (B), skew control
	3-621-079	Rubber, tension
	3-621-080	Clutch Spring, skew control
	3-621-081	Spring (A), tension arm
	3-621-082	Clamper, harness
	3-621-086	Ornamental Plate, pushbutton
	3-621-087	Bracket, meter
	3-621-088	Bracket, REC lamp
	3-621-089	Bracket, leaf switch
	3-621-090	Cam, leaf switch
	3-621-094	Felt (A), pushbutton
	3-621-102	Spacer (A), pinch roller
	3-621-103	Spacer (C)
	3-621-104	Actuator (A), lock
	3-621-205	Oil retaining ring

Ref. No.	Part No.	Description
	3-621-206	Emblem, AV-3620CE
	3-621-207	Actuator
	3-621-208	Nameplate
	3-621-212-11	DKN-Clamper
	3-621-401	Nemeplate, AV-3620CE
	3-621-404	Bracket, fuse holder
	3-621-405	Panel, connector
	3-621-406	Ornamental Panel, connector
	3-621-409	Protector
	3-621-410	Holde, power switch
	3-621-411	Capstan
	3-621-412	Fuse Label (C)
	3-621-413	Fuse Label (D)
	3-621-504	Slide Plate (A), slide switch
	3-621-505	Slide Plate (V), slide switch
	3-621-506	Spring, slide switch
	3-621-507	Reinforcement, deck support
	3-621-508	Clutch ass'y, (A), skew control
	3-621-509	Bracket, spring
	3-621-517	Velt Separator
	3-621-518	Holder, static discharge band
	3-621-520	Screw, capstan retaining
	3-621-525	Adhesive Tape
	3-621-528	Static Discharge Band
	3-625-088-03	Return Spring, head shield plate
	3-625-095	Retainer, lamp
	3-625-142	Cushion, meter
	3-625-158	Clamper (2), harness
	3-625-165-03	Shield (E)
	3-625-180-11	Protector, rubber
	3-625-426	Spacer, jack
	3-637-044	Plate C. T. L
	3-637-045	Holder, power supply block
	3-637-067	Terminal, C.P.
	3-637-086	Cap, shield
	3-701-030	Label, serial number
	3-701-057-11	SONY Emblem
	3-701-192	Foot, rubber
	3-701-395	Caution Card (UK)
	3-701-415	Set Screw 3 x 3
	4-302-555-02	Clamp Band
	4-303-820	Wire Clip (B)
	4-804-158	Wire Clip

SCREWS

7-621-259-25	(+) P 2.6 x 4
7-621-259-45	(+) P 2.6 x 6
7-621-260-05	(+) P 2.6 x 16
7-621-559-25	(+) K 2.6 x 4
7-621-559-35	(+) K 2.6 x 5
7-621-773-60	(+) B 2.6 x 5
7-682-144-01	(+) P 3 x 3, tape guide
7-682-145-01	(+) P 3 x 4, upper, drum washer

Ref. No.	Part No.	Description
	7-682-145-14	(+) P 3 x 4
	7-682-147-01	(+) P 3 x 6, PG coil bracket
	7-682-147-14	(+) P 3 x 6
	7-682-148-01	(+) P 3 x 8
	7-682-148-14	(+) P 3 x 8 (connector panel)
	7-682-149-01	(+) P 3 x 10, brush mt'g board
	7-682-151-01	(+) P 3 x 14
	7-682-160-01	(+) P 4 x 6
	7-682-163-01	(+) P 4 x 12, stator
	7-682-167-01	(+) P 4 x 25
	7-682-246-01	(+) K 3 x 5
	7-682-247-01	(+) K 3 x 6
	7-682-248-01	(+) K 3 x 8
	7-682-260-01	(+) K 4 x 6
	7-682-262-01	(+) K 4 x 10
	7-682-369-04	(+) RK 4 x 35 (carrying handle)
	7-682-546-14	(+) B 3 x 5
	7-682-546-15	(+) B 3 x 5
	7-682-547-05	(+) B 3 x 6
	7-682-568-04	(+) B 4 x 30
	7-682-589-01	(+) PS 3 x 8
	7-682-647-01	(+) PS 3 x 6 (with spring washer)
	7-682-661-01	(+) PS 4 x 8 (with spring washer)
		WASHERS
	7-623-105-22	2 mm dia (large)
	7-623-107-22	2.6 mm dia (large)
	7-623-108-12	3 mm dia (medium)
	7-623-110-12	4 mm dia (medium)
	7-623-112-12	5 mm dia (medium)
	7-623-113-12	6 mm dia (medium)
	7-623-207-22	Spring Washer, 2.6 mm dia
	7-623-208-22	Spring Washer, 3 mm dia
	7-623-210-22	Spring Washer, 4 mm dia
	7-623-407-05	Star Washer, external, 2.6 mm dia
	7-623-408-05	Star Washer, external, 3 mm dia
	7-623-908-02	Fiber Washer, 3 mm dia
	7-623-908-04	Plastic Washer, 3 mm dia

Ref. No.	Part No.	Description
		RETAINING RINGS
	7-624-102-01	E 1.5
	7-624-105-01	E 2.3
	7-624-106-01	E 3
	7-624-108-01	E 4
	7-624-109-01	E 5
		LUGS
	7-623-508-01	3 mm dia
	7-623-510-01	4 mm dia
		NAIL
	7-629-100-19	1 x 6
		NUTS
	7-622-105-02	2 mm dia
	7-684-013-01	3 mm dia
	7-684-014-01	4 mm dia
		ACCESSORIES
	X-36052-03	Accessory Ass'y
	1-506-161-11	Multi Plug, 8-pin
	1-534-698	Power Cord (AEP only)
	1-534-819	Power Cord (UK only)
	3-701-239	Polyethylene Bag
	3-701-250	Polyethylene Bag
	3-790-580-11	Instruction Manual
	3-793-068	Warning Card
	3-793-524-81	Caution Card (UK only)
	3-793-573-11	Instruction Card
	8-871-247	Video Tape, V-60E
	8-880-007-00	Reel, RH-7V
		PACKING
	X-36212-05-1	Carton Ass'y, including
	3-621-065	Cushion
	3-621-209	Packing Carton
	3-613-222	Polyethylene Bag
	3-701-250	Polyethylene Bag
	3-701-360-01	Tack Lable (AEP only)
	3-701-389-01	Tack Lable (UK only)

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description

"V1" LIMITER, DEMODULATOR & NOISE ELIMINATOR

	8-984-052-10	"V1" Printed Circuit Board, with components

CAPACITORS

All capacitors in microfarads unless otherwise indicated.
All silvered mica capacitors in ±5%, 50 V.
Tolerance of all electrolytic (elect) capacitors as follows.
less than 4.7 μF = −10%, +150%
4.7 μF and over = −10%, +100%

C301	1-105-821-12	0.001	±10%	50 V, mylar
C302	1-105-845-12	0.1	±10%	50 V, mylar
C303	1-105-841-12	0.047	±10%	50 V, mylar
C304	1-121-398-11	10		25 V, elect
C305	1-121-391-11	1		50 V, elect
C306	1-105-841-12	0.047	±10%	50 V, mylar
C307	1-105-833-12	0.01	±10%	50 V, mylar
C308	1-105-845-12	0.1	±10%	50 V, mylar
C309	1-121-413-11	100		6.3 V, elect
C310	1-121-410-11	47		25 V, elect
C311	1-105-841-12	0.047	±10%	50 V, mylar
C312	1-107-088-11	130pF, silvered mica		
C313	1-107-088-11	130pF, silvered mica		
C314	1-107-075-11	39pF, silvered mica		
C315	1-121-409-11	47		16 V, elect
C316	1-121-413-11	100		6.3 V, elect
C317	1-107-233-11	430pF, silvered mica		
C318	1-107-090-11	160pF, silvered mica		
C321	1-121-416-11	100		25 V, elect
C322	1-121-410-11	47		25 V, elect
C323	107-089-11	150pF, silvered mica		
C324	121-421-11	220		16 V, elect
C325	1-107-072-11	30pF, silvered mica		
C326	1-121-391-11	1		50 V, elect
C328	1-121-398-11	10		10 V, elect
C329	1-121-391-11	1		50 V, elect
C330	1-121-416-11	100		25 V, elect
C332	1-121-413-11	100		6.3 V, elect
C333	1-107-077-11	47pF, silvered mica		
C334	1-121-416-11	100		25 V, elect
C335	1-121-409-11	47		16 V, elect
C336	1-121-416-11	100		25 V, elect
C337	1-121-425-11	470		10 V, elect
C352	1-107-085-11	100pF, silvered mica		

DIODES

D303		1S1587
D304		1S1587

IC

IC301		CX-034

Ref. No.	Part No.	Description

INDUCTORS

L301	1-407-157-11	10 μH
L302	1-407-160-11	18 μH
L303	1-407-163-11	33 μH
L304	1-407-160-11	18 μH
L305	1-407-189-11	8.2 μH
L306	1-407-160-11	18 μH
L308	1-407-163-11	33 μH

TRANSISTORS

Q301	2SC403C
∫	
Q304	2SC403C
Q307	2SC403C
∫	
Q315	2SC403C

RESISTORS

Carbon resistors in ohms, 1/4 W, ±5% are omitted.

R305	1-221-492	100,	adjustable (linear)
R306	1-244-876-11	1300, 1/2 W	
R307	1-244-876-11	1300, 1/2 W	
R311	1-244-879-11	1800, 1/2 W	
R315	1-221-494	470,	adjustable (linear)
R319	1-222-805	470,	adjustable, composition
R336	1-244-868-11	620, 1/2 W	
R345	1-222-701	10 K,	adjustable, composition
R347	1-244-860-11	300, 1/2 W	
R357	1-244-860-11	300, 1/2 W	
R365	1-244-868-11	620, 1/2 W	
R370	1-244-866-11	510, 1/2 W	

TRANSFORMER

T301	1-425-544-11

"V3" VIDEO AMP, MODULATOR & REC/PB AMP

	8-984-052-60	Printed Circuit Board, with components

CAPACITORS

All capacitors in microfarads unless otherwise indicated.
All mylar capacitors in ±10% 50 V.
Tolerance of all electrolytic (elect) capacitors as follows.
less than 4.7 μF = −10%, +150%
4.7 μF and over = −10%, +100%

C201	1-107-008-11	150pF	±10%	50 V, silvered mica
C202	1-121-409-11	47		16 V, elect

Ref. No.	Part No.	Description
C203	1-121-415-11	100 16 V, elect
C204	1-121-409-11	47 16 V, elect
C205	1-121-398-11	10 25 V, elect
C206	1-105-661-12	0.001, mylar
C207	1-121-410-11	47 25 V, elect
C208	1-121-416-11	100 25 V, elect
C209	1-121-392-11	3.3 25 V, elect
C210	1-105-661-12	0.001, mylar
C211	1-121-398-11	10 25 V, elect
C212	1-107-165-11	56pF ±10% 50 V, silvered mica
C213	1-121-409-11	47 16 V, elect
C214	1-121-410-11	47 25 V, elect
C215	1-121-392-11	3.3 25 V, elect
C216	1-121-410-11	47 25 V, elect
C217	1-129-662-11	470pF ±10% 50 V, combination film
C218	1-105-681-12	0.047, mylar
C219	1-105-681-12	0.047, mylar
C220	1-121-410-11	47 25 V, elect
C221	1-107-044-11	3.3pF ±0.5pF 50 V, silvered mica
C222	1-107-165-11	56pF ±5% 50 V, silvered mica
C223	1-107-163-11	47pF 0.5% 50 V, silvered mica
C224	1-105-685-12	0.1, mylar
C226	1-105-673-12	0.01, mylar
C227	1-105-673-12	0.01, mylar
C228	1-105-673-12	0.01, mylar
C230	1-131-215-11	1 ±20% 35 V, tantalum
C231	1-105-685-12	0.1, mylar
C232	1-105-673-12	0.01, mylar
C234	1-131-215-11	1 ±20% 35 V, tantalum
C235	1-105-685-12	0.1, mylar
C237	1-141-070-11	20pF 250 V, trimmer
C238	1-105-673-12	0.01, mylar
C239	1-105-681-12	0.047, mylar
C240	1-141-070-11	20pF 250 V, trimmer
C241	1-105-673-12	0.01, mylar
C242	1-105-681-12	0.047, mylar
C243	1-105-673-12	0.01, mylar
C244	1-105-685-12	0.1, mylar
C245	1-105-673-12	0.01, mylar
C246	1-105-685-12	0.1, mylar
C247	1-105-685-12	0.1, mylar
C248	1-121-398-11	10 25 V, elect
C249	1-107-189-11	30pF ±10% 50 V, silvered mica
C250	1-105-674-12	0.012, mylar
C251	1-141-070-11	20pF 250 V, trimmer
C252	1-105-685-12	0.1, mylar

DIODES

Ref. No.	Part No.	Description
D201		1S1555
D202		1S1555
D203		1S1555
D204		1S1555
D205		1S1555
D206		1S1925
D207		1S1925
D208		10D-2

INDUCTORS

Ref. No.	Part No.	Description
L201	1-407-162-11	27 μH
L202	1-407-162-11	27 μH
L203	1-407-205-21	8.2 mH
L204	1-407-205-21	8.2 mH
L205	1-407-255-11	47 μH
L206	1-407-191-21	0.47 mH

TRANSISTORS

Q201		2SK23
Q202		2SC403B
Q203		2SC403B
Q204		2SC403B
Q205		2SC403B
Q207		2SA564
Q208		2SC403B
Q209		2SC403B
Q210		2SC403B
Q211		2SC403B
Q212		2SC403B
Q213		2SC1124
Q215		2SC403B
Q216		2SC1124
Q219		2SA564
Q220		2SK43
Q221		2SC634A
Q222		2SC403B
Q223		2SK43
Q224		2SC634A
Q225		2SC403B
Q226		2SC403B
Q227		2SC403B
Q228		2SC403B

RESISTORS

Carbon resistors in ohms, 1/4 W, ±5% are omitted.

R214	1-244-861-11	330, 1/2 W
R221	1-222-804	1 K, adjustable, composition
R225	1-244-861-11	330, 1/2 W
R228	1-221-997	2200, adjustable, composition
R237	1-221-997	2.2 K, adjustable, composition
R238	1-221-978	4700, adjustable, composition
R242	1-206-648	220, 2 W, metalized-paper
R243	1-222-805	470, adjustable, composition
R248	1-222-805	470, adjustable, composition
R260	1-221-986	330, adjustable, composition
R264	1-221-997	2200, adjustable, composition

Ref. No.	Part No.	Description
R268	1-244-857-11	220, 1/2 W
R269	1-221-986	330, adjustable, composition
R273	1-221-997	2200, adjustable, composition
R283	1-222-701	10 K, adjustable, composition
R285	1-222-701	10 K, adjustable, composition
R293	1-221-978	4700, adjustable, composition
R296	1-244-865-11	470, 1/2 W
R298	1-244-857-11	220, 1/2 W

SWITCH

S201	1-514-813-22	Slide Switch

TRANSFORMERS

T201	1-425-383-11	Modulator Transformer
T202	1-427-295-11	Output Transformer, REC amp
T203	1-427-295-11	Output Transformer, REC amp
T204	1-425-782-11	RF Transformer
T205	1-425-782-11	RF Transformer

"A2" AUDIO

8-984-052-70 Printed Circuit Board, with components

CAPACITORS

All capacitors in microfarads unless otherwise indicated.
Tolerans of all electrolytic (elect) capacitors as follows.
less than 4.7 μF = −10%, +150%
4.7 μF and over = −10%, +100%

C501	1-129-664-11	680pF	±10%	50 V, combination film
C502	1-121-398-11	10		25 V, elect
C503	1-121-398-11	10		25 V, elect
C504	1-105-501-12	0.001	±5%	50 V, mylar
C505	1-121-402-11	33		10 V, elect
C506	1-107-123-11	47pF	±10%	50 V, silvered mica
C507	1-121-398-11	10		25 V, elect
C508	1-121-416-11	100		25 V, elect
C509	1-121-398-11	10		25 V, elect
C510	1-107-131-11	100pF	±10%	50 V, silvered mica
C511	1-105-673-12	0.01	±10%	50 V, mylar
C512	1-121-395-11	4.7		25 V, elect
C513	1-121-395-11	4.7		25 V, elect
C514	1-121-414-11	100		10 V, elect
C515	1-121-398-11	10		25 V, elect
C516	1-105-501-12	0.001	±5%	50 V, mylar
C517	1-105-510-12	0.0056	±5%	50 V, mylar
C518	1-107-123-11	47pF	±10%	50 V, silvered mica
C519	1-121-402-11	33		10 V, elect
C520	1-121-413-11	100		6.3 V, elect
C521	1-121-398-11	10		25 V, elect
C522	1-105-837-12	0.0033	±10%	50 V, mylar
C523	1-107-131-11	100pF	±10%	50 V, silvered mica
C524	1-121-395-11	4.7		25 V, elect
C525	1-121-395-11	4.7		25 V, elect
C526	1-121-402-11	33		10 V, elect
C527	1-121-410-11	47		25 V, elect
C528	1-121-411-11	47		50 V, elect
C529	1-105-683-12	0.068	±10%	50 V, mylar
C531	1-121-410-11	47		25 V, elect
C532	1-121-398-11	10		25 V, elect
C533	1-127-093-11	0.47	±20%	25 V, aluminum-elect
C534	1-129-665-11	820pF	±10%	50 V, combination film
C535	1-129-660-11	330pF	±10%	50 V, combination film
C536	1-141-034-21	20～120pF		1000 V, trimmer
C542	1-129-710-11	4700pF	±10%	630 V, film
C543	1-105-679-12	0.033	±10%	50 V, mylar
C544	1-105-837-12	0.022μF	±20%	50 V, mylar
C545	1-121-404-11	33		25 V, elect
C546	1-121-398-11	10		25 V, elect

DIODES

D501	1T22M
D502	1T22M
D503	1T22M
D504	1T22M

INDUCTORS

L501	1-407-198-21	2.2 mH
L502	1-407-240-11	22 mH, variable
L503	1-407-198-21	2.2 mH
L504	1-407-198-21	2.2 mH

TRANSISTORS

Q501	2SC631A
Q502	2SC631A
Q503	2SC634A
Q504	2SC634A
Q505	2SC634A
Q506	2SC634A
Q507	2SC634A
Q508	2SC634A
Q509	2SC634A
Q510	2SC634A
Q513	2SC1124

RESISTORS

Carbon resistors in ohms, 1/4 W, ±5% are omitted.

R513	1-222-701	10 K,	adjustable, composition
R518	1-221-979	22 K,	adjustable, composition
R538	1-222-701	10 K,	adjustable, composition
R539	1-222-701	10 K,	adjustable, composition

Ref. No.	Part No.	Description
R540	1-244-860-11	300, 1/2 W
R560	1-244-875-11	1200, 1/2 W
R561	1-244-875-11	1200, 1/2 W

SWITCH

S501	1-514-813-22	Slide Switch

TRANSFORMER

T501	1-405-574-11	Oscillator Transformer

"SV" SERVO

	8-984-052-20	"SV" Printed Board, with components

CAPACITORS

All capacitors in microfarads, ±20%, unless otherwise indicated. (P = μμF)
Tolerance of all electrolytic (elect) capacitors as follows.
less than 4.7 μ F = −10%, +150%
4.7 μ F and over = −10%, +100%

C41	1-105-845-12	0.1	50 V, mylar
C401	1-121-391-11	1	50 V, elect
C402	1-121-391-11	1	50 V, elect
C403	1-121-403-11	33	16 V, elect
C404	1-105-821-12	0.001	50 V, mylar
C405	1-105-841-12	0.047	50 V, mylar
C406	1-121-391-11	1	50 V, elect
C407	1-121-469-11	10	10 V, elect
C408	1-121-410-11	47	25 V, elect
C409	1-127-091-11	0.22	25 V, aluminum-elect
C410	1-105-845-12	0.1	50 V, mylar
C411	1-105-849-12	0.22	50 V, mylar
C412	1-105-833-12	0.01	50 V, mylar
C413	1-105-833-12	0.01	50 V, mylar
C414	1-105-833-12	0.01	50 V, mylar
C415	1-121-391-11	1	50 V, elect
C416	1-121-391-11	1	50 V, elect
C417	1-121-416-11	100	25 V, elect
C418	1-105-827-12	0.0033	50 V, mylar
C419	1-127-093-11	0.47	25 V, aluminum-elect
C420	1-105-827-12	0.0033	50 V, mylar
C421	1-127-093-11	0.47	25 V, aluminum-elect
C423	1-105-827-12	0.0033	50 V, mylar
C424	1-127-093-11	0.47	25 V, aluminum-elect
C425	1-121-409-11	47	16 V, elect
C426	1-105-849-12	0.22	50 V, mylar
C427	1-127-093-11	0.47	25 V, aluminum-elect
C428	1-105-825-12	0.0022	50 V, mylar
C429	1-121-398-11	10	25 V, elect
C430	1-105-833-12	0.01	50 V, mylar
C431	1-121-391-11	1	50 V , elect
C432	1-105-849-12	0.22	50 V, mylar
C433	1-105-845-12	0.1	50 V, mylar
C434	1-121-391-11	1	50 V, elect
C435	1-105-827-11	0.0033	50 V, mylar
C436	1-105-825-12	0.0022	50 V, mylar
C439	1-105-833-12	0.01	50 V, mylar
C440	1-105-835-12	0.015	50 V, mylar
C441	1-105-680-12	0.039	±10% 50 V, mylar

DIODES

D401	1S1555
D402	1S1555
D403	1S1555
D404	1S1555
D405	1S1555
D406	1S1555
D407	1S1555

MICRO MODULES

FF401	CF-011B
MM401	CV-001
MM402	CV-001
MM403	CV-001
MM404	CV-001
MM405	CV-001

INDUCTOR

L401	1-407-285-11	1.5 mH,	Dummy coil

TRANSISTORS

Q401	2SC633
Q402	2SA611
Q403	2SC633
Q404	2SA611
Q405	2SC633
Q406	2SK23
Q407	2SD291
Q408	2SC403C

RESISTORS

Cabon resistors in ohms, 1/4 W, ±5% are omitted.

R401	1-250-881-11	2200, 1/2 W	
R402	1-250-881-11	2200, 1/2 W	
R412	1-224-073	100 K,	adjustable (linear)
R413	1-224-073	100 K,	adjustable (linear)
R433	1-224-073	100 K,	adjustable (linear)

Ref. No.	Part No.	Description
R441	1-224-073	100 K, adjustable (linear)
R445	1-250-869	680, 1/2 W
R451	1-224-075	1 M, adjustable (linear)
R454	1-221-694	20 K, adjustable (linear)
R459	1-221-681	47 K, adjustable (linear)

SWITCH

SW7	1-514-813-22	Slide Switch

"R5" VOLTAGE REGULATOR

8-984-052-40 "R5" Printed Circuit Board, with components

CAPACITORS

All capacitors in microfarads, ±20%, unless otherwise indicated. (P = μμF)
Tolerance of all electrolytic (elect) capacitors as follows.
less than 4.7 μF = −10%, +150%
4.7 μF and over = −10%, +100%

C601	1-121-074-21	1000	50 V, elect
C602	1-105-837-12	0.022	50 V, mylar
C603	1-121-738-11	10	50 V, elect
C604	1-121-411-11	47	50 V, elect
C605	1-105-821-12	0.001	50 V, mylar
C606	1-121-398-11	10	25 V, elect
C607	1-121-409-11	47	16 V, elect
C608	1-105-837-12	0.022	50 V, mylar
C609	1-105-925-12	0.1	200 V, mylar
C610	1-105-925-12	0.1	200 V, mylar

DIODES

D601	SA2Z
D602	SA2Z
D603	RD13A
D604	RD4A

TRANSISTORS

Q602	2SC756
Q603	2SC403C
Q604	2SC756
Q605	2SC403C

RESISTORS

Carbon resistors in ohms, 1/4 W, ±5% are omitted.

R604	1-221-497	5 K adjustable (linear)
R606	1-250-860-11	300, 1/2 W
R610	1-221-497	5 K adjustable (linear)

Ref. No.	Part No.	Description

"SY3" SYNC SEPARATOR

8-984-042-80 "SY3" Printed Circuit Board, with components

CAPACITORS

ALL capacitors in microfarads, ±20%, unless otherwise indicated. (P = μμF)
Tolerance of all electrolytic (elect) capacitors as follows.
less than 4.7 μF = −10%, 150%
4.7 μF and over = −10%, +100%

C901	1-105-849-12	0.22	50 V, mylar
C903	1-121-404-11	33	25 V, elect
C904	1-105-831-12	0.0068	50 V, mylar
C905	1-121-469-11	10	10 V, elect
C906	1-121-403-11	33	16 V, elect
C907	1-121-414-11	100	10 V, elect

DIODE

D901	1S1555

TRANSISTORS

Q901	2SC403B
Q902	2SC403B
Q903	2SA564A

RESISTORS

Carbon resistors in ohms, 1/4 W, ±5% are omitted.

FRAME

CAPACITOR

C001	1-113-069-11	2.5 μF + 1.2 μF −5 +10% 250 V, metalized paper

CONNECTORS

CN1	1-509-355-11	Receptacle, AC input
CN3	1-509-095-11	8-pin Receptacle, TV
CN4	1-526-063-11	6-pin Receptacle, CAMERA
CN5	1-507-053-04	Mini Jack
CN6	1-507-053-04	Mini Jack
CN7	1-507-053-04	Mini Jack
CN8	1-509-502-21	UHF Connector
CN9	1-509-502-21	UHF Connector
CN11	1-507-290-12	6-pin Socket, RF adaptor
CN12	1-509-482	Power Voltage Select Socket

Ref. No.	Part No.	Description
	FUSES	
F1	1-532-285-11	1.25 A
F2	1-532-053-11	1.6 A
F3	1-532-053-11	1.6 A
F4	1-532-294-11	0.4 A
F5	1-532-215-11	0.8 A
F6	1-532-215-11	0.8 A
	TRANSISTOR	
Q601		2SD316
	RESISTORS	
	Carbon resistors in ohms, 1/4 W, ±5% are omitted.	
R007	1-222-327	100 K, variable tracking
R008	1-222-559	10 K, adjustable, audio level
	SWITCHES	
SW1	1-514-850-13	Power Switch
SW2	1-514-039-12	Microswitch
SW3	1-514-423-11	Microswitch
SW4	1-514-057-10	Microswitch
SW5	1-514-335-11	Slide Switch
SW9	1-514-057-10	Microswitch
SW10	1-513-149-00	Push Switch
	1-514-924-11	Leaf Switch
	TRANSFORMER	
PT	1-441-998-11	Transformer, power
	MISCELLANEOUS	
	1-518-082-12	Pilot Lamp
	1-518-082-22	Pilot Lamp
	1-520-103	Level Meter
	1-533-026-11	Fuse Holder
	1-536-278-12	Terminal Strip, 5-pin
	1-536-394-11	Terminal Strip
	1-536-396-11	Terminal Strip, 1L2
	1-539-493-13	SW Printed Circuit Board
	8-821-221-08	Audio Head, PP30-2102F
	8-831-634-06	Motor, HC634B

MECHANICAL PARTS LIST (FOR AV-3620CE DRUM)

Ref. No.	Part No.	Description
	3-601-236-01	Spacer, flange
	5	
	3-601-236-04	Spacer, flagne
	3-607-104-03	Brush
	3-612-922	Bracket, FG coil
	3-612-926-01	Head Drum Pulley, 60 Hz
	?	
	3-612-926-41	Head Drum Pulley, 60 Hz
	3-612-927	Bracket, brush
	3-612-940	Bracket, brush
	3-618-713	Retainer, lead
	8-829-510-52	Video Head Ass'y, H01-12
	SCREWS	
	7-621-255-25	(+) P 2 x 4
	7-621-255-45	(+) P 2 x 6
	7-621-255-55	(+) P 2 x 8
	7-621-259-12	(+) P 2.6 x 3
	7-621-259-32	(+) P 2.6 x 5
	7-621-712-51	(–) 2.6 x 6
	7-682-144-01	(+) P 3 x 3
	7-682-145-01	(+) P 3 x 4
	7-682-146-13	(+) P 3 x 5
	7-682-147-01	(+) P 3 x 6
	7-682-148-01	(+) P 3 x 8
	7-682-160-01	(+) P 4 x 6
	7-682-161-13	(+) P 4 x 8
	7-682-645-13	(+) PS 3 x 4
	7-682-647-01	(+) PS 3 x 6
	7-682-648-01	(+) PS 3 x 8
	7-682-649-01	(+) PS 3 x 10
	7-682-663-01	(+) PS 4 x 12
	7-682-665-01	(+) PS 4 x 16
	WASHERS	
	7-623-105-02	2 ϕ (small)
	7-623-107-12	2.6 ϕ (medium)
	7-623-108-08	3 ϕ (small)
	7-623-108-12	3 ϕ (medium)
	7-623-110-12	4 ϕ (medium)
	7-623-112-12	5 ϕ (medium)
	7-623-212-22	Spring Washer, 5 ϕ
	VOLT	
	7-683-437-01	5 x 4
	NUT	
	7-684-015-01	5 ϕ

ELECTRICAL PARTS LIST (FOR AV-3620CE DRUM)

Ref. No.	*Part No.*	*Description*
	1-419-019-23	Coil, 30 PG
	1-419-019-81	Coil, 30 PG
	1-454-019	Brake Coil
	1-536-255	Terminal Board, brush
	1-582-017	Board, brush lead
	8-825-567	Erase Head