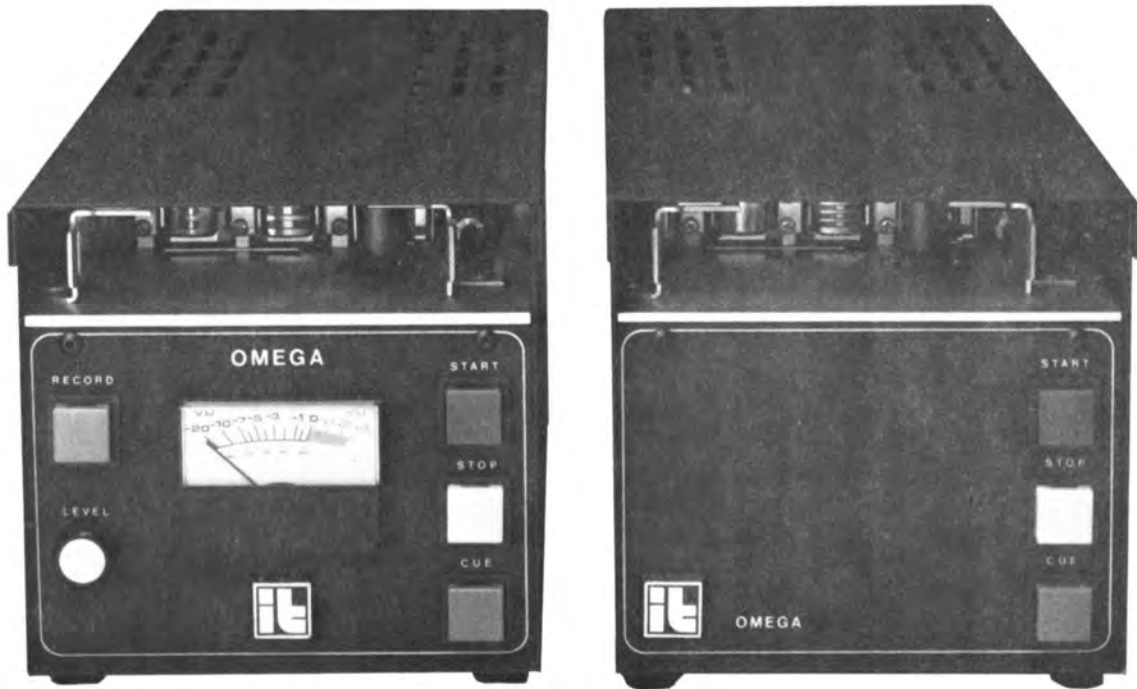


“OMEGA”

Technical Manual

890-0032-000

(5/87)



“Affordable Performance You Can Trust”

From

“The Leader in Reliability and Service”

International Tapetronics Corporation/3M
2425 South Main Street
P.O. Box 241
Bloomington, Illinois 61702-0241



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Preface

International Tapetronics Corporation/3M manuals are written with the intent of assisting the reader/user towards a better understanding of ITC equipment. Please read through this manual and familiarize yourself with the various procedures and tests necessary to keep your equipment in top operating condition. It is advisable to keep the manual in a convenient and readily accessible area near the machine.

Our test procedures are designed to allow adjustment for accurate and repeatable results while yielding performance within specifications.

Should you discover any errors or omissions, or wish to comment on the manual or equipment, your input will be greatly appreciated. Forward any suggestions or recommendations to the Technical Documentation Coordinator; c/o ITC Technical Service department.

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International Tapetronics Corporation/3M

WARRANTY CONDITIONS: There are no warranties, expressed or implied including the warranties of merchantability and fitness for use, beyond those stated herein.

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The sole or exclusive liability of ITC shall be to replace or repair the product as it may designate. **ITC assumes no liability for consequential damages or for any other loss, damage or expense, directly or indirectly arising from the use of its products.** In order to obtain warranty service ITC may require Purchaser to deliver the item to ITC at Purchaser's expense.

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Equipment Return Policy

When return of ITC equipment or components is necessary, please use the following procedure. These four easy steps will insure prompt attention for your equipment.

1. Call the ITC Technical Service Department for return authorization and assistance. We must know that your equipment is coming and what the problem is before we can help. Unexpected or unidentified equipment returned to us is subject to delay. Also, many problems can be diagnosed and rectified without actually returning the equipment, thereby saving you the expense of shipping and downtime.
2. Let us know who you are by writing a brief note listing the problem, your name, call letters or company name, address, phone number and who you spoke with at ITC. Enclose this note with the equipment. Also, make sure that your return address is visible on the outside of the carton.
3. Package the equipment securely! ITC is not responsible for shipping damage. If possible, use the original packing material. (Replacement packing material is available from ITC.)
4. Ship the equipment, prepaid, via a traceable mode of transportation; UPS, air express or air freight. Parcel Post and Air Mail are not traceable. Do not ship collect unless prior arrangements have been made. ITC recommends that you insure your shipment. Our Technical Service or Customer Service staff can assist with declared values for insurance purposes.

We continually strive to make available the finest in technical support and service for our products. Your help in making this possible is appreciated.

For Information On Warranty Or Service, Contact ITC At:

International Tapetronics
2425 S. Main St., P.O. Box 241
Bloomington, Illinois, USA 61702-0241

TEL: Toll-Free 800-447-0414; Alaska & Illinois call collect, 309-828-1381.

Outside The USA, Contact Your Local ITC Representative.

FCC Radio Frequency Emission Statement`

WARNING: This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Section I Introduction & Specifications

INTRODUCTION

This manual provides instructions for the installation, operation and maintenance of OMEGA series audio tape cartridge machines from International Tapetronics Corporation/3M. OMEGA machines are available as Stereophonic or Monophonic reproducers, and as Monophonic recorder/reproducers. All versions are covered by this manual.

ITC cartridge machines are designed and built for rugged use, with minimal required effort needed for normal servicing.

OMEGA series cartridge machines utilize a crystal-referenced, DC brushless capstan motor and bottoming solenoid for stable flutter & speed accuracy. A toroidal power transformer significantly reduces heat and minimizes radiated electromagnetic fields. Also, a patented head mounting module provides precise adjustment and alignment for tape contact. Access for adjustments and routine servicing is made via an easily removable top cover.

Electronics are contained on three (3) major printed circuit boards:

1. The main board, (PLAY/LOGIC), holds the microprocessor-based playback/record logic system, solenoid driver circuits, cue/reproduce amplifiers, and output transformers. Power supply components are located separately on a small PCB assembly which mounts next to the solenoid.
2. A second board, (MOTOR CONTROL), contains the motor servo system, including the frequency reference, motor tachometer, and winding driver circuits. This board is mounted next to the motor, underneath the deck plate.
3. The third major board (RECORD), is used in the recorder/reproducer only. This board contains the recording circuits, including the input amplifier, meter amplifier, bias generation and amplifier circuits, and the record logic (switch & lamp) interface to the microprocessor. Also, the record head drivers are located on this board.

The design of the rear housing and PC mountings allow the PLAY/LOGIC and RECORD boards to be tilted up and over the chassis, into an "in-circuit" test position. This permits servicing the boards during operation without extender boards or other custom service aids.

SPECIFICATIONS: OMEGA series cartridge machines

Power-

- A. 105-132 VAC or 210-264 VAC
- B. 50/60 Hz

Power consumption-

- A. Mono Reproducer: 45 VA Typ.; 65 VA Max.
- B. Stereo Reproducer: 45 VA Typ.; 65 VA Max.
- C. Mono Recorder/Reprod.: 50 VA Typ.; 70 VA Max.

Tape Speed-

- A. 7.5 IPS (19 cm/s) Standard
- B. 3.75 IPS (9.5 cm/s) Strappable Option

Speed Accuracy-

Better than +/- 0.2%

Capstan Motor-

- A. Direct Drive
- B. DC Brushless
- C. Non-magnetic, Stainless Steel Shaft.
- D. Permanently Lubricated Ball Bearings
- E. Crystal-referenced, Phase-locked Controller

Record/Play Flutter-(measured on a 3.5 min. cart)

- A. Play Max.: 0.12% DIN Wtd. @ 7.5 IPS
- B. Rec/Play Max.: 0.15% DIN Wtd. @ 7.5 IPS

Audio Output Configuration-

Transformer Coupled

Audio Output Impedances-

600 Ohm Recommended Load Impedance
(180 Ohm Source Impedance)

Audio Output Level-

+18 dBm Before Clipping Into 600 Ohm Load

Distortion-*

System: 1.5% or less THD. (Tape dependent)

Noise-

A.* Signal to Noise: Measured with bias/
no signal.

MONO	STEREO	MIC-MONO R/P
56 dB	54 dB	51 dB
(or better)	(or better)	(or better)

B.* Signal to Noise: No tape running;
ScotchCart™ II broadcast cartridge in place.

MONO	STEREO
58 dB	56 dB
(or better)	(or better)

C. Squelch Noise-
70 dB or better

Crosstalk (System)-*

-50 dB Minimum Separation Between Any Two
Channels.

Frequency Response-*

A. Playback: +/- 2.0 dB, 50 Hz to 16kHz
B. R/P-Line
Level Input: +/- 2.0 dB, 50 Hz to 16 kHz
C. R/P-MIC
Level Input: +/- 3.0 dB, 300 Hz to 10 kHz

Equalization-

A. 1975 NAB: Factory Standard
B. 1964 NAB: Field Convertible
C. CCIR: Field Convertible

Adjustments: High Frequency Via Potentiometer
Low Frequency Via Jumper

Head Configuration-

NAB Standard: Mono Play; Stereo Play; Mono R/P

Cue Signals- (Conforms to NAB Specification)

A. NAB Primary Cue: 1 kHz
B. NAB Secondary Cue: 150 Hz
C. External Cue:
1. Cue Record Logging Input-
Source Impedance: 10K Ohms or less
Volts In: 0.5 +/- .25V RMS
2. Cue Reproduce Audio Output-
Load Impedance: 47K Ohms or greater
Volts Out: 0.5 +/- .25V RMS

Audio Input Sensitivity-

A. Line Input: 0 dBm nominal
B. MIC Input: -70 dBV nominal

(Input Range: +/- 18 dB From Midpoint Setting
Of Front Panel Level Control Knob.)

Audio Input Configuration-

A. Line Input-Transformer Coupled:
1. 20K Ohm Bridging Standard
2. Strappable for 150/600 Ohms Terminating
Impedance

- B. Microphone Input:
 - 1. Unbalanced
 - 2. Input Impedance: 50K Ohms

Metering-

- A. Monitors Input Level To The Recorder
- B. Taut Band Movement with "A" Scale

Bias-

111.84 kHz, Crystal-referenced

Cartridge Size-

NAB A/AA

Start Time-

100 ms typical. (Dependent on solenoid air-damp adjustment.)

Stop Time-

Less than 100 ms typical.
(Tape travel varies according to type of cartridge and length of tape)

Ambient Operating Temperature Range-

10 to 50 Degrees C. (50 to 122 Degrees F.)

Storage Temperature Range-

-40 to +85 Degrees C. (-40 to +185 Degrees F.)

Front Panel Controls-

- A. START Switch: On during RUN; flashes upon 150 Hz detection.
- B. STOP Switch: On during READY; flashes slowly upon 1 kHz Cue detection; flashes fast when stopped manually.
- C. RECORD SET Switch/150 Hz Record: On during RECORD/RECORD SET; flashes when 1 kHz tone is defeated. Records 150 Hz cue tone when pressed while machine is in RECORD or RUN.
- D. CUE Switch: Used for high-speed cue & audio mute from STOP, START, or RECORD modes. (Cancels RECORD SET.) Pressing CUE while in high-speed cue causes audio to turn ON for duration of switch closure.

Remote Controls-

- A. START Switch
- B. STOP Switch
- C. CUE Switch (high-speed & mute)
- D. RECORD SET/150 Hz Cue Record/
1 kHz Defeat Switch
- E. Cue Bias Enable Switch
- F. RUN Lamp: On during RUN; flashes upon
150 Hz detection.**
- G. READY Lamp: On during READY; flashes slowly
upon 1 kHz Cue detection; flashes fast when
stopped manually. **
- H. CUE Lamp: On during high-speed cue.
- I. 150 Hz Cue Open Collector Switching to
Ground: (operates on 150 Hz Cue detection)
 - 1. Maximum Voltage: 25 VDC
 - 2. Maximum Current: 200 ma
- J. Record Lamp: On during RECORD/RECORD SET;
flashes when 1 kHz tone is defeated.**

** Ratings for lamps **

- 1. Maximum Voltage: 25 VDC
- 2. Maximum Current: 150 ma

External Connectors-

Screw Terminal blocks - Audio & Remote Control

Mounting-

- A. Table-top Standard
- B. Rack-mount Optional with URM-0001 Rack-
mount Kit
(Three units may mount side-by-side)

Dimensions-

- A. Width: 14.6 cm (5.75")
- B. Depth: 38.1 cm (15.00")
- C. Height: 13.34 cm (5.25")
Add 1 cm (.375") for feet.

Weight- (Typical)

- | | |
|-----------------------------------|-------------------|
| A. Mono Reproducer: | 6.84 kg (15 lbs.) |
| B. Stereo Reproducer: | 6.84 kg (15 lbs.) |
| C. Mono Recorder/
Reproducer: | 6.84 kg (15 lbs.) |
| D. Total Max.
Shipping Weight: | 9.1 kg (20 lbs.) |

Note: Specifications marked with a single asterisk (*) were made with a ScotchCart™ II broadcast cartridge at a reference level of 1 kHz @ 250 nWb/m.

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Without Notice.

Section II Installation & Operation

UNPACKING, HANDLING & PRE-INSTALLATION CHECKOUT

Fully unpack the unit, retaining all packing material. Place the unit in an area suitable for servicing. Visually inspect the chassis and cover for signs of freight damage. This inspection is necessary in order to determine if a damage claim is warranted.

Occasionally, damage is hidden and not readily apparent on external examination. Remove the top cover by sliding the cover forward approximately 1/4" and lifting the cover off. Inspect internal components for signs of damage.

CAUTION

If damage is discovered--DO NOT POWER UP THE UNIT! Personal injury or further damage to the machine may occur. When a machine is damaged in shipment, please follow this procedure:

1. Call the ITC Customer Service department to inform them of the damage.
2. Describe the damage, how it was discovered and whether the delivering carrier has been informed. We can assist in determining what forms need to be submitted for a claim.
3. Do not repack the machine or dispose of any packing material until an inspection has been made by the delivering carrier or a representative.

After it is determined that the unit has not been damaged in shipment, check all internal connectors and other assemblies to make sure that nothing has been shaken loose or come unplugged. Verify that the line cord and fuse are correct for your type of installation: (See Table 2-1)

Table 2-1

Unit Type	Description	Part Number
-Line Cord-		
120V	North American plug, molded, with ground lug.....	433-0001-000
240V	European type pigtail provided for customer installed connector.....	433-0007-000

European Color Code for Leads:		
Brown = Live Conductor		
Blue = Neutral Conductor		
Green w/Yellow Stripe = Ground		

-Fuse Carrier-		
120V	3AG size fuse holder (Grey).....	418-0006-000
240V	5mm x 20mm European fuse holder. (Black).....	418-0007-000
-Fuse-		
120V	3AG, .75 Amp time-delay type.....	417-0012-000
240V	5mm x 20mm, 250V, 400 mA slo-blo type.....	417-0018-000

Operational Checkout Prior to actual installation, it is advisable to perform a short, operational check on the unit:

1. With the top cover removed, plug the unit in and check to make sure that the motor is running. No front panel lamps will be illuminated.

2. Insert a blank tape cartridge into the machine. The yellow (READY/STOP) lamp will illuminate, indicating the motor and microprocessor are functional.

3. Press the green (RUN/START) button. The green lamp will come on, the yellow lamp will go out, the solenoid plunger will pull in and tape will be pulled.

4. Press the yellow button. The green lamp will go out, the solenoid plunger will release and the tape will stop. The yellow lamp will be flashing.

5. Press the blue button. The blue lamp will illuminate, the solenoid pull in again, and and the motor increase to approximately 3X normal speed for "high-speed" cueing. Simultaneously, the yellow lamp will extinguish.

6. Press the yellow button. As before, the function in progress will be halted. The blue lamp will extinguish, and the yellow lamp flash.

7. Remove the cartridge from the machine. The yellow lamp will go out. Unplug the unit.

If the motor fails to run or if any of the lamps fail to illuminate, check connections to make sure that nothing has come loose. The lamps may be checked by removing the switch lens (pull straight forward) and reseating the bulb.

Factory Setup

Factory setup procedures call for adjusting and testing this unit to prevailing industry standards. The unit's final setup standards may be different than those already in use at your facility. Therefore, a careful check of this unit's operating parameters is in order to insure that the unit conforms to your needs. We make every possible effort to insure the accuracy of our factory adjustments and presume that certain setup conditions exist at your facility. These conditions include, but are not limited to input level, output level, record fluxivity, equalization, tape type, cartridge type, etc. Please check the unit's final inspection tag and the Specifications section of this manual for setup information.

To complete the pre-installation process, make note in your company's permanent records of the date you received the equipment, and the model/serial numbers. You may need this information for future reference.

INSTALLATION

Machine Installation

TABLE TOP: Your OMEGA cartridge machine was shipped from the factory as a table-top unit. Up to three (3) units may be mounted on top of each other. Units should not be fully enclosed unless additional ventilation is provided by external sources. (See **VENTILATION**) In addition, units should not be placed on top of equipment producing large amounts of heat.

RACK MOUNTING: OMEGA cartridge machines may be rack mounted. Three (3) units will fit side-by-side in a standard 19" rack opening. ITC makes available a universal rack mounting kit and filler panel as options. Please refer to Table 2-2 for ordering information.

Table 2-2

<u>Description</u>	<u>Part Number</u>
URM-0001 Universal Rack Mount.	878-0089-010
1/3 Rack Width Filler Panel.	878-0091-000

To prepare the unit for rack mounting, remove all four (4) feet and the top cover. Place these parts in a storage area for use if needed again.

CAUTION

Rack mounted units may be installed without lids, and must have power disconnected during removal from or installation into the rack frame.

Ventilation

The unit's top cover, and the URM-0001 (rack mount), are slotted to allow normally generated heat to dissipate without allowing debris to fall into the chassis. No forced air cooling is needed unless the unit is to be installed in fully closed, unventilated housing. If a fully closed housing is used, a ventilating fan should be installed to draw heat away from the unit. Also, check air-flow from the fan and install a filter if needed to prevent excess dust from being drawn into the cart machine.

CAUTION

Do not block the top cover slots, or those of the URM-0001 by placing material on top the unit. Abnormal heat buildup will cause component life to be considerably shortened.

EXTERNAL AUDIO/REMOTE CONTROL CONNECTIONS

External Input/Output

Connections for external audio inputs/outputs and remote controls are made at rear panel terminal blocks.

Audio output for playback units is balanced, transformer coupled. Audio input for record/playback units is transformer coupled, balanced or unbalanced. (See Jumpers & Straps #3.)

MICROPHONE/LINE LEVEL INPUT SELECTION SWITCH

Recorder Input Switch

Slide switch S301, located on the Record Amplifier PCB, is used to select EITHER the Microphone level input, (TB301-Pins 1 & 2), or the Line audio input, (TB301-Pins 3 & 4). ONLY one input may be selected at a time. The slide switch knob is moved toward the back of the machine for Line position and toward the front of the machine for Microphone position.

Microphone Wiring

Microphone input is unbalanced. Please refer to Figure 2-1. for a sample microphone wiring diagram.

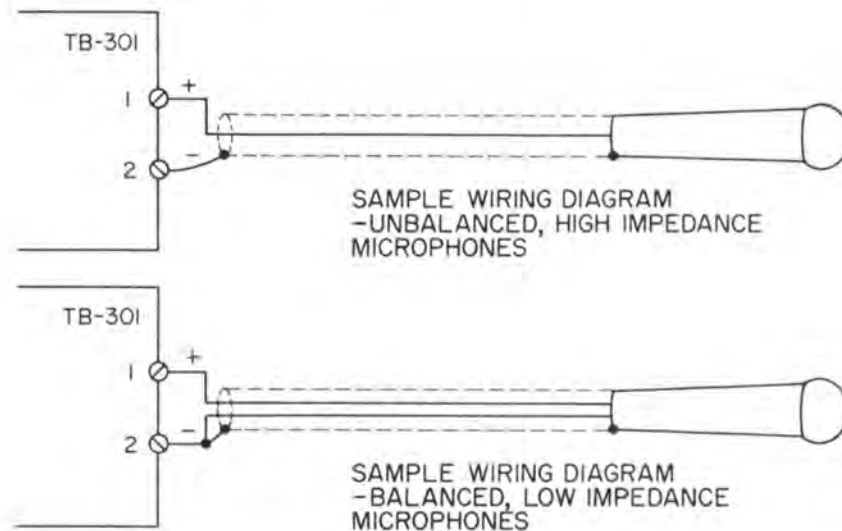


Fig. 2-1

Cabling

ITC recommends that only shielded, twisted pair cable be used for input/output connections. In some remote audio output applications, unshielded cable may be tolerated if necessary, but this is not recommended.

Hookup

+(plus) and -(minus) signs on audio connections are indications of proper (stereo) phase relationship only and do not reflect DC voltage potential. It is necessary to connect the +(plus) lines of both channels to the corresponding +(plus), or equivalent terminal of the terminating equipment. This will prevent audio phase reversals (mono sum errors).

Terminal Blocks

Terminal function designations for the PLAY/LOGIC and RECORD PCB terminal blocks are shown in Tables 2-3 and 2-4. Included with each table is a sample remote control connection diagram for reference purposes.

Table 2-3

Play PCB Terminal Block-TB201 (Remote)

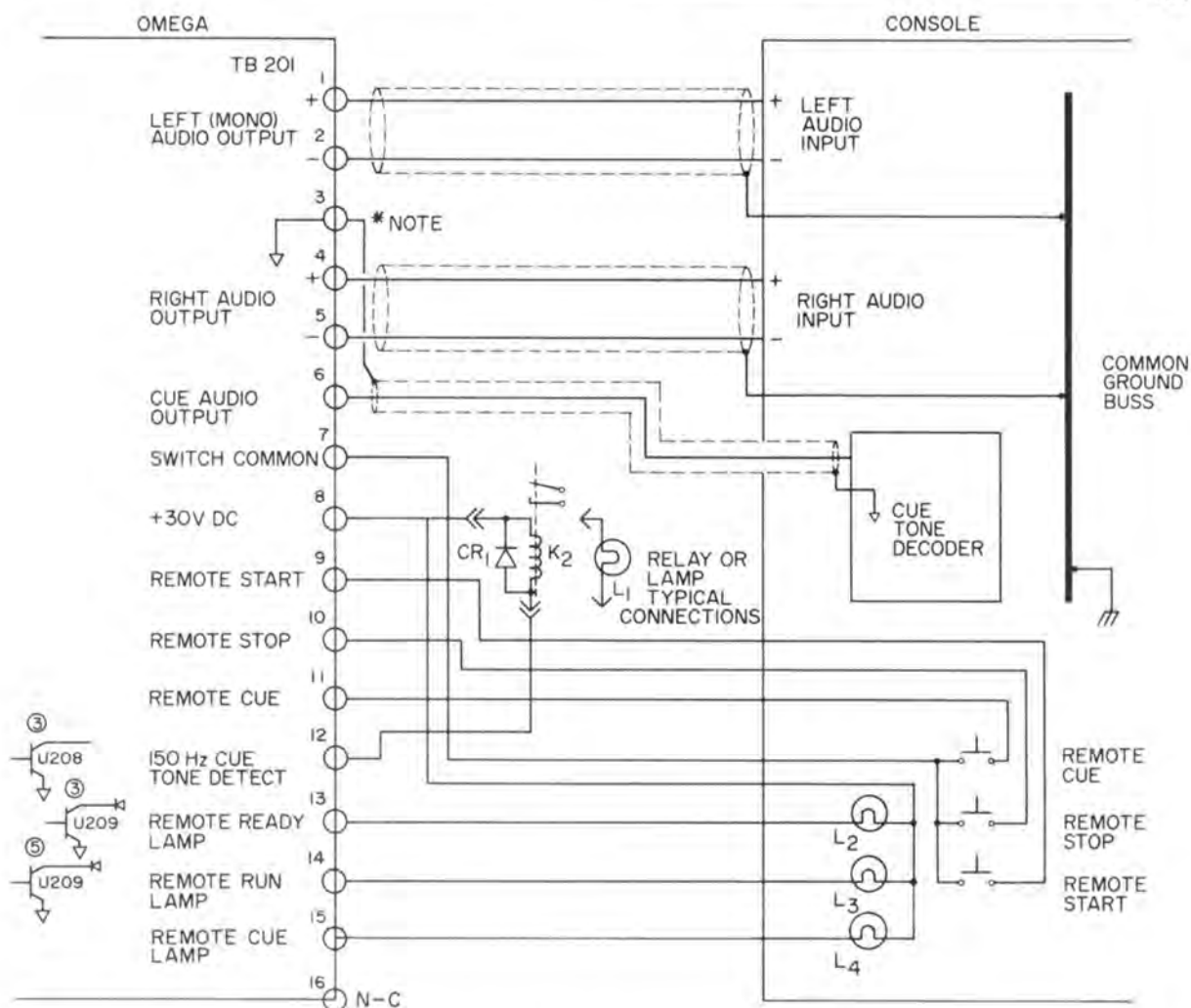
#	Function	#	Function
1	(+) Left (MONO) Audio Out	9	Remote START Switch
2	(-) Left (MONO) Audio Out	10	Remote STOP Switch
3	Signal Common	11	Remote CUE Switch
4	(+) Right Audio Out	12	Remote 150 Hz Cue Detect-Open Coll
5	(-) Right Audio Out	13	Remote READY-Open Collector
6	Cue Audio Out	14	Remote RUN Open Collector
7	Switch Common	15	Remote CUE Open Collector
8	Unregulated +30 Volts	16	No Connection

MAXIMUM OPEN COLLECTOR RATINGS ARE:
 MAXIMUM VOLTS 25V
 MAXIMUM CURRENT 200 ma
 SATURATION VOLTS 0.7V MAX @ 200 ma

$K_1 = 24V$ DC RELAY, 200 ma MAX COIL CURRENT
 $CR_2 = IN4005$, OR EQUIVALENT
 $L_1-L_3 = 327$ OR EQUIVALENT

*NOTE: CUE AUDIO OUTPUT IS HIGH IMPEDANCE UNBALANCED, AND MAY NOT REQUIRE GROUNDING OF THE SHIELD AT EACH END, DEPENDING UPON THE DECODER REQUIREMENTS, AND ITS CONNECTION TO OTHER EQUIPMENT

Fig. 2-2



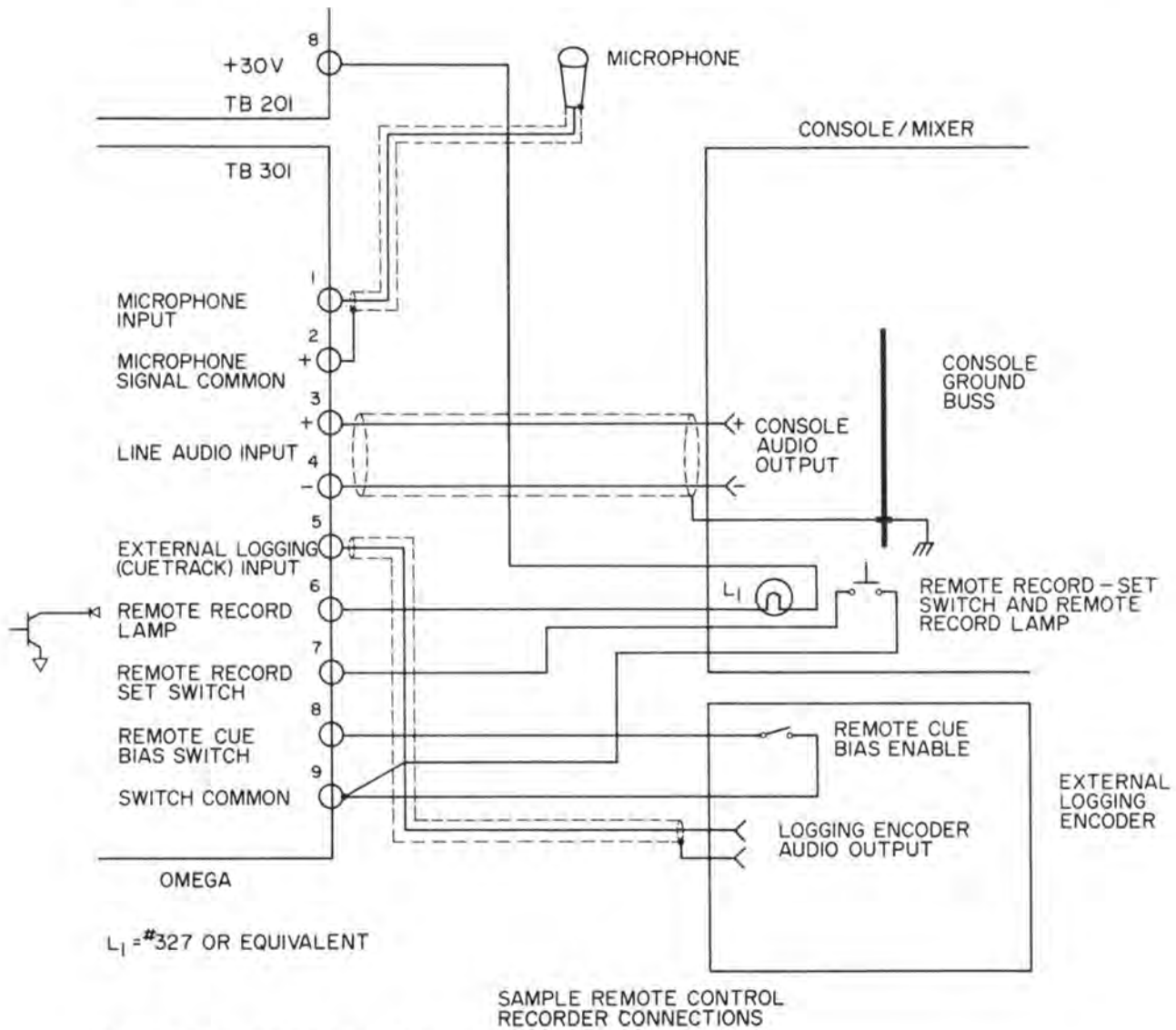
Sample Remote Control Schematic -- OMEGA Playback

Table 2-4

Record PCB Terminal Block-TB301 (Remote)

#	Function
1	MIC Input
2	MIC Signal Common
3	(+) Line Audio Input
4	(-) Line Audio Input
5	External Logging Input
6	Remote RECORD Lamp
7	Remote RECORD SET Switch
8	Remote Cue Bias Switch
9	Switch Common

Fig. 2-3



MAXIMUM OPEN COLLECTOR RATING IS:
 MAXIMUM VOLTS 25V
 MAXIMUM CURRENT 200ma
 SATURATION VOLTS 0.7 MAX @ 200 ma

Sample Remote Control Schematic -- OMEGA Record PCB

Grounding & Shielding

Proper grounding and shielding techniques are important in insuring safe and noise-free operation. Fig. 2-4 illustrates a common installation technique for the prevention of audio (hum) ground loops. Notice that all third-lug connections must be made through this studio's AC power distribution system. This technique allows the mixer ground bus to become the central grounding point for all equipment in the studio.

CAUTION: The third (ground) lug should not be removed due to the increased potential for a shock hazard.

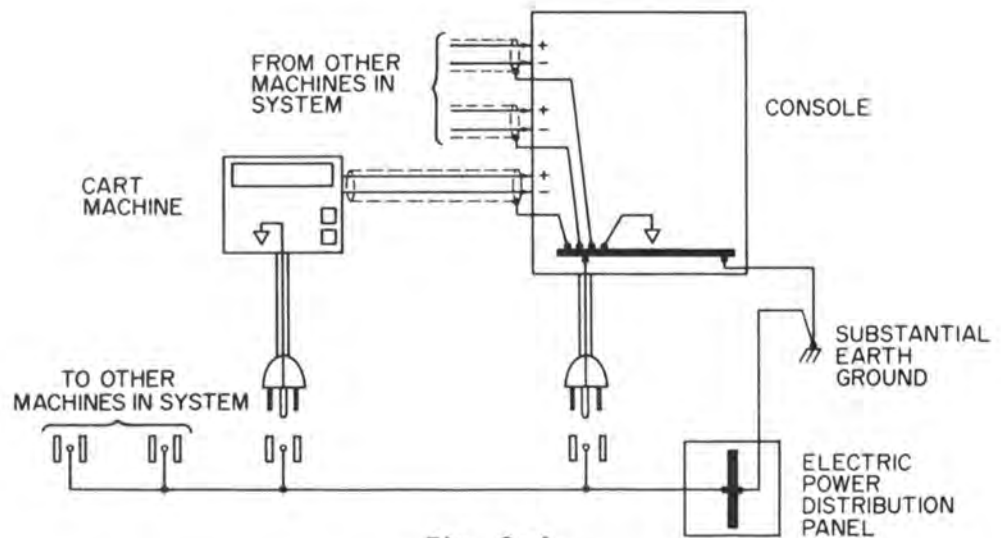


Fig. 2-4

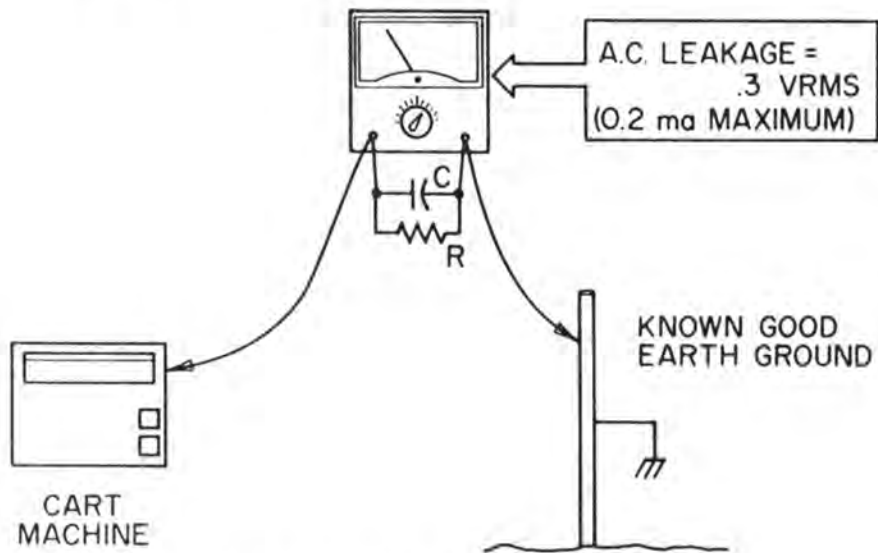
AC Leakage Test

AC leakage currents in the system, between chassis components of properly connected and operating equipment, will be minimized. In any new equipment installation, AC leakage currents must be measured. **Leakage of more than 200 microamps indicates a potentially hazardous condition that must not be left unremedied!**

Use an AC voltmeter of 5000 Ohms per volt, or greater, and build a parallel circuit consisting of a 1500 Ohm, 10 Watt resistor and a .15 mfd capacitor, connected as shown in Figure 2-5.

Measure the voltage between a known good earth ground and an exposed metallic part on the chassis of the equipment under test. **Voltage measured must not exceed .3V RMS, (corresponding to 0.2 ma AC).** ANY value exceeding this limit must be considered a potential shock hazard and should be remedied immediately.

Fig. 2-5



* R = 1500 OHM, 10 WATT
C = .15 MFD

COURTESY OF E.I.A. CONSUMER ELECTRONICS
SYSTEMS TECHNICIAN SAFETY GUIDELINES
(7-84)

Sample AC Leakage Test Wiring

The studio construction technique shown in Fig. 2-4 is sometimes called "Spoke", or "Hub and Spoke" construction. In this technique, the mixer is always considered to be the electrical "Hub" of the studio, with all other equipment connected to the mixer in a "Spoke" fashion. All grounding is referenced to the mixer (Console) as is power distribution. Correct and incorrect grounding techniques are illustrated in Fig. 2-6.

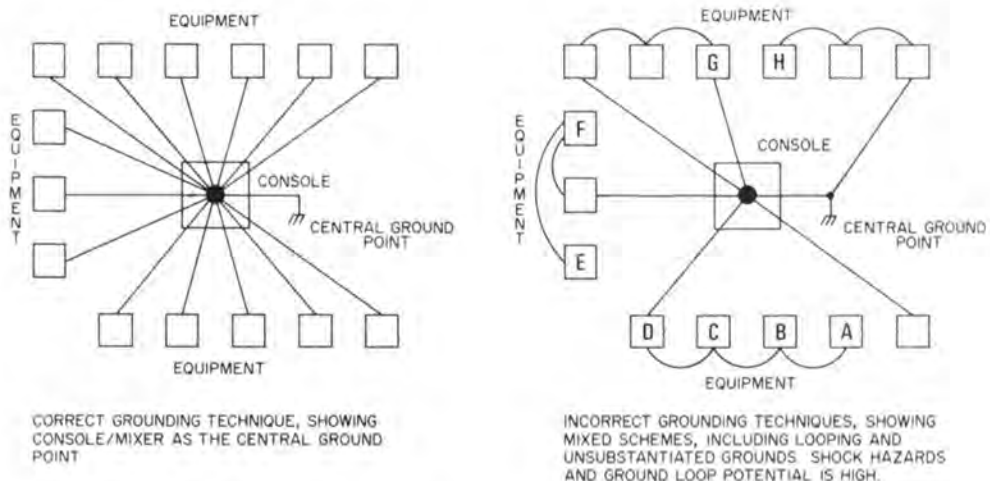


Fig. 2-6

Proper & Improper Grounding

Leakage current measurements between machine A and the mixer will usually reveal a serious ground fault because of the long route back to the mixer. The **ACTUAL** route is A to B to C to D, then back to the mixer before true ground is achieved.

Similarly, leakage current between machines E and H is significant due to its equally lengthy route.

JUMPERS & STRAPS
(Special Functions)

Function Modification

OMEGA series cartridge machines are factory configured for broadcast industry standard operation. All standard configuration machines also have the ability to be reconfigured via jumper and strap changes for special operation to meet the needs of your particular installation.

Flashing Ready Lamp

1. **START LOCK OUT/1 kHz FLASH (yellow lamp):** As supplied from the factory, the READY (Stop) lamp will flash slowly when a cartridge plays through to the 1 kHz cue tone and stops. To disable this "flashing READY" on cue up, install jumper W201 on the PLAY/LOGIC PCB.

Repeat-Play Lockout

As supplied from the factory, a cartridge that has played through to the 1 kHz cue tone and stopped may be replayed by pressing the START button. To prevent accidental replay of the same cartridge, enable the repeat play lockout by installing W202 on the PLAY/LOGIC PCB. Please refer to Figure 2-7 and Table 2-5 for exact location and function.

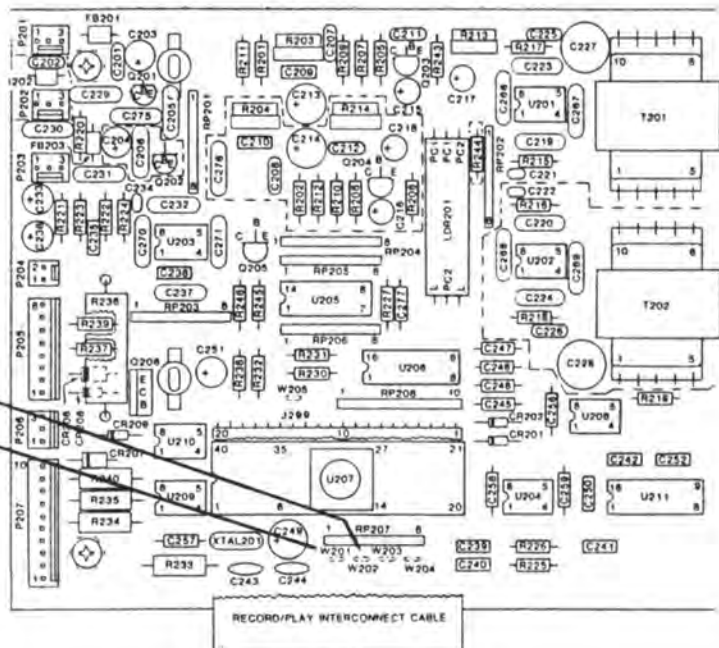
Fig. 2-7

W202

W201

Table 2-5

FUNCTIONS	STRAP	
	W201	W202
NO FLASH, NO START LOCK OUT	IN	IN OR OUT
FLASH, NO START LOCK OUT	OUT	OUT
FLASH, START LOCK OUT	OUT	IN



Reproduce PCB

**150 Hz Detect/
Flashing Run-
Lamp**

2. 150 Hz AUDIO MUTE/FLASH & HIGH-SPEED CUE:
As supplied from the factory, the START (green) lamp will flash upon detection of a 150 Hz Secondary cue tone and continue to flash until the tone ends. The 150 Hz flash may be disabled by installing jumper W204 on the PLAY/LOGIC PCB.

**Automatic
Audio Muting**

As supplied from the factory, a 150 Hz Secondary cue tone will cause audio to mute at the trailing edge of the tone and the cartridge will high-speed recue with the CUE lamp illuminated. 150 Hz cue tone audio mute may be disabled by installing jumper W203 on the PLAY/LOGIC PCB. High-speed recue may be disabled by installing jumper W205 as shown. Please refer to Figure 2-8 and Table 2-6 for exact locations and functions.

**High-Speed
Cue Defeat**

Fig. 2-8

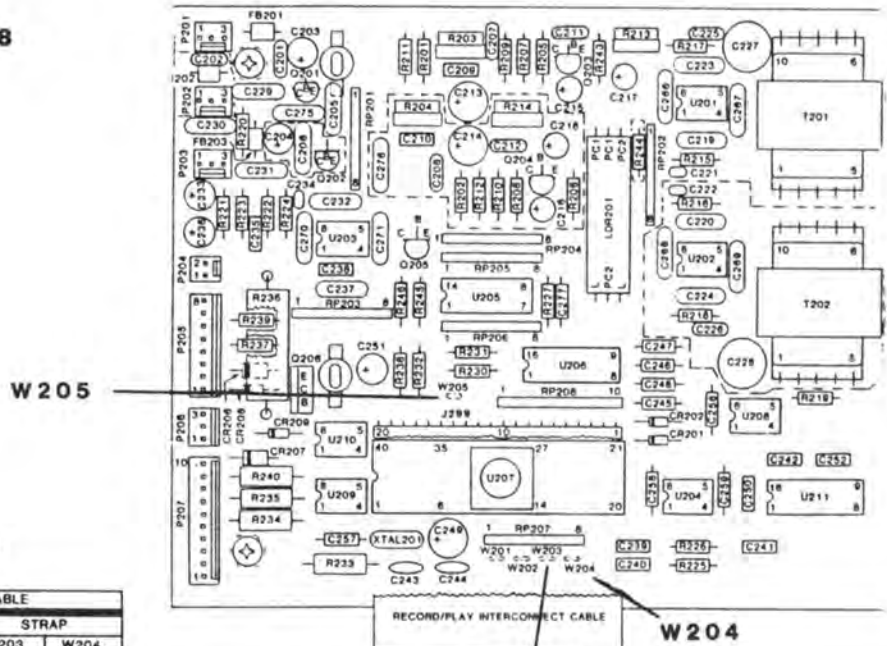


Table 2-6

150 Hz DETECT TABLE		
FUNCTIONS	STRAP	
	W203	W204
150 Hz AUDIO MUTE	OUT	
NO 150 Hz AUDIO MUTE	IN	
150 Hz FLASH		OUT
NO 150 Hz FLASH		IN

Reproduce PCB

3. RECORDER INPUT IMPEDANCE:

(Note: Nominal input level is selectable via an internal slide switch for Line or Microphone. Only one may be selected at a time. Microphone input impedance is NOT adjustable.)

Line Input:

The unit is shipped from the factory set up for 20K Ohms bridging input, transformer coupled. If 20K Ohms BALANCED bridging input is desired, jumper W303 on the RECORD PCB should be installed.

Also, if 150 or 600 Ohms terminating is needed, jumpers W301 and W302 respectively are available. Please refer to Figure 2-9 for exact location.

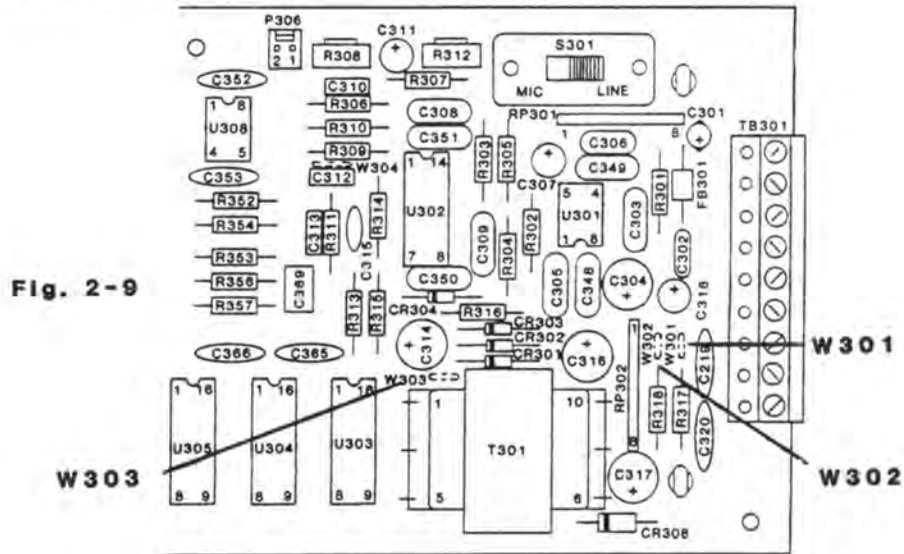


Fig. 2-9

Record PCB

4. SERVO MOTOR SPEED: Standard motor speed is set at 7 1/2 IPS as supplied from the factory, unless otherwise specified when ordered. Units may operate at 3 3/4 IPS by performing the following modification: On the MOTOR CONTROL PCB, (Figure 2-10), cut foil trace W101 on the PCB back side. Load wire jumper W102 as shown.

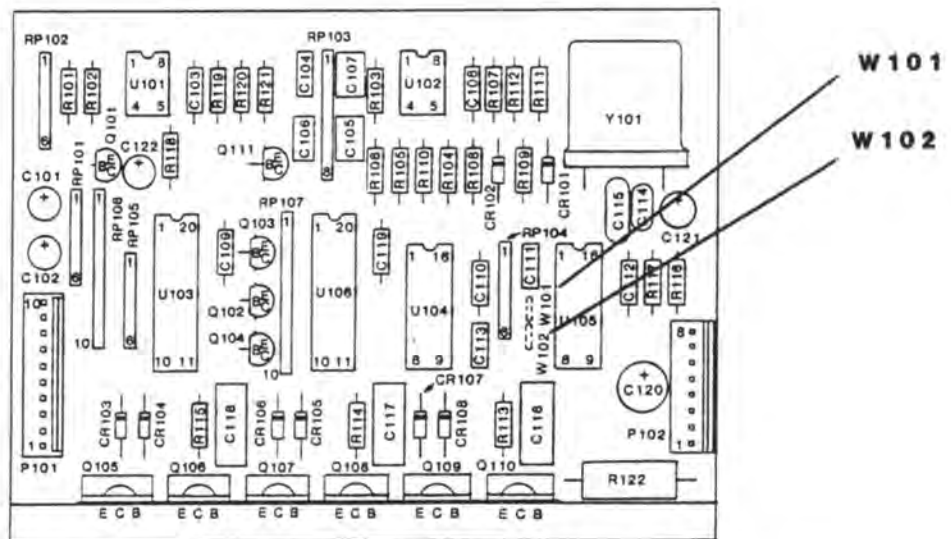


Fig. 2-10

Motor Control PCB

5. EQUALIZATION: Unless otherwise specified when ordered, OMEGA machines are set up to the 1975 NAB Standard for equalization. Equalization may be changed to either 1964 NAB Standard or IEC/CCIR equalization as follows:

A. 1964 NAB Standard: Locate capacitor C312 on the RECORD PCB (Figure 2-11). Cut the back side foil trace directly underneath C312. For changes on the PLAY/LOGIC PCB, refer to Table 2-8 and Figure 2-12. Make the appropriate component changes as noted in the table. If you wish to return to 1975 NAB equalization, install a jumper wire at W304 on the front side of the RECORD PCB and return PLAY/LOGIC PCB components noted in Table 2-8 to the appropriate values.

Fig. 2-11

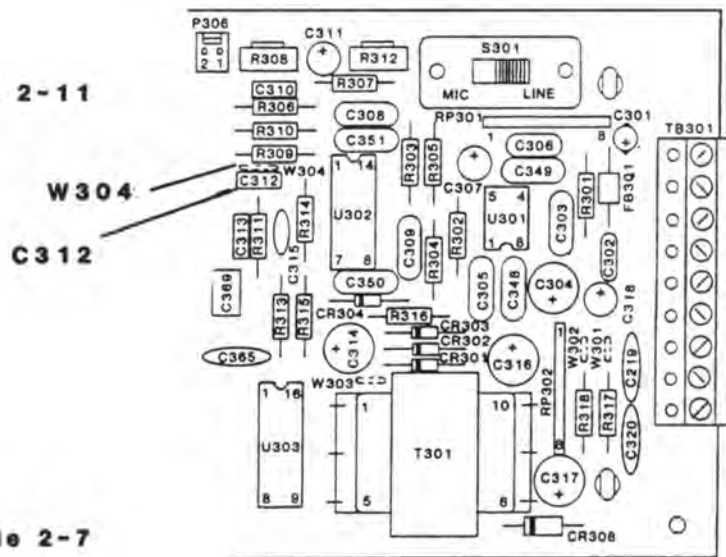


Table 2-7

NAB EQUALIZATION		
STRAP	1964	1975
W304	OUT	IN

Record PCB

Fig. 2-12

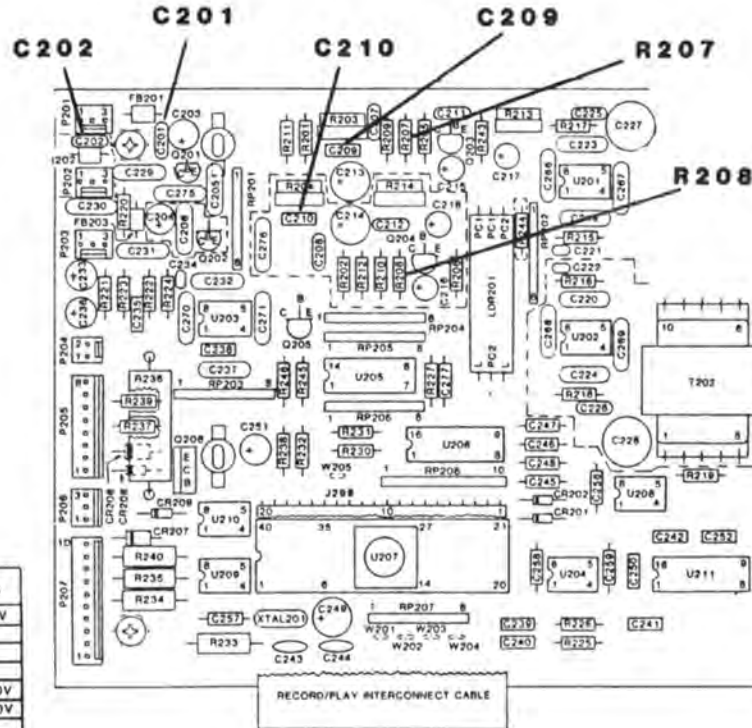


Table 2-8

EQUALIZATION TABLE

		1975 NAB OR 1971 IEC	1984 NAB
MONO	C201	22pfd 300V	22pfd 300V
	C209	.047 63V	.047 63V
	R207	220	1K
STEREO	C201	47pfd 300V	100pfd 300V
	C202	47pfd 300V	100pfd 300V
	R207	220	1K
	R208	220	1K
	C209	.022 63V	.022 63V
	C210	.022 63V	.022 63V

Reproduce PCB

B. CCIR/IEC equalization: Potentiometer R308 on the RECORD PCB controls record equalization for this adjustment. Component loading on the PLAY/LOGIC PCB remains the same as that for the 1975 NAB Standard.

CONTROLS & INDICATORS

Operational Functions

Front Panel:

1. **STOP switch (READY - yellow lens):** Active when a cartridge is properly loaded. Will override all other machine functions regardless of mode.

2. **READY (Stop) lamp:** Illuminated when a cartridge has been properly loaded. Flashes slowly after the 1 kHz Primary cue tone is detected and the cart has recued. Flashes quickly when the cart is stopped manually, indicating that the cart has not automatically recued.

3. **START switch (RUN - green lens):** Active when the unit is in the READY mode, (yellow lamp on), or in the CUE mode. Pressing the START switch will initiate the recording process when the unit is in the RECORD SET mode, (red & yellow lamps on).

4. **RUN (Start) lamp:** Illuminated during the RUN mode. Flashes during 150 Hz Secondary cue tone detection.

5. **CUE switch (blue lens):** Used to high-speed cue tape and mute audio from the READY mode (yellow lamp on), RUN mode (green lamp on), or RECORD mode (red & green lamps on). This switch cancels the RECORD SET condition. Normally, this switch is automatically activated by detection of a 150 Hz Secondary cue tone. Pressing this switch while in the high-speed CUE mode will turn audio ON for the duration of switch closure.

6. **CUE lamp:** Illuminated when in the CUE mode.

Special Note - For users having OMEGA series machines manufactured without a CUE switch. (Before April, 1987): All switch/lamp functions remain as for those of original units.

7. RECORD SET/150 Hz RECORD/1 kHz DEFEAT switch (red lens):

Note: This is a multiple function switch controlling several machine operations.

A. Record Set: When the unit is in READY (yellow lamp on), pressing the red switch will place the unit in RECORD SET, or a ready-to-record condition. After RECORD SET is achieved (red & yellow lamps on), pressing the START switch will initiate the RECORD process (red & green lamps on). A 1 kHz Primary cue tone is automatically recorded at the beginning of the program when the START switch is pressed.

B. 150 Hz Cue Tone Record: At any time the machine is in the RUN mode, a 150 Hz Secondary cue tone is recorded on the cue track by pressing the red switch. A 150 Hz tone is recorded for the duration the switch is held.

C. 1 kHz Cue Record Defeat: Before the RECORD process is started, when the unit is still in RECORD SET (red & yellow lamps on), the 1 kHz Primary cue tone may be DEFEATED by pressing the red switch a second time before pressing the START switch to begin recording. When this is done, the red lamp will flash quickly, indicating 1 kHz cue record DEFEAT. The recording process may now be started by pressing the green START switch. 150 Hz Secondary tones may be recorded as noted in Step B.

If the 1 kHz DEFEAT is used, the red lamp will continue to flash throughout the recording process, indicating that the cartridge **WILL NOT STOP** if the program exceeds the tape length. This can result in recording over the initial program. Also, if using "playback while recording", note that the audio will not be muted when a 150 Hz tone is recorded.

B. RECORD SET lamp: Illuminated in RECORD & RECORD SET modes. Lamp flashes quickly when 1 kHz Primary cue tone is DEFEATED.

Rear Panel--Terminal Block Remote Connections:

1. Remote STOP switch: Same as front panel.
 2. Remote READY (Stop) lamp: Same as front panel.
 3. Remote START switch: Same as front panel.
 4. Remote RUN (Start) lamp: Same as front panel.
 5. Remote CUE switch: Same as front panel.
 6. Remote CUE lamp: Same as front panel.
 7. Remote RECORD SET/150 Hz RECORD/1 kHz DEFEAT switch: Same as front panel.
 8. Remote CUE BIAS ENABLE switch: Closure to ground applies bias to the cue record head.
 9. Remote 150 Hz CUE OPEN COLLECTOR SWITCHING TO GROUND: Operates on detection of 150 Hz tones. Allows operation of external signaling devices from logged inputs on CUE track.
-

Section III Adjustments & Alignments

Your OMEGA cartridge machine is designed and built for reliable, long-term operation. As with any electromechanical device, various factors such as severity of use, ambient temperature, vibration and normal wear contribute to diminished performance.

With proper attention paid to operating conditions, and a little routine maintenance, your machine will provide many years of trouble-free service.

The following sections describe adjustment and alignment procedures needed to assure optimum operation of mechanical and electrical assemblies. Please read through these sections carefully and familiarize yourself with the workings of the machine.

These procedures are designed to be performed using ITC gauges and fixtures. Use of gauges and fixtures other than those specified may lead to incorrect alignment or less than optimum performance.

Adjustments may be performed individually as needed, or as part of a regular service schedule.

Due to the interrelationship of these procedures, a complete check of all assemblies requires that you follow, in order, the sequence of adjustments in this section. Failure to follow this sequence could result in misalignment and less than optimum performance.

Review the following checklist to make sure that you have the correct tools and materials to do the job.

Table 3-1 Adjustment Tool Checklist

1. Gauges:
 - A. Capstan Shaft Locator Gauge
ITC #830-0043-001 *
 - B. Pressure Roller Pressure Gauge
ITC #830-0042-011 *
 - C. Tape Guide Height Gauge
ITC #830-0041-022 *
 - D. Zenith Gauge
ITC #830-0026-022 *

2. Tools:
 - A. 5/64" Long-arm Hex Wrench (provided with unit)
 - B. 1/8" Hex Wrench or Driver
 - C. 1/4" Open-end or Box Wrench
 - D. Phillips-head Screwdrivers:
 1. #0 bit
 2. #1 bit
 - E. Small Flat-blade Screwdriver
 - F. Needle-nose Pliers
 - G. Razor Knife, Scribe or Sharp Awl
 - H. Ruler--accurate to 1/32".
3. Test Tapes:
 - A. NAB Standard Azimuth and Spot Frequency Alignment Tape. (MONO or STEREO, dependent on unit type)
 - B. 3.5 Minute Blank Cartridge--Known To Have Good Operating Characteristics. (Use the same type as in normal daily cart library. Needed for Recorder units only.)
4. Test Equipment:
 - A. Oscilloscope
 - B. Audio Oscillator--(Capable of producing 0 dBm into a 600 Ohm termination.)
 - C. 600 Ohm Termination
 - D. RMS Voltmeter--(Capable of reading dBm.)
 - E. Clip Leads (For Terminals)

NOTE: Items with an asterisk next to them are available from ITC. All other items are user provided unless otherwise noted.

NOTE: Many of the following procedures require the termination of the audio output terminals with 600 Ohms. A simple 600 Ohm terminating resistor may be made by paralleling two 1200 Ohm, 1/2 watt, 5% resistors.

TOP COVER REMOVAL:

Access for servicing is accomplished by sliding the top cover forward approximately 1/4" and lifting the cover off. (Figure 3-1)

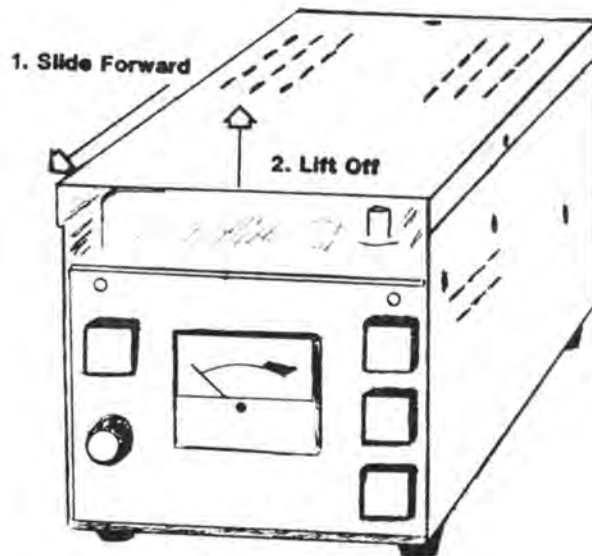


Fig. 3-1

NOTE: Illustrations and photographs used for the following procedures may not exactly resemble your unit. Machine appearance can differ as improvements are made. However, adjustment and alignment points as illustrated are accurate regardless of generation.

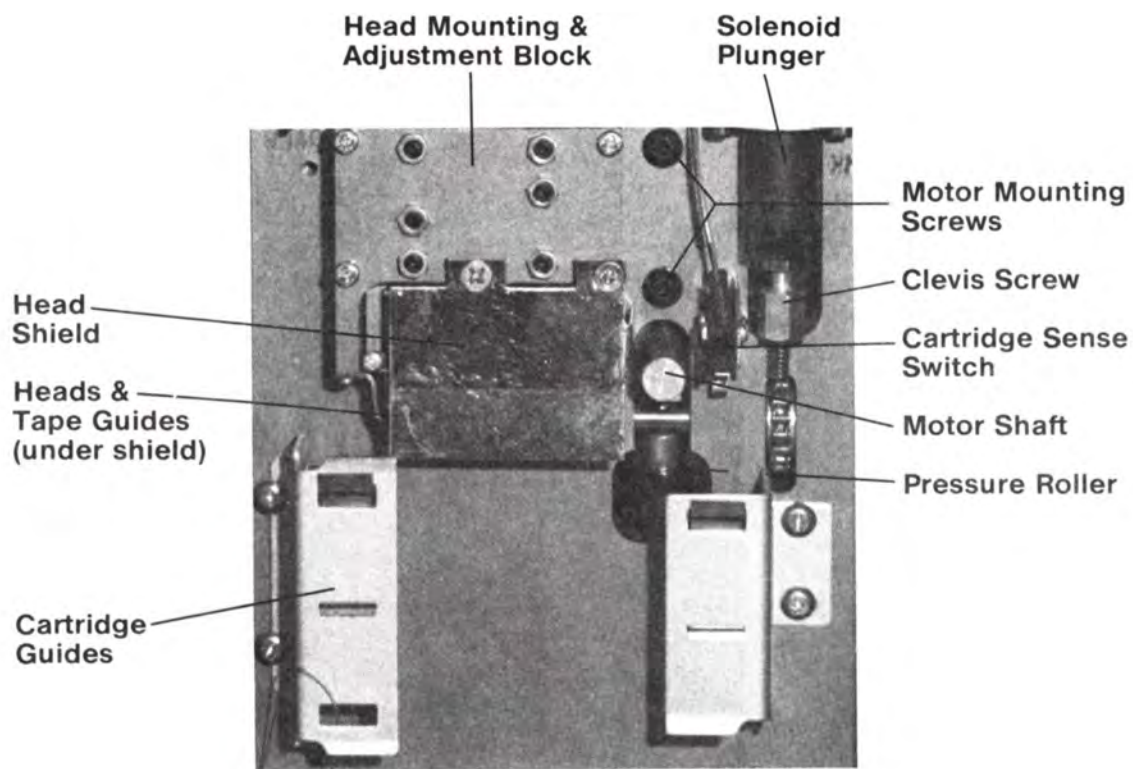


Fig. 3-2

**OMEGA Recorder/Reproducer
Front Half Components**

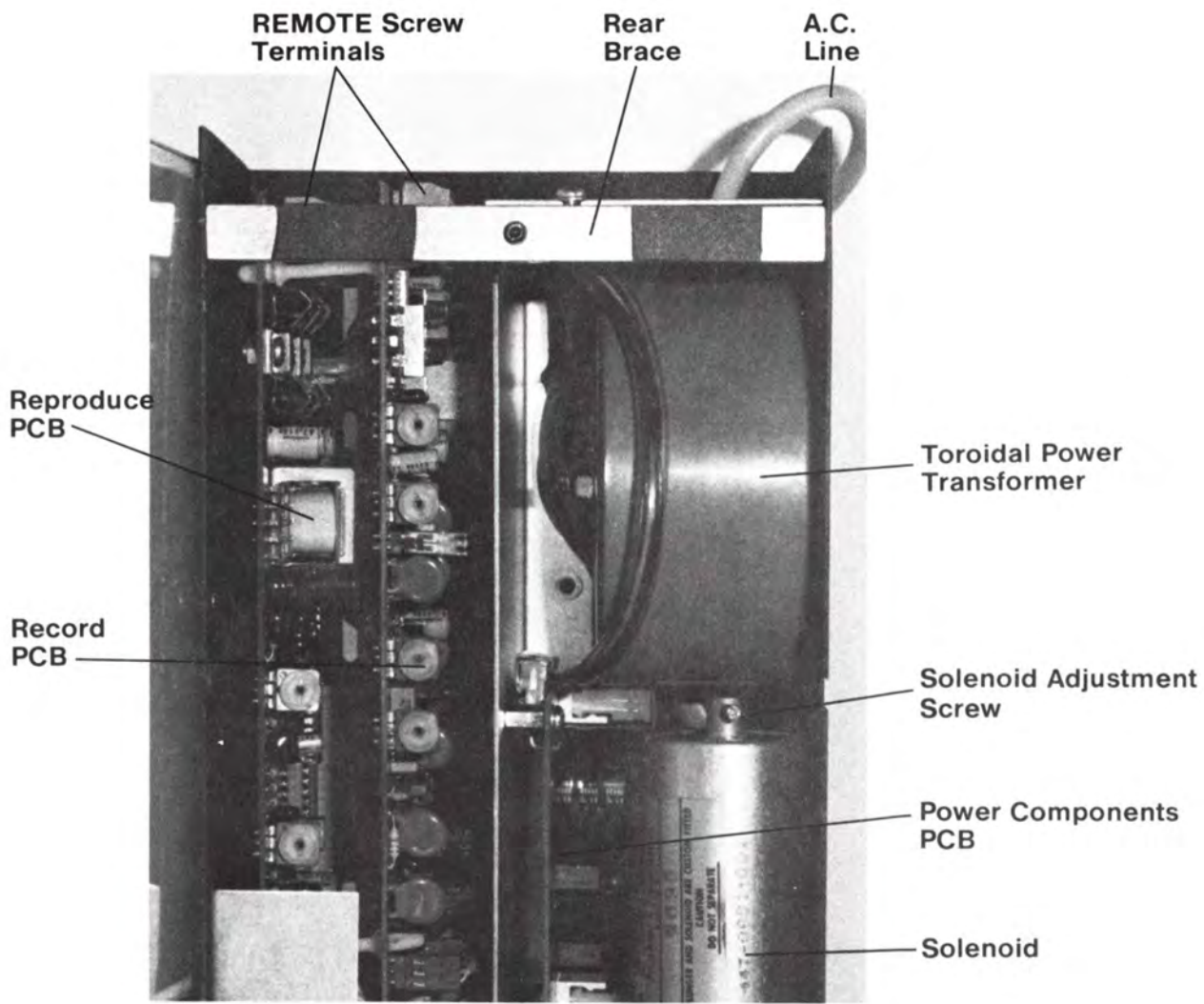


Fig. 3-3

OMEGA Recorder/Reproducer
Rear Half Components

CAUTION

CAUTION: These adjustments require contact with the capstan shaft, which can be easily damaged. DO NOT FORCE gauges into position or allow the capstan shaft to become bound by a gauge. To do so will risk both shaft finish and straightness of the shaft.

1. Motor (Capstan Shaft) Location:

(Required when a motor is removed or replaced)

The purpose of this adjustment is to insure that the pressure roller shaft and the motor shaft remain absolutely parallel to each other during operation. Shaft parallelism is a critical requirement. Its establishment insures that no tape skewing occurs.

With power OFF, loosen (do not remove) the two motor mounting screws (Figure 3-5). Remove the pressure roller by gently unfastening the "E" clip, nylon washer, pressure roller and metal washer. (Figure 3-4)

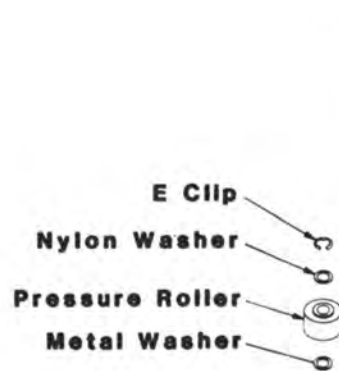
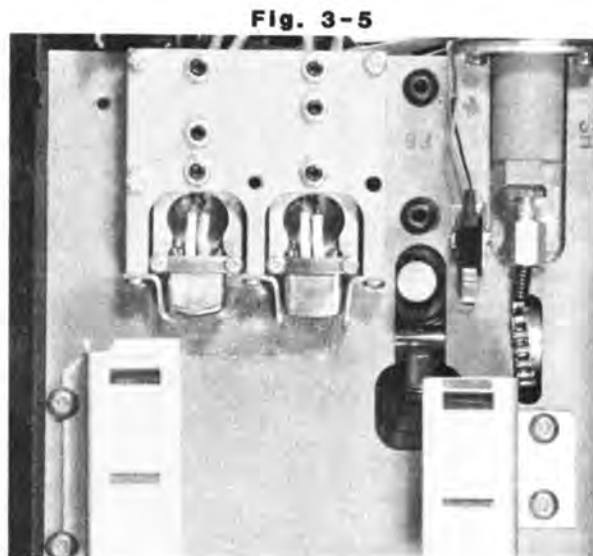


Fig. 3-4



Place the capstan shaft locator gauge over the pressure roller shaft as illustrated in Figure 3-6.

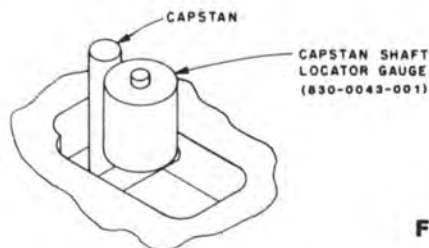


Fig. 3-6

Move the gauge up against the capstan shaft and carefully observe the gauge surface as it mates with the capstan surface. The gauge surface should lie flush against the capstan shaft. If not, gently move the motor until both surfaces are completely flush against each other. (See Figure 3-7).

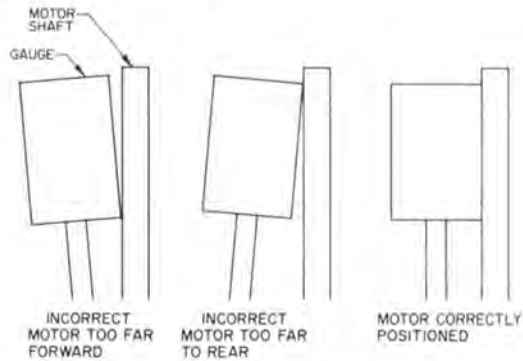


Fig. 3-7

As noted in the first paragraph, the capstan shaft (and the locator gauge) must remain parallel to the capstan shaft. To insure parallelism, the capstan shaft and pressure roller shaft must remain directly in line with each other. (See Figure 3-8). Also, as illustrated, the centerline of each shaft must be an equal distance from the right-hand side panel, setting up 90 degree angles at each corner.

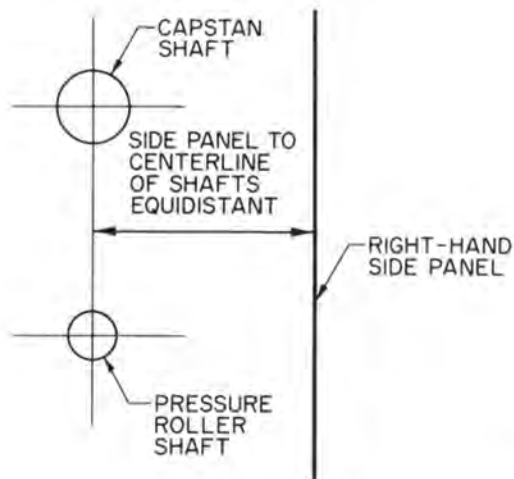


Fig. 3-8

Proper Orientation of Capstan Shaft & Pressure Roller Shaft To Each Other & to the Right-Hand Side Panel

Once the gauge and both shafts are correctly positioned, carefully tighten the motor mounting screws, making sure that neither shaft nor gauge change position. After tightening the screws, remove the gauge and reinstall the pressure roller by reversing the order of removal.

2. Pressure Roller Pressure Adjustment:

(NOTE: Required after parts replacement, but should be performed as routine maintenance.)

OMEGA units utilize a low-voltage (24V, DC) bottoming-plunger solenoid. This design requires that the solenoid plunger bottom against the stop seat and remain there during the entire tape driving operation. Accurate and repeatable adjustment of the pressure roller mechanism is assured because of its definite location against a rigid, fixed mechanical member. Refer to Figure 3-9 for an illustration of a properly bottomed plunger.

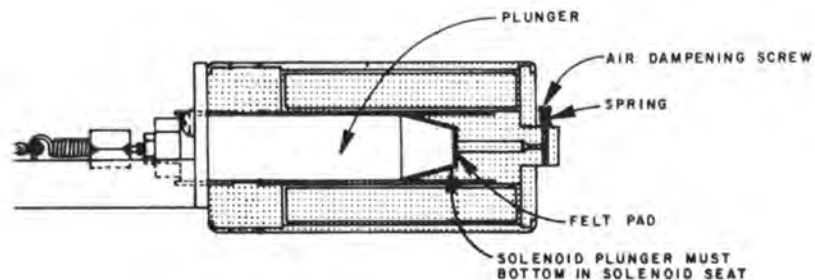


Fig. 3-9

The Pressure Roller Pressure gauge is used in the same manner as that of a "feeler" gauge or a "Go-No Go" type fixture. Refer to Figure 3-10 for gauge dimensions. Step "A" indicates OPTIMUM pressure roller pressure. Step "B" indicates LOW pressure roller pressure.

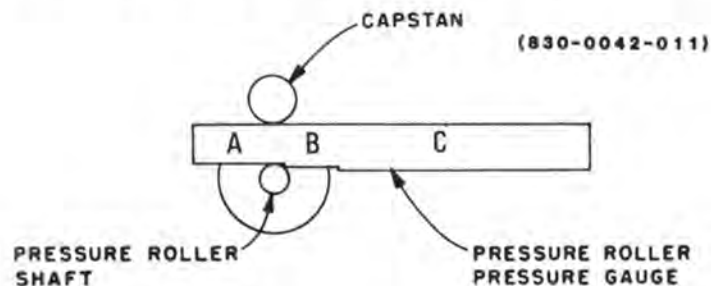


Fig. 3-10

Step "C" is simply a handle and has no measurement function. You may hold the gauge at any point on Step "C".

With power ON, hold the cartridge sensing switch closed, Figure 3-11, and press the START switch to engage the solenoid. Make sure that the solenoid plunger has bottomed and stays bottomed throughout this procedure.

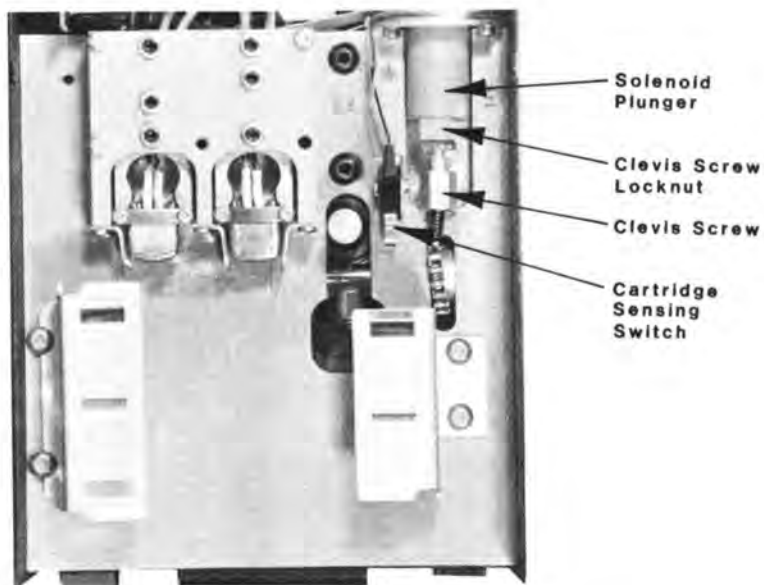


Fig. 3-11

Insert Step "A" of the gauge between the capstan shaft and the pressure roller shaft, as shown in Figure 3-10, stopping at Step "B".

Step "A" should slip between the shafts without being forced. If not, loosen (do not remove) the clevis screw locknut, (Figure 3-11), and rotate the solenoid plunger CLOCKWISE until Step "A" slips through. Conversely, Step "B" should not slip between the shafts. If it does, rotate the solenoid plunger COUNTERCLOCKWISE until Step "B" cannot slip through.

Once pressure roller pressure has been adjusted, tighten the clevis screw lock nut, taking care not to disturb any of your previous adjustments. Remove the gauge.

3. Solenoid Air-Damping Adjustment:

The speed and noise of solenoid operation is determined by the rate at which air flows through a small hole in the solenoid seat. Optimum adjustment of the air damp screw is achieved when a suitable balance between speed and noise is obtained.

Since speed and noise are directly related, the fastest operation of the solenoid usually results in the most noise. Therefore, this adjustment is made to provide a suitable balance between speed and noise, without compromising the operation of either.

Adjustment of airflow is accomplished by using a #0 bit Phillips screwdriver to turn the solenoid air-damp screw. Figure 3-12. The screw is turned CLOCKWISE for increased damping and COUNTER-CLOCKWISE for less.

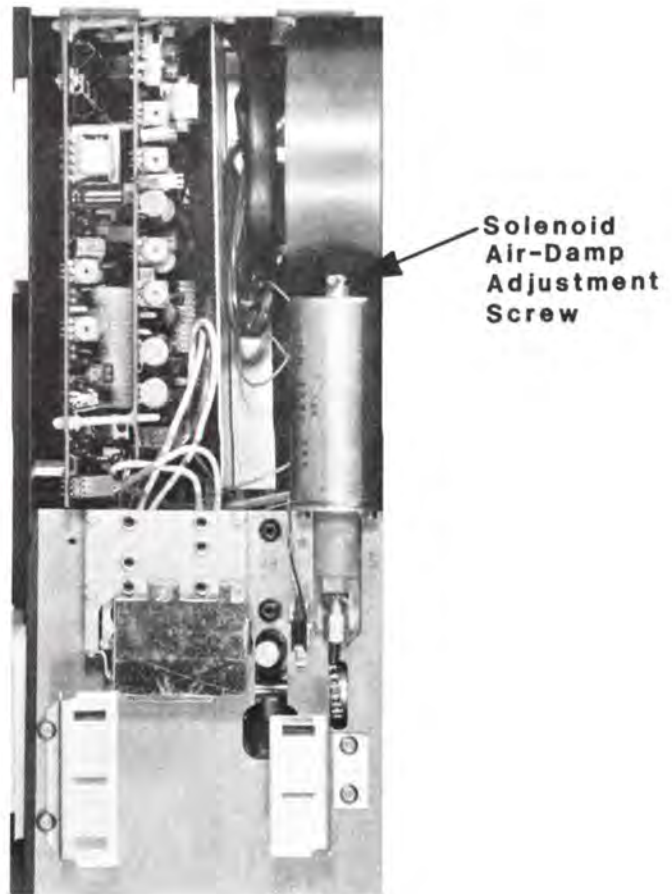


Fig. 3-12

4. Cartridge Guide Adjustment:

Optimum performance from cartridge machines and your tape cartridges can only be realized if the cartridge is positioned accurately and consistently each time it is inserted.

Figure 3-13 illustrates key indexing points by which cartridge location is measured. These markings correspond to NAB mechanical specifications for broadcast cartridge systems, and should correspond to your own system adjustments.

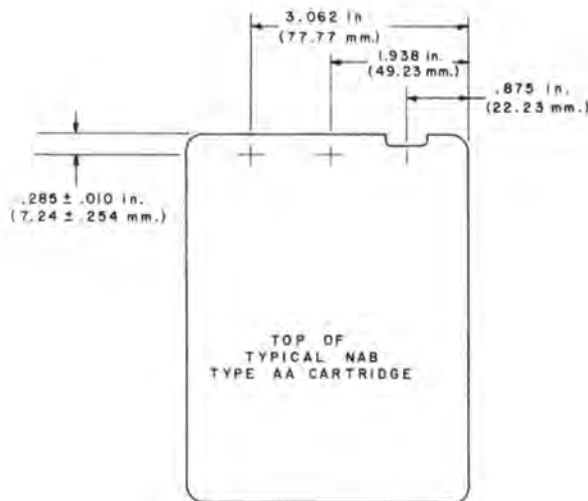


Fig. 3-13

A mechanical reference cartridge may be constructed by using these measurements as a guide. Scribe index lines on a cartridge body, using a razor knife, awl or other sharp instrument, and an accurate measure such as a machinist's ruler.

Proper cartridge positioning is achieved when the following criteria are met:

1. The cartridge face is snugly and squarely located against the head block.
2. The heads are centered in each cartridge head opening.
3. The pressure roller shaft is centered in the cart's pressure roller keyway when the solenoid is engaged.

4. The right-hand cartridge guide is snug and square against the cartridge body right-hand side. See Figure 3-14.

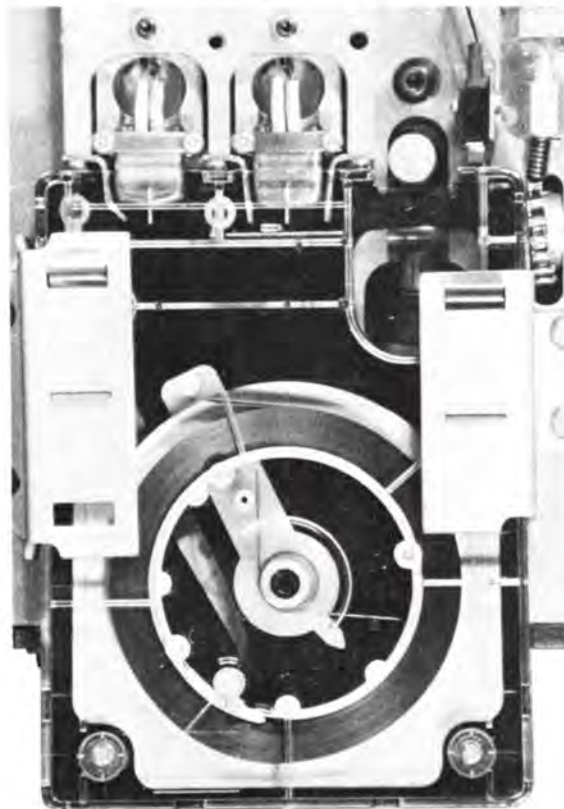


Fig. 3-14

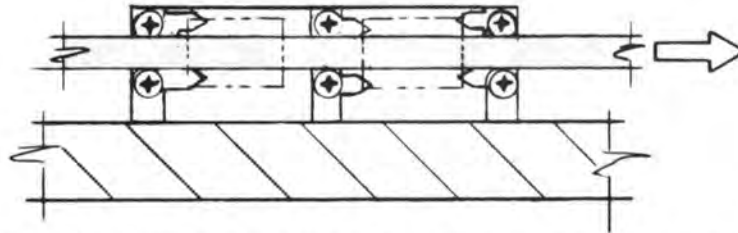
Be certain that the front edge of the cartridge seats firmly and squarely against the tape guide screws. When all four (4) of the above mentioned criteria are met, tighten down the right hand cartridge guide mounting screws, insuring that the cartridge and cartridge guide do not move or change positions.

Position the left hand cartridge guide parallel to the right hand guide and check to see that the two springs are compressed equally and that the cartridge is reasonably snug but not bound by the guides.

Remove the cartridge and reinsert it. If the cartridge does not position correctly, repeat the alignment procedure.

5. Tape Guide Adjustment:

This procedure provides precise adjustment of the tape guide "tangs" and establishes a 3-point contact area between the guides and the tape. The result is a very closely controlled tape path across the heads. Figure 3-15.



TAPE PATH WITH 3 POINT CONTACT OF TAPE GUIDES

Fig. 3-15

All cartridge machines in your system would benefit greatly from this setup procedure.

Remove the head shield before beginning guide adjustment. After the shield is removed, secure the head block to the deck by reinstalling the right hand head shield screw and spacer. Make sure that the screw is tight and the head block does not move. Figure 3-16.

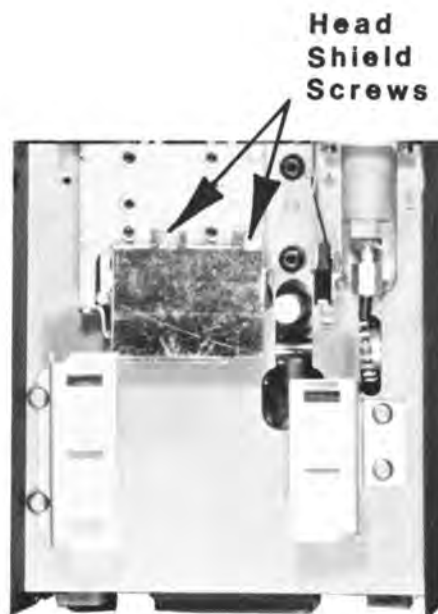


Fig. 3-16

Place the tape guide height gauge flat on the deck, as shown in Figure 3-17.

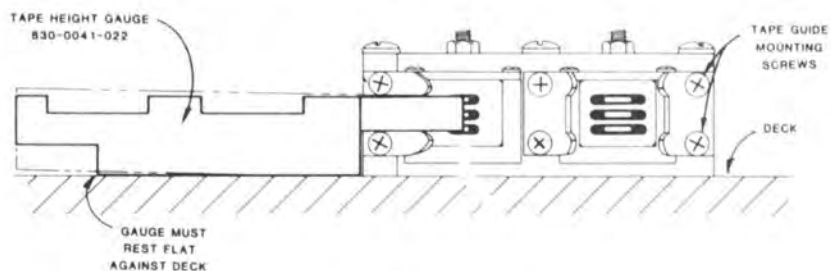


Fig. 3-17

Adjust the tape guides in the following manner:

Left (Entry) Guide: Loosen (do not remove) the guide mounting screws. Insert the gauge straight into the guide ONLY AS FAR AS THE FACE OF THE HEAD. Move the guide upward so that the bottom guide tang just touches the bottom of the gauge. Tighten the mounting screws and recheck your adjustment with the gauge.

Right (Exit) Guide: Same as the Left tape guide procedure.

Center Guide: Loosen (do not remove) the center guide mounting screws. Reposition the gauge as shown in Figure 3-18, with the cut-out areas facing the heads. Adjust the center guide so that the top guide tang just touches the gauge, then tighten the mounting screws.

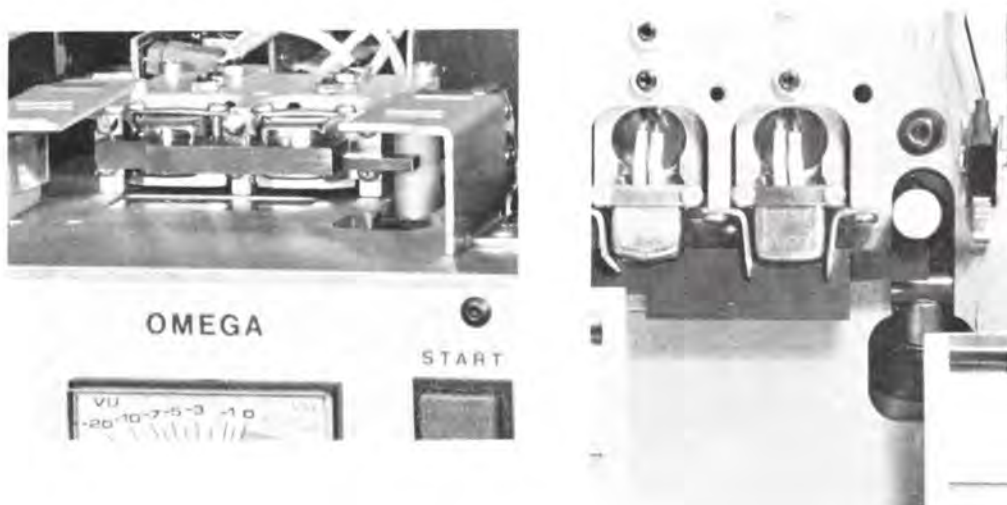


Fig. 3-18

6. Reproduce Head Height & Zenith Adjustment:

Connect a 600 Ohm termination to the Left (MONO) channel reproduce output and connect the voltmeter across this termination. (For STEREO units, add the second termination to the Right channel reproduce output.) Figure 3-19.

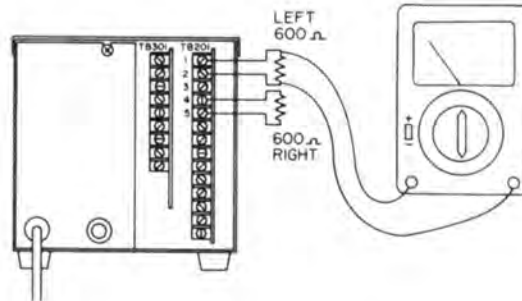


Fig. 3-19

Figure 3-20 shows the location of the heads and adjustment screws on the head mounting block. Make sure that you locate the correct screw for each adjustment.

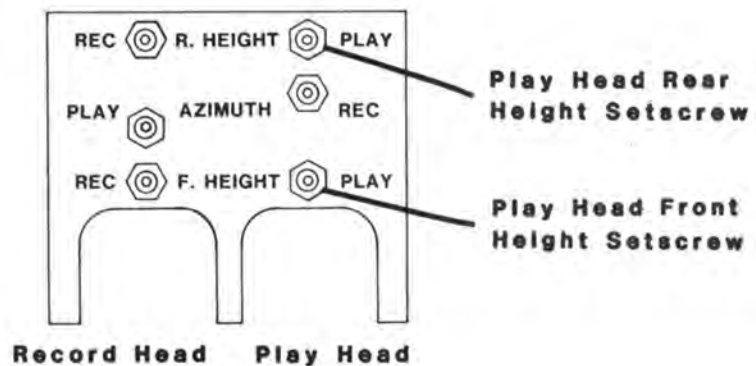


Fig. 3-20

CAUTION

Caution: Demagnetize all gauges and tools BEFORE making any adjustments. Be especially careful to avoid scratching the head faces during adjustment.

Loosen (do not remove) the reproduce (PLAY) head Front & Rear Height setscrew locknuts. Place the Tape Height gauge on the deck and position it in front of the Play head as shown in Figure 3-21.

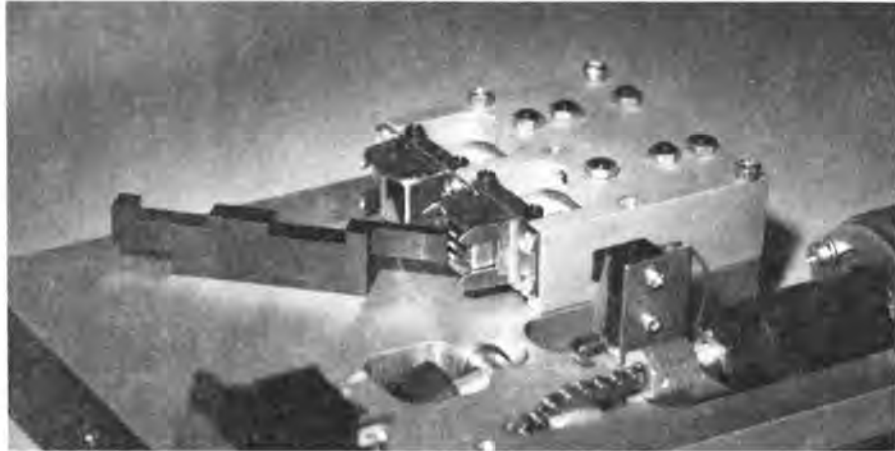


Fig. 3-21

**Rough-In
Head Height**

Alternately adjust, in equal amounts, the Play Front & Rear Height setscrews until the nose of the gauge is approximately centered between the top of the upper head pole piece and the bottom of the lower head pole piece.

Head Zenith

Position the Zenith gauge, (or any gauge known to be completely square.), near the face of the head and alternately adjust the Play Front & Rear Height setscrews until the face of the head is parallel to the gauge and perpendicular to the deck surface. Move the Zenith gauge gently up against the face of the Play head. Be very careful to avoid any scratching. If the head is perpendicular to the deck, there will be no gap visible between the gauge and the head face. If a gap is visible, slowly adjust, independantly and in equal amounts, the Play Front & Rear Height setscrews until no gap exists.

**Final Height
Adjustment**

Final height adjustment is made by electrically measuring the machine's audio output level while playing a standard alignment tape and making fine adjustments to head height. This procedure insures that the head pole pieces are aligned with, and centered on the magnetic tracks of the tape. Adjustments are made to head height by turning the Front and Rear Height setscrews small but equal amounts in the same direction. Since adjustments to the Front or Rear Height setscrews may introduce a Zenith error, Zenith and fine Height adjustments may require repeated, alternating adjustment until no further improvements in either may be made.

At this point, demagnetize the heads and the head block assembly to avoid any stray magnetization.

Insert a standard alignment tape and start the machine in the RUN mode. While monitoring audio output level on the voltmeter, adjust the Play Front & Rear Height setscrews in small but equal amounts for maximum output as indicated on the meter. Recheck the head Zenith, and readjust if necessary, before tightening the setscrew locknuts. Once all measurements and readings are optimized, carefully tighten the setscrew locknuts. Stop the cartridge and remove it. This ends the adjustment.

7. Dummy Head Adjustment:

In reproduce only machines, a "dummy" head is installed in place of the recording head to maintain constant tension on the tape. This helps minimize wow & flutter and improves tape guidance. "Dummy" heads that have developed significant wear patterns should be replaced.

Loosen (do not remove) the "dummy" head Front & Rear Height setscrew locknuts, (Figure 3-22). Place the Tape Height gauge on the deck and position it in front of the "dummy" head as done for the reproduce head in Figure 3-21.

Adjust the "dummy" head Front Height setscrew until the nose of the gauge is approximately centered between the top and bottom of the head. Position the Zenith gauge, or any gauge known to be completely square, near the face

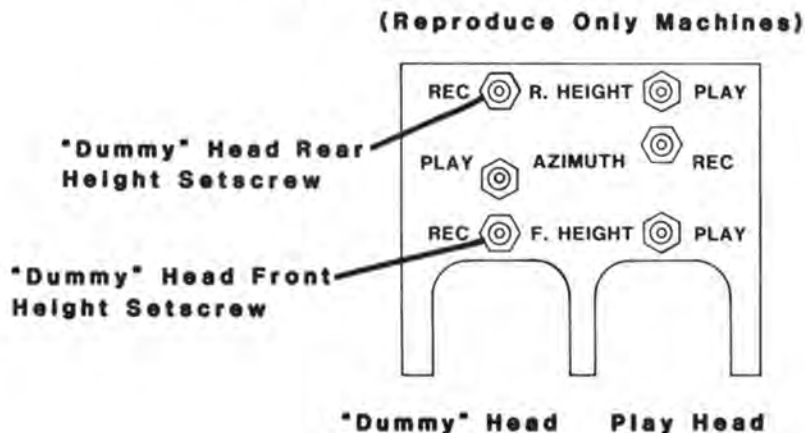


Fig. 3-22

of the head and adjust the "dummy" head Rear Height setscrew until the face of the head is parallel to the gauge and perpendicular to the deck surface.

Carefully tighten the locknuts and remove the gauge. This ends the adjustment.

8. Reproduce Head Azimuth Adjustments:

NOTE: The azimuth adjustment screws are considerably offset from the heads that they adjust. Refer to Figure 3-23 for location of these screws.

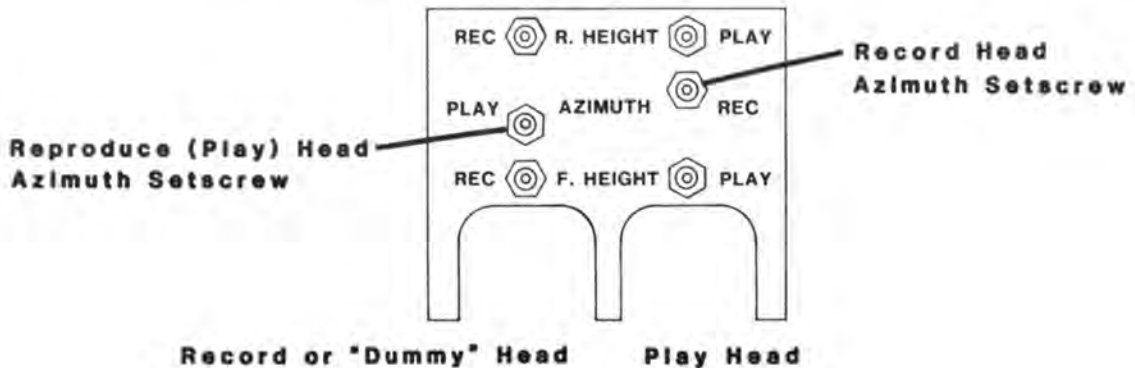


Fig. 3-23

A. Mono Azimuth:

Connect a 600 Ohm termination to the Left (MONO) reproduce amplifier output terminals. Connect the voltmeter across this termination. (Figure 3-24).

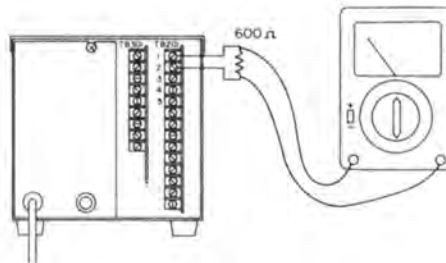


Fig. 3-24

Insert a standard Mono azimuth alignment tape and start the machine in the RUN mode.

Loosen (do not remove) the reproduce (Play) head azimuth setscrew locknut and adjust the

setscrew for maximum output at 12.5 kHz. Hold maximum output and carefully tighten the locknut. Monitor the voltmeter to insure that no output level change occurs as the locknut is tightened.

This ends the procedure. Stop the machine and remove the cartridge. Leave all equipment connected and proceed to Step #9, Reproduce Amp Output Level Adjustment.

B. Stereo Azimuth (Phase):

SPECIAL NOTE FOR STEREO HEAD AZIMUTH

2-track stereo recording/reproducing performance is subject to several mechanical inaccuracies which contribute to phase shift in simultaneously monitored reproducer outputs. In stereo systems these phase shifts are generally not noticeable in the final reproduction. However, in cases where monophonic "dubbing" or channel summing is desired, phase shifts cause serious amplitude variations or dropouts. This is especially true at higher frequencies. The most common causes of this problem are:

1. Lateral displacement of the pole pieces with respect to each other within the head case.
2. Improper azimuth of the heads with respect to each other. (Record head to Play head in any reproducer within a system)
3. Improper tape guidance (skew) either within the cartridge or through the tape guide systems.

The preferred method of adjusting for STEREO azimuth (phase) utilizes an oscilloscope for accurate phase relationship measurement and alignment. This is the method recommended by ITC for best results.

Attach 600 Ohm terminations to the Left and Right channel reproduce outputs. Connect the horizontal input of an oscilloscope to the Right channel output. Figure 3-25.

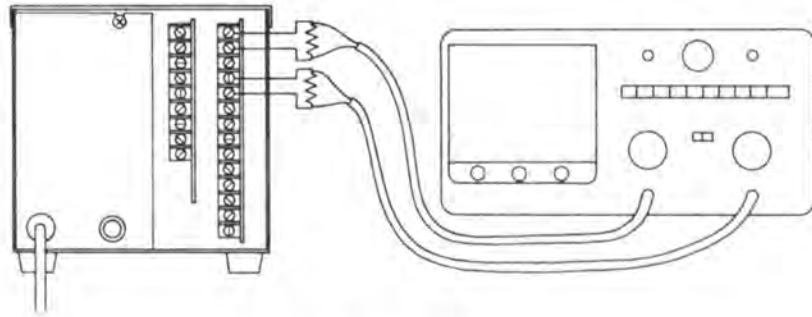


Fig. 3-25

Connect the vertical input of the scope to the Left (MONO) channel machine output. Adjust the scope's horizontal & vertical gain to provide an in-phase Lissajous display.

Allow the alignment tape to run to the lowest frequency section. A scope pattern such as that illustrated by Figure 3-26A should appear. If a pattern such as Figure 3-26D appears, reverse the polarity of the scope horizontal input leads.

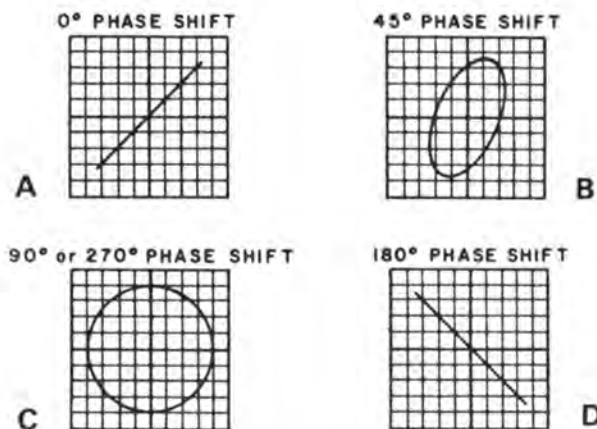


Fig. 3-26

Allow the alignment tape to run to the 8 kHz section while monitoring the scope to determine if any phase shift occurs. If phase shift is observed, loosen (do not remove) the reproduce (Play) head azimuth setscrew locknut and adjust the setscrew in the opposite direction to that in which phase shift occurred. Do not tighten the locknut.

Continue running the tape through the various frequencies and monitor the scope to insure

that minimal phase errors occur at any frequency. It is normal for small shift "jitters" to occur at the higher frequencies. Your final setting will be based on best AVERAGE results.

At 16 kHz, make a final adjustment to the setscrew for the best possible reading. Do not tighten the locknut.

Rerun the alignment tape through ALL frequencies several times to insure that minimal errors occur at any frequency. If an error exists, repeat the entire procedure.

Once the best possible results are consistently obtained, carefully tighten the locknut while monitoring the scope to make sure that best overall results in phase reading are maintained.

This ends the oscilloscope procedure. Remove the cartridge and disconnect the scope. Leave the termination resistors intact. Proceed to Step #9, Reproduce Amp Output Level Adjustment.

Substitute Method For STEREO Azimuth

IMPORTANT

This procedure is to be used ONLY when an oscilloscope is not available. Satisfactory results may be obtained using this method, but not with the accuracy in phase alignment provided by a scope.

Attach 600 Ohm terminations to the Left (MONO) and Right channels outputs. Connect the voltmeter across the Left channel termination. Figure 3-27.

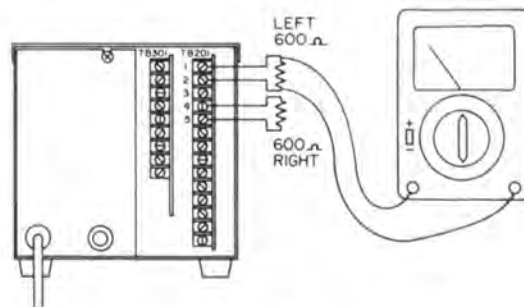


Fig. 3-27

Insert the alignment tape, (1 kHz reference "0" level), and start the machine in the RUN mode. Locate the Left (MONO) channel level control potentiometer (R213) on the Reproduce PCB, and adjust it for 0 dBm output. Figure 3-28.



Fig. 3-28

Move the voltmeter leads to the Right channel output. Adjust the Right channel level control potentiometer (R214) for 0 dBm output. Move the voltmeter leads back to the Left (MONO) channel output. Loosen (do not remove) the reproduce (Play) head azimuth setscrew locknut.

Adjust the setscrew for a maximum output reading on the voltmeter at 12.5 kHz. Using the hex wrench handle as a guide, note the physical position of the setscrew. (A small piece of tape will suffice for marking the position.) Leave the wrench in place.

Move the voltmeter leads to the Right channel output and slowly adjust the setscrew to determine which direction INCREASES output. Continue adjusting the setscrew for increasing output until a maximum reading is obtained.

Once again, note the position of the setscrew by using the hex wrench handle as a guide. Mark the position. Compare this position with that of the Left channel adjustment and slowly readjust the setscrew to the midpoint between the two marks. This setting will provide AVERAGE azimuth for both channels.

This ends the procedure. Remove the cartridge. Leave all equipment connected.

9. Reproduce Amp Output Level Adjustment:

Standard output level is factory set to 0 dBm while reproducing a 1 kHz reference tone at 250 nWb/m. On the Reproduce PCB, potentiometer R213 controls Left (MONO) channel level and R214 controls Right channel level. Figure 3-29.

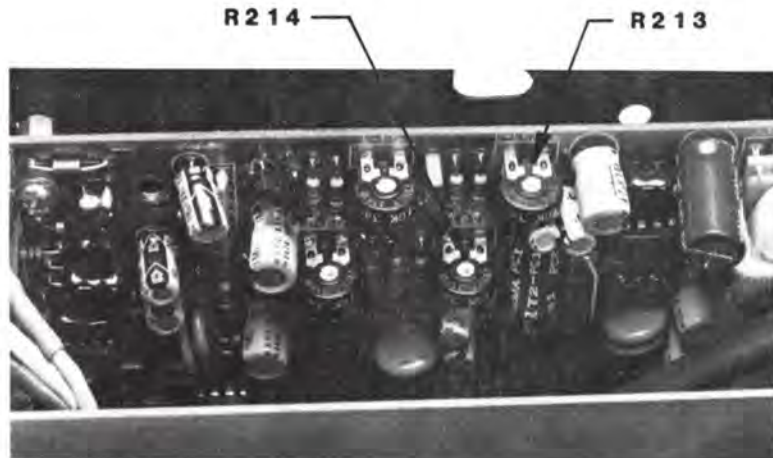


Fig. 3-29

Connect a 600 Ohm termination to the Left (MONO) channel reproduce output. (For STEREO units, add the second 600 Ohm termination to the Right channel output.) Connect the voltmeter across this termination. Figure 3-30.

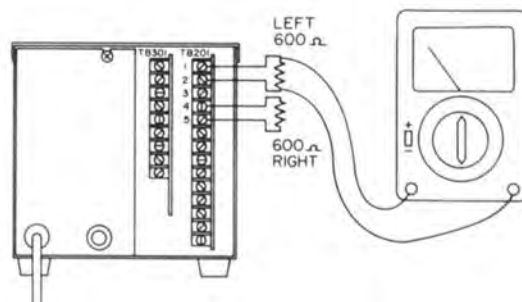


Fig. 3-30

Insert a reproduce alignment tape and start the machine in the RUN mode. Adjust R213 for 0 dBm output at 1 kHz. If this is a STEREO unit, move the voltmeter leads to the Right channel and repeat the procedure, using R214.

This ends the procedure. Stop the alignment tape and remove it. Leave all equipment connected.

10. Reproduce Amp Equalization Adjustment:

Connect a 600 Ohm termination to the Left (MONO) reproduce output. (For STEREO units, add a second termination to the Right channel output. Connect a voltmeter across this termination. Figure 3-31.

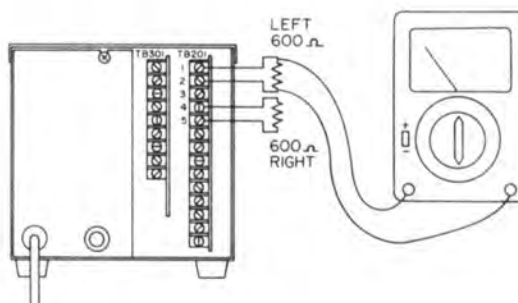


Fig. 3-31

Potentiometers R203 & R204 control high frequency equalization for the Left (MONO) and Right channels respectively. Figure 3-32.

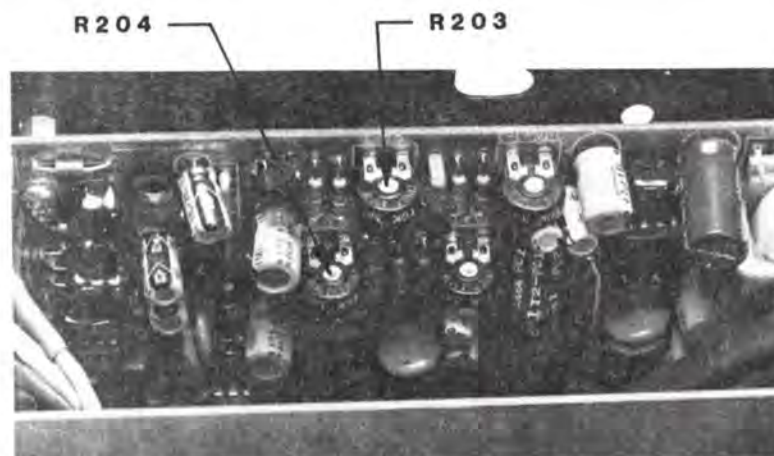


Fig. 3-32

Insert the reproduce alignment tape and start the machine in the RUN mode. Adjust R203 for 0 dBm (± 2 dBm) output at 12.5 kHz and 16 kHz. For STEREO units, move the voltmeter leads to

the Right channel output and repeat the procedure, using R204.

This ends the procedure.

Since reproduce amplifier adjustments are, to a degree interrelated, the equalizer adjustments will usually require that a small readjustment be made for the reproducer output levels. At this point, repeat the reproduce amp output level adjustment procedure. (Section #9).

11. Miscellaneous:

A. Capstan Motor Duty Cycle:

The motor has no duty cycle adjustment.

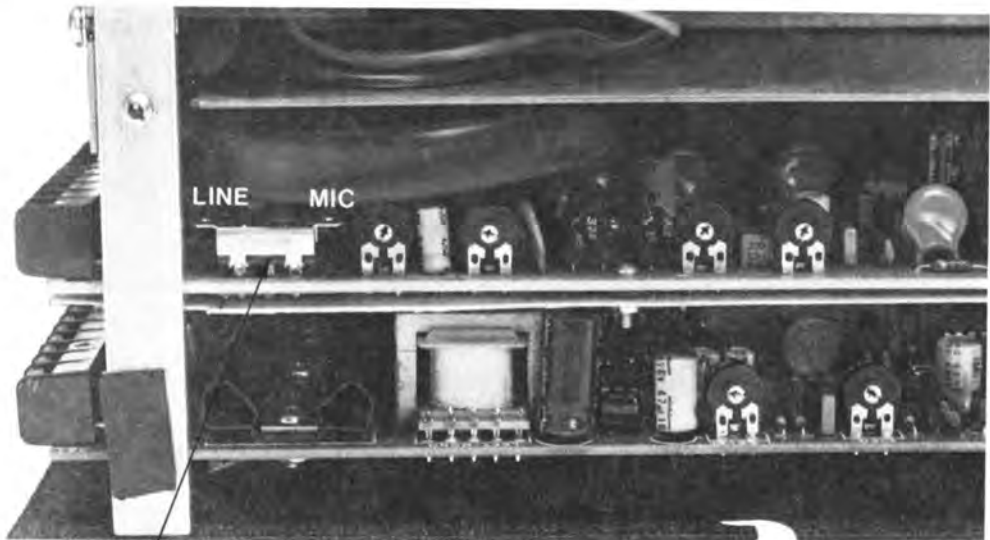
B. Reproduce Cue Detect Sensitivity:

Cue detection is digitally controlled and will operate from cue tones recorded in accordance with NAB standards for frequency and level tolerance. NO adjustments are required at any time.

Recorder Adjustments

Adjustments to the recorder section should only be performed AFTER all reproducer adjustments have been completed. Failure to complete the reproducer section first may result in recorder misalignment. When all other adjustments are considered to be in alignment, recorder adjustments may be made individually as needed, or as part of a regular maintenance schedule.

Note: Locate the internal LINE/MICROPHONE switch and set it to the LINE position before beginning any adjustments. Figure 3-33. It will remain in this position unless otherwise instructed.



Line/MIC Switch

Fig. 3-33

1. Record Head Height & Zenith Adjustment:

Connect a 600 Ohm termination to the Left (MONO) channel reproduce output and connect the voltmeter across this termination. Connect a second 600 Ohm termination to the recorder Line input and connect an audio oscillator across this termination. Figure 3-34.

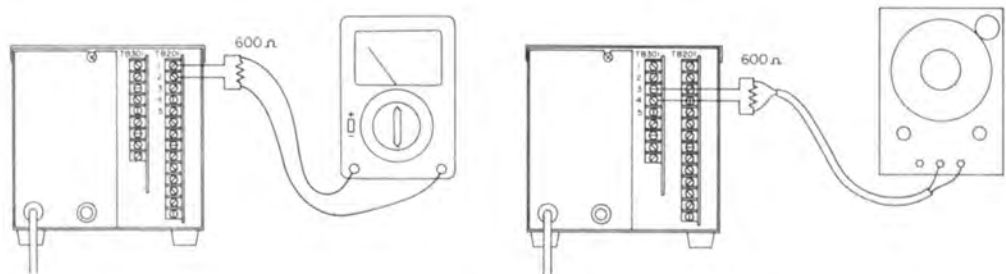
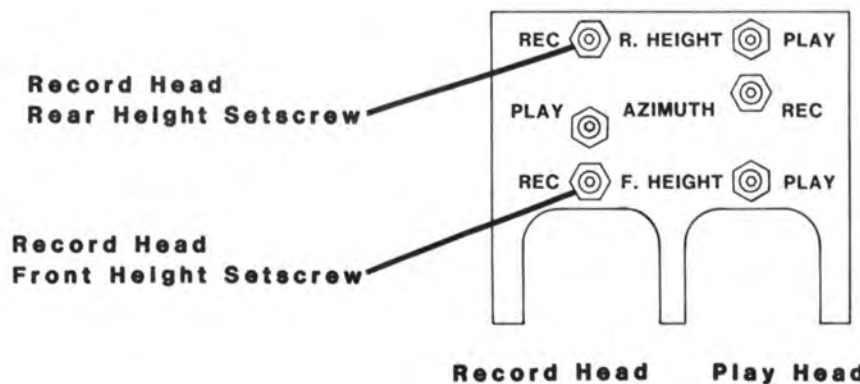


Fig. 3-34

Figure 3-35 shows the location of the heads and adjustment screws on the head mounting block.



Record Head Play Head

Fig. 3-35

CAUTION

Caution: Demagnetize all gauges and tools BEFORE making any adjustments. Be especially careful to avoid scratching the head face during adjustment.

Loosen (do not remove) the record (Rec) Front and Rear Height setscrew locknuts. Place the Tape Guide Height gauge on the deck and position it in the record head tape guide as shown in Figure 3-36.

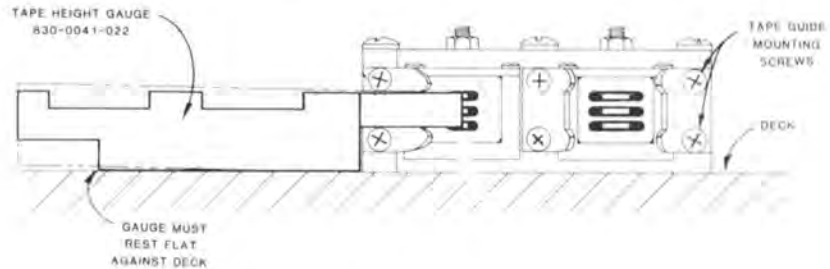


Fig. 3-36

Rough-In Head Height

Alternately adjust, in equal amounts, the record Front & Rear Height setscrews until the nose of the gauge is approximately centered between the top of the upper head pole piece and the bottom of the lower head pole piece.

Head Zenith

Position the Zenith gauge, (or any gauge known to be completely square.), near the face of the head and alternately adjust the record Front & Rear Height setscrews until the face of the head is parallel to the gauge and perpendicular to the deck surface. Move the Zenith gauge gently up against the face of the record head. Be very careful to avoid any scratching. If the head is perpendicular to the deck, there will be no gap visible between the gauge and the head face. If a gap is visible, slowly adjust, independantly and in equal amounts, the record Front & Rear Height setscrews until no gap exists.

Final Height Adjustment

Final height adjustment is made by electrically measuring the machine's audio output level while recording a reference tone and making fine adjustments to head height. This procedure depends on accurately adjusted Reproduce head height, which was done in an earlier procedure. Adjustments are made to head height by turning the Front and Rear Height setscrews small but equal amounts in the same direction. Since adjustments to the Front or Rear Height setscrews may introduce a

Zenith error, Zenith and fine Height adjustments may require repeated, alternating adjustment until no further improvements in either may be made.

At this point, demagnetize the heads and the head block assembly to avoid any stray magnetization.

Set the audio oscillator to 1 kHz, insert a blank 3.5 minute cartridge and start the machine in the RECORD mode. While monitoring the audio output level on the voltmeter, adjust the Record Front & Rear Height setscrews in small but equal amounts for maximum output as indicated on the meter. Recheck the head Zenith, and readjust if necessary, before tightening the setscrew locknuts. Once all measurements and readings are optimized, carefully tighten the setscrew locknuts. Stop the cartridge and remove it. This ends the adjustment.

2. Record Head Azimuth Adjustment:

IMPORTANT

Note: Changes in azimuth for the record head can result in apparent errors in all reproducers within a given system, unless the resultant azimuth is checked against each reproducer. Any change in azimuth of the record head should be done ONLY AFTER all adjustments are carefully checked and the reproduce head is correctly azimuth aligned.

Attach a 600 Ohm termination to the reproduce Left (MONO) channel output and connect the voltmeter across this termination. Attach a 600 Ohm termination to the recorder Line input and connect an audio oscillator across this termination. Figure 3-37.

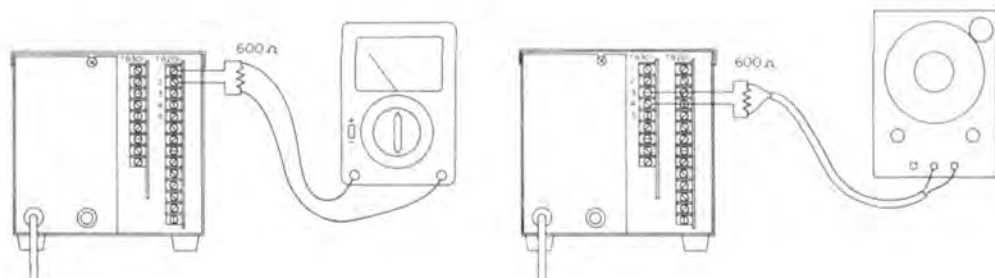


Fig. 3-37

Set the oscillator output to -10 dBm. Adjust the front panel record Level knob to a reading of -10 dB.

Insert a blank 3.5 minute cartridge and start the machine in the RECORD mode. Loosen (do not remove) the record head Azimuth setscrew locknut (Figure 3-38) and adjust the setscrew for a maximum output reading on the voltmeter at 12.5 kHz and 16 kHz.

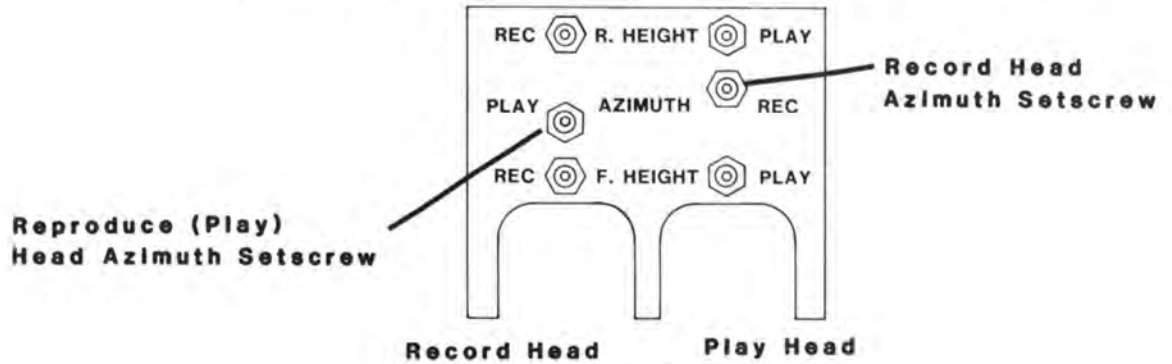


Fig. 3-38

Tighten the locknut and monitor the voltmeter to insure that no change in output level occurs.

This ends the procedure. Stop the cartridge and remove it. Leave all test equipment connected.

3. Program Record Bias Adjustment:

IMPORTANT

Note: This procedure will adjust program recording bias according to generally accepted standards for commonly available tape formulations. The object is acceptable recording performance, (ie; noise, distortion and frequency response), from many of the tape oxide formulations in current use. However, due to the wide variety of tape formulations available, recommended bias setting may differ from one tape formulation to the next. For more exact recording bias adjustment, consult the specifications provided by the tape manufacturer.

Attach a 600 Ohm termination to the reproduce Left (MONO) channel output and connect the voltmeter across this termination. Attach a 600 Ohm termination to the recorder LINE input and connect an audio oscillator across this termination. Figure 3-39.

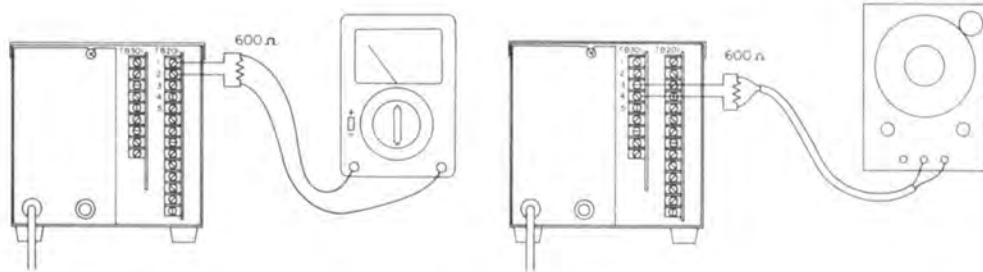


Fig. 3-39

Adjust the audio oscillator output to 10 kHz at -10 dBm as indicated on the front panel meter. Insert a blank 3.5 minute cartridge and start the machine in the RECORD mode.

Locate R325 on the Record PCB, Figure 3-40, and adjust it for a maximum (peak) output reading on the external voltmeter.

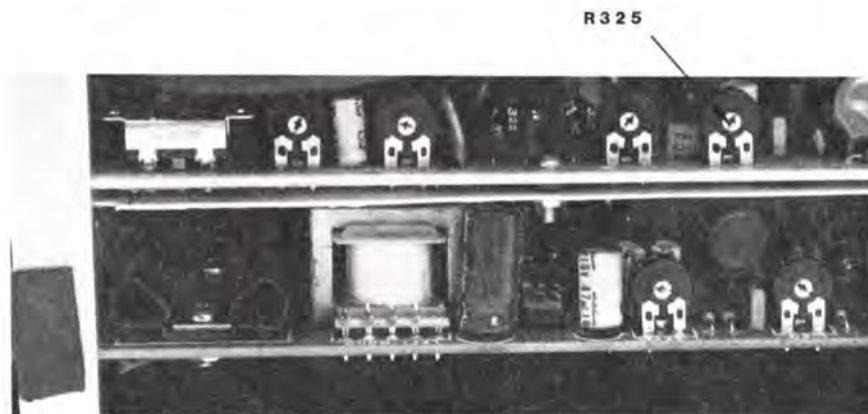


Fig. 3-40

Continue to adjust R325 clockwise until the voltmeter indicates 2 dB below the peak reading.

This ends the procedure.

4. Cue Record Bias Adjustment:

Connect a 600 Ohm termination to the Left (MONO) channel output and attach a voltmeter across this termination. Attach an audio

oscillator to the remote cue audio input (TB301, Pins 2 & 5). Connect a clip lead to the GROUND terminal (TB301, Pin 9). The other end of the clip lead will connect to the remote cue switch terminal (TB301, Pin 8) later in the procedure. (Figure 3-41).

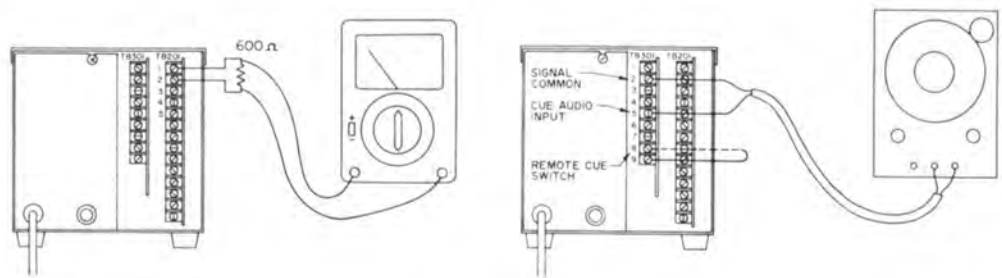


Fig. 3-41

Exchange the cue play and the Left (MONO) program play head leads so that the cue track audio information may be reproduced through the normal program amplifier as follows:

Disconnect the Left (MONO) channel input (J201). Move the cue reproduce head lead connector (J203) to the Left (MONO) channel input connector (P201).

Adjust the audio oscillator output for a .5V RMS, 8 kHz signal.



Fig. 3-42

Insert a blank 3.5 minute cartridge and start the machine in the RECORD mode. Connect the loose end of the clip lead to the remote cue switch terminal, (see Figure 3-41), closing the "switch". Locate R326 which controls cue bias on the Record PCB. Figure 3-42.

Use the voltmeter to monitor the audio being recorded on the cue track through the Left (MONO) channel reproduce amplifier.

Adjust R326 for a maximum (peak) output reading on the external voltmeter. Slowly continue to adjust R326 clockwise until the voltmeter indicates 2 dB below the peak output reading.

This ends the procedure.

Return the head leads to their ORIGINAL position and disconnect the clip lead.

5. Program Record Equalization:

Connect a 600 Ohm termination to the Left (MONO) channel reproduce output and attach a voltmeter across this termination. Connect a second 600 Ohm termination to the recorder LINE input and attach an audio oscillator across this termination. Figure 3-43.

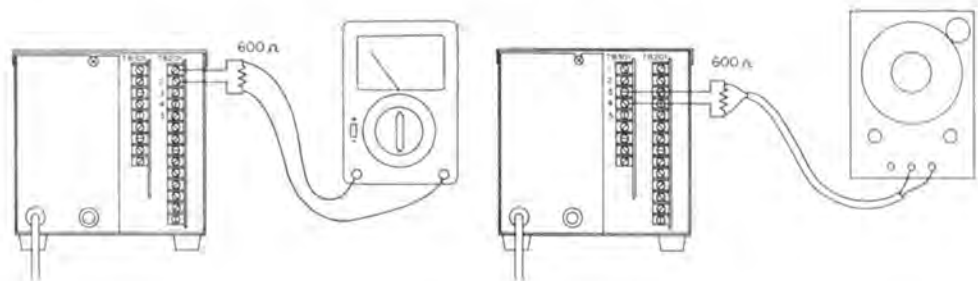


Fig. 3-43

Adjust the audio oscillator for an output of 1 kHz at -10 dBm. Insert a blank 3.5 minute cartridge into the machine and press RECORD and START in order. Adjust the audio oscillator output level for a -10 dBm indication on the machine's output, as measured by the voltmeter. Locate potentiometer R308, which controls record equalization on the Record PCB. Figure 3-44.

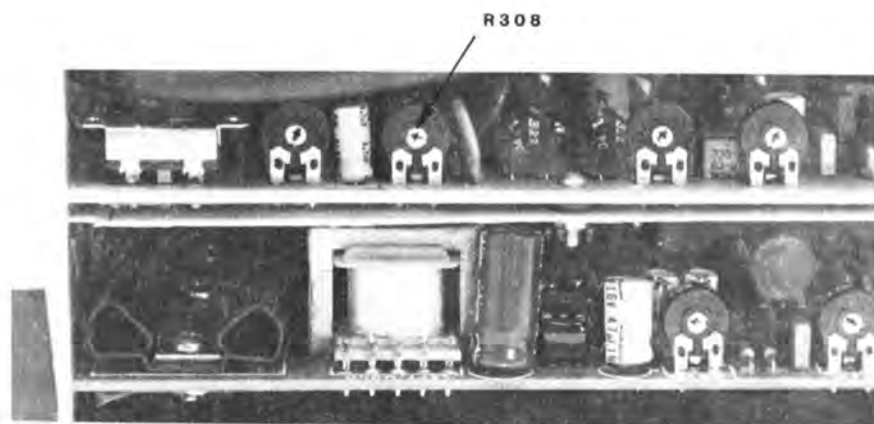


Fig. 3-44

Switch the audio oscillator output to 10 kHz and adjust R308 for a -10dBm indication on the voltmeter. Compare the 1 kHz and 10 kHz voltmeter readings by switching the audio oscillator frequency back and forth. If necessary, readjust R308 to produce a -10 dBm output level at 1 kHz and 10 kHz as measured on the voltmeter.

Slowly move the audio oscillator frequency upward to 15 kHz and evaluate the voltmeter readings. If a difference of more than +/- 2 dB in response occurs, it may indicate that a readjustment in bias is necessary. Excessive bias (overbias) causes losses at high frequencies. Likewise, underbias causes peaked response at high frequencies.

Adjustments should be made for flattest overall response from 1 kHz to 16 kHz.

This ends the procedure.

6. Program Meter Calibration:

Connect a 600 Ohm termination to the Left (MONO) channel reproduce output and attach a voltmeter across this termination. Connect a second 600 Ohm termination to the recorder LINE input and attach an audio oscillator across this termination. Figure 3-45.

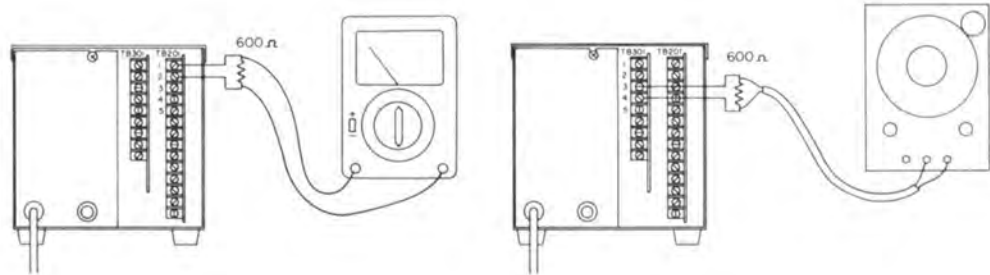


Fig. 3-45

Adjust the audio oscillator output for a signal of 1 kHz at 0 dBm. Insert a blank 3.5 minute cartridge and start the machine in the RECORD mode. Adjust the front panel record Level knob to produce a reproducer output level of 0 dBm

Potentiometer R312 on the Record PCB controls meter calibration. Figure 3-46.

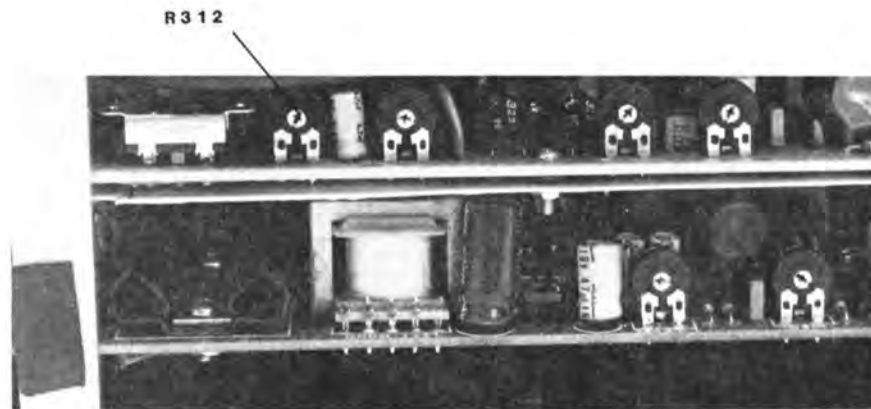


Fig. 3-46

Adjust R312 to achieve a front panel meter reading of 0 VU.

This ends the procedure.

7. Miscellaneous:

A. Cue Record Level ("Master" Level):

This is factory set and NO adjustment is required.

B. Program Level Input Sensitivity:

This is controlled by the front panel record Level knob. No other adjustment is possible.

HEAD REPLACEMENT

ITC Cartridge machines use strap-mount type heads, facilitating quick and easy replacement.

CAUTION

CAUTION: Demagnetize all tools and fixtures BEFORE beginning any work on or near the heads.

Remove the head shield by unscrewing the two shield screws and spacers. Figure 3-47. Secure the head block by reinstalling the right hand shield screw and spacer.

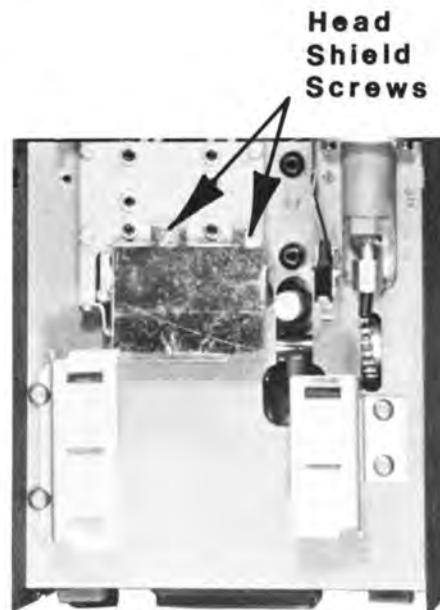


Fig. 3-47

Remove the two screws holding the head strap in place. Figure 3-48.

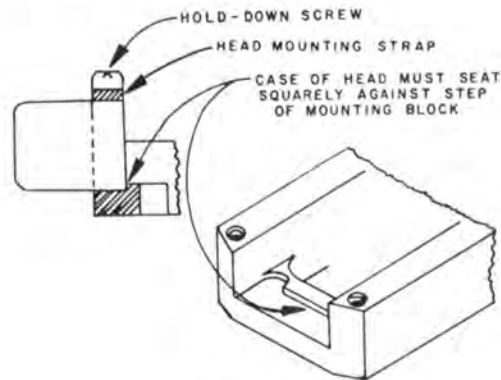


Fig. 3-48

CAUTION

CAUTION: Use extreme care when disconnecting and reconnecting head cables. The head pins can be broken off and the pin sockets on the head cable can be bent if excessive side pressure is exerted.

Disconnect and remove the old head. Install the new head and reconnect the cables. (See Figure 3-49 for the cable lead color arrangement.)

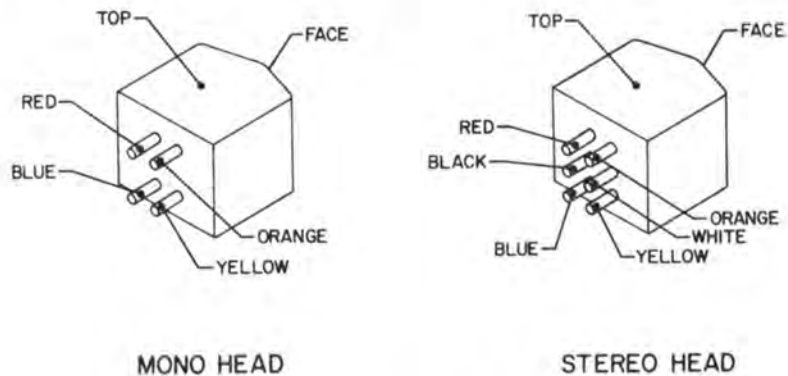


Fig. 3-49

Remount and fasten the head strap. Remove the right hand head shield screw and spacer from the head block, remount the head shield and reinstall both screws and spacers.

IMPORTANT

This ends the procedure. Note: A COMPLETE check of alignment IS necessary after a head is disconnected and/or replaced.

Section IV Routine Maintenance

In addition to performing adjustments and alignments described in Section III, a regular maintenance program will aid overall machine operation and help prevent potential problems. We recommend that you make the following information part of your complete maintenance schedule.

Motor Lubrication

The motor contains permanently lubricated ball bearings which require NO further lubrication. Any attempt to oil these bearings may cause premature motor failure due to migration of oil into the windings and ultimately, breakdown of the insulation material.

The cross shaft assembly contains permanently lubricated, sintered bronze bearings. The solenoid plunger is coated with a friction-reducing, self-lubricating material. As with the motor bearings, any attempt to oil these parts will cause damage, poor performance and possibly complete failure.

Head Cleaners

ITC recommends using ONLY isopropyl alcohol for head cleaning. After cleaning, all surfaces should be dried thoroughly before machine operation is begun again. The use of cleaners containing organic-based solvents such as acetone or ketone can severely damage or destroy rubber or plastic parts and other components.

The use of aerosol propellants for head cleaning is discouraged. This is due to the high likelihood of the cleaner being blown into motor bearing assemblies and degrading or destroying bearing lubricants.

1. Mechanical Maintenance Schedule:

Daily-

-Inspect and, if necessary, clean the heads with a cotton swab dipped in isopropyl alcohol.

-Clean the capstan shaft and pressure roller with a clean cloth dipped in isopropyl alcohol. (Be careful not to allow any alcohol

to drip down into the motor.) Remove all traces of tape lubricant and tape oxide.

Weekly or Monthly-

(Dependent on machine usage)

-Check pressure roller pressure/solenoid adjustment. (See Section III)

-Check reproduce and record head azimuth. (See Section III)

Biannually-

-Inspect all internal assemblies for dirt or dust buildup. If cleaning is needed, use a soft, dry brush to remove the buildup. Note: In some cases an air-gun or blower may be used for cleaning, but care should be exercised so that no debris is forced into adjacent parts.

2. Electrical Maintenance Schedule:

Daily or Weekly-

(Dependent on machine usage)

-Degauss all heads and tape guides, carefully following the instructions for degausser use.

Biannually-

-Check and adjust reproduce and record high frequency equalization.

-Check and adjust program recording bias and program bias meter calibration.

-Check and adjust record bias and cue bias calibration.

(All adjustments in Section III)

Section V Service Access

Occasionally, parts and assemblies may need to be accessed for repair & replacement or troubleshooting. Partial disassembly is usually necessary. This type of work is to be performed by qualified service personnel ONLY.

This section is not intended as a troubleshooting guide, but rather as an explanation of the procedures necessary to access certain major areas of the unit.

Questions regarding repair or replacement of parts or assemblies should be directed to ITC Technical Service.

1. PCB Swing-up: -----

(Note: Top cover is already removed. On reproduce only machines, ignore references to the Record PCB.)

A. Unscrew the two (2) countersunk screws located on each side of the REAR chassis. Loosen the rear panel/rear brace screw and lift the rear brace out. Figure 5-1.



Fig. 5-1

B. Locate the two (2) standoff screws holding the Reproduce PCB to the Left side of the chassis. Loosen the UPPER screw and remove the LOWER screw, retaining the LOWER screw for use in Step C. Figure 5-2.

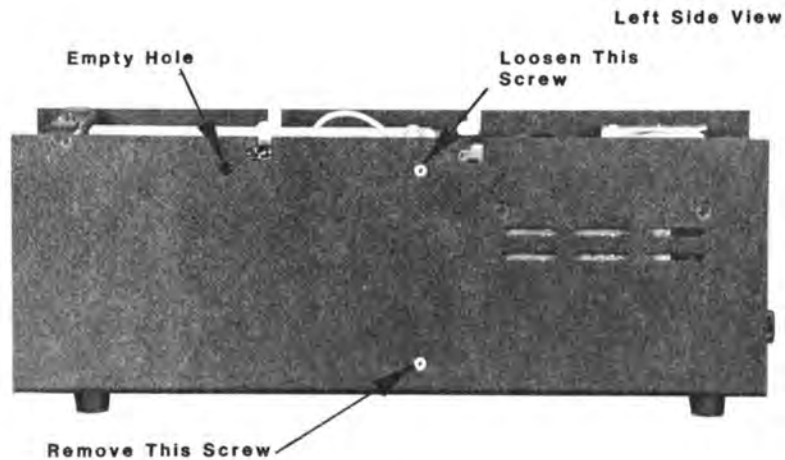


Fig. 5-2

CAUTION

CAUTION: A shock hazard is present any time the PCB's are moved while the machine is under power, as in the case of troubleshooting or repair. Adequate care must be exercised to avoid injury.

Also, the power transformer leads, connected to the PCB, are insulated with heavy, stiff tubing. When PCB's are moved, this stiff tubing can push the PCB against the chassis wall, creating a short circuit. Be very careful to hold the PCB's securely, and correctly reposition the transformer leads when necessary.

C. The Reproduce and Record PCB's are electrically and mechanically connected. After Step B, they may be swung up and over the chassis as illustrated in Figure 5-3. Take the standoff screw removed in Step B and reposition it in the empty countersunk hole near the chassis top. To hold the PCB's in the "up" position, tighten both standoff screws.

D. The Reproduce and Record PCB's are mechanically fastened by four (4) nylon "push-pull" standoffs. The boards can be gently pried apart for additional access. The Reproduce PCB will remain mounted to the chassis side and the Record PCB may be stood on end across the chassis.

There is a ribbon cable which electrically connects the two boards. This cable should remain connected.

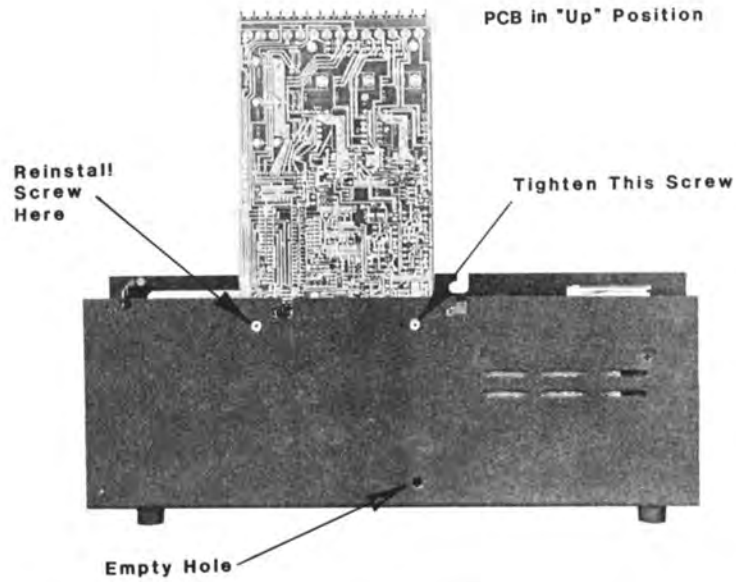


Fig. 5-3

2. Access to Components Under Deck Assembly:

A. Remove the two (2) LEFT side deck mounting screws. Figure 5-4.

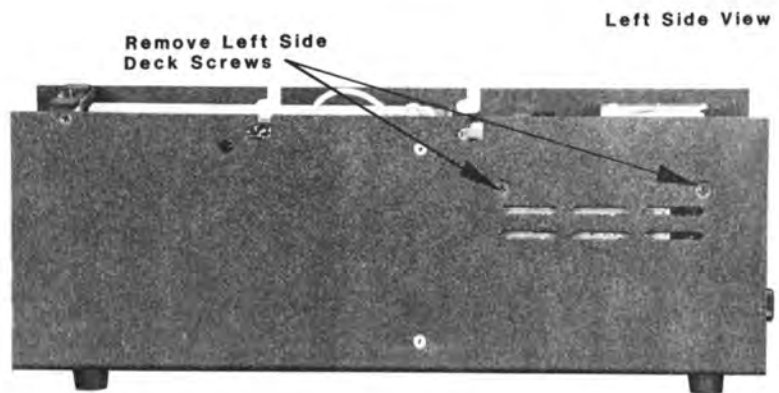


Fig. 5-4

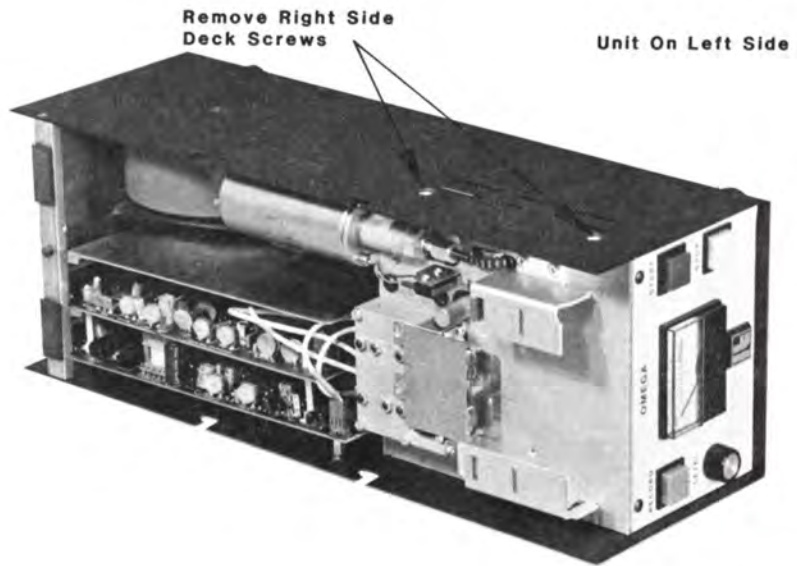


Fig. 5-5

B. Gently turn the machine on its LEFT side and remove the RIGHT side deck mounting screws. Figure 5-5.

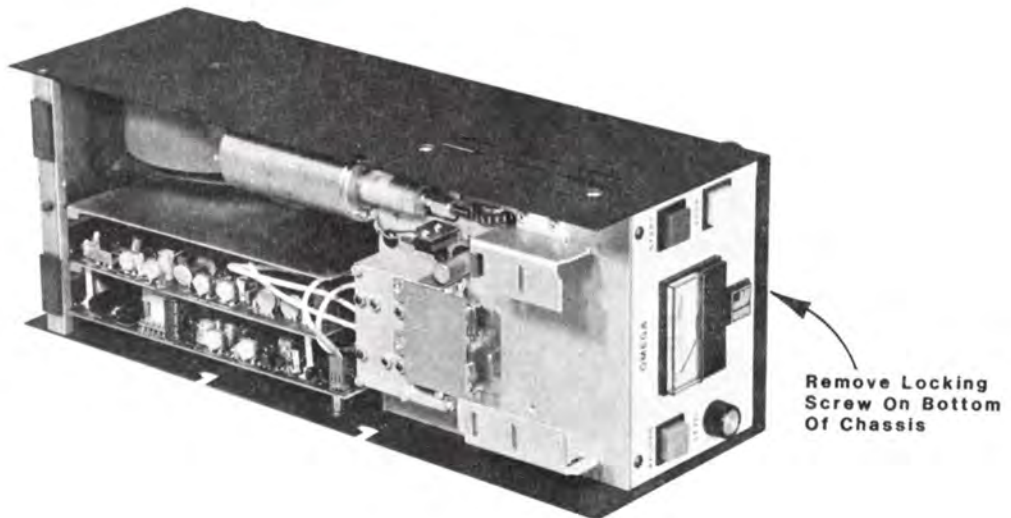


Fig. 5-6

C. The front panel is fastened to the chassis by a locking screw installed from the bottom. Remove this screw. Figure 5-6.

D. The front panel and deck assembly may now be swung out and away from the chassis for access to switches and connectors. Figure 5-7. Be careful not to disconnect the motor from the controller PCB.

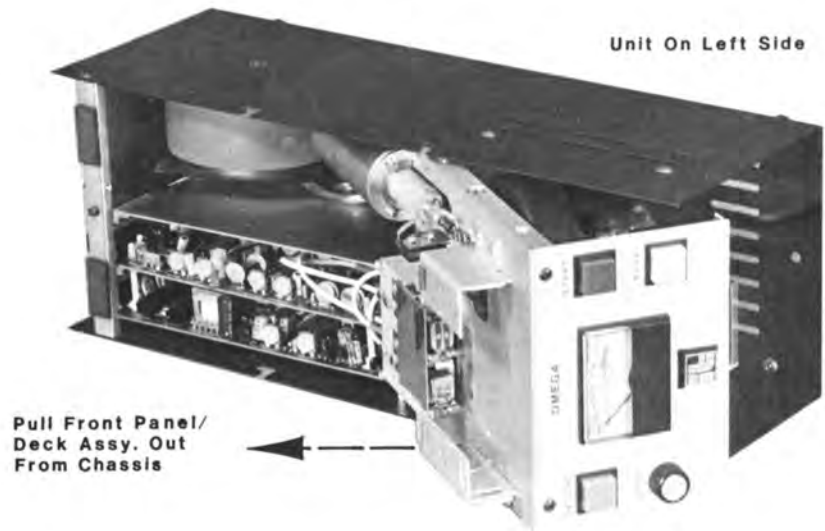


Fig. 5-7

E. Reassembly requires that you reverse the order of removal.

Section VI Electrical Illustrations

A. PLAY (Logic) PCB Parts List (831-0381) STEREO 120V Version

CAPACITORS

C201	See Component Value Table On Schematic Or Overlay
C202	See Component Value Table On Schematic Or Overlay
C203	695-1335-013 Capacitor, Electrolytic, 10 ufd, 35V
C204	695-1335-013 Capacitor, Electrolytic, 10 ufd, 35V
C205	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C206	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C207	677-0001-000 Capacitor, Silver Mica, 100 pfd, 300V
C208	677-0001-000 Capacitor, Silver Mica, 100 pfd, 300V
C209	See Component Value Table On Schematic Or Overlay
C210	See Component Value Table On Schematic Or Overlay
C211	677-0001-000 Capacitor, Silver Mica, 100 pfd, 300V
C212	677-0001-000 Capacitor, Silver Mica, 100 pfd, 300V
C213	695-1716-013 Capacitor, Electrolytic, 47 ufd, 16V
C214	695-1716-013 Capacitor, Electrolytic, 1 ufd, 50V
C215	695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
C216	695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
C217	695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
C218	695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
C219	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C220	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C221	686-0013-000 Capacitor, Ceramic, 22 pfd
C222	686-0013-000 Capacitor, Ceramic, 22 pfd
C223	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C224	677-0003-000 Capacitor, Silver Mica, 47 pfd, 300V
C225	677-0003-000 Capacitor, Silver Mica, 47 pfd, 300V
C226	677-0003-000 Capacitor, Silver Mica, 47 pfd, 300V
C227	697-0002-000 Capacitor, Non-polar, 220 ufd, 16V
C228	697-0002-000 Capacitor, Non-polar, 220 ufd, 16V
C229	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C230	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C231	677-0007-000 Capacitor, Silver Mica, 470 pfd, 300V
C232	677-0007-000 Capacitor, Silver Mica, 300 pfd, 300V
C233	695-1335-013 Capacitor, Electrolytic, 10 ufd, 35V
C234	686-0013-000 Capacitor, Ceramic, 22 pfd
C235	680-1563-033 Capacitor, Polyester, .015 ufd, 63V
C236	695-1335-013 Capacitor, Electrolytic, 10 ufd, 35V
C237	677-0003-000 Capacitor, Silver Mica, 300 pfd, 300V
C238	680-0701-033 Capacitor, Polyester, .0033 ufd, 100V
C239	680-1763-033 Capacitor, Polyester, .022 ufd, 63V
C240	680-1763-033 Capacitor, Polyester, .022 ufd, 63V
C241	680-0301-033 Capacitor, Polyester, .0015 ufd, 100V
C242	680-0301-033 Capacitor, Polyester, .0015 ufd, 100V
C243	686-0011-000 Capacitor, Ceramic Disc, 15 pfd, 1000V
C244	686-0011-000 Capacitor, Ceramic Disc, 15 pfd, 1000V
C245	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C246	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C247	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C248	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C249	695-1716-013 Capacitor, Electrolytic, 47 ufd, 16V
C250	680-0401-033 Capacitor, Polyester, .0018 ufd, 100V
C251	695-1535-013 Capacitor, Electrolytic, 22 ufd, 35V
C252	680-0401-033 Capacitor, Polyester, .0018 ufd, 100V
C253	694-0003-000 Capacitor, Tantalum, 4.7 ufd
C254	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C255	695-2106-013 Capacitor, Electrolytic, 220 ufd, 6.3V
C256	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C257	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C258	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C259	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C260	694-0003-000 Capacitor, Tantalum, 4.7 ufd
C261	694-0003-000 Capacitor, Tantalum, 4.7 ufd
C262	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C263	686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
C264	695-1716-013 Capacitor, Electrolytic, 47 ufd, 16V

RESISTOR NETWORKS

RP201 631-0042-000 Separate SIP, 4R, 100K ohm, 2%
 RP202 631-0037-000 Separate SIP, 4R, 3.3K ohm, 2%
 RP203 631-0030-000 Separate SIP, 4R, 4.7K ohm, 2%
 RP204 631-0030-000 Separate SIP, 4R, 4.7K ohm, 2%
 RP205 631-0032-000 Separate SIP, 4R, 4.7K ohm, 2%
 RP206 631-0030-000 Separate SIP, 4R, 4.7K ohm, 2%
 RP207 631-0061-000 Common SIP, .10K ohm, 8-pin TR
 RP208 631-0007-000 Common SIP, 9R, 330 ohm, 2%

DIODES

CR201 575-0031-000 Small Signal, 1N4448
 CR202 575-0031-000 Small Signal, 1N4448
 CR203 575-0007-000 Power, 1A, 1N4005
 CR204 575-0007-000 Power, 1A, 1N4005
 CR205 577-0007-000 Power, 1A, 1N4005
 CR206 575-0007-000 Power, 1A, 1N4005
 CR207 575-0007-000 Power, 1A, 1N4005
 CR208 577-0011-000 Zener, 5.1V, 1N5231B
 CR209 577-0011-000 Zener, 5.1V, 1N5231B
 CR210 575-0007-000 Power, 1A, 1N4005
 CR211 575-0007-000 Power, 1A, 1N4005
 CR212 575-0007-000 Power, 1A, 1N4005

TRANSISTORS

Q201 590-0013-010 NPN, Low Noise, 2N5089
 Q202 590-0013-010 NPN, Low Noise, 2N5089
 Q203 590-0013-010 NPN, Low Noise, 2N5089
 Q204 590-0013-010 NPN, Low Noise, 2N5089
 Q205 590-0017-010 NPN, Low Power, GES5816
 Q206 590-0032-000 PNP, Darlington, TIP127

INTEGRATED CIRCUITS

U201 606-0021-010 NE5532AN, Dual OpAmp
 U202 606-0021-010 NE5532AN, Dual OpAmp
 U203 606-0014-000 TL072CP, Dual OpAmp
 U204 606-0014-000 TL072CP, Dual OpAmp
 U205 609-0002-000 LM339, Quad Voltage Comparator
 U206 608-0027-000 MC14050BCP, Buffer/Driver
 U207 610-0010-060 68701L, Microprocessor, EPROM
 U208 607-0009-000 75451, Dual Peripheral + AND Driver
 U209 607-0009-000 75451, Dual Peripheral + AND Driver
 U210 607-0009-000 75451, Dual Peripheral + AND Driver
 U211 608-0036-000 DG201, Quad Analog Switch

VOLTAGE REGULATORS

VR201 605-0012-000 MC7805CT, +5V Regulator
 VR202 605-0010-000 MC7815CT, +15V Regulator
 VR203 605-0011-000 MC7915CT, -15V Regulator

B. Play (Reproduce) PCB Overlay

6-4

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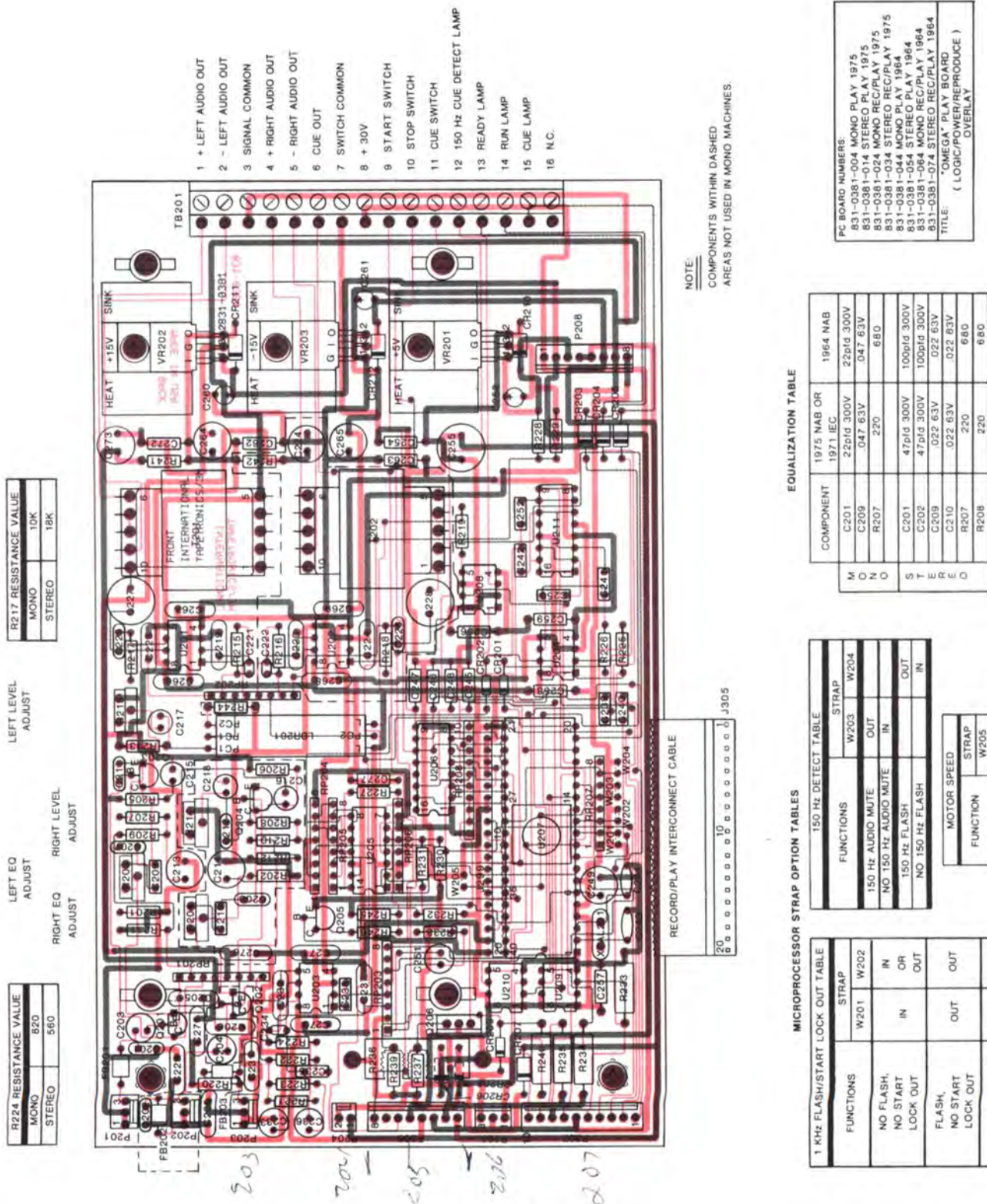


Fig. 6-1

EQUALIZATION TABLE

COMPONENT	1975 NAB OR 1971 IEC	1964 NAB
M C201	22pfd 300V	22pfd 300V
O C209	.047 63V	.047 63V
N R207	220	680
S C201	47pfd 300V	100pfd 300V
T C202	47pfd 300V	100pfd 300V
E C209	.022 63V	.022 63V
D C210	.022 63V	.022 63V
R207	220	680
R208	220	680

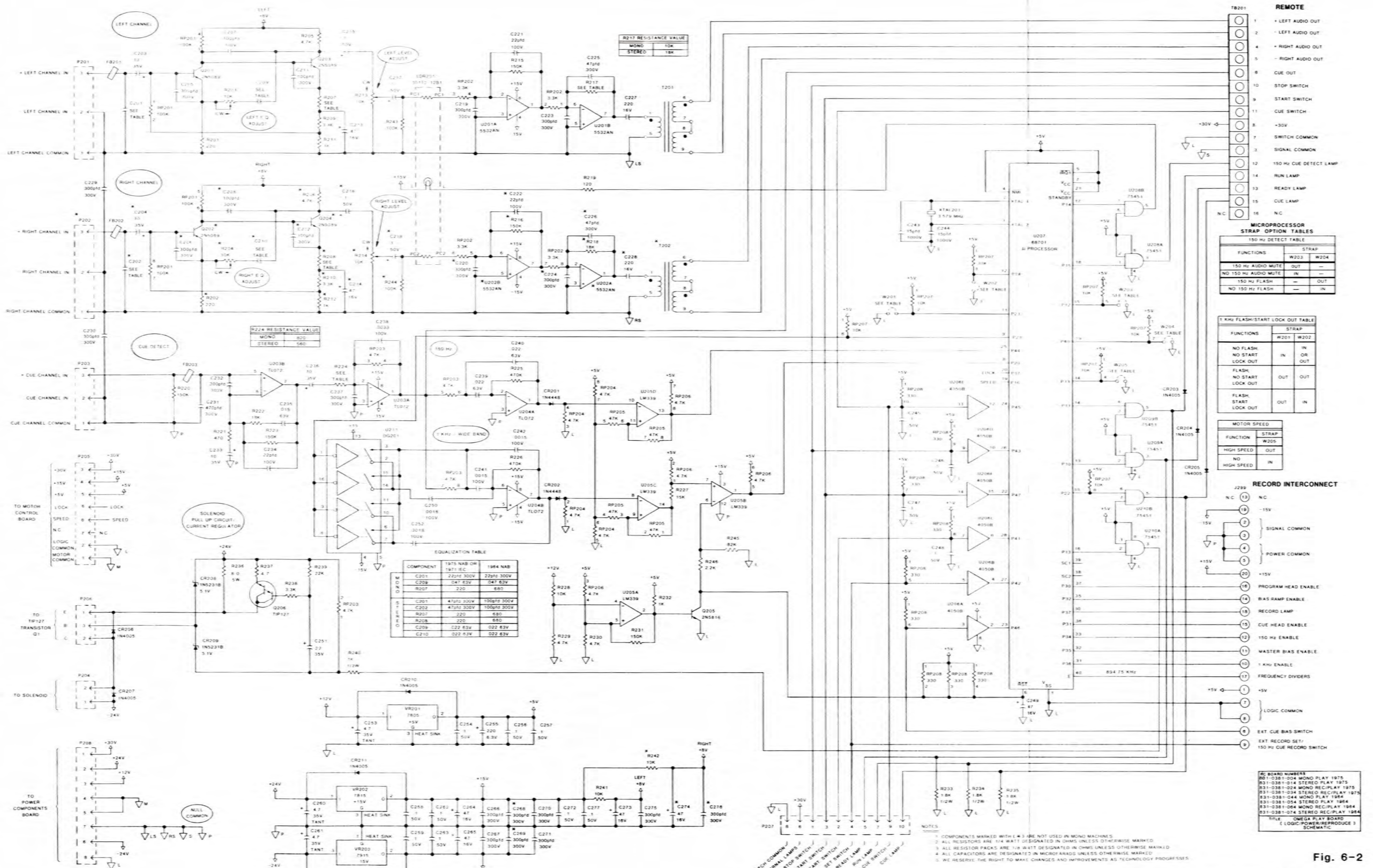
MICROPROCESSOR STRAP OPTION TABLES

150 HZ DETECT TABLE		
FUNCTIONS	STRAP W203	W204
150 HZ AUDIO MUTE	OUT	OUT
NO 150 HZ AUDIO MUTE	IN	IN
150 HZ FLASH	OUT	OUT
NO 150 HZ FLASH	IN	IN

MOTOR SPEED		
FUNCTION	STRAP W205	W206
HIGH SPEED	OUT	OUT
NO HIGH SPEED	IN	IN

1 KHz FLASH/START LOCK OUT TABLE		
FUNCTIONS	STRAP W201	W202
NO FLASH, NO START LOCK OUT	IN	OR OUT
FLASH, NO START LOCK OUT	OUT	OUT
FLASH, START LOCK OUT	OUT	IN

PC BOARD NUMBERS:
831-0381-004 MONO PLAY 1975
831-0381-014 STEREO REC/PLAY 1975
831-0381-024 STEREO REC/PLAY 1975
831-0381-034 STEREO REC/PLAY 1975
831-0381-044 MONO PLAY 1964
831-0381-054 STEREO PLAY 1964
831-0381-064 MONO REC/PLAY 1964
831-0381-074 STEREO REC/PLAY 1964
TITLE: "OMEGA" PLAY BOARD
(LOGIC/POWER/REPRODUCE)
OVERLAY



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Fig. 6-2 C. Play (Reproduce) PCB Schematic



A. RECORD PCB Parts List (831-0384)

CAPACITORS

C301	694-0005-000	Capacitor, Tantalum, 1 ufd, 35V
C302	677-0001-000	Capacitor, Silver Mica, 100 pfd, 300V
C303	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C304	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C305	677-0008-000	Capacitor, Silver Mica, 22 pfd, 300V
C306	677-0001-000	Capacitor, Silver Mica, 100 pfd, 300V
C307	695-0550-013	Capacitor, Electrolytic, 47 ufd, 50V
C308	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C309	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C310	680-1563-033	Capacitor, Polyester, .015 ufd, 63V
C311	695-1135-013	Capacitor, Electrolytic, 4.7 ufd, 35V
C312	680-2363-033	Capacitor, Polyester, .068 ufd, 63V
C313	680-1763-033	Capacitor, Polyester, .022 ufd, 63V
C314	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C315	686-0011-000	Capacitor, Ceramic Disc, 15 pfd, 1000V
C316	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C317	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C318	695-1335-013	Capacitor, Electrolytic, 10 ufd, 35V
C319	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C320	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C321	680-0101-033	Capacitor, Polyester, .001 ufd, 100V
C322	677-0013-000	Capacitor, Silver Mica, 15 pfd, 300V
C323	680-0101-033	Capacitor, Polyester, .001 ufd, 100V
C324	678-0163-033	Capacitor, Polypropylene, 220 pfd, 63V
C325	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C326	695-1335-013	Capacitor, Electrolytic, 10 ufd, 35V
C327	678-0363-033	Capacitor, Polypropylene, 330 pfd, 63V
C328	678-0363-033	Capacitor, Polypropylene, 330 pfd, 63V
C329	680-0901-033	Capacitor, Polyester, .0047 ufd, 100V
C330	677-0008-000	Capacitor, Silver Mica, 22 pfd, 300V
C331	677-0008-000	Capacitor, Silver Mica, 22 pfd, 300V
C332	697-0002-000	Capacitor, Non-polar, 220 ufd, 16V
C333	697-0002-000	Capacitor, Non-polar, 220 ufd, 16V
C334	680-1763-033	Capacitor, Polyester, .022 ufd, 63V
C335	See Component Value Table On Schematic Or Overlay	
C336	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C337	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C338	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C339	680-0501-033	Capacitor, Polyester, .0022 ufd, 100V
C340	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C341	680-1963-033	Capacitor, Polyester, .033 ufd, 63V
C342	695-0750-013	Capacitor, Electrolytic, 1 ufd, 50V
C343	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C344	680-0501-033	Capacitor, Polyester, .0022 ufd, 100V
C345	680-2563-033	Capacitor, Polyester, .1 ufd, 63V
C346	680-1963-033	Capacitor, Polyester, .033 ufd, 63V
C347	695-0750-013	Capacitor, Electrolytic, 1 ufd, 50V
C348	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C349	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C350	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C351	677-0003-000	Capacitor, Silver Mica, 300 pfd, 300V
C352	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C353	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C354	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C355	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C356	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C357	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C358	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C359	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C360	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C361	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C362	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C363	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C364	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V

RESISTOR NETWORKS

RP301	631-0042-000	Separate SIP, 4R, 100K ohm, 2%
RP302	631-0030-000	Separate SIP, 4R, 4.7K ohm, 2%
RP303	631-0030-000	Separate SIP, 4R, 4.7K ohm, 2%
RP304	631-0042-000	Separate SIP, 4R, 100K ohm, 2%
RP305	631-0037-000	Separate SIP, 4R, 3.3K ohm, 2%
RP306	631-0033-000	Separate SIP, 4R, 2.2K ohm, 2%

DIODES

CR301	575-0031-000	Small Signal, IN4448
CR302	575-0031-000	Small Signal, IN4448
CR303	575-0031-000	Small Signal, IN4448
CR304	575-0031-000	Small Signal, IN4448
CR305	575-0031-000	Small Signal, IN4448
CR306	575-0031-000	Small Signal, IN4448
CR307	575-0031-000	Small Signal, IN4448
CR308	575-0007-000	Power, IA, IN4005
CR309	575-0007-000	Power, IA, IN4005
CR310	575-0031-000	Small Signal, IN4448

TRANSISTORS

Q301	596-0004-000	N-Channel, J-FET, MPF4391
Q302	596-0004-000	N-Channel, J-FET, MPF4391
Q303	596-0004-000	N-Channel, J-FET, MPF4391
Q304	590-0018-000	PNP, Low-Power, GESS817
Q305	590-0017-000	PNP, Low-Power, GESS816
Q306	594-0004-000	N-Channel, J-FET, MPF4391

INTEGRATED CIRCUITS

U301	606-0024-000	NE5534AN, Single Op-Amp, Low Noise
U302	606-0016-000	TLO74, Quad Op-Amp
U303	608-0033-000	MC14526B
U304	608-0033-000	MC14526B
U305	607-0079-000	74LS390
U306	607-0079-000	74LS390
U307	606-0016-000	TLO74, Quad Op-Amp
U308	606-0014-000	TLO72CP, Dual Low-Noise Bi-FET Op-Amp
U309	606-0023-000	NE5534N, Single Op-Amp
U310	606-0023-000	NE5534N, Single Op-Amp
U311	606-0016-000	TLO74, Quad Op-Amp

C365 886-0009-000
 C366 886-0009-000
 C367 886-0009-000
 C368 680-2563-033
 C369 680-2763-033

Capacitor, Ceramic Disc, .1 ufd, 25V
 Capacitor, Ceramic Disc, .1 ufd, 25V
 Capacitor, Ceramic Disc, .1 ufd, 25V
 Capacitor, Polyester, .1 ufd, 63V
 Capacitor, Polyester, .33 ufd, 63V

RESISTORS

R301 630-0049-000
 R302 630-0067-000
 R303 630-0089-000
 R304 630-0089-000
 R305 630-0089-000
 R306 630-0033-000
 R307 630-0087-000
 R308 636-0046-000
 R309 630-0099-000
 R310 630-0119-000
 R311 630-0063-000
 R312 636-0046-000
 R313 630-0043-000
 R314 630-0135-000
 R315 630-0079-000
 R316 630-0087-000
 R317 630-0043-000
 R318 630-0058-000
 R319 630-0081-000
 R320 630-0087-000
 R321 630-0085-000
 R322 630-0072-000
 R323 630-0079-000
 R324 630-0073-000
 R325 636-0046-000
 R326 636-0046-000
 R327 630-0071-000
 R328 630-0079-000
 R329 630-0067-000
 R330 630-0067-000
 R331 630-0039-000
 R332 630-0039-000
 R333 630-0111-000
 R334 630-0111-000
 R335 630-0103-000
 R336 630-0079-000
 R337 630-0135-000
 R338 630-0135-000
 R339 630-0082-000
 R340 630-0083-000
 R341 630-0087-000
 R342 630-0105-000
 R343 630-0103-000
 R344 630-0103-000
 R345 630-0107-000
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 R348 630-0135-000
 R349 630-0065-000
 R350 630-0045-000
 R351 630-0069-000
 R352 630-0103-000
 R353 630-0091-000
 R354 630-0079-000
 R355 630-0119-000
 R356 630-0125-000
 R357 630-0063-000

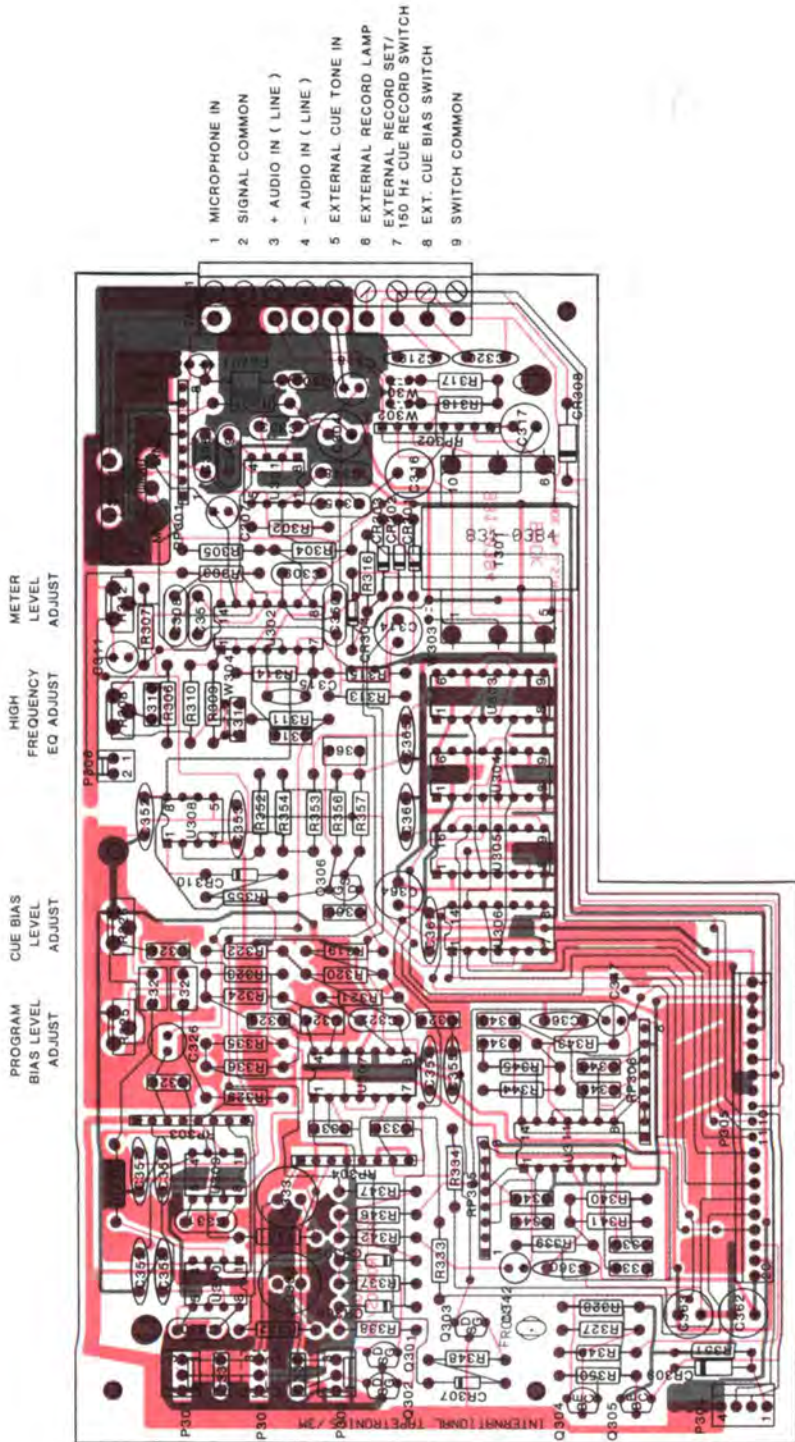
Resistor, Carbon Film, 1/4w, 270 ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.5K ohm, 5%
 Resistor, Carbon Film, 1/4w, 12K ohm, 5%
 Resistor, Carbon Film, 1/4w, 12K ohm, 5%
 Resistor, Carbon Film, 1/4w, 12K ohm, 5%
 Resistor, Carbon Film, 1/4w, 12K ohm, 5%
 Resistor, Carbon Film, 1/4w, 56 ohm, 5%
 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 Potentiometer, 10K ohm
 Resistor, Carbon Film, 1/4w, 33K ohm, 5%
 Resistor, Carbon Film, 1/4w, 220K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1K ohm, 5%
 Potentiometer, 10K ohm
 Resistor, Carbon Film, 1/4w, 150 ohm, 5%
 Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 Resistor, Carbon Film, 1/4w, 150 ohm, 5%
 Resistor, Carbon Film, 1/4w, 620 ohm, 5%
 Resistor, Carbon Film, 1/4w, 5.6K ohm, 5%
 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 Resistor, Carbon Film, 1/4w, 8.2K ohm, 5%
 Resistor, Carbon Film, 1/4w, 2.4K ohm, 5%
 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 Resistor, Carbon Film, 1/4w, 2.7K ohm, 5%
 Potentiometer, 10K ohm
 Potentiometer, 10K ohm
 Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.5K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.5K ohm, 5%
 Resistor, Carbon Film, 1/4w, 100 ohm, 5%
 Resistor, Carbon Film, 1/4w, 100 ohm, 5%
 Resistor, Carbon Film, 1/4w, 100K ohm, 5%
 Resistor, Carbon Film, 1/4w, 100K ohm, 5%
 Resistor, Carbon Film, 1/4w, 47K ohm, 5%
 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
 Resistor, Carbon Film, 1/4w, 6.2K ohm, 5%
 Resistor, Carbon Film, 1/4w, 6.8K ohm, 5%
 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 Resistor, Carbon Film, 1/4w, 56K ohm, 5%
 Resistor, Carbon Film, 1/4w, 27K ohm, 5%
 Resistor, Carbon Film, 1/4w, 56K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.2K ohm, 5%
 Resistor, Carbon Film, 1/4w, 180 ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.8K ohm, 5%
 Resistor, Carbon Film, 1/4w, 47K ohm, 5%
 Resistor, Carbon Film, 1/4w, 68K ohm, 5%
 Resistor, Carbon Film, 1/4w, 27K ohm, 5%
 Resistor, Carbon Film, 1/4w, 56K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.2K ohm, 5%
 Resistor, Carbon Film, 1/4w, 180 ohm, 5%
 Resistor, Carbon Film, 1/4w, 1.8K ohm, 5%
 Resistor, Carbon Film, 1/4w, 47K ohm, 5%
 Resistor, Carbon Film, 1/4w, 15K ohm, 5%
 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 Resistor, Carbon Film, 1/4w, 220K ohm, 5%
 Resistor, Carbon Film, 1/4w, 390K ohm, 5%
 Resistor, Carbon Film, 1/4w, 1K ohm, 5%

CONNECTORS & SOCKETS

P301 376-0032-000 Wafer, Locking, 3 Pos.
 P302 376-0032-000 (Used on 3-Track Only) Same as P301
 P303 376-0032-000 Wafer, locking, 3 Pos.
 P304 376-0082-000 Wafer, locking, 4 Pos.
 P305 376-0080-000 Wafer, locking, 20 Pos.
 P306 376-0031-000 Wafer, locking, 2 Pos.
 TR301 376-0108-000 Terminal Strip, 9-Position, 5mm, Closed Housing
 382-0151-000 Pin Strip For 376-0108-000
 U301 613-0007-000 Socket, IC, 8-Pin DIP
 U302 613-0008-000 Socket, IC, 14-Pin DIP
 U303 613-0009-000 Socket, IC, 16-Pin DIP
 U304 613-0009-000 Socket, IC, 16-Pin DIP
 U305 613-0009-000 Socket, IC, 16-Pin DIP
 U306 613-0008-000 Socket, IC, 14-Pin DIP
 U307 613-0008-000 Socket, IC, 14-Pin DIP
 U308 613-0007-000 Socket, IC, 8-Pin DIP
 U309 613-0007-000 Socket, IC, 8-Pin DIP
 U310 613-0007-000 Socket, IC, 8-Pin DIP
 U311 613-0008-000 Socket, IC, 14-Pin DIP

MISCELLANEOUS

T301 532-0010-000 Transformer, Input +28 dBm
 S301 402-0003-000 Switch, Slide, DPDT
 W301 427-0003-000 Wire, Buss, (150 ohm Strap)
 W302 427-0003-000 Wire, Buss, (600 ohm Strap)
 W303 427-0003-000 Wire, Buss, (XFMR C.T. to Ground)
 W304 000-0000-000 PCB Foil Trace (Cut for 1964 NAB E.Q.)
 FR301 516-0001-000 Head, Ferrite, w/Leads, (57-3425)
 300-0101-000 (4) Spacer, Nylon, 1" Self-Locking (PCB mtg.)



- 1 MICROPHONE IN
- 2 SIGNAL COMMON
- 3 + AUDIO IN (LINE)
- 4 - AUDIO IN (LINE)
- 5 EXTERNAL CUE TONE IN
- 6 EXTERNAL RECORD LAMP
- 7 150 Hz CUE RECORD SWITCH
- 8 EXT. CUE BIAS SWITCH
- 9 SWITCH COMMON

PC BOARD NUMBERS:
 831-0384-004 MONO 2 TRACK
 831-0384-014 MONO 3 TRACK
 TITLE: "OMEGA"
 RECORD BOARD
 OVERLAY

NAB EQUALIZATION

STRAP	1964	1975
W304	OUT	IN

IMPEDANCE TABLE

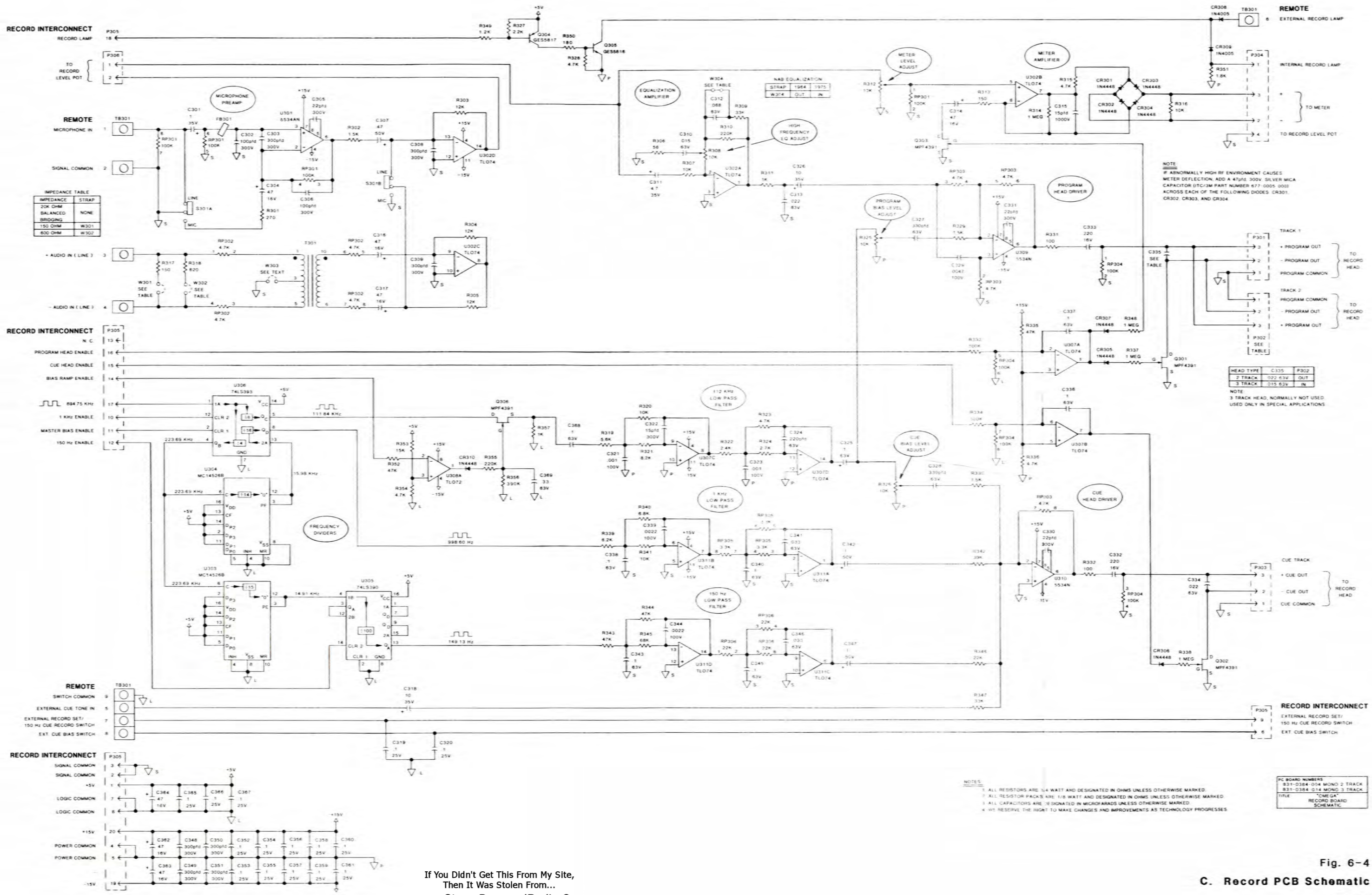
IMPEDANCE	STRAP
20K OHM	NONE
BALANCED BRIDGING	W301
150 OHM	W301
600 OHM	W302

HEAD TYPE	C335	P302
2 TRACK	.022 63V	OUT
3 TRACK	.015 63V	IN

NOTE:
 3 TRACK HEAD, NORMALLY NOT USED.
 USED ONLY IN SPECIAL APPLICATIONS.

Fig. 6-3

B. Record PCB Overlay



IMPEDANCE TABLE

IMPEDANCE	STRAP
20K OHM BALANCED BRIDGING	NONE
150 OHM	W301
800 OHM	W302

HEAD TYPE

C.335	P.302
2 TRACK	022 63V OUT
3 TRACK	015 63V IN

NOTE
IF ABNORMALLY HIGH RF ENVIRONMENT CAUSES METER DEFLECTION, ADD A 47pfd. 300V SILVER MICA CAPACITOR (UTC/3M PART NUMBER 677-0005 0001) ACROSS EACH OF THE FOLLOWING DIODES: CR301, CR302, CR303, AND CR304.

NOTE
3 TRACK HEAD, NORMALLY NOT USED. USED ONLY IN SPECIAL APPLICATIONS.

- NOTES
- ALL RESISTORS ARE 1/4 WATT AND DESIGNATED IN OHMS UNLESS OTHERWISE MARKED.
 - ALL RESISTOR PACKS ARE 1/8 WATT AND DESIGNATED IN OHMS UNLESS OTHERWISE MARKED.
 - ALL CAPACITORS ARE DESIGNATED IN MICROFARADS UNLESS OTHERWISE MARKED.
 - WE RESERVE THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS AS TECHNOLOGY PROGRESSES.

PC BOARD NUMBERS

831-0384-014	MONO 2 TRACK
831-0384-014	MONO 3 TRACK

TITLE
"OMEGA"
RECORD BOARD
SCHEMATIC

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Fig. 6-4
C. Record PCB Schematic
6-11

A. MOTOR CONTROL PCB Parts List (831-0380)

CAPACITORS

C101 695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
 C102 695-0750-013 Capacitor, Electrolytic, 1 ufd, 50V
 C103 26-1004-7762-4 Capacitor, Ceramic, Axial Lead, .1 ufd, 50V
 C104 680-1763-033 Capacitor, Polyester, .022 ufd, 63V
 C105 680-3363-033 Capacitor, Polyester, .47 ufd, 63V
 C106 680-2963-033 Capacitor, Polyester, .22 ufd, 63V
 C107 680-3363-033 Capacitor, Polyester, .47 ufd, 63V
 C108 686-0009-000 Capacitor, Ceramic Disc, .1 ufd, 25V
 C109 26-1004-7762-4 Capacitor, Ceramic, Axial Lead, .1 ufd, 50V
 C110 26-1004-7762-4 Capacitor, Ceramic, Axial Lead, .1 ufd, 50V
 C111 680-0101-033 Capacitor, Polyester, .001 ufd, 500V
 C112 26-1004-7762-4 Capacitor, Ceramic, Axial Lead, .1 ufd, 50V
 C113 680-0101-033 Capacitor, Polyester, .001 ufd, 500V
 C114 677-0015-000 Capacitor, Silver Mica, 100 pfd, 500V
 C115 677-0008-000 Capacitor, Silver Mica, 22 pfd, 500V
 C116 682-0003-000 Capacitor, Polyester, .33 ufd, 100V
 C117 682-0003-000 Capacitor, Polyester, .33 ufd, 100V
 C118 682-0003-000 Capacitor, Polyester, .33 ufd, 100V
 C119 26-1004-7762-4 Capacitor, Ceramic, Axial Lead, .1 ufd, 50V
 C120 695-1716-013 Capacitor, Electrolytic, .47 ufd, 16V
 C121 694-0002-000 Capacitor, Tantalum, 10 ufd, 20V
 C122 695-1135-013 Capacitor, Electrolytic, 4.7 ufd, 35V

RESISTORS

R101 630-0135-000 Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
 R102 630-0087-000 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 R103 630-0103-000 Resistor, Carbon Film, 1/4w, 47K ohm, 5%
 R104 630-0071-000 Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
 R105 630-0123-000 Resistor, Carbon Film, 1/4w, 330K ohm, 5%
 R106 630-0061-000 Resistor, Carbon Film, 1/4w, 820 ohm, 5%
 R107 630-0085-000 Resistor, Carbon Film, 1/4w, 8.2K ohm, 5%
 R108 630-0080-000 Resistor, Carbon Film, 1/4w, 5.1K ohm, 5%
 R109 630-0075-000 Resistor, Carbon Film, 1/4w, 3.3K ohm, 5%
 R110 630-0071-000 Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
 R111 630-0071-000 Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
 R112 630-0127-000 Resistor, Carbon Film, 1/4w, 470K ohm, 5%
 R113 630-0015-000 Resistor, Carbon Film, 1/4w, 10 ohm, 5%
 R114 630-0015-000 Resistor, Carbon Film, 1/4w, 10 ohm, 5%
 R115 630-0019-000 Resistor, Carbon Film, 1/4w, 10 ohm, 5%
 R116 630-0079-000 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 R117 630-0079-000 Resistor, Carbon Film, 1/4w, 4.7K ohm, 5%
 R118 630-0087-000 Resistor, Carbon Film, 1/4w, 10K ohm, 5%
 R119 630-0063-000 Resistor, Carbon Film, 1/4w, 1K ohm, 5%
 R120 630-0077-000 Resistor, Carbon Film, 1/4w, 3.9K ohm, 5%
 R121 630-0067-000 Resistor, Carbon Film, 1/4w, 1.5K ohm, 5%
 R122 628-0001-000 Resistor, BWH-Type, 2w, .1 ohm

RESISTOR NETWORKS

RP101 631-0052-000 Separate SIP, 3R, 6-Pin, 100 ohm
 RP102 631-0053-000 Separate SIP, 3R, 6-Pin, 2.2K ohm
 RP103 631-0033-000 Separate SIP, 4R, 8-Pin, 2.2K ohm
 RP104 631-0023-000 Common SIP, 5R, 6-Pin, 10K ohm
 RP105 631-0052-000 Separate SIP, 3R, 6-Pin, 100 ohm
 RP106 631-0044-000 Separate SIP, 5R, 10-Pin, 1.5K ohm
 RP107 631-0044-000 Separate SIP, 5R, 10-Pin, 1.5K ohm

DIODES

CR101 575-0031-000 Small Signal, IN4448
 CR102 575-0031-000 Small Signal, IN4448
 CR103 575-0031-000 Small Signal, IN4448
 CR104 575-0031-000 Small Signal, IN4448
 CR105 575-0031-000 Small Signal, IN4448
 CR106 575-0031-000 Small Signal, IN4448
 CR107 575-0031-000 Small Signal, IN4448
 CR108 575-0031-000 Small Signal, IN4448

TRANSISTORS

Q101 590-0017-010 NPN, Low Power, GES5816
 Q102 590-0017-010 NPN, Low Power, GES5816
 Q103 590-0017-010 NPN, Low Power, GES5816
 Q104 590-0017-010 NPN, Low Power, GES5816
 Q105 590-0032-000 PNP, Darlington, TIP127
 Q106 590-0036-000 NPN, Darlington, TIP122
 Q107 590-0032-000 PNP, Darlington, TIP127
 Q108 590-0036-000 NPN, Darlington, TIP122
 Q109 590-0032-000 PNP, Darlington, TIP127
 Q110 590-0036-000 NPN, Darlington, TIP122
 Q111 590-0017-010 NPN, Low Power, GES5816

INTEGRATED CIRCUITS

U101 606-0025-000 TLC272CP, CMOS OpAmp
 U102 606-0025-000 TLC272CP, CMOS OpAmp
 U103 617-0004-001 PLS155, Program = Phase/Frequency Comparator
 U104 608-0042-000 74HC123, Retriggerable Monostable Multivibrator
 U105 608-0041-000 74HC1060, Asynch. 14-Stage Binary Counter & Osc.
 U106 617-0005-001 PLS155, Program = Hi-Speed Control

CONNECTORS & SOCKETS

P101 376-0047-000 Wafer, w/lock, 10 Pos., (22-23-2101)
 P102 376-0071-000 Wafer, w/lock, 8 Pos., (MLSS100-8, .1001)
 U101 613-0007-000 Socket, IC, 8-Pin DIP
 U102 613-0007-000 Socket, IC, 8-Pin DIP
 U103 613-0020-000 Socket, IC, 20-Pin DIP
 U104 613-0009-000 Socket, IC, 16-Pin DIP
 U105 613-0009-000 Socket, IC, 16-Pin DIP
 U106 613-0020-000 Socket, IC, 20-Pin DIP

MISCELLANEOUS

W101 ----- PCB Foil (Cut for 3.75 IPS Operation)
 W102 ----- Wire Jumper (Add for 3.75 IPS Operation)
 Y101 448-0015-000 Crystal, 1.143 MHz
 253-0096-002 Mounting Block, Motor Control PCB
 613-0043-000 Insulator, 816-PAD, 7 Position
 352-0004-000 (6) Screw, Nylon, 6-32 x 1/4 Slotted Round Hd.
 350-0605-000 (2) Screw, 6-32 x 1/4 Phil. Pan Hd., Internal SEMS

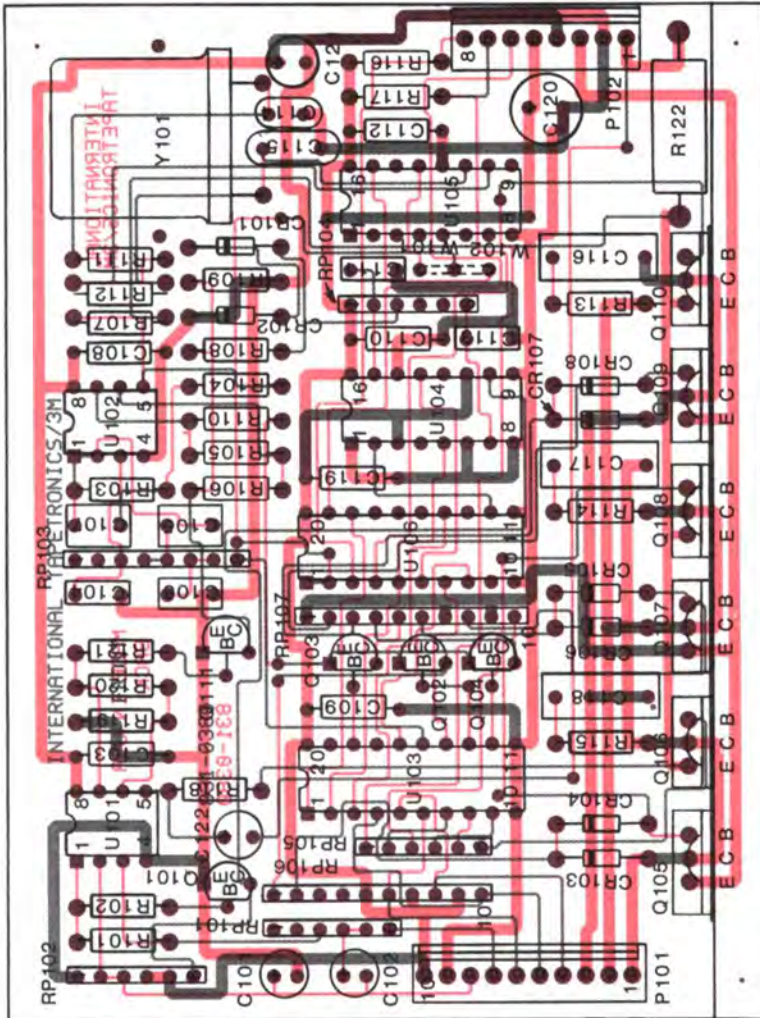
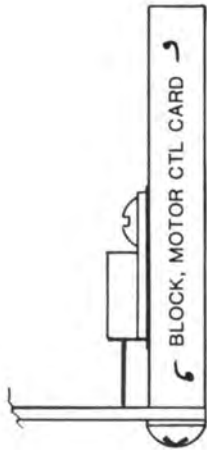


Fig. 6-5

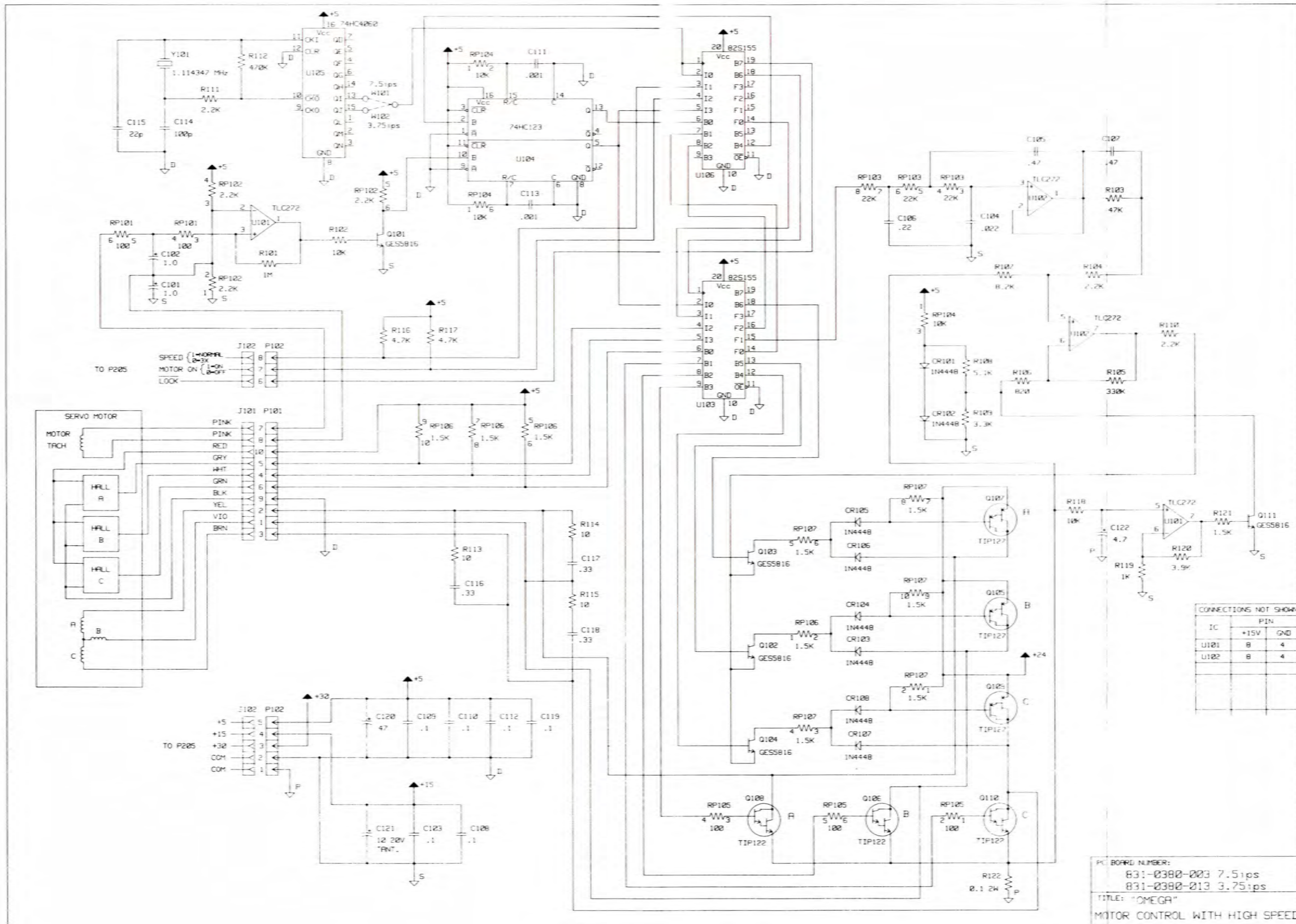
MOTOR SPEED TABLE

STRAP	3.75 IPS	7.5 IPS
W101	OUT	IN
W102	IN	OUT

NOTE: CUT W101, FOIL ON BACK SIDE, WHEN W102 IS LOADED.

PC BOARD NUMBERS:	831-0380-003	7.5 IPS
	831-0380-013	3.75 IPS
TITLE:	"OMEGA" MOTOR CONTROL BOARD OVERLAY	

B. Motor Control PCB Overlay



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- NOTES:
1. ALL RESISTORS ARE 1/4 WATT AND DESIGNATED IN OHMS UNLESS OTHERWISE MARKED.
 2. ALL RESISTORS PACKS ARE 1/8 WATT AND DESIGNATED IN OHMS UNLESS OTHERWISE MARKED.
 3. ALL CAPACITORS ARE DESIGNATED IN MICROFARADS UNLESS OTHERWISE MARKED.
 4. WE RESERVE THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS.

PJD 3-4-87

PC BOARD NUMBER:
831-0380-003 7.5ips
831-0380-013 3.75ips
TITLE: "OMEGA"
MOTOR CONTROL WITH HIGH SPEED

Fig. 6-6

A. POWER COMPONENTS PCB Parts List (831-0385)

CAPACITORS

C501	687-0015-000	Capacitor, Electrolytic, 6800 ufd, 50V
C502	687-0014-000	Capacitor, Electrolytic, 6800 ufd, 35V
C503	687-0014-000	Capacitor, Electrolytic, 6800 ufd, 35V
C504	687-0012-000	Capacitor, Electrolytic, 6800 ufd, 16V

DIODES

CR501	575-0022-000	Rectifier, Full-Wave Bridge, GI 2KBP06
CR502	575-0022-000	Rectifier, Full-Wave Bridge, GI 2KBP06
CR503	575-0022-000	Rectifier, Full-Wave Bridge, GI 2KBP06

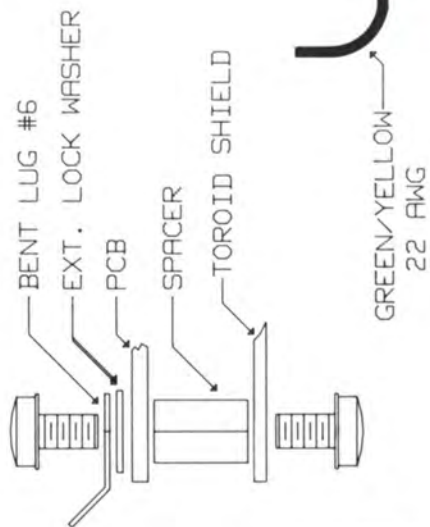
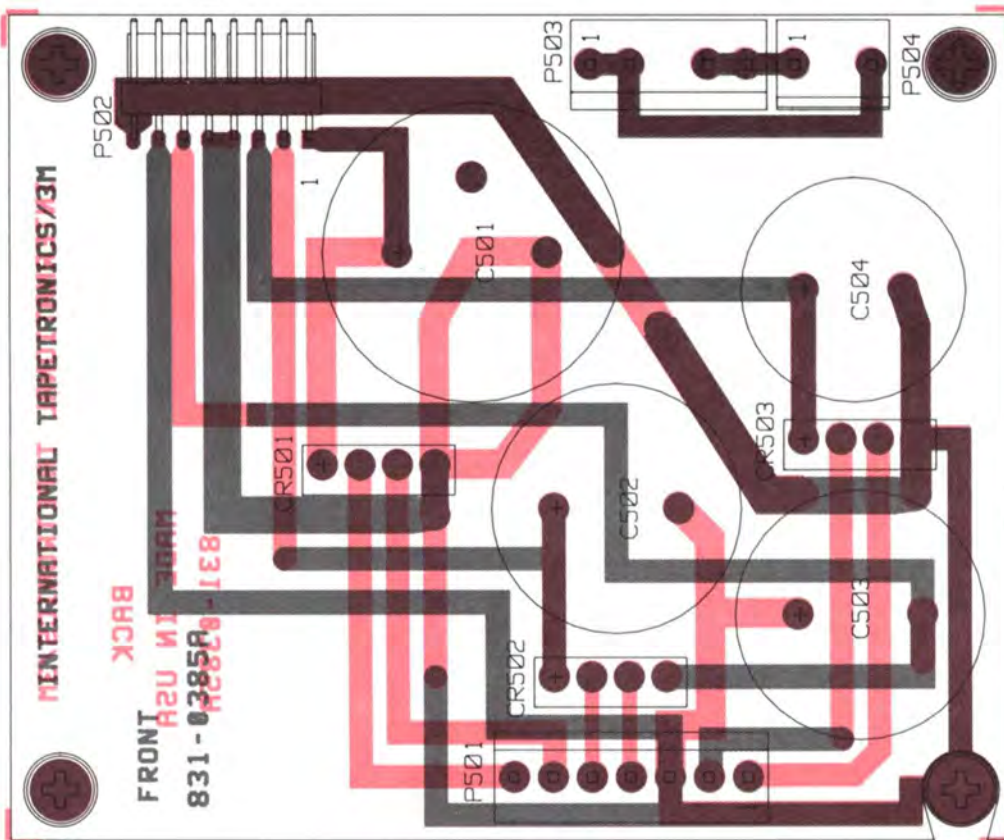
CONNECTORS & SOCKETS

P501	376-0096-000	Wafer, Locking, 7-Pos.
P502	376-0095-000	Wafer, Locking, Right Angle 8-Pos.
P503	376-0067-011	Wafer, Locking, 5 Pos. without Pin 3
P504	376-0061-011	Wafer, Locking, 3 Pos. without Pin 2

MISCELLANEOUS

(4)	300-0092-000	Spacer, Hex, 6-32 x 1/4 x 3/8
(4)	350-0605-000	Screw, 6-32 x 1/4 Phil. Pan-Int. SEMS
	365-0602-000	Lockwasher, #6 Ext. Tooth

MOUNTED ON BACK

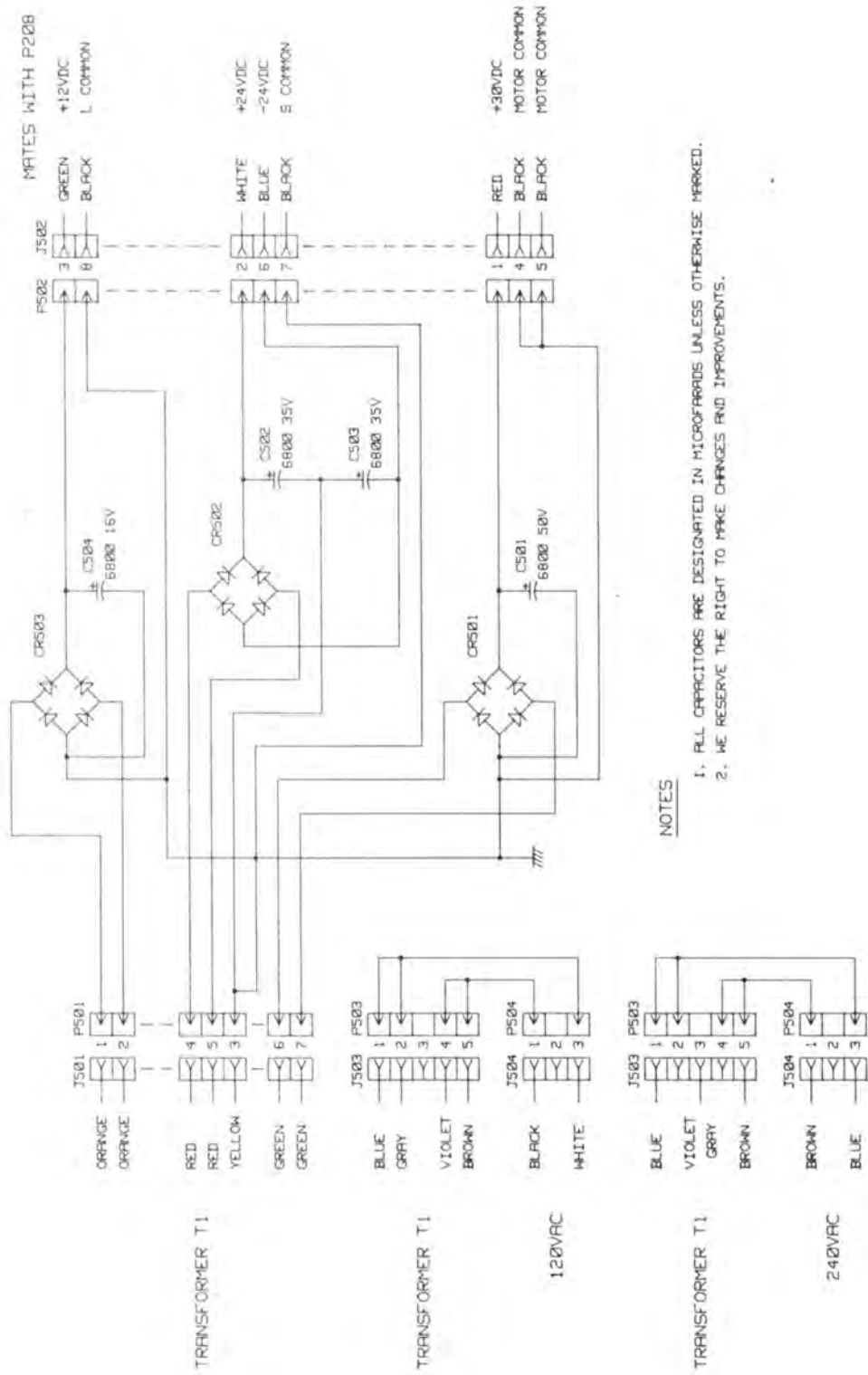


PC BOARD NUMBER: 831-0385-003
TITLE: "OMEGA" POWER COMPONENTS BOARD

4-2-87

821-0385-001A

Fig. 6-7



NOTES

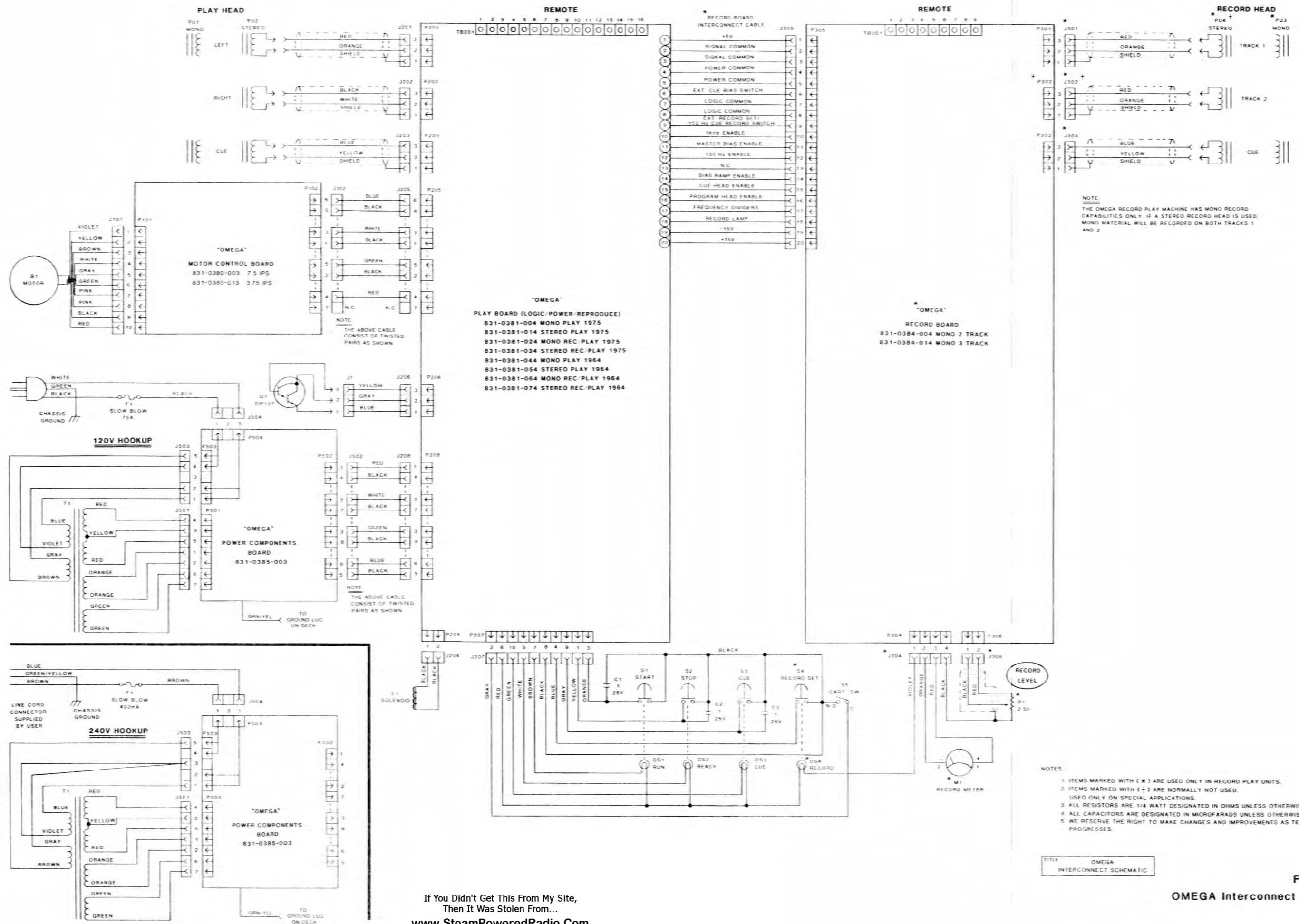
1. ALL CAPACITORS ARE DESIGNATED IN MICROFARADS UNLESS OTHERWISE MARKED.
2. WE RESERVE THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS.

PC BOARD NUMBER:	831-0385-003
TITLE:	"OMEGA" POWER COMPONENTS BOARD

C. Power Components PCB Schematic

Fig. 6-8

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Fig. 6-9
OMEGA Interconnect Schematic

Section VII Mechanical Parts Lists

OMEGA Series Mechanical Parts List
(REV. 5/87)

Includes Reproducer and Recorder/Reproducer Parts

DECK

A. DECK ASSEMBLY

- 1 832-1512-000 Assembly, Deck w/Cross Shaft & Clamp
- 1 878-0097-000 Pressure Roller Assembly Replacement Kit
(Includes Roller & Hardware)
- 1 837-0199-002 Assembly, Deck Ground Strap

B. MOTOR

- 1 455-0008-033 Motor, PAPST, 10mm Shaft, w/Plug
- 2 353-1018-000 Screw, 10-32 x 3/4 Button-Head Socket Cap
- 1 297-0050-002 Motor Shield
- 1 837-0193-002 Cable, Motor Interconnect

C. SOLENOID

- 1 477-0028-012 Solenoid Assembly, 24VDC Bottoming, w/Plug
- 1 254-0109-011 Bracket, Solenoid Mounting
- 2 350-0624-000 Screw, 6-32 x 5/16 Phil Fillister Head ZP
- 1 301-0060-001 Spring, Return .027 MW x 1 45/64 x .305
- 1 832-1003-000 Assembly, Solenoid Clevis Screw

D. TRANSISTOR ASSEMBLY

- 1 590-0032-000 (Q1) Transistor, PNP Power Darlington TIP127
- 1 613-0048-000 Insulator, SIL-PAD 400 .787 x 1.26 x .009 Thk
- 1 350-0604-000 Screw, 6-32 x 1/4 Phil. Pan Hd.
- 1 613-0049-000 Insulator Block, Nylon
- 1 837-0190-002 Cable, Transistor Regulator

E. CART SWITCH ASSEMBLY

- 1 254-0097-001 Bracket, Cart Switch Mounting
- 1 392-0009-000 Switch, Snap-Action-Simulated Roller (E63-00R)
- 2 350-0604-000 Screw, 6-32 x 1/4 Phil Pan Head
- 2 350-0610-000 Screw, 6-32 x 3/8 Phil Flat Head 82 Degree
- 2 350-0205-000 Screw, 2-56 x 3/8 Phil Pan Head
- 2 370-0201-000 Nut, Hex 2-56 x 3/16

F. CART GUIDE ASSEMBLY

- 1 272-0033-012 Guide, Right Cart Hold Down
- 1 272-0042-012 Guide, Left Cart Hold Down
- 4 350-0620-000 Screw, 6-32 x 1/4 Phil Truss Head
- 3 301-0050-001 Spring, Cart Hold Down

G. HEAD BLOCK/TAPE GUIDES

- 1 832-1004-000 Assembly, Head Block, w/o Heads

TAPE GUIDES:

- 1 878-0103-000 Tape Guide Replacement Kit: includes -
 - 1 272-0038-012 Guide, Tape (Left)
 - 2 272-0039-012 Guide, Tape (Right & Center)
 - 6 350-0404-000 Screw, 4-40 x 1/4 Phil Pan Head
- 2 303-0001-001 Strap, Head Mounting
- 4 350-0308-000 Screw, 3-48 x 5/8 Phil Pan Head

HEAD SHIELD:

1 297-0034-001 Shield, Upper Head
 2 300-0098-001 Spacer, Head Shield
 1 350-0628-000 Screw, 6-32 x 3/8 Phil Flat Head, 100 Degree
 1 350-0649-000 Screw, 6-32 x 1 1/8 Phil Flat Head, 100 Degree
 3 350-0644-000 Screw, 6-32 x 1 Phil Fillister Head

H. HEADS

1 504-0033-002 Head, MONO Reproduce
 1 504-0045-002 Head, STEREO Reproduce
 1 504-0036-002 Head, Record, 2-HT, 100 uH
 1 504-0037-002 Head, 3-Track Record (Special Order)
 1 504-0001-002 Head, Dummy (Reproducer Only)

I. HEAD CABLE ASSEMBLIES**REPRODUCER:**

1 837-0064-002 (J201) Cable, Left (MONO) Head
 1 837-0065-002 (J202) Cable, Right Head
 1 837-0066-002 (J203) Cable, Cue Head

RECORDER/REPRODUCER:

1 837-0064-012 (J301) Cable, Left (MONO) Head
 1 837-0066-012 (J303) Cable, Cue Head
 1 837-0064-012 (J302) Cable, 2nd Track (Special) Head

FRONT PANEL

1 281-0149-002 Panel, Playback Front
 1 281-0150-002 Panel, Recorder Front
 1 328-0051-002 Inlay, Play Front Panel
 1 328-0050-002 Inlay, Recorder Front Panel

SWITCHES:

3 391-0023-000 Switch, Licon (START/STOP/CUE)
 3 415-0001-000 Lamp, #327 28V (START/STOP/CUE)
 1 391-0023-000 Switch, Licon (RECORD switch only)
 1 415-0001-000 Lamp, #327 28V (for RECORD switch)
 1 404-0059-011 Lens, Yellow, w/dimple (STOP)
 1 404-0060-000 Lens, Green (START)
 1 404-0062-000 Lens, Blue (CUE)
 1 404-0061-000 Lens, Red (RECORD only)
 1 686-0009-000 (C1) Capacitor, .1 ufd, 25V (START switch)
 1 686-0009-000 (C2) Capacitor, .1 ufd, 25V (STOP switch)
 1 686-0009-000 (C3) Capacitor, .1 ufd, 25V (CUE Switch)
 2 353-0604-000 Screw, 6-32 x 3/8 Button Head, Socket, Blk.-Inlay
 1 837-0191-003 Harness, Switch
 1 837-0074-003 Harness, Switch (RECORD & Level Pot.)
 1 262-0002-000 Clamp, Cable, 5/16 Dia. (Heyco #3305)

LEVEL POTENTIOMETER:

1 636-0045-000 (R1) Potentiometer, 2.5K Ohm, (RECORD Only)
 1 254-0108-002 Bracket, Record Level Pot.
 2 350-0423-000 Screw, 4-40 x 1/4 Phil Flat Head 100 Degree, ZP
 2 370-0403-000 Nut, 4-40 x 1/4 KEPS, Hex, ZP
 1 315-0018-002 Knob, w/Set Screw for .25 Shaft, Blk.

VU METER:

1 554-0002-000 (M1) Meter, VU (RECORD Only)
 4 370-0403-000 Nut, 4-40 x 1/4 KEPS, Hex, ZP
 2 370-1001-000 Nut, 10-32 x 3/8 x 1/8 Thick, Hex, ZP
 2 375-0008-000 Terminal, Bent Locking, #10

REAR PANEL

1	281-0151-003	Panel, Rear
1	311-0003-000	Clip, Line Cord (Smith #939)
1	380-0239-000	Housing, 3-position Locking
2	382-0008-000	Terminal, Crimp
1	375-0027-000	Terminal, #6 Bent, Non-Locking

FUSE/POWER CORD:

120V:

1	418-0005-000	Fuse Holder, low-profile
1	418-0006-000	Carrier, Fuse, 3AG (Grey)
1	417-0012-000	(F1) Fuse, 3AG, .75A, Slo-Blde
1	433-0001-000	Cord, Line, 6 Feet, (Grey)

240V:

1	418-0005-000	Fuse Holder, low-profile
1	418-0007-000	Carrier, Fuse, 5 x 20mm (Black)
1	417-0018-000	(F1) Fuse, 5 x 20mm, 400 ma., Time-Delay
1	433-0007-000	Cord, Line, 8 Feet, (Gray)
1	309-0019-002	Brace, Top Rear
2	311-0042-000	Sponge, Rubber 1/8 x 1/2
1	285-0012-000	Spring Plunger, 10-32 x 15/32
2	350-0650-000	Screw, 6-32 x 3/8 Phil Flat Hd 100 Degree

POWER TRANSFORMER

1	526-0034-003	Assembly, Toroidal Power Transformer
1	359-0038-000	Washer, Neoprene, 6mm ID x 90mm OD x 1.5m
1	344-0601-000	Screw, M6 x 60mm, Phil Flat Head, 90 Degree, Blk.
1	369-0601-000	Nut, M6 Hex
1	365-0005-000	Washer, Int., Thin Stainless, .25 x .4 x .018
1	360-1010-000	Washer, .25 ID x 3/8 OD x 1/32 Thick
1	380-0214-000	(J501) Housing, 6 Pos., .156 (09-50-3061) XFMR
7	382-0008-000	Terminal, Crimp, 18-24 AWG, For KK156
1	376-0076-000	Terminal Strip, 1 Vert. Terminal (AC)

CHASSIS/COVER

CHASSIS:

1	261-0039-004	Chassis, Black
1	302-0002-011	Strip, PC Card Mounting, 4 Inch
4	311-0039-000	Feet, Medium, Black Rubber (#F6B)
4	350-0608-000	Screw, 6-32 x 3/8 Phil Pan Hd. ZP
4	370-0602-000	Nut, 6-32 x 1/4 KEPS
1	297-0049-012	Shield, Toroid, ZP
2	350-0654-000	Screw, 6-32 x 3/8 Phil Flat Hd. 100 Dg. Blk.
4	350-1043-000	Screw, 10-32 x 3/8 Phil Flat Hd. 100 Dg. Blk. (Deck Mount)
2	370-0605-000	Nut, 6-32 Press Nut
1	297-0046-012	Shield, Play Amp PCB

COVER:

1	265-0069-013	Cover, Top, Black
2	300-0107-001	Spacer, Round 6-32 x 1/4 x 1/4, Brass, 100 Degree
2	350-0654-000	Screw, 6-32 x 1/4 Phil Flat Hd. 100 Degree Blk.

MISCELLANEOUS

1	890-0032-000	Technical Manual (Rev. 5/87)
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Section VIII Change Information

To maintain the finest possible equipment performance, ITC is constantly working to incorporate new technology and improvements into our products. Occasionally, due to scheduling and printing conflicts, these changes may not be immediately included in technical manuals. Change information which is not yet a permanent part of the manual will be noted in this section. Also, as you receive technical bulletins from ITC, we recommend that you file them here for quick reference.

KIT INSTRUCTIONS

PRESSURE ROLLER REPLACEMENT KIT
(60 Durometer)
81-8000-7559-0

Parts List

QUANTITY	PART NUMBER	DESCRIPTION
1	81-8000-1499-5	Retainer, E clip
1	81-8000-2421-8	Washer, Nylon
1	81-8000-1523-2	Pressure Roller, 60 Durometer
1	81-8000-2476-2	Washer, Steel
1	81-8000-4832-4	Instruction Sheet

CAUTION!

Remove all power from the machine prior to beginning any repair or replacement procedure. High voltage electrolytic capacitors in the machine may retain a stored charge indefinitely. Do not unnecessarily contact or short any electronic component in the machine. Electronic shock to personnel or damage to the machine may result. You will be working on and near potential shock hazards.

NOTICE!

Follow all recognized methods of static electricity and ESD protection. Static sensitive devices in the machine may be damaged unless protective measures are employed.

Pressure rollers are a key component in the tape drive path and should be inspected and serviced frequently. This kit contains the information and the parts required for the replacement of the pressure roller in broadcast cartridge machines requiring a 60 durometer roller. Those machines currently requiring 60 durometer pressure rollers include:

81-8000-4832-4
JGS 4-25-91

International Tapetronics Corporation
2425 South Main Street
P.O. Box 241
Bloomington, IL 61702-0241
Ph. 309-828-1381



Delta Series Cartridge Machines
Omega Series Cartridge Machines
Series 1 Cartridge Machines
Other manufacturer's machines

Some cartridge machines, manufactured by ITC and other manufacturers, require the 70 durometer pressure roller, also available from ITC. See your machine's Technical Manual to determine the proper pressure roller type for your machine. The pressure roller supplied in this kit is made from a rubber compound selected to provide optimum tape drive and designed for long life in your broadcast cartridge machine.

Pressure Roller Installation Procedure:

Remove the old roller by unfastening and removing, in order, the "E" clip retainer, the nylon washer, the old roller, and the metal washer. Gently, remove any contaminates from the pressure roller shaft with a soft cloth. Do not risk scratching the pressure roller shaft by touching it with any metal object. Discard the old parts. Install the new parts by reversing the order of disassembly.

Cleaning and Maintenance:

Clean the pressure roller when a build-up of contaminates becomes apparent on the roller. Use only 99% isopropyl alcohol on a cotton cloth, or cotton tipped applicator, to clean the drive surface of the roller and the capstan motor shaft. Do not allow any solvents, or lubricants, to contact the bearings of the roller or the motor. When clean, the roller's and motor shaft's surface should show no signs of wear or discoloration across the entire drive surface.

Replace the pressure roller when: 1. the drive surface loses its matt texture and becomes shiny, 2. any roller surface is pitted chipped, cupped, discolored, or worn, or 3. the roller will not spin freely on its shaft.

Warning:

The use of any solvents other than isopropyl alcohol can severely damage the roller, heads, motor shaft, bearings, tapes, or housings. No lubricant should be used on the roller or the motor. Both of these have been permanently lubricated.

Note:

Store any unused pressure rollers in a closed, non-absorbent container to prevent the impregnated lubricant from being drawn from the bearing.

KIT INSTRUCTIONS

OMEGA CAPSTAN MOTOR RETROFIT KIT SHINANO-KENSHI TO PAPST CAPSTAN MOTOR

81-8000-8512-8

This kit allows the user to replace a Shinano-Kenshi brand pancake-type rotor capstan motor with a Papst brand, cup rotor capstan motor in the OMEGA Series cartridge machines.

KIT PARTS LIST

<u>PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
81-8000-3621-2	1	Motor, PAPST, 10mm Shaft
81-8000-1627-1	1	Shield, PAPST Motor
81-8000-5238-3	1	Printed Circuit Board (PCB), PAPST Motor Controller
81-8000-5245-8	1	Printed Circuit Board (PCB), Current Limiter
-81-8000-2300-4	2	Screw, 6-32 x 1/4 FH (Motor Ctl. PCB mount)
81-8000-1673-5	1	Spacer, #6 x 1/4 x 3/16 Round
81-8000-1691-7	1	Spacer, #6 x 1/4 x 1/4 Alum., Rnd.
81-8000-2304-6	1	Screw, 6-32 x 1/2 Steel, Slot Pan Hd.
81-8000-2356-6	1	Screw, 6-32 x 1/2 Nylon, Slot Pan Hd.
78-8037-1934-9	1	Insulator, SIL-PAD 400
81-8000-3303-7	1	Cable Tie, 4"
81-8000-4841-5	1	Instruction Sheet

CAUTION!

Remove all power from the machine prior to beginning the retrofit procedure. You will be working on and near potential shock hazards.

Instruction Sheet: 81-8000-4841-5
JGS 9-11-90

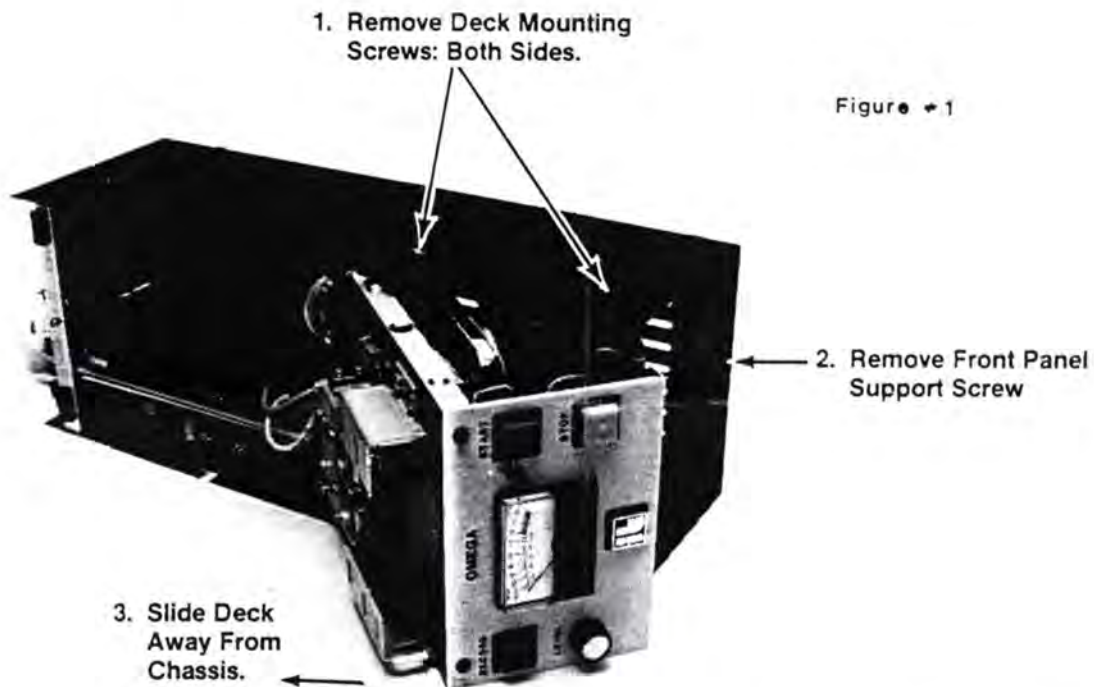
Old numbers:
811-0113-000
81-8000-7965-9

International Tapetronics Corporation
2425 South Main Street
P.O. Box 241
Bloomington, IL 61702-0241



1. Remove the top cover of the OMEGA unit and set it aside. Use a 1/8" hex wrench to loosen (DO NOT REMOVE) the two motor mounting screws. It will be much easier to remove the motor later on if these screws are loose.

2. Refer to Figure 1 to locate the deck mounting screws. Turn the unit onto its right side and remove the two left-side deck mounting screws, then turn the unit onto its left side and remove the two right-side deck mounting screws. At the bottom front of the unit, remove the single screw holding the front panel to the chassis. Set aside all the screws for later re-assembly.



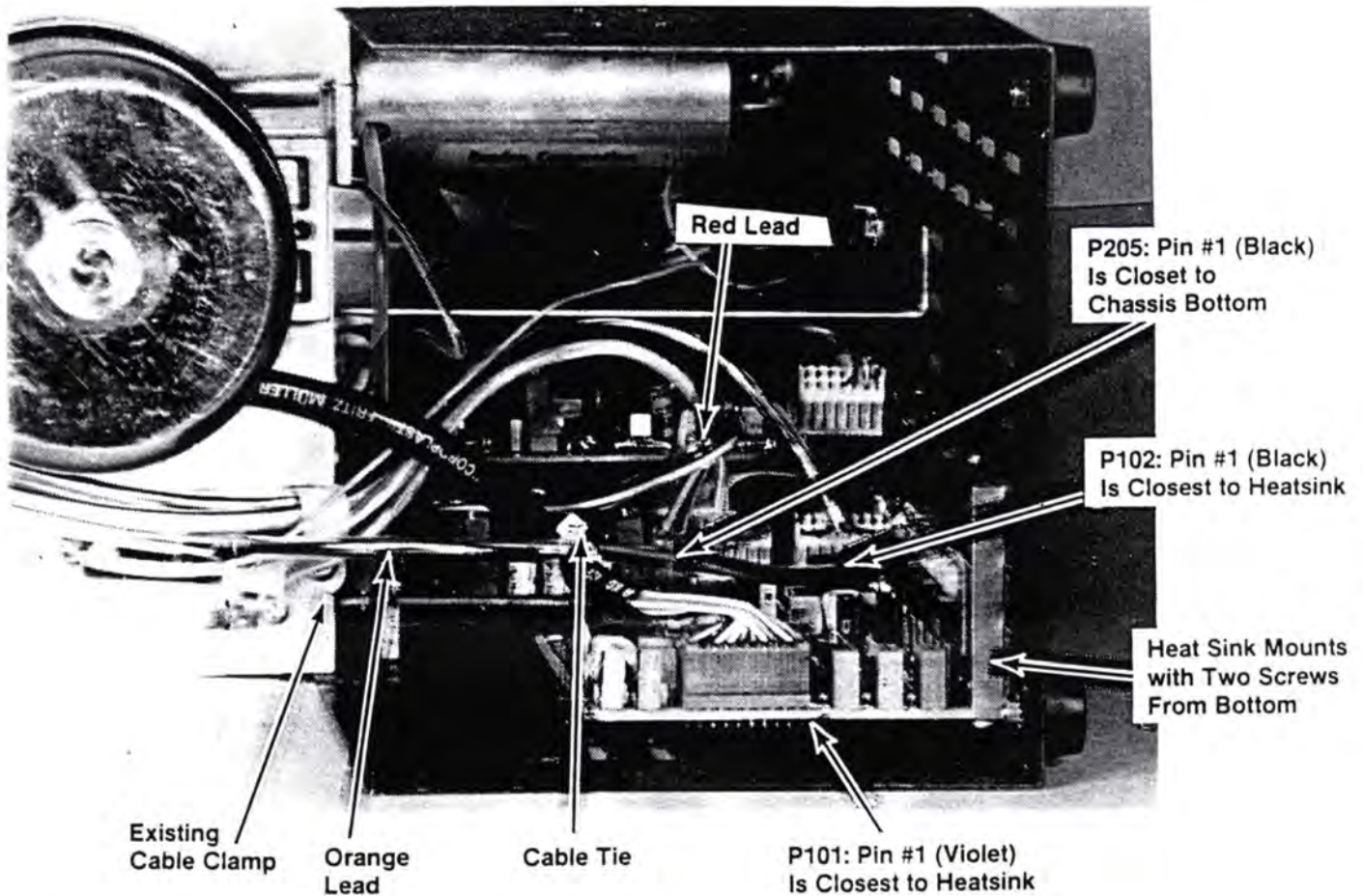
3. Gently slide the deck/front panel assembly slightly away from the chassis. Locate and gently disconnect the 13-pin plug (P101) leading from the Motor Control PCB to the motor. You may now slide the deck/front panel assembly away from the chassis for full access to the Motor Control PCB. Avoid pulling on the head cables.

4. From the underside of the chassis, unscrew and remove the four black flat head screws which hold the Motor Control PCB to the chassis. Unplug the blue/white cable (J102) from the Play/Logic PCB. Remove the original Motor Control PCB. This board, its cable and the four mounting screws will not be reused. You will use the enclosed 6-32 x 1/4 Phillips flat-head screws for installing the new Motor Control PCB.

5. While gently holding onto the old motor, unscrew and remove the two previously loosened motor mounting screws. Remove the motor and the motor shield. Set the motor mounting screws aside for later use with the new motor.

8. The new Motor Control PCB and heat sink comes with two black flat head screws. Use these screws to mount the new Motor Control PCB/heat sink inside the chassis as shown in Figure 3. This assembly requires using only two of the four existing holes. Do not attempt to use the original black flat head screws, as they may be too long to fit properly in some machines.

Figure #3



9. Connect the Current Limiter cable assembly's orange/black wire pair (3-pin connector) to the new motor control PCB at P102, and connect the red/black wire pair (3-pin connector) to the Reproduce PCB at P205. Connect the PAPST motor to the new Motor Control PCB via the 10-pin plug at P101. NOTE: It is very important that Pin 1 of each connector be oriented as noted. Otherwise, the motor will not function properly. Check the motor rotor to insure that it is free from any cable interference.

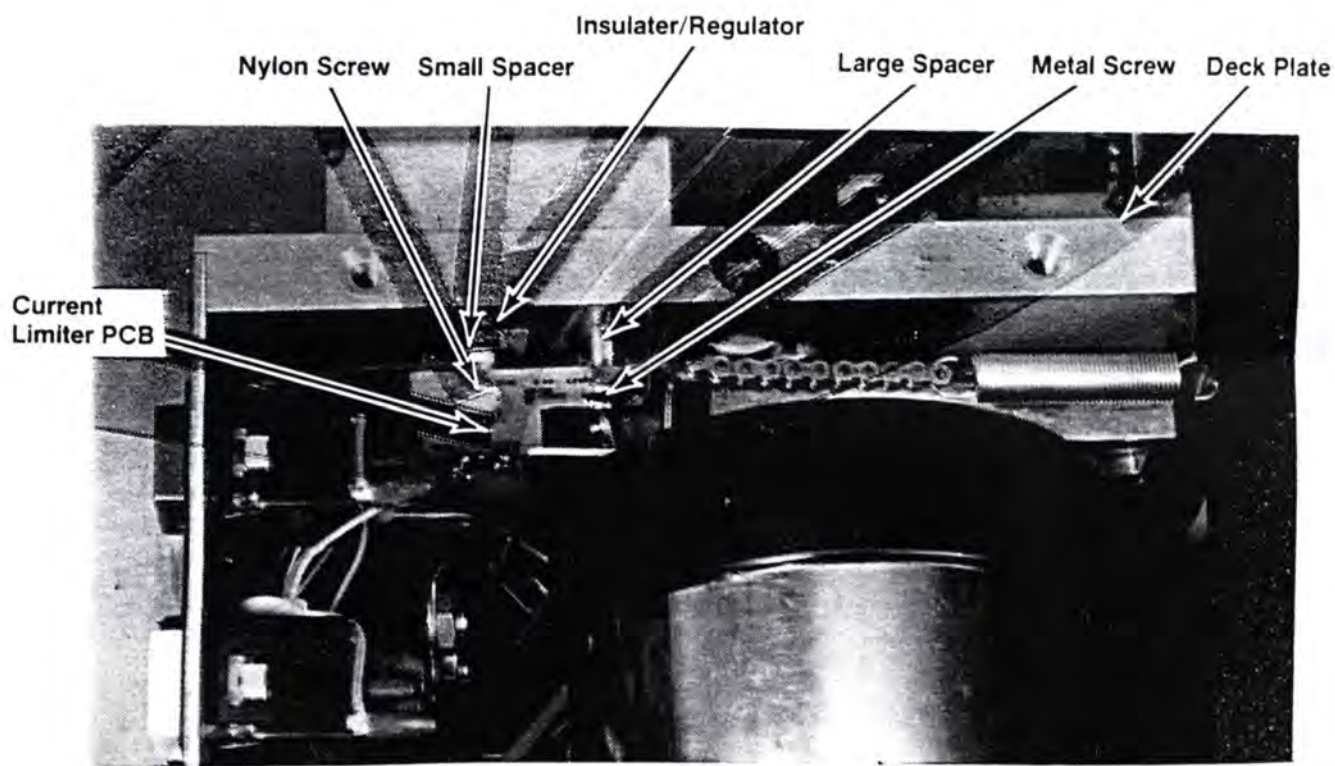
10. Reassemble the machine by reversing the order of disassembly.

11. Use the two alignment gauges provided with this kit to perform the mechanical adjustments for motor location and pressure roller pressure, found on pages 3-6 thru 3-9 of your "OMEGA" technical manual.

This completes installation and adjustment of the new motor. Failure to follow these procedures may result in improper machine operation.

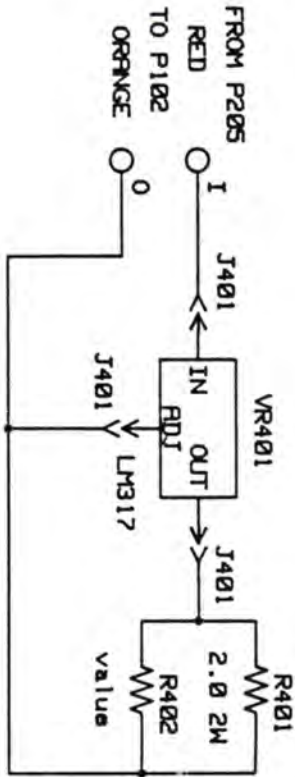
6. The Current Limiter PCB limits the amount of current reaching the Motor Control PCB at any one time, preventing the potentially damaging effects of motor stall. This PCB mounts to the deck as shown in Figure 2. Place the small metal spacer between the voltage regulator and the PCB surface, inserting the nylon screw through this spacer. Place the SIL-PAD insulator on the voltage regulator (adhesive side to the regulator) where it will contact the deck. Place the larger metal spacer over the second hole, and insert the metal screw through this hole. Mount the entire assembly to the deck and tighten both screws.

Figure #2



Correctly mounted, the Current Limiter PCB cable's orange lead should be nearest the front panel, and the red lead closest to the motor mounting hole. To avoid any conflict with the motor rotor, run the 4" cable tie provided with this kit through the existing under-deck cable clamp (no need to loosen the clamp), so that the two sets of leads (RED/BLACK, ORANGE/BLACK) running from the Current Limiter PCB to the Motor Control and Reproduce PCB may be pulled back snug against the deck. (See Figure 3 for location of cable clamp.)

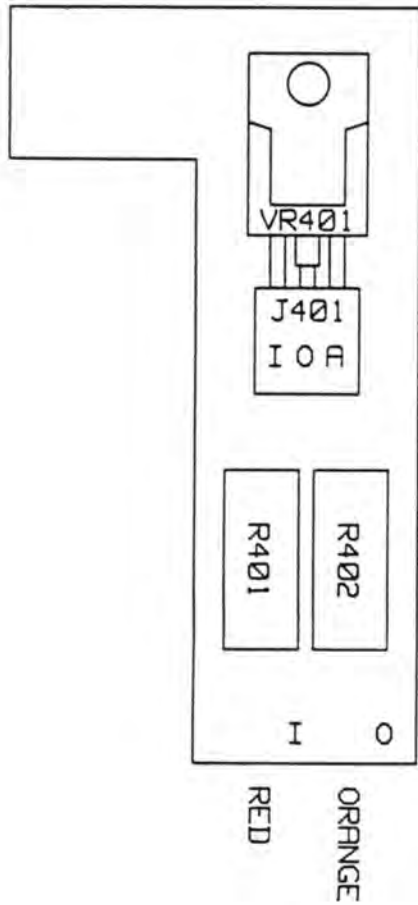
7. Remove the protective plastic cap from the new PAPST motor shaft. Save the cap and its screws for protection if the motor is ever shipped for repair. Return the motor shield to its original position under the deck, and mount the new motor by using the two original motor mounting screws. Do not completely tighten the mounting screws yet. The new motor shaft's final positioning will be adjusted in a later step.



- NOTES:
1. R402 MAY NOT BE LOADED.
 2. ALL RESISTORS ARE DESIGNATED IN OHMS.
 3. WE RESERVE THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS.

PJD
3-21-86

PC BOARD NUMBER:		831-0330-003
TITLE:		OMEGA CURRENT LIMITER
		INTERNATIONAL TAPETRONICS CORPORATION
DRAWING NUMBER	895-0330-001	



R402 MAY NOT BE LOADED.

PC BOARD NUMBER:	831-0330-003
TITLE:	OMEGA CURRENT LIMITER

OMEGA Motor Control PCB (Retrofit Units) 831-0323-003

CAPACITORS

C101	695-0750-013	Capacitor, Electrolytic, 1 ufd, 50V
C102	695-0750-013	Capacitor, Electrolytic, 1 ufd, 50V
C103	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C104	680-1763-033	Capacitor, Polyester, .022 ufd, 63V
C105	680-3363-033	Capacitor, Polyester, .47 ufd, 63V
C106	680-2963-033	Capacitor, Polyester, .22 ufd, 63V
C107	680-3363-033	Capacitor, Polyester, .47 ufd, 63V
C108	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C109	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C110	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C111	680-0101-033	Capacitor, Polyester, .001 ufd, 500V
C112	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C113	680-0101-033	Capacitor, Polyester, .001 ufd, 500V
C114	677-0015-000	Capacitor, Silver Mica, 100 pfd, 500V
C115	677-0008-000	Capacitor, Silver Mica, 22 pfd, 500V
C116	682-0003-000	Capacitor, Polyester, .33 ufd, 100V
C117	682-0003-000	Capacitor, Polyester, .33 ufd, 100V
C118	682-0003-000	Capacitor, Polyester, .33 ufd, 100V
C119	686-0009-000	Capacitor, Ceramic Disc, .1 ufd, 25V
C120	695-1716-013	Capacitor, Electrolytic, 47 ufd, 16V
C121	680-3163-033	Capacitor, Polyester, .33 ufd, 63V
C122	695-1735-013	Capacitor, Electrolytic, 47 ufd, 35V
C123	680-3163-033	Capacitor, Polyester, .33 ufd, 63V
C124	677-0016-000	Capacitor, Silver Mica, 10 pfd, 500V

RESISTORS

R101	630-0135-000	Resistor, Carbon Film, 1/4w, 1 Meg ohm, 5%
R102	630-0087-000	Resistor, Carbon Film, 1/4w, 10K ohm, 5%
R103	630-0103-000	Resistor, Carbon Film, 1/4w, 47K ohm, 5%
R104	630-0071-000	Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
R105	630-0123-000	Resistor, Carbon Film, 1/4w, 330K ohm, 5%
R106	630-0061-000	Resistor, Carbon Film, 1/4w, 820 ohm, 5%
R107	630-0085-000	Resistor, Carbon Film, 1/4w, 8.2K ohm, 5%
R108	630-0080-000	Resistor, Carbon Film, 1/4w, 5.1K ohm, 5%
R109	630-0075-000	Resistor, Carbon Film, 1/4w, 3.3K ohm, 5%
R110	630-0071-000	Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
R111	630-0071-000	Resistor, Carbon Film, 1/4w, 2.2K ohm, 5%
R112	630-0127-000	Resistor, Carbon Film, 1/4w, 470K ohm, 5%
R113	630-0015-000	Resistor, Carbon Film, 1/4w, 10 ohm, 5%
R114	630-0015-000	Resistor, Carbon Film, 1/4w, 10 ohm, 5%
R115	630-0015-000	Resistor, Carbon Film, 1/4w, 10 ohm, 5%
R116	628-0001-000	Resistor, BWH-Type, 2w, .1 ohm

RESISTOR NETWORKS

RP101	631-0052-000	Separate SIP, 3R, 6-Pin, 100 ohm
RP102	631-0053-000	Separate SIP, 3R, 6-Pin, 2.2K ohm
RP103	631-0033-000	Separate SIP, 4R, 8-Pin, 22K ohm
RP104	631-0023-000	Common SIP, 5R, 6-Pin, 10K ohm
RP105	631-0052-000	Separate SIP, 3R, 6-Pin, 100 ohm
RP106	631-0044-000	Separate SIP, 5R, 10-Pin, 1.5K ohm
RP107	631-0044-000	Separate SIP, 5R, 10-Pin, 1.5K ohm

DIODES

CR101	575-0031-000	Small Signal, 1N4448
CR102	575-0031-000	Small Signal, 1N4448
CR103	575-0031-000	Small Signal, 1N4448
CR104	575-0031-000	Small Signal, 1N4448
CR105	575-0031-000	Small Signal, 1N4448
CR106	575-0031-000	Small Signal, 1N4448
CR107	575-0031-000	Small Signal, 1N4448
CR108	575-0031-000	Small Signal, 1N4448
CR109	575-0007-050	Power, 1A, 1N4005, Formed Leads
CR110	575-0007-050	Power, 1A, 1N4005, Formed Leads

TRANSISTORS

Q101	590-0017-010	NPN, Low Power, GES5816
Q102	590-0017-010	NPN, Low Power, GES5816
Q103	590-0017-010	NPN, Low Power, GES5816
Q104	590-0017-010	NPN, Low Power, GES5816
Q105	590-0032-000	PNP, Darlington, TIP127
Q106	590-0036-000	NPN, Darlington, TIP122
Q107	590-0032-000	PNP, Darlington, TIP127
Q108	590-0036-000	NPN, Darlington, TIP122
Q109	590-0032-000	PNP, Darlington, TIP127
Q110	590-0036-000	NPN, Darlington, TIP122

INTEGRATED CIRCUITS

U101	606-0025-000	TLC272CP, CMOS OpAmp
U102	606-0025-000	TLC272CP, CMOS OpAmp
U103	617-0001-010	82S155, Programmed Logic Sequencer
U104	608-0042-000	74HC123, Retriggerable Monostable Multivibrator
U105	608-0041-000	74HC4060, Asynch. 14-Stage Binary Counter & Osc.

VOLTAGE REGULATORS

VR101	605-0012-000	MC7805CT, +5V Regulator
VR102	605-0022-000	MC78L15ACP, +15V Regulator

OMEGA Current Limiter PCB/831-0330-001 (Retrofit Units)

#RESISTORS

R401 628-0032-000 Resistor, Fixed Wire, BWH, 2 ohm, 2w, 5%
R402 628-0032-000 Resistor, Fixed Wire, BWH, 2 ohm, 2w, 5%

#VOLTAGE REGULATORS

VR410 605-0023-000 Regulator, LM317T, 3-Pin Adjustable
J401 380-0062-000 Socket, Regulator, 3-Pin

#MISCELLANEOUS

300-0093-000 Spacer, Round, Aluminum, #6 x .25 x .187
300-0112-000 Spacer, Round, Aluminum, #6 x .25 x .25
350-0658-000 Screw, 6-32 x 1/2 Slotted Pan Hd.
352-0009-000 Screw, Nylon, 6-32 x 1/2 Slotted Pan Hd.

613-0045-000 Insul.Pad, SIL PAD .410 x .750 x .009

837-0101-002 Cable Assembly, Current Limiter PCB

CONNECTORS & SOCKETS

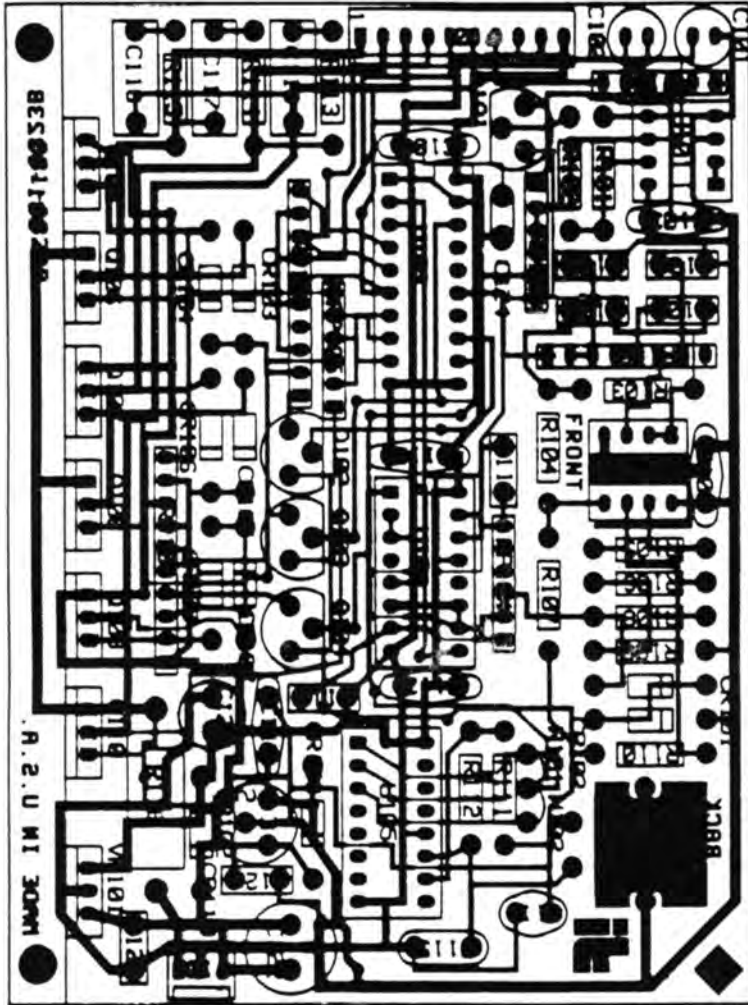
P101 376-0047-000 Wafer, w/lock, 10 Pos., (22-23-2101)
P102 376-0065-000 Wafer, w/lock, 3 Pos., (MLSS100-3 .100)

U101 613-0007-000 Socket, IC, 8-Pin DIP
U102 613-0007-000 Socket, IC, 8-Pin DIP
U103 613-0020-000 Socket, IC, 20-Pin DIP
U104 613-0009-000 Socket, IC, 16-Pin DIP
U105 613-0009-000 Socket, IC, 16-Pin DIP

MISCELLANEOUS

W101 ----- PCB Foil (Cut for 3.75 IPS Operation)
W102 ----- Wire Jumper (Add for 3.75 IPS Operation)
Y101 448-0012-000 Crystal, 5.9432 MHZ

253-0096-002 Mounting Block, Motor Control PCB
613-0051-001 Insulator, SIL-PAD 400, 7 Pos. Custom
352-0004-000 (7) Screw, Nylon, 6-32 x 1/4 Slotted Round Hd.



	M101	M102
7.5ips	IN	OUT
3.75ips	OUT	IN

NOTE: CUT M101, FOIL ON BACK SIDE, WHEN M102 IS LOADED.

PC BOARD NUMBER:	831-0323-003B 7.5ips
	831-0323-013B 3.75ips
TITLE:	OMEGA MOTOR CONTROL