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**AMPEX**

**AUDIO-VIDEO  
SYSTEMS DIVISION**

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**MM-1100  
RECORDER/REPRODUCER**

**DESCRIPTION  
INSTALLATION  
OPERATION  
MAINTENANCE**

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CATALOG NO. 4390321-03  
ISSUED: 20 OCTOBER 1972

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# DESCRIPTION

## GENERAL

This manual contains installation, operation, and maintenance instructions for the Ampex Model Master Maker 1100 Tape Recorder/Reproducer, Ampex part no. 4010210. The standard model MM-1100 provides 16 channels of audio recording/reproducing capabilities, using 2-inch magnetic tape on reels up to 16 inches in diameter. Eight-channel and 24-channel recorder/reproducer systems are available on special order. Any machine may be converted to an alternate configuration (e.g. 16 to 24-channel) by installing a conversion kit. The MM-1100 provides the capability of recording on any or all 16 channels simultaneously, or of monitoring a previously recorded channel while recording in synchronization on additional channels(s). The selective synchronization (SEL SYNC\*) feature is enabled by using the record head(s) of the prerecorded channel as playback head(s).

The MM-1100 recorder/reproducer consists of a tape transport assembly; a transport control assembly, a frame assembly; a motor drive amplifier assembly; a head assembly; four electronics assemblies (for 16-channel systems); a control box assembly; a meter panel assembly; two power supplies; a fan assembly; an external connector panel assembly; an input/output adapter panel assembly; and a circuit breaker assembly. Connectors are used extensively between units to allow easy removal of components and assemblies.

## TAPE TRANSPORT ASSEMBLY

The tape transport assembly, Figure 1, consists of supply and takeup reel assemblies; a capstan drive assembly; a capstan pinch roller assembly; a tension sensor assembly; an end-of-tape arm and housing assembly; a tape lifter assembly; and an optional tape timer assembly; Also mounted on the tape transport, but not considered part of the tape transport, are the erase, record, and reproduce heads comprising the head assembly.

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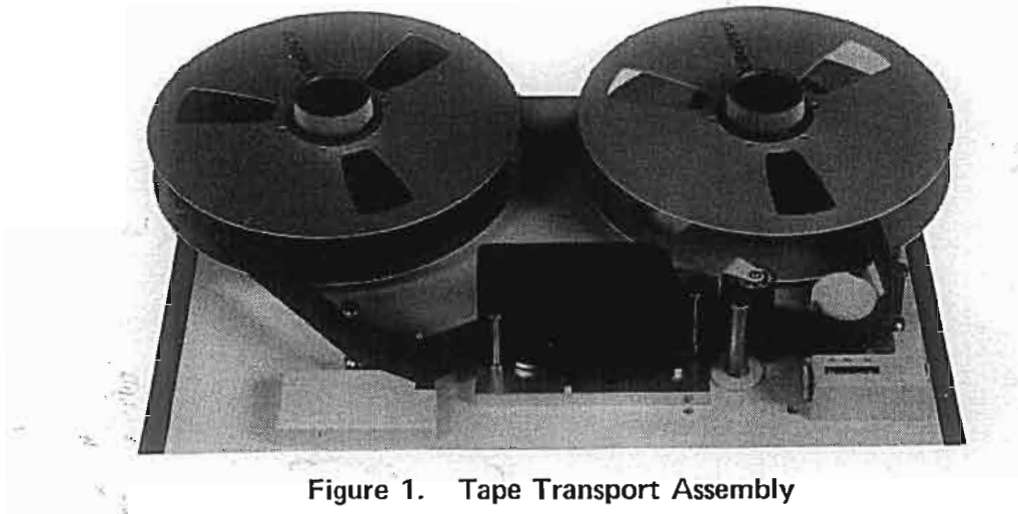


Figure 1. Tape Transport Assembly

## **SUPPLY AND TAKEUP REEL ASSEMBLIES**

The supply and takeup reel assemblies each consist of a split phase, four-pole ac torque motor and brake assembly. The motors drive the tape reel turntables. A motion sense assembly is mounted on the bottom of the supply reel drive motor and shares the turntable shaft. These assemblies can be removed through the top of the transport deck for servicing.

## **CAPSTAN DRIVE ASSEMBLY**

The capstan drive assembly consists of a dc servo-controlled motor and a tachometer wheel. The shaft of the motor is the capstan for the tape transport. The tachometer wheel assembly consists of a pickup coil and inner and outer tach (gear) wheels mounted on the motor shaft and housing. The use of both inner and outer tachs minimizes flutter introduced by tach irregularities.

## **CAPSTAN PINCH ROLLER**

The capstan pinch roller consists of a solenoid-operated, shaft-mounted arm. The arm supports a rubber pinch roller fitted with ball bearings at each end of the pinch roller shaft. An adjustable pressure spring is used to maintain the necessary force of the pinch roller against the capstan.

## **TENSION SENSOR ASSEMBLY**

The tension sensor assembly consists of two selenium photovoltaic cells and an incandescent lamp mounted on a fixed bracket. The three active components are wired to a connector plug



that interconnects with the transport harness. A moving window is fixed to a tension arm in the tape path which passes an amount of light proportional to the tape tension from the lamp to the photocells.

### **END-OF-TAPE ARM**

The end-of-tape arm is contained in a housing and consists of a spring-loaded tension arm assembly fitted with a tape guide at the free end. The post to which the tension arm is attached extends through the transport chassis and is mechanically coupled to a dashpot to dampen the spring-loaded effect. The tension arm post is also equipped with an actuator that trips a microswitch which signals that there is no tape pressure against the tension arm.

### **TAPE LIFTER ASSEMBLY**

The tape lifter assembly is a solenoid-operated, spring-return pivoted assembly. The tape lifter pins extend up through the head assembly mounting block and are moved forward of the head assembly when the solenoid is actuated. Unless defeated by the operator, the tape lifters function during the fast forward and rewind modes.

### **TAPE TIMER ASSEMBLY (OPTIONAL)**

The tape timer assembly consists of a tape-driven idler assembly attached to a mounting boss. The timer idler drives a gear train arrangement, which, in turn, drives a mechanical time counter. The counter indicates tape travel time in hours, minutes and seconds. If the tape timer option is not used, a fixed post is fitted in its place.

## **TRANSPORT CONTROL ASSEMBLY**

The transport control assembly is an enclosed chassis with a hinged lift-up cover, which contains two separate printed circuit board assemblies and an extender board. The transport control board and the capstan servo board plug into 56-pin connector receptacles J1 and J2, respectively. The extender board plugs into spare receptacle J3. The board receptacles are hard-wired to a connector cable harness that interconnects with the transport assembly, the electronics assembly, the remote control connector on the input power panel, and the tachometer. The transport control assembly is mounted to the rear of the meter panel assembly, adjacent to the control box assembly.

## MOTOR DRIVE AMPLIFIER ASSEMBLY

The motor drive amplifier (MDA), is a completely enclosed chassis that mounts on the right side of the rear panel. The MDA assembly contains a printed circuit board mounted on the chassis with five heatsinks for power transistors. A chassis connector is provided for interconnection of power and control signals. Three separate MDA's are enclosed, two for the reel motors and one for the capstan motor.

## HEAD ASSEMBLY

The head assembly (Figure 2) contains three 16-channel head stack assemblies: the erase head, the record head, and the reproduce head. The head assembly accepts 2-inch wide recording tape to provide 16-channel record, reproduce, and erase capabilities. The record and reproduce head stacks are magnetically shielded with laminated mu-metal. A hinged head shield cover is block-mounted in front of the record and reproduce heads. In addition, two precision tape guides are mounted adjacent to the erase head on one end and the reproduce head at the other end. The record and reproduce heads are identical, and are of a design which provides Sel-Sync response comparable to that of conventional reproduce heads.

## ELECTRONICS ASSEMBLIES

Four electronics assemblies are required to make up the total complement of 16 channels. Each electronics assembly (Figure 3) comprises four channels of the 16-channel recorder and

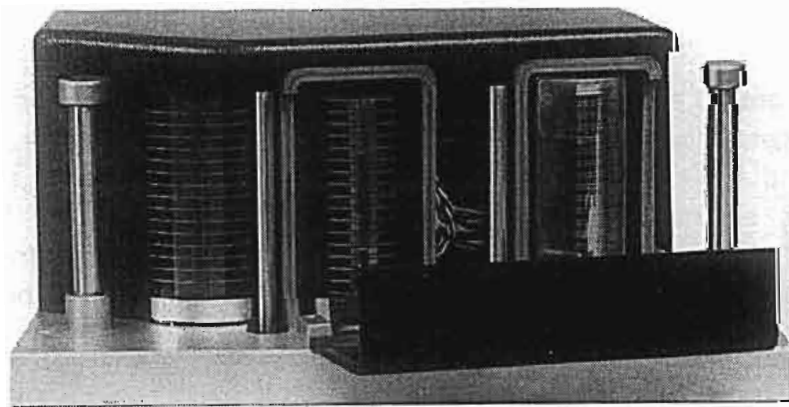
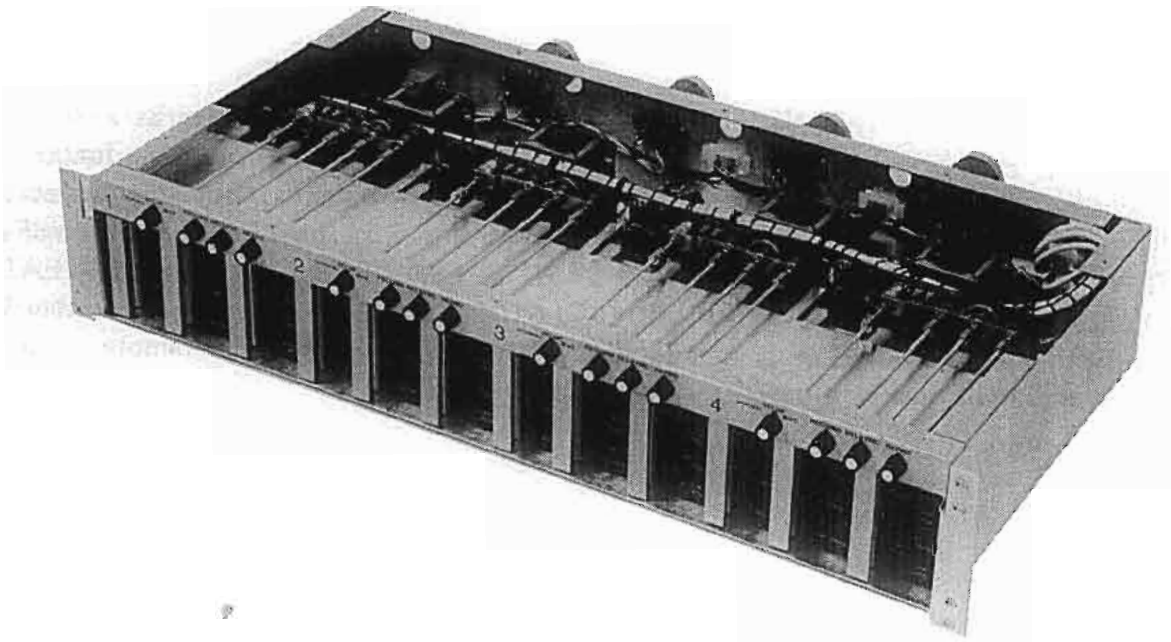


Figure 2. Head Assembly





**Figure 3. Electronics Assembly**

consists of four audio switching printed circuit boards. Each audio switching board contains three 24-pin printed board receptacles. The bias amplifier, record amplifier, and reproduce amplifier boards plug into the receptacles on the audio switching board. A 30-pin connector connects each audio switching board with the rest of the electronics. Three potentiometers and a switch on each audio switching board are mechanically coupled by shaft extenders to the front panel to provide switching and adjustment of Sel-Sync, reproduce, and record levels. Normally, knobs are provided for these controls. However, if desired, the knobs may be removed and the exposed shafts recessed for screwdriver adjustment only. Protrusion of the shafts is governed by adjusting the shaft coupler.

Each record and reproduce board contains a 10-pin printed circuit board receptacle for a plug-in equalization board. The equalization boards plug in at right angles to the record and reproduce boards so that the board adjustment controls are accessible at the front panel of the electronics assembly. The rear panel contains all necessary input/output connectors. Each electronics assembly (4 channels) is fitted with an individual 2A slow blow fuse for protection of the 39-V supply, located on the rear of the assembly. A line bridging transformer is provided and is inserted in the INPUT ACCESSORY socket on the rear panel of the electronics assembly.

## CONTROL BOX ASSEMBLY

The control box assembly (Figure 4) is a removable assembly that doubles as a remote control unit. The control box contains the controls and indicators for all operating functions of the recorder. There are 16 SAFE/READY rocker switches which select the particular channel(s) to record on or reproduce from. Other control box assembly switches are: SEL SYNC/REPRO, INPUT MON/NORM MON, TAPE SPEED 15/30, LIFTER DEFEAT, RECORD, PLAY, REWIND, FAST FORWARD, and STOP. When the control box assembly is used as a remote control unit, it is connected by a cable assembly to the remote control connector on the input power panel on the rear of the recorder.

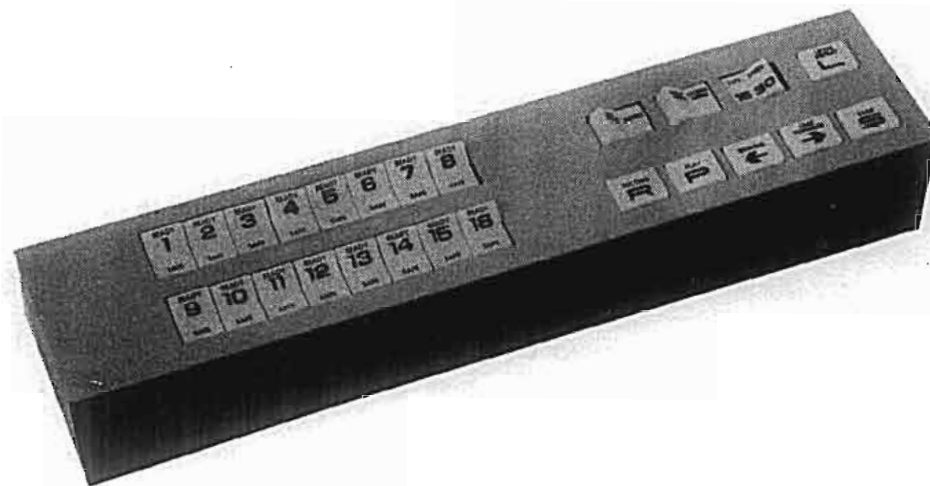


Figure 4. Control Box Assembly

## METER PANEL ASSEMBLY

The meter panel assembly is comprised of 16 individual vu meters, one meter per channel. The meter panel tilts into three different positions, the last of which is with the meters tilted down for lamp replacement. A cable harness provides interconnection to the electronics assembly.

## POWER SUPPLIES

A 15/27-volt power supply and a 39-volt power supply are mounted on the rear panel of the recorder, with the 39-volt supply on top. Basically, each power supply consists of a transformer, filter capacitors, transistors with heatsinks, a regulator board, and output connectors. In addition, the 39-volt supply contains a bias/erase oscillator for the electronics. The main difference between the units is the regulator printed circuit board which plugs into the power supply chassis.

## SPECIFICATIONS

Specifications for the MM-1100 are presented in Table 1.

Table 1. Specifications

PARAMETER	SPECIFICATION
Tape Widths	1 inch for 8-track systems 2 inch for 16 or 24-track systems
Tape Speeds	15 and 30 in/s
Reel Size	NAB hub up to 16-inch diameter
Inputs	20 kilohms balanced input. Accepts line levels from -17 dBm to produce recommended operating level.
Outputs	600-ohm load balanced or unbalanced with nominal output level of +4 dBm and maximum output of +27 dBm, nominal.
Equalization	Automatically switched with speed change, using NAB plug-in equalization circuits [IEC (CCIR) plug-in circuits available on order].
Electronics	All electronics are solid-state. Plug-in printed circuit boards for record, reproduce, equalization, and bias amplifiers.

Table 1. Specifications (Continued)

PARAMETER	SPECIFICATION
Power Supplies	39 vdc regulated (electronic system) +27 vdc, +15 vdc and +5 vdc (servo and control system)
Electronic Overload Margin	Record Amplifier: Overload greater than 28 dB above normal operating level
Overall Frequency Response, Sel-Sync and Reproduce Modes	30 in/s: $\pm 2$ dB, from 50 Hz to 18 kHz 15 in/s: $\pm 2$ dB, from 30 Hz to 15 kHz
Signal-to-Noise Ratio  Using Ampex 406 tape or equivalent at 15 or 30 in/s  Using Ampex 404 tape or equivalent at 15 or 30 in/s	8 or 16 channels, 63 dB; 24 channels, 58 dB; peak record level to unweighted (30 Hz to 18 kHz) noise; includes bias, erase, and reproduce amplifier noise. (Peak record level corresponds to a tape flux of 520 nWb/m.)  8 or 16 channels, 60 dB; 24 channels, 55 dB; peak record level to unweighted (30 Hz to 18 kHz) noise; includes bias, erase, and reproduce amplifier noise. (Peak record level corresponds to a tape flux of 370 nWb/m.)
Third Harmonic Distortion	30 or 15 in/s: 1000 Hz  1. Using Ampex 406 tape or equivalent, $\leq 1.0\%$ at recorded flux level 3 dB above 185 nWb/m (Ampex operating level).  2. Using Ampex 404 tape or equivalent, $\leq 1.0\%$ at recorded flux level of 185 nWb/m (Ampex operating level).
Even Order Harmonic Distortion	At 1000 Hz, $\leq 0.3\%$ at a recorded level corresponding to 6 dB above a tape flux of 185 nWb/m.
Bias/Erase Frequency	150 kHz $\pm 2\%$
Erase Depth	At 1000 Hz, peak record level signal erased to -75 dB minimum on channel(s) selected

Table 1. Specifications (Continued)

PARAMETER	SPECIFICATION							
Flutter	15 and 30 in/s: 0.08% peak weighted per ANSI S4.3/DIN 45507, in a band 0.5 to 200 Hz, while reproducing a 3150 Hz signal. (0.08% NAB unweighted; 0.1% peak unweighted.)							
Crosstalk	-50 dB minimum for 8 or 16 channels at 500 Hz -45 dB minimum for 24 channels at 500 Hz							
Timing Accuracy	±0.1% (1.8 seconds in a 30-minute record time) for tape recorded, rewind, and reproduced on the same unit							
Tape Position Index	Reads hours, minutes, and seconds, with repeat accuracy of ±0.1% at 15 ips.							
Tape Speed Accuracy	Within ±0.05% from beginning to end of reel. Tape speed unaffected by line voltage or line frequency fluctuations (per NAB Standard on Magnetic Recording and Reproduction, 1965, Section 2.02.01)							
Reference Oscillator	±0.01%, 0 degrees C to 65 degrees C							
Heads	8, 16, and 24 tape stacks are non-adjustable precision-mounted							
Start Time	Full speed within 0.5 seconds at 15 ips							
Rewind Time	2.0 minutes for 10.5-inch reel of 1.5-mil tape							
Power Requirements	<p>105 to 125 vac, 48 to 62 Hz</p> <table data-bbox="711 1465 1458 1570"> <tr> <td>MM-1100-8</td> <td>8.0 kVA maximum</td> <td rowspan="3">} without accessories</td> </tr> <tr> <td>MM-1100-16</td> <td>1.0 kVA maximum</td> </tr> <tr> <td>MM-1100-24</td> <td>1.2 kVA maximum</td> </tr> </table>	MM-1100-8	8.0 kVA maximum	} without accessories	MM-1100-16	1.0 kVA maximum	MM-1100-24	1.2 kVA maximum
MM-1100-8	8.0 kVA maximum	} without accessories						
MM-1100-16	1.0 kVA maximum							
MM-1100-24	1.2 kVA maximum							

# **INSTALLATION**

## **EQUIPMENT SITING**

The installation site for the MM-1100 should be free of strong electromagnetic and electrostatic fields which could interfere with or degrade system operation. The environment should be reasonably dust-free; ambient temperature should be from 32 to 122 degrees F (0 to 50 degrees C); relative humidity should be 10 to 90 percent; and no less than six inches of ventilation space should be left behind the machine. The system requires 28 by 27 inches of floor space, plus access and reel clearances.

## **UNPACKING**

Upon receipt, examine the shipping crate for any signs of damage. Unpack the equipment and inspect for physical damage. Check the packing list to determine that all items have been received. Immediately report any damages (retain the shipping carton) and shortages to the Ampex distributor and the transportation company. Remove all materials (adhesive tape, rubber bands, etc.) used to secure tape-handling and other moving components during shipment.

## **POWER REQUIREMENTS**

The MM-1100 requires 115 volts at 50 or 60 Hz. Power is connected by a grounding-type (three-prong) plug.

### **CAUTION**

**BE SURE THE POWER PLUG IS PROPERLY GROUNDED  
BY MEANS OF THE CENTER PRONG.**

## CABLE CONNECTIONS

Audio signals are connected to and from the MM-1100 by the rear panel connectors shown in Figure 5. The connectors are three-conductor XLR-type; females are used for the input connections, while males are used for the output connections. The mating plugs are user-supplied, XLR-type, and should be used with shielded-pair audio cable to provide input and output connections to the MM-1100. Refer to Table 1 for input and output level and impedance specifications.

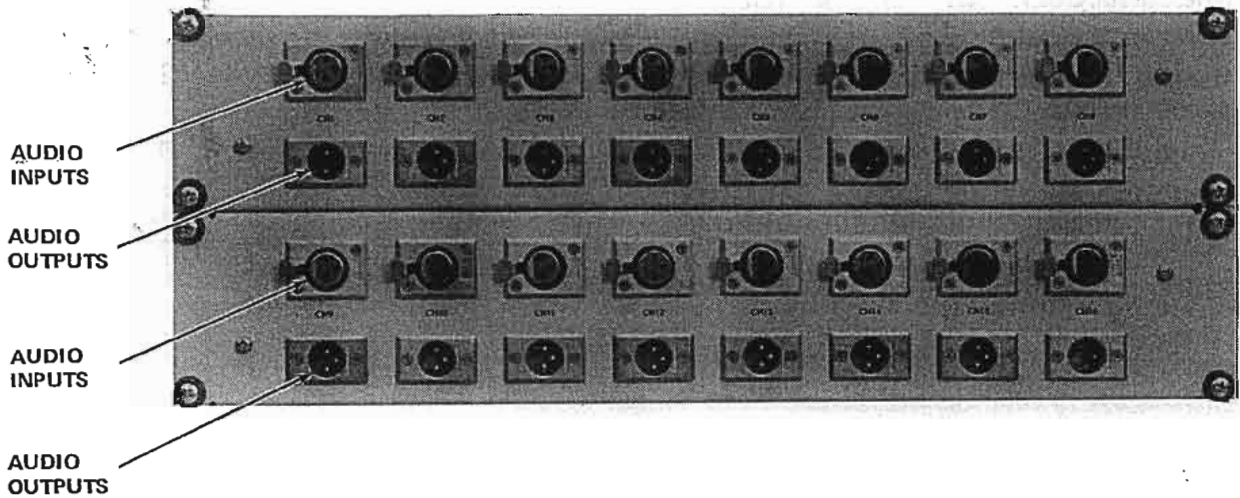


Figure 5. MM-1100 Input and Output Connectors



# OPERATION

## CONTROLS AND INDICATORS

Operator controls and indicators are provided on the system control box, the individual electronics assemblies, and the meter panel. (Refer to Figure 6.) The control box is shown in Figure 7 and described in Table 2. The electronics controls are shown in Figure 8 and described in Table 3.

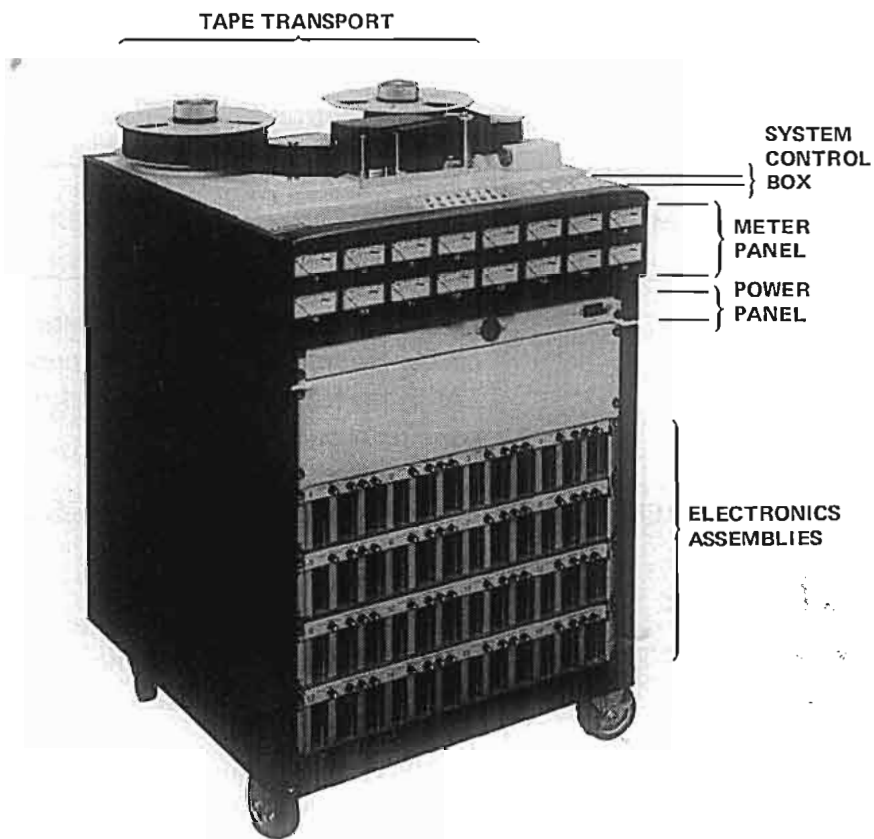


Figure 6. Location of System Components

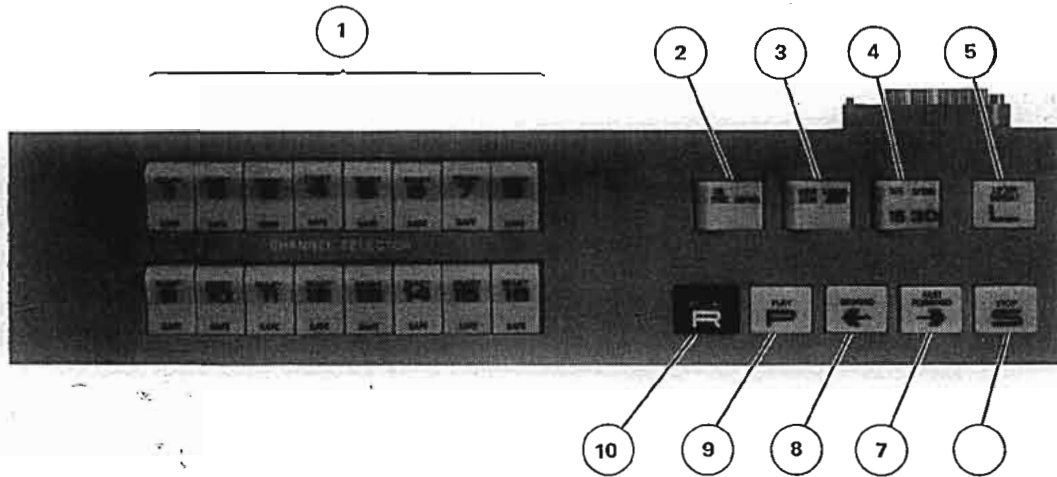


Figure 7. System Control Box, Controls and Indicators

Table 2. System Control Box, Controls and Indicators

FIG. 7 INDEX NO.	NAME	FUNCTION
1	READY/SAFE rocker switches	Permit channel selection for recording. In READY, enable recording on the corresponding channel. In SAFE, no recording is permitted on the corresponding channel.
2	SEL SYNC/REPRO rocker switch	In SEL SYNC, causes all channels to reproduce from the record heads.  In REPRO, causes all channels to reproduce from the reproduce heads. (Sel Sync operation is described later in this section.)
3	INPUT MON/NORMAL MON rocker switch	In INPUT MON, causes the audio input to be connected directly to the audio output of those channels with their READY/SAFE switches set to READY. In NORMAL MON, causes all audio outputs to be derived from off-tape only.

Table 2. System Control Box, Controls and Indicators (Continued)

FIG. 7 INDEX NO.	NAME	FUNCTION
4	TAPE SPEED 15/30 rocker switch	Permits selection of tape speed.
5	LIFTER DEFEAT push- button switch	Defeats operation of the tape lifters so that the tape may be monitored during the fast forward and rewind modes, and lifted from the heads in play and stop modes
6	STOP pushbutton switch	Stops the transport from any operating mode. Also used to halt the recording of all channels without stopping the transport if the RECORD pushbutton is held while the STOP pushbutton is momentarily pressed
7	FAST FORWARD pushbutton	Causes the tape to move forward in the fast mode
8	REWIND pushbutton switch	Causes the tape to reverse in the fast mode
9	PLAY pushbutton switch	Places the system in the reproduce mode
10	RECORD pushbutton switch	Pressed simultaneously with the PLAY pushbutton to place the system in the record mode. Only those channels with their READY/SAFE switches set to READY will record; those with the switch in the SAFE position will reproduce using the head selected by the SEL SYNC/NORMAL switch

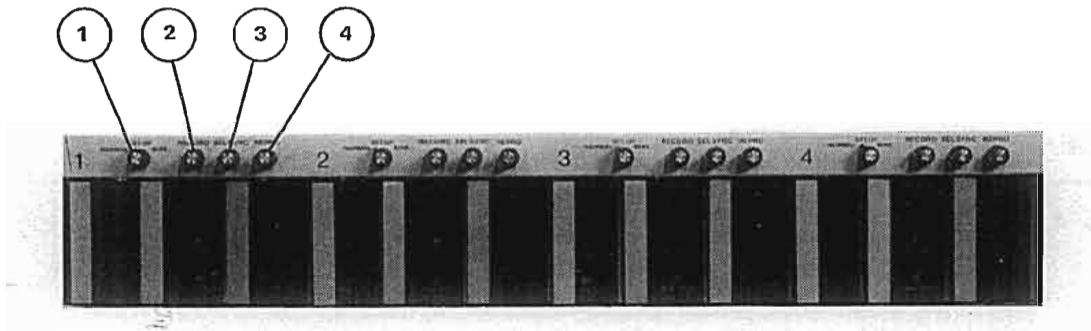


Figure 8. Electronics Module Controls

Table 3. Electronics Module Controls

FIG. 8 INDEX NO.	NAME	FUNCTION
1	NORMAL/SET UP/BIAS switch	In NORMAL, vu meter monitors the reproduce out- put; in the record mode, vu meter monitors the input.  In SET UP, causes the system to reproduce while in the record mode with the reproduced audio output connected to the vu meter.  In BIAS, connects the output of the bias amplifier to the vu meter.
2	RECORD control	Adjusts the level of the signal being recorded
3	SEL SYNC control	Adjusts the level of the reproduced signal when the SEL SYNC/REPRO switch is in the SEL SYNC position (Sel Sync mode).
4	REPRO control	Adjusts the level of the reproduce signal when the SEL SYNC/REPRO switch is in the REPRO position (normal reproduce mode)

## OPERATING PROCEDURES

### MAKING A RECORDING – WITHOUT SEL SYNC

To make a recording without using the Sel-Sync feature, proceed as follows:

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors and place the POWER switch (in the upper right corner) to ON.
3. If not previously done, calibrate the reproduce amplifier levels as described in the Maintenance section.
4. Thread a bulk-erased reel of tape onto the transport as shown in Figure 9, and close the head gate.

#### NOTE

It is good practice to bulk-erase all tape prior to using it for recording.

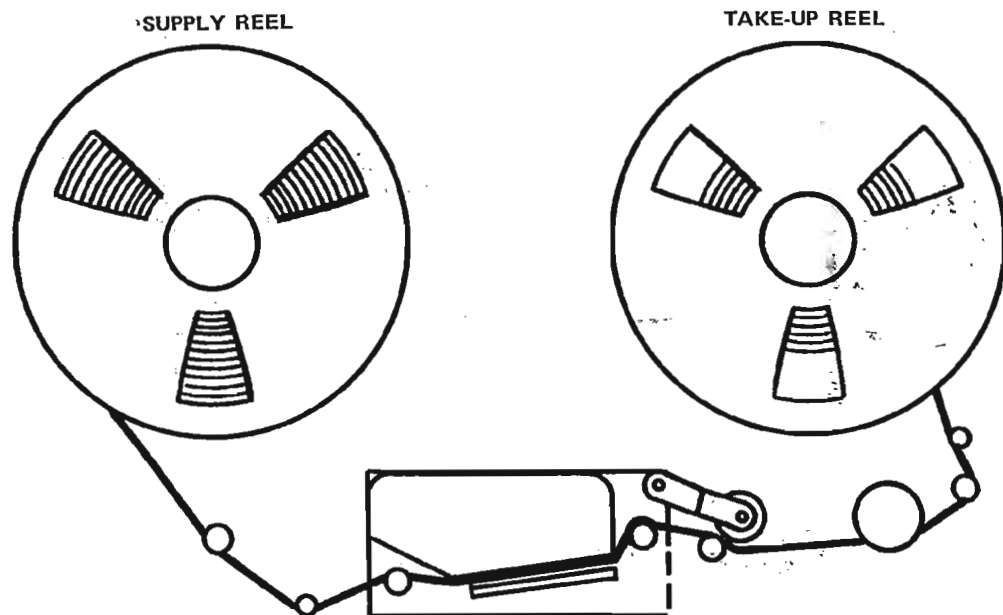


Figure 9. Tape Threading Path

5. On the system control box:
  - a. Set the TAPE SPEED switch to the desired recording speed.
  - b. Set the INPUT MON/NORM MON switch to NORM MON.
  - c. Set the SEL SYNC/REPRO switch to REPRO.
  - d. Set the READY/SAFE switches of those channels to be recorded to the READY position; all others to SAFE.
6. Open the front cabinet doors and set the NORMAL/SET UP/BIAS switch of the channels to be recorded to the SET UP position.
7. With the audio sources connected to the appropriate channel inputs, perform a test or rehearsal run by simultaneously pressing the PLAY and RECORD switches. During this test run, adjust the appropriate individual RECORD level controls (on the electronics assemblies) to obtain audio peaks of 0 vu on the corresponding vu meters.
8. When each of the RECORD level controls has been properly adjusted, press the STOP switch to halt the transport.
9. On the electronics modules, set the NORMAL/SET UP/BIAS switches to NORMAL.
10. Re-cue the tape at the beginning and initiate the record mode by pressing the PLAY and RECORD switches simultaneously.
11. The record mode can be halted by any of the following methods:
  - a. If it is desired to halt recording on all channels without stopping the transport, hold the RECORD switch and momentarily press the STOP switch.
  - b. If it is desired to halt recording on a selected channel(s), place the corresponding READY/SAFE switch(es) in the SAFE position.
  - c. If it is desired to halt the transport, press the STOP switch.

#### **MAKING A RECORDING – WITH SEL SYNC**

To make a recording using the Sel-Sync Feature, proceed as follows (Sel-Sync operation is described later in this section).

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors, and place the POWER switch (in the upper right corner) to ON.
3. If not previously done, calibrate the reproduce amplifier levels as described in the Maintenance section.
4. Thread the master tape onto the transport as shown in Figure 9 and close the head gate.
5. On the system control box:
  - a. Set the TAPE SPEED switch to the desired recording speed.
  - b. Set the INPUT MON/NORM MON switch to NORM MON.
  - c. Set the SEL SYNC/REPRO switch to SEL SYNC.
  - d. Set the READY/SAFE switches of the channel(s) to be recorded to the READY position; all others to SAFE.
6. Connect monitoring facilities (headphones or loudspeaker) to the outputs of the channel(s) to be monitored. Refer to Table 1 for output specifications.
7. Open the front cabinet doors and set the NORMAL/SET UP/BIAS switches of the channel(s) to be recorded to the SET UP position.
8. With the audio sources connected to the appropriate channel inputs, perform a test or rehearsal run by simultaneously pressing the PLAY and RECORD switches. During this test run, adjust the appropriate individual RECORD level controls (on the electronics assemblies) to obtain audio peaks of 0 vu on the corresponding vu meters.
9. When each of the RECORD level controls has been properly adjusted, press the STOP switch to halt the transport.
10. On the electronics assemblies, set the NORMAL/SET UP/BIAS switches to NORMAL.
11. Re-cue the tape at the beginning of the master tape and initiate the recording mode by simultaneously pressing the PLAY and RECORD switches. In this mode, the audio reproduced is in exact sync with that being recorded.



12. The record mode can be halted by any of the following methods:
  - a. If it is desired to halt recording on all channels without stopping the transport, hold the RECORD switch and momentarily press the STOP switch.
  - b. If it is desired to halt recording on a selected channel(s), place the corresponding READY/SAFE switch(es) in the SAFE position.
  - c. If it is desired to halt the transport, press the STOP switch.

## REPRODUCING A PREVIOUSLY RECORDED TAPE

Reproduce tape as follows:

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors and place the POWER switch (in the upper right corner) to the ON position.
3. Thread the tape to be reproduced onto the transport as shown in Figure 9, and close the head gate.
4. On the system control box:
  - a. Set the TAPE SPEED switch to the required tape speed.
  - b. Set the INPUT MON/NORM MON switch to NORM MON.
  - c. Set the SEL SYNC/REPRO switch to REPRO.
  - d. Set all READY/SAFE switches to SAFE.
  - e. Press the PLAY switch.
5. Adjust the appropriate REPRO level controls (on the electronics assemblies) to obtain the desired audio level.
6. Press the STOP switch to terminate the reproduce operation. If the tape supply is exhausted before the operator halts operation, the transport will automatically halt.

## FAST WINDING

For tape editing or cueing, the tape is rapidly wound by pressing the REWIND or FAST FORWARD switch. The switches can be pressed alternately without first stopping tape motion. When the desired point on the tape is reached, press the STOP switch to halt the tape. If the tape runs off either reel, the transport will automatically stop. The REWIND and FAST FORWARD switches can be pressed while in the record or reproduce modes without first stopping the tape; however, the PLAY switch must be pressed in order to enter the record mode (i.e., pressing the PLAY and RECORD switches simultaneously).

A tape-lifter mechanism, which automatically lifts the tape off the heads during fast winding, can be prevented from operating by means of the LIFTER DEFEAT switch. Holding the LIFTER DEFEAT switch permits monitoring of the reproduced audio during the fast wind modes for cueing purposes. It is good practice to avoid unnecessary use of this feature to minimize head wear. Alternatively, during play or stop modes holding the LIFTER DEFEAT switch will cause the tape to be lifted away from the heads.

## SEL SYNC OPERATION

The main function of the Sel-Sync feature is to enable the recording of material precisely in step with previously recorded material. In conventional multi-track recorder/reproducer systems, the different physical locations of the record and reproduce heads along the tape path cause a timing error between material being reproduced on one channel and material being recorded on another. This set-up is shown in the upper diagram of Figure 10 where the material is recorded a fraction of a second before it is reproduced. The result is that the listener who is reproducing one channel (refer to the center diagram of Figure 10) while recording another in step, ends up with the newly recorded track slightly behind the previously recorded track.

The solution to this problem is the Sel-Sync mode of operation. As shown in the lower diagram of Figure 10, a channel placed in the Sel-Sync mode causes the previously recorded audio to be reproduced by the record head and fed to the audio output, thereby eliminating the timing error caused by a displaced reproduce head. When a pre-recorded channel is monitored in this mode, the listener can record on another channel (or channels) while maintaining synchronism.

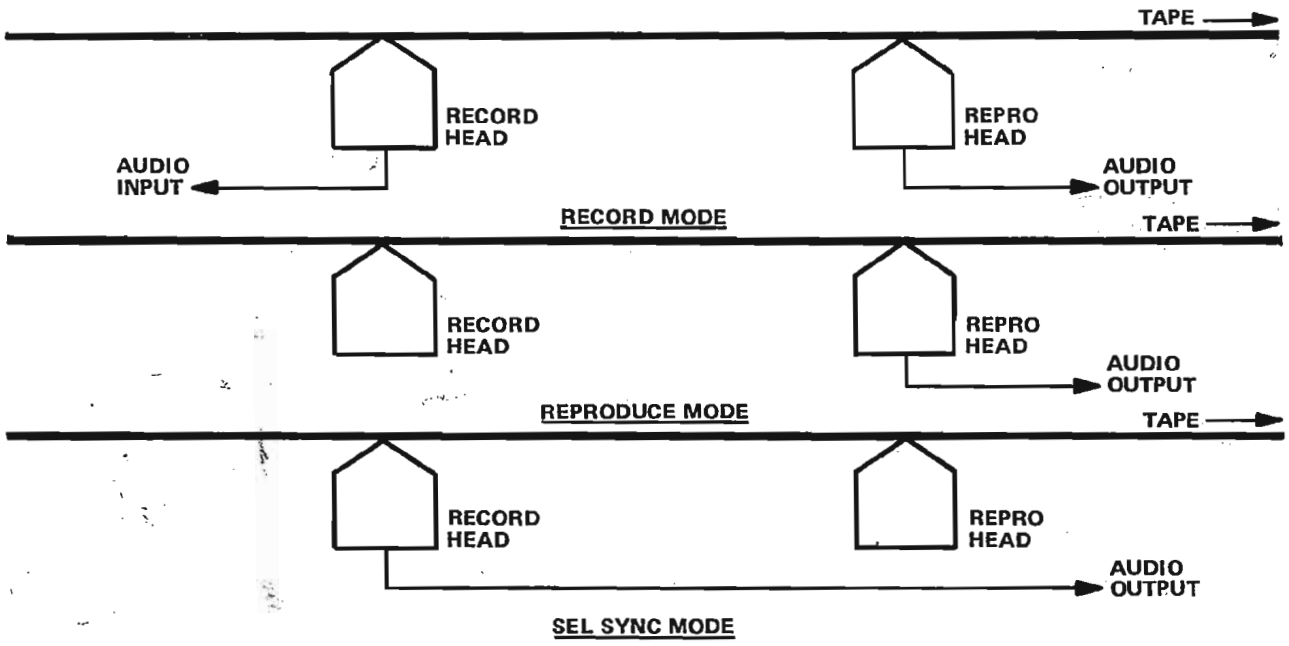


Figure 10. Head Usage for Different Operating Modes

## **MAINTENANCE**

### **CLEANING**

All components in the tape path should be cleaned every eight hours of transport operation, or more often as required by visual inspection, to remove accumulations of oxide deposited by the recording tape. Excess oxide deposits can cause degradation of equipment performance. Proceed as follows to perform periodic cleaning procedures:

#### **CAUTION**

**USE RECOMMENDED SOLVENTS WHEN CLEANING TAPE PATH COMPONENTS, AND DO NOT USE METAL TOOLS FOR CLEANING. DO NOT ALLOW TAPE HEAD CLEANER TO COME IN CONTACT WITH THE RUBBER IDLER ROLLER OR PLASTIC FINISHES. FAILURE TO OBSERVE THIS CAUTION MAY RESULT IN DAMAGE TO TAPE PATH COMPONENTS.**

1. Clean tape heads with a cotton-tipped wooden applicator moistened in Ampex Head Cleaner (4010823 or 087-007). Do not allow tape cleaning fluid to come in contact with capstan idler roller; the cleaning fluid will damage the rubber tire and cause tape slippage.
2. Clean tape guides, the capstan, and the capstan idler with isopropyl alcohol. Take care to remove fingerprints from the rubber idler roller and capstan, and immediately remove any oil deposits from the rubber idler roller.

#### **CAUTION**

**DO NOT USE COMPRESSED AIR FOR CLEANING TRANSPORT MECHANISMS. THE AIR PRESSURE CAN FORCE DIRT PARTICLES INTO BEARINGS AND CAUSE DAMAGE TO TRANSPORT COMPONENTS.**

## DEMAGNETIZATION

Tape heads and other components in the path can acquire permanent magnetization which increases signal noise and distortion, and partially erases high frequencies on recorded tapes. Demagnetize tape path components after each eight hours of operation, using Ampex Head Demagnetizer 4010820 or equivalent as follows:

1. Turn equipment power off, and remove any recorded tape near the transport (tape could be partially erased by the demagnetizer).
2. Cover the demagnetizer tips with pressure-sensitive tape (to prevent scratching the heads).
3. With the demagnetizer at least three feet from the recorder, connect it to a 110-120-volt ac power source.
4. Slowly move the demagnetizer toward the head stack.
5. Simultaneously and lightly touch the two demagnetizer tips to both faces of the head stack.
6. Hold the tips perfectly parallel to the stack face at all times. With a slow, even motion, move the tips up and down the stack several times. Slowly withdraw the demagnetizer (slow withdrawal is required for effective demagnetization).
7. Repeat steps 4 through 6 at each head stack and tape guide (including the one on the tape tension arm).
8. Move the demagnetizer at least three feet from the recorder, then de-energize it.

## LUBRICATION

The MM-1100 requires no periodic lubrication. All moving parts are permanently lubricated at the factory prior to shipment.

# CAPSTAN SERVO

## SPEED PAIR SELECTION

The control panel SPEED switch permits selection of high or low-speed operation (normally 30 and 15 in/s) of the transport. These speeds are determined by two shorting plugs on the capstan servo card, as detailed in Table 4.

Table 4. Speed Strap Positions

SPEED STRAPPING			
RANGE	60 in/s	30 in/s	15 in/s
	30 in/s	15 in/s	7-1/2 in/s
HI	E5 to E6	E5 to E3	E5 to E4
LOW	E2 to E3	E2 to E4	E2 to E1

## VARIABLE SPEED TAPE MODE

Using a dummy plug in J4 on the rear of the machine causes the capstan motor to run locked to a crystal-controlled reference of 9600 Hz. To operate the system at variable speeds, it is necessary only to remove the plug and insert a variable frequency oscillator (square or sine wave) into pins 2 (HIGH) and 3 (COMM). A frequency of 9600 Hz will correspond to the speed indicated on the control box (speed switching and equalization switching still function in the variable speed mode). Varying this frequency will vary the capstan speed. Input voltage to J4 should be greater than 3 vp-p but must not exceed 30 vp-p.

## SERVO GAIN ADJUSTMENT

Servo gain adjustment R19 on the capstan servo pwa is normally adjusted to mid-range; however, to minimize flutter, it may be adjusted by observing the servo error signal at TP2 on the card and advancing R19 clockwise for minimum jitter. A 9600-Hz square wave at TP1 indicates that the crystal reference oscillator is functioning properly.

# TRANSPORT CONTROL

## SETUP PROCEDURE

### Preliminary Procedure

1. Place transport control card (4050706-01) into the extender card provided, ensuring that the component side of the card is facing outward toward the meter panel, and re-insert card into the transport control chassis.
2. Position potentiometers R1 through R8 fully ccw, and R9 at mid-range. Secure the end-of-tape arm out of the tape path using masking tape.

### Normalizing Reel Servos

1. Energize the equipment in stop mode, hold the tension sensor arm all the way in toward the center of the transport, and adjust supply gain potentiometer R7 until torque on the supply reel just reduces to zero (Figure 11).
2. Again, while holding the tension sensor arm all the way in, place the machine in rewind mode and adjust takeup gain potentiometer R8 until torque on the takeup reel just reduces to zero.
3. De-energize the machine and thread a tape of the largest reel size expected to be used on the machine (up to 16 inches).

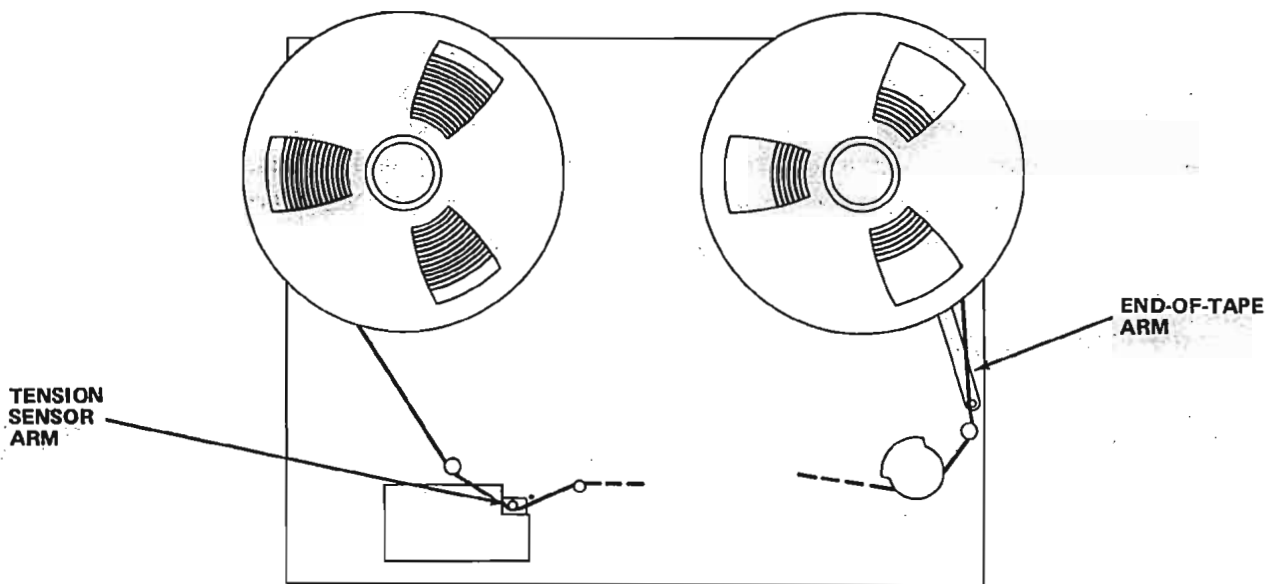


Figure 11. Normalizing Reel Servos



## TENSION ADJUSTMENTS

### Stop Tension

1. While holding the takeup reel securely, energize the machine and adjust supply stop tension potentiometer R3 until the edge of the tension sensor arm just lines up with the center-punch mark on the transport deck (Figure 12), indicating 10 ounces of supply tension.

#### NOTE

If the transport exhibits a tendency to oscillate during these adjustments, overall gain adjustment R9 should be rotated ccw until the oscillations just stop. This adjustment should be made with a minimum tape pack on the supply reel, using the smallest available reel.

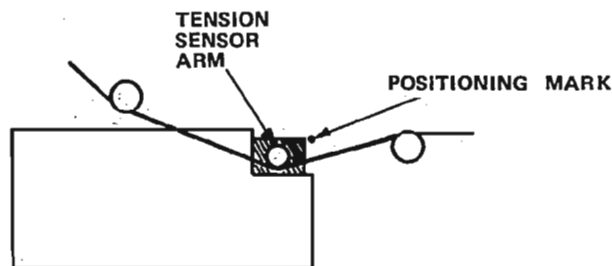


Figure 12. Positioning Tension Sensor Arm

2. With approximately equal packs on the supply and takeup reels, adjust stop takeup potentiometer R6 until tension on the takeup reel just equals that on the supply reel. This is indicated when there is no tendency for the machine to "creep" in stop mode.

#### NOTE

The above adjustments result in relatively high tension in stop mode. For ease of tape handling and editing purposes, R3 and R5 may be adjusted so that tension is approximately one-half of normal or less. Check that balance is maintained to prevent creeping.

## Play Tension

1. Remove the masking tape from the end-of-tape arm and push the arm toward the center of the transport against the stop. This will release reel tensions and apply the brakes. Now loop the tape around the outside of the capstan, and take up the slack in the tape until the brakes release.
2. Push the PLAY button while holding the takeup reel securely, and adjust play supply potentiometer R2 until the tension sensor arm lines up with the center punch mark (Figure 12). Now release the takeup reel and adjust play takeup potentiometer R5 until tensions are approximately equal on both reels.
3. At 30 in/s, record a 3-kHz test signal at normal operating level at the beginning of a reel. A recording time of 90 seconds is sufficient. Rewind the tape.
4. Monitor the 3-kHz output of the channel just recorded. Press the PLAY and STOP pushbuttons alternately. When you press PLAY, the reproduced signal will normally rise to the correct tone. If, however, play tension is too high, the tape may overspeed for a moment before settling to the correct tone.
5. If the tape does overspeed, adjust R5 to the point just below where overspeed occurs.

## Shuttle Tension

1. With all the pack on the supply reel, push the REWIND button and adjust rewind takeup potentiometer R4 so that the tape just begins to rewind.
2. With all the pack on the takeup side, push the FAST FORWARD button and adjust fast forward supply potentiometer R1 so that the tape just begins to move forward.

These settings will result in optimum tape pack on a reel and maximum accuracy of the tape timer; however, for more rapid fast forward and rewind shuttling, R4 and R5 may be adjusted for less holdback tension.

## 15/27-VOLT AND 39-VOLT POWER SUPPLIES

The MM-1100 power supplies feature both over-voltage and over-current protection. In addition, the 39-volt supply (4050658-01) contains the 150-kHz bias and erase oscillator. The 15/27-volt supply is normally mounted on the bottom of the frame. As indicators of supply operation, the meter panel lamps are powered by the 39-volt supply; the control box is powered by the 27-volt supply.

## VOLTAGE ADJUSTMENTS

Voltage adjustments are made by means of access holes in the rear of the machine. Pin jacks are provided to accommodate meter probes, in accordance with Table 5.

Table 5. Voltage Test Points

VOLTAGE	TEST POINT	CONTROL	SUPPLY
15 ±0.5 volts	TP2	R2	4050699-02
27 ±0.5 volts	TP1	R1	4050699-02
39 ±0.5 volts	TP1	R1	4050658-01

Measurements in Table 5 are from the appropriate test point to TPG (ground). The erase/bias oscillator is tuned through an access hole in the side of the frame, which is reached by removing the right side panel.

Line voltage fuse F1 (5 A, slow-blow) and over-voltage protection fuse F2 (10 A, fast-blow) are on the back of the machine. The over-current protection circuit can be reset by turning the machine off for approximately 20 seconds, then re-energizing it.

## CONTROL BOX

The control box can be removed from the transport for servicing by pulling the meter panel fully forward and forcing the control box up to disengage the "snap" fasteners on its base.

There is no active circuitry in the control box, and servicing will consist primarily of changing lamps.

## BULB REMOVAL

Pushbutton bulbs (no. 327) are removed by pulling the button directly up and out, as shown in Figure 13, and removing the bulbs from the barrel of the button.

The rocker switch bulbs (Ampex part no. 060-471) are removed by putting the particular switch in READY and the adjacent switches in SAFE, then removing the switch with pliers, thus exposing the bulb, as shown in Figure 14.

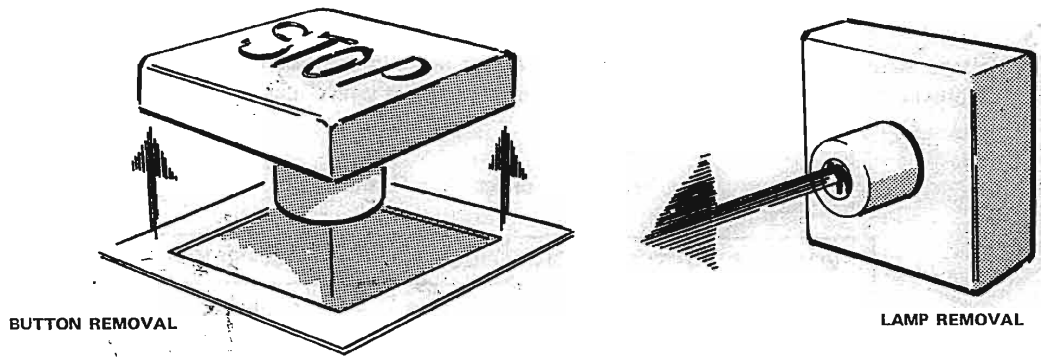


Figure 13. Button and Lamp Removal

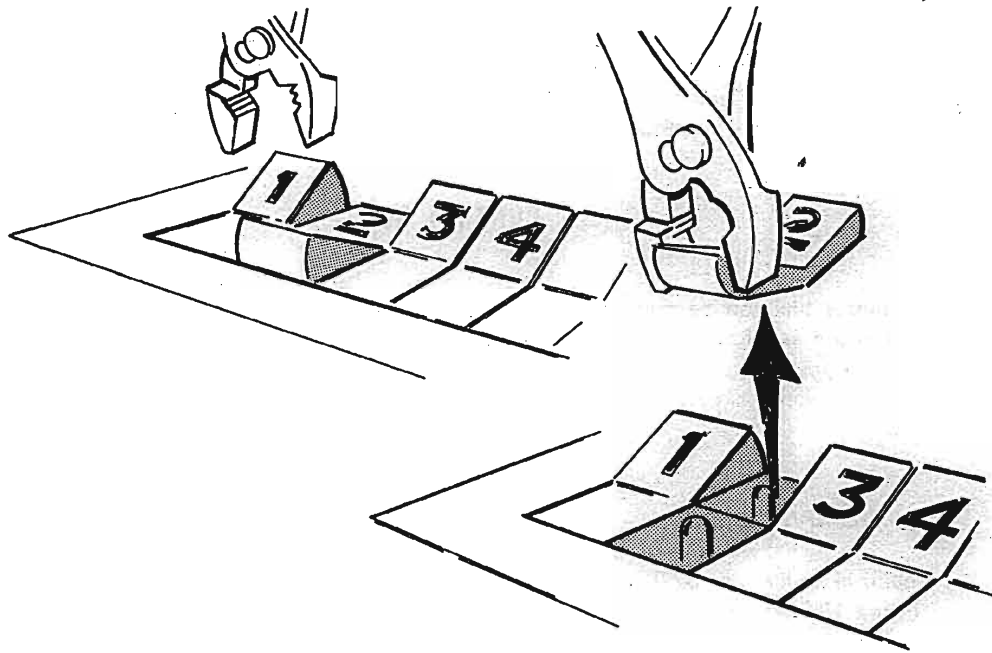


Figure 14. Rocker Switch Bulb Removal

## REMOTE CONTROL AND TRANSPORT-ONLY CONTROL

A remote control cable is required for remote operation. For remote control, the control box assembly is removed, as described earlier in this section, and connected to the remote control connector on the rear of the frame via the remote control cable. In addition, a "transport only" control box is available as an option to fit in the original control box position, if desired.

## MDA ASSEMBLY

The MDA assembly consists of three separate motor-drive amplifiers, one for each reel motor, and one for the capstan. The reel MDA's are unique in that they use optical couplers to isolate the low-level (27-volt) signal from the transport control to the high-level (117-vac) drivers to the reel motors. No adjustments are necessary on the MDA. However, under failure conditions where full torque is applied to a reel regardless of transport mode, the isolators (A1, A2) should immediately be checked.

## METER PANEL ASSEMBLY

Meter panel servicing should be limited to bulb replacement. Bulbs are wired in series/parallel, and may be replaced by pulling the panel out to its extreme forward position (ensuring that doors are closed). Be careful to prevent lamp sockets from shorting to the panel itself.

## HEAD ASSEMBLY

The head assembly can be quickly changed to convert from two-inch to one-inch format. To remove the head assembly, lift off the moulded head cover and back out the large jackscrew. Reverse this procedure when replacing the head assembly. When changing formats, ensure that the two quick-change guides on the transport are also switched. A shorting bar is included on all two-inch erase head assemblies to properly program tensions on the transport; thus, tension changes are automatically effected when the format is changed.

## TAPE LIFTER ADJUSTMENT

Tape lifter positions can be adjusted by removing the tension sensor cover, exposing two hex socket cap screws. These screws may be loosened and repositioned to adjust lifter positions.

## TEST EQUIPMENT

Test equipment required for checkout and adjustment is listed in Table 6.

**Table 6. Test Equipment Required for Checkout and Adjustment**

DESCRIPTION	IDENTIFICATION	USED FOR
Spring gauge, 0-30 ounces	Model LO-2M, Hunter Spring Co., Lansdale, Penn. (Ampex 650-105)	Tape Tension checkout
Spring gauge, 0-10 pounds	Gauge-R, Chatillon, N.Y. (Ampex 650-104)	Idler roller pressure and brake force checkout
Nylon line or cord, 30 inches long	N/A	Idler roller pressure checkout
Vacuum Tube Voltmeter	Model 400D, Hewlett Packard Co., Palo Alto, California	Tape tension potentiometer adjustment and general purpose electronic measurements
Flutter Bridge	Model 8155-01 or 8100-W, Mincom, a Division of 3M, Camarillo, California; or Model ME102B, Gotham Audio, New York, New York	Flutter check
Wave Analyzer	Model 302A, Hewlett Packard Co.	Harmonic distortion checkout

Table 6. Test Equipment Required for Checkout and Adjustment (Continued)

DESCRIPTION	IDENTIFICATION	USED ON
Frequency Counter	Model 5216A, Hewlett Packard Co.	Reference oscillator checkout
Signal Generator	Model 204C or 209D, Hewlett Packard Co.	Record/reproduce electronics alignment
Test Tape	Ampex (refer to Table 8 for applicable part number)	Record and reproduce alignment

## BRAKE ADJUSTMENT

(See Figure 15.) The brake system stops reel rotation and maintains tape tension when the equipment power is removed while in any operating mode. A brake differential is necessary to

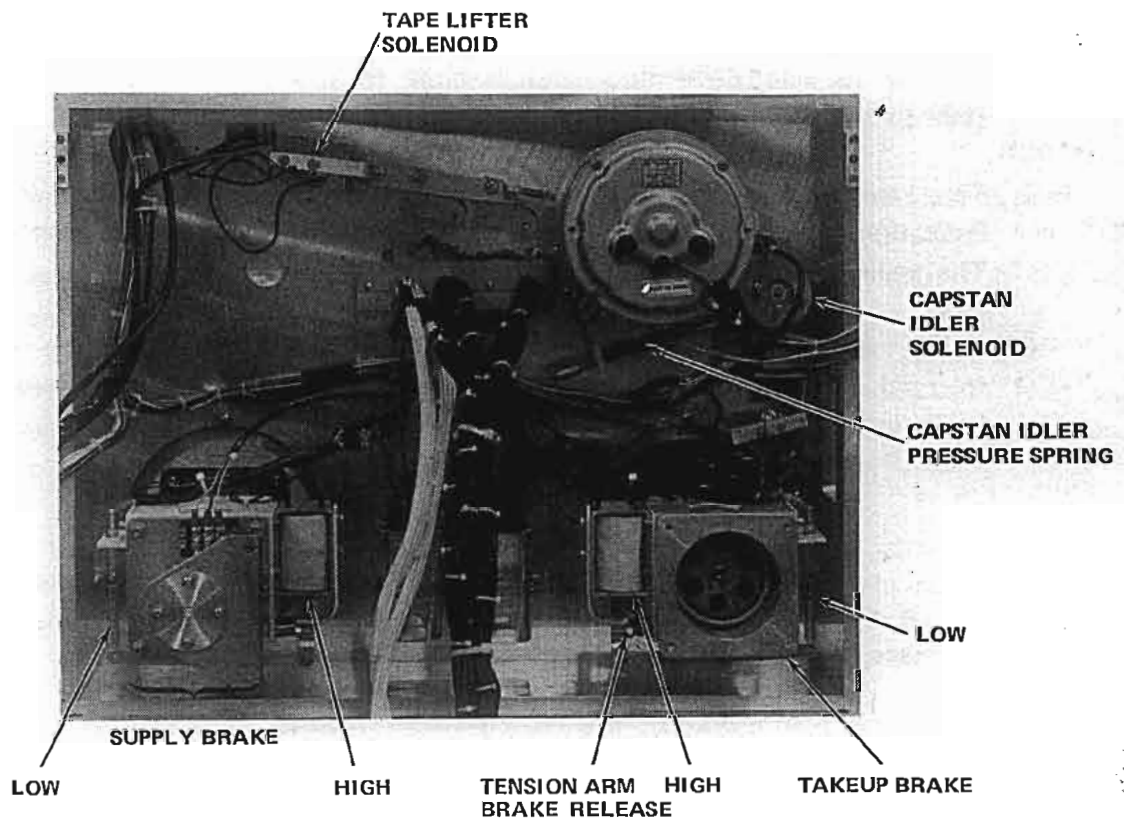


Figure 15. Transport Adjust Points



maintain tension while stopping; the brake force is therefore higher for the tape-feeding reel in every case. Braking functions are checked with power off and no tape installed.

## TAKEUP REEL BRAKES

Adjust the takeup reel brakes as follows:

1. Wrap all of 4-foot nylon cord ccw on takeup reel and insert hook of the 0 to 30-ounce scale in a cord loop.
2. Hold scale parallel to floor and as close as possible to reel, then pull scale (takeup turntable rotates ccw).
3. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
4. If the reading is not within limits, slightly turn takeup reel brake adjustment nut (cw increases braking), then repeat procedures beginning with step 2.
5. Wrap all of the cord cw on reel, and insert hook of the 1 to 10-lb scale in cord loop.
6. Hold scale parallel to floor and as close as possible to reel, then pull the scale (takeup turntable rotates cw).
7. Tap reel, to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
8. If the reading is not within limits, slightly adjust nuts on each side of brake solenoid an equal number of turns (cw increases braking), then repeat procedures beginning with step 6.

### NOTE

If the tension varies while the cord is being pulled at a steady rate, the tensions of the springs may be unequal.

**Table 7. Transport Brake Torques**

SUPPLY REEL		TAKEUP REEL	
REWIND (CW)	FORWARD (CCW)	REWIND (CW)	FORWARD (CCW)
14 – 18 oz.	4-1/2 ( $\pm 1/4$ ) lb	4-1/2 ( $\pm 1/4$ ) lb	14 – 18 oz.

**SUPPLY REEL BRAKES**

(See Figure 15.) Adjust the supply reel brakes as follows:

1. Wrap all of nylon cord cw on reel and insert hook of the 0 to 30 ounce scale in cord loop.
2. Hold scale parallel to floor and as close as possible to reel, then pull scale (supply turntable rotates cw).
3. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
4. If the reading is not within limits, slightly turn takeup reel brake adjustment nut (cw increases reading), then repeat procedures beginning with step 2.
5. Wrap all of the cord ccw on reel, and insert hook of the 1 to 10-lb scale in cord loop.
6. Hold scale parallel to floor and as close as possible to reel, then pull the scale (supply turntable rotates ccw).
7. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
8. If the reading is not within limits, slightly adjust nuts on each side of brake solenoid an equal number of turns (cw increases braking), then repeat procedures beginning with step 6).

## NOTE

If the tension varies while the cord is being pulled at a steady rate, the tensions of the springs may be unequal.

10. Remove scale and cord from transport.

## CAPSTAN IDLER

The capstan idler force against the moving capstan is determined by the capstan idler pressure spring. The force is adjusted by a locknut which compresses the capstan idler spring shown in Figure 15.

As the solenoid temperature rises, its resistance also rises. When power line regulation is poor, allow 30 minutes or more for warmup (operating in the reproduce mode) before adjusting the capstan idler force. At the factory, the solenoid is checked to be sure it will bottom at line voltages of 90 volts (cold) and 105 volts (hot).

1. Wrap a 12-inch knotted piece of lacing, nylon cord, or twine around pinch roller yoke as shown in Figure 16. Insert hook of 0 to 10-lb scale in cord loop.
2. Tape or block end-of-tape arm in on position.
3. Press PLAY button and pull on scale to pull pinch roller off capstan.
4. The force required to just eliminate pinch roller/capstan contact (pinch roller will stop rotating) is 8-3/4 to 9-1/4 pounds.
5. Press STOP button.

## DASH POT ADJUSTMENT

The dash pot adjustments, Figure 17 are set at the factory and do not require readjustment unless tension arm parts or dash pot are replaced, or a malfunction develops. Proceed as follows to check out and adjust dash pot.

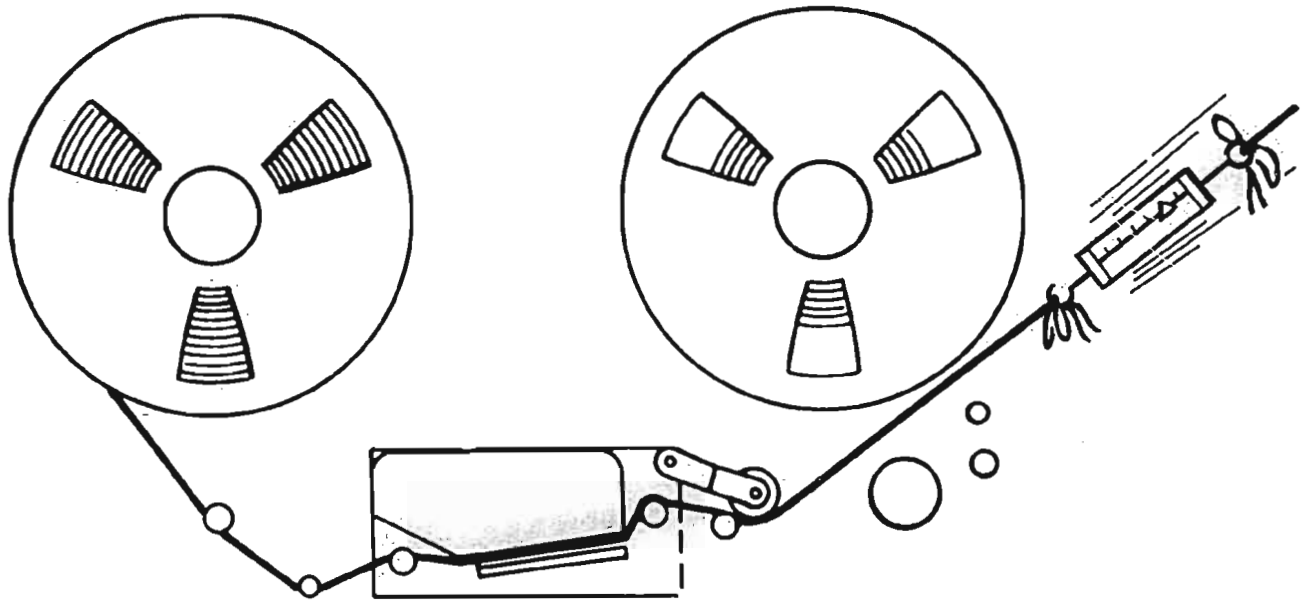


Figure 16. Pinch Roller Adjustment

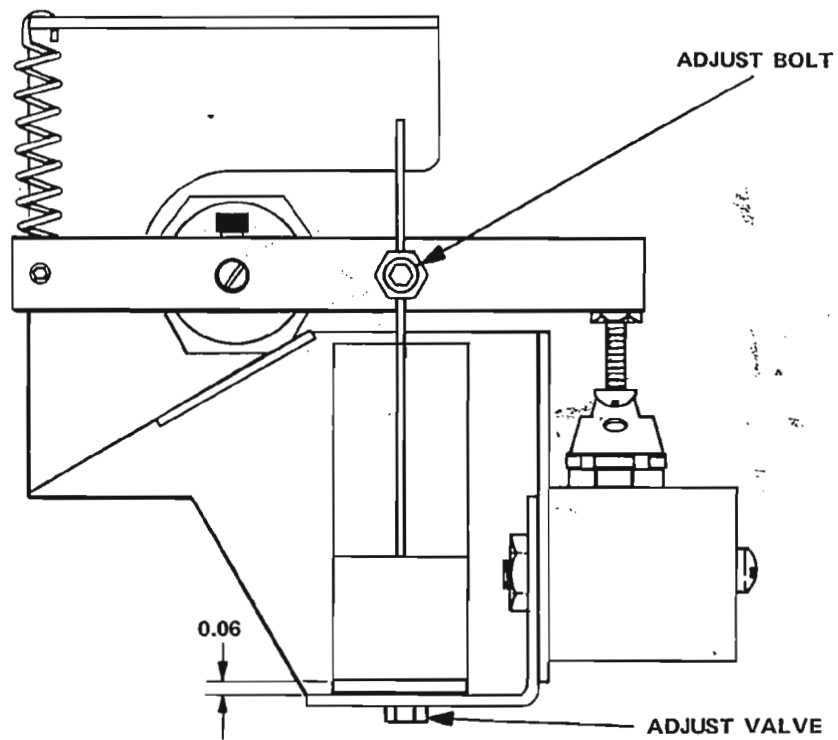


Figure 17. Tension Arm Dash Pot Adjustment

1. With tension arm in released position (safety switch actuated), measure clearance between bottom of plunger and bottom of cylinder. Clearance should be 0.06 inch.
2. If clearance is not as specified, loosen adjust bolt and move plunger up or down as required.
3. Tighten adjust bolt.
4. If end-of-tape switch is not actuated as soon as desired when end-of-tape condition is reached, rotate adjust valve ccw. Switch should actuate in 1/2 to 1-1/2 seconds after end-of-tape.

## AUDIO ALIGNMENT PROCEDURES

These procedures are based on the use of low-noise, high-output tapes (Ampex 406 or equivalent) and reflect the higher saturation levels of these tapes. A new operating level, referred to as "Ampex Mastering Level", is used. This level corresponds to a recorded flux 3 dB higher than the original Ampex operating level. (Ampex Operating Level is 185 nWb/m; hence, Ampex Mastering Level is 260 nWb/m at 500 Hz.)

### REPRODUCE ALIGNMENT

1. Degauss and clean heads and other components in the tape path. Use Ampex head cleaner on all components except the pinch roller, which should be cleaned with isopropyl or denatured alcohol.
2. Thread the appropriate alignment tape on the machine (see Table 8).
3. Place all RECORD/SAFE switches to SAFE, INPUT MON/NORMAL MON switch to NORMAL MON, SEL SYNC/REPRO switch to REPRO, and NORMAL/SET UP/BIAS switches on electronics panel to SET UP.
4. Place machine in PLAY mode and on the 700-Hz Ampex operating level section, adjust all REPRO LEVEL controls so that the vu meters read -3 vu (this corresponds to a line output level of +1 dBm).
5. Place the SEL SYNC/REPRO switch in SEL SYNC and repeat step 4, adjusting the SYNC LEVEL controls.

Table 8. Ampex Test Tapes

TYPE		AMPEX PART NUMBER
NAB, 1-inch	15 in/s, 8-track	4690006-01
	15 in/s, full-track	4690005-01
IEC (CCIR), 1-inch	15 in/s, 8-track	4690020-01
	15 in/s, full-track	4690031-01
NAB, 2-inch	15 in/s, 16-track	4690018-01
	15 in/s, full-track	4690024-01
IEC (CCIR), 2-inch	15 in/s, 16-track	4690033-01
	15 in/s, full-track	4690035-01
17.5 $\mu$ s, 1-inch	30 in/s, 8-track	4690042-01
	30 in/s, full-track	4690048-01
17.5 $\mu$ s, 2-inch	30 in/s, 16-track	4690039-01
	30 in/s, full-track	4690047-01

6. Place the SEL SYNC/REPRO switch back to REPRO. Adjust the reproduce high frequency equalization for the speed in use on the 10-kHz section of the tape for -3 vu on the vu meter.
7. Adjust the reproduce low frequency equalization to give -4 vu at 50 Hz and 30 in/s, and -3 vu at 30 Hz and 15 in/s. (This adjustment is approximate only and must be confirmed by overall record/reproduce.)
8. Check the response at all frequencies on the alignment tape. Specifications are:

30 in/s:  $\pm 2$  dB at 50 Hz to 100 Hz,  $\pm 1$  db at 100 Hz to 18 kHz  
 15 in/s:  $\pm 2$  dB at 30 Hz to 100 Hz,  $\pm 1$  db at 100 Hz to 15 kHz

**NOTE**

Low-frequency equalizers cannot be adjusted correctly on reproduce only unless an alignment tape recorded to the track format of the machine being aligned is used.

9. Repeat step 8 with SEL SYNC/REPRO switch in SEL SYNC position.
10. Connect a band-limiting filter (Figure 18) between line output and a vtm to measure reproduce standby noise. The vtm reading should be less than -58 dBm at either speed for 8 or 16-channel systems, or less than -54 dBm for 24-channel systems.

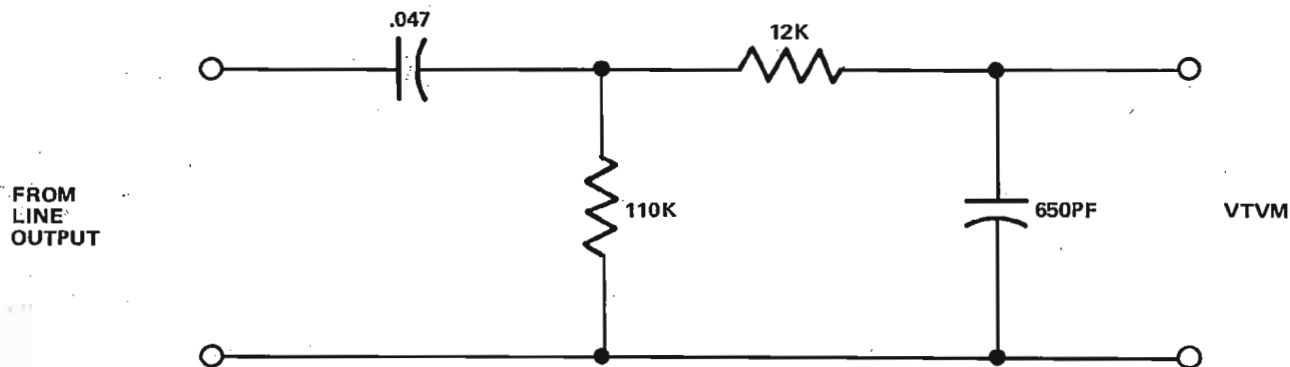


Figure 18. 30 Hz - 18 kHz Band-Limiting Filter

## RECORD ALIGNMENT

Do not start record alignment unless the reproduce alignment either has just been done or is known to be correct.

1. Prepare the machine for alignment as follows:
  - a. Thread a reel of blank tape of the type to be used (Ampex 406 or equivalent) onto the transport.
  - b. Connect an oscillator to the line inputs and set it to 1 kHz with a level of +4 dBm.
  - c. Set the READY/SAFE switches of the appropriate channels to be aligned to READY.
  - d. Place the INPUT MON/NORMAL MON switch in the NORMAL MON position.
  - e. Place the NORMAL/SETUP/BIAS switches on the electronics panels to BIAS.

2. Place the machine in the record mode. Observe that all channels in ready mode go into record mode, and that on-scale readings appear on the vu meters. Then do one of the following steps according to the proper system configuration:
  - a. For 8 or 16 channel systems, adjust the ERASE PEAK preset on each bias electronics card to give a maximum reading on the respective vu channel meter. If necessary, adjust the BIAS CAL controls to obtain on-scale readings.
  - b. For 24 channel systems, turn the ERASE PEAK preset fully counterclockwise and then turn this preset slowly clockwise. The bias level indication on the vu meter will change very slowly at first. Then the vu meter will indicate a sudden 2 to 3 dB drop. Continue turning the preset clockwise until the vu meter reading is reduced another 0.5 to 1 dB below the initial drop.
3. Reset all NORMAL/SET UP/BIAS switches to the SET UP position. Adjust RECORD LEVEL controls to give a mid-scale indication on the vu meters.
4. Carefully adjust the BIAS LEVEL control on each record amplifier card to give maximum output as indicated on the vu meters. Then reset the RECORD LEVEL controls until the vu meters indicate 0 vu.
5. Change the oscillator frequency to 15 kHz at +4 dBm output and adjust the appropriate record equalizer to give 0 vu indication on the vu meter (HI SPEED for 30 in/s, LOW SPEED for 15 in/s).
6. Change the oscillator frequency to 50 Hz at +4 dBm output and adjust the reproduce low frequency equalization for the speed in use to achieve a minimum deviation from 0 vu meter indication for frequencies between 30 Hz and 100 Hz at 15 in/s and between 50 Hz and 100 Hz at 30 in/s.
7. Sweep the oscillator through the band 30 Hz to 15 kHz at 15 in/s and 50 Hz to 18 kHz at 30 in/s. With a constant oscillator output level, the vu meter should remain within  $\pm 2$  dB (-2 vu to +2 vu) of 0 vu.
8. Set the oscillator to 1 kHz at +4 dBm level and then place the INPUT MON/NORMAL MON switch to INPUT MON. Adjust the REC CAL control on each record electronics card to give 0 vu indication on the vu meter.
9. Place the NORMAL/SET UP/BIAS switch on the electronics panel to the BIAS position and adjust the BIAS CAL control on the bias amplifier card to give 0 vu indication on the vu meter. Return the NORMAL/SET UP/BIAS switch to the SET UP position.



10. Perform the bias trap adjustment as follows:

- a. Place the SEL SYNC/REPRO switch in SEL SYNC. Place the INPUT MON/NORMAL MON switch in NORMAL MON.
- b. Place READY/SAFE switches of channels adjacent to channel to be set in READY position; set switch of channel to be set in SAFE position.
- c. Remove tape from machine and hold the end-of-tape arm in on position with an elastic band or pressure-sensitive tape.
- d. With system power off, mount the record electronics card of the channel to be set on an extender card.
- e. Connect a vtvm to the channel line output, switch system power on, and place machine in record mode.
- f. Adjust the bias trap inductor for minimum reading on the vtvm. (The bias trap inductor is accessible with a long, insulated core turning tool; it is on the switching card at the rear of the card cage in line with the extended record card.)

## OVERALL NOISE AND DISTORTION MEASUREMENTS

A wave analyzer is recommended for making distortion measurements, and is necessary for making erasure depth measurements. An oscillator with less than 0.1% distortion is also required for making distortion measurements. Correct record and reproduce alignment is assumed.

### Distortion Measurement

1. Set up the system for distortion measurement as follows:
  - a. Thread a reel of degaussed tape of the type to be used (Ampex 406 or equivalent) onto the transport.
  - b. Place all READY/SAFE switches to READY.
  - c. Select NORMAL MON and REPRO settings.
  - d. Connect an oscillator to the line inputs. Adjust oscillator frequency to 1 kHz and level to +4 dBm.

2. Place the machine in the record mode. Ensure that all vu meters read 0 vu. Adjust RECORD LEVEL controls as required to achieve the indication.
3. Connect the wave analyzer to the line outputs and normalize its full-scale reading at 1 kHz. Measure the second harmonic component; this should not exceed 0.3% or -50 dB with respect to the fundamental. Similarly, measure the third harmonic component; this should not exceed 1% or -40 dB with respect to the fundamental. Repeat this procedure for each channel.
4. If the second harmonic component is high, degauss heads and tape guides thoroughly, and repeat the measurement. A continuing high reading may indicate either a faulty record amplifier output capacitor or a misadjusted bias amplifier. Check the ERASE PEAK adjustment (previously described) initially. The record card may be checked by substitution with another channel. If the record card is not at fault, refer to the Bias Amplifier Alignment.
5. If the third harmonic component is high, the two most likely reasons are that the record level is set too high (reproduce calibration incorrect), or the bias level is incorrectly set. These levels can be reset as previously described.

#### Noise and Erasure Depth

1. Prepare the machine as follows:
  - a. Thread a reel of tape of the type to be used (Ampex 406 or equivalent) on the transport.
  - b. Connect an oscillator to the line inputs. Set oscillator to 1 kHz and +4 dBm output level.
  - c. Place all NORMAL/SET UP/BIAS switches to SET UP. Place SEL SYNC/REPRO switch in REPRO. Place INPUT MON/NORMAL MON in NORMAL MON.
  - d. Set all READY/SAFE switches to READY.
2. Place machine in record mode and adjust record level controls to give 0 vu indication on vu meters (reproduce calibration should be aligned correctly). Increase oscillator level to +10 dBm. Record at this level for two or three minutes.
3. Rewind the tape to the beginning of the recorded section and remove the oscillator input signal. The inputs should be terminated with a low impedance (600 ohms) or shorted. Connect a vtm to the line output via a bandpass filter (see Figure 18).

- Place the machine in the record mode once again and read the residual noise of the vtvm for each channel. For 8 and 16-track systems, the meter should read less than -53 dBm, and for 24-track systems, less than -48 dBm. If the ASA "A" weighted filter (Figure 19) is used, after correction for the insertion loss of the filter, the meter should read -55 dBm or greater for 8 and 16-track systems or -51 dBm or greater for 24-track systems.

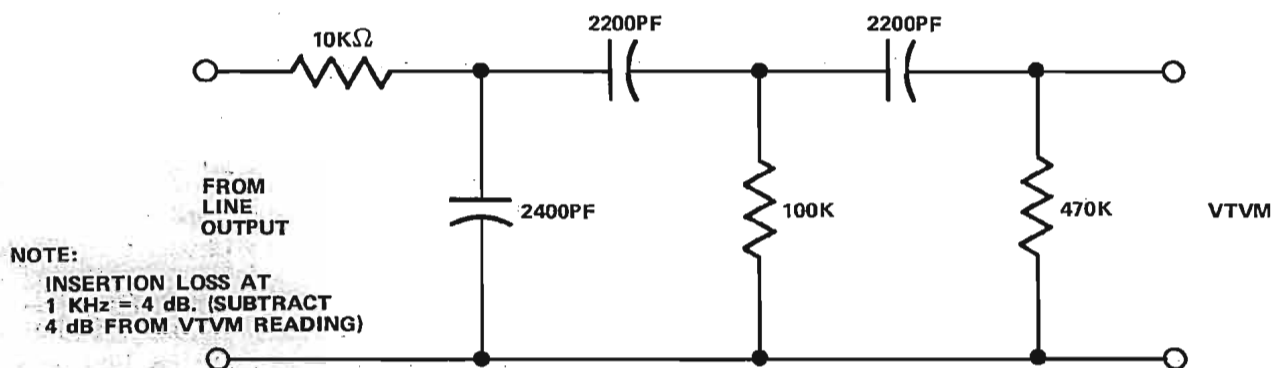


Figure 19. ASA "A" Weighted Filter

NOTE

The figures in step 4 are absolute noise levels. When referred to the peak signal level of +10 dBm, the signal-to-noise ratio is obtained; i.e., meter reads -55 dBm noise using bandpass filter, therefore signal-to-noise ratio is 65 dB unweighted.

- If a wave analyzer is connected to the line output, the erasure depth may also be determined. Measure the residual level of the 1000-Hz signal; the level should not exceed -65 dBm.

BIAS AMPLIFIER ALIGNMENT FOR 8 OR 16 CHANNEL SYSTEMS

NOTE

This adjustment should normally be required only if a bias amplifier card is used in a channel in which it was not previously used or if failure of the card requires component replacement. Operational indications that adjustment may be required are excessive second harmonic noise or noise when all other possible sources of the noise or distortion (e.g., magnetized heads or guides or faulty record amplifiers) have been eliminated.

1. Prepare the machine as follows:
  - a. Place the bias amplifier card of the channel to be aligned on an extender board (Ampex part no. 4020153-01).
  - b. Place the NORMAL/SET UP/BIAS switch in BIAS.
  - c. Place the channel READY/SAFE switch in READY.
  - d. Remove tape from the transport and temporarily secure the end-of-tape switch in the on-position.
2. Place the transport in record mode and proceed as follows:
  - a. Adjust the BIAS CAL preset on the bias amplifier card to obtain a 2/3-scale reading on the vu meters.
  - b. Adjust the core of T3 (nearest connector) to achieve maximum reading on vu meter.
  - c. Repeat this procedure for the core of T4 (furthest from connector).
3. Adjust the ERASE PEAK preset for maximum output and proceed as follows:
  - a. Slowly adjust the core of T4 and note that there are two distinct peaks in the vu meter indication with a slight dip in the meter reading. Set the core of T4 so that the meter is reading at the center of the dip.
  - b. Repeat step a for T3.
  - c. Check that ERASE PEAK is still set to give maximum output.
4. The bias level should now be reset (as described in Record Alignment Produce), together with the BIAS CAL preset.

#### NOTE

If a large readjustment to the bias level is necessary, step 3 should be repeated.

5. Remove the extender card and replace the bias amplifier in the electronics chassis.
6. If necessary, recheck the second harmonic distortion at this time.

## BIAS AND ERASE AMPLIFIER ADJUSTMENT FOR 24 CHANNEL SYSTEMS

1. Prepare the machine as follows:
  - a. Place the bias amplifier card of the channel to be aligned on an extender board (Ampex part no. 4020153-01).
  - b. Place the NORMAL/SET UP/BIAS switch in BIAS.
  - c. Place the channel READY/SAFE switch in READY.
  - d. Remove tape from the transport and temporarily secure the end-of-tape switch in the on position.
2. Place the transport in record mode and proceed as follows:
  - a. Adjust the BIAS CAL preset on the bias amplifier card to obtain a 2/3-scale reading on the vu meter.
  - b. Adjust the core of T3 (nearest connector) to achieve maximum reading on the vu meter.
  - c. Repeat this procedure for the core of T4 (furthest from connector).
3. Turn the ERASE PEAK preset fully counterclockwise and proceed as follows:
  - a. Turn the ERASE PEAK preset slowly clockwise. The bias level indication will change very slowly at first. Then the vu meter will indicate a sudden 2 to 3 dB drop. Continue turning the preset clockwise until the vu meter reading is reduced another 0.5 to 1 dB below the initial drop.
  - b. Leave T3 and T4 cores in their peaked positions as per step 2.
4. The bias level should now be reset (as described in record alignment), together with the BIAS CAL preset.

## NOTE

If a large readjustment to the bias level is necessary, step 3 should be repeated.

5. Remove the extender card and replace the bias amplifier in the electronics chassis.
6. -If necessary, recheck the second harmonic distortion at this time.

## PARTS LISTS

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Master Maker Assembly	4010210C	53
Record Equalizer PWA	4020269G	55
Reproduce Equalizer PWA	4020270C	57
Head Assembly, 1 Inch	4020334-	59
Transport Assembly	4020360-	61
Capstan Idler Housing	4030369-	63
Reel Motor Assembly	4030375-	65
Solenoid Assembly	13954D	67
Reel Hold Down Assembly	1243031D	69
End-of-Tape Arm and Housing Assembly	4030377-	71
Tape Lifter Assembly	4030379A	73
Tension Sensor Assembly	4030384A	75
Cable Assembly, Erase Head	4050686A	77
Cable Assembly, Reproduce Head	4050687-	79
Cable Assembly, Record Head	4050688A	81
Harness Assembly, Tape Transport	4050708-	83
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Bias Amplifier PWA	4050433H	87
Record Amplifier PWA	4050434G	89
Reproduce Amplifier PWA	4050435U	91
Audio Switching PWA	4050690A	93
Harness, Electronics Chassis	4050691-	95
Harness, Head and Input Cabling	4050704-	97
Head Assembly, 2 Inch	4020372-	99
Transport Control Chassis	4020373A	101
Capstan Servo PWA	4050692B	103
Transport Control PWA	4050706-	105
Motor Drive Amplifier Assembly	4020374-	107
Motor Drive Amplifier PWA	4050698-	109
Fan Assembly	4020379	111
Frame Assembly	4030383A	113
Power Supply Assembly	4050658B	115
Regulator-Oscillator PWA	4050699A	117

## PARTS LISTS (Continued)

TITLE	DRAWING NO.	PAGE
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Circuit Breaker Assembly	4050647A	121
Input/Output Connector Panel (8 and 16-Channel)	4050685-	123
Meter Panel Assembly	4050707-	125
Meter Panel Cable Assembly	4050682-	127
Input/Output Connector Panel (24-Channel)	4050715-	129
Motion Sense Assembly	4952610D	131
Miscellaneous Spare Parts Kit	4090024A	133

## NUMERICAL INDEX TO PARTS LISTS

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1243031D	Reel Hold Down Assembly	69
4010210C	Master Maker	53
4020269G	Record Equalizer PWA	55
4020270C	Reproduce Equalizer PWA	57
4020334-	Head Assembly, One Inch	59
4020360-	Transport Assembly	61
4020371C	Electronics Assembly	85
4020372-	Head Assembly, Two Inch	99
4020373A	Transport Control	101
4020374-	Motor Drive Amplifier	107
4020379-	Fan Assembly	111
4030369-	Capstan Idler Housing Assembly	63
4030375-	Reel Motor Assembly	65
4030377-	End-of-Tape Arm and Housing Assembly	71
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NUMERICAL INDEX TO PARTS LISTS (Continued)

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4050434G	✓ Record Amplifier PWA	89
4050435U	✓ Reproduce Amplifier PWA	91
4050646A	Control Box	119
4050647A	Circuit Breaker	121
4050658B	Power Supply Assembly	115
4050682-	Cable Assembly, Meter Panel	127
4050685-	Input/Output Connector Panel (8 and 16-Channel)	123
4050686A	Cable Assembly, Erase Head	77
4050687-	Cable Assembly, Reproduce Head	79
4050688-	Cable Assembly, Record Head	81
4050690A	Audio Switching PWA	93
4050691-	Harness, Electronics Chassis	95
4050692B	✓ Capstan Servo PWA	103
4050698- ✓	✓ Motor Drive Amplifier PWA	109
4050699A	✓ Regulator/Oscillator PWA	117
4050704-	Harness, Head and Input Cabling	97
4050706-	✓ Transport Control PWA	105
4050707-	Meter Panel Assembly	125
4050708-	Harness Assembly, Tape Transport	83
4050715-	Input/Output Connector Panel Assembly (24-Channel)	129
4090024A	✓ Miscellaneous Spare Parts Kit	133
4952610D	Motion Sense Assembly	131

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC.	QTY REQD PER DASH NUMBER			
				-01	-02	-03	-04
1	4020334-01	HEAD ASSY, 8 CHANNEL		1	-	-	-
2	4020263-06	REC'D EQUALIZER, CE1A (EC)		-	-	8	16 24
3	4020360-01	TRANSPORT ASSY		1	-	-	-
4	4020360-02	TRANSPORT ASSY		-	-	-	-
5	4020360-03	TRANSPORT ASSY		-	-	-	-
6	4020269-08	REC'D EQUALIZER, UAB		8	16 24	-	-
7	4020371-02	ELECTRONICS ASSEMBLY		2	4	6	2 4 6
8	4020279-02	REPRODUCE EQUALIZER, UAB		8	16 24	8	16 24
9	4020372-01	HEAD ASSY, 16 CHANNEL		-	-	-	-
10	4020372-02	HEAD ASSY, 24 CHANNEL		-	-	-	-
11	4292955-01	COVER, POWER SUPPLY		1	1	1	1
12	4020373-01	TRANSPORT CONTROL ASSY, 8 - 16 CH.		1	1	1	1
13	4020373-02	TRANSPORT CONTROL ASSY, 24 CH.		-	-	-	-
14							
15	4020374-01	MOTOR DRIVE AMPLIFIER ASSY		1	1	1	1
16							
17	4020379-01	FAM ASSY		1	1	1	1
18							
19	4020381-01	FRAME ASSEMBLY		1	1	1	1
20							
21	4020387-01	DOOR ASSY		1	1	1	1
22	4020387-02	DOOR ASSY		1	1	1	1
23							
24	4050646-01	CONTROL BOX ASSY, 8 CH.		1	-	-	-
25	4050646-02	CONTROL BOX ASSY, 16 CH.		-	-	-	-
26	4050646-03	CONTROL BOX ASSY, 24 CH.		-	-	-	-
27							
28	4050647-02	CIRCUIT BREAKER ASSY		1	1	1	1
29	4050654-01	POWER SUPPLY, 20 VOLT		1	1	1	1
30	4050654-02	POWER SUPPLY, 15/27 VOLT		1	1	1	1
31							
32	4050685-01	INPUT/OUTPUT CONN. PANEL ASSY, CH 1-8		1	-	-	-
33	4050685-02	INPUT/OUTPUT CONN. PANEL ASSY, CH 1-16		-	-	-	-
34							
35	4050707-01	METER PANEL ASSY, 8 CH		1	-	-	-
36	4050707-02	METER PANEL ASSY, 16 CH		-	-	-	-
37	4050707-03	METER PANEL ASSY, 24 CH		-	-	-	-

4010210C  
Master Maker Assembly

Sheet 1 of 3

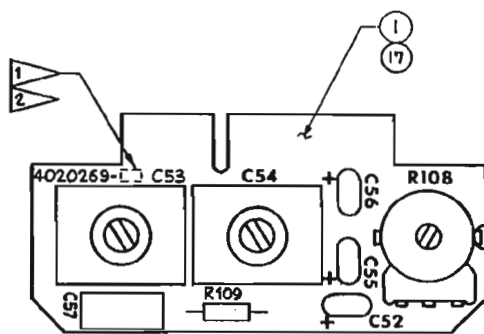
ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC.	QTY REQD PER DASH NUMBER			
				-01	-02	-03	-04
38							
39	4050709-01	CABLE ASSY, ELECTRONICS PWR & CONTROL		1	2	3	2 3
40							
41	4050710-01	DUMY PLUG ASSY, REMOTE CONTROL		1	1	1	1
42							
43	4050715-01	INPUT/OUTPUT CONN. PANEL ASSY, CH 1-24		-	-	-	-
44							
45	4090014-01	MISCELLANEOUS PARTS KIT		1	-	-	-
46	4090014-02	MISCELLANEOUS PARTS KIT		-	-	-	-
47	4090014-03	MISCELLANEOUS PARTS KIT		-	-	-	-
48	4170309-01	LABEL, ELECTRONICS CHASSIS, CH 1-4		1	1	1	1
49	4170309-02	LABEL, ELECTRONICS CHASSIS, CH 5-8		1	1	1	1
50	4170309-03	LABEL, ELECTRONICS CHASSIS, CH9-12		1	1	1	1
51	4170309-04	LABEL, ELECTRONICS CHASSIS, CH13-16		1	1	1	1
52	4170309-05	LABEL, ELECTRONICS CHASSIS, CH 17-20		1	1	1	1
53	4170309-06	LABEL, ELECTRONICS CHASSIS, CH 21-24		-	-	-	-
54							
55	4290825-05	PANEL, SIDE		1	1	1	1
56	4290825-06	PANEL, SIDE		1	1	1	1
57	4290825-07	PANEL, SIDE, 24 CHANNEL		-	-	-	-
58	4290825-08	PANEL, SIDE, 24 CHANNEL		-	-	-	-
59							
60	4290836-01	PANEL, BLANK 4" (24")		2	2	2	2
61	4290836-02	PANEL, BLANK 8 1/4" (24")		1	-	-	-
62	4290917-01	PANEL, FILLER, REAR		1	1	1	1
63	4290917-01	PANEL, FILLER, 24 CH		-	-	-	-
64							
65	4300319-01	PLATE, SPACER		1	1	1	1
66							
67							
68							
69							
70	4352812022	INSTRUCTION MANUAL		1	1	1	1
71							
72							
73	4390321	INSTRUCTION MANUAL		1	1	1	1
74	4110272-77	LABEL, IDENTIFICATION		1	1	1	1
75							
76							
77							
78							
79							
80	470-029	SCREW, #8-32 X .50 LG, CAP HEX SOCKET HD		4	4	4	4
81	470-040	SCREW, #10-32 X .75 LG, CAP, HEX SOCKET HD		3	3	3	3
82							

4010210C

Sheet 2 of 3

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DISC.	QTY REQD PER DASH NUMBER					
				-01	-02	-03	-04	-05	-06
83	471-069	SCREW, #6-32 X .75 LG, PAN HD, XREC		5	5	5	5	5	5
84	471-080	SCREW, #8-32 X .50 LG, PAN HD, XREC		6	6	6	6	6	6
85	471-462	SCREW, #12-24 X .75 LG, PAN HD, XREC		4	4	4	4	4	4
86									
87									
88	472-578	SCREW, #10-32 X .75 LG, OVAL HD, XREC, RKL PLD		44	44	44	44	44	44
89	473-624	SCREW, #10-32 X 1.25 LG, FLAT HD, XREC		4	4	4	4	4	4
90									
91									
92									
93	501-009	WASHER #6 PLAIN		5	5	5	5	5	5
94	501-205	WASHER #8 PLAIN		10	10	10	10	10	10
95	501-702	WASHER #10 FINISHING, NYLON, BLACK		44	44	44	44	44	44
96									
97	502-005	WASHER #10, LOCK, SPRING		3	3	3	3	3	3
98	502-025	WASHER #6, LOCK, INTL TOOTH		5	5	5	5	5	5
99	502-026	WASHER, #8, LOCK, INTL TOOTH		10	10	10	10	10	10

ITEM NO.	PART NUMBER	C	DESCRIPTION	REF. DESIG.	QTY. REQD. PER DASH NUMBER										
					-01	-02	-03	-04	-05	-06	-07	-08			
1	450109-02		PRINTED WIRING BOARD			1	1	1	1	1					
2	450153-01		RESISTOR, VARIABLE (100K OHMS)	R108		1	1	1	1	1	1				
3	450314-02		CAPACITOR TRIMMER (50-280PF)	C54		1	1	1	1	1	1				
4	450314-03		CAPACITOR TRIMMER (170-780PF)	C53		1	1	1	1	1	1				
5	450314-01		CAPACITOR TRIMMER (170-780PF)	C54		1	1	1	1	1	1				
6	450314-04		CAPACITOR, TRIMMER (100-1180PF)	C53		1	1	1	1	1	1				
7	037-634		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C52		1	1	1	1	1	1				
8	037-664		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C56		1	1	1	1	1	1				
9	4802189		SCHEMATIC	REF REF REF											
10	055-164		CAPACITOR, MYLAR, .0022 uF, 50V, 10%	C57		1	1	1	1	1	1				
11	041-436		RESISTOR, FIXED, 12K, 1/4W, 5%	R109		1	1	1	1	1	1				
12	037-634		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C56		1	1	1	1	1	1				
13	450314-01		CAPACITOR, TRIMMER (50-280PF)	C54		1	1	1	1	1	1				
14	450314-02		CAPACITOR, TRIMMER (50-280PF)	C53		1	1	1	1	1	1				
15	450156-01		PRINTED WIRING BOARD			1	1	1	1	1	1				
16	4802159		SCHEMATIC	REF REF REF											
17	450216-02		PRINTED WIRING BOARD			1	1	1	1	1	1				
18	450153-07		POTENTIOMETER, RECORD CALIBRATION	R108		1	1	1	1	1	1				
19	4802157		SCHEMATIC	REF REF REF											



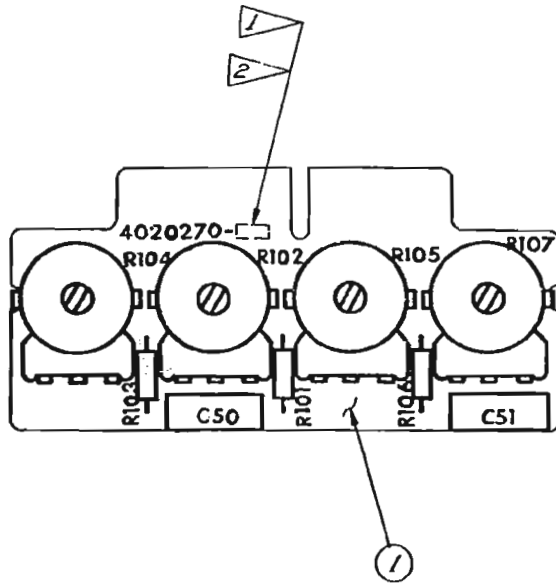
NOTES:

- 1 ASSEMBLY NUMBER TO BE 4020269 - XX.
- 2 MARK DASH NUMBER PER BDI-1.

**4020269G**  
**Record Equalizer PWA**

**Sheet 2 of 2**

**Next Assy: 4010210**



NOTES:

- 1 PART NO. IS 4020270-LX
- 2 INK STAMP DASH NO. PER MIL. STD. 130.

REF	-	9	4840259	SCHEMATIC	
2	-	8	055-889	CAPACITOR, .0033 MFD, MYLAR	C50, 51
-	REF	7	4840169	SCHEMATIC	
-	2	6	055-222	CAPACITOR, .0047 MFD, MYLAR	C50, 51
1	1	5	049-527	RESISTOR, 2.2 K, 1/8 W, 10%	R101
2	2	4	049-528	RESISTOR, 220K, 1/8 W, 10%	R103, 106
2	2	3	C-4520152-02	POTENTIOMETER, 2.5 MEG.	R102, 107
2	2	2	C-4520152-01	POTENTIOMETER, 50 K	R104, R105
1	1	1	D-4500110-01	PRINTED WIRING BOARD, REP. EQUAL.	
-02	-01	ITEM NO	PART NUMBER	DESCRIPTION	
LIST OF MATERIALS					

4020270C  
Reproduce Equalizer PWA

Sheet 1 of 1

Next Assy: 4010210



ITEM NO.	PART NUMBER	DESCRIPTION	QTY	REF. DESIG.	QTY REQ PER DASH NUMBER
1	4020228-05	CAPSTAN DRIVE ASSY	1		
2	4020285-01	CAPSTAN IDLER HOUSING ASSY	1		
3	4020325-01	TAPE UP REEL ASSY	1		
4	4020325-02	SUPPLY REEL ASSY	1		
5	4020377-01	DRUM-UP TAKE-UP ARM & HOUSING ASSY	1		
6	4020379-01	TAPE LIFTER ASSY	1		
7	4021160-01	TOP PLATE ASSY	1		
8	4020380-01	TENSION SENSOR ASSY	1		
9	4020208-01	WARRISS, TAPE TRANSPORT	1		
10	4100068-01	CAP. TENSION ARM	1		
11	4110285-01	OPERATOR TRANSPORT	1		
12					
13	4021141-01	ARM ASSY, TENSION SENSOR	1		
14	4220128-01	BLOCK, MOUNTING, TENSION SENSOR	1		
15	4210253-01	GUIDE, 1 INCH FIXER	2		
16	4220257-01	SPACER, TRANSPORT	3		
17	4210253-02	GUIDE, 2 INCH FIXER	2		
18	4220148-01	ARM, PHOTOCELL COVER	1		
19	4220294-01	SPACER, HEAD CABLE CLAMP	2		
20	4220205-01	SPACER, TRANSPORT	2		
21	4250229-01	RING, SPACER, SERVO MOTOR	1		
22					
23	41471-01	BRACKET, SPRING P...	1		
24	59102-05	TAPE TINDER ASSY	1		
25	1024-01	SPRING, TAKE UP TENSION	1		
26	4270131-01	SPRING, SENSOR	1		
27	4290797-01	COVER, TENSION SENSOR	1		
28	4290819-01	SHIELD, TRANSPORT	1		
29	11871-02	ARM, SOLENOID	1		
30	4220206-02	SOLENOID COIL	1		
31	4220206-01	SOLENOID COIL	1		
32	4220206-03	SOLENOID COIL	1		
33	4130312-01	PLATE, BACKING	1		
34					
35	4290012-01	DASHPOD	1		
36	474-052	SCREW, SHOULDER #10-32 X .250 LG	2		
37					

4020360—  
Transport Assembly

Next Assy: 4010210

Sheet 1 of 3

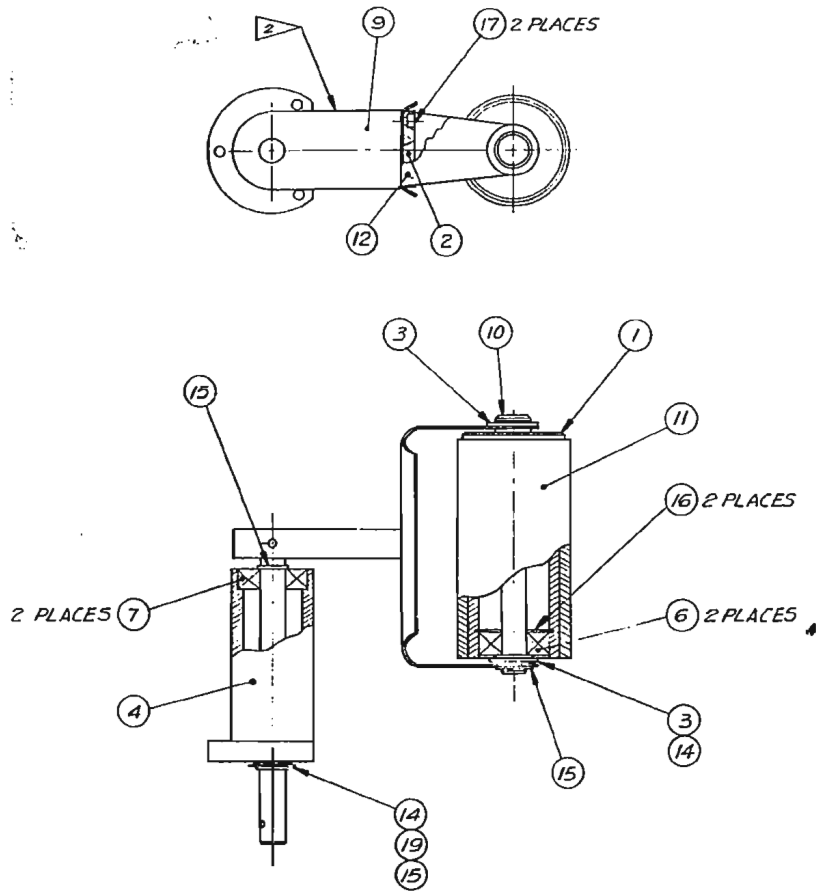
ITEM NO.	PART NUMBER	DESCRIPTION	QTY	REF. DESIG.	QTY REQ PER DASH NUMBER
38	4020285-01	ARM ASSY, DASHPOD	1		
39	4020210-03	MOTION SENSE ASSY	1		
40					
41	6000035-02	LABEL, IDENTIFICATION	1		
42	50115-04	SLEEVE, BUMPER, TAPE TENSION ARM	2		
43	55670-04	CAPSTAN SOLENOID ASSY	1		
44	4220206-02	SOLENOID COIL	1		
45	4600153-01	CLAMP, HEAD CABLE	1		
46	4600153-03	CLAMP, HEAD CABLE	1		
47	4600153-05	CLAMP, HEAD CABLE	1		
48	4600153-02	CLAMP, HEAD CABLE	1		
49	4600153-04	CLAMP, HEAD CABLE	1		
50	4600153-06	CLAMP, HEAD CABLE	2		
51	032-084	BOOT, CAPACITOR	2		
52	036-126	CAPACITOR, FIXED, 10 uF, 130V	2		
53					
54	180-042	SWITCH, SENSITIVE LEVER	1		
55	120-074	SWITCH, SENSITIVE PUSHBUTTON	1		
56	290-111	BRACKET, CAPACITOR, BE #027065P21	2		
57	235-353	TAPE, ADHESIVE, DBL SIDE, .031 THK X .500 V	A/R		
58					
59	406-030	PIN, SPRING, ROLL .125 DIA X .625 LG	1		
60					
61	302-365	CLAMP, CABLE	8		
62					
63					
64					
65	470-181	SCREW, CAP HEX SOC, #10-24 X 1.50 LG	4		
66	470-021	SCREW, CAP, #6-32 X .62 LG, HEX SOC.	5		
67	470-089	SCREW, CAP, #10-32 X .50 LG, HEX SOC.	12		
68	470-028	SCREW, CAP, #8-32 X .44 LG, HEX SOC.	8		
69	470-019	SCREW, CAP, #6-32 X .48 LG, HEX SOC.	4		
70	470-160	SCREW, CAP, #6-32 X 1.25 LG, HEX SOC.	2		
71	470-016	SCREW, CAP, #6-32 X .25 LG, HEX SOC.	1		
72	470-503	SCREW, CAP, #8-32 X .37 LG, HEX SOC.	1		
73	471-119	SCREW, PAN HD #6-32 X .37 LG, XREC	8		
74	471-117	SCREW, PAN HD #6-32 X .25 LG, XREC	1		
75	471-119	SCREW, PAN HD #10-32 X .50 LG, XREC	4		
76	470-039	SCREW, CAP, #10-32 X .62 LG, HEX SOC.	3		
77	421-058	SCREW, PAN HD #8-32 X .245 LG, XREC	2		
78	471-110	SCREW, PAN HD #8-32 X .50 LG, XREC	4		
79					
80	480346	SCHEMATIC, TRANSPORT	REF		
81					
82					

4020360—  
Sheet 2 of 3



ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY. REQD. PER DASH NUMBER		
				-01	-02	-03
83						
84	501-009	WASHER, #6 PLAIN		21	21	21
85	501-070	WASHER, #10 PLAIN		13	13	13
86	501-205	WASHER, #8 PLAIN		11	11	11
87	501-631	WASHER, #8 PLAIN		4	4	4
88						
89						
90						
91						
92						
93	502-003	LOCKWASHER, #6 SPRING		12	12	12
94	502-004	LOCKWASHER, #8 SPRING		9	9	9
95	502-005	LOCKWASHER, #10 SPRING		9	9	9
96						
97						
98	502-025	WASHER #6, INTERNAL TOOTH		9	9	9
99	502-026	WASHER #8, INTERNAL TOOTH		6	6	6
100	502-027	WASHER #10, INTERNAL TOOTH		4	4	4
101						
102						
103						
104	4050686-01	CABLE ASSY, ERASE HEAD		1	1	1
105	4050686-02	CABLE ASSY, ERASE HEAD		-	-	-
106	4050686-03	CABLE ASSY, ERASE HEAD		-	-	-
107						
108	4050687-01	CABLE ASSY, REPRO HEAD		1	1	1
109	4050687-02	CABLE ASSY, REPRO HEAD		-	-	-
110	4050687-03	CABLE ASSY, REPRO HEAD		-	-	-
111						
112						
113	4050688-01	CABLE ASSY, RECORD HEAD		1	1	1
114	4050688-02	CABLE ASSY, RECORD HEAD		-	-	-
115	4050688-03	CABLE ASSY, RECORD HEAD		-	-	-

PART NUMBER	DESCRIPTION	REF. DESIGNATION	QTY REQD PER DASH NUMBER	
1-13867-02	CAP, FINCH ROLLER	1		
2-13868-03	PLATE, HOUSING ARM IDLER ING	1		
3-13869-01	SPACER, CAPSTAN IDLER SHAFT	2		
4-14503-01	HOUSING, CAPSTAN IDLER SHAFT	1		
5-				
6-16683A-03	BEARING, BALL	2		
7-16694-02	BEARING, BALL	2		
8-				
9-4030372-01	CAPSTAN IDLER ARM ASST	1		
10-4210399-01	SHAFT, CAPSTAN IDLER FINCH ROLLER	1		
11-4280230-01	FINCH ROLLER, CAPSTAN IDLER ARM	1		
12-4240504-01	SWACKET, CAPSTAN IDLER	1		
13-				
14-501-032	WASHER, NUT, 3/16 ID X .005 THK X .080, FREE HEIGHT	2		
15-430-006	RING, RETAINING	3		
16-430-027	RING, RETAINING	2		
17-470-008	SCREW, CAP, HEX 80C HP, 1/40 X 1/4 LG	2		
18-				
19-101-888	WASHER, PRECISION, 316 10, .047 THK	1		

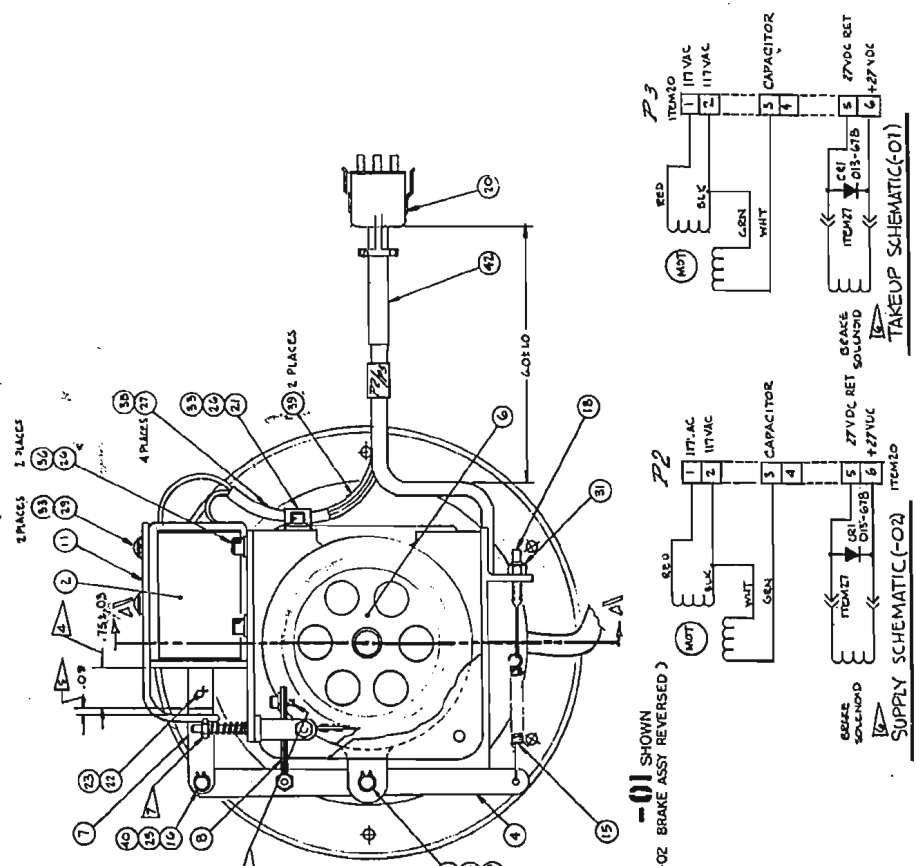


4030369—  
 Capstan Idler Housing Assembly

Sheet 2 of 2

Next Assy: 4020360





-01 SHOWN  
(-02 BRAKE ASSY REVERSED)

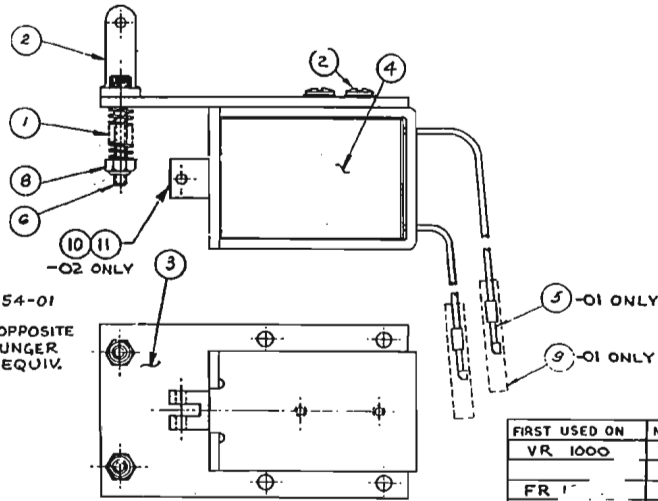
NOTES  
 1. PART NOS. 4030375 - XX  
 2. MARK PART NO. SLK ED1.1  
 3. ADJUST BRAKE BAND LENGTH TO INDICATED DIMENSION OF SOLID PLUNGER WHEN SOLID IS DE-ENERGIZED.  
 4. ADJUST BRAKE BAND LENGTH TO INDICATED DIMENSION OF SOLID PLUNGER WHEN SOLID IS DE-ENERGIZED.  
 5. SUPPLY AND TAKEUP SCHEMATICS DIFFER ONLY IN MOTOR TO ITEM 30 CONNECTIONS.

ADJUST SPRINGS FOR BRAKE ACTION. HIGH 7 1/2 LB. ± 1/4 LB. LOW 1 1/2 LB. ± 1/4 LB. MEASURED AT AN EMPTY REEL HUB.

Sheet 3 of 3

4030375-  
 Reel Motor Assembly  
 Next Assy: 4020360

MATERIALS LIST						
QTY	ITEM	AMPER	QTY. OR	DESCRIPTION	UNLESS	
-02	-01	PART NO.	INCH.		NOTED	
2	1	B-1387-01		SPRING		
1	2	B-13955-01		BRACKET, BRAKE LIMIT		
1	3	A-13957-02		PLATE, SOLENOID BASE		
1	4	C-14415-01		SOLENOID		
-	2	171-009		CONNECTOR, SOLDERLESS		
2	6	470-124		SCREW, CAP #8-32 x 1/2 LAG		
4	7	475-035		SCREW, (SEM) #8-32 x 3/8 LAG		
2	8	483-007		NUT, SELF LOCKING #8-32		
-	9	600-000		TUBING, $\phi$ 1/200 I.D. BLK. PLASTIC		
1	10	503-030		WASHER, NYLON 1/4 ID x 1/2 OD x 1/32 THK		
A/R	-	018-015		ADHESIVE		



NOTES:  
 1. ASSY NO. TO BE 13954-01 OR 13954-02.  
 2. MOUNT ITEM 10 TO OPPOSITE END OF SOLENOID PLUNGER USING ITEM 11 OR EQUIV.

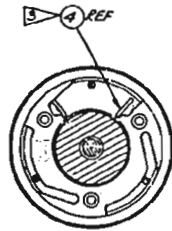
FIRST USED ON	NEXT ASSY	VEESKON
VR 1000	13950	-01
	13960	-01
FR 1	1220303	-01
	1220304	-02
VR 1100	52110	-01
	52111	-01
VR 2000	1210959	-01
	52110	-01

13954D  
 Solenoid Assembly

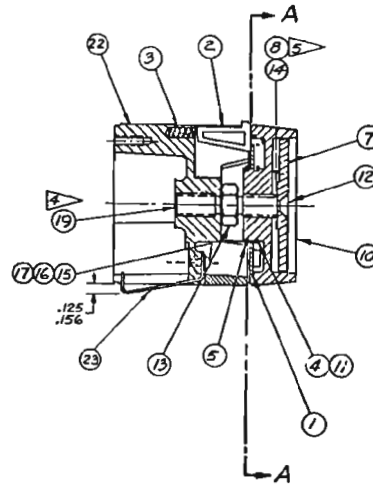
Sheet 1 of 1

Next Assy: 4030375

1				23	1365171-01	SPRING, REEL
1				22	1243035-02	HUB, REEL
-	1			21	1161321-01	SPRING, REEL
-	1			20	1243035-02	HUB, REEL
1				19	1243032-01	SHAFT, KNOB
-	1			18	1360109-4	SPRING, REEL
1				17	471-061	SCREW, PAN HD, PH. DR, 4-40 x 5/16 LG.
1				16	501-008	WASHER, FLAT, #4
AR	AR	AR	AR	15	018-030	ADHESIVE, THREAD LOCKING, LOCKTITE GRADE C
AR	AR	AR	AR	14	018-019	ADHESIVE
-	1			13	492-452	NUT, JAM HEX, 1/16-14
1				12	471-979	SCREW, FLAT HD, HEX SOC, 10-32 x 3/4 LG
AR	AR	AR	AR	11	081-057	GREASE, MOLYLUBE
1				10	1243036-01	KNOB-REEL
-	1			9	1243035-01	HUB-REEL
1				8	1243034-01	WASHER
1				7	1243033-01	RETAINER
-	1			6	1243032-01	SHAFT-KNOB
1				5	52391-01	SPRING-CAM
1				4	1243068-01	SPRING-ENERGIZING
3	5	2	3	3	52386-01	SPRING-FINGER, HOLD DOWN
3	5	2	3	2	52378-01	FINGER-HOLD DOWN
1				1	1243069-01	CAM-ACTUATOR
04-22-92-01-54 PART NUMBER						DESCRIPTION
PER ENG. V. HALL						LIST OF MATERIALS



SECTION A-A



NOTES:

1. PART NO. IS 1243031-04.
2. MARK PART NO. WITH PREFIX "ASSY" PER 601-1.
3. COAT CIRCULAR PORTION OF ITEM 4 LIGHTLY WITH ITEM 11 & INSTALL IN ITEM 10. INSTALL ITEM 1 WITH BOSSES OUTSIDE OF THE SPRING LEGS & INSTALL ITEM 5.
4. COAT EXPOSED THDS ON ITEM 19 LIGHTLY WITH ITEM 11.
5. COAT ROUGH SIDE OF ITEM 8 WITH ITEM 14 AND ASSEMBLE TO ITEM 7.

1243031D  
Reel Hold Down Assembly

Sheet 1 of 1

Next Assy: 4030375



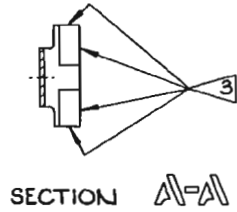
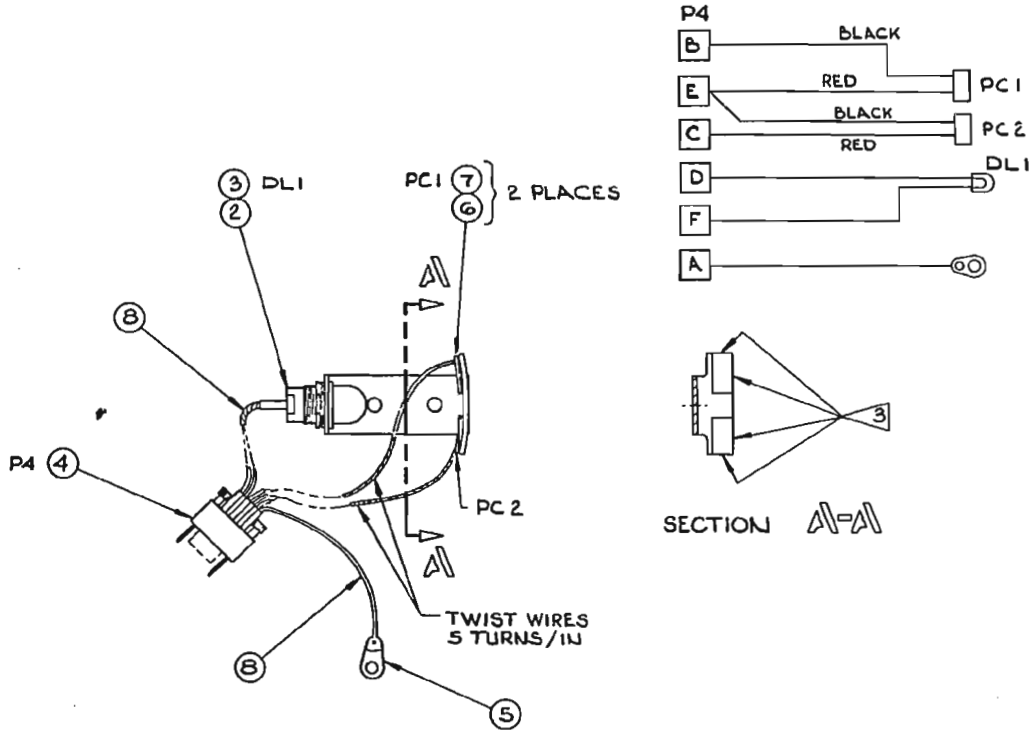


ITEM NO.	PART NUMBER	DESCRIPTION	REF. DASC	QTY REQ PER DASH NUMBER
1	4041162-01	ARM, BLOCK ASSY	-01	2
2				
3	4220291-01	STOP, SOLENOID		1
4				
5	4230284-01	LINK, TAPE LIFTER		1
6	4330302-01	Mounting Plate, Solenoid		1
7				
8	4440312-04	WASHER, FELT		2
9				
10	022-179	SOLENOID, 2W		1
11	013-678	DIODE, SILICON		1
12	181-023	TERMINAL STRIP	TBA	1
13	352-362	SPRING, .250 OD X 1.00 LG		1
14				
15	421-343	BEARING SLEEVE, .192 ID X .553 OD X .550 LG		2
16	406-284	PIN, SPRING ROLL .094 DIA X .50 LG		1
17				
18				
19				
20	490-090	RETAINING RING		2
21	501-032	WASHER, .515 ID X .87 OD X .032 THK		1
22	501-736	WASHER, NYLON, .253 ID X .031 THK		4
23	471-345	SCREW, FLAT HD #8-32 X .37 LG		4
24	471-342	SCREW, FLAT HD #6-32 X 1.00 LG		2
25	471-078	SCREW, PAN HD #8-32 X .37 LG		2
26	501-009	WASHER, PLAIN #8		2
27	501-003	WASHER, LOCK #6		2
28	501-205	WASHER, PLAIN #8		2
29	502-026	WASHER, LOCK #8		2
30	492-008	NUT, PLAIN #6-32		2

4030379A

Tape Lifter Assembly

Next Assy: 4020360



WIRE LEAD LENGTHS		
FROM	DL 1	2.5
P4	PC 1	5.0
TO	PC 2	3.5
	ITEM 5	2.0

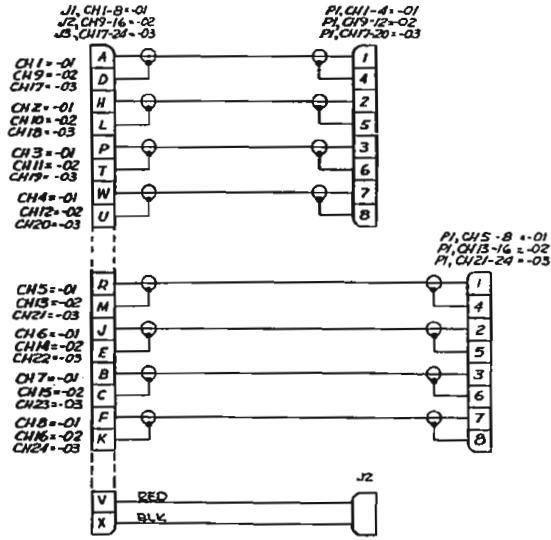
- NOTES:
- PART NO. IS 4030384-01.
  - MARK PART NO. WITH PREFIX "ASSY" PER BDI-1.
  - MOUNT ITEM 7 TO EXTREME EDGES OF ITEM 1 AS SHOWN USING ITEM G.
  - WIRE LEAD LENGTHS FROM P4 (ITEM 4) SHOWN IN TABLE.

A/R	8	611-316	WIRE, INS. STRANDED, 22 AWG, BLK
	2	581-204	DIODE, PHOTOVOLTAIC, SELENIUM
A/R	6	225-316	TAPE, DOUBLE-SIDED, VINYL FOAM
	1	172-010	TERMINAL LUG, SOLDER, #6
	1	139-514	CONNECTOR, RECT. PLLIG, 8 PIN
	1	132-313	LAMP FIXTURE, INDICATOR, INCANDESCENT
	1	060-373	LAMP, INCANDESCENT, 28 V, .06 AMP
	1	4260143-01	BKT, MTG, LAMP AND PHOTOCCELL

4030384A  
Tension Sensor Assembly

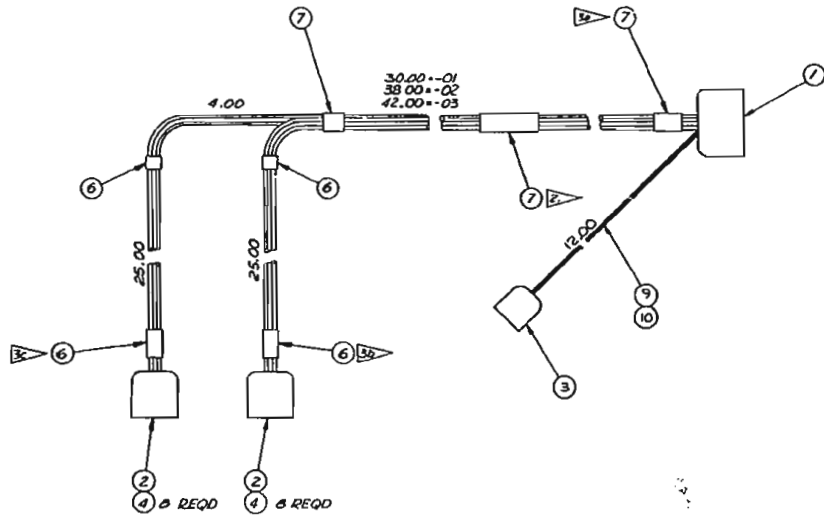
Sheet 1 of 1

Next Assy: 4020360



WIRING DIAGRAM

QTY	SIZE	LENGTH	PART NUMBER	DESCRIPTION
-	1/16"	10	617-050	WIRE, STRANDED, INSUL., 20 AWG RED
-	1/16"	9	611-256	WIRE, STRANDED, INSUL., 20 AWG BLK
1/2	1/8"	8	616-303	CABLE, COAX, 24AWG
1/2	1/8"	7	606-257	SLEEVING, SHRINKABLE, .500 I.D.
1/2	1/8"	6	600-256	SLEEVING, SHRINKABLE, .375 I.D.
		5		
16	16	4	187-037	TERMINAL, QUICK-DISCONNECT, FEMALE
-	1	3	145-023	CONNECTOR, CIRCULAR, 2 PIN LATCHING
2	2	2	165-085	CONNECTOR PART, BODY, RECT RECP, 9 CONTACTS
1	1	1	146-129	CONNECTOR, RECT RECP, 20 SOCKET
03	02	01		



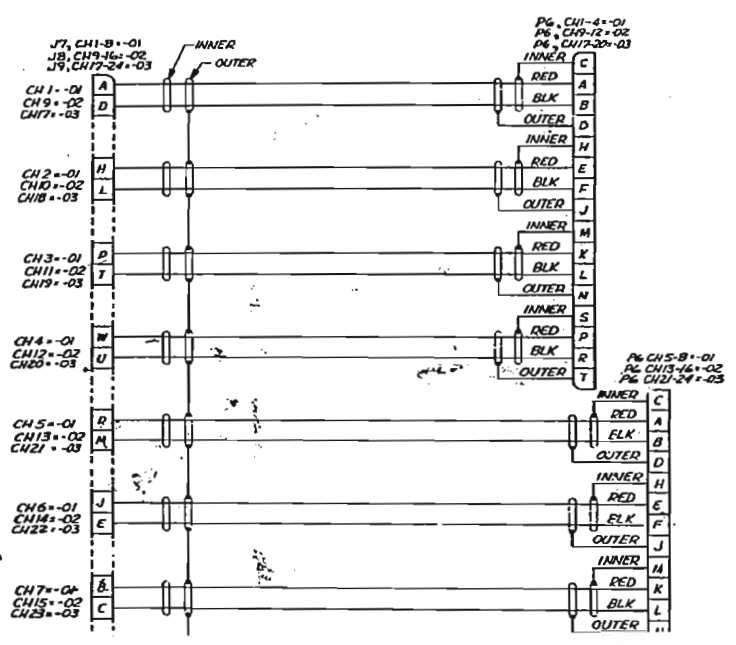
- NOTES:
- PART NO. IS 4050686-XX.
  - MARK PART NO. PER BDI-1.
  - MARK REF DES PER BDI-1.
1. -01, MARK "J1, CH1-8" -02, MARK "J2, CH9-16" -03, MARK "J3 CH17-24."  
 2. -01, MARK "P1, CH1-4" -02, MARK "P1, CH9-12" -03, MARK "P1 CH17-20."  
 3. -01, MARK "P1, CH5-8" -02, MARK "P1, CH13-16" -03, MARK "P1 CH21-24."

4050686A  
Erase Head Cable Assembly

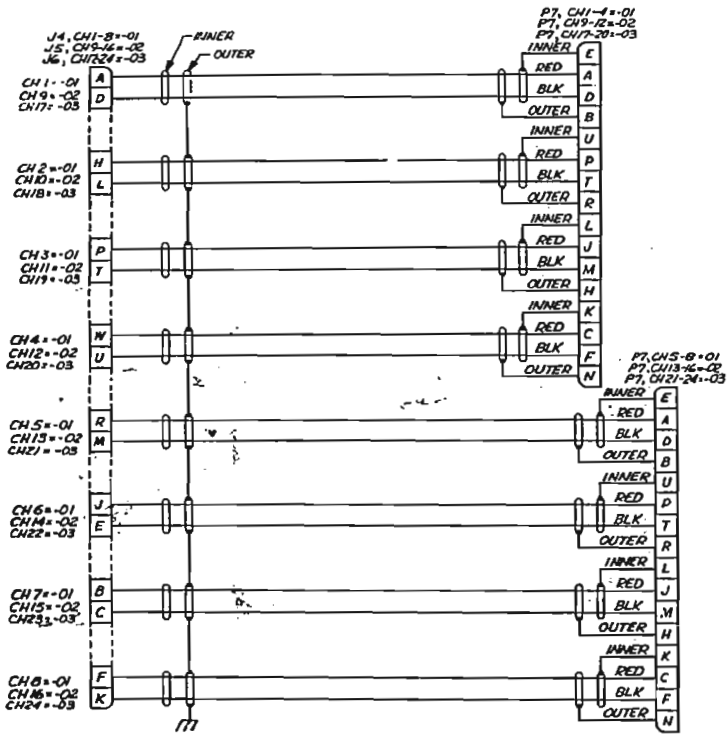
Sheet 1 of 1

Next Assy: 4020360

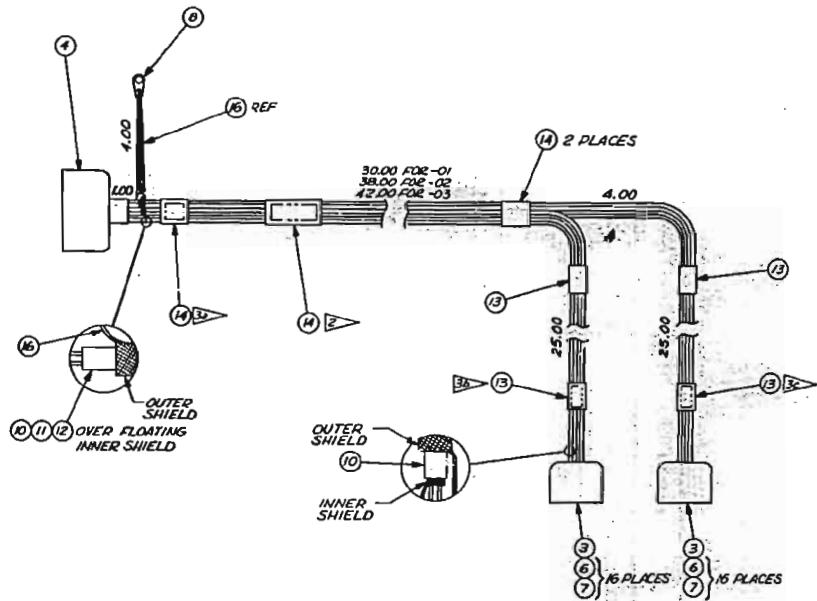




ITEM NO.	PART NUMBER	DESCRIPTION	REP. P/50	QTY REQ PER DASH NUMBER		
				-01	-02	-03
1	8700573-01	CABLE HEAD		M/A	M/A	M/A
2	145-170	CONNECTOR PART BODY, RECT PLUG, 20 POSITIONS		2	2	
3	144-139	CONNECTOR, SIGNAL CIRCUIT, RECT RECP, 20 SOCKETS		1	1	
4	169-089	CONNECTOR PART, CONTACT PIN 14-16 AWG		16	16	
5	169-086	CONNECTOR PART, CONTACT PIN 24 AWG		16	16	
6	172-003	TERMINAL LUG, SOLDER, RING TONGUE, #6		1	1	
7	600-823	SLEEVING, SHRINKABLE, .115 ID		M/A	M/A	M/A
8	600-825	SLEEVING, SHRINKABLE, .275 ID		M/A	M/A	M/A
9	600-826	SLEEVING, SHRINKABLE, .375 ID		M/A	M/A	M/A
10	600-827	SLEEVING, SHRINKABLE, .500 ID		M/A	M/A	M/A
11	600-828	SLEEVING, SHRINKABLE, .750 ID		M/A	M/A	M/A
12	611-200	WIRE, 24 AWG, BLK		M/A	M/A	M/A



WIRING DIAGRAM



NOTES:  
 1. PART NO. IS 4050688-XX  
 2. MARK PART NO. PER BDI-1.  
 3. MARK REF DES PER BDI-1.  
 4. -01, MARK "J4, CH 1-01" -02, MARK "J5, CH 9-02" -03 MARK "J6, CH 17-24"  
 5. -01, MARK "P7, CH 1-01" -02, MARK "P7, CH 9-02" -03 MARK "P7, CH 17-20"  
 6. -01, MARK "P7, CH 5-01" -02, MARK "P7, CH 13-16" -03 MARK "P7, CH 21-24"

4050688A  
 Record Head Cable Assembly

Sheet 2 of 2

Next Assy: 4020360

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESG	CITY REQD PER DASH NUMBER
1	480346	DIAGRAM, HARNESS	REF	
2	420473-01	CABLE, DOUBLE-SHIELDED, TWISTED PAIR	A/N	
3	4260481-01	BRACKET, CONNECTOR MOUNTING	1	
4	139-515	CONNECTOR, 8 SOC, FEMALE	J4	
5	144-013	CONNECTOR, 6 SOC, FEMALE	J2,3	
6	144-030	CONNECTOR, 15 SOC, FEMALE	P6	
7	144-037	CONNECTOR, 2 SOC, FEMALE	P2	
8	145-020	CONNECTOR, 10 PIR, MALE	P3,A	
9	144-003	CONNECTOR, 8 SOC, FEMALE	J1	
10				
11	166-863	CONNECTOR, 36 SOC, FEMALE	P5	
12	171-009	TERMINAL, QUICK-DISCONNECT, KNIFE	2	
13	171-117	TERMINAL, CRIMP, SPADE TONGUE	5	
14	171-238	TERMINAL, QUICK-DISCONNECT, FEMALE	8	
15	171-001	TERM, CRIMP, SPADE LUG	2	
16	187-037	CONTACT, CONNECTOR, SOCKET	36	
17	171-043	TERMINAL, QUICK-DISCONNECT, FEMALE	2	
18	600-256	SLEEVING, PTC, SHRINKABLE, .375 ID	A/N	
19	600-258	SLEEVING, PTC, SHRINKABLE, .75 ID	A/N	
20				
21	611-358	WIRE, INS, STANDED, 18 AWG, BLK	A/N	
22	611-159	WIRE, INS, STANDED, 18 AWG, ST	A/N	
23	611-363	WIRE, INS, STANDED, 18 AWG, RED	A/N	
24	611-364	WIRE, INS, STANDED, 18 AWG, W/O	A/N	
25	611-498	WIRE, INS, STANDED, 18 AWG, GRN	A/N	
26	611-510	WIRE, INS, STANDED, 18 AWG, ORN	A/N	
27	611-511	WIRE, INS, STANDED, 18 AWG, YEL	A/N	
28	611-512	WIRE, INS, STANDED, 18 AWG, BU	A/N	
29	613-024	CABLE, SHIELDED, WHT/RED	A/N	
30	613-030	CABLE, SHIELDED, WHT/GRN	A/N	
31	613-055	CABLE, SHIELDED, WHT/YEL	A/N	
32	614-333	CABLE, SHIELDED, WHT/ORN	A/N	
33	616-115	CABLE, SHIELDED, TWISTED PAIR	A/N	
34	CD569	WIRE, INS, STANDED, 16 AWG	A/N	
35	CD569	WIRE, INS, STANDED, 18 AWG	A/N	
36	CD569	WIRE, INS, STANDED, 20 AWG	A/N	
37	CD569	WIRE, INS, STANDED, 22 AWG	A/N	

4050708-

Tape Transport Harness Assembly

Next Assy: 4020360



ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC.	QTY. REQD PER DASH NUMBER
1	4840346	DIAGRAM, HARNESS	REF	
2	4700473-01	CABLE, DOUBLE-SHIELDED, TWISTED PAIR	A/R	
3	4700481-01	BRACKET, CONNECTOR MOUNTING	1	
4	137-515	CONNECTOR, 8 SOC, FEMALE	J4	
5	144-013	CONNECTOR, 6 SOC, FEMALE	J2,3	
6	144-030	CONNECTOR, 15 SOC, FEMALE	P6	
7	144-037	CONNECTOR, 2 SOC, FEMALE	P2	
8	145-020	CONNECTOR, 10 PIN, MALE	P3,4	
9	146-003	CONNECTOR, 8 SOC, FEMALE	J1	
10				
11	166-863	CONNECTOR, 36 SOC, FEMALE	P5	
12	171-009	TERMINAL, QUICK-DISCONNECT, KNIFE	2	
13	171-117	TERMINAL, CRIMP, SPADE TONGUE	5	
14	171-238	TERMINAL, QUICK-DISCONNECT, FEMALE	8	
15	171-001	TERM. CRIMP, SPADE LUG	2	
16	187-037	CONTACT, CONNECTOR, SOCKET	36	
17	171-043	TERMINAL, QUICK-DISCONNECT, FEMALE	2	
18	600-256	SELECTING, PVC, SHRINKABLE, .375 ID	A/R	
19	600-258	SELECTING, PVC, SHRINKABLE, .75 ID	A/R	
20				
21	611-158	WIRE, INS. STRANDED, 14 AWG, BLK	A/R	
22	611-159	WIRE, INS. STRANDED, 18 AWG, SY	A/R	
23	611-263	WIRE, INS. STRANDED, 18 AWG, RED	A/R	
24	611-264	WIRE, INS. STRANDED, 14 AWG, YLO	A/R	
25	611-098	WIRE, INS. STRANDED, 14 AWG, GRN	A/R	
26	611-510	WIRE, INS. STRANDED, 14 AWG, ORN	A/R	
27	611-511	WIRE, INS. STRANDED, 18 AWG, YEL	A/R	
28	611-512	WIRE, INS. STRANDED, 18 AWG, BLU	A/R	
29	611-024	CABLE, SHIELDED, WHT/RED	A/R	
30	611-055	CABLE, SHIELDED, WHT/YEL	A/R	
31	611-933	CABLE, SHIELDED, WHT/GRN	A/R	
32	616-415	CABLE, SHIELDED, TWISTED PAIR	A/R	
33	CD669	WIRE, INS. STRANDED, 16 AWG	A/R	
34	ED669	WIRE, INS. ST ENDED, 18 AWG	A/R	
35	ED669	WIRE, INS. STRANDED, 20 AWG	A/R	
36	ED669	WIRE, INS. STRANDED, 22 AWG	A/R	
37	ED668	WIRE, INS. STRANDED, 22 AWG	A/R	

Sheet 1 of 1

4050708—  
Tape Transport Harness Assembly

Next Assy: 4020360

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER	
				-01	-02
1					
2					
3	405013-05	BIAS PWA			
4	405013-01	RECORD PWA			
5	405013-08	REPRODUCE PWA			
6	405009-03	PRINTED WIRING ASSY. AUDIO SWITCHING			
7					
8					
9	405071-01	HARNES. HEAD AND INPUT CABLING			
10					
11					
12					
13					
14					
15					
16					
17	432023-01	GUIDE, P.C. BOARD, VERTICAL			
18					
19					
20					
21					
22	4580100-01	INPUT TRANSFORMER			
23	455017-0A	CAPACITOR, ALUM. ELECT. 1500 UFD, 50VDC	C1		
24	4840327	INTERCONNECT DIAGRAM, ELECTRONICS ASSY			
25	4940357	SCHEMATIC, ELECTRONICS			
26	063-091	CLAMP, CAPACITOR			
27					
28					
29	070-019	FUSE, 125V, 2 AMP, S10-B10			
30	085-001	FUSE, HOLDER			
31					
32	139-211	CONNECTOR, BODY, RECT F. IUC. 12 CONTACTS			
33	150-023	ELECTRON TUBE SOCKET, OCTAL			
34					
35	165-093	CONNECTOR, BODY, RECT. 9 PIN			
36	165-146	CONNECTOR, BODY, RECT RECP. 15 CONTACTS			
37	166-154	CONNECTOR, BODY, RECT PLUG. 15 PIN			

Sheet 1 of 2

4020371C  
Electronics Assembly

Next Assy: 4010210

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER	
				-01	-02
38	164-862	CONNECTOR, BODY, RECT PLUG. 35 PIN			
39	164-867	CONNECTOR, BODY, RECT 18 SOCKET			
40	169-083	CONNECTOR, BODY, RECT. 20 SOCKET			
41					
42					
43	230-099	KNOB			
44	251-019	BUTTON, PLUG			
45	471-066	SCREW, PAN HD XREC. 4-40 X 3/4 L2			
46	471-064	SCREW, PAN HD, XREC 4-40 X 1/2 LG			
47	501-008	WASHER, PLAIN F/A			
48	502-002	LOCK WASHER, SPRING F/A			
49	495-00A	MUT. KEYS F/A			
50	530-159	GUIDE, P.C. BOARD, EDGE			
51	530-164	GUIDE, P.C. BOARD, EDGE			
52					
53	041-406	RESISTOR, COMP. 22K OHMS. 1/2W, 5%	R1,2,3,4		
54					
55	405061-02	HARNES ELECT. CHASSIS			
56	430007-02	PANEL REAR, ELECT			
57	430008-02	PANEL TOP, ELECT			
58	430012-02	CHASSIS, ELECT			
59	430019-01	TRANSFORMER, OUTPUT			
60					
61	031-126	CAPACITOR, ALUM. 250 UFD, 50VDC			
62	063-191	CAPACITOR, QUAD. ALUM. 500 UFD, 50VDC	C2		
63	180-039	TERMINAL STRIP			
64					
65	421050-03	SHAFT, EXTENDER			
66	421050-04	SHAFT, EXTENDER			
67	421012-01	CG-L.I.C			
68	265-065	CUSHING, SNAP, NYLON, BLK			

4020371C

Sheet 2 of 2

ITEM NO.	PART NUMBER	D	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER				
					-01	-02	-03	-04	-05
1	4500104-01	D	PRINTED WIRING BOARD, BIAS AMPLIFIER						
2	4500972-01	C	BRACKET, BIAS EQUALIZATION						
3	4110219-01	B	LABEL, BIAS MODULE						
4	4330211-01	C	FRONT PLATE, BIAS MODULE	044					
5	4500104-01	C	POT, BIAS CALIBRATE 750 OHMS	060					
6	4500104-20	B	POT, BIAS ADJUST 15K OHMS	073, 5					
7	4500103-01	C	COIL, OSCILLATOR						
8									
9	417-508		WIRE, #24 GA, BUNCH TYPED, BROWN	A/A					
10	417-509		WIRE, #24 GA, BUNCH TYPED, RED	A/A					
11	417-510		WIRE, #24 GA, BUNCH TYPED, ORANGE	A/A					
12	417-511		WIRE, #24 GA, BUNCH TYPED, YELLOW	A/A					
13	417-512		WIRE, #24 GA, BUNCH TYPED, GREEN	A/A					
14	417-513		WIRE, #24 GA, BUNCH TYPED, BLUE	A/A					
15	034-491		CAPACITOR, MICA, .00167, 500V, 5%	C39					
16									
17									
18	816-319		TRANSISTOR, 2N2102	Q14, 17					
19	816-553		TRANSISTOR, 6N6	Q18, 19					
20	911-190		CAPACITOR, ELEC, 500PF, 50V	C44					
21	034-275		CAPACITOR, MICA, 500PF, 500V, 5%	C41					
22	034-280		CAPACITOR, MICA, 5000 PFD, 100V, 5%	C45					
23									
24	041-031		RESISTOR, FIXED, 1 RES OHM, 1/2W, 10%	R60, 61					
25	041-033		RESISTOR, COMP, 22 OHMS, 1/2W, 10%	R67					
26	041-345		RESISTOR, COMP, 51 OHMS, 1/2W, 5%	R63					
27	041-352		RESISTOR, FIXED, 1.4K OHMS, 1/2W, 5%	R66					
28	041-475		RESISTOR, COMP, 3K OHMS, 1/2W, 5%	R64, 85					
29	041-519		RESISTOR, FIXED, 20K OHMS, 1/2W, 5%	R68, 89					
30	055-106		CAPACITOR, MTLAB, 100PF, 100V, 10%	C41, 51					
31	055-017		RESISTOR, V.V, 180 OHMS, 5W, 5%	R82					
32	250-131		TRANSISTOR, PNP, 200 BIA,						
33	475-006		SCREW, #4-40 x 1/2 LB, 50%						
34	504-046		NUT, HEX 1/4-28						
35	504-078		POT, HEX 3/8-32						
36	501-008		WASHER, FLAT, 1/4"						
37	502-028								

Sheet 1 of 3

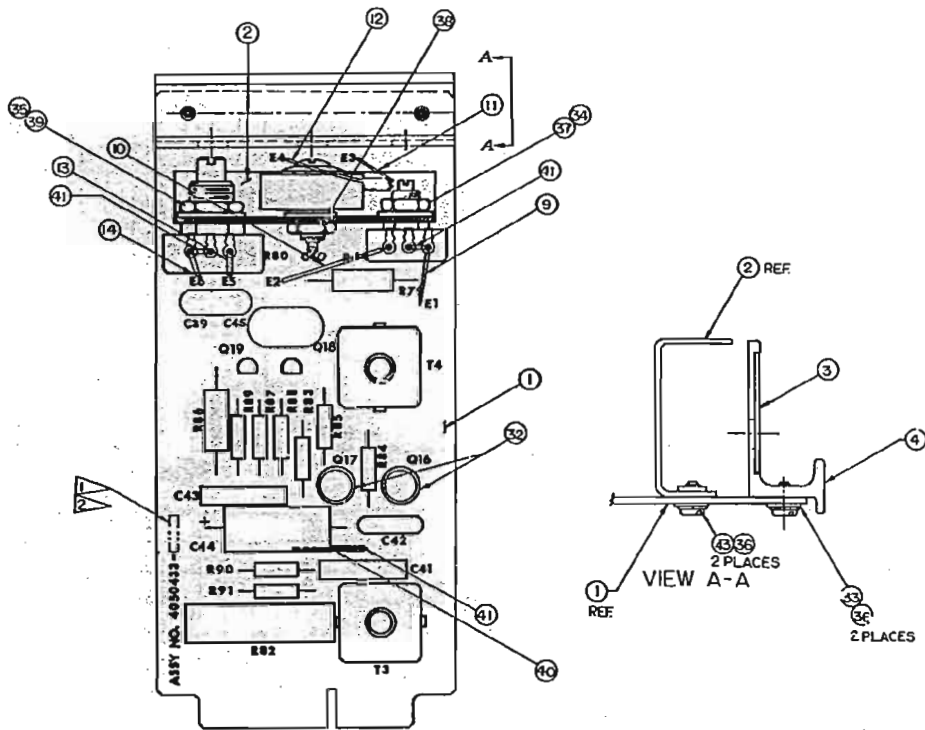
4050433H  
Bias Amplifier PWA

Next Assy: 4020371

ITEM NO.	PART NUMBER	D	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER				
					-01	-02	-03	-04	-05
38	502-559		WASHER, FLAT, INT TOOTH #12						
39	502-083		WASHER, FLAT, INT TOOTH #18						
40	502-016		TUBING, TIFCON	A/R					
41	615-002		WIRE, BARE, SOLID #22 AWG	A/R					
42	034-928		CAPACITOR, MICA, 520 PF, 500V, 5%	C19					
43	475-007		SCREW, #4-40 x 5/16 LB, PAN HD, 50%						
44	034-911		CAPACITOR, VARIABLE, 1-500 - 3,055 PF, 350V, C40						
45									
46									
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51									
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80	4050169	D	SCHEMATIC	REF 457					
81									

4050433H

Sheet 2 of 3



NOTES:

- 1. ASSY NUMBER TO BE 4050433-XX
- 2. MARK PART NO PER BCI-1.

**4050433H**  
**Bias Amplifier PWA**

Sheet 3 of 3

Next Assy: 4020371

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQD PER DASH NUMBER
1	4000107-01	PRINTED WIRING BOARD		
2	4110062-01	FRONT PLATE, RECORD MODULE		
3	4000000-01	TRANSISTOR, SILICON, CD552		
4	4000000-01	TRANSISTOR, SILICON, CD552		
5	01-146	CAPACITOR, ELECT. (10UF, 25V)	CS2	1
6	01-146	CAPACITOR, TANT. (15UF, 15V, 20%)	CS2	1
7	01-146	CAPACITOR, TANT. (5UF, 5V, 10%)	CS2	3
8	01-146	CAPACITOR, TANT. (.68UF, 25V, 5%)	CS2, 37	2
9	01-106	CAPACITOR, MYLAR (.1UF, 100V, 10%)	CSA, 30	2
10	01-012	RESISTOR, FIXED (6.3K OHMS, 1/2W, 5%)	RS5, 61	2
11	01-012	RESISTOR, FIXED (10K OHMS, 1/2W, 5%)	RS1, 52	2
12	01-018	RESISTOR, FIXED (100 OHMS, 1/2W, 10%)	RS2, 72	2
13	01-094	RESISTOR, FIXED (3.3K OHMS, 1/2W, 10%)	RS6	1
14	01-060	RESISTOR, FIXED (10K OHMS, 1/2W, 10%)	RS5, 60	2
15	01-064	RESISTOR, FIXED (22K OHMS, 1/2W, 10%)	RS4, 63	2
16	01-067	RESISTOR, FIXED (3.3K OHMS, 1/2W, 10%)	RS3, 58	2
17	01-068	RESISTOR, FIXED (5.1K OHMS, 1/2W, 10%)	RS4	1
18	01-069	RESISTOR, FIXED (6.8K OHMS, 1/2W, 10%)	RS5	1
19	01-070	RESISTOR, FIXED (8.2K OHMS, 1/2W, 10%)	RS2	1
20	01-072	RESISTOR, FIXED (100K OHMS, 1/2W, 10%)	RS7, 64	2
21	01-078	RESISTOR, FIXED (3.3K OHMS, 1/2W, 10%)	RS6	1
22	01-080	RESISTOR, FIXED (5.1K OHMS, 1/2W, 10%)	RS7	1
23	01-082	RESISTOR, FIXED (6.8K OHMS, 1/2W, 10%)	RS0	1
24	01-261	RESISTOR, FIXED (150 OHMS, 1/2W, 10%)	RS1	1
25	01-161	RESISTOR, FIXED (7.5K OHMS, 1/2W, 5%)	RS4, 59	2
26	01-177	RESISTOR, FIXED (1.5K OHMS, 1/2W, 5%)	RS7	1
27	01-098	RESISTOR, FIXED (1.1K OHMS, 1/2W, 5%)	RS8	1
28	4000000-01	TRANSISTOR, SILICON, CD552		
29	280-131	TRANSISTOR, PNP		2
30	472-006	SCREW, 280, PAN HD, (6-40 X 1/4)		2
31	501-008	WASHER, FLAT #4		2
32	4000000-01	CONNECTOR, ASSY, 10 PIN		1
33	4000000-01	CONNECTOR		1
34	4110070-01	LABEL, RECORD MODULE		1
35	01-178	TRANSISTOR, SILICON, CD552	Q13	1
36	01-178	TRANSISTOR, SILICON, CD513	Q15	1
37	01-177	TRANSISTOR, SILICON, CD58	Q14	1

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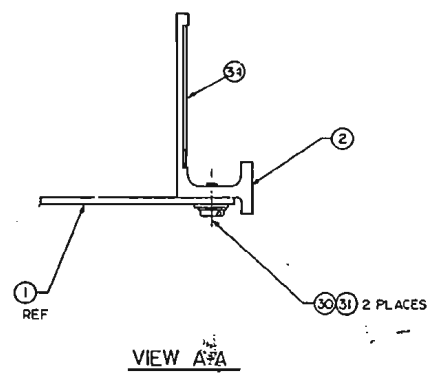
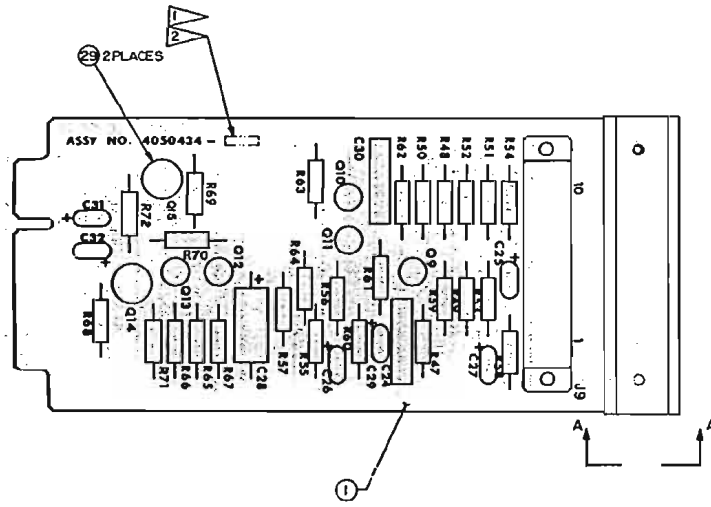
4050434G  
Record Amplifier PWA

Next Assy: 4020371

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQD PER DASH NUMBER
38	01-146	TRANSISTOR, SILICON, CD552	Q12	1

4050434G

Sheet 2 of 3



NOTES:

- 1 ASSEMBLY NUMBER TO BE 4050434-01
- 2 INK STAMP DASH NUMBER PER *201-1*

**4050434G**  
**Record Amplifier PWA**

Sheet 3 of 3

Next Assy: 4020371

ITEM NO.	PART NUMBER	QTY	REQ	PER	DASH	NUMBER	REF	DESC	DESCRIPTION	REF	DESC	QTY	REQ	PER	DASH	NUMBER
1	500108-02	1	1	1	1	1			PRINTED WIRE BOARD - REPRODUCE AMPLIFIER							
2	501210-02	1	1	1	1	1			CONNECTION ASSY. IO CONTACT							
3	511971-01	1	1	1	1	1			LABEL - REPRODUCE MODULE							
4	511263-01	1	1	1	1	1			FRONT PLATE, REPRODUCE MODULE							
5	500199-01	1	1	1	1	1			TRANSFORMER INPUT							
6	513-559	1	1	1	1	1			DIODE							
7	014-247	1	1	1	1	1			TRANSISTOR, NPN, CD18							
8	014-523	1	1	1	1	1			TRANSISTOR, CD54							
9	014-704	1	1	1	1	1			TRANSISTOR, CD562							
10	014-508	1	1	1	1	1			TRANSISTOR, NPN, CD562							
11	014-706	1	1	1	1	1			HEAT SINK, TRANSISTOR							
12	014-723	1	1	1	1	1			TRANSISTOR, 2N4037							
13	014-329	1	1	1	1	1			TRANSISTOR, 2N102							
14	031-187	1	1	1	1	1			CAPACITOR, ELEC. (50MFD, 50V)							
15	031-190	1	1	1	1	1			CAPACITOR, ELEC. (50MFD, 50V)							
16	034-181	1	1	1	1	1			CAPACITOR, NICA (57MFD, 500V, 5%)							
17	037-524	1	1	1	1	1			CAPACITOR, TANT. (1.5MFD, 35V, 20%)							
18	037-446	1	1	1	1	1			CAPACITOR, TANT. (15MFD, 15V, 20%)							
19	037-494	1	1	1	1	1			CAPACITOR, TANT. (5MFD, 4V, 20%)							
20	041-012	1	1	1	1	1			RESISTOR, COMP. (4.7K OHMS, 1/2W, 5%)							
21	041-533	1	1	1	1	1			RESISTOR, FIXED (24 OHMS, 1/2W, 5%)							
22	041-573	1	1	1	1	1			RESISTOR, FIXED (370 OHMS, 1/2W, 5%)							
23	041-045	1	1	1	1	1			RESISTOR, FIXED (680 OHMS, 1/2W, 10%)							
24	041-048	1	1	1	1	1			RESISTOR, FIXED (1K OHMS, 1/2W, 10%)							
25	041-019	1	1	1	1	1			RESISTOR, FIXED (2.0 K OHMS, 1/2W, 5%)							
26	041-054	1	1	1	1	1			RESISTOR, FIXED (5.1 K OHMS, 1/2W, 10%)							
27	041-056	1	1	1	1	1			RESISTOR, FIXED (4.7 K OHMS, 1/2W, 10%)							
28	041-058	1	1	1	1	1			RESISTOR, FIXED (6.8 K OHMS, 1/2W, 10%)							
29	041-061	1	1	1	1	1			RESISTOR, FIXED (12 K OHMS, 1/2W, 10%)							
30	041-062	1	1	1	1	1			RESISTOR, FIXED (15 K OHMS, 1/2W, 10%)							
31	041-067	1	1	1	1	1			RESISTOR, FIXED (49 K OHMS, 1/2W, 10%)							
32	041-069	1	1	1	1	1			RESISTOR, FIXED (1.6 K OHMS, 1/2W, 10%)							
33	041-072	1	1	1	1	1			RESISTOR, FIXED (100 K OHMS, 1/2W, 10%)							
34	041-076	1	1	1	1	1			RESISTOR, FIXED (220 K OHMS, 1/2W, 10%)							
35	041-075	1	1	1	1	1			RESISTOR, FIXED (180K OHMS, 1/2W, 10%)							
36	041-080	1	1	1	1	1			RESISTOR, FIXED (470K OHMS, 1/2W, 10%)							
37	041-081	1	1	1	1	1			RESISTOR, FIXED (660K OHMS, 1/2W, 10%)							

4050435U

Reproduce Amplifier PWA

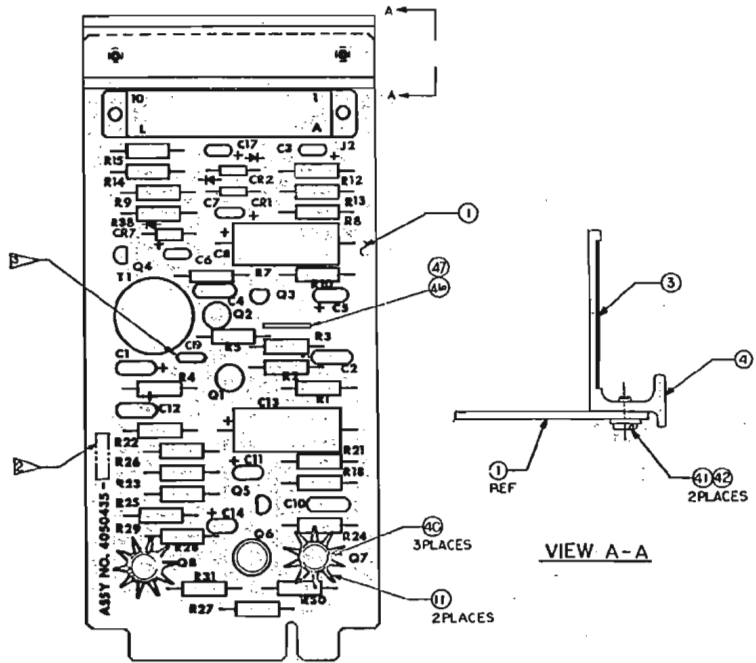
Sheet 1 of 3

Next Assy: 4020371

ITEM NO.	PART NUMBER	QTY	REQ	PER	DASH	NUMBER	REF	DESC	DESCRIPTION	REF	DESC	QTY	REQ	PER	DASH	NUMBER
38	041-004	1	1	1	1	1			RESISTOR, COP (510 OHMS, 1/2W, 5%)							
39	500-135	1	1	1	1	1			TRANSISTOR, 2N4104							
40	280-180	1	1	1	1	1			TRANSISTOR, PNP (.200 DIA.)							
41	575-007	1	1	1	1	1			SCREW, #4-40 x 5/16, S&S, PAN HD							
42	501-008	1	1	1	1	1			WASHER, #4 FLAT							
43	031-180	1	1	1	1	1			CAPACITOR, NICA, 500V, 39PF, 5%							
44	014-698	1	1	1	1	1			TRANSISTOR, NPN, CD 562							
45	041-046	1	1	1	1	1			RESISTOR, 680 OHMS, 1/2W, 10%							
46	615-012	1	1	1	1	1			WIRE, SOLID, BARE, 20 AWG							
47	600-287	1	1	1	1	1			SLEEVING, TEFLON							
48		1	1	1	1	1										
49	280-130	1	1	1	1	1			HTC PNP TRANSISTOR							
50	4580044-01	1	1	1	1	1			TRANSFORMER INPUT							
51		1	1	1	1	1										
52		1	1	1	1	1										
53		1	1	1	1	1										
54		1	1	1	1	1										
55		1	1	1	1	1										
56		1	1	1	1	1										
57		1	1	1	1	1										
58		1	1	1	1	1										
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71		1	1	1	1	1										
72		1	1	1	1	1										
73		1	1	1	1	1										
74	4840259	1	1	1	1	1			SCHEMATIC							
75	4840214	1	1	1	1	1			SCHEMATIC							
76		1	1	1	1	1										
77		1	1	1	1	1										
78		1	1	1	1	1										
79	4840209	1	1	1	1	1			SCHEMATIC							
80	4952429	1	1	1	1	1			SCHEMATIC							
81	4840119	1	1	1	1	1			SCHEMATIC							
82		1	1	1	1	1										

4050435U

Sheet 2 of 3



NOTES:

1 PART NUMBER IS 4050435-XX.

▷ MARK DASH No. PER EBI-1.

▷ NOT USED ON -03.

**4050435U**  
**Reproduce Amplifier PWA**

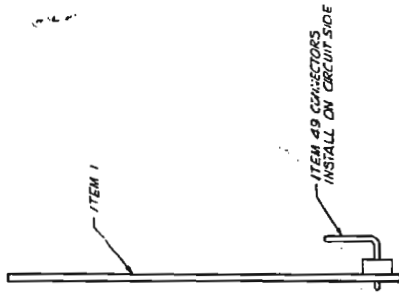
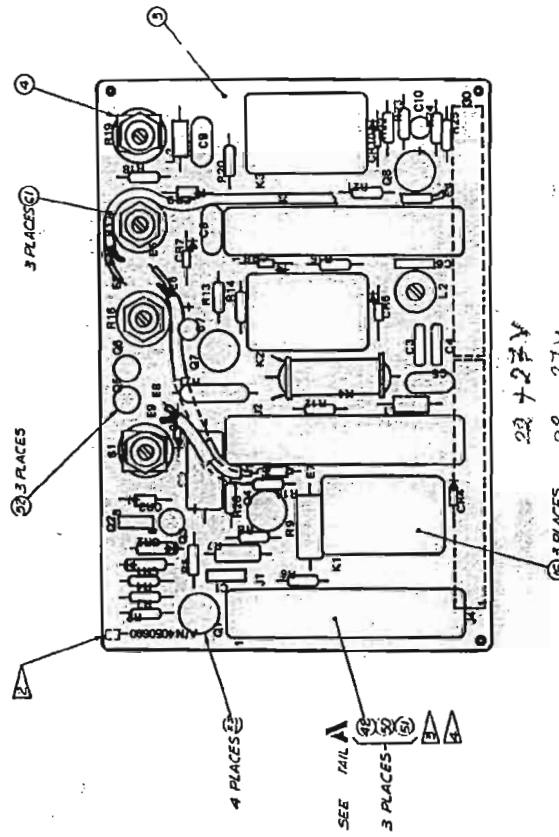
Sheet 3 of 3

Next Assy: 4020371



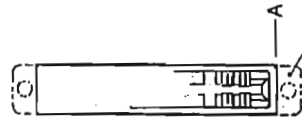
ITEM NO.	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER	
				-02	-03
38	051-360	INDUCTOR, FIXED A.7 MH	L1	1	
39	057-759	RESISTOR, METAL FILM, 3.57K OHMS, 1/4W, 1% R11	R11	1	
41	058-838	RESISTOR, VAR. CARBON, 10K OHMS, 1/2W, 10% R17,19	R17,19	2	
42	058-837	RESISTOR, VAR. CARBON, 100K OHMS, 1/2W, 10% R16	R16	1	
43					
44					
45	037-980	CAPACITOR, TANT. 10 UF, 50 VDC	CZ	1	
46					
47	122-465	SWITCH, ROTARY, 3P3T	S1	1	
48	139-512	CONNECTOR, PC RECP, 12 CONTACTS	J1,22,J3	3	
49	139-513	CONNECTOR, WAFER, RIGHT ANGLE	J4	2	
50	166-818	CONNECTOR, PMT., POLARIZING KEY		3	
51	225-304	TAPE, ADHESIVE, TEFLON	REF:J1,J2,J3	2	
52	280-130	MTE. PAD, TRANSISTOR (T0-18)	REF:Q2,5,6	3	
53	280-998	MTE. PAD, TRANSISTOR (T0-5)	REF:Q1,4,7,8	4	
54					
55					
56	540-055	INDUCTOR, 10 MH	L3	1	
57	541-133	INDUCTOR, VAR, 220 MH	L2	1	
58	580-394	TRANSISTOR, SILICON PNP, 2N5193	Q2	1	
59					
60					
61	613-055	CABLE, SHED, JACKETED, 1 COND, 25 AWG		2	

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER	
				-02	-03
1	4900314	SCHEMATIC	REF		
2	4900308-02	PWA AUDIO SWITCHING			
3	4260511-02	STRAP, POT SUPPORT			
4					
5					
6					
7	013-599	DIPDE, SILICON, SMALL SIGNAL, CD458	CR1,2,4,5, 6,7,8,10	8	
8	013-578	DIPDE, SILICON, LARGE SIGNAL, CD451	CR3,9	2	
9					
10	01A-247	TRANSISTOR, SILICON, NPN CD38	Q1,4	2	
11	01A-248	TRANSISTOR, SILICON, NPN CD37	Q5,6	2	
12	01A-364	TRANSISTOR, SILICON, PNP CD438	Q7,8	2	
13	01A-389	TRANSISTOR, SILICON, NPN CD441	Q3	1	
14					
15	020-623	RELAT. ARMATURE, A PDT FORM 0	R1,2,3	3	
16	020-754	SOCKET, RELAY WITH RETAINING SPRING		5	
17	020-932	RELAY, REED, SPST	R4	1	
18					
19	03A-213	CAPACITOR, MICA, 150 pF, 500V, 5% C8		1	
20	03A-240	CAPACITOR, MICA, 220 pF, 500V, 5% C5		1	
21	03A-935	CAPACITOR, MICA, 110 pF, 500V, 5% C9		1	
22	035-730	CAPACITOR, PTLAR, 4700 pF, 50V, 5% C6		1	
23	035-888	CAPACITOR, PTLAR, .022 UF, 50V, 5% C1,3,4		3	
24					
25	017-908	CAPACITOR, TANT. A.7 UF, .35V, 20% C7,10		2	
26					
27	041-011	RESISTOR, COMP, 4.7K OHMS, 1/2W, 5% R7		1	
28	041-102	RESISTOR, COMP, 1K OHMS, 1/4W, 5% R9		1	
29	041-405	RESISTOR, COMP, 22K OHMS, 1/4W, 5% R12		1	
30	041-408	RESISTOR, COMP, 10K OHMS, 1/4W, 5% R3,4,8		3	
31	041-394	RESISTOR, COMP, 100K OHMS, 1/4W, 5% R6,21,25		3	
32	041-411	RESISTOR, COMP, 47K OHMS, 1/4W, 5% R10		1	
33	041-437	RESISTOR, CO-UP, 1.4K OHMS, 1/4W, 5% R26		1	
34	041-518	RESISTOR, COMP, 33K OHMS, 1/4W, 5% R4,5,18		3	
35	041-561	RESISTOR, COMP, 5.1K OHMS, 1/4W, 5% R14,15,23,24		4	
36	041-570	RESISTOR, COMP, 2.4K OHMS, 1/4W, 5% R13,22		2	
37	041-636	RESISTOR, C-RE, 18K, 1/4W, 5% R20		1	



ITEM 49 CAPACITORS  
INSTALL ON CIRCUIT SIDE

COMPONENTS OMITTED  
FOR CLARITY



CUT OFF THIS PORTION  
TO FLUSH SURFACE A  
ON BOTH ENDS

DETAIL A

NOTES:

1. PART NO. IS 4050690-03
2. MARK DASH NO. PER BDI-1
3. PUT ITEM 31 IN BETWEEN ITEM 46 AND ITEM 1 PRIOR TO SOLDERING
4. CONNECTOR KEY POLARIZING
- U1 POLARIZE PIN # 5
- U2 POLARIZE PIN # 9
- U3 POLARIZE PIN # 3

Sheet 3 of 3

4050690A  
Audio Switching PWA

Next Assy: 4020371

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC.	QTY. REQ. PER DASH NUMBER
1	166-876	CONTACT, COMM. SPRING TYPE	J2	120
2	166-862	CONNECTOR, RECT., 36 PIN	J2	1
3	187-035	PIN, MALE MOLEX #1560	J2	83
4	187-037	SOCKET, FEMALE MOLEX #1561	J2	14
5	166-868	CONNECTOR HOUSING	PA-1,2,3,4	8
6	166-099	CONNECTOR, RECT., 5 PIN	J1	1
7	614-931	CABLE, SHIELDED 24 AWG, WHT/BRN		A/N
8	614-932	CABLE, SHIELDED 24 AWG, WHT/RED		A/N
9	614-933	CABLE, SHIELDED 24 AWG, WHT/GRN		A/N
10	614-934	CABLE, SHIELDED 24 AWG, WHT/YEL		A/N
11	614-935	CABLE, SHIELDED 24 AWG, WHT/GRN		A/N
12	614-936	CABLE, SHIELDED 24 AWG, WHT/ALU		A/N
13	614-937	CABLE, SHIELDED 24 AWG, WHT/Y10		A/N
14	614-938	CABLE, SHIELDED 24 AWG, WHT/RY		A/N
15	66-146	CONNECTOR, RECT., 15 PIN	J5	1
16	616-383	CABLE, TWISTED PAIR, BELSOM B451		A/N
17	616-303	CABLE, HEAD SHIELDED, MICRODOT 275-3533		A/N
18	179-511	CONNECTOR, RECT., 12 PIN	J4	1
19				
20	CD568	WIRE, STRANDED, 22 AWG		A/N
21	CD568	WIRE, STRANDED, 24 AWG		A/N

Sheet 1 of 1

4050691 -  
Electronics Chassis Harness

Next Assy: 4020371





ITEM NO.	PART NUMBER	DESCRIPTION	REF DESG	QTY REQD PER DASH NUMBER
1	405092-02	PRINTED WIRING ASSY, CAPSTAN SERVO	1 1	
2	405096-01	PRINTED WIRING ASSY, TRANSPORT CONTROL	1 1	
3	405095-01	PRINTED WIRING ASSY, EXTENDER CARD	1 1	
4	405094-01	PRINTED WIRING ASSY, TRANSPORT CONTROL	1 1	
5	401117-01	COVER ASSY, TRANSPORT CONTROL CHASSIS	1 1	
6	429096-02	CHASSIS, TRANSPORT CONTROL	1 1	
7	480318	WIRING DIAGRAM, TRANSPORT CONTROL CHASSIS	REF -	
8	480319	WIRING DIAGRAM, TRANSPORT CONTROL CHASSIS	REF -	
9				
10	143-804	CONNECTOR, P.C. DUAL, SR. PIN	J1-2, 4, 3	
11	146-257	CONNECTOR, 104 PLUG, MDC-104S	P1	
12	146-258	CONNECTOR, 104 SOC, MDC-104S	J4	
13	147-036	CONNECTOR, CLINCH-JONES, 4 PIN MALE	J3	
14				
15	166-864	CONNECTOR, MOLEX, PLUG, 36 PIN	J5	
16	166-863	CONNECTOR, MOLEX, RECEPT, 36 SOC	J6	
17	189-144	CONTACT, CONNECTOR, SOC, 22 AWG,	REF: J6, P1	140 108
18	189-318	REF, POLARIZING, P.C. CONN.	REF: J1, 2	2 2
19				
20	187-038	CONTACT, CONNECTOR, PIN	REF: J5	36 36
21	187-037	CONTACT, CONNECTOR, SOC	REF: J6-10	72 108
22	282-007	WASHING, FLANGED, .750 I.D.		1 1
23	471-066	SCREW, MACH, PAN HD XREC, 4-40 X 1/4 LG		6 6
24	471-067	SCREW, MACH, PAN HD XREC, 6-32 X 1/4 LG		4 4
25	495-005	NUT, KEPS, 6-32		2 2
26				
27	501-008	WASHER, FLAT #1		6 6
28	501-009	WASHER, FLAT #6		2 2
29	502-011	WASHER, LOCK, INT STAR, #1		6 6
30	502-015	WASHER, LOCK, INT STAR, #6		2 2
31				
32	530-159	GUIDE, P.C.		6 6
33	600-258	SLEEVING, PVC, HEAT SHRINKABLE, .750 I.D.	A/A N/A	
34	611-024	CABLE, SHIELDED, WHT/RED	A/A N/A	
35	611-040	CABLE, SHIELDED, WHT/GRN	A/A N/A	
36	611-055	CABLE, SHIELDED, WHT/TEL	A/A N/A	
37	614-933	CABLE, SHIELDED, WHT/GRN	A/A N/A	

4020373A

Transport Control Chassis

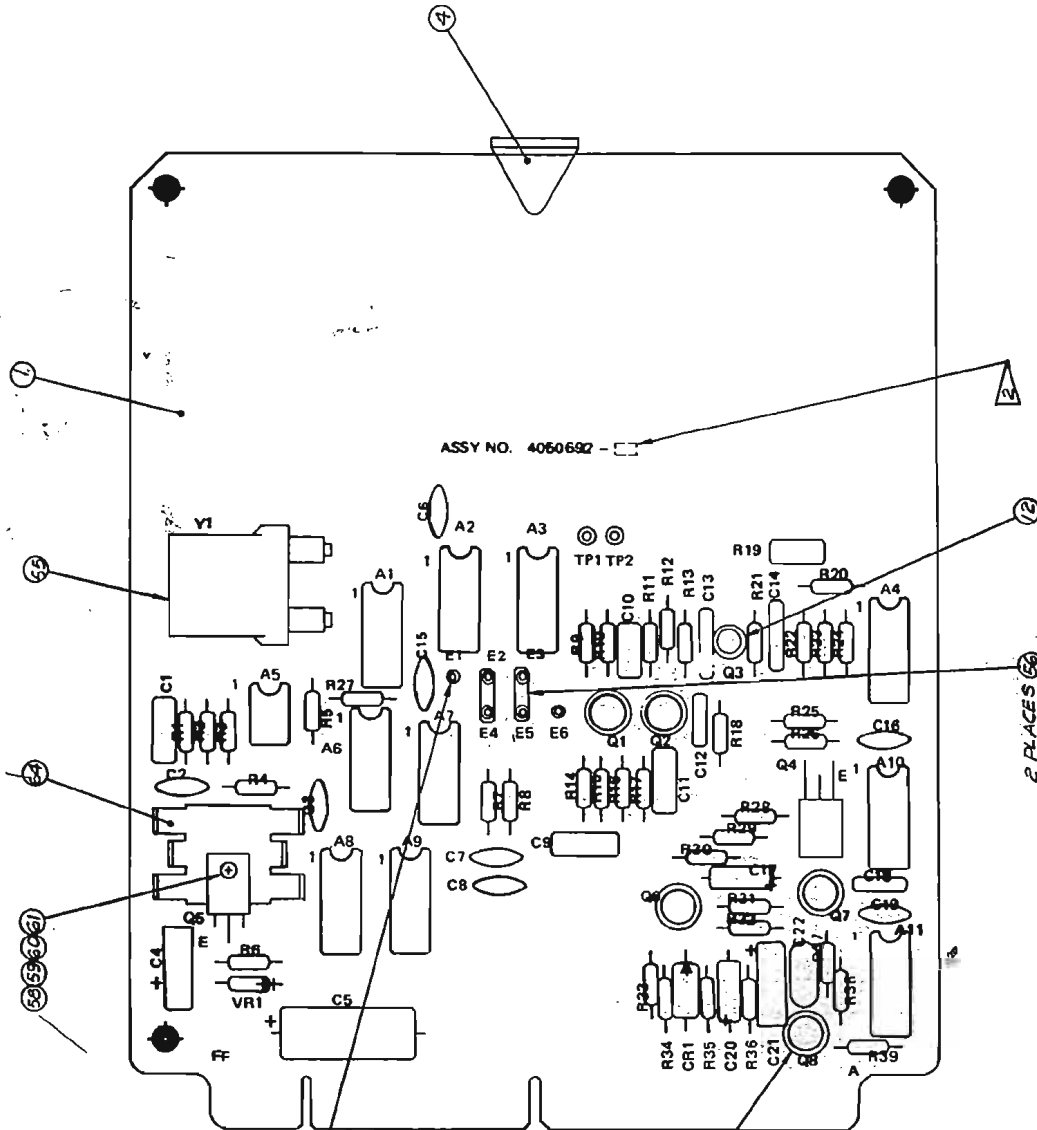
Next Assy: 4010210

Sheet 1 of 3

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESG	QTY REQD PER DASH NUMBER
38	616-115	CABLE, SHIELDED, TWISTED-PAIR	A/A N/A	
39	616-038	WIRE, BARE, SOLID, 20 AWG	A/A N/A	
40	6555	WIRE, INS., STRANDED, 22 AWG	A/A N/A	
41	6559	WIRE, INS., STRANDED, 20 AWG	A/A N/A	
42	6559	WIRE, INS., STRANDED, 18 AWG	A/A N/A	
43	6559	WIRE, INS., STRANDED, 16 AWG	A/A N/A	
44				
45				
46				
47				
48				
49				
50				
51				
52	429095-01	CONNECTOR PANEL, TRANSPORT CONTROL	1 1	

4020373A

Sheet 2 of 3



ASSY NO. 4060692 -

Sheet 3 of 3

4020373A  
Transport Control Chassis

Next Assy: 4010210

6 PLACES (5)

5 PLACES (1)

2 PLACES (6)  
SEE TABLE 1

TABLE 1

SPEED - STRIDING	
RANGE	HI - MED - LO
HI	E5 TO E3 E5 TO E4
LO	E2 TO E3 E2 TO E4 E2 TO E1

NOTES:  
1. PART NO. IS 4060692-02  
2. MARK DASH NO. PER 201-1

ITEM NO.	PART NUMBER	ID	DESCRIPTION	REF. DESC	QTY REQD PER DASH NUMBER	
1	450209-52		PRINTED CIRCUIT BOARD			
2	440155		SCHEMATIC	REF		
3						
4	450201		WASHER			
5						
6	011-578		DIBEL, 6051	60		
7	011-981		DIBEL, ZEMER, 4x, 5.8V, C033	WV		
8						
9	011-652		TRANSISTOR, PNP, 6054	00, 17		
10	011-698		TRANSISTOR, NPN, C0562	01, 2, 5, 6		
11	011-793		MTB, P42, TRANSISTOR	REF, 01, 2, 5, 7, 8		
12	280-130		MTB, P42, TRANSISTOR	REF, 03		
13	011-112		CRYSTAL, QUARTZ, PROBUCKS	Y1		
14						
15	010-007		CAPACITOR, CER, D100, 100V, 20K	C1, 3, 6, 8, 15, 14, 19		
16	010-417		CAPACITOR, KORG, 0.1uF, 25V	C1, 9		
17						
18	011-195		CAPACITOR, MYLAR, 0.0001uF, 50V, 5%	C18		
19						
20	011-283		CAPACITOR, NICA, 300V, 5%	C22		
21	011-288		CAPACITOR, MYLAR, 0.01uF, 50V, 5%	C11		
22	011-553		CAPACITOR, MYLAR, 0.05uF, 50V, 5%	C13		
23	011-893		CAPACITOR, MYLAR, 0.1uF, 50V, 5%	C14		
24						
25						
26	011-157		CAPACITOR, TANT, 2.2uF, 20V, 10%	Z17, 20		
27	011-680		CAPACITOR, TANT, 100uF, 20V, 10%	C5		
28	011-894		CAPACITOR, TANT, 100uF, 10V, 5%	C4, 21		
29	011-482		RESISTOR, COMP, 1200, 1/4W, 5%	R37		
30	011-666		RESISTOR, COMP, 2200, 1/4W, 5%	R16		
31	011-687		RESISTOR, COMP, 3.300, 1/4W, 5%	R7, 8, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		

Sheet 1 of 2

4050692B  
Capstan Servo PWA  
Next Assy: 4020373

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC	QTY REQD PER DASH NUMBER
38	041-483	RESISTOR, COMP, 2700, 1/4W, 5%	R35	1
39	041-495	RESISTOR, COMP, 8.200, 1/4W, 5%	R3	1
40	041-502	RESISTOR, COMP, 2400, 1/4W, 5%	R26	1
41	041-503	RESISTOR, COMP, 2700, 1/4W, 5%	R6	1
42	041-504	RESISTOR, COMP, 5100, 1/4W, 5%	R25	1
43	041-518	RESISTOR, COMP, 9.100, 1/4W, 5%	R20	1
44	041-530	RESISTOR, COMP, 1500, 1/4W, 5%	R29	1
45	041-554	RESISTOR, COMP, 1500, 1/4W, 5%	R36	1
46	041-594	RESISTOR, COMP, 10000, 1/4W, 5%	R33, 39	2
47	041-653	RESISTOR, COMP, 3900, 1/4W, 5%	R31	1
48	055-133	CAPACITOR, MYLAR, .0025uF, 50V, 5%	C10	1
49	055-168	CAPACITOR, MYLAR, .0050uF, 50V, 5%	C12	1
50	041-562	RESISTOR, COMP, 43K OHMS, 1/4W, 5%	R28	1
51	057-137	RESISTOR, METAL FILM, 5100, 1/4W, 5%	R12, 13, 15, 17, 21, 5	5
52	041-447	RESISTOR, 3300, 1/4W, 5%	R38	1
53	058-254	RESISTOR, 10K, 1/4W, 5%	R39	1
54	110-981	CONNECTOR, JACK	E1-6	6
55	150-106	MTB BRACKET, CRISTAL	REF, Y1	1
56	160-628	PLUG, SHORTING BLOCK, MILK		2
57				
58	071-062	SCREW, XREQ PAN HD, 4-40 X .375 L3		1
59	092-008	NUT, FLAIN, HEX, 4-40		1
60	091-008	WASHER, FLAT, #4		1
61	092-024	WASHER, LOCK #4		1
62				
63				
64	090-338	HEATSHIELD	REF, S5	1
65	090-395	TRANSISTOR, KPM, 2N5190	Q4, 5	2
66				
67				
68	094-153	INTERMATED CIRCUIT, PCB44F	A7	1
69	094-068	INTERMATED CIRCUIT, PCB41C	A4	1
70	094-083	INTERMATED CIRCUIT, PCB493H	A1	1
71	094-309	INTERMATED CIRCUIT, PCB4901	A10	1
72	094-045	INTERMATED CIRCUIT, PCB35P	A2, 3	2
73	094-098	INTERMATED CIRCUIT, PCB350	A4, 8, 9	3
74	097-066	INTERMATED CIRCUIT, 8 PIN, DUAL IN	A5, ...	1
75	097-080	INTERMATED CIRCUIT, PCB413J	A11	1

4050692B

Sheet 2 of 2



ITEM NO.	PART NUMBER	D	DESCRIPTION	REF. DISC.	QTY REQD PER DASH NUMBER
1	450000-02		PAINTED WIRING BOARD		
2	480015		SPHERICAL	REF	
3					
4	500001		WASHER		
5					
6	013-578		DIODE, CMAJ1		
7	013-581		DIODE, ZENER, 4V, 5.0V, 0.032		
8					
9	014-551		TRANSISTOR, PNP, CPE24		
10	014-552		TRANSISTOR, PNP, CPE24		
11	014-553		TRANSISTOR, PNP, CPE24		
12	014-554		TRANSISTOR, PNP, CPE24		
13	014-555		TRANSISTOR, PNP, CPE24		
14	014-556		TRANSISTOR, PNP, CPE24		
15	014-557		TRANSISTOR, PNP, CPE24		
16	014-558		TRANSISTOR, PNP, CPE24		
17	014-559		TRANSISTOR, PNP, CPE24		
18	014-560		TRANSISTOR, PNP, CPE24		
19	014-561		TRANSISTOR, PNP, CPE24		
20	014-562		TRANSISTOR, PNP, CPE24		
21	014-563		TRANSISTOR, PNP, CPE24		
22	014-564		TRANSISTOR, PNP, CPE24		
23	014-565		TRANSISTOR, PNP, CPE24		
24	014-566		TRANSISTOR, PNP, CPE24		
25	014-567		TRANSISTOR, PNP, CPE24		
26	014-568		TRANSISTOR, PNP, CPE24		
27	014-569		TRANSISTOR, PNP, CPE24		
28	014-570		TRANSISTOR, PNP, CPE24		
29	014-571		TRANSISTOR, PNP, CPE24		
30	014-572		TRANSISTOR, PNP, CPE24		
31	014-573		TRANSISTOR, PNP, CPE24		
32	014-574		TRANSISTOR, PNP, CPE24		
33	014-575		TRANSISTOR, PNP, CPE24		
34	014-576		TRANSISTOR, PNP, CPE24		
35	014-577		TRANSISTOR, PNP, CPE24		
36	014-578		TRANSISTOR, PNP, CPE24		
37	014-579		TRANSISTOR, PNP, CPE24		

Sheet 1 of 2

4050692B  
Capstan Servo PWA

Next Assy: 4020373

ITEM NO.	PART NUMBER	D	DESCRIPTION	REF. DISC.	QTY REQD PER DASH NUMBER
38	041-483		RESISTOR, 2700, 1/4W, 5%	R15	
39	041-495		RESISTOR, 8.2K, 1/4W, 5%	R3	
40	041-502		RESISTOR, 240, 1/4W, 5%	R26	
41	041-503		RESISTOR, 270, 1/4W, 5%	R6	
42	041-504		RESISTOR, 510, 1/4W, 5%	R25	
43	041-511		RESISTOR, 9.1K, 1/4W, 5%	R20	
44	041-530		RESISTOR, 15, 1/4W, 5%	R29	
45	041-504		RESISTOR, 270, 1/4W, 5%	R16	
46	041-504		RESISTOR, 270, 1/4W, 5%	R10, R39	
47	041-523		RESISTOR, 390, 1/4W, 5%	R11	
48	055-133		CAPACITOR, MYLAR, .0022UF, 50V, 5%	C10	
49	055-168		CAPACITOR, MYLAR, .0056UF, 50V, 5%	C12	
50	061-562		RESISTOR, 31K OHMS, 1/4W, 5%	R28	
51	077-137		RESISTOR, METAL FILM, 510K, 1/4W, 2%	R2, R3, R15, R17, R21	
52	081-427		RESISTOR, 330K, 1/4W, 5%	R18	
53	082-754		RESISTOR, VAR, CER MET, 100K, 1V, 20%	R19	
54	143-981		CONNECTOR, JACK	ET-6	
55	150-104		MTG BRACKET, CRYSTAL	REF: Y1	
56	166-428		PLUG, SHORTING BLOCK, BLK		
57					
58	471-042		SCRUB, XEC PAN NO. 4-40 X .375 L3		
59	495-008		MT, PLAIN, HEX, 4-40		
60	501-008		WASHER, FLAT, #4		
61	502-024		WASHER, LOCK #4		
62					
63					
64	500-332		HEATING	REF: Q5	
65	500-395		TRANSISTOR, PNP, 2N5150	Q6, Q5	
66					
67					
68	504-153		INTEGRATED CIRCUIT, MC846P	A7	
69	504-168		INTEGRATED CIRCUIT, UA741C	A4	
70	504-183		INTEGRATED CIRCUIT, SN7403N	A1	
71	504-309		INTEGRATED CIRCUIT, UA4861	A10	
72	504-425		INTEGRATED CIRCUIT, MC853P	A2, A3	
73	504-698		INTEGRATED CIRCUIT, UA60950	A6, B, D	
74	507-066		INTEGRATED CIRCUIT, 6 PIN, LM311N	A5...	
75	508-680		INTEGRATED CIRCUIT, SN7413J	A11	

4050692B

Sheet 2 of 2

ITEM NO.	PART NUMBER	DESCRIPTION	QTY REQD PER DASH NUMBER		REF DESC
			-01		
1	450020-01	PRINTED WIRING BOARD			
2	52528-01	HANDLE, SWAP ON	1		
3					
4	4820345	SCHEMATIC	REF		
5	013-983	DIODE, ZENER, 5.6V, CD32			
6	013-999	DIODE, SILICON CD508	CR1-23		
7	014-847	TRANSISTOR, NPN, CD38	Q1-14, 20, 21		
8	070-077	CAPACITOR, CER, .01UF, 100V	C2-4, 9, 11		
9	070-077	CAPACITOR, CER, 0.1UF, 25V, 480-505	C10, 13, 14, 18, 20, 21		
10	031-891	CAPACITOR, ELECT, 0.1UF, 50V, 505	C5		
11	077-109	CAPACITOR, TANT, 10UF, 20V	C15, 16		
12	077-287	CAPACITOR, TANT, 2.2UF, 20V	C19		
13	077-489	CAPACITOR, TANT, 33UF, 25V	C22, 23		
14	077-778	CAPACITOR, TANT, 27UF, 20V	C12		
15	077-794	CAPACITOR, TANT, 47UF, 20V	C17		
16	077-790	CAPACITOR, TANT, 68UF, 20V	C1		
17	041-536	RESISTOR, COMP, 4700, 1/2W, 5%	R12, 13		
18	041-594	RESISTOR, COMP, 3300, 1/4W, 5%	R20, 20		
19	041-609	RESISTOR, COMP, 15K, 1/4W, 5%	R10, 24, 26, 31-34		
20					
21	041-449	RESISTOR, COMP, 250K, 1/4W, 5%	R21, 35, 40		
22	041-487	RESISTOR, COMP, 27K, 1/4W, 5%	R5, A1		
23	041-501	RESISTOR, COMP, 3300, 1W, 5%	R17		
24	041-551	RESISTOR, COMP, 5.1K, 1/4W, 5%	R16		
25	041-746	RESISTOR, COMP, 500K, 1/4W, 5%	R27, 28		
26	041-772	RESISTOR, COMP, 1.5 MEG O, 1/4W, 5%	R23		
27	041-782	RESISTOR, COMP, 3.3 MEG O, 1/4W, 5%	R10, 17		
28	041-408	RESISTOR, COMP, 4700, 1/4W, 5%	R10		
29	055-146	CAPACITOR, MYLAR, .001UF, 50V	C7		
30					
31	058-662	RESISTOR, VAR, 500, 1/2" .80%	R5-8		
32	058-662	RESISTOR, VAR, 1000, 1W, 10%	R1-4		
33	058-655	RESISTOR, VAR, 1.0 MEG, 1/2W, 20%	R9		
34					
35	280-998	RTG PAD, TMB, 1000 (T05)	REF: Q1-16, 20, 21, 33, 26, 18		
36	580-464	TRANSISTOR, SILICON, PNP, NFE 1000	Q22, 25		
37	580-467	TRANSISTOR, SILICON, NPN, NFE 1100	Q10-18		

Sheet 1 of 3

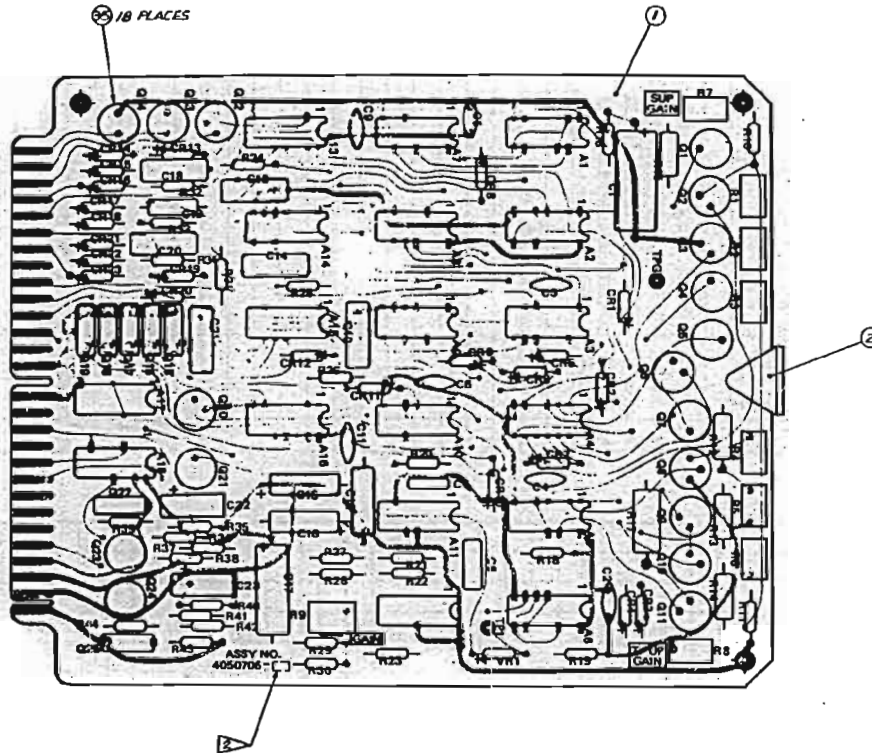
4050706-  
Transport Control PWA

Next Assy: 4020373

ITEM NO.	PART NUMBER	DESCRIPTION	QTY REQD PER DASH NUMBER		REF DESC
			-01		
38	586-268	INTEGRATED CIRCUIT, U17A1			
39	597-101	INTEGRATED CIRCUIT, MC680	A4, 5, 13, 16		
40	597-101	INTEGRATED CIRCUIT, MC661	A2, 9, 14		
41	597-102	INTEGRATED CIRCUIT, MC668	A1, 3, 6-8, 10, 15, 17		
42	586-792	INTEGRATED CIRCUIT, MC665	A1, 8		
43					
44	041-560	RESISTOR, COMP, 2K OHMS, 1/4W, 5%	R11, 18, 43		
45	041-518	RESISTOR, COMP, 200 OHMS, 1/2W, 5%	R14, 15		
46	041-408	RESISTOR, COMP, 100 OHMS, 1/4W, 5%	R19, 29, 44		
47	041-518	RESISTOR, COMP, 33K OHMS, 1/4W, 5%	R22		
48	041-413	RESISTOR, COMP, 5.8K OHMS, 1/4W, 5%	R32, 42		
49					
50	014-678	TRANSISTOR, NPN, CD511	Q23, 24		

4050706-

Sheet 2 of 3



NOTES:

1. PART NO. IS 4050706-01.
- ▲ MARK DASH NO. PER BDI-1.

4050706—  
Transport Control PWA

Sheet 3 of 3

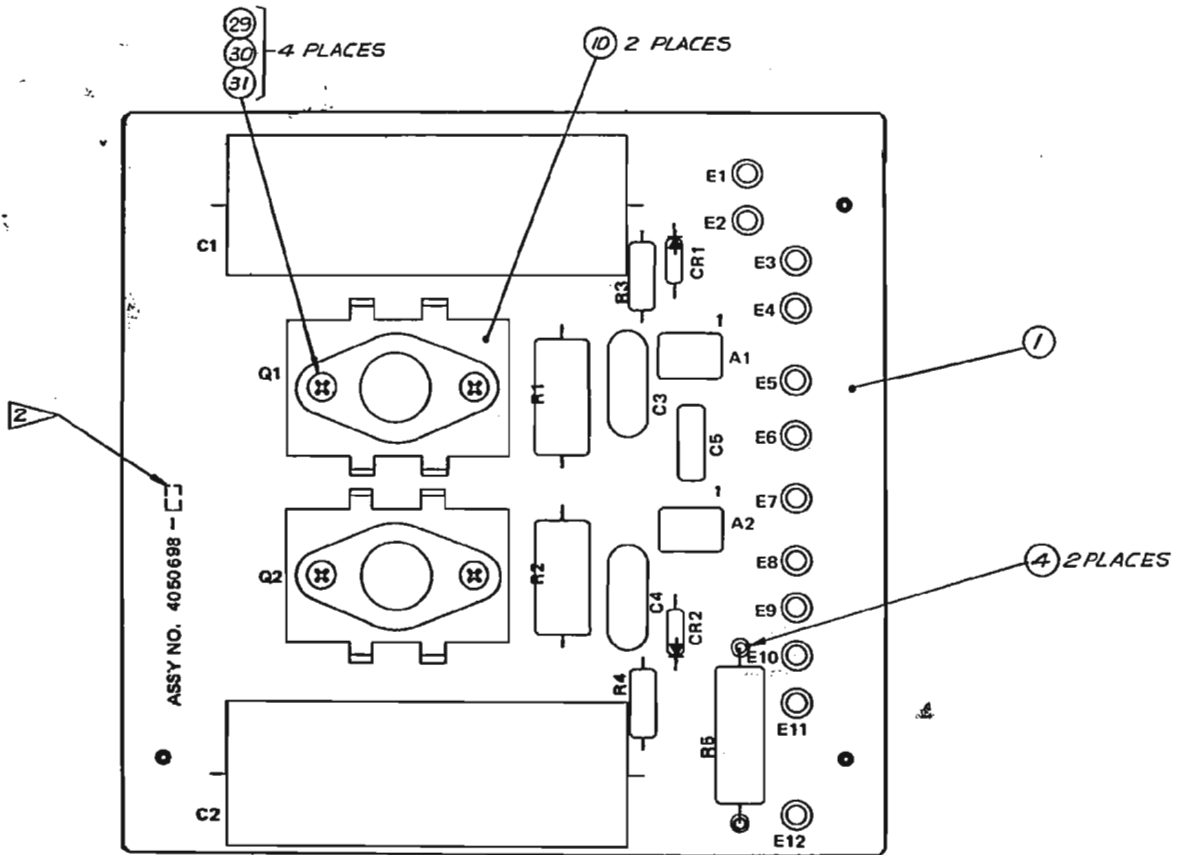
Next Assy: 4020373

REF. PART NUMBER	DESCRIPTION	REF. DESK	QTY REQD PER DASH NUMBER
4050098-01	PRINTED WIRING ASSY, MOTOR DRIVE ASSEMBLY	1	
4290082-01	CHASSIS, MOTOR DRIVE ASSEMBLY	1	
4290083-01	COVER, MDA CHASSIS	1	
4290094-01	HEATING, POWER TRANSISTOR	5	
4800336	SCHEMATIC, MOTOR DRIVE ASSEMBLY	REF	
011-614	TRANSISTOR, POWER, MPN C0461	05	1
020-417	CAPACITOR, .1 UF, 150 V, 20%	66.7	2
150-142	TRANSISTOR, MTR. RIT		5
147-007	CONNECTOR, MALE CHASSIS MTC., 15 PIN		1
171-021	TERMINAL, QUICK-DISCONNECT 16-IN AWG, FEMALE		8
043-556	RESISTOR, V.V. PWR., 1 OHM, 5W, 3%	MC-9	4
280-014	DIODE		1
471-062	SCREW, MACH, PAN HD, XREC 4-40 X 1/8 LG		6
471-060	SCREW, MACH, PAN HD, XREC, 4-40 X 1/4 LG		4
471-048	SCREW, MACH, PAN HD, XREC, 6-32 X 5/16 LG		14
471-077	SCREW, MACH, PAN HD, XREC, 8-32 X 5/16 LG		4
471-081	SCREW, MACH, PAN HD, XREC, 8-32 X 5/8 LG		2
496-004	NUT, REPS, 4-40		6
496-005	NUT, REPS, 6-32		2
501-008	WASHER, PLAIN #4		4
501-009	WASHER, PLAIN #6		12
501-010	WASHER, PLAIN #8		5
502-002	LOCK WASHER, SPRING #4		4
502-003	LOCK WASHER, SPRING #6		12
502-004	LOCK WASHER, SPRING #8		5
500-533	TRANSISTOR, POWER NPN	03-4, 6, 7	4
581-095	DIODE BRIDGE ASSY, C0665-200	CP3, 4	2
CD568	WIRE, 18#, STRANDED, 20 AWG		4/R
CD568	WIRE, 18#, STRANDED, 16 AWG		4/R
615-019	WIRE #18 AWG SOLID, BARE		4/R

Sheet 1 of 1

4020374—  
Motor Drive Amplifier Assembly

Next Assy: 4010210



NOTES:

1. PART NO. IS 4050698-01.

Z MARK DASH NO. PER BDI -1.

4050698—  
Motor Drive Amplifier PWA

Sheet 2 of 2

Next Assy: 4020374

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQD PER DASH NUMBER
1	492097-01	PANEL, FAN	1	1
2				
3	391-093	FAN ROTARY WHISPER	3	
4				
5	591-207	QUAD FAN	3	
6				
7	180-988	STRIP TERN	1	
8				
9				
10				
11	471-071	SCREW, PPH, 6-32 X .500	4	
12	571-072	SCREW, PPH, 6-32 X .625	12	
13				
14				
15	496-005	NUT, KEYS #6	12	
16				
17	501-009	WASHER, FLAT #6	28	
18	492-034	NUT, HEX 6-32, SMALL PATTERN	4	
19	501-188	WASHER, FLAT #6 SMALL PATTERN	4	
20	502-003	WASHER, LOCK, SPRING #6	4	

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQD PER DASH NUMBER
1	590597-01	MOTOR, FAN		
2				
3	591-035	FAN MOTOR WHISPER		
4				
5	591-507	QUAD FAN		
6				
7	189-308	STRIP TERM		
8				
9				
10				
11	471-071	SCREW, PPH, 6-32 X .500		
12	571-072	SCREW, PPH, 6-32 X .625		
13				
14				
15	596-005	NUT, 3/8" X 1/4"		
16				
17	501-009	WASHER, FLAT #4		
18	595-D34	NUT, HEX 6-32, SMALL PATTERN		
19	501-188	WASHER, FLAT #6 SMALL PATTERN		
20	502-003	WASHER, LOCK, SPRING #5		

4020379-  
Fan Assembly

Sheet 1 of 1

Next Assy: 4010210

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESC.	QTY REQD PER DASH NUMBER
1	419099-01	FRAME IDENTIFICATION	1	
2				
3	429095-01	PANEL, BOTTOM	1	
4	426095-01	ANGLE, MOUNTING, REAR	1	
5	429081-01	PANEL, CONNECTOR	1	
6	430381-01	PLATE, DOOR HINGE	2	
7	4110021-01	CATCH	2	
8				
9	4260511-01	BRACKET, DOOR HINGE	1	
10	4260511-02	BRACKET, DOOR HINGE	1	
11	470-016	SCREW CAP, HEX SOC. RD., 10-32 X 3/8	6	
12				
13	446-005	NUT, KEPS 6-32	8	
14	491-007	NUT, KEPS, 10-32	6	
15	491-009	NUT, KEPS, 1/2-20	16	
16				
17	497-190	NUT, SPRING, #10-32	44	
18				
19	501-011	WASHER, #10	6	
20	501-012	WASHER, 1/4-20	32	
21				
22				
23	082-050	CASTER, SWIVEL	4	
24				
25				
26				
27	422-016	BEARING, NYLON	2	
28	480-096	SCREW, BOLT, 1/4-40 X 3/4 LG, HEX HD	16	
29				
30				
31				
32				
33				
34	280-751	SPACER CONNECTOR, PANEL	2	
35	471-093	SCREW, PAN HD, X REC., 10-32 X 1" LG	2	
36	495-007	NUT, KEPS	2	
37	501-011	WASHER	4	

4020383A

Frame Assembly

Next Assy: 4010210



ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESCR.	QTY REQD PER DASH NUMBER
			-01 -02	
1	4290891-01	HEATING, TRANSISTOR		2
2				2
3	4050699-03	PWA, 35V REGULATOR		1
4	4050699-04	PWA, 15/27V REGULATOR		1
5	4290819-01	CHASSIS, POWER SUPPLY		1
6	4580211-01	TRANSFORMER, POWER	T1	1
7	4840199	SCHEMATIC, 35V POWER SUPPLY	REF	
8	4840142	SCHEMATIC, 15/27V POWER SUPPLY	REF	
9	4290891-02	HEATING, POWER SUPPLY		1
10	4290891-01	SHIELD, POWER SUPPLY		1
11	011-611	TRANSISTOR, POWER, CD461	Q4	1
12	011-035	TRANSISTOR, POWER, 2N3773	Q1,2	2
13	011-833	MTG KIT, TRANSISTOR TO-46		1
14				1
15	031-126	CAPACITOR, AL., 250UF, 50V	C4	1
16	031-126	CAPACITOR, AL., 250UF, 50V	C4	1
17	031-411	CAPACITOR, AL., 500 UF, 25V	C3	1
18				1
19	047-748	RESISTOR, W.M., 25 OHMS, 25W, 3%	R1,2	2
20				2
21	063-182	CAPACITOR, AL., 10K UF, 75V	C1	1
22	063-183	CAPACITOR, AL., 1000 UF, 75V	C2	1
23				1
24	074-020	FUSE, 5A, SLOW BLOW	F1	1
25	074-034	FUSE, 10A, FAST BLOW	F2	1
26	085-001	FUSE HOLDER		2
27				2
28	143-207	CONNECTOR, PC RECP, 18 CONTACTS	C5	1
29	146-018	CONNECTOR, RECT RECP, 10 SOC	C6	1
30	147-072	CONNECTOR, TWIST-LOCK, PWR, 3 MALE CONTACTS	C7	1
31				1
32	150-142	MTG KIT, TRANSISTOR TO-3		2
33				3
34				1
35	171-044	TERMINAL LUG, CRIMP, RING TONGUE #6		4
36	172-005	TERMINAL LUG, SOLDER #10		8
37	21-199	WIRE, INS, 18 AWG, GRN		1

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4050658B  
Power Supply Assembly

Next Assy: 4010210

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESCR.	QTY REQD PER DASH NUMBER
			-01 -02	
38	260-079	CRIMPET, 3/8 ID		2
39	260-052	CRIMPET, CATERPILLAR		A/A
40				2
41	302-062	CLAMP, CRADLE, U-SHAPD, 1.662 ID NYLON		1
42	302-067	CLAMP, CRADLE, NYLON		1
43				1
44	470-045	SCREW, CAP HEX SOC HD, 1/4-20 X 1/2 LG		4
45	471-061	SCREW, PAN HD 4-40 X 5/16 LG		10
46	471-062	SCREW, PAN HD 4-40 X 3/8 LG		4
47	471-064	SCREW, PAN HD, 4-40 X 1/2 LG		2
48	471-067	SCREW, PAN HD 6-32 X 1/4 LG		2
49	471-068	SCREW, PAN HD 6-32 X 5/16 LG		19
50	471-073	SCREW, PAN HD 6-32 X 5/8 LG		1
51	471-334	SCREW, FLAT HD, #6-32 X 1/4 LG		2
52	496-004	NUT, SEPS, 4-40		12
53				14
54	501-008	WASHER, ZLAT #4		8
55	501-009	WASHER, FLAT #6		13
56	502-002	WASHER, LOCK, SPLIT #4		2
57	502-003	WASHER, LOCK, SPLIT #6		15
58				15
59	580-112	TRANSISTOR, POWER 2N3767	Q3	1
60	581-351	DIODE ASSY, POWER	Q4	1
61	616-415	CABLE, SHIELDED, TWISTED PAIR		A/A
62				1
63	617-385	WIRE, INS, 20 AWG, GRN		A/A
64	617-387	WIRE, INS, 20 AWG, VIO		A/A
65	617-390	WIRE, INS, 12 AWG, BLK		A/A
66	617-393	WIRE, INS, 14 AWG, RED		A/A
67	617-394	WIRE, INS, 16 AWG, GRN		A/A
68				A/A
69	617-396	WIRE, INS, 16 AWG, BLU		A/A
70	617-398	WIRE, INS, 16 AWG, VIO		A/A
71	617-399	WIRE, INS, 16 AWG, RED		A/A
72	617-400	WIRE, INS, 16 AWG, BLK		A/A
73	617-401	WIRE, INS, 16 AWG, GRN		A/A
74	499022-01	ENCLOSURE, TRANSFORMER		1
75	499023-01	COVER, TRANSFORMER		1

4050658B

Sheet 2 of 2

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESK	QTY REQD PER DASH NUMBER
1	4500116-01	PRINTED WIRING BOARD		1
2	4500121-01	COIL, BIAS OSC	TI	1
3	4500216-02	PRINTED WIRING BOARD		1
4	4500317	SEMICONDUCTOR, 33V	REF	1
5	4500319	SEMICONDUCTOR, 15/27V	REF	1
6	4500320	SEMICONDUCTOR, 10/10V	REF	1
7	4500321	SEMICONDUCTOR, 10/10V	REF	1
8	101107-01	STANDARD		1
9	013-599	DIODE, CO558	C53,4	2
10	013-578	DIODE, CO551	C81	1
11	013-578	DIODE, CO551	C81,2	2
12	013-747	DIODE, ZDKR, 13V, 2V	V86	1
13	013-799	DIODE, ZDKR, 45V, 1V, 1M7355	V82	1
14	013-911	DIODE, ZDKR, 33V, 1V, 1M7352	V82	1
15	013-970	DIODE, ZDKR, 6.8V, 1V, 1M736	V84	1
16	501-197	DIODE, ZDKR, 8.2V, 1V, 1M738	V81	1
17	501-502	DIODE, ZDKR, 9.1V, 1V, 1M739	V80	1
18	501-503	DIODE, ZDKR, 16V, 1V, 1M745	V85	1
19	014-721	TRANSISTOR, PNP, 2N4017	C8,5	2
20	014-747	TRANSISTOR, NPN, CO58	Q1	1
21	014-555	HEAT SINK, TRANSISTOR, T0-5		2
22	014-550	TRANSISTOR, NPN, 2N4053	Q4	1
23	014-550	TRANSISTOR, NPN, 2N4053	Q4,4	2
24	014-653	TRANSISTOR, NPN, CO555	C8,7	2
25	500-564	TRANSISTOR, SCR, 2N4442	Q1,5	2
26	030-057	CAPACITOR, CER, .01uF, 50V, 20%	C2	1
27	030-057	CAPACITOR, CER, .01uF, 50V, 20%	C2,3	2
28	035-491	CAPACITOR, CER, 0.1uF, 50K, 10%	C8	1
29	034-597	CAPACITOR, MICA, 5600pF, 300V, 5%	C5,6	2
30	034-594	CAPACITOR, MICA, 2500pF, 500V, 5%	C7	1
31	037-728	CAPACITOR, TANT, 6.8uF, 6V, 10%	C9	1
32	037-363	CAPACITOR, TANT, 330uF, 6V, 10%	C1	1

Sheet 1 of 3

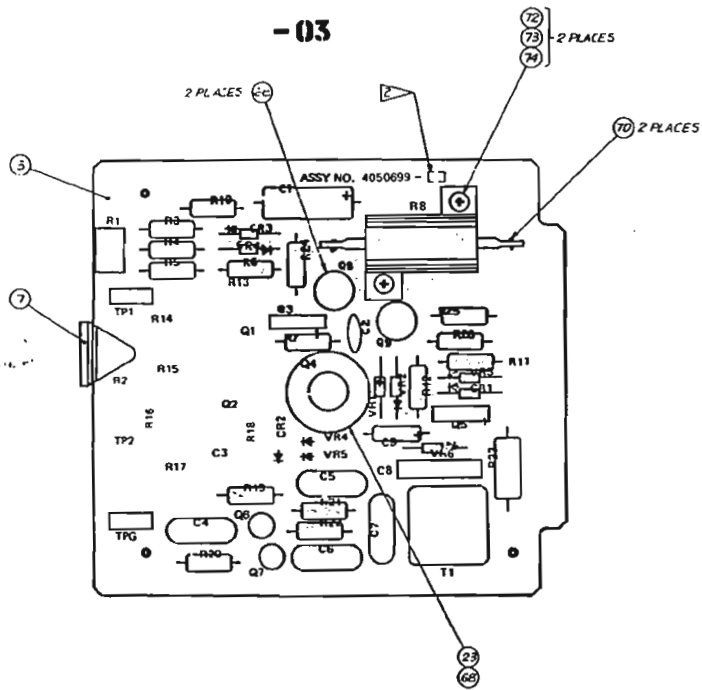
4050699A  
Regulator-Oscillator PWA

Next Assy: 4050658

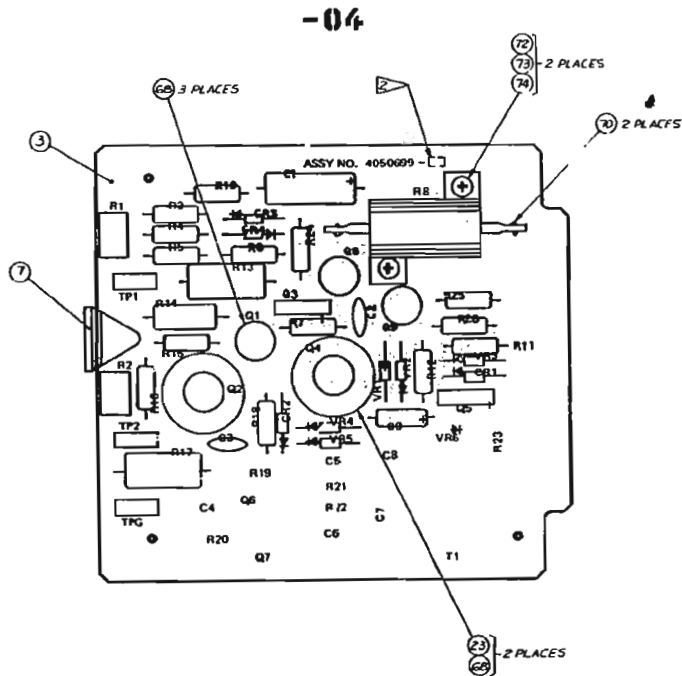
ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESK	QTY REQD PER DASH NUMBER
36	041-003	RESISTOR, COMP, 1000, 1/2W, 5%	R12	1
37	041-008	RESISTOR, COMP, 1.500, 1/2W, 5%	R10	1
38	041-008	RESISTOR, COMP, 1.500, 1/2W, 5%	R3, 15, 16	3
39	041-010	RESISTOR, COMP, 220, 1/2W, 5%	R7, 11	2
40	041-016	RESISTOR, COMP, 220, 1/2W, 5%	R21, 22	2
41	041-135	RESISTOR, COMP, 390, 1/4, 10%	R14	1
42	041-147	RESISTOR, COMP, 1.200, 1/4, 10%	R23	1
43	041-199	RESISTOR, COMP, 1000, 1/2W, 5%	R1	1
44	041-277	RESISTOR, COMP, 100, 1/2W, 5%	R4	1
45	041-317	RESISTOR, COMP, 20 OHMS, 1/2W, 5%	R18	1
46	041-553	RESISTOR, COMP, 1200, 1/2W, 5%	R6	1
47	041-533	RESISTOR, COMP, 240, 1/2W, 5%	R19, 20	2
48	041-586	RESISTOR, COMP, 3300, 2V, 5%	R13	1
49	041-245	RESISTOR, COMP, 100, 1/2W, 5%	R5	1
50	041-216	RESISTOR, VARIOUS, 10, 2V, 10%	R17	1
51	307-880	RESISTOR, VARIOUS, 10, 25V, 5%	R8	1
52	054-108	CAPACITOR, MICA, 6800pF, 500V, 5%	C4	1
53	058-319	RESISTOR, CERMET, VAR, 200, 1V, 10%	R1	1
54	058-319	RESISTOR, CERMET, VAR, 200, 1V, 10%	R1,2	2
55	058-319	RESISTOR, CERMET, VAR, 200, 1V, 10%	R1,2	2
56	148-057	CONNECTOR, PC TIP JACK, CRN	TP2	1
57	148-058	CONNECTOR, PC TIP JACK, RED	TP1	1
58	148-059	CONNECTOR, PC TIP JACK, BLK	TP1	1
59	280-998	MTE PAD, TRANSISTOR (TO-5)		3
60	615-024	WIRE, BARE, SOLID, #18		3
61	471-061	SCREW, XIEC PAN HD, 4-40 X 5/16 LG		2
62	499-004	NUT, NEMA, 4-40		2
63	500-008	WASHER, FLAT, #4		2
64	011-011	RESISTOR, COMP, 10K OHMS, 1/2W, 5%	R10	1
65	011-283	RESISTOR, COMP, 47 OHMS, 1/2W, 5%	R24	1
66	011-319	RESISTOR, COMP, 330 OHMS, 1/2W, 5%	R25	1
67	011-245	RESISTOR, COMP, 1K OHMS, 1/2W, 5%	R26	1

Sheet 2 of 3

4050699A



NOTES:  
 1. PART NO. IS 4050699-XX.  
 ▷ MARK DASH NO. PER BDI-1.



**4050699A**  
**Regulator-Oscillator PWA**

**Sheet 3 of 3**

**Next Assy: 4050658**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY REQD PER DASH NUMBER			
			REF DESIG	-01	-02	-03 -04
1	411028A-01	OVERLAY, CONTROL PANEL, 8 CHANNEL		1	-	-
2	411028B-02	OVERLAY, CONTROL PANEL, 16 CHANNEL		1	-	-
3	411028C-03	OVERLAY, CONTROL PANEL, 24 CHANNEL		1	-	-
4	415028Z-01	SUBPANEL, CONTROL BOX		1	-	-
5	415028Z-01	BASE, CONTROL BOX		1	-	-
6	411028A-01	OVERLAY, CONTROL PANEL		1	-	-
7	4420081-01	BUTTON, "LIFTER DEFALT"		1	-	-
8	4420081-02	BUTTON, "RECORD", RED		1	-	-
9	4420081-03	BUTTON, "PLAY", GREEN		1	-	-
10	4420081-04	BUTTON, "STOP", YELLOW		1	-	-
11	4420081-05	BUTTON, "REVIEW"		1	-	-
12	4420081-06	BUTTON, "FAST FORWARD"		1	-	-
13	4620082-01	SWITCH, ROCKER, SAFE / READY, NO. 1		1	-	-
14	4620082-02	SWITCH, ROCKER, SAFE / READY, NO. 2		1	-	-
15	4620082-03	SWITCH, ROCKER, SAFE / READY, NO. 3		1	-	-
16	4620082-04	SWITCH, ROCKER, SAFE / READY, NO. 4		1	-	-
17	4620082-05	SWITCH, ROCKER, SAFE / READY, NO. 5		1	-	-
18	4620082-06	SWITCH, ROCKER, SAFE / READY, NO. 6		1	-	-
19	4620082-07	SWITCH, ROCKER, SAFE / READY, NO. 7		1	-	-
20	4620082-08	SWITCH, ROCKER, SAFE / READY, NO. 8		1	-	-
21	4620082-09	SWITCH, ROCKER, SAFE / READY, NO. 9		1	-	-
22	4620082-10	SWITCH, ROCKER, SAFE / READY, NO. 10		1	-	-
23	4620082-11	SWITCH, ROCKER, SAFE / READY, NO. 11		1	-	-
24	4620082-12	SWITCH, ROCKER, SAFE / READY, NO. 12		1	-	-
25	4620082-13	SWITCH, ROCKER, SAFE / READY, NO. 13		1	-	-
26	4620082-14	SWITCH, ROCKER, SAFE / READY, NO. 14		1	-	-
27	4620082-15	SWITCH, ROCKER, SAFE / READY, NO. 15		1	-	-
28	4620082-16	SWITCH, ROCKER, SAFE / READY, NO. 16		1	-	-
29	4620082-17	SWITCH, ROCKER, SAFE / READY, NO. 17		1	-	-
30	4620082-18	SWITCH, ROCKER, SAFE / READY, NO. 18		1	-	-
31	4620082-19	SWITCH, ROCKER, SAFE / READY, NO. 19		1	-	-
32	4620082-20	SWITCH, ROCKER, SAFE / READY, NO. 20		1	-	-
33	4620082-21	SWITCH, ROCKER, SAFE / READY, NO. 21		1	-	-
34	4620082-22	SWITCH, ROCKER, SAFE / READY, NO. 22		1	-	-
35	4620082-23	SWITCH, ROCKER, SAFE / READY, NO. 23		1	-	-
36	4620082-24	SWITCH, ROCKER, SAFE / READY, NO. 24		1	-	-
37						

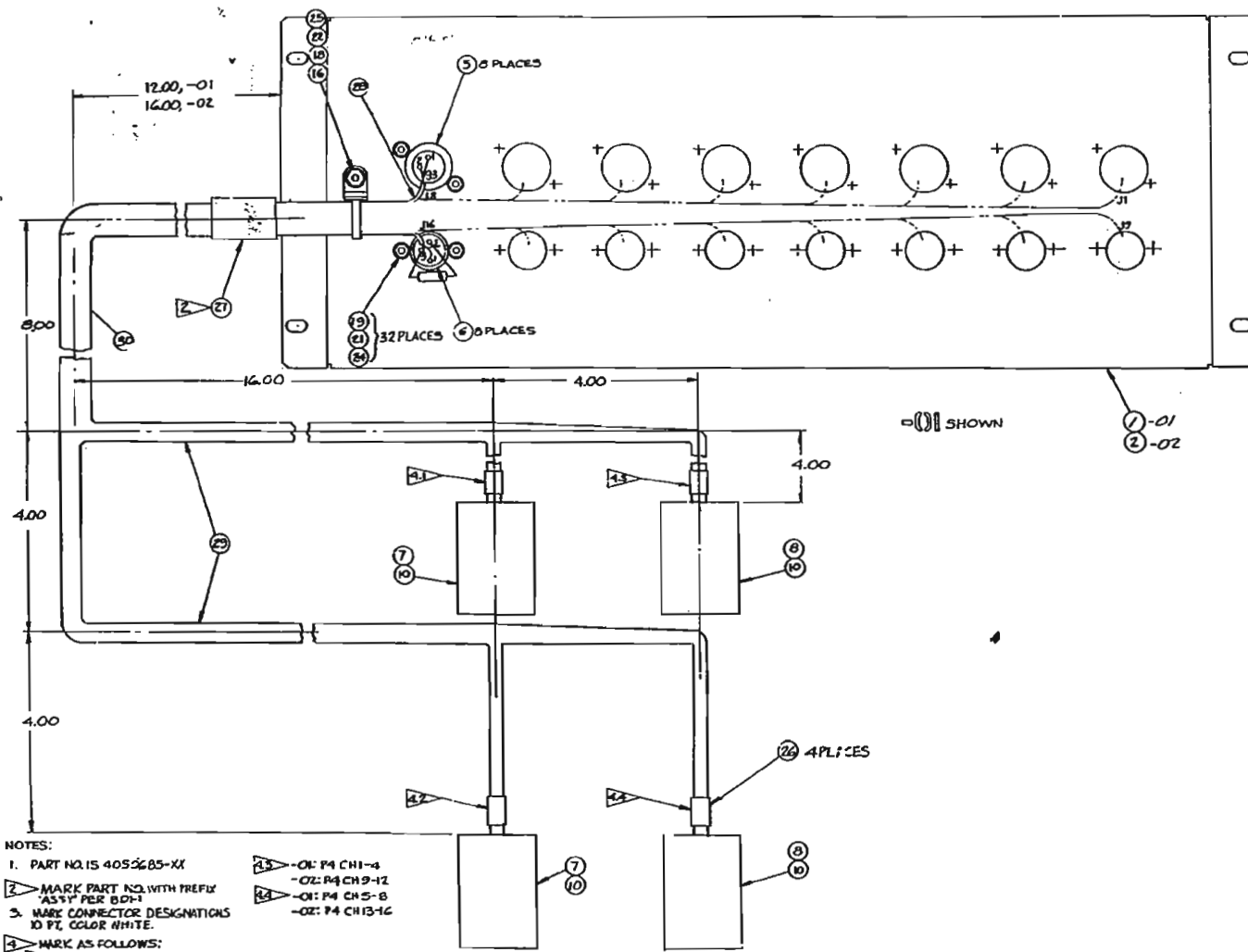
4050646A  
Control Box, 8, 16, and 24-Channel

Next Assy: 4010210

ITEM NO.	PART NUMBER	DESCRIPTION	QTY REQD PER DASH NUMBER			
			REF DESIG	-01	-02	-03 -04
38	4620083-01	SWITCH, ROCKER, MONITOR NORMAL/IMPULS, TEL-GM		1	-	-
39	4620083-02	SWITCH, ROCKER, "REPRO-SELSINC", TEL-GM		1	-	-
40	4620083-03	SWITCH, ROCKER, "SPEED 30-15", GUM-RED		1	-	-
41	4840347	SCHEMATIC, CONTROL BOX		REF	REF	REF
42	013-078	DIODE, SILICON, SMALL SIGNAL		8	16	24
43	060-373	LAMP, INCANDESCENT, 28V		5	5	5
44	060-471	LAMP, INCANDESCENT, 28V		22	38	54
45	119-108	SWITCH, PUSHBUTTON, ROBERTARY		6	6	6
46						
47	141-057	CONNECTOR, 104 PINS	J1	1	1	1
48	615-012	WIRE, SOLID, UNINSULATED, 20 AWG		N/A	N/A	N/A
49	600-21A	SLEEVING, TEFLON, FLEXIBLE, 20 AWG		N/A	N/A	N/A
50	173-041	TERMINAL STUD, #6-32 EXT THREAD		4	4	4
51	169-143	CONTACTS, COHR, PIN		45	69	93
52	250-165	BUMPER, RUBBER		4	4	4
53	280-716	SPACER, THREADED, 4-40 X 2.25 LG		4	4	4
54	280-161	SPACER, MAIN #6-32 X 1" LG		4	4	4
55	470-018	SCREW, CAP, HEX LOC, 6-32 X .375		4	4	4
56	471-061	SCREW, MACH, PAN HD, 4-40 X 5/16 LG		16	16	16
57	471-064	SCREW, MACH, PAN HD, 4-40 X 1/2 LG		4	4	4
58						
59	493-006	NUT, SELF-LOCKING, 4-32		4	4	4
60	495-004	NUT, KEPS 4-40		5	5	5
61						
62	501-008	WASHER, FLAT #4		20	20	20
63	502-024	WASHER, LOCK, INT TOOTH #4		12	12	12
64						
65	310-740	CATCH ASSY		2	2	2
66	09558	WIRE, STRANDED, INSULATED, 22 AWG		N/A	N/A	N/A
67	615-006	WIRE, #14 B&G SOLID, BARE		N/A	N/A	N/A
68						
69						
70	4050703-01	HARNESS ASSY, CONTROL BOX		1		
71	4050703-02	HARNESS ASSY, CONTROL BOX		1		
72	4050703-03	HARNESS ASSY, CONTROL BOX		1		
73	4050703-04	HARNESS ASSY, CONTROL BOX		1		

ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQ PER DSK NUMBER
1	4160-007-02	ANGLE, CONTROL BOX	41	1
2	4160-008-01	ANGLE, CONTROL BOX	41	1
3	4160-011-01	INCHGT. AS OUTPT	41	1
4	4160-012-01	INCHGT. CIRCUIT BREAKER	41	1
5	4160-013-01	COVER, TERMINAL BLOCK, 11	41	1
6	4160-014-01	SCHEMATIC, CIRCUIT BREAKER	41	1
7	4160-015-01	SCHEMATIC, CIRCUIT BREAKER	41	1
8	4160-017-01	CIRCUIT BREAKER, 15 AMP	41	1
9	4160-018-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
10	4160-019-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
11	4160-020-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
12	4160-021-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
13	4160-022-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
14	4160-023-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
15	4160-024-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
16	4160-025-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
17	4160-026-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
18	4160-027-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
19	4160-028-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
20	4160-029-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
21	4160-030-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
22	4160-031-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
23	4160-032-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
24	4160-033-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
25	4160-034-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
26	4160-035-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
27	4160-036-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
28	4160-037-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
29	4160-038-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
30	4160-039-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
31	4160-040-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
32	4160-041-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
33	4160-042-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
34	4160-043-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
35	4160-044-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
36	4160-045-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
37	4160-046-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
38	4160-047-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
39	4160-048-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
40	4160-049-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
41	4160-050-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
42	4160-051-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
43	4160-052-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
44	4160-053-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
45	4160-054-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
46	4160-055-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
47	4160-056-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
48	4160-057-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
49	4160-058-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
50	4160-059-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
51	4160-060-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
52	4160-061-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
53	4160-062-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
54	4160-063-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
55	4160-064-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
56	4160-065-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
57	4160-066-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
58	4160-067-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
59	4160-068-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
60	4160-069-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
61	4160-070-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
62	4160-071-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
63	4160-072-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
64	4160-073-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
65	4160-074-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
66	4160-075-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
67	4160-076-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
68	4160-077-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
69	4160-078-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
70	4160-079-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
71	4160-080-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
72	4160-081-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
73	4160-082-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
74	4160-083-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
75	4160-084-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
76	4160-085-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
77	4160-086-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
78	4160-087-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
79	4160-088-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
80	4160-089-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
81	4160-090-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
82	4160-091-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
83	4160-092-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
84	4160-093-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
85	4160-094-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
86	4160-095-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
87	4160-096-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
88	4160-097-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
89	4160-098-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
90	4160-099-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1
91	4160-100-01	TERMINAL STRIP, 6 DUAL TERMINALS	41	1





NOTES:

1. PART NO. IS 4050685-XI
2. MARK PART NO. WITH PREFIX "ASSY" PER BOP-1
3. MARK CONNECTOR DESIGNATIONS 10 PT. COLOR WHITE.
4. MARK AS FOLLOWS:
  - 4.1 - 01: P3 CH1-4
  - 4.2 - 02: P3 CH3-12
  - 4.3 - 01: P3 C-5-8
  - 4.4 - 02: P3 CH13-16

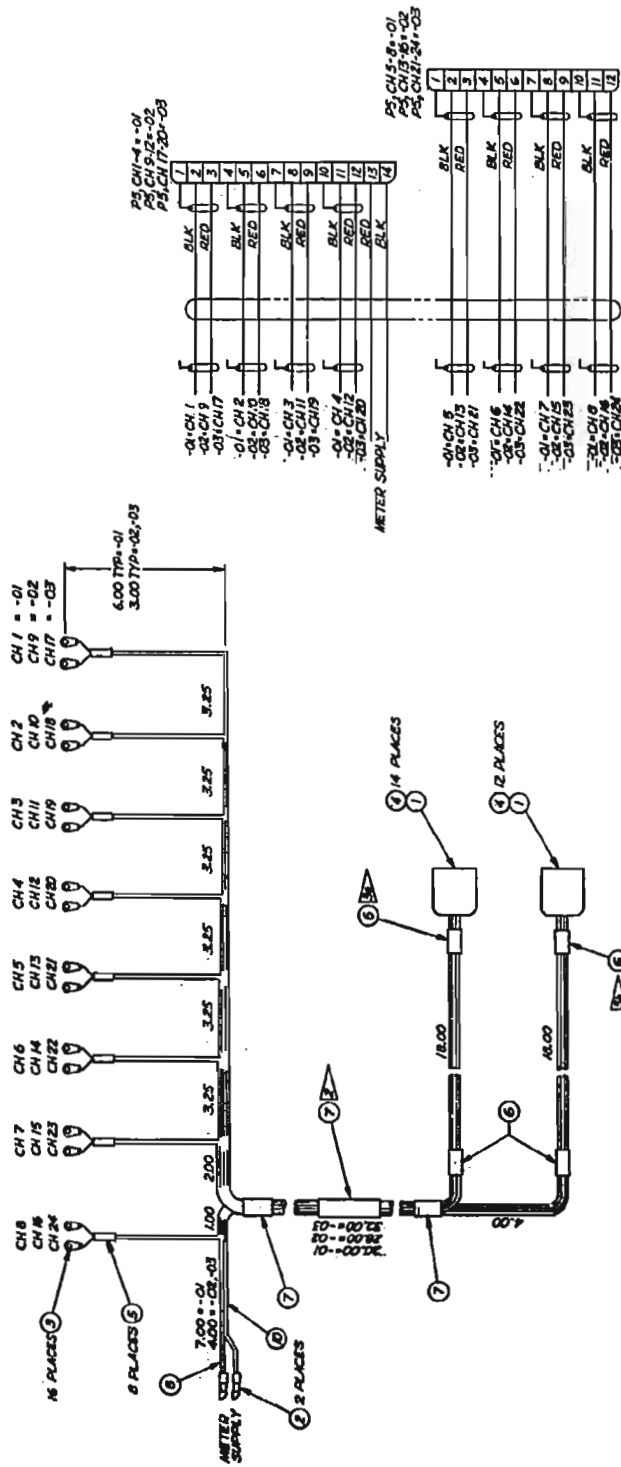
- 4.5 - 01: P4 CH1-4
- 4.6 - 02: P4 CH9-12
- 4.7 - 01: P4 CH5-8
- 4.8 - 02: P4 CH13-16

**4050685—** Sheet 2 of 2  
**Input/Output Connector Panel (8 and 16-Channel)**

Next Assy: 4010210

REF NO.	PART NUMBER	DESCRIPTION	REF POLIC	QTY REQD PER DASH NUMBER				
				-01	-02	-03	-04	-05
1	4050481-01	WARMER ASBY, METER PANEL		1	-	-	-	-
2	4050482-02	WARMER ASBY, METER PANEL		1	-	-	-	-
3	4110217-01	OVERLAY, METER PANEL		1	-	-	-	-
4	4110218-02	OVERLAY, METER PANEL		1	-	-	-	-
5	4110219-01	OVERLAY, METER PANEL		1	-	-	-	-
6	4150350-01	ARM REST ASBY		1	1	1	1	1
7	4150351-01	BLACK, METER PANEL		1	1	1	1	1
8	4160512-01	BRACKET, METER PANEL		1	1	1	1	1
9	4160513-02	BRACKET, METER PANEL		1	1	1	1	1
10	4160514-01	METER PANEL		1	1	1	1	1
11	4160515-01	METER PANEL		1	1	1	1	1
12	4160516-01	LAMP, 28 VOLT		16	31	48	-	-
13	4160517-01	SOCKET, HOLYHUB		1/2 A/A	1/2 A/A	1/2 A/A	1/2 A/A	1/2 A/A
14	4160518-01	WARMER ASBY, METER PANEL		1	-	-	-	-
15	4160519-01	WARMER ASBY, METER PANEL		1	-	-	-	-
16	4160520-01	WARMER ASBY, METER PANEL		1	-	-	-	-
17	4160521-01	WARMER ASBY, METER PANEL		1	-	-	-	-
18	4160522-01	WARMER ASBY, METER PANEL		1	-	-	-	-
19	4160523-01	WARMER ASBY, METER PANEL		1	-	-	-	-
20	4160524-01	WARMER ASBY, METER PANEL		1	-	-	-	-
21	4160525-01	WARMER ASBY, METER PANEL		1	-	-	-	-
22	4160526-01	WARMER ASBY, METER PANEL		1	-	-	-	-
23	4160527-01	WARMER ASBY, METER PANEL		1	-	-	-	-
24	4160528-01	WARMER ASBY, METER PANEL		1	-	-	-	-
25	4160529-01	WARMER ASBY, METER PANEL		1	-	-	-	-
26	4160530-01	WARMER ASBY, METER PANEL		1	-	-	-	-
27	4160531-01	WARMER ASBY, METER PANEL		1	-	-	-	-
28	4160532-01	WARMER ASBY, METER PANEL		1	-	-	-	-
29	4160533-01	WARMER ASBY, METER PANEL		1	-	-	-	-
30	4160534-01	WARMER ASBY, METER PANEL		1	-	-	-	-
31	4160535-01	WARMER ASBY, METER PANEL		1	-	-	-	-
32	4160536-01	WARMER ASBY, METER PANEL		1	-	-	-	-
33	4160537-01	WARMER ASBY, METER PANEL		1	-	-	-	-
34	4160538-01	WARMER ASBY, METER PANEL		1	-	-	-	-
35	4160539-01	WARMER ASBY, METER PANEL		1	-	-	-	-
36	4160540-01	WARMER ASBY, METER PANEL		1	-	-	-	-
37	4160541-01	WARMER ASBY, METER PANEL		1	-	-	-	-

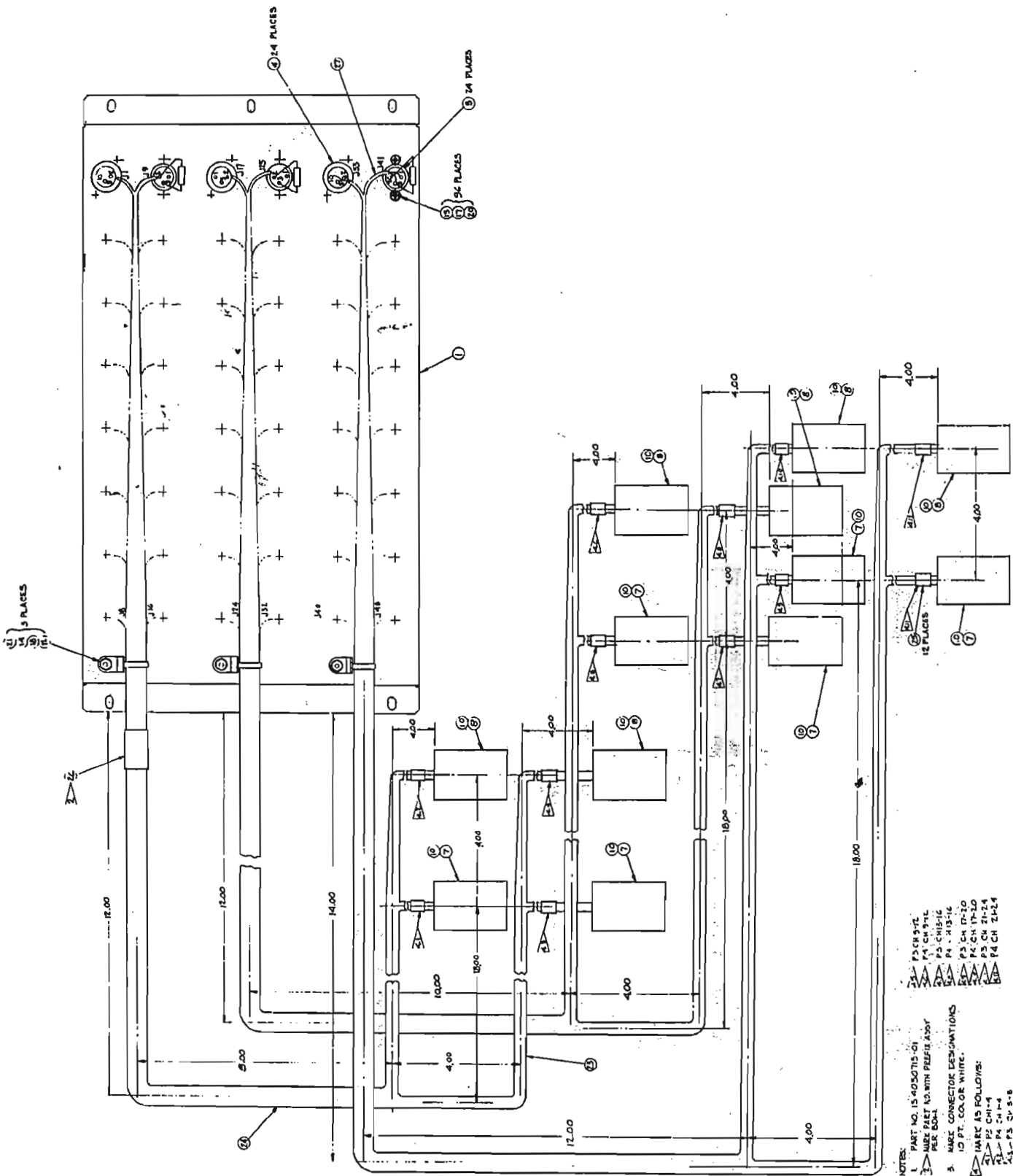




WIRING DIAGRAM

QTY	SIZE	DESCRIPTION	PART NO.
10	1/16"	WIRE, 20 AWG, RED	617-050
10	1/16"	CABLE, SHIELDED & JACKETED, 2 COND, 22 AWG	616-283
9	1/16"	WIRE, 20 AWG, BLACK	611-256
6	1/16"	SLEEVING, SHRINKABLE, .500 I.D.	600-257
6	1/16"	SLEEVING, SHRINKABLE, .375 I.D.	600-256
3	1/16"	SLEEVING, SHRINKABLE, .125 I.D.	600-253
4	1/16"	TERMINAL, QUICK DISCONNECT, MALE	197-036
3	1/16"	TERMINAL LUG, SOLDER, RING THRU, A.D. 10	172-005
2	2	TERMINAL, QUICK DISCONNECT, WIRE TYPE	171-009
2	2	CONNECTOR PART, BODY, BRET PLUG, 15 CONTACTS	165-154
1	1	TERMINAL	165-154
1	1	TERMINAL	165-154





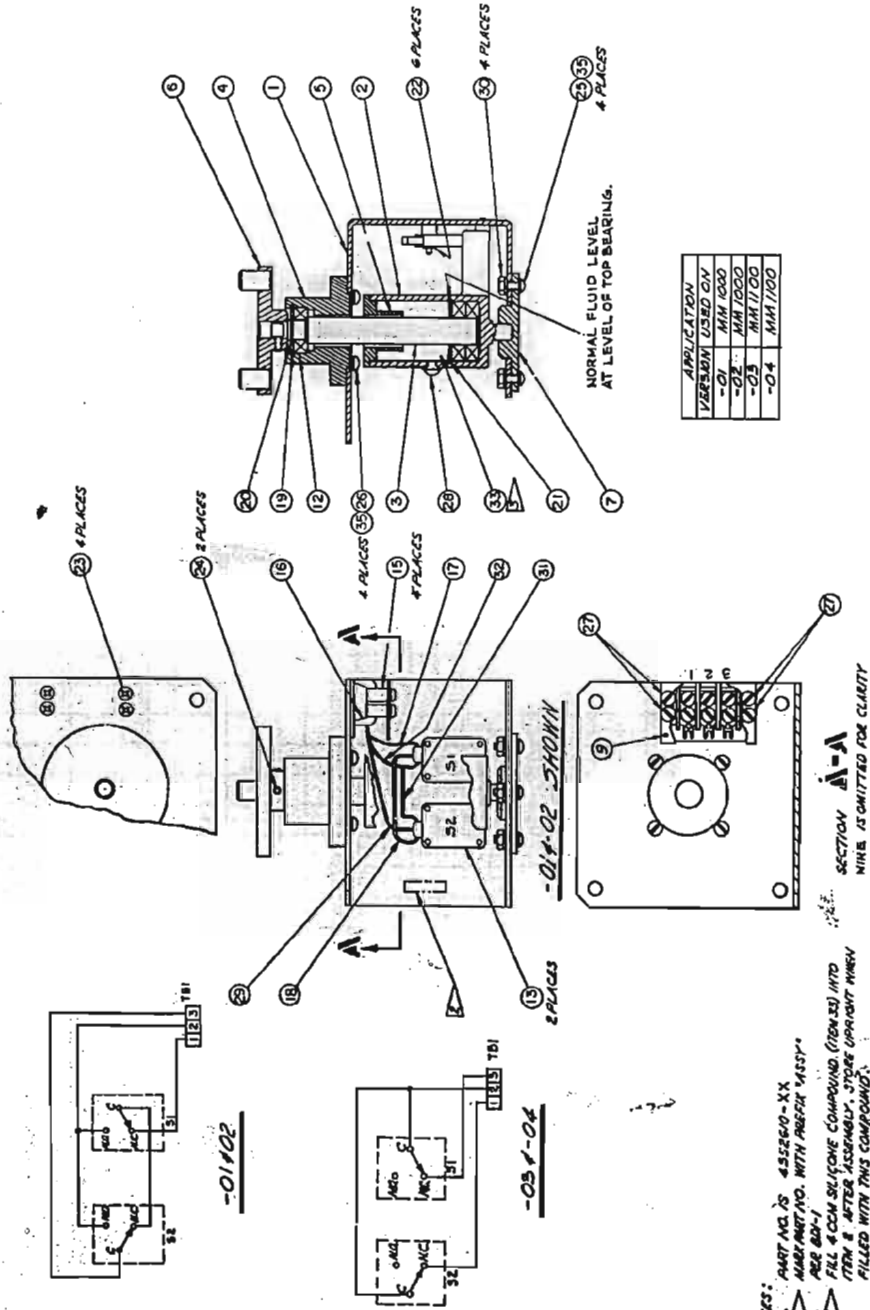
- NOTES:
- 1 PART NO. IS 4050715-01
  - 2 MARK PART NO. WITH PREFIX ASSY PER BOB.
  - 3 MARK CONNECTOR DESIGNATIONS 10 FT. COLOR WHITE.
  - 4 MARK AS FOLLOWS:  
 P3 CH 9-7L  
 P4 CH 9-7R  
 P5 CH 9-16  
 P6 CH 9-14  
 P7 CH 17-10  
 P8 CH 17-10  
 P9 CH 21-24  
 P10 CH 21-24

4050715-  
 Input/Output Connector Panel (24-Channel)

Sheet 2 of 2

Next Assy: 4010210

ITEM NO.	PART NUMBER	QTY REQ	D	DESCRIPTION	MFG. PKG. QTY	QTY REQ PER DASH NUMBER		
						-02	-01	-04
1	210952-10B			BRACKET-MOTION SWITCH		1	1	1
2	210953-10B			HOUSING-ACTUATOR		1	1	1
3	210954-10C			SHAFT-BEARING S/A		1	1	1
4	210955-10B			HOUSING-BEARING		1	1	1
5	210957-10B			CAP-HOUSING		1	1	1
6	210950-10B			COUPLING-PIH S/A		1	1	1
7	210951-10C			COLLAR		1	1	1
8								
9	211065-10B			COVER, TERMINAL BLOCK		1	1	1
10								
11								
12	164864-03			BEARING BALL		1	1	1
13	30-607			SWITCH	51,2	2	2	2
14	30-339			SWITCH				
15	280-016			SPACER, 1/4 DIA X 3/8 X #6-32 NYLON STRIP		4	4	4
16	180-422			TERMINAL BLOCK, 3 TERM (KULKA 600 3/AST-3)		1	1	1
17	619-983			WIRE, STRD, IMS, 22 AWG, W18 5" LG		1	1	1
18	619-983			WIRE, STRD, IMS, 22 AWG, Y10 1/2 X 1/3 1/2 LG		1	1	1
19	530-085			RETAINING RING		1	1	1
20	530-086			RETAINING RING		1	1	1
21	430-063			RETAINING RING		1	1	1
22	530-902			RETAINING RING		6	6	6
23	371-338			SCREW, FLAT HD, #6-32 X 1/2 LG		4	4	4
24	377-184			SCREW, SET, #6-32 X 3/16, NYLON		2	2	2
25	371-071			SCREW, PAN HD, #6-32 X 1/2 LG		4	4	4
26	375-059			SCREW, SEM, #6-32 X 1/2 LG		4	4	4
27	375-011			SCREW, SEM, #6-32 X 3/16 LG		4	4	4
28	370-185			SCREW, CAP, #6-32, NYLON		1	1	1
29	619-982			WIRE, STRD, IMS, 22 AWG, 67 3" LG		1	1	1
30	686-002			NUT, KEP #6-32		4	4	4
31	619-985			WIRE, STRD, IMS, 22 AWG, 818 2 1/2 LG		1	1	1
32	619-985			WIRE, STRD, IMS, 22 AWG, 818 4" LG		1	1	1
33	087-434			SILICONE COMPOUND 50,000 CS		1	1	1
34	087-720			TUBE OF SILICONE COMPOUND 50,000		1	1	1
35	201-009			WASHER, FLAT #6		8	8	8
36	480233			INSTALLATION INSTRUCTIONS		1	1	1
37	619-23			WIRE, STRANDED, IMS, 22 AWG, 67 5" LG		1	1	1



NOTES:  
 1. PART NO. IS 45250-XX  
 2. MARK PART NO. WITH PREFIX "ASST"  
 3. PER 804-1  
 4. FILL 4 CCs SILICONE COMPOUND (70003) INTO  
 ITEM 8 AFTER ASSEMBLY. STORE UPRIGHT WHEN  
 FILLED WITH THIS COMPOUND.

SIMILAR TO 1210952

Sheet 2 of 2

4952610D  
 Motion Sense Assembly

Next Assy: 4010210

ITEM NO.	PART NUMBER	DESCRIPTION	REF DESG		QTY REQD PER DISH NUMBER					
			-01	-02	-03	-04	-05	-06		
1										
2	479039-01	CORD, 110V POWER			1	1	1			
3										
4	4952254-01	RING, HOLD-DOWN	2							
5	4952553-01	ADAPTER RING, REEL LOWER	2							
6										
7										
8	A1471	REEL, 3 INCH	1							
9	A3571	REEL, 2 INCH	1							

4090024A  
 Miscellaneous Spare Parts Kit  
 Next Assy: 4010210  
 Sheet 1 of 1

## SCHEMATIC DIAGRAMS

DRAWING NO.	TITLE	PAGE
4840343-	Circuit Breaker Assembly	137
4840299-	39 V Power Supply, -01	139
4840337A	39 V Regulator PWA, -01	141
4840342-	15/27 V Power Supply, -02	143
4840339A	15/27 V Regulator PWA, -02	145
4840346A	Transport Harness	147
4840348-	Transport Control Wiring Diagram, -01	149
4840349-	Transport Control Wiring Diagram, -02	151
4840345A	Transport Control PWA	153
4840356-	Capstan Servo PWA	155
4840336-	Motor Drive Amplifier	157
4840347-	Control Box	159
4840327-	Electronics Interconnect Diagram	161
4840344-	Audio Switching PWA	163
4840357A	Reproduce, Record, and Bias PWA's	165
4840366-	Meter Panel	167

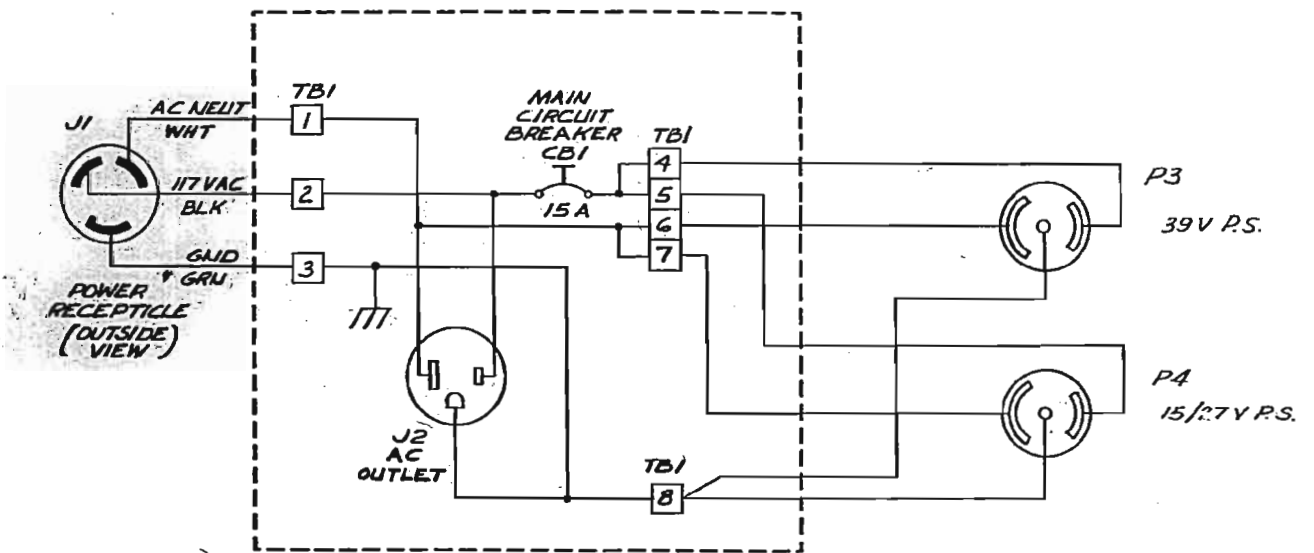
## NUMERICAL INDEX TO SCHEMATIC DIAGRAMS

DRAWING NO.	TITLE	PAGE
4840299-	39 V Power Supply, -01	139
4840327-	Electronics Interconnect Diagram	161
4840336-	Motor Drive Amplifier	157
4840337A	39 V Regulator PWA, -01	141
4840339A	15/27 V Regulator PWA, -02	145
4840342-	15/27 V Power Supply, -02	143
4840343-	Circuit Breaker Assembly	137
4840344-	Audio Switching PWA	163
4840345A	Transport Control PWA	153

## NUMERICAL INDEX TO SCHEMATIC DIAGRAMS (Continued)

DRAWING NO.	TITLE	PAGE
4840346A	Transport Harness	147
4840347-	Control Box	159
4840348-	Transport Control Wiring Diagram, -01	149
4840349-	Transport Control Wiring Diagram, -02	151
4840356-	Capstan Servo PWA	155
4840357A	Reproduce, Record, and Erase PWA's	165
4840366-	Meter Panel	167

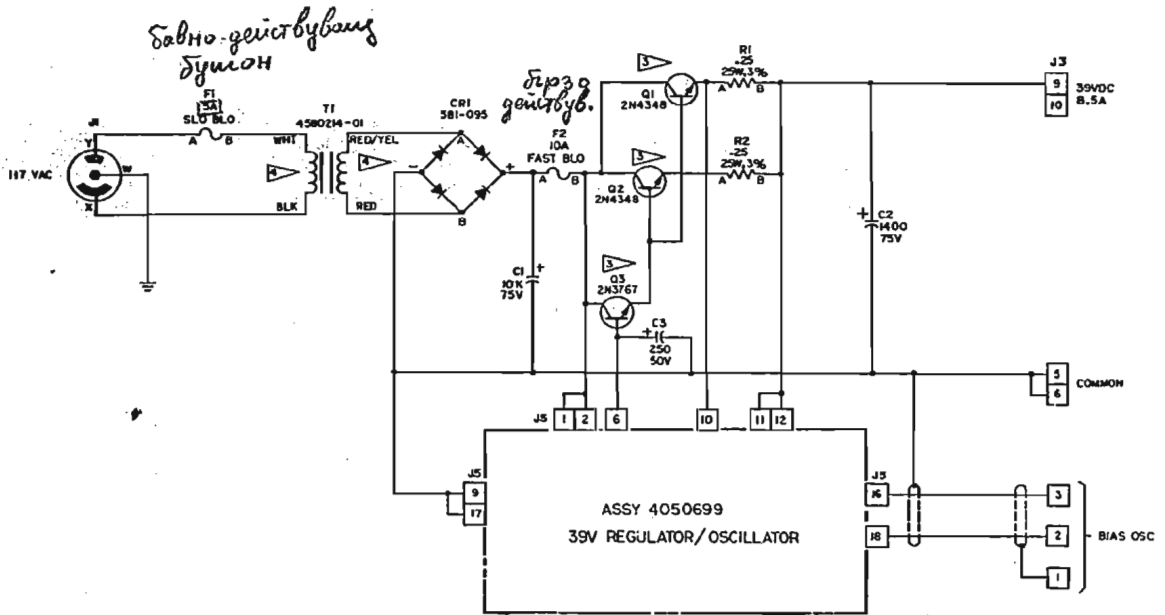




4840343—  
Circuit Breaker Assembly

Sheet 1 of 1

Ref. Assy: 4050647



NOTES: UNLESS OTHERWISE SPECIFIED

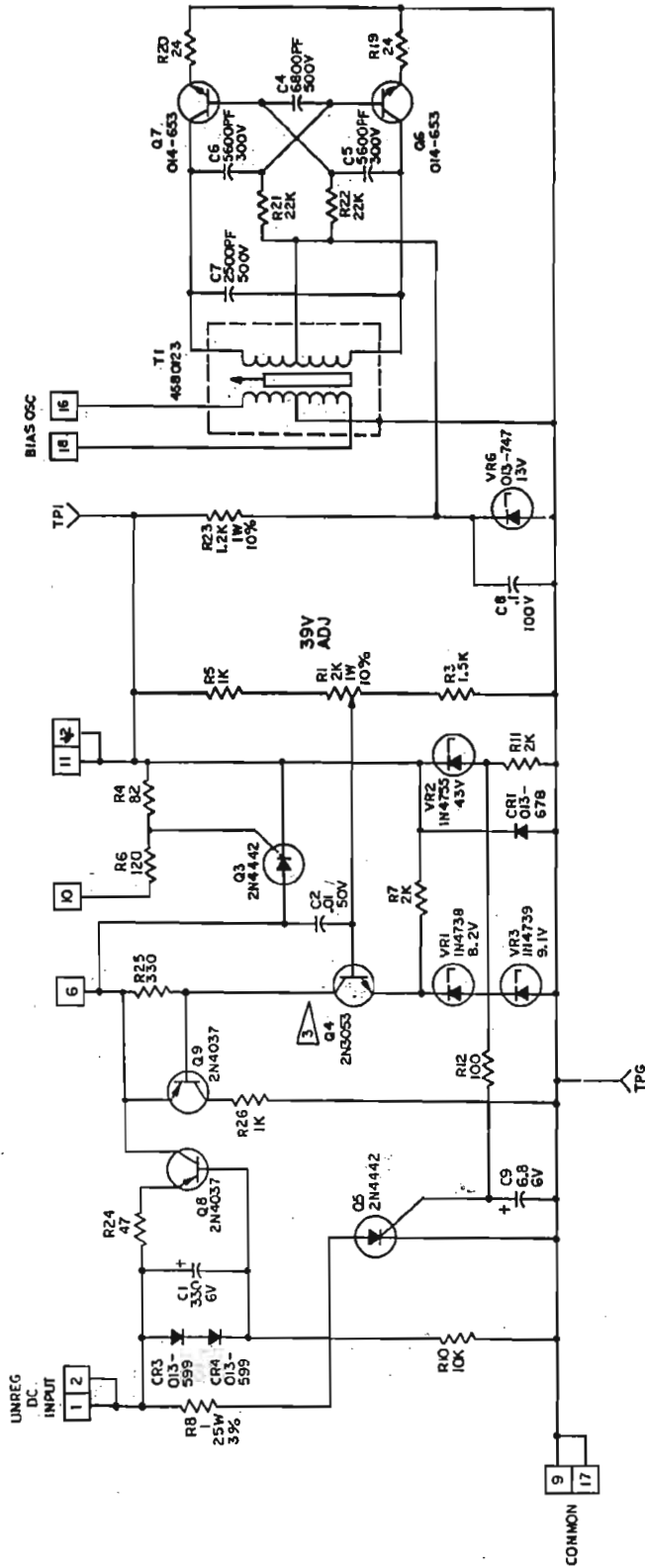
1. CAPACITANCE VALUES ARE IN MICROFARADS.
  2. RESISTANCE VALUES ARE IN OHMS.
- THIS TRANSISTOR TO HAVE HEAT SINK.  
 PRIMARY AND SECONDARY TRANSFORMER LEADS TO BE TWISTED TOGETHER TIGHTLY.

REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C3	
CR1	
F2	
J3	
Q3	
R2	
T1	

4840299—  
39 V Power Supply, -01

Sheet 1 of 1

Ref. Assy: 4050658



NOTES: UNLESS OTHERWISE SPECIFIED  
 1. CAPACITANCE VALUES ARE IN MICROFARADS.  
 2. RESISTANCE VALUES ARE IN OHMS, 1/2W, 5%.

⚠ THIS TRANSISTOR TO HAVE HEAT SINK.

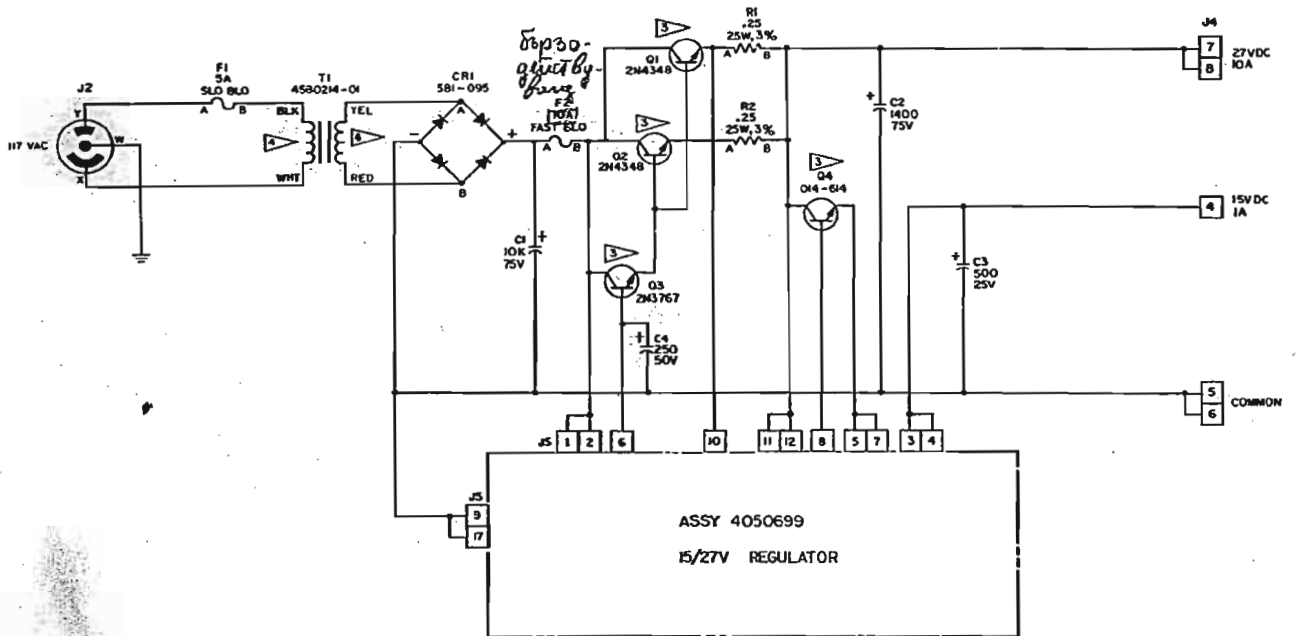
REFERENCE DESIGNATIONS	LAST USED	NOT USED
C9		C3
CR4		CR2
Q1		Q1, Q2
Q2		Q3, Q4, Q5, Q6, Q7, Q8
Q3		VR4, VR5
Q4		VR6
Q5		TP1, TPG

FIELD SERVICE COMPONENT SUBSTITUTION LIST	
AMPEX P/N	NEAREST COMMERCIAL EQUIVALENT
014-653	2N3904

4840337A  
 39V Regulator, -01

Sheet 1 of 1

Ref. Assy: 4050699



NOTES - UNLESS OTHERWISE SPECIFIED

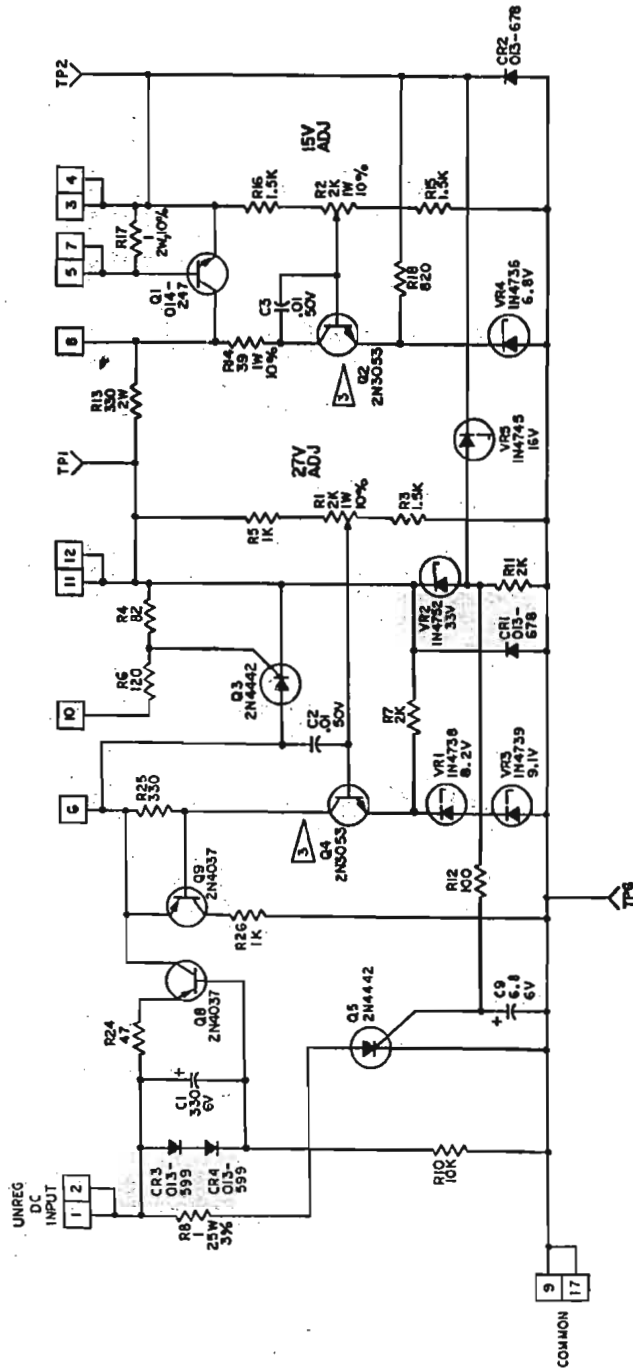
- 1. CAPACITANCE VALUES ARE IN MICROFARADS.
- 2. RESISTANCE VALUES ARE IN OHMS.
- 3. THIS TRANSISTOR TO HAVE HEAT SINK.
- 4. PRIMARY AND SECONDARY TRANSFORMER LEADS TO BE TWISTED TOGETHER TIGHTLY.

REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C6	
CR1	
F2	
J3	
Q4	
R2	
T1	

4840342-  
15/27 V Power Supply, -02

Sheet 1 of 1

Ref. Assy: 4050658



NOTES: UNLESS OTHERWISE SPECIFIED

1. CAPACITANCE VALUES ARE IN MICRORADS.

2. RESISTANCE VALUES ARE IN OHMS, 1/2W, 5%.

3. THIS TRANSISTOR TO HAVE HEAT SINK.

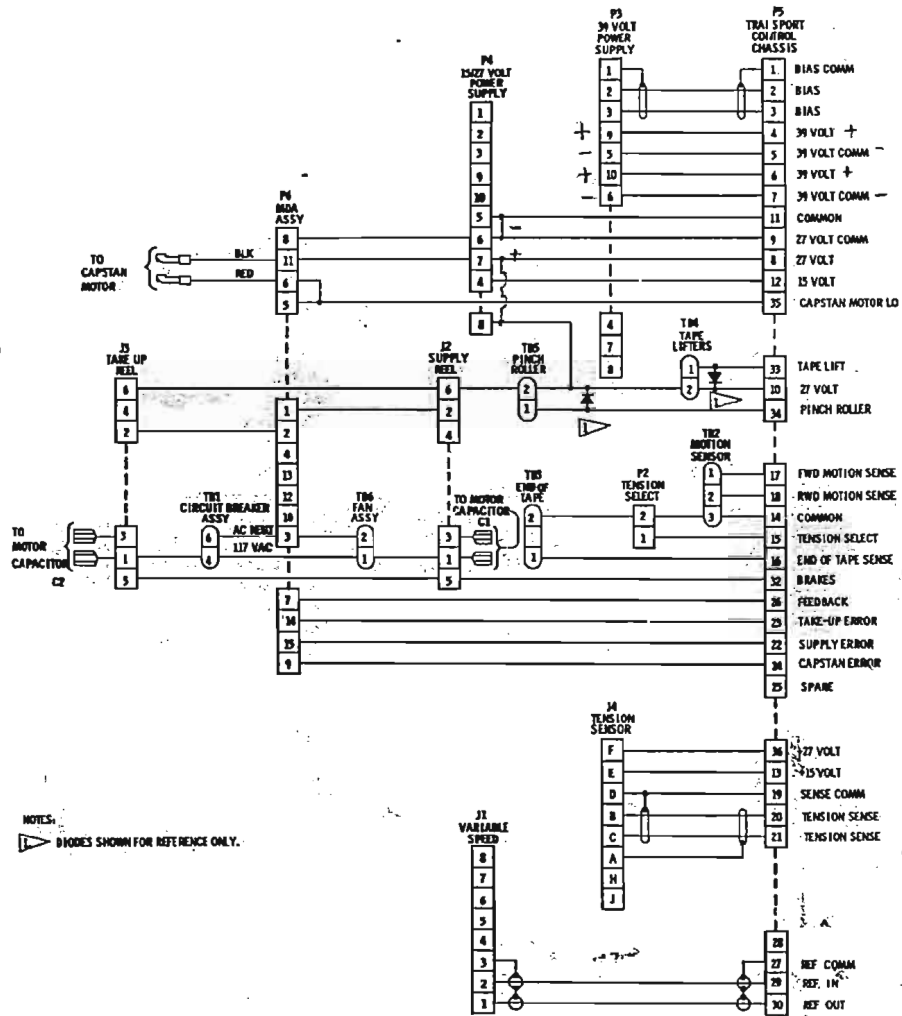
REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C3	C4 THRU C8
CR4	Q9
Q3	R6,7
R26	R9,19-23
VRS	TP2 TPG

FIELD SERVICE COMPONENT SUBSTITUTION LIST		
AMPEX P/N	NEAREST COMMERCIAL EQUIVALENT	
014-247	2N2219	

4840339A  
15/27 V Regulator, -02

Sheet 1 of 1

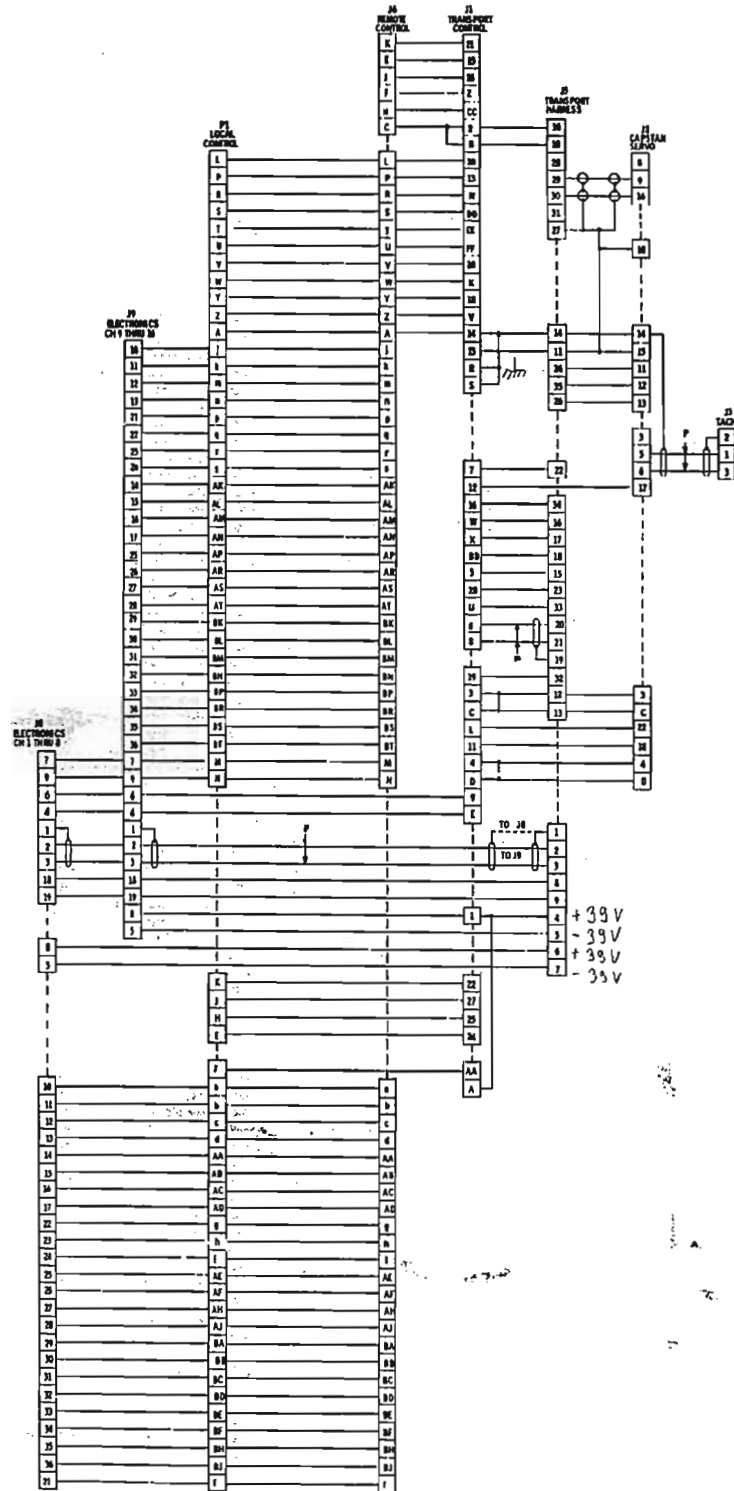
Ref. Assy: 4050699



48403-3A  
 Transport Harness

Sheet 1 of 1

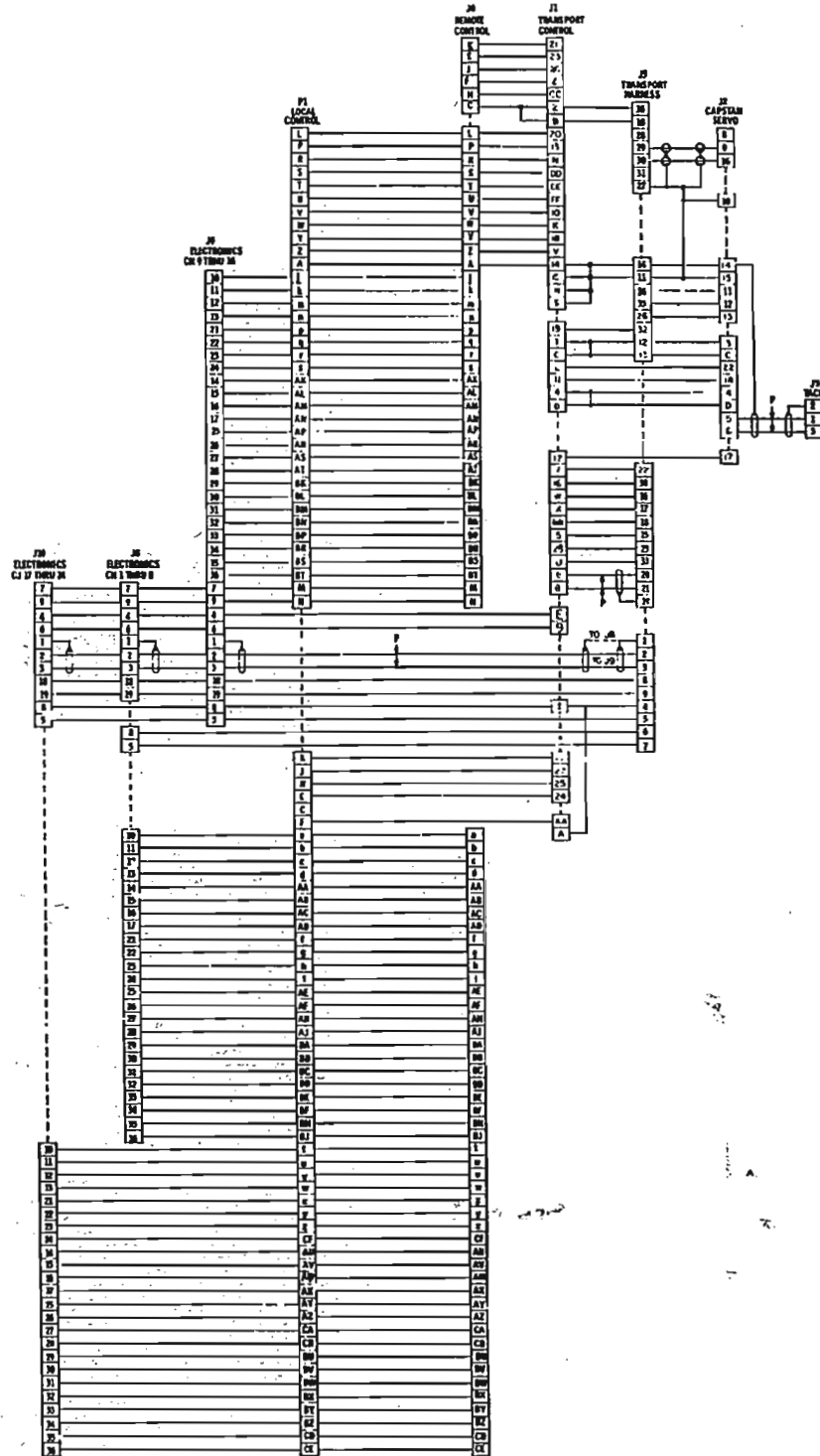
Ref. Assy: 4020360



NOTES:  
 1. THIS DIAGRAM INDICATES ELECTRICAL CONTINUITY AND DOES NOT NECESSARILY REPRESENT POINT TO POINT CONNECTIONS.

4840348—  
 Transport Control Wiring Diagram, -01  
 Ref. Assy: 4020373

Sheet 1 of 1

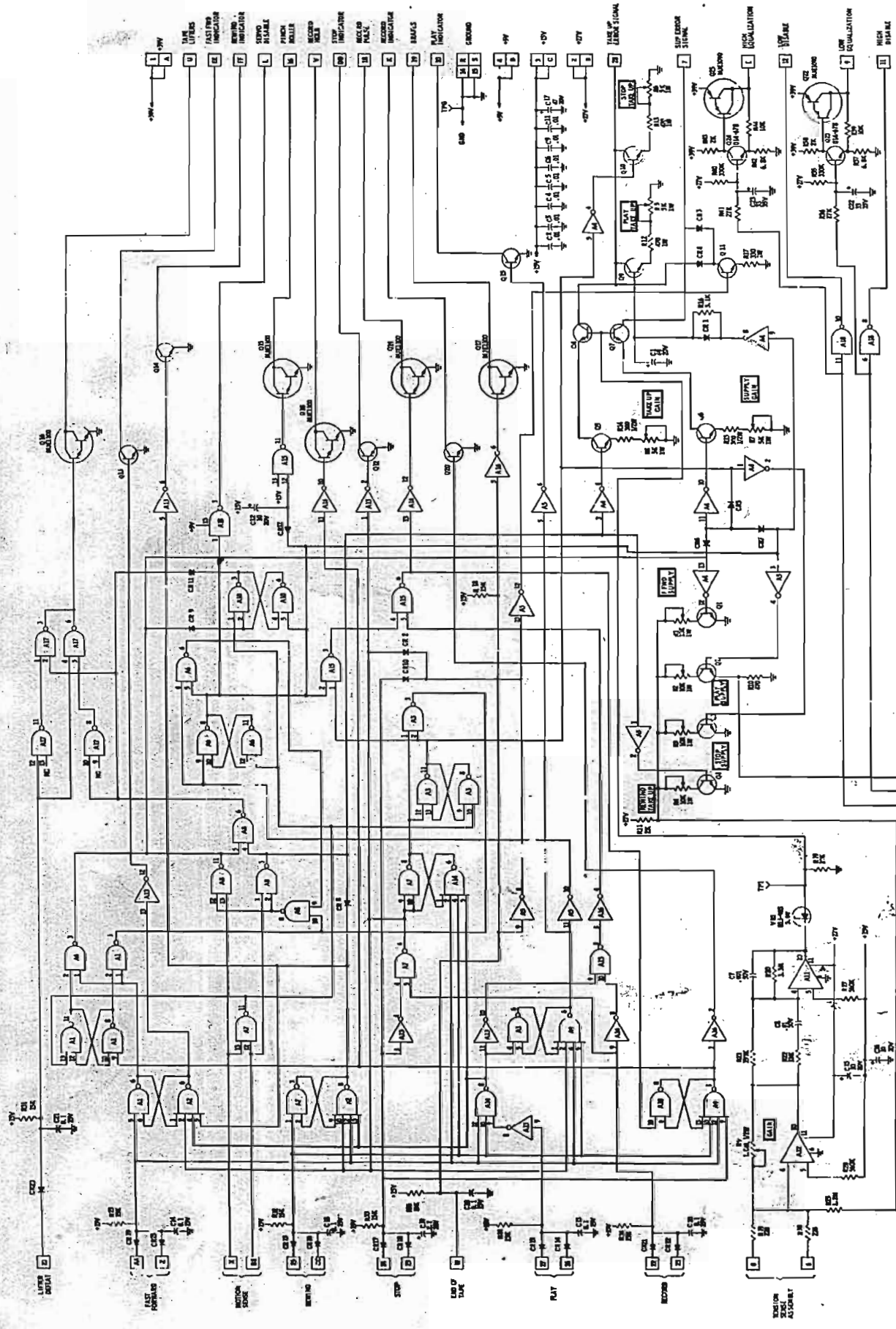


NOTES:  
 1. THIS DIAGRAM SHOWS ELECTRICAL CONTINUITY AND DOES NOT NECESSARILY REPRESENT POINT TO POINT CONNECTIONS.

4840349—  
 Transport Control Wiring Diagram, -02  
 Ref. Assy: 4020373

Sheet 1 of 1





REFERENCE DESIGNATIONS

DESIGNATION	QUANTITY	DESCRIPTION
A1-A15	15	AND GATES
O1-O15	15	OR GATES
I1-I15	15	INVERTERS
C1-C15	15	CAPACITORS
R1-R15	15	RESISTORS

L.C. LIST

DESIGNATION	QUANTITY	DESCRIPTION
A1-A15	15	AND GATES
O1-O15	15	OR GATES
I1-I15	15	INVERTERS
C1-C15	15	CAPACITORS
R1-R15	15	RESISTORS

4840345A  
 Transport Control PWA  
 Ref. Assy: 4050706  
 Sheet 1 of 1

NO IS THIS OPERATOR REQUIRED  
 1. CHECK ALL WIRING IN THIS ASSY.  
 2. CHECK ALL WIRING IN THIS ASSY.  
 3. CHECK ALL WIRING IN THIS ASSY.  
 4. CHECK ALL WIRING IN THIS ASSY.

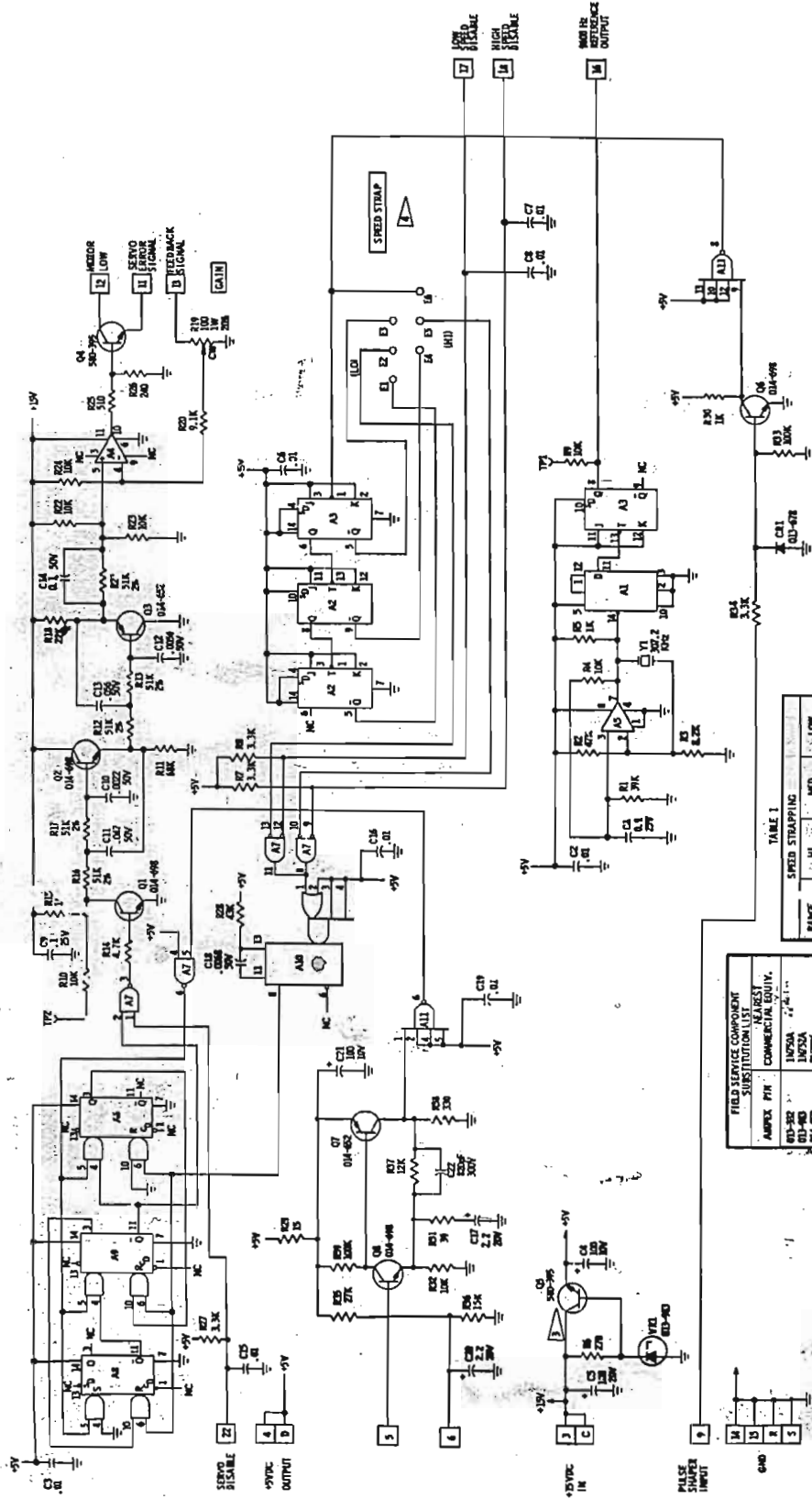


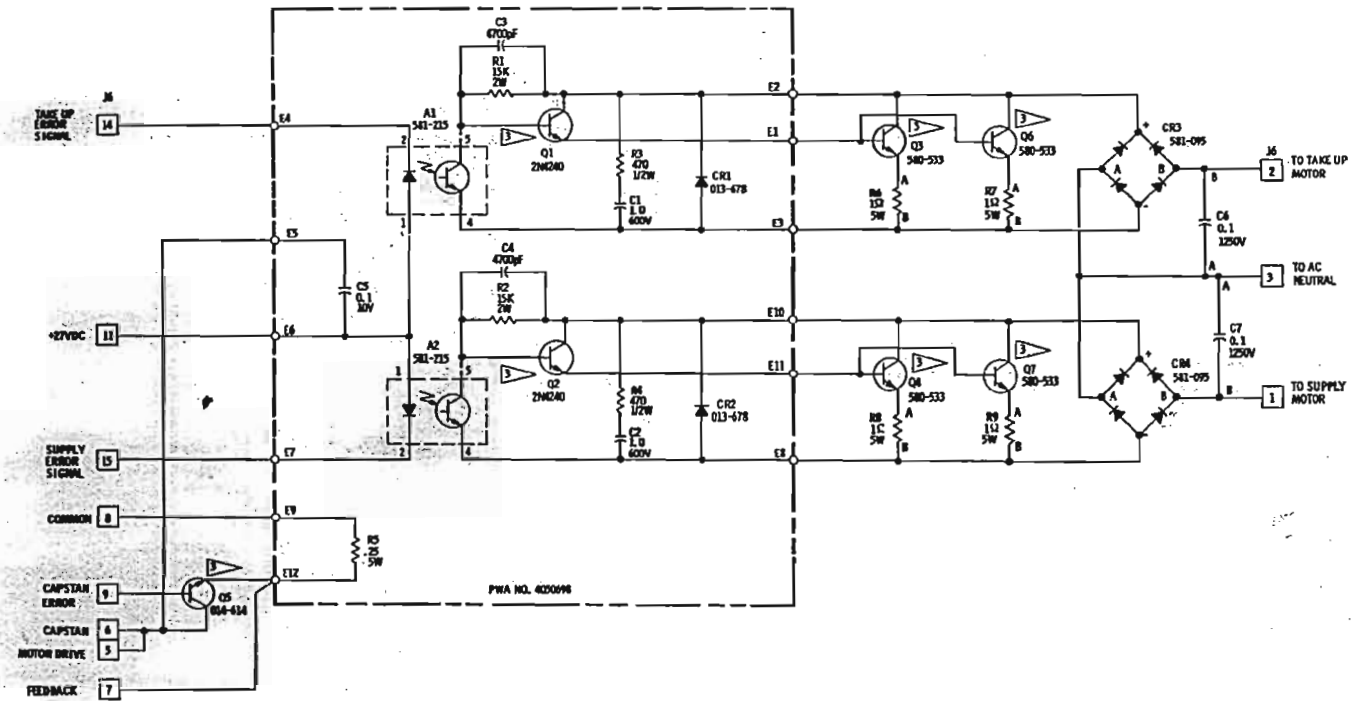
TABLE 1

RANGE	HI	MED	LOW
HI	E3 TO E4	E3 TO E3	E3 TO E4
LO	E2 TO E3	E2 TO E4	E2 TO E1

FIELD SERVICE COMPONENT SUBSTITUTION NEAREST COMMERCIAL EQUIV.

AMPLEX P/N	NEAREST COMMERCIAL EQUIV.
01A-202	1N969A
01A-203	1N969A
01A-204	2N3638A
01A-205	2N3638A
01A-206	2N3638A
01A-207	2N3638A
01A-208	2N3638A
01A-209	2N3638A
01A-210	2N3638A
01A-211	2N3638A
01A-212	2N3638A
01A-213	2N3638A
01A-214	2N3638A
01A-215	2N3638A
01A-216	2N3638A
01A-217	2N3638A
01A-218	2N3638A
01A-219	2N3638A
01A-220	2N3638A
01A-221	2N3638A
01A-222	2N3638A
01A-223	2N3638A
01A-224	2N3638A
01A-225	2N3638A
01A-226	2N3638A
01A-227	2N3638A
01A-228	2N3638A
01A-229	2N3638A
01A-230	2N3638A
01A-231	2N3638A
01A-232	2N3638A
01A-233	2N3638A
01A-234	2N3638A
01A-235	2N3638A
01A-236	2N3638A
01A-237	2N3638A
01A-238	2N3638A
01A-239	2N3638A
01A-240	2N3638A
01A-241	2N3638A
01A-242	2N3638A
01A-243	2N3638A
01A-244	2N3638A
01A-245	2N3638A
01A-246	2N3638A
01A-247	2N3638A
01A-248	2N3638A
01A-249	2N3638A
01A-250	2N3638A
01A-251	2N3638A
01A-252	2N3638A
01A-253	2N3638A
01A-254	2N3638A
01A-255	2N3638A
01A-256	2N3638A
01A-257	2N3638A
01A-258	2N3638A
01A-259	2N3638A
01A-260	2N3638A
01A-261	2N3638A
01A-262	2N3638A
01A-263	2N3638A
01A-264	2N3638A
01A-265	2N3638A
01A-266	2N3638A
01A-267	2N3638A
01A-268	2N3638A
01A-269	2N3638A
01A-270	2N3638A
01A-271	2N3638A
01A-272	2N3638A
01A-273	2N3638A
01A-274	2N3638A
01A-275	2N3638A
01A-276	2N3638A
01A-277	2N3638A
01A-278	2N3638A
01A-279	2N3638A
01A-280	2N3638A
01A-281	2N3638A
01A-282	2N3638A
01A-283	2N3638A
01A-284	2N3638A
01A-285	2N3638A
01A-286	2N3638A
01A-287	2N3638A
01A-288	2N3638A
01A-289	2N3638A
01A-290	2N3638A
01A-291	2N3638A
01A-292	2N3638A
01A-293	2N3638A
01A-294	2N3638A
01A-295	2N3638A
01A-296	2N3638A
01A-297	2N3638A
01A-298	2N3638A
01A-299	2N3638A
01A-300	2N3638A

NOTES: UNLESS OTHERWISE SPECIFIED  
 1. CAPACITANCE VALUES ARE IN MICROFARADS, 100V.  
 2. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.  
 3. HEAT SINK REQUIRED.  
 4. SEE TABLE 1 FOR SPEED STRAPPING.

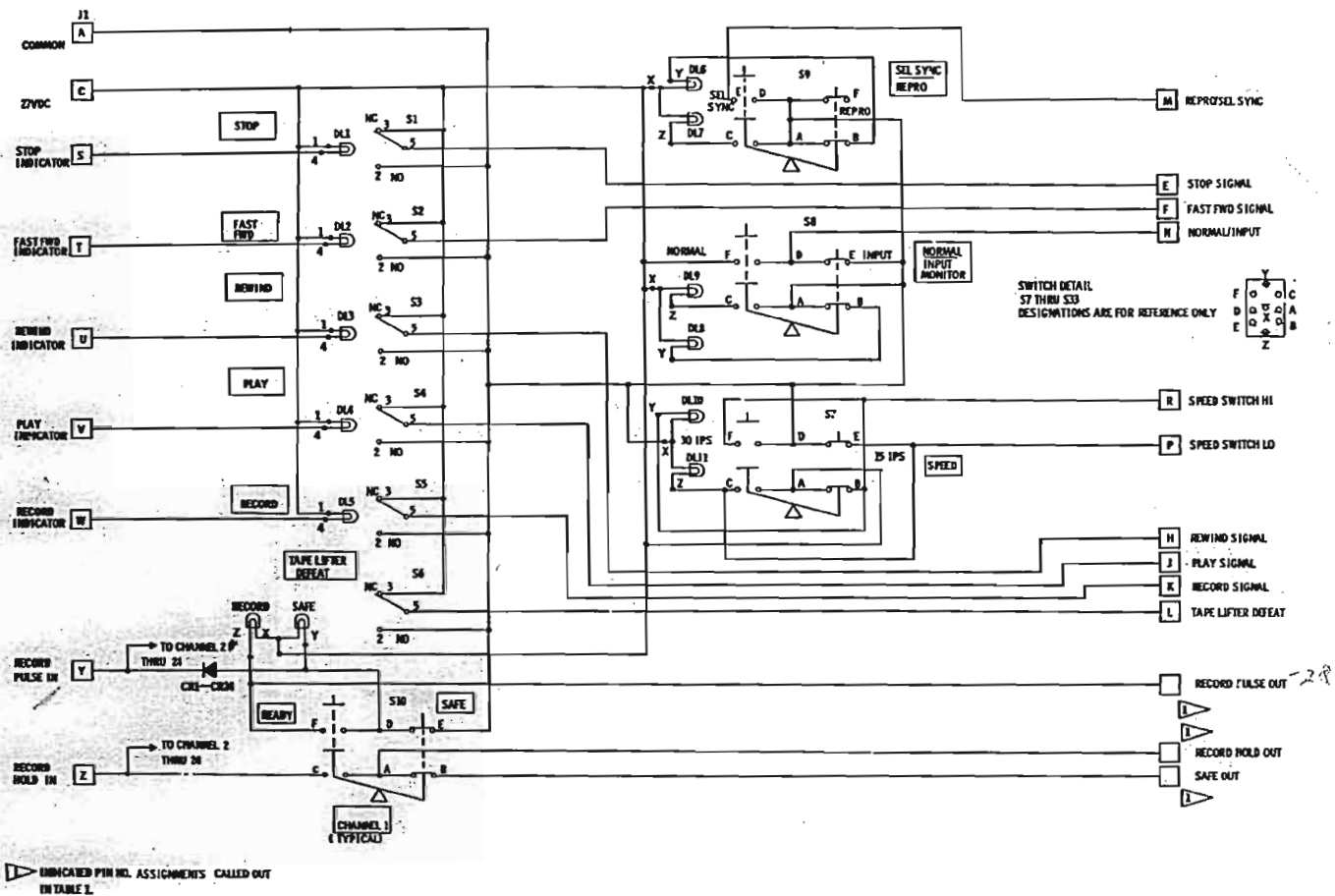


NOTES: UNLESS OTHERWISE SPECIFIED  
 1. CAPACITANCE VALUES ARE IN MICROFARADS.  
 2. RESISTANCE VALUES ARE IN OHMS.  
 ▲ HEATSINK REQUIRED.

4840336—  
 Motor Drive Amplifier

Sheet 1 of 1

Ref. Assy: 4050698

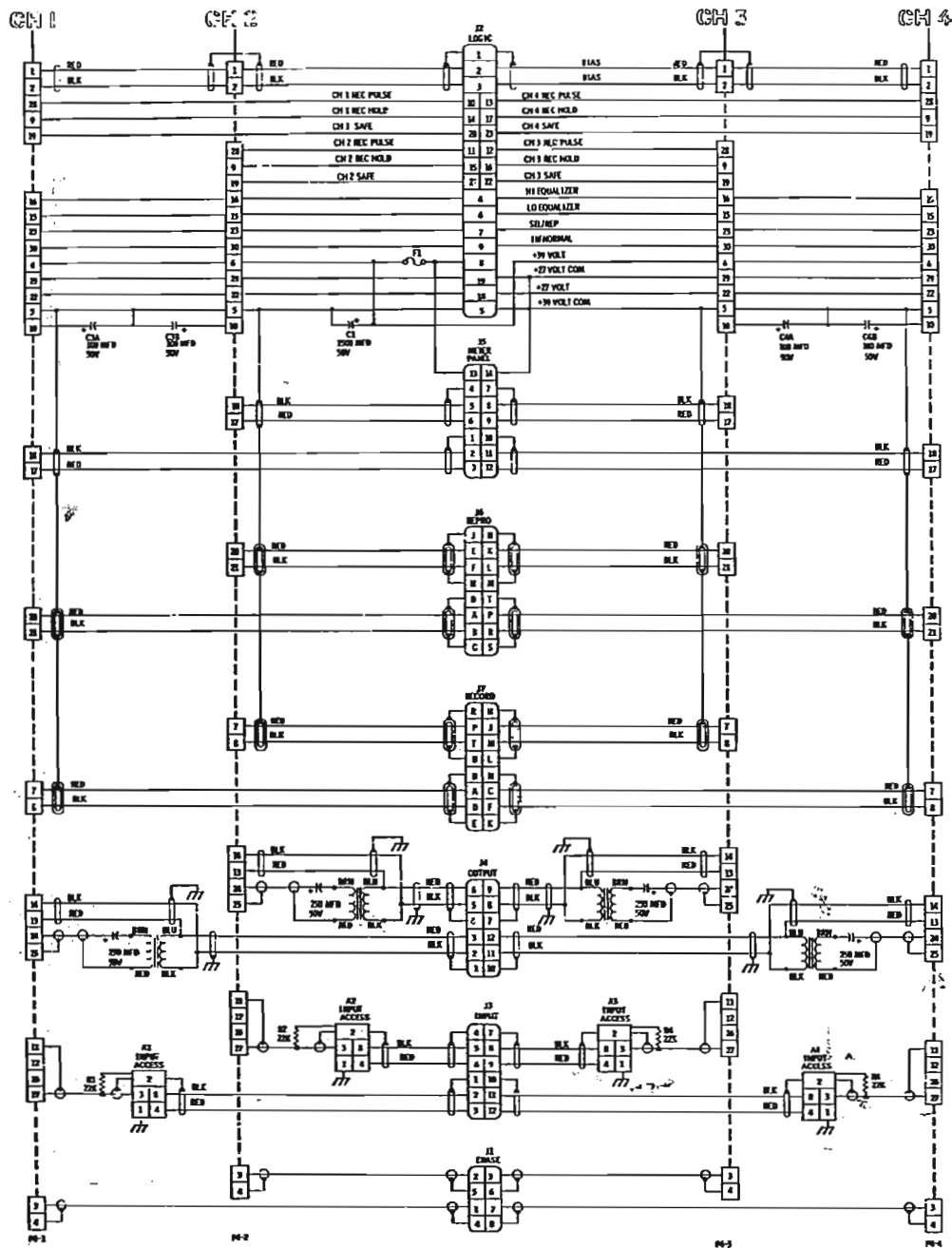


PIN ASSIGNMENTS				
CHANNEL NO.	SWITCH NO.	RECORD PULSE OUT PIN NO.	RECORD HOLD OUT PIN NO.	SAFE OUT PIN NO.
1	S30	a	AA	MA
2	S31	b	AB	MB
3	S32	c	AC	MC
4	S33	d	AD	MD
5	S34	e	AE	ME
6	S35	f	AF	MF
7	S36	g	AG	MG
8	S37	h	AH	MH
9	S38	i	AI	MI
10	S39	j	AJ	MJ
11	S40	k	AK	MK
12	S41	l	AL	ML
13	S42	m	AM	MM
14	S43	n	AN	MN
15	S44	o	AO	MO
16	S45	p	AP	MP
17	S46	q	AQ	MQ
18	S47	r	AR	MR
19	S48	s	AS	MS
20	S49	t	AT	MT
21	S50	u	AU	MU
22	S51	v	AV	MV
23	S52	w	AW	MW
24	S53	x	AX	MX
25	S54	y	AY	MY
26	S55	z	AZ	MZ
27	S56	aa	BA	NA
28	S57	ab	BB	NB
29	S58	ac	BC	NC
30	S59	ad	BD	ND
31	S60	ae	BE	NE
32	S61	af	BF	NF
33	S62	ag	BG	NB
34	S63	ah	BH	NC
35	S64	ai	BI	ND
36	S65	aj	BJ	NE
37	S66	ak	BK	NF
38	S67	al	BL	NG
39	S68	am	BM	NH
40	S69	an	BN	NI
41	S70	ao	BO	NJ
42	S71	ap	BP	NK
43	S72	aq	BQ	NL
44	S73	ar	BR	NM
45	S74	as	BS	NN
46	S75	at	BT	NO
47	S76	au	BU	NP
48	S77	av	BV	NQ
49	S78	aw	BW	NR
50	S79	ax	BX	NS
51	S80	ay	BY	NT
52	S81	az	BZ	NU
53	S82	ba	CA	NV
54	S83	cb	CB	NW

4840347—  
Control Box

Sheet 1 of 1

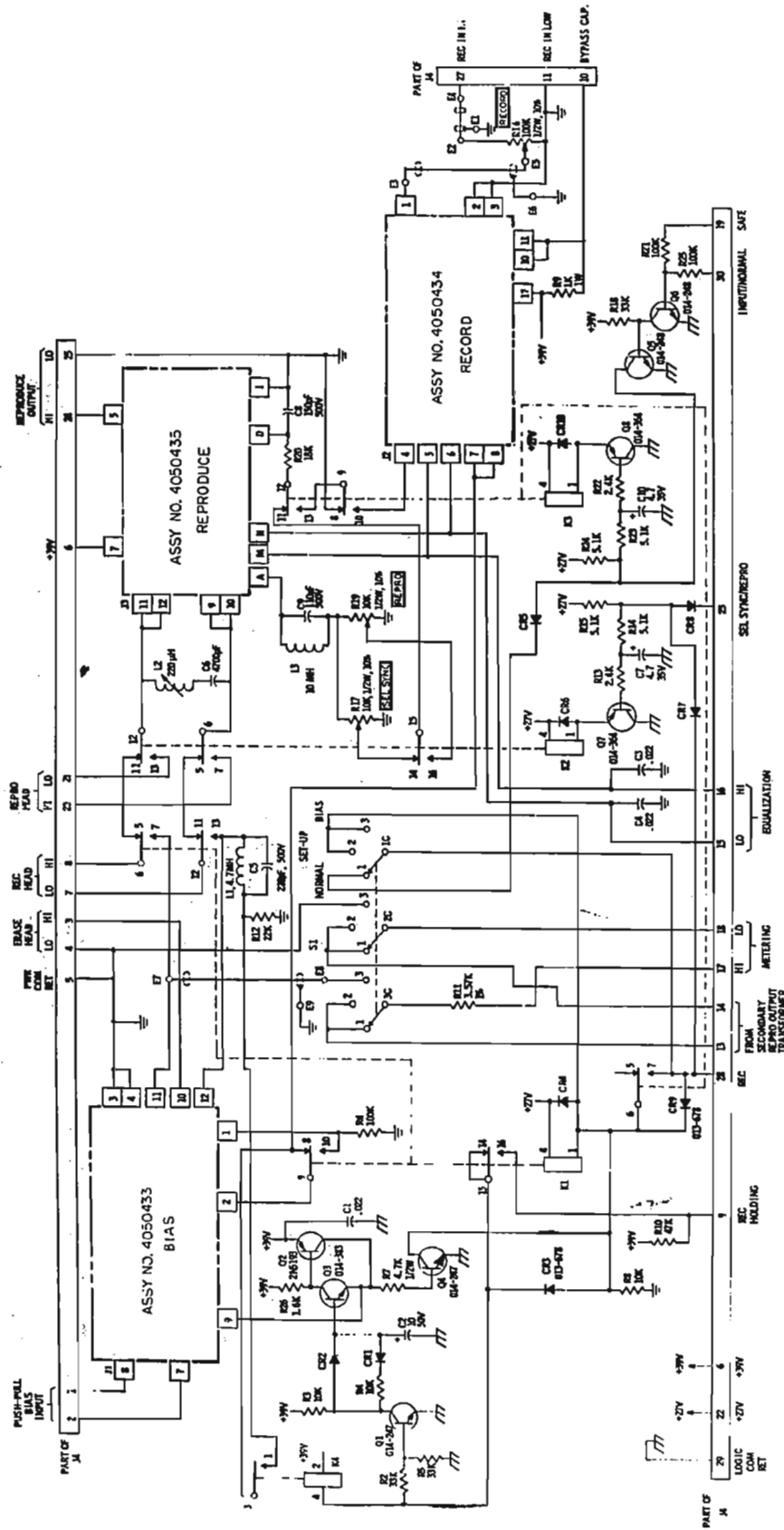
Ref. Assy: 4050646



4840327—  
Electronics Interconnect Diagram

Sheet 1 of 1

Ref. Assy: 4020371

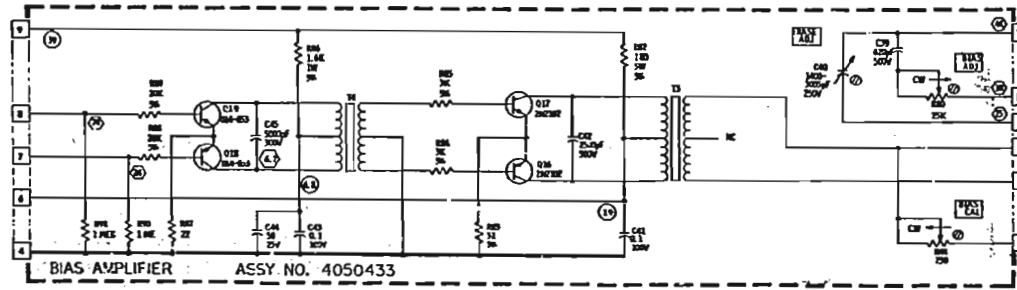
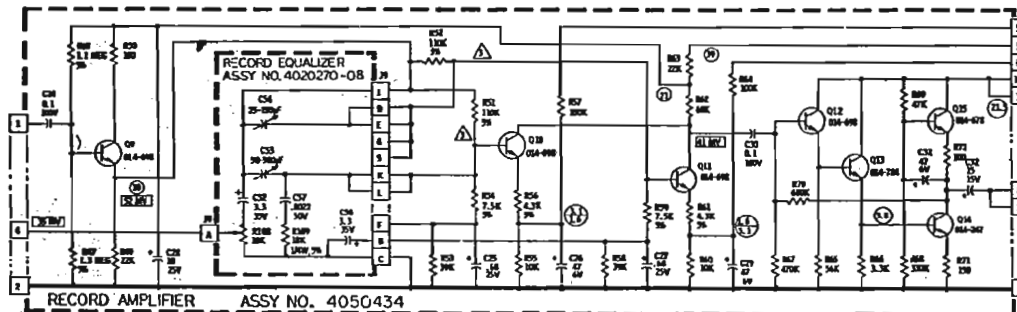
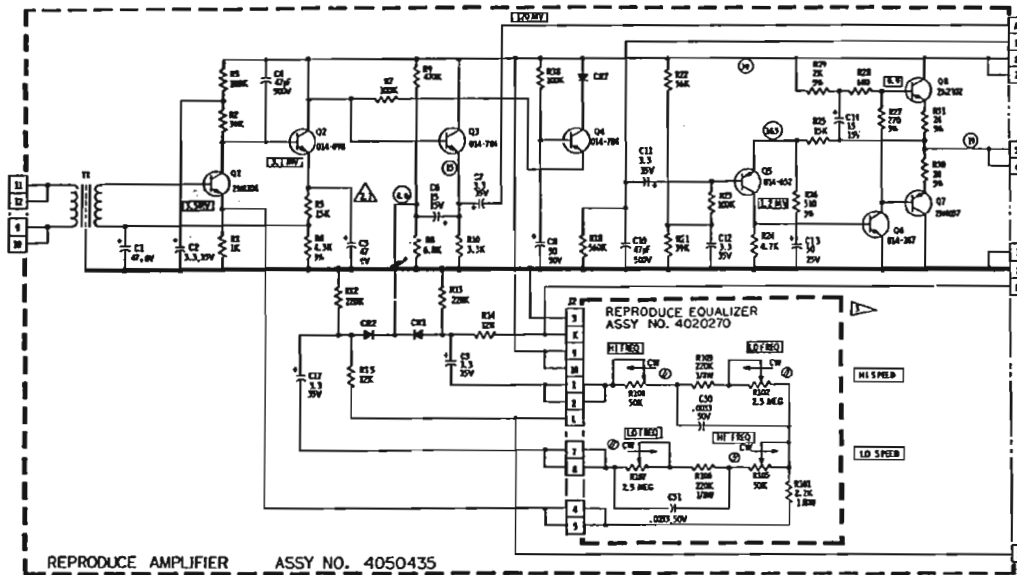


- NOTES: UNLESS OTHERWISE SPECIFIED
1. CAPACITANCE VALUES ARE IN MICROFARADS. 50F.
  2. DIODES ARE TYPE 1N34A.
  3. RESISTANCE VALUES ARE IN OHMS, UNLESS SHOWN OTHERWISE.
  4. LAST SCHEMATIC REVISION FOR 4050434-02 BOARD ASSY WAS

Sheet 1 of 1

4840344—  
Audio Switch

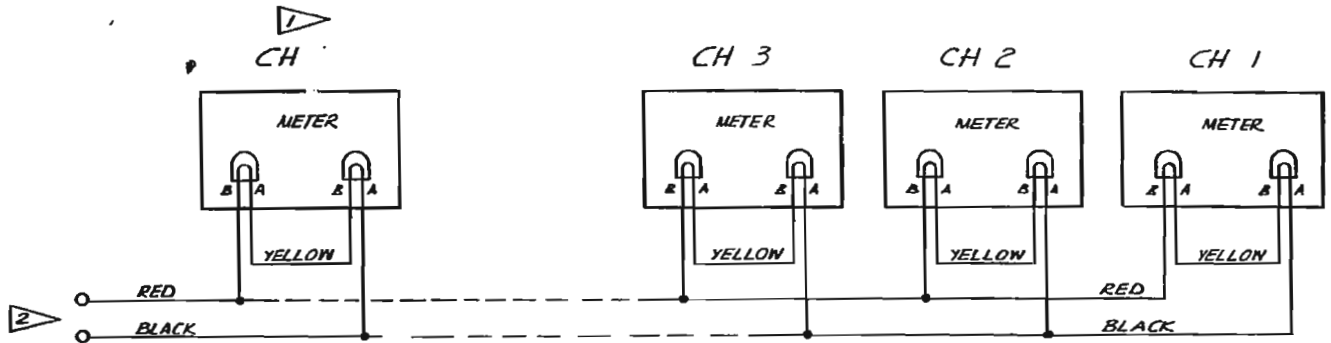
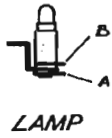
Ref. Assy: 4050690



- 1. CAPACITANCE VALUES ARE IN MICROFARADS
- 2. DIODES ARE TYPE 1N34-50L
- 3. RESISTANCE EQUALIZER Q40270-08 CAN BE ADJUSTED TO 0.01 OHM ACCURACY
- 4. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED
- 5. INDICATES VOLTS D.C. MEASURED WITH A 100 OHM IMPEDANCE VTM.
- 6. INDICATES VOLTS D.C. MEASURED WITH A HIGH IMPEDANCE VTM.
- 7. INDICATES VOLTS D.C. MEASURED WITH A HIGH IMPEDANCE VTM AT OPERATING LEVEL OF 3000 Hz.
- 8. INDICATES VOLTS A.C. MEASURED WITH A HIGH IMPEDANCE VTM AT 60 Hz FREQUENCY.
- 9. REFERENCE DRAWING Q40270-08 SCHEMATIC, AUDIO SWITCHING.
- 10. FIELD SERVICE COMPONENT SUBSTITUTION.

REF. DES.	AMP/EX P/N	BEAN/CS COM. EQUIVALENT
CX1, CX2, CX7	6X4-78	2N174
C6, C14	6X4-62	2N1229
C5	6X4-62	2N174
C19, C19	6X4-62	2N174
C25	6X4-62	2N174
C7, C9, C12	6X4-68	2N174
C8, C13	6X4-78	2N174

4840357A Sheet 1 of 1  
 Reproduce, Record, and Bias PWA's (Electronics, -02)  
 Ref. Assy: 4020371



NOTES:

- 1 ▷ CHANNEL B, 16, OR 24
- 2 ▷ QUICK DISCONNECT TERMINALS
- 3. ALL WIRINGS ARE # 22 AWG.

4840366—  
Meter Panel

Sheet 1 of 1

Ref. Assy: 4050707