

**OTARI**

---

**ZA-55H**

**TIME CODE KIT**

INSTRUCTION MANUAL

---

EDITION NO. 3  
REVISED JULY 1986

# CAUTION

To prevent fire or shock hazard :

Do not expose this appliance to rain or moisture.

Do not remove cover.

No user-serviceable parts inside.

Refer servicing to qualified service personnel.

PLEASE READ THROUGH SAFETY INSTRUCTIONS  
ON THE NEXT PAGE.

## **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 this own expense will be required to take whatever measures may be required to correct the interference.

## SAFETY INSTRUCTIONS

1. Read Instructions — All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions — The safety and operating instructions should be retained for future reference.
3. Heed Warnings — All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions — All instructions should be followed.
5. Water and Moisture — The appliance should not be used near water - for example, near a bathtub, washbasin, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. Carts and Stands — The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. Ventilation — The appliance should be situated so that its location or position does not interfere with its proper ventilation.  
For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
8. Heat — The appliance should be situated away from near sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
9. Power Sources — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
10. Grounding or Polarization — Precautions should be taken so that the grounding or polarization means of an appliance are not defeated.
11. Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
12. Cleaning — The appliance should be cleaned only as recommended by the manufacturer.
13. Nonuse Periods — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.



14. Object and Liquid Entry — Care should be taken so that objects do not fall into and liquids are not spilled into the enclosure through openings.
15. Damage Requiring Service — The appliance should be serviced by qualified service personnel when:
  - A. The power-supply cord or the plug has been damaged; or
  - B. Objects have fallen, or liquid has been spilled into the appliance; or
  - C. The appliance has been exposed to rain; or
  - D. The appliance does not appear to operate normally or exhibits marked change in performance; or
  - E. The appliance has been dropped, or the enclosure damaged.
16. Servicing — The user should not attempt to service the appliance beyond that described in the operating instructions.  
All other servicing should be referred to qualified service personnel.

COMMUNICATION WITH OTARI  
FOR SERVICE INFORMATION AND PARTS

The OTARI PRODUCTS are manufactured under strict quality control and each unit is carefully tested and inspected prior to shipment from our factory.

If, however, some adjustments or technical support become necessary, replacement parts are required, or technical questions arise, please contact your nearest Otari dealer or write to:

OTARI ELECTRIC CO., LTD.  
4-29-18, Minami Ogikubo,  
Suginami-ku, Tokyo, 167, Japan  
Phone: (03) 333-9631  
Telex: J26604 OTRDENKI

OTARI CORPORATION  
2 Davis Drive, Belmont,  
California 94002, U.S.A.  
Phone: (415) 592-8311  
Telex: 25 9103764890

OTARI ELECTRIC DEUTSCHLAND GmbH.  
Gielenstrasse 9, 4040 Neuss 1  
F.R. Germany  
Phone: 02101-274011  
Telex: 41 8517691 OTEL D

OTARI SINGAPORE PTE., LTD.  
625 Aljunied Road #07-05  
Aljunied Industrial Complex,  
Singapore 1438  
Phone: 743-7711  
Telex: 87 36935 RS36935 OTARI

OTARI ELECTRIC (UK) LTD.  
Herschel Industrial Centre, Church Street,  
Slough SL1 1EL, Berkshire, United Kingdom  
Phone: (0753) 822381  
Telex: 849453 OTARI G

Another part of Otari's continuous technical support program for our products, is the continuous revision of manuals as the equipment is improved or modified.

In order for you to receive our information and service applicable to your requirements, and for the technical support to function properly, please include the following information, most of which can be obtained from the name plate on the equipment in all correspondences.

1. Model Number
2. Serial Number
3. Date of purchase
4. Name and address of dealer from whom machine was purchased
5. Power requirements (voltage and frequency) of the machine
6. Manual number to which you are referring

SECTION 1: GENERAL INFORMATION

1.1 INTRODUCTION

The OTARI ZA-55H time code kit is designed to be used with MTR-10, MTR-12, MTR-10II, and MTR-12II 1/4" 2 track machines to record and reproduce SMPTE (EBU) TIME CODE.

1.2 APPLICABLE TYPES OF EQUIPMENT

ZA-55H can be installed in the following types of equipment.

- MTR-10-2, C, 2L, CL
- MTR-12-2, C, 2L, CL
- MTR-10II-2, C, 2L, CL
- MTR-12II-2, C, 2L, CL

1.3 CONTENTS OF KIT

The kit includes the following:

Table 1-1

Name	Quantity	Parts No.	Notes
T.C. HEAD Ass'y	1	KH-41W ✓	
T.C. PCB Ass'y	1	PB-47RA ✓	
Sub-mother PCB Ass'y	1	PB-79GA ✓	
Connector Panel Ass'y	1	CB-710 ✓	
Guide Strip	2	CN7B-015 ✓	*1
<i>N/A</i> Cable Ass'y A - <i>MTR-10/12</i>	1	ZA-66Q	*2
Cable Ass'y B - <i>MTR-10/12-II</i>	1	ZA-66R ✓	*3
Instruction Manual	1	OS3-089 ✓	

- \*1 Not required for newer machines.
- \*2 For MTR-10/12
- \*3 For MTR-10 II/12II

## TABLE OF CONTENTS

### SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION . . . . .	1-1
1.2 APPLICABLE TYPES OF EQUIPMENT . . . . .	1-1
1.3 CONTENTS OF KIT . . . . .	1-1

### SECTION 2 SPECIFICATIONS . . . . . 2-1

### SECTION 3 INSTALLATION

3.1 MECHANICAL INSTALLATION . . . . .	3-1
3.2 ELECTRONICS INSTALLATION . . . . .	3-2
3.2.1 Installation of Cable Ass'y A and Ass'y B .	3-2
3.2.2 Connector Panel Installation . . . . .	3-2
3.3 HEAD ASSEMBLY INSTALLATION . . . . .	3-5

### SECTION 4 OPERATION

4.1 FRONT PANEL CONTROLS AND INDICATORS . . . . .	4-1
---	-----

### SECTION 5 SCHEMATIC DIAGRAM . . . . . 5-1

### SECTION 6 ALIGNMENT INSTRUCTIONS

6.1 HEAD ALIGNMENT . . . . .	6-1
6.1.1 Azimuth Alignment . . . . .	6-1
6.1.2 Head Height Adjustment . . . . .	6-1
6.2 REPRODUCE AND OUTPUT LEVEL ADJUSTMENT . . . . .	6-1
6.3 INPUT LEVEL ADJUSTMENT . . . . .	6-2
6.4 ERASE AND RECORD BIAS ADJUSTMENT . . . . .	6-3
6.5 RECORD LEVEL ADJUSTMENT . . . . .	6-4
6.6 FINE ADJUSTMENT OF DELAY TIME . . . . .	6-4

SECTION 2: SPECIFICATIONS

(1) Channel format

The time code channel conforms to IEC publication 461.

(2) Code format

SMPTE/EBU 80 bit address code.

(3) Track format

0.38 mm center of tape

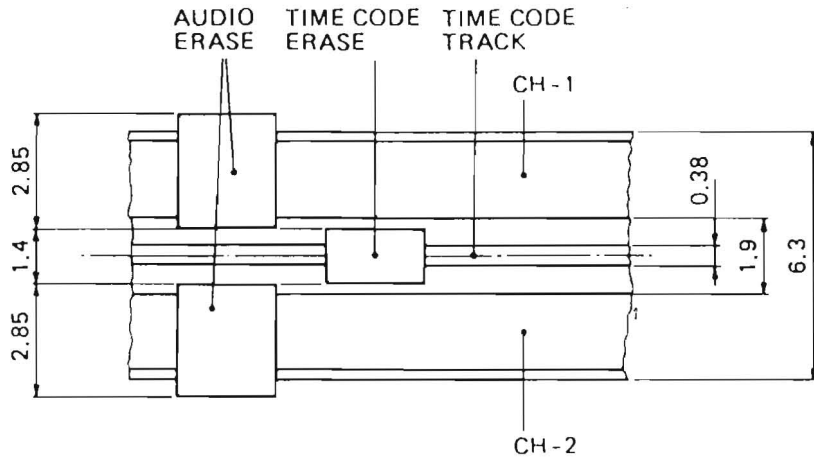


Fig. 2-1

(4) Head mounting

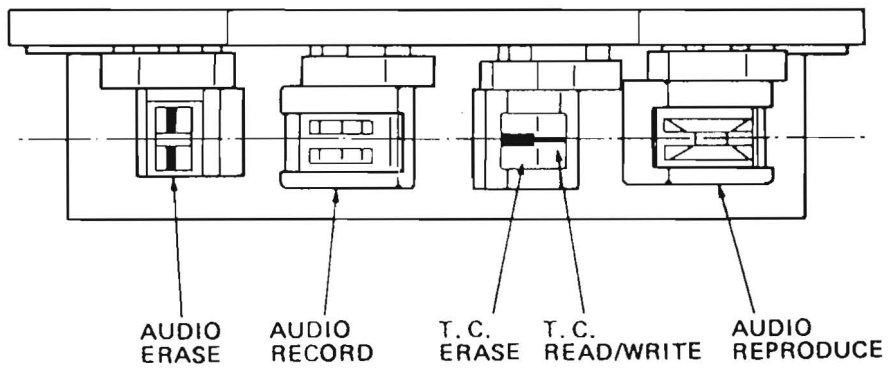


Fig. 2-2

- (5) Magnetic flux level  
707 nWb/m p-p  $\pm$  3 dB  
(250 nWb/m rms sinusoidal signal)  
Normal bias recording,  
without frequency equalization
- (6) Tape speed  
30, 15, 7.5, 3.75 ips
- (7) Delay line  
Coincidence of audio signal and time code signal in  
INPUT, SEL·REP, and REPRO modes
- (8) Input  
Min. 0.2 Vp-p  
Nom. 2 Vp-p  
Max. 6.3 Vp-p  
Active balanced  
Input impedance; 20 kOhm (balanced)
- (9) Output  
Min. 1 Vp-p  
Nom. 2 Vp-p  
Max. 4 Vp-p  
Active balanced  
Output impedance; 5 Ohm
- (10) Readable speed range  
From 1/5 to 20 times of normal play speed **(35X AT 7.5 IPS)**
- (11) Cross-talk: code channel to audio channel  
 $\geq$  75 dB : 250 nWb/m magnetic flux of audio track
- (12) Coincidence error between code track and audio track  
0.4 msec



## SECTION 3: INSTALLATION

### 3.1 MECHANICAL INSTALLATION

- (1) Open the upper rear panel of the MTR-10/12 by removing the 4 phillips screws. (Fig. 3-1)
- (2) Remove the left rear side panel from the machine and replace with the connector-panel. Refer to page 13-30, 13-40 or 13-46 of MTR-10 and 12 Operation Manual.
- (3) Remove all blank panels located on the left side of the card cage from the front of the cage.
- (4) Remove the four round head socket screws (two on each side) attaching the card cage to the main chassis. This will allow the card cage to be withdrawn approximately 1 inch from the chassis for clearance while working.
- (5) Remove, reverse, and reinstall with the nuts facing outward, the four screws and nuts holding the card cage mounting brackets on the LEFT side of the card cage. This is necessary in order to provide clearance for the Time code PCB module in the leftmost card cage slot.

This step is not necessary on later machines.

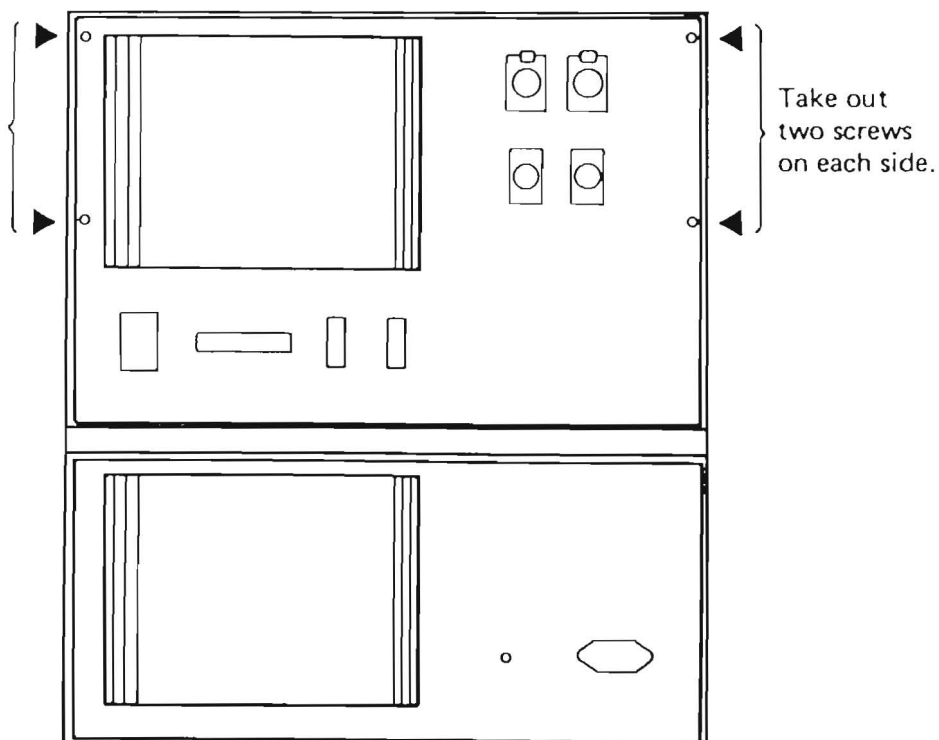


Fig. 3-1 Rear Panel Screws



- (6) Install the two card guide-strips (locate "V" end toward you) in the empty card slot at the far left of the upper card cage. The card guides are secured to the rails using the pins provided.

This step is not necessary on later machines.

- (7) Install the Sub Mother PCB Ass'y at the rear of the slot. The connector is mounted from the FRONT of the machine, with the CN1 end of the PCB uppermost. Make sure that the Time Code PCB slides into the slot and mates properly with the edge connector before proceeding to electronics installation.
- (8) Replace the panels removed from the front of the card cage in Step (3), and reinstall the card cage in the chassis.

## 3.2 ELECTRONICS INSTALLATION

### 3.2.1 Installation of Cable Ass'y A and Cable Ass'y B

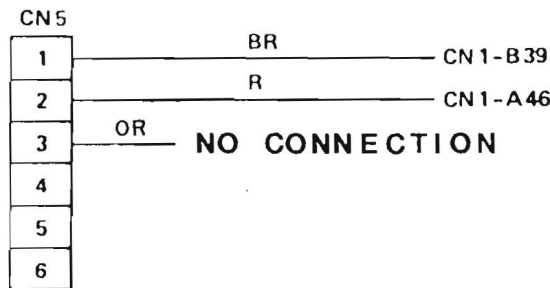
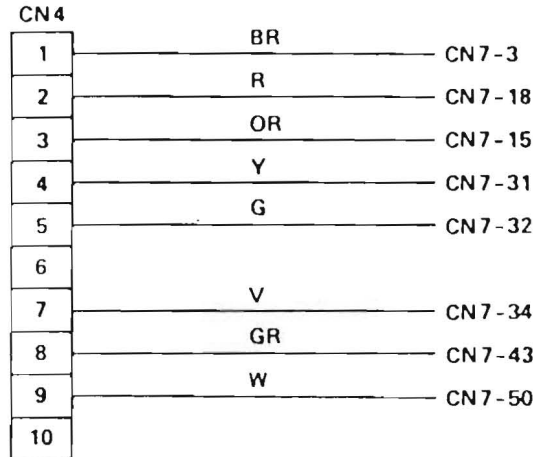
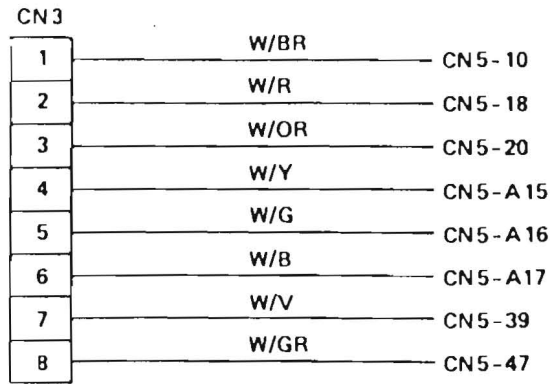
- (1) For MTR-10/12, solder Cable Ass'y A to the back of the MTR-10/12 mother board as shown by Fig. 3-2.
- (2) For MTR-10II/12II, connect Cable Ass'y B to the back of the MTR-10II/12II mother board and connect to the sub-mother board as shown by Fig. 3-3.
- (3) For both Cable Ass'y A and Cable Ass'y B, connect CN3, CN4 and CN5 to CN3, CN4 and CN5 of the time code sub-mother PCB.

### 3.2.2 Connector Panel Installation

- (1) For MTR-10/12, connect CN6 and CN2 of the connector panel to CN6 and CN2 on the sub-mother PCB, respectively.
- (2) For MTR-10II/12II,
  1. Remove XLR connectors with cable Ass'y from the CB-710 connector panel.
  2. Remove the blank panel located next to INPUT and OUTPUT connectors on the upper rear panel of the MTR-10II/12II.
  3. Install both of INPUT/OUTPUT connectors removed at Step 1 at the left side of the channel 2 connected on the rear panel.
  4. Install the blank panel (A108801) contained in this kit into unused hold for connectors.
  5. Connect CN6 and CN2 to CN6 and CN2 on the sub mother PCB Ass'y.

To ZA-55H  
Sub Mother PCB

To MTR-10/12  
Mother PCB



\* This Cable Ass'y is for the MTR-10/12 solder each wire to the point on the Mother Board as guided above.

	Otari Parts No.
CN3	CN408395
CN4	CN410397
CN5	CN406393

**SOLDER**

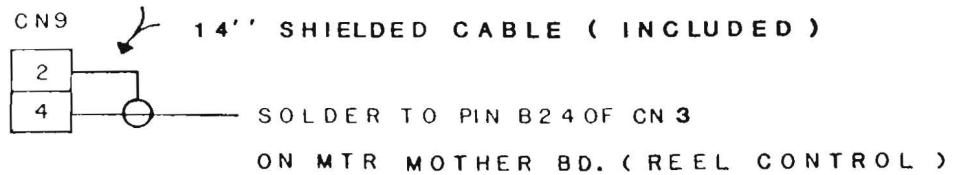


Fig. 3-2

To ZA-55H  
Sub Mother PCB

To MTR-10II/12II  
Mother PCB

CN3		CN68
1	W/BR	1
2	W/R	2
3	W/OR	3
4	W/Y	4
5	W/G	5
6	W/B	6
7	W/V	7
8	W/GR	8

CN4		CN70
1	BR	1
2	R	2
3	OR	3
4	Y	4
5	G	5
6	B	6
7	V	7
8	GR	8
9	W	9
10	BL	10

CN5		CN67
1	BR	1
2	R	2
3	OR	3
4		4
5		5
6	B	6

\* This Cable Ass'y is for the MTR-10II/12II  
Connect each connector to a mated con-  
nector as described above.

	Otari Parts No.
CN3	CN408395
CN4	CN410397
CN5	CN406393
CN67	CN406393
CN68	CN408395
CN70	CN410397

**SOLDER**

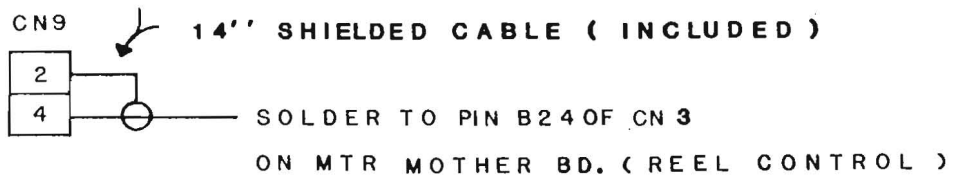


Fig. 3-3

### 3.3 HEAD ASSEMBLY INSTALLATION

- (1) Remove the Head Assembly Rear Cover by removing 2 socket head hex screws.
- (2) Remove the 2 screws that secure the head block to the top of the tape guide posts at either end of the head assembly.
- (3) Open the transport. On the MTR-10, this is accomplished by depressing the 2 buttons on the right and left side of the chassis near the front of the transport. On the MTR-12, two levers on each side of the transport panel perform the same function. The transport will "pop up" about one-half inch. Lift the transport to the vertical position, and let it back down gradually; latching supports will "lock" to support it, at which point you may release your grip.
- (4) From underneath the deck plate, remove the screw holding the bottom of the center tape guide post.  
NOTE: This guide post is not centered in the head assembly on early MTR-10s.
- (5) Remove Head Assembly by pulling straight up to unplug the PC Board from the connector.
- (6) From beneath the deck plate, remove the cable clamp and ground wire from the head block edge connector bracket. On the top of the transport remove the two phillips screws holding the connector to the bracket.
- (7) Remove the connector bracket from the transport by removing two phillips head screws.
- (8) Remove the head block connector bracket from the cable assembly.
- (9) Thread the 8 conductor Time code head cable through the hole in the new connector bracket with the 8 conductor (CN1) end uppermost.
- (10) Mount the head cable assembly connector on the new connector bracket using the screws from the old connector bracket.
- (11) Reinstall the connector bracket on the transport chassis panel. Reinstall the Cable Clamp and Ground Lug.
- (12) Route the head cable down the left side of the transport to the Sub Mother PCB. The cable may be strain relieved by tie-wrapping it to the hexagonal brake panel stud on the supply reel motor assembly.

- (13) Close the transport by gently lifting the transport panel to vertical and lowering it. Latch the transport closed by pressing down on the top until it latches.
- (14) Connect the 4 conductor (CN7) end of the head cable to CN7 on the Sub Mother PCB.
- (15) Install the new head assembly by plugging the PCB into the edge connector.
- (16) Replace the screws into the two remaining tape guide posts.
- (17) Replace the head assembly rear cover.
- (18) Verify all cables and connections before proceeding on to the next steps.
- (19) Mount the CONNECTOR SUB-PANEL on the back of the machine by slipping the screw heads through the keyhole slots and sliding the Panel down. Tighten the screws.
- (20) Close the upper rear panel by hinging it up and securing it with four phillips screws.
- (21) Replace any Blank Panels removed from the front of the upper card cage.

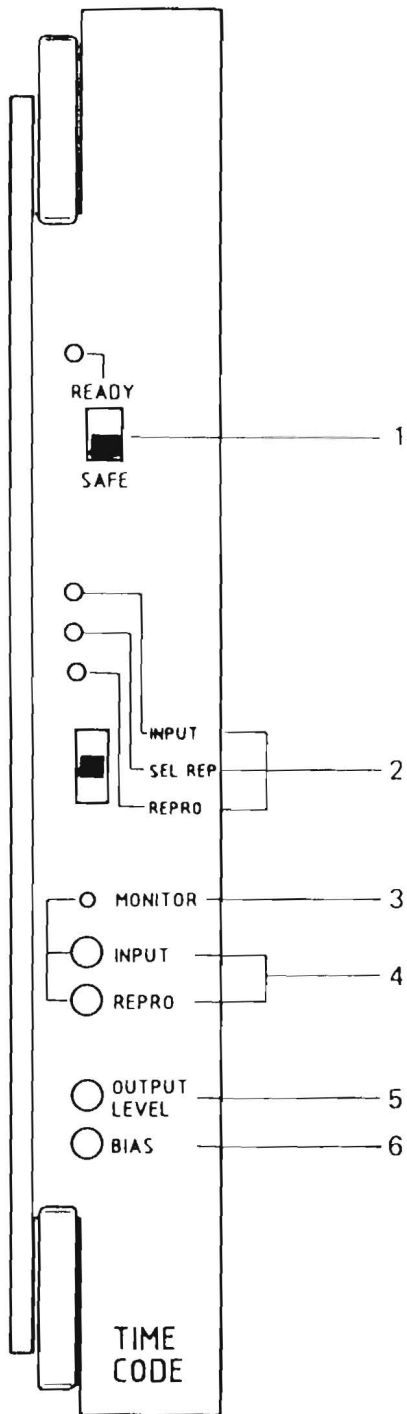


Fig. 3-4 Time Code PCB Ass'y Front Panel



## SECTION 4: OPERATION

### 4-1 FRONT PANEL CONTROLS

Numbers in brackets [ ] refer to callouts in Fig. 3-4.

[1] READY/SAFE switch

With the switch up, the Time code channel is in record READY mode, and recording will take place if the transport RECORD and PLAY buttons are or have already been pressed. With the switch down, the Time code channel is in SAFE mode, and recording will not take place regardless of the machine RECORD and READY mode.

[2] Monitor mode select switch

This switch is designed to select the time compensation for the time code.

INPUT: The input signal is output as it is without compensation.

SEL·REP: The time code recorded on the tape is reproduced with proper time compensation for the location of the record head.

REPRO: The time code recorded on the tape is reproduced with proper time compensation for the location of the Reproduce head.

This time compensation insures the time code will be in the correct relationship with the audio signal regardless of monitor mode.

[3] INPUT and REPRO LEVEL ADJ trimmers

These controls adjust the level of the input and reproduce signal levels to the time code compensation circuits. The trimmers should be set so that the MONITOR LED [4] turns green. If the level is too low the LED will turn red.

[5] OUTPUT LEVEL ADJ trimmer

Adjusts the level of the time code output.

[6] BIAS LEVEL ADJ trimmer

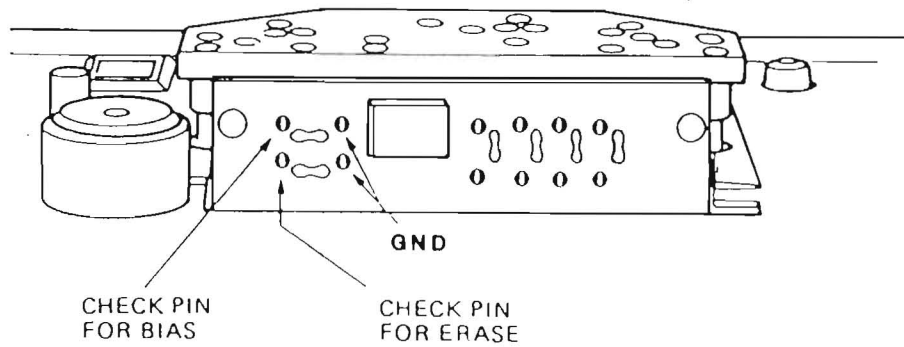
This control adjusts the bias level of the time code channel. Remove the head housing cover and measure as shown in Fig. 4-1 with an AC voltmeter (VTVM). The following values are recommended:



TABLE 4-1

	3M			AGFA		AMPEX	
	206	226	250	468	469	406	456
BIAS (MV)	6	10	8	6	10	8	12
ERASE (MV)	50-80 -----						

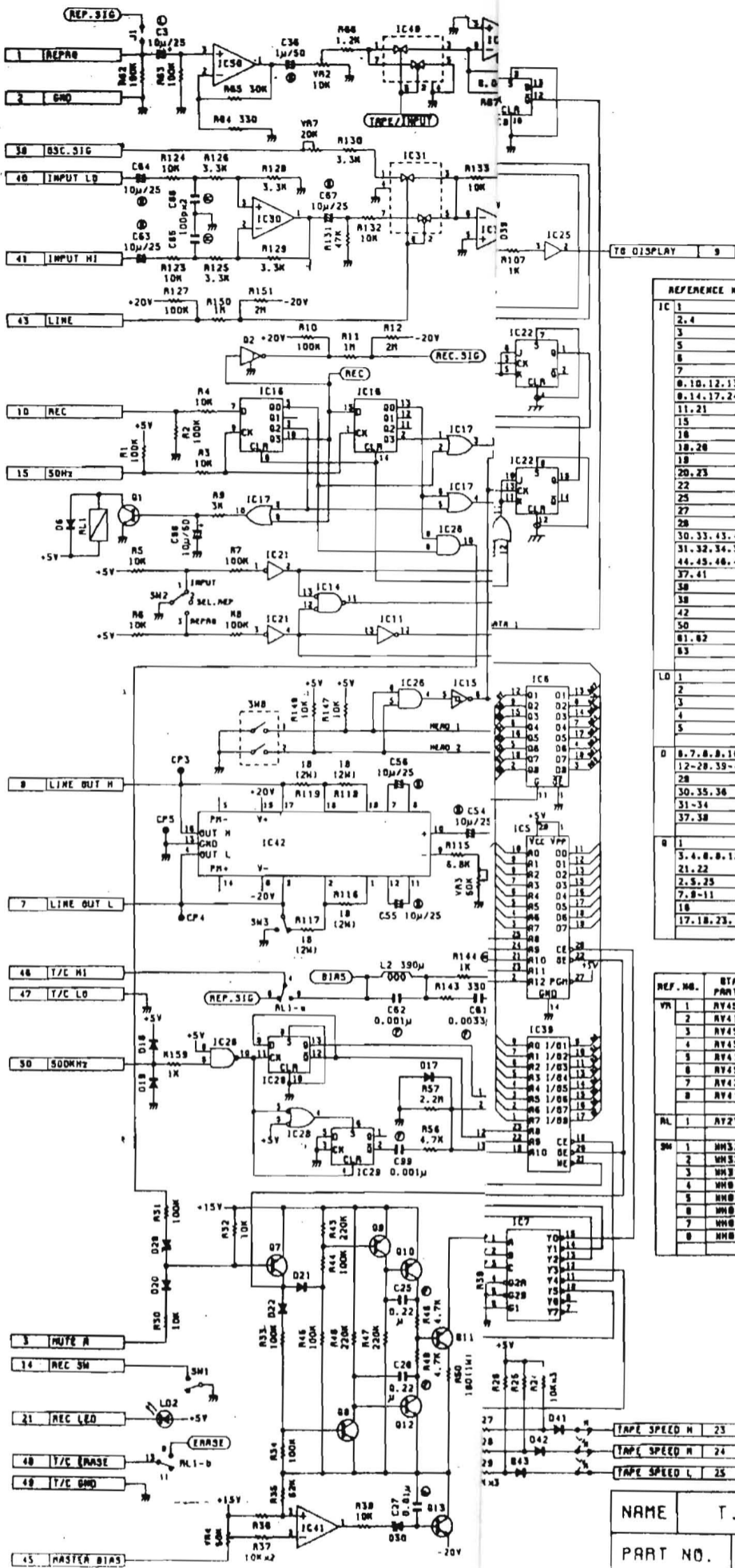
FIG. 4-1



Note: The DIP switches 4, 5 and 6 on the PB-47RA (Time Code PCB Ass'y) compensate the distance between Time Code Head and Audio Head.

These adjustments have been made at the factory and realignment will not be necessary.

SECTION 5: SCHEMATIC DIAGRAMS



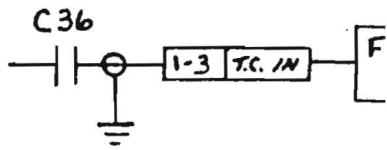
REFERENCE NO.	BTANI PART NO.	DESCRIPTION
IC 1	JMSL 8085	JMSL8085AP
2,4	JMSL 8251	JMSL8251AP
3	JMSL 8253	JMSL8253AP-S
5	JMSL 2764	JMSL2764K
6	JAL5373K	SM74LS373H
7	JAL3138H	SM74LS138H
8,10,12,13,28	JMC14013	JMC14013BCP
8,14,17,24,40	JMC14071	JMC14071BCP
11,21	JMC14080	JMC14080BCP
15	JMC14584	JMC14584BCP
18	JMC14815	JMC14815BCP
18,28	JMC14081	JMC14081BCP
18	JMC14070	JMC14070BCP
20,23	JMC14048	JMC14048BCP
22	JMC14827	JMC14827BCP
25	JMC14050	JMC14050BCP
27	JMC14001	JMC14001BCP
28	JMC14811	JMC14811BCP
30,33,43,47,48	J-0818	JMS532H
31,32,34,35,38	J-0853	
44,45,46,48	J-0853	
37,41	J-0817	JM45800-I
38	JMSL 8253	JMSL8253P-S
38	J-0821	JM6116P-4
42	J-0850	
50	J-0831	JM2043
81,82	JMC78M15	JMC78M15H
83	JMC78M15	JMC78M15H
LD 1	PH-0181	LR18MPF
2	PHTL0124	TL0124
3	PHTL0124	TL0124
4	PHTL0124	TL0124
5	PHTL0124	TL0124
D 8,7,8,8,10,11	PHSM1-02	SM-1A-02
12-28,39-43	PH-0188	FM8815
28	PH-0028	RM8,2E83
30,35,36	PH-0011	RM5,1E83
31-34	PH-0032	RM10E83
37,38	PH-0008	RM4,7E83
B 1	QC1318A	ZSC1318A
3,4,6,8,12-15	MC1815BL	ZSC1815BL
21,22	B-0010	DM1213,UM4213
2,5,25	DM1015GM	ZSA1015GM
7,8-11	DM1015GM	ZSA1015GM
18	QC2655Y	ZSC2655Y
17,18,23,24	SM720A	ZSM720A

REF. NO.	BTANI PART NO.	DESCRIPTION
VR 1	AV454174	EVHC0TAD1854 INPUT LEVEL
2	AV454172	EVHC0TAD1814 REPRO LEVEL
3	AV454174	EVHC0TAD1854 OUTPUT LEVEL
4	AV454174	EVHC0TAD1854 RECORD BIAS
5	AV453203	GF08P-1K PHASE COMP
6	AV454210	GF08P-50K MONITOR LED
7	AV424208	GF08P-20K TEST OSC LEVEL
8	AV414207	GF08P-10K REC LEVEL
RL 1	AT2Y052	G2V-2-DC5V REC RELAY
SM 1	MH32003	SM273-1-22 REC READY/SAFE
2	MH32007	SM277-1-2 MONITOR MODE
3	MH31006	SS8012 LINE OUTPUT MODE
4	MH84008	RM5-4 DELAY FINE ADJ.P
5	MH84008	RM5-4 DELAY FINE ADJ.N
6	MH84008	RM5-4 DELAY FINE ADJ.E
7	MH82021	DSS202 SMPTE/FWD
8	MH82021	DSS202 HEAD VARIATION

NAME: T.C.P.C.B. ASS'Y  
 PART NO.: PB47ROA  
 APPLIED: 1 20 1799

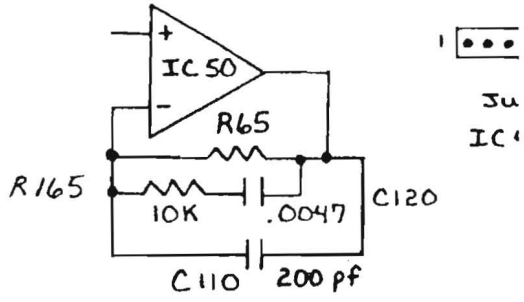
Dwg. No. 13.9872

FILTER

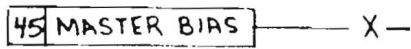


HEAD AMP

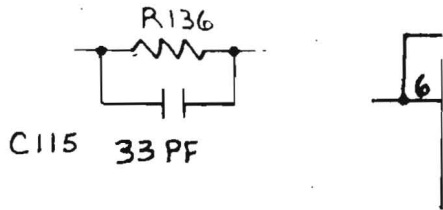
FET



BIAS

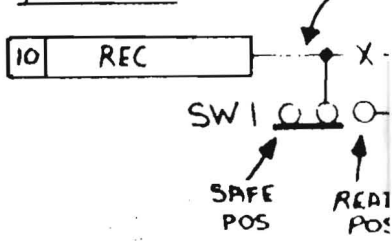


RECORD AMP

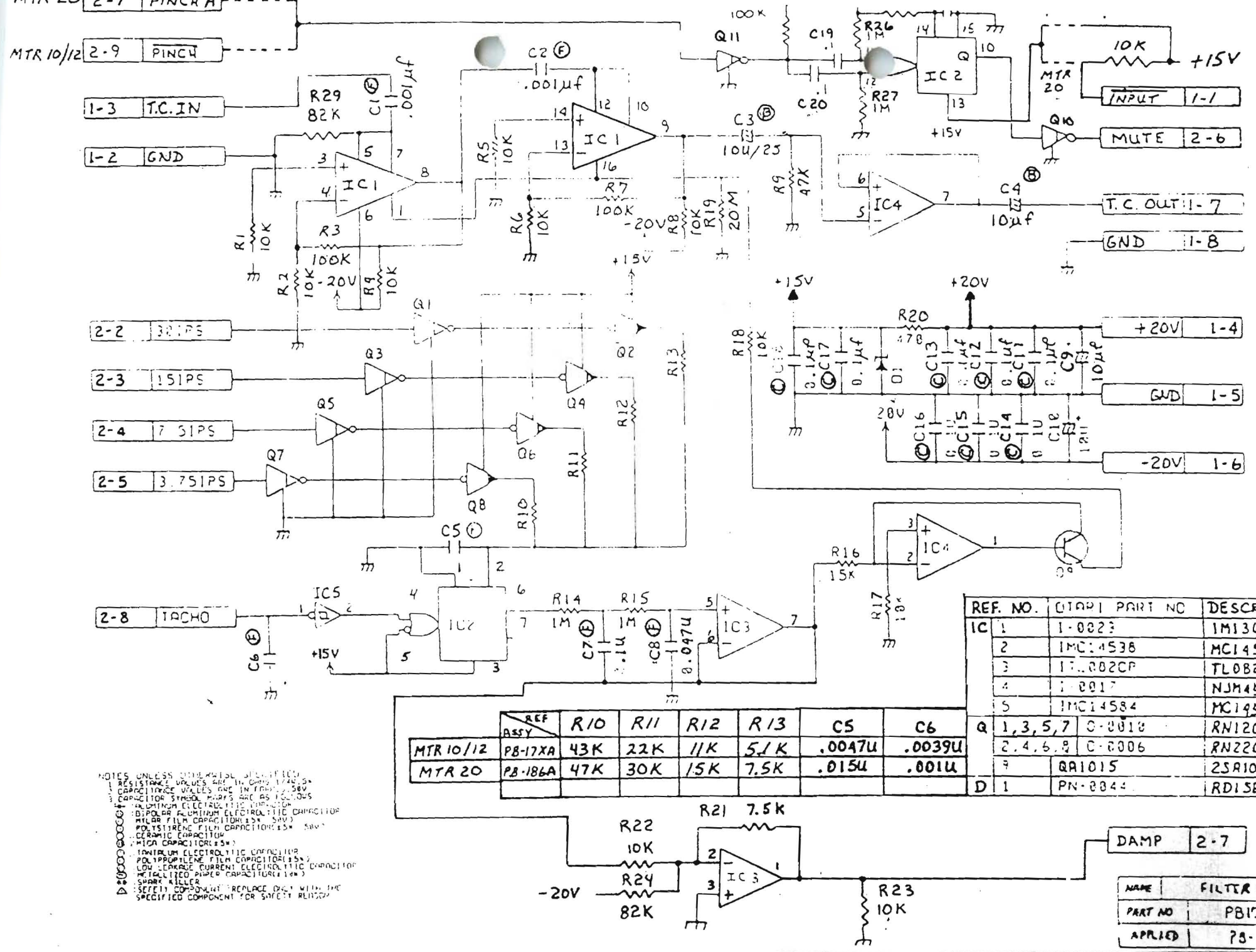


RECORD

JUMP







NOTES: UNLESS OTHERWISE SPECIFIED:  
 1. RESISTANCE VALUES ARE IN OHMS, 1K=1,000,  
 CAPACITANCE VALUES ARE IN FARADS, 50V  
 CAPACITOR SYMBOL PARTS ARE AS FOLLOWS:  
 (A) OPTIMUM ELECTROLYTIC CAPACITOR  
 (B) POLAR ALUMINUM ELECTROLYTIC CAPACITOR  
 (C) MIC. FILM CAPACITOR (0.15V, 50V)  
 (D) POLYSTYRENE FILM CAPACITOR (50V, 50V)  
 (E) CERAMIC CAPACITOR  
 (F) TANTALUM CAPACITOR (5V)  
 (G) TANTALUM ELECTROLYTIC CAPACITOR  
 (H) POLYPROPYLENE FILM CAPACITOR (50V)  
 (I) LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR  
 (J) METALLIZED PAPER CAPACITOR (10V)  
 (K) SPARK KILLER  
 (L) SAFETY COMPONENT: REPLACE ONLY WITH THE  
 SPECIFIED COMPONENT FOR SAFETY REASON

REF ASSY	R10	R11	R12	R13	C5	C6	
MTR 10/12	PB-17XA	43K	22K	11K	5.1K	.0047u	.0039u
MTR 20	PB-186A	47K	30K	15K	7.5K	.015u	.001u

REF. NO.	Q1	Q2	PART NO	DESCRIP
IC 1	1-0023			1M136C
2	1M1453B			MC1453
3	1M1002CP			TL082C
4	1-0017			NJM454
5	1M1458A			MC1458
Q 1, 3, 5, 7	C-0010			RN120
2, 4, 6, 8	C-0006			RN220
9	QA1015			2SA101
D 1	PN-0044			RDISE

DAMP 2-7

NAME	FILTER
PART NO	PB10
APPLIED	PS-

## SECTION 6

### ALIGNMENT INSTRUCTIONS

#### 6.1 HEAD ALIGNMENT

**IMPORTANT:** Head alignment is not necessary unless the Time Code head has been replaced.

##### 6.1.1 Azimuth and Tape Wrap adjustments

1. Extend the TC module using an MTR-10/12 extender PCB (PB-76X).
2. Connect an AC voltmeter or oscilloscope to CP 6 on the TC PCB.
3. Using the 1 kHz portion of a 7-1/2 ips, 250 nWb/m full track reproduce alignment tape, adjust the TC head "wrap" for peak output (best head to tape contact). Repeat using the 2 kHz and 4 kHz portions of the alignment tape.

Observe the head wear pattern by inking the head and running marking tape across the head. The wear pattern must just cover the erase (left most) portion of the head gaps. It may be necessary to adjust, and re-ink the head several times for best adjustment.

4. Using the 500 Hz portion of the alignment tape, adjust the azimuth of the TC head for maximum output.
5. Repeat step 4 using the 1 kHz and 2 kHz portions of the alignment tape.

##### 6.1.2 Head Height Adjustment

1. Connect a source of time code to the TC module Input, and record 1 or 2 minutes of time code.
2. Using magnetic developing fluid or a "magnetic viewer" to make the tracks visible, measure the track spacing and adjust the head height so that the track spacing conforms to the dimensions shown in Figure 2-1.

#### 6.2 REPRODUCE AND OUTPUT LEVEL ADJUSTMENT

**NOTE:** These adjustments have been performed at the OTARI factory, and should not be changed unless the Head Assembly or other component has been replaced.

**HINT:** The calibrated (+4 dBm) meters on the MTR-10/12 provide a simple and easy method of adjusting the Input and Output level of the Time Code module.

1. Set the INPUT/SEL-REP/REPRO switch on the Time Code module to the Repro position.
2. Using an XLR to XLR cable, connect the Time Code Output of the MTR-10/12 to the Channel 2 Audio Input. Set Channel 2 to Input monitor and engage the Input SRL button.
3. Connect an oscilloscope to CP6 on the Time Code module, using CP5 for the Ground. Adjust the oscilloscope for 1 V/div vertical sensitivity and 10 mSec/div horizontal sweep rate.
4. Play 1 kHz at reference level from a 7.5 ips 250 nWb/m reproduce alignment tape. (See Note below for use with other speeds).
5. Adjust the front panel REPRO trimmer for 4.5 V P-P on the oscilloscope.
6. Play the 1 kHz portion of the alignment tape again, and adjust the OUTPUT LEVEL trimmer on the Time Code module front panel for 0 VU on the MTR-10/12 Channel 2 VU meter.

NOTE: If a 7.5 ips alignment tape is not available, use an 15 or 30 ips alignment tape recorded at 250 nWb/m and adjust for the following voltage in Step 5:

15 ips 4.5 V P-P  
30 ips 6.0 V P-P

Return the SPEED switch to 7.5 ips when finished with this adjustment.

### 6.3 INPUT LEVEL ADJUSTMENT

1. Connect the output of a Time Code Generator to the Channel 1 Input of the MTR-10/12 using an XLR-XLR cable. If the Channel 1 VU meter does not read 0 VU, disengage the SRL button and adjust the Channel 1 INPUT level for a 0 VU indication.
2. Connect an XLR to XLR cable from the Channel 1 Output of the MTR-10/12 to the Time Code Input. Set the Time Code module to Input monitor.
3. Adjust the Input trimmer on the Time Code module front panel until the Channel 2 VU meter indicates 0 VU.
4. Adjust Channel 1 Input level until the Channel 1 VU Meter indicates -20 VU.



5. Adjust VR6 on the Time Code module until the Monitor LED becomes amber.
6. Re-adjust Channel 1 Input Level until the Channel 1 VU Meter indicates 0 VU.

NOTE: After completing Steps 3 and 4, vary the Channel 1 Input Level control on the MTR-10/12, and make sure that both (Channel 1 and Channel 2) VU meters track together. Re-check to make sure that the Monitor LED is solidly green as the level increases to 0 VU.

#### 6.4 ERASE AND RECORD ADJUSTMENT

1. Remove the Head Cover and attach the AC Voltmeter to the Erase Check points. Refer to Figure 4-1.
2. Thread the machine with a reel of the tape type which will be used for sessions.
3. Set the Time Code module Ready/Safe switch to the Ready position and press the RECORD button on the MTR-10/12 transport.
4. Using a plastic slug adjusting tool, adjust the core of T2 for a reading of 50 - 80 mV on the AC Voltmeter.
5. Connect the AC Voltmeter test leads to the Record Bias Check points. (Refer to Figure 4-1).
6. Adjust the core of T1 for a maximum reading on the AC Voltmeter. HINT: Use the 10 mV full scale setting.
7. Adjust the BIAS trimmer on the Time Code module front panel for the appropriate Bias for the tape type used. Refer to Table 4-1 for Bias currents for various tape types.

NOTE: Adjusting the Audio Bias on the MTR-10/12 does not affect the Time Code bias.

#### 6.5 RECORD LEVEL ADJUSTMENT

1. Set the Time Code module Monitor switch to the Repro position.
2. Connect the oscilloscope to CP6 on the Time Code module, using CP5 for the Ground. Set the oscilloscope to 2 V/div vertical sensitivity and 10 mSec/div horizontal sweep rate.
3. Connect a Time Code generator to the Time Code input. Set the Time Code module Ready/Safe switch to the Ready position, and press the transport RECORD button to begin recording at 7.5 ips. The Time Code module will

automatically switch to Input monitor mode.

4. Record approximately 10 seconds of Time Code on the tape. Rewind the tape and enter Play. If the Time Code envelope, displayed on the oscilloscope, is not 10 V P-P, adjust VR8 on the Time Code module a small amount. Repeat the Record - Play - Adjust procedure until the Time Code envelope is 10 V P-P.

#### 6.6 FINE ADJUSTMENT OF DELAY TIME

**IMPORTANT:** Adjustment of the Delay Time is not necessary unless the Time Code head has been replaced or the wrap has been adjusted.

1. Thread the MTR-10/12 with a full track time code tape, recorded at 250 nWb/m.
2. Connect the output of audio channel 1 to the channel 1 input of a 2 channel digital storage oscilloscope. Connect the Time Code Module Output to the channel 2 input to the oscilloscope.
3. Set the controls on the oscilloscope so that both signals are displayed, and the sweep is triggered by the CH 1 input.

Note: the oscilloscope must be either a dual-beam unit or be placed in Chop mode rather than Alternate, so that the time relationship between the two signals can be observed.

4. While playing the tape containing time code in Repro mode, adjust SW 6 so that the delay remains within 0.5 bit.
5. While playing the tape containing time code in Sel-Rep mode, adjust SW 5 so that the delay remains within 0.5 bit.

Do not adjust SW 4.

Alternate Method if a Digital Storage Oscilloscope is not available but a Synchronizer capable of displaying the error between master and slave code is available.

1. Connect the Output of audio channel 1 to the Master time code input of your synchronizer.
2. Connect the Time Code Module Output to the Slave time code input to the synchronizer.
3. Play the 15 ips full track time code tape.
4. With both the Audio Channel and the ZA-55H Time Code module in Repro mode, adjust SW 6 until the synchronizer displays 0 subframes of offset.

5. Repeat step 4 with both Audio Channel and Time Code MODULE IN SEL-REP MODE adjusting SW 5.

NOTE: A non-correctable error greater than 2 subframes may indicate errors in head wrap or head gap centering adjustment.

#### 6.7 SWITCH SETTINGS

Switch 3 Balanced/Unbalanced Operation

- \* BAL = Toward Rear of PCB
- UNBAL = Toward Front of PCB

Switch 7-1 SMPTE/EBU Time Code

- On = EBU
- \* OFF = SMPTE

Switch 7-2 Lifter Defeat

- \* On = Lifters Defeated in Fast Wind Modes
- Off = Lifters Operate Normally in all modes

Switches 8-1 and 8-2 Select Single or Dual Time Code heads, and are factory set. Do Not Disturb These Settings

- \* SW 8-1 = OFF
- \* SW 8-2 = ON

\* Indicates switch position at time of shipment.