S S I

STRATEGIC SOUND, INC.

OPERATOR'S MANUAL

CENTER TRACK TIME CODE SYSTEM
FOR THE AMPEX ATR-100
PROFESSINAL AUDIO RECORDER

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REVISION B

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INTRODUCTION

The SSI Center Track Time Code System is an intelligent upgrade package that adds SMPTE/EBU Time Code capabilities to the AMPEX ATR-100 2 track mastering recorder.

The Center Track Time Code System, when properly installed into the AMPEX ATR-100 recorder, provides full Time Code Record, Reproduce and Sync capabilities. This is done by making use of a narrow unused section of tape inbetween the two audio tracks, where Time Code can be recorded without any noticable crosstalk into either adjacent audio track.

SSI's proprietary Center Track Head easily mounts onto the ATR's head block assembly into the third head position, between the audio record and reproduce heads. In this position, the Center Track Time Code System Microprocessor will precisely advance or delay the Time Code signal, so as to record and reproduce Time Code coincident with audio. Therefore, tape can be cut and spliced without the problems of lost code or offsets.

For minimizing system costs and for ease of installation, SSI has made use of existing cabling, power supplies and control signals within the ATR-100. The main Center Track Time Code Board fits into the fourth audio card slot of the ATR-100. This also allows for operation of the Time Code channel from the ATR's Control Panel as if it were the Fourth audio channel.

SSI also provides the interface electronics, so that Balanced Input and Output Time Code signals are provided by way of 'XLR' style connectors at the rear of the machine.

MAIN TIME CODE BOARD - GENERAL DESCRIPTION

Upon the Main Time Code Board resides the majority of the Center Track Time Code System electronics. A Microprocessor and its associated logic performs all intelligent functions. The reproduce preamp, record amp and bias amp circuits are also present on the Main Board to provide the interface to the Center Track Head.

There are only five adjustments required on the main time code board when installing or calibrating the system (figure 1). They are the 'RECORD' level adjustment pot, the 'BIAS' level adjustment pot, the 'THRESHOLD' adjustment pot, the 'REPRODUCE' delay time fine adjustment switch, and the 'RECORD/SYNC' advance/delay time fine adjustment switch.

The switches on the Main Board are identified as follows:

Switch SW1 is a 'RESET' button, when pressed, it restarts the microprocessor. (Used mainly as a convenience in performing self diagnostic tests.)

Switch SW2 is for fine adjustment of the time difference between the Time Code Head and the audio Reproduce Head.

Switch SW3 is for fine adjustment of the time difference between the Time Code Head and the audio Record Head.

Switch SW4 is the Diagnostic and User bit option select switch.

The functions of the LEDs are as follows, from top to bottom:

LED	COLOR	FUNCTION
DISP 1	GREEN	TIME CODE PRESENT
DISP 2	YELLOW	DROP FRAME FLAG PRESENT
DISP 3	YELLOW	USER BIT OPTION SELECTED
DISP 4	RED	RECORD MODE IS OPERATING
DISP 5	RED	HIGH SPEED MODE

DISP 1 thru 4 appear on the front panel, while DISP 5 is only visible from behind the front panel (for diagnostic use).

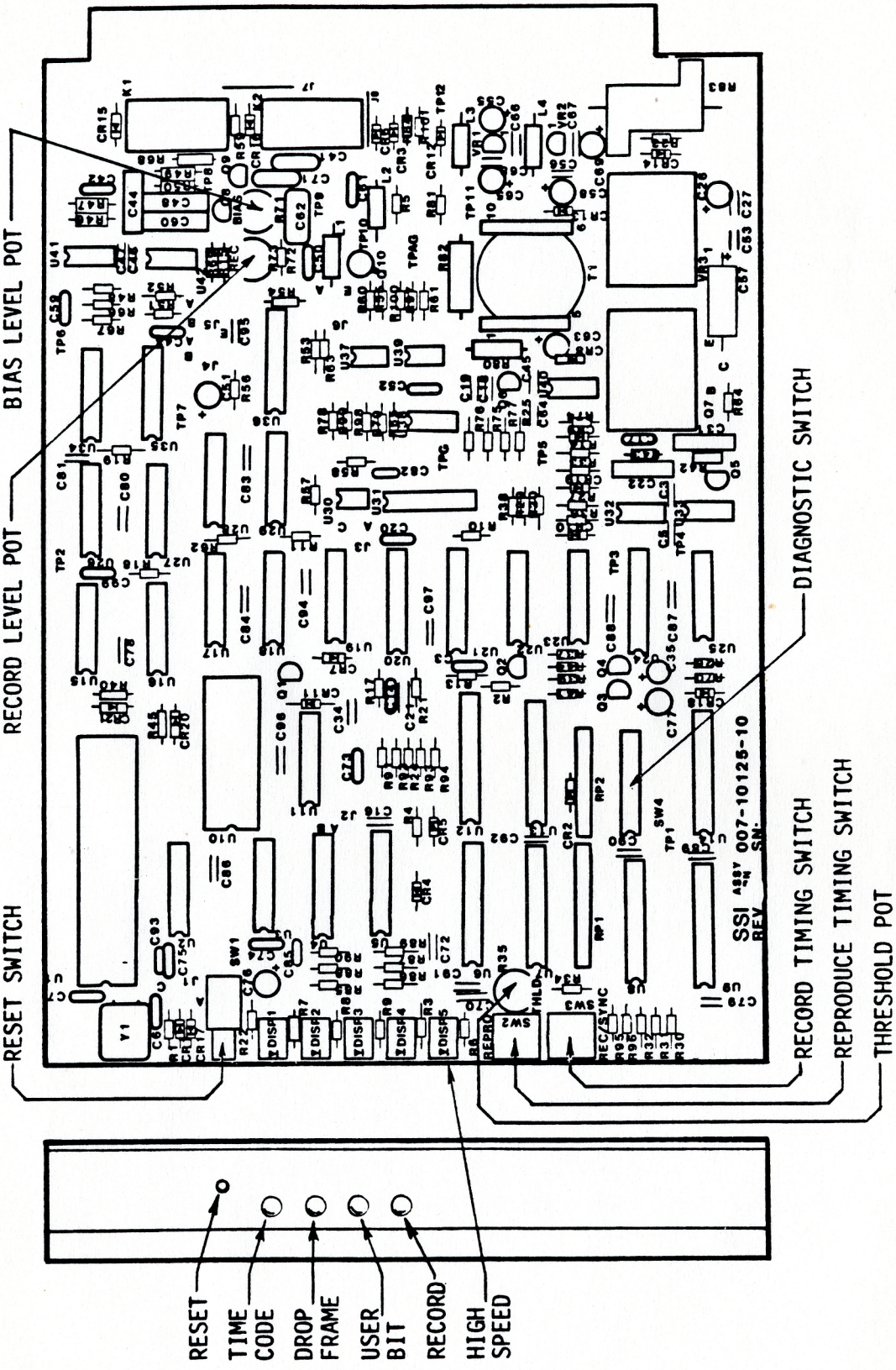

BIAS LEVEL POT
RECORD LEVEL POT
RESET SWITCH
DIAGNOSTIC SWITCH
RECORD TIMING SWITCH
REPRODUCE TIMING SWITCH
THRESHOLD POT
RESET
TIME CODE
DROP FRAME
USER BIT
RECORD
HIGH SPEED

FIGURE 1

CENTER TRACK HEAD - GENERAL DESCRIPTION

SSI's custom designed Center Track Head incorporates a unique design to provide Erase, Record and Reproduce functions all in one package. The head design is optimised for Time Code signal performance, while minimizing (nearly eliminating) crosstalk with the adjacent audio tracks.

The Center Track is precisely located at the center of the tape when properly installed onto the ATR-100 Head Assembly. Figures 2 and 3 show the relative locations of the Audio and Time Code tracks, and the Erase and Record/Reproduce head gap widths.

TAPE TRACK CONFIGURATION

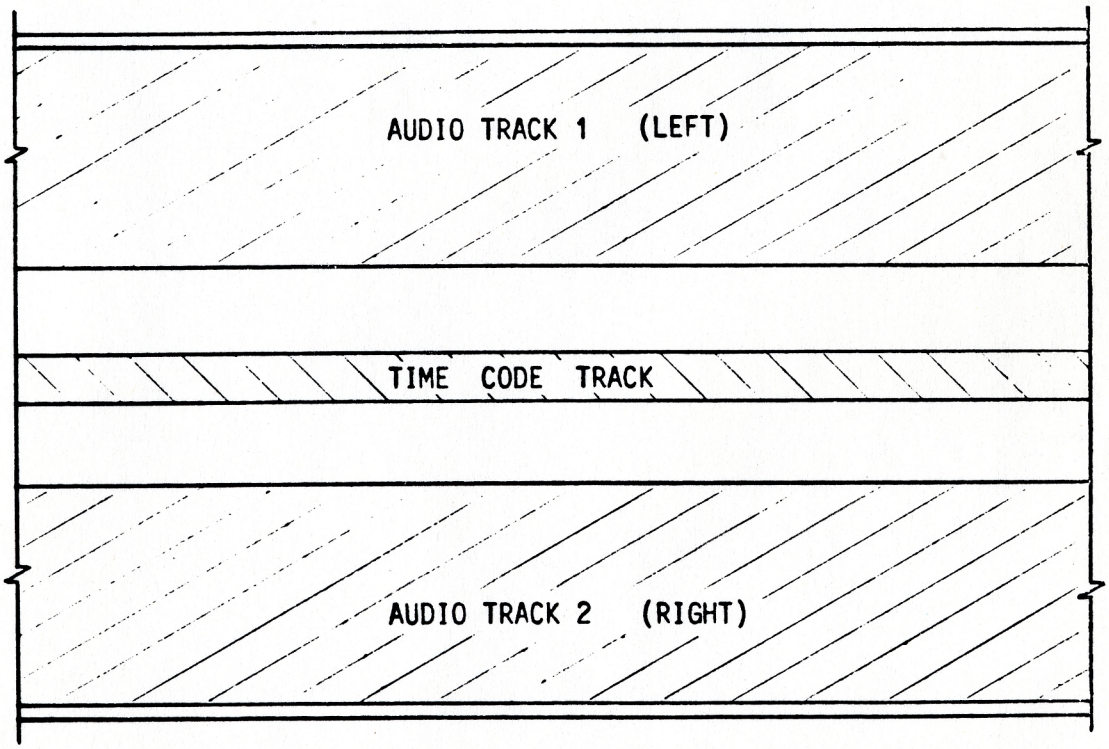
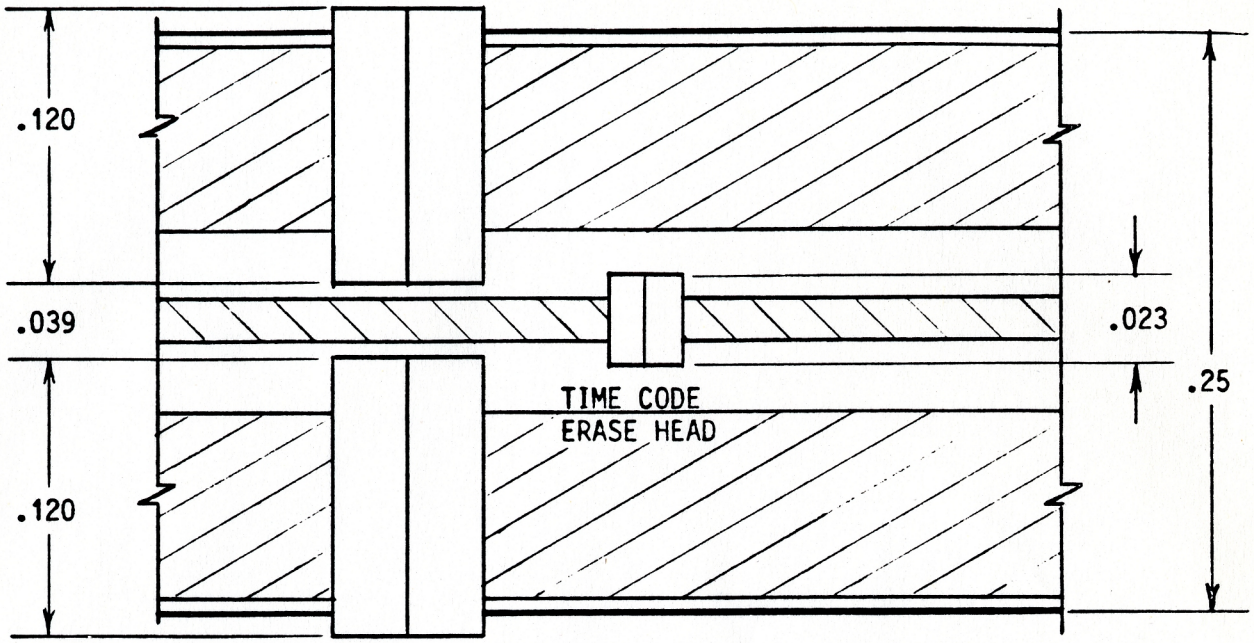


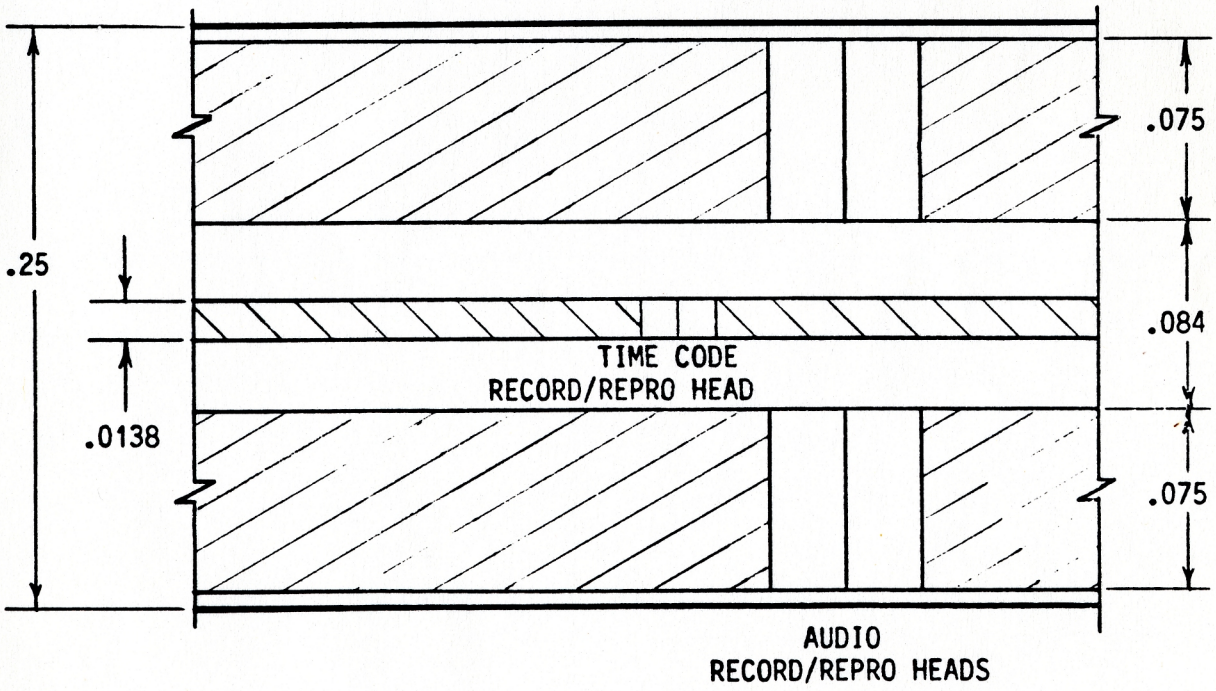
FIGURE 2

AUDIO AND TIME CODE ERASE TRACK WIDTH



AUDIO ERASE HEAD

AUDIO AND TIME CODE RECORD/REPRODUCE TRACK WIDTH



AUDIO
RECORD/REPRO HEADS

FIGURE 3

INPUT/OUTPUT INTERFACE - GENERAL DESCRIPTION

SSI provides cabling and electronics with its Center Track Time Code System, so that convienient balanced input and output connections can be located at the rear of the machine.

The Input/Output Interface can be easily connected to any time code Generator, Reader or Synchronizer by way of the 'XLR' connectors located on the Interface. NOTE: the input level requirements and output level range are contained within the product Specifications page of this manual.

SPECIFICATIONS *

CENTER TRACK TAPE FORMAT

Tape width	1/4 inch (6.30mm)
Track width	.0138 inch (0.35mm)
Track location	centered on tape center +/-.003 inch
Recording level	370 nWb/m equivalent sine wave rms

CODE STANDARDS

Auto recognition within 1 second

SMPTE/EBU (FRAMES PER SECOND)	30	(NON DROP FRAME)
	29.9	(DROP FRAME)
	25	(EBU)
	24	(FILM)

TIME CODE INPUT

Balanced Input	(Female 'XLR')
Input impedance	greater than 10k Ohms
Input level	100mV peak to peak Minimum
	2V peak to peak Nominal
	15V peak to peak Maximum

USER BIT OPTION SELECT INPUT

Shorting input to select option.

Open circuit voltage	less than 5Vdc
Short circuit current	less than 10mAdc

TIME CODE OUTPUT

Balanced Output	(Male 'XLR')
Output Impedance	600 Ohms
Output level, adjustable	100mV peak to peak Minimum
	2V peak to peak Nominal
	3V peak to peak Maximum

TIME CODE PLAYBACK

From 0.1 to 70 times the nominal speed.

TIME CODE PROCESSING

Processing and delay of the time code signal functions from 0.1 to 7 times the nominal speed.

CROSSTALK

Residual time code signal on either audio track below -80dB. (REF: .075 inch audio tracks on .159 centers mounted at center of tape within .003 inch)

* Product specifications are subject to change without notice.

INSTALLATION PROCEDURE

The following procedure should be followed carefully, step by step, and in sequence, to assure proper installation and operation of the Center Track Time Code System.

CENTER TRACK HEAD INTALLATION PROCEDURE

To install the SSI Center Track Time Code Head, proceed as follows:

Tools required:
- Allen wrench set
- Hot soldering iron
- Small amount of rosin core solder
- Small flat blade screwdriver
- Pair of Small needle nose pliers

1. Remove power from the ATR-100.

2. Remove head cover from transport by carefully lifting cover straight up.

3. Insert Allen wrench through center hole in head shield and turn spring loaded screw 1/4 turn clockwise to release head assembly. (figure 4)

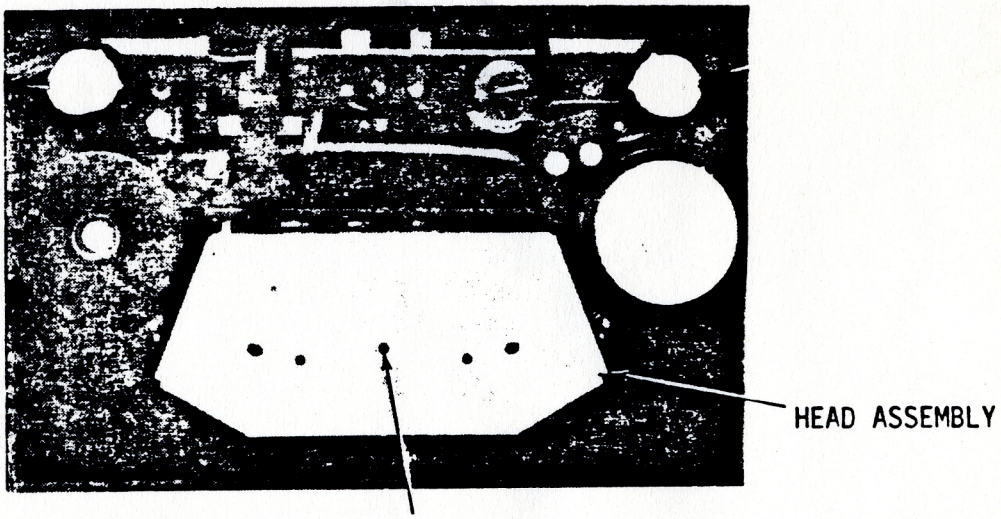


FIGURE 4

4. Carefully lift head assembly straight up from transport.

5. Remove the main head shield from the head assembly by removing four screws (figure 5) that secure the main shield to the base plate.

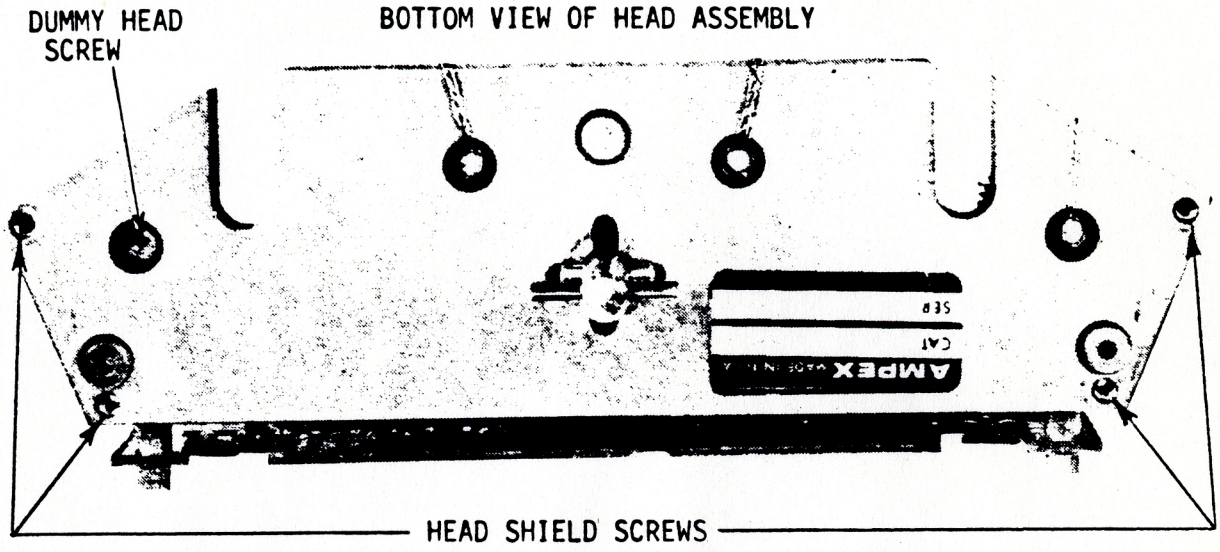


FIGURE 5

6. Remove dummy head post from base plate (figure 6) by removing screw from underside of head base plate (figure 5).

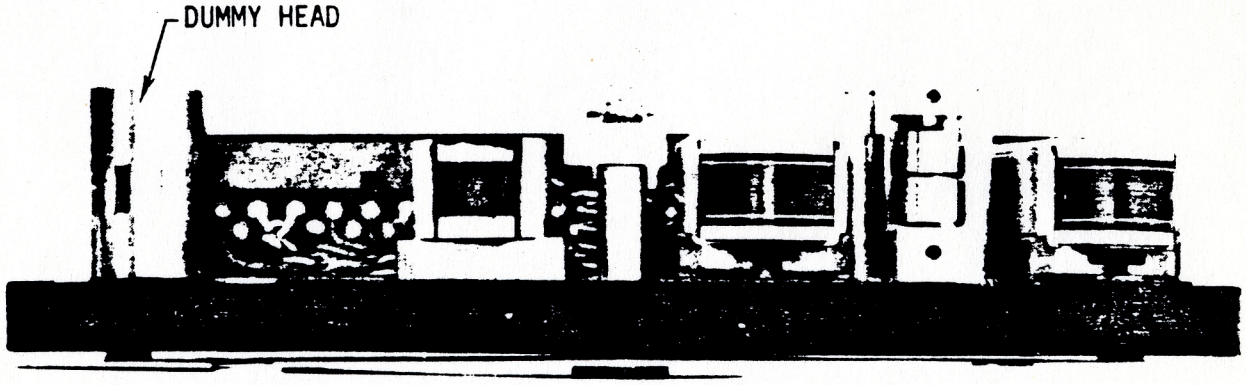


FIGURE 6

7. Clean off top surface of base plate throughout the area where the dummy head was previously removed using Kimwipe (or lint free cloth or tissue) moistened with isopropyl alcohol.

8. Carefully unplug the head connector from the Audio Erase head (figure 7).

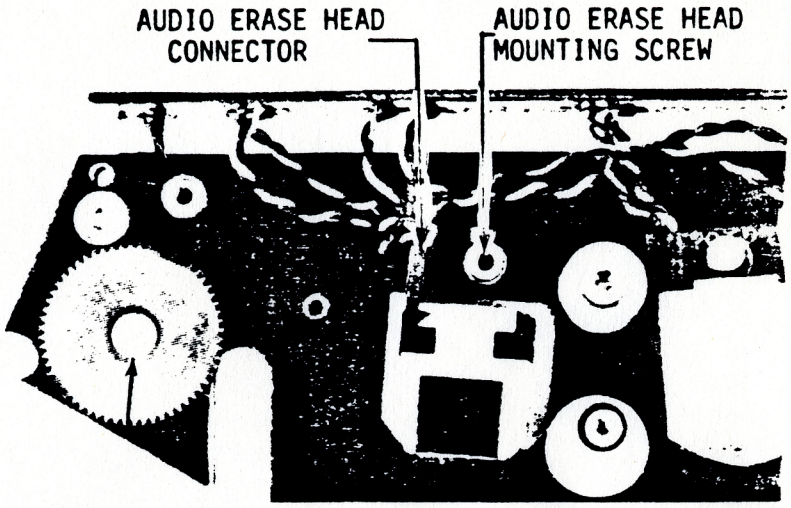


FIGURE 7

9. Remove Audio Erase head stack mounting screw and spring (figure 7).

10. Remove Audio Erase head by pressing the spring-loaded retaining pin (figure 8) from underside of head base plate, and carefully sliding head toward head connector PWA. Set erase head aside to be re-installed later.

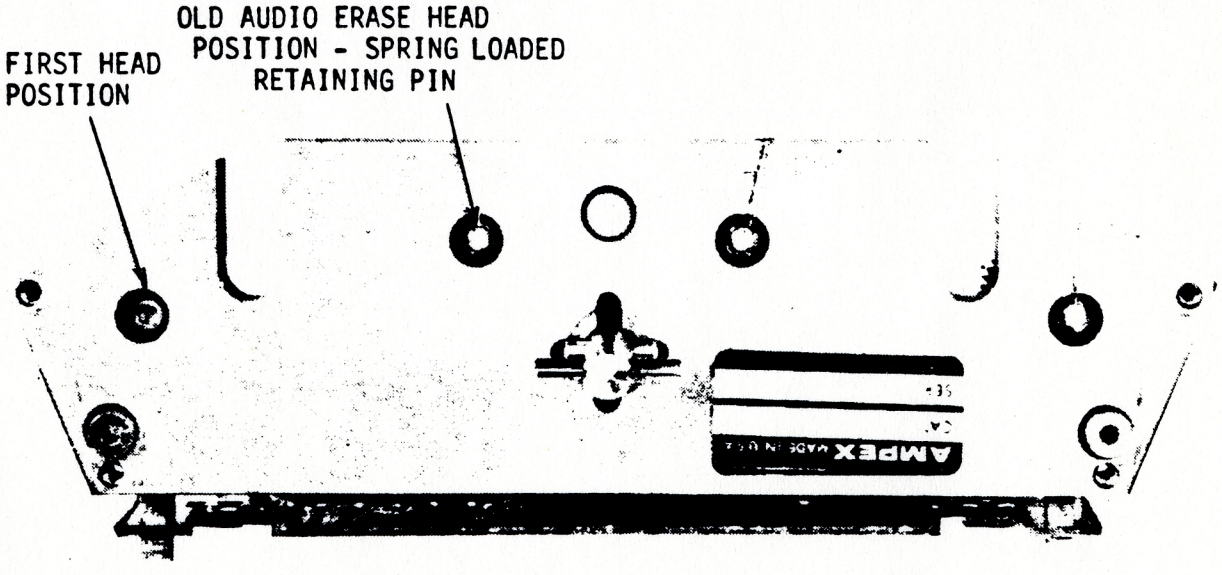


FIGURE 8

11. Remove azimuth gear from where audio erase head was installed by sliding the retaining ring off of the retaining pin (figure 9) and removing the retaining pin and spring from the hole in the base plate.

12. Re-install this azimuth gear into the first head position (where the dummy head was removed) (figure 7) by re-using the head retaining pin, spring and retaining rings (figure 9).

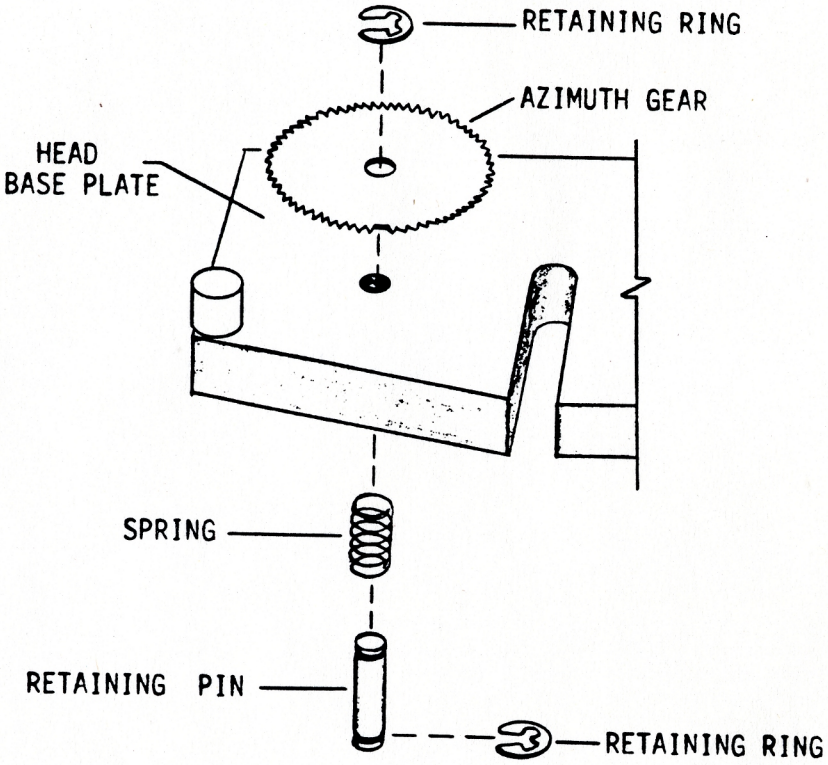


FIGURE 9

13. Remount Audio Erase head at first head position on base plate by pressing the spring-loaded pin (figure 8) from underside of head base plate, and carefully sliding head forward into place on the azimuth gear.

14. Reinstall head stack mounting screw and spring. Lightly tighten screw to fully compress spring, then turn screw one full turn counterclockwise to permit head azimuth to be adjusted.

15. Carefully reinstall Audio Erase head connector onto audio erase head (red wire towards top of head).

16. Carefully unplug head connectors from the Audio Record head (figure 10).

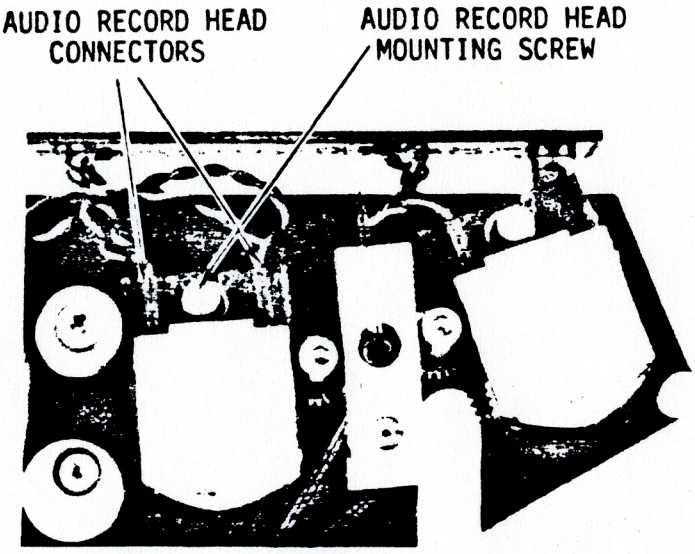


FIGURE 10

17. Remove Audio Record head stack mounting screw and spring (figure 10).

18. Remove Audio Record head by pressing the spring-loaded pin (figure 11) from underside of head base plate, and carefully sliding head toward head connector PWA.

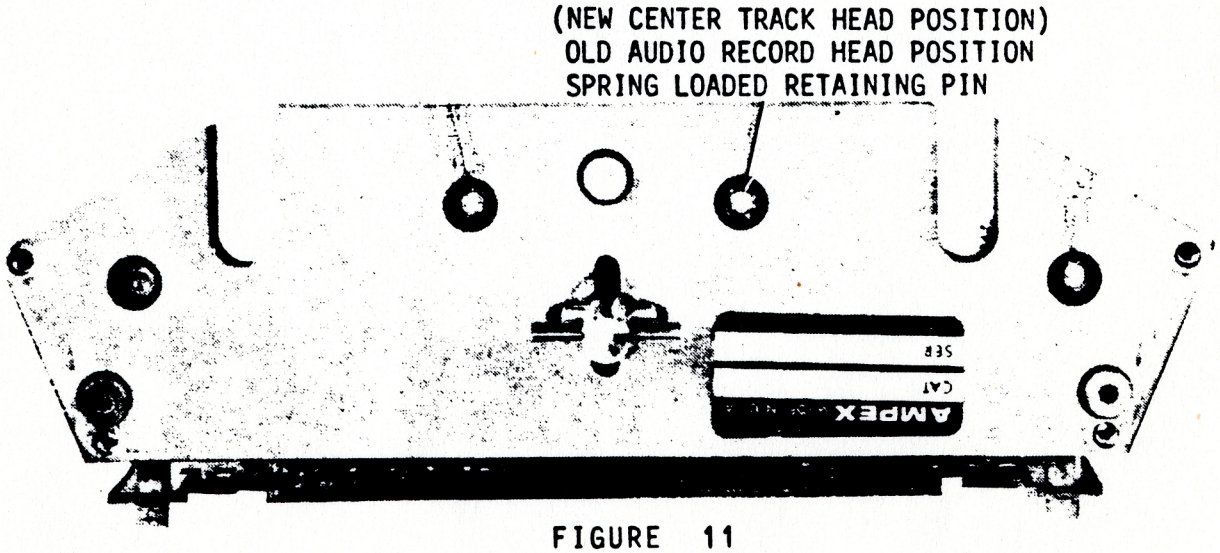


FIGURE 11

19. Remove azimuth gear from where audio record head was installed by sliding the retaining ring off of the retaining pin (figure 9) and removing the retaining pin and spring from the hole in the base plate.

20. Note the location of the scrape flutter idler in relation to the base plate. There are two small lines scratched into the base plate that indicate the proper position for the scrape flutter idler. After noting this position, carefully remove the scrape flutter idler by removing the screw from the top of the scrape flutter idler assembly (figure 12).

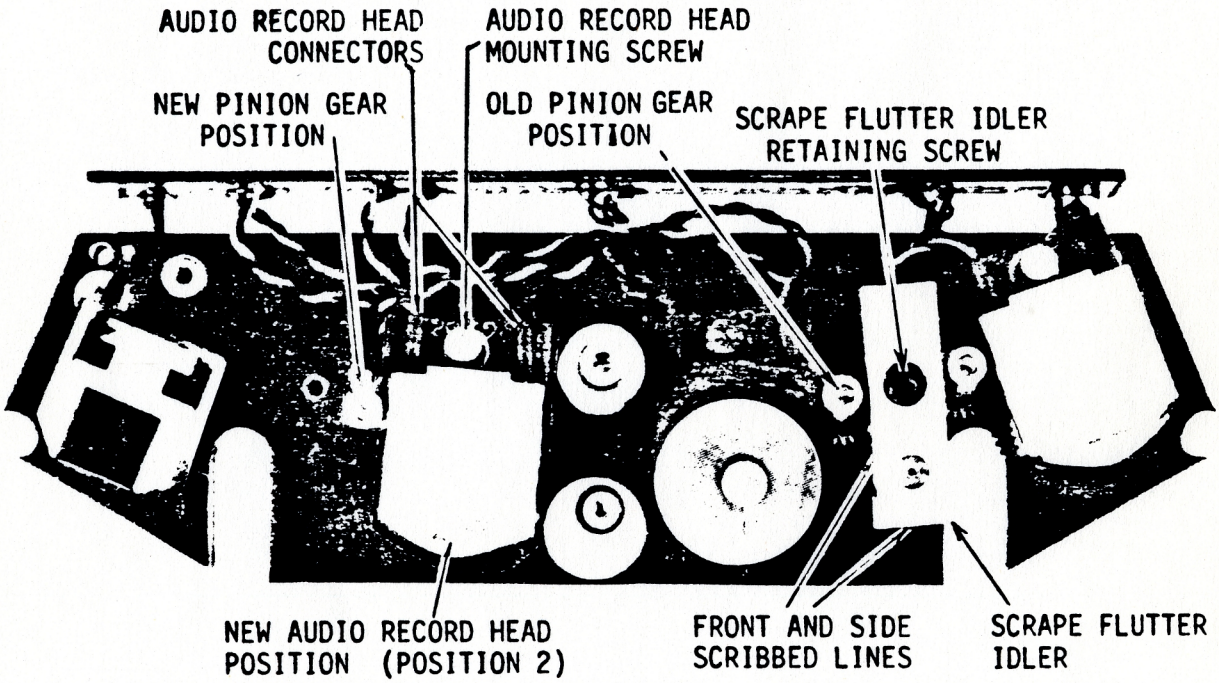


FIGURE 12

21. Remove the pinion gear assembly from its position by gently lifting straight upwards (figure 12).

22. Clean off top surface of base plate throughout the second head position area where the audio erase head was previously removed using a Kimwipe (or lint free cloth or tissue) moistened with isopropyl alcohol.

23. Re-install this azimuth gear into the second head position (from where the audio erase head was previously removed) (figure 7) by re-using the head retaining pin, spring and retaining rings.

24. Reinstall pinion gear assembly onto base plate (figure 12) for second head position.

25. Reinstall scrape flutter idler back to its original position relative to the lines scratched on the base plate (figure 12).

26. Remount Audio Record head at second head position by pressing spring-loaded pin (figure 12) and sliding head forward into place on the azimuth gear.

27. Reinstall head stack mounting screw and spring. Lightly tighten screw to fully compress spring, then turn one full turn counterclockwise to permit head azimuth to be adjusted (figure 12).

28. Carefully reinstall Audio Record head connectors (figure 12).

29. Solder jumper wire onto head connector PWA so as to short positions 'D', '4' and '10' (GROUND) together (figure 13).

30. Solder jumper wire onto head connector PWA so as to short positions 'P', '13' and '10' (GROUND) together (figure 13).

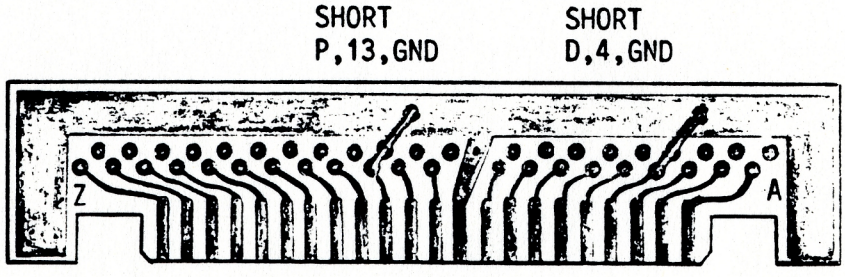


FIGURE 13

31. Solder the Longer pair of Center Track head wires (about 3 inches long) to head connector PWA as follows: (figure 14)

    'RED' wire to '5' (1)
    'BLACK' wire to 'E' (2)

32. Solder the Shorter pair of Center Track head wires (about 2 inches long) to head connector PWA as follows: (figure 14)

    'RED' wire to '14' (3)
    'BLACK' wire to 'R' (4)

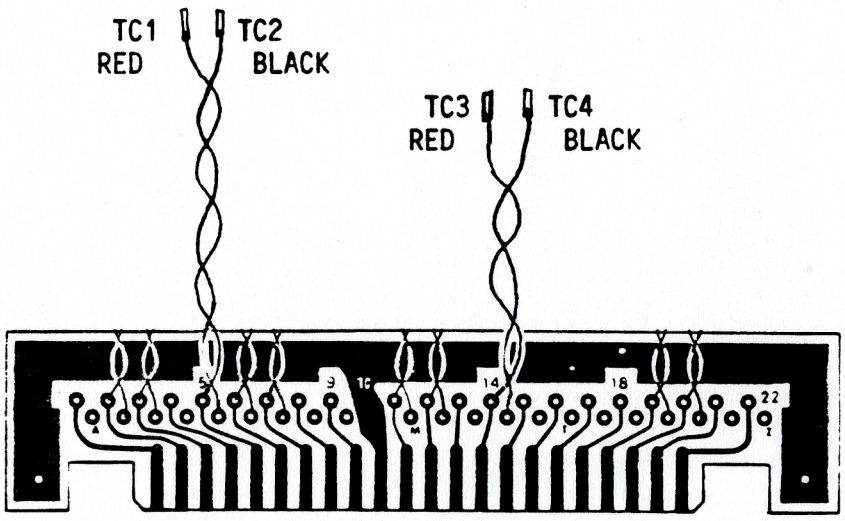


FIGURE 14

33. Clean off any flux residue left behind on the head connector PWA around solder joints.

34. Clean surfaces of third head position with Kimwipe moistened with isopropyl alcohol.

35. Install the center track head shim (not an azimuth gear, has no teeth) into the third head position using head retaining pin, spring and retaining rings (all provided) (same as in figure 9) by carefully snapping one retaining ring into groove at one end of retaining pin. Slip the end of retaining pin that does not yet have a retaining ring, through the spring and up

through the hole in the base plate from the underside. Using a small screwdriver, gently press the retaining pin up through the base plate and place the center track head shim over the exposed end of the retaining pin, now snap the second retaining ring into the grove on the retaining pin above the center track head shim. With the second retaining ring snapped into place, you can now release the pressure from the underside of the retaining pin.

36. Install Center Track head at third head position by pressing spring-loaded pin (figure 11) and sliding head into place on the head shim (figure 15).

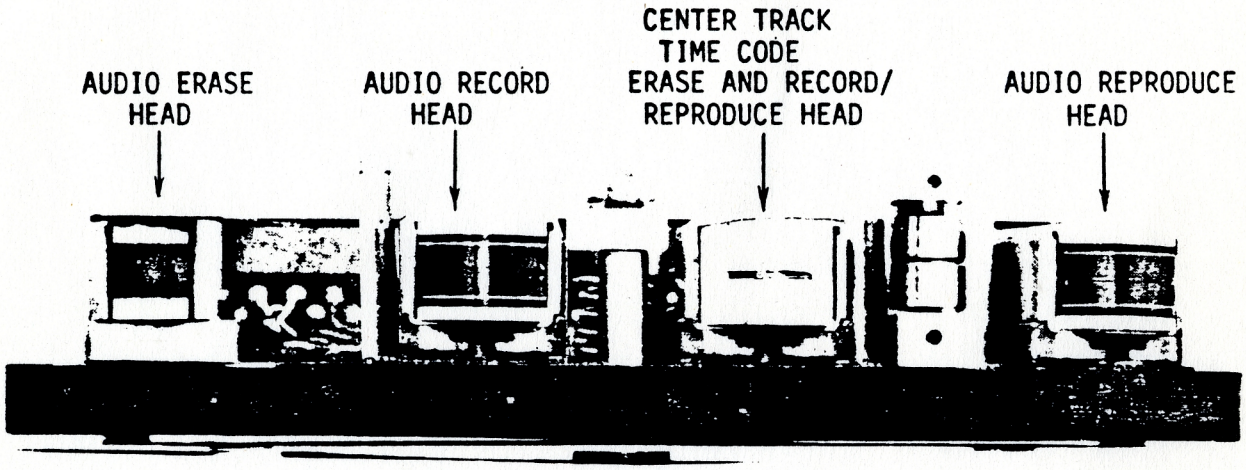


FIGURE 15

37. Install head stack mounting screw and spring (provided) into base plate thru hole at rear of center track head (figure 16). Center the head stack mounting screw in the rear mounting slot of the Center Track Head. Then tighten the head stack screw to fully compress spring.

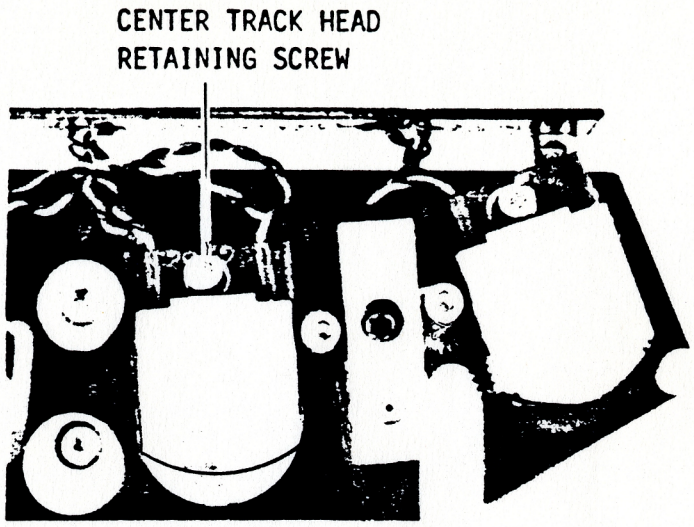


FIGURE 16

38. Carefully install Center Track Head (figure 17) to the connectors on the wires soldered in steps #31 and #32 bove.

Long RED wire from '5' to head pin '1'
Long BLACK wire from 'E' to head pin '2'

Short RED wire from '14' to head pin '3'
Short BLACK wire from 'R' to head pin '4'

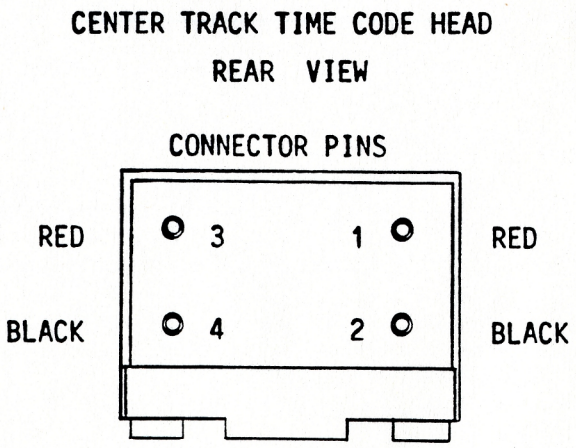


FIGURE 17

39. Reinstall main head shield using four screws removed in step #5 above (figure 5).

40. Install entire head assembly onto transport by carefully lowering head assembly over transport to mate the head centering pins on the transport into the bottom of the head assembly. Lower head assembly onto transport and fully mate the head connector PWA.

41. Lock the head assembly to the transport by inserting an Allen wrench through hole in center of head shield and turn spring-loaded screw 1/4 turn clockwise (figure 4).

42. Perform the appropriate record, reproduce and erase Head allignment procedures as given in the Maintenance section of the AMPEX ATR-100 manual.

MAIN BOARD INSTALLATION PROCEDURE

1. With power off, make sure that no boards exist in slots 3 and 4.

2. Check to see that all Jumpers are installed into the Main Time Code Board in their "NORMAL" operation positions. The Main Board comes from the factory with all jumpers installed in their "NORMAL" positions. These jumpers should only be changed when a special operation option is selected (see the Operation section of this manual) , or when testing and servicing the Main board (see the Maintenance section of this manual).

   JUMPER POSITIONS (figure 18)

   FACTORY PRESETS (NORMAL OPERATION)

JUMPER	J1	POSITION	A-B
	J2		A-B
	J3		A-B
	J4		A-B
	J5		A-B
	J6		A-B

3. Check to see that all eight positions of Dip Switch (switch SW4) are in thier "NORMAL" operation position. These switch positions should only be changed when a special User Bit option is to be selected (see Operation -User Bits- section of this manual), or when performing Self Diagnostics on the Main Board (see Maintenance section of this manual).

   DIP SWITCH POSITIONS (figure 18)

   FACTORY PRESETS (NORMAL OPERATION)

SWITCH	SW4-1	POSITION	OFF
	SW4-2		OFF
	SW4-3		OFF
	SW4-4		OFF
	SW4-5		OFF
	SW4-6		OFF
	SW4-7		OFF
	SW4-8		OFF

4. Place extender board onto Main Time Code board and insert into slot 4. Make sure that both the extender board and the Main Time Code board are fully seated into their mating connectors.

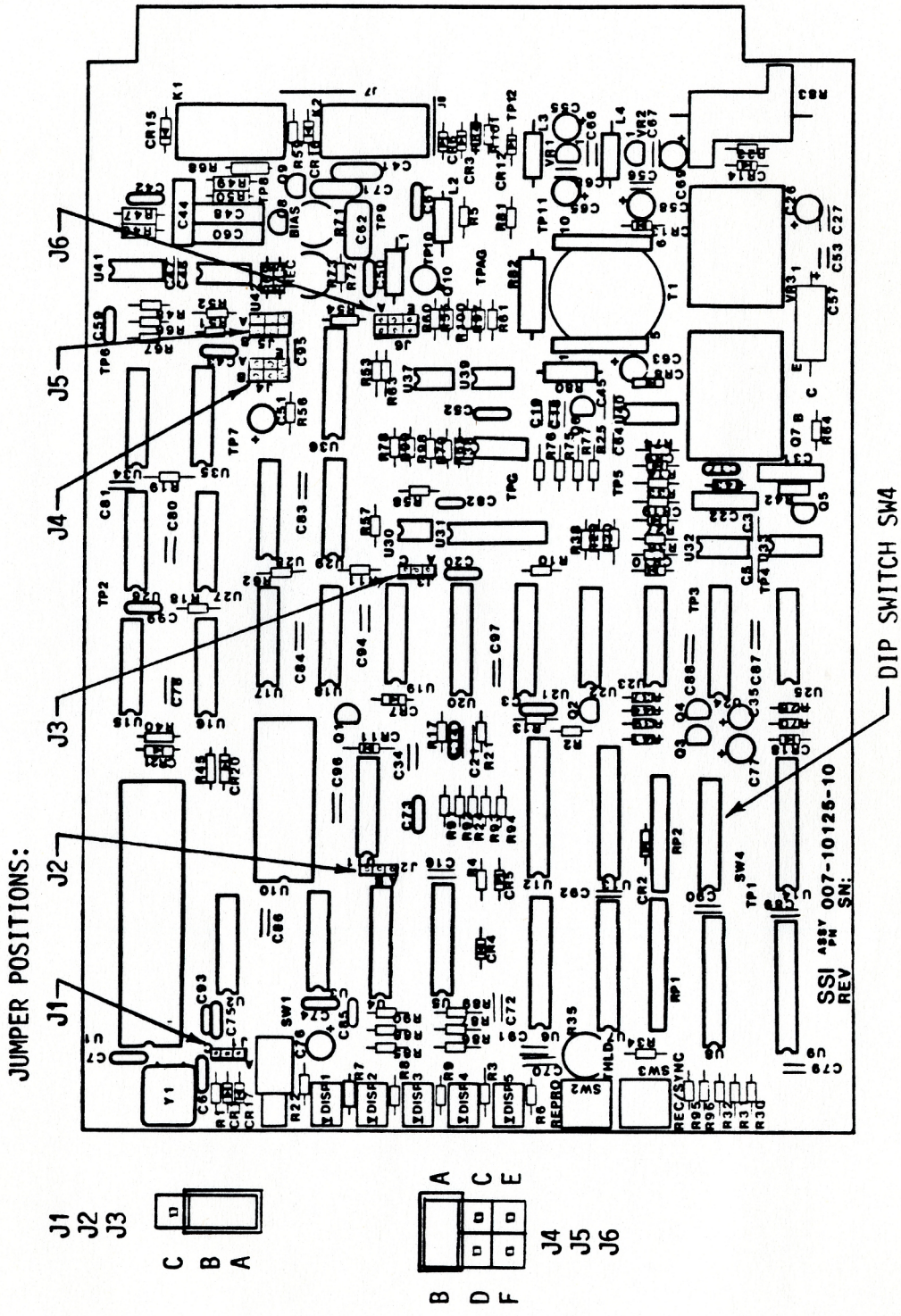

J6
J5
J4
J3
J2
J1
DIP SWITCH SW4
JUMPER POSITIONS:
J1
J2
J3
C
B
A
A
C
E
J4
J5
J6
B
D
F
SSI
REV
SN:

FIGURE 18

INPUT/OUTPUT INTERFACE INSTALLATION PROCEDURE

1. Route cable of Input/Output Interface through hole in rear of machine and connect to Input/Output connector J14 for channels 3 and 4 located below the capstan motor near front of transport (figure 19).

2. Use double sided tape to attach Interface box to a convenient spot on the rear of the transport.

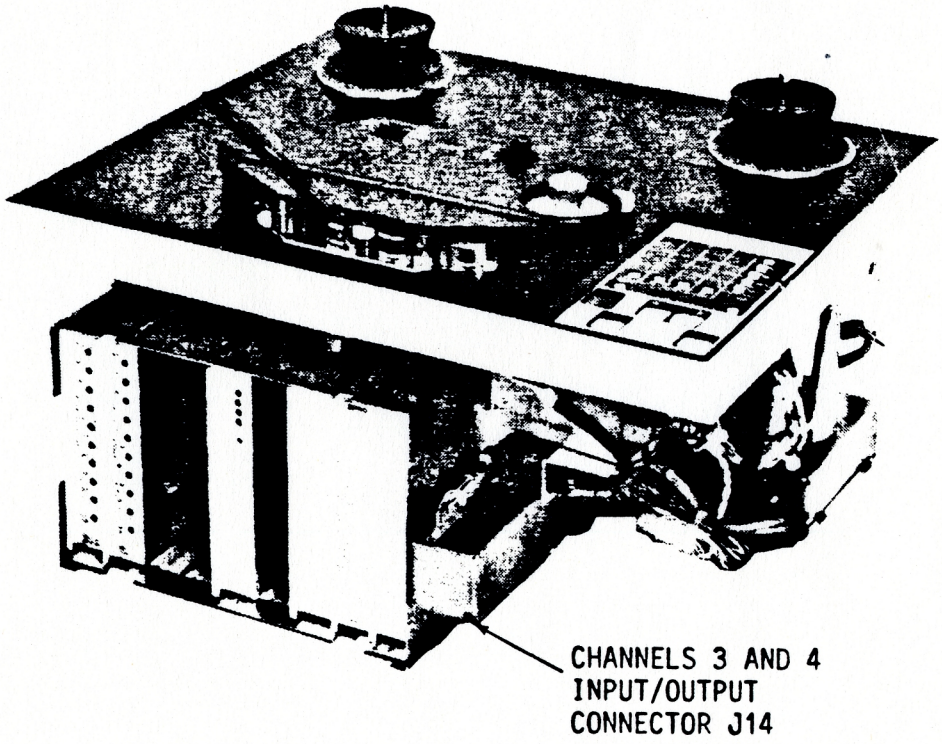


FIGURE 19

If any of the available User Bit Options are to be utilized (selected), a cable and and switch (not provided) must be connected to the Interface. This cable assembly consists of a 9-pin male mini 'D' connector, two or more conductor cable, and a shorting switch (figure 20). To select a User Bit Option, the switch is thrown, causing pin '1' and '2' of the 9-pin connector to short, and remain shorted until the User Bit Option is no longer desired (selected). The control voltage and current used in this circuit is less than 5 volts DC and less than 10mA.

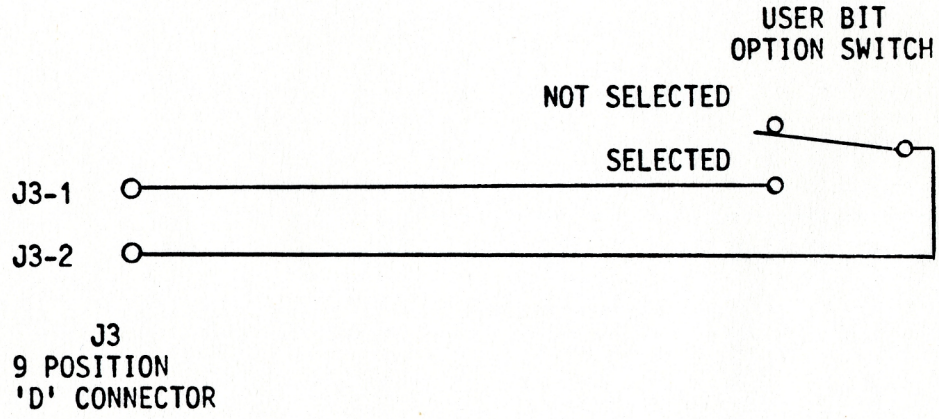


FIGURE 20

ALLIGNMENT AND CALIBRATION PROCEDURE

To realize the specified performance of this system, allignment and calibration procedures MUST be carefully performed initially upon completion of installation. They must also be performed after making any adjustments or replacements whatsoever to any one or more of these HEADS: Audio Record, Audio Reproduce, or Center Track; Also, whenever any service or repair has been performed on any ot the Main CTTC PC Board analog circuits.

First, a complete head allignment MUST be performed on the AUDIO heads. To perform this allignment, refer to AMPEX ATR-100 manual. This is required whenever there has been movement of the Audio heads. PERFORM THIS ALLIGNMENT NOW, PRIOR TO PROCEDING FURTHER.

The following procedures are to be followed in the same sequence as presented here in this manual to obtain optimal performance from the SSI Center Track Time Code System.

The following items are required for proper allignment and calibration of the CTTC System.

1. A synchronyzer with a Time Code generator and 2 channels of readers (master and slave).

2. An Oscilloscpe or AC Voltmeter with a bandwidth greater than 200kHz.

3. A small flat blade screw driver.

CENTER TRACK HEAD ALLIGNMENT PROCEDURE

1. The Center Track head is accurately alligned at the factory by control of precision ground conponents. The only adjustment that may be necissary after installation of the Center Track head is tangency. To allign the Center Track head, load a tape onto the transport and verify that the tape wrap against the head is centered so as to assure that both the erase gap and the read/write gap make conact with tape (figure 21). If adjustment is required, loosen the head retaining screw located at the rear of the Center Track head, and pivot the head until proper tape wrap is obtained, then re-tighten the head retaining screw.

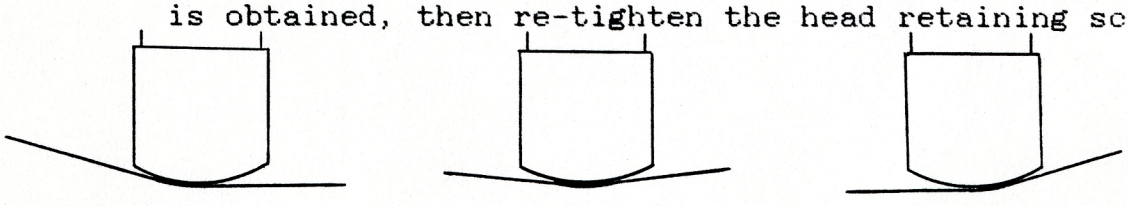


FIGURE 21

MAIN BOARD CALIBRATION PROCEDURE

1. Connect a Time Code Generator to the Input 'XLR' connector of the Input/Output Interface.

2. Connect a Time Code Reader to the Output 'XLR' connector of the Input/Output Interface.

3. With the Main Time Code Board installed onto the extender board, and both inserted into the fourth audio board slot of the transport, turn on the power to the ATR-100 while watching the LEDs on the front panel of the Main Time Code Board. The two yellow LEDs, DISP 2 and 3 (figure 22), should both light for about one second, and then extinguish. If this does not take place, or, if the two LEDs begin to flash, then proceed to the Maintenance & Diagnostics section of this manual.

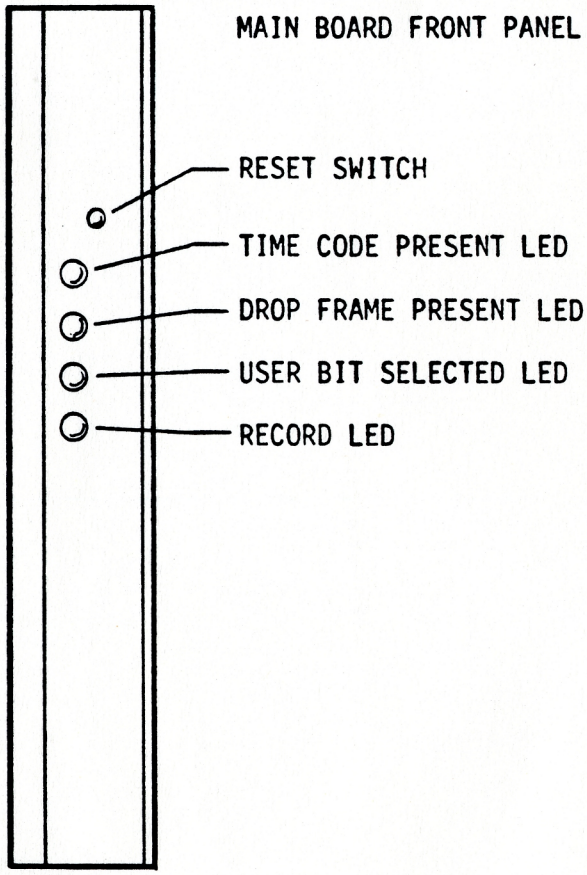


FIGURE 22

4. Select Input monitoring mode for the Time Code channel (channel 4) by simultaniously pressing the Input button and the channel 4 button on the ATR-100 control panel (figure 23). Turn on the power to the Time Code Generator now connected to the input of the Time Code Channel. The green LED (DISP 1) on the front panel of the Main Time Code board should light (figure 22), indicating that time code signal is present.

ATR-100 CONTROL PANEL

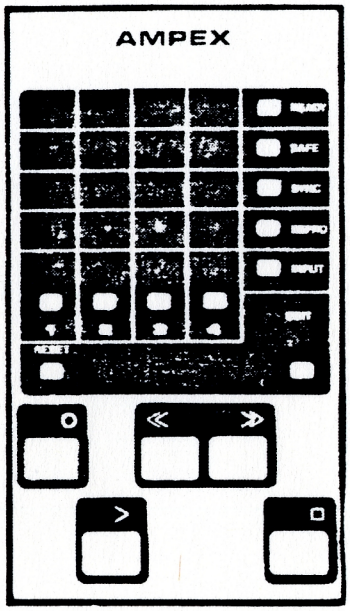
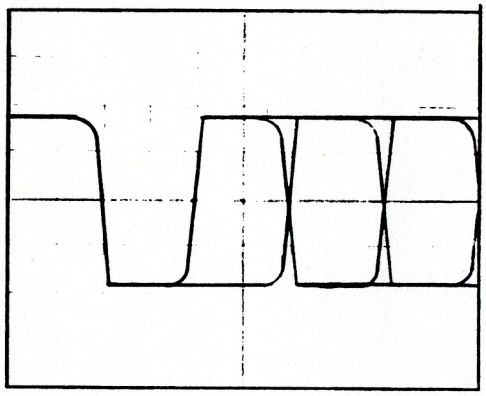


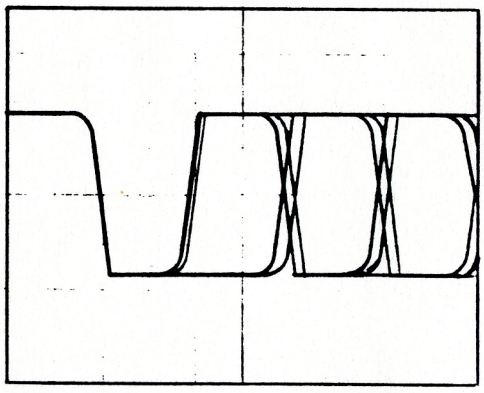
FIGURE 23

5. With a Time Code Reader or Synchronyzer connected to the Time Code channel output, Time Code coming from the Generator, passing through the Time Code channel electronics, should now be read by the Time Code Reader.

6. Load the prerecorded full track time code tape (provided) onto the transport. Connect a Synchronizer's Master channel reader input to one of the audio channel outputs (channel 1). Connect the Synchronizer's Slave channel reader input to the Center Track Time Code channel output. Place both the Audio channel being used (channel 1) and the Time Code channel (channel 4) into 'Reproduce'. Connect an oscilloscope to the lower side of resistor R54 (figure 25). While playing the full track time code tape and watching the scope, adjust the 'THRESHOLD' trim pot R35 (figure 25) for minimum jitter (figure 24) of the time code signal.



MINIMUM TIME CODE JITTER



EXCESSIVE TIME CODE JITTER

FIGURE 24

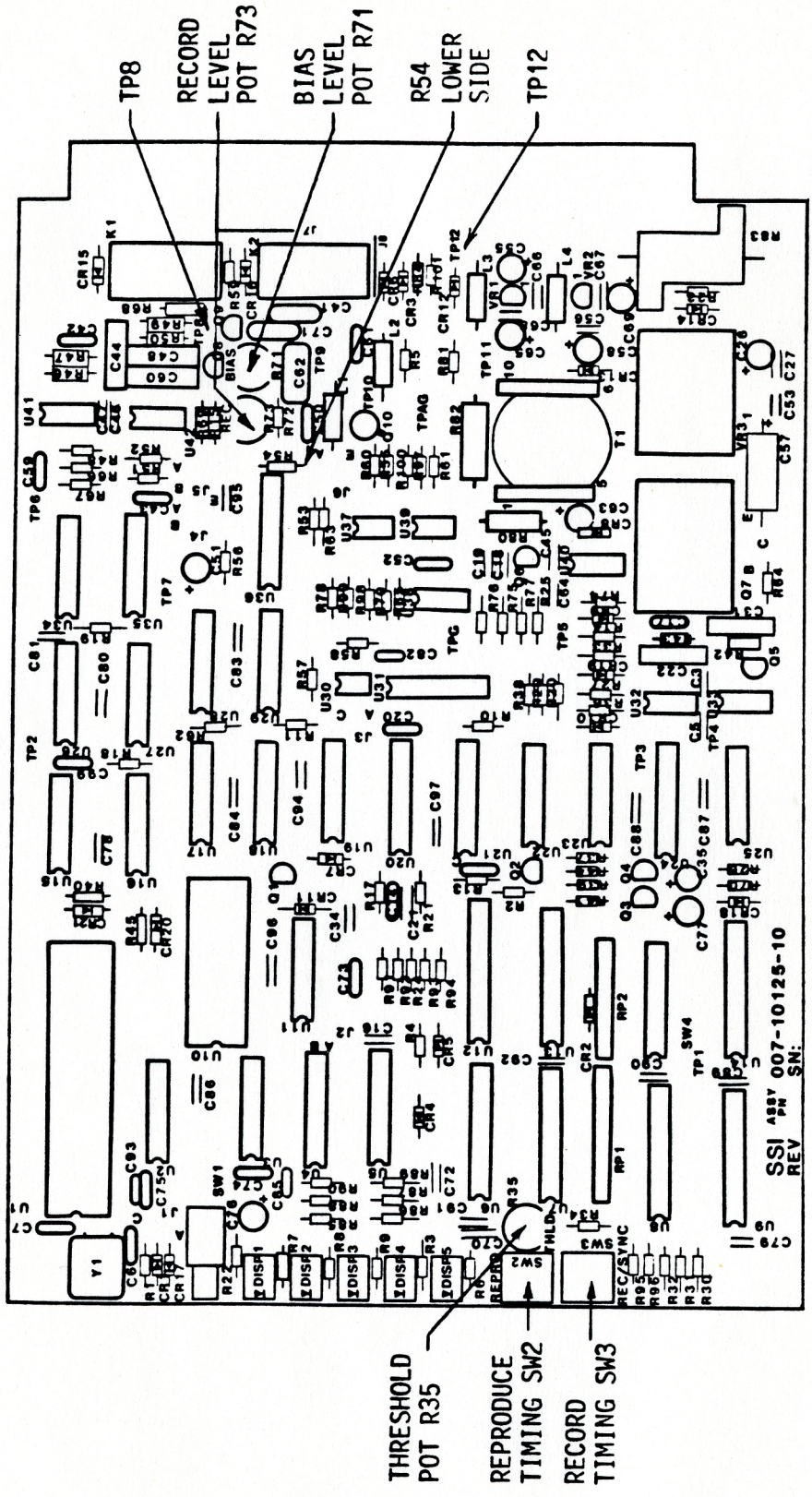

TP8
RECORD LEVEL POT R73
BIAS LEVEL POT R71
R54 LOWER SIDE
TP12
THRESHOLD POT R35
REPRODUCE TIMING SW2
RECORD TIMING SW3
SSI 007-10125-10

FIGURE 25

7. Connect oscilloscope to Test Point Eight, TP8 (figure 25). While playing the full track test tape, and with the time code channel in 'Reproduce' mode, measure the voltage at TP8 and make note of this voltage for future referance. (Should be between 70mV and 120mV peak to peak, or 44mV and 68mV rms.)

8. Place the synchronyzer into a mode where the error (difference) between the time code signal arriving at the master channel reader and the slave channel reader is displayed on the synchronizer. With both the audio channnel being used, and the Center Track Time Code channel into 'Reproduce'. Play the full track time code tape while watching the error signal on the synchronizer, adjust the 'REPRO' code delay fine adjustment switch, SW2 (figure 25) for minimun offset error.

9. Place both the audio channel being used, and the Center Track Time Code channel into 'Sync'. Play the full track time code tape while watching the error signal on the synchronizer, adjust the 'REC/SYNC' code delay/ advance fine adjustment switch, SW3 (figure 25) for minimum offset error.

10. Now remove the full track time code tape from the transport, and load a reel of blank tape for adjusting the Center Track BIAS and RECORD levels.

11. Because Time Code is a digital signal recorded onto and reproduced off of tape, bias and record levels are not nearly as critical as with analog signals. Thus the calibration procedure is much simpler. Connect an oscilloscope to Test Point twelve, TP12 (figure 25) 'Record Current'. Place Time code channel into 'Input' 'Record' mode. Disconnect time generator from input of Time Code channel. While recording tape and while watching scope, adjust 'BIAS' trim pot R71 for 800mV peak to peak (or to maximum sinusoidal waveform, without showing signs of saturation or distortion of sinusoidal waveform).

12. With Time Code Generator connected to the Time Code channel Input. Connect oscilloscope to Test Point eight TP8 (figure 25). Place Time Code channel into 'Ready' 'Sync' mode. Reset tape timer. With time code present at input of Time Code channel, record section of tape (about 20 seconds) with Center Track Time Code. Rewind the tape to the starting point of the section of tape just recorded. Play back that same section of tape while watching the oscilloscope. Take note of the peak to peak voltage waveform measured. If the voltage is less than that measured in step #7 above (about 140mV peak to peak), then turn 'RECORD' trim pot R73 (figure 25) clockwise slightly; if its less than that measured in step #7 above, then turn R73 counter-

clockwise slightly. Repeat the above process of adjusting R73, recording a section of tape, rewinding the tape, and measuring TP8 until the measured signal at TP8 is equal to that measured in step #7 above.

13. Turn OFF the power to the ATR-100, and disconnect the Main Time Code Board from slot 4 and the extender board. Reinstall the Time Code Board into slot 4 without the extender board.

INPUT/OUTPUT INTERFACE ADJUSTMENT PROCEDURE

1. Connect a Time Code generator to the input of the Time Code channel Input/Output Interface. Connect an oscilloscope across the Output of the Time Code channel 'XLR' connector (pin 3 to scope probe shield, and pin 2 to scope probe). With time code signal present at the input, and the Time Code channel in 'Input' monitoring mode, measure time code output signal with scope. The time code output waveform can be set to any desired level between 100mV and 3V peak to peak. The factory presets this level at 2V peak to peak. If you require a different level than that set by the factory, use a small screwdriver to adjust the level trim pot behind the hole in the side of the Input/Output Interface labeled 'OUTPUT LEVEL'.

This completes the allignment and adjustment procedure.

OPERATION

The SSI Center Track Time Code system is controlled from the ATR-100 control panel the same as if it were and audio channel. With the Main Time Code board installed in the fourth audio channel slot of the transport, control of channel four from the control panel equates to control of the Time Code Channel.

Coincidence of Time Code to Audio is maintained acurately only when both the Center Track head and electronics have been correctly installed and alligned, and when the proper operating procedures have been followed. The basic rule to remember when recording or reproducing time code on the Center Track, is that THE TIME CODE CHANNEL SHOULD BE TREATED JUST LIKE IT IS AN AUDIO CHANNEL. The way to keep time code coincident with audio, is the same way one would keep Audio in sync with Audio. The same way one would record, overdub, or reproduce audio in sync with audio with any multitrack recorder, is how one would record, overdub, or reproduce Time Code in sync (coincident) with Audio.

NORMAL OPERATING MODES

RECORDING TIME CODE

To record time code onto the center track, place the time code channel (channel 4) into 'Ready' 'Sync' mode by pressing the Ready and channel 4 buttons simultaneously, and pressing Sync and channel 4 buttons simultaneously on the ATR-100 control panel (figure 26).

ATR-100 CONTROL PANEL

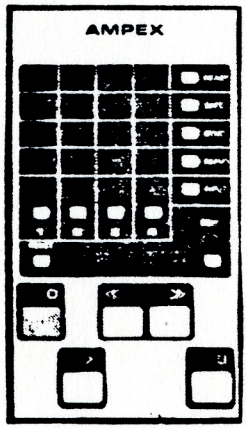


FIGURE 26

Whenever the time code channel is in 'Record' mode, it automatically switches to Input Monitoring mode. This takes place because of the fact that the Center Track Head actually is a Two-Head system. The one Center Track Head housing contains two gaps, one for Erase, and the other for Record or Reproduce functions. Because of this, there is no real Record Monitoring mode ('Record' 'Reproduce') off of tape while recording. Thus, if 'Record' and 'Reproduce' are simultaneously selected on the time code channel, the output being monitored is actually "INPUT", not "REPRODUCE". This does not create any limitations to the operation of the center track time code system, only an inconvenience when alligning record levels during calibration or adjustments.

REPRODUCING TIME CODE

To reproduce time code from the center track in sync with an audio channel which is in 'Reproduce' mode, place the time code channel (channel 4) into 'Reproduce' mode by pressing the Reproduce and channel 4 buttons simultaneously on the ATR-100 control panel.

To reproduce time code in sync with an audio channel which is in 'Sync' mode, place time code channel in 'sync' mode by pressing the Sync and channel 4 buttons simultaneously on the ATR-100 control panel.

FAST WIND

During fast wind, while in 'Reproduce' or 'Sync' modes, one can monitor time code off of tape by pressing the EDIT button on the ATR-100 control panel.

IMPORTANT. TO AVOID THE POSSIBILITY OF PRINT-THRU OF TIME CODE FROM THE CENTER TRACK ONTO AN AUDIO TRACK, ONLY USE THE SPOOLING MODE OF THE ATR-100 FOR ALL FAST WINDING OF TAPE. THE SPOOLING MODE PROVIDES UNIFORM TAPE PACK. THIS MODE IS ENTERED BY SIMULTANIOUSLY PRESSING THE PLAY AND FAST FORWARD BUTTONS FOR FORWARD SPOOL MODE, OR BY PRESSING THE PLAY AND REWIND BUTTONS SIMULTANIOUSLY FOR REWIND SPOOL MODE. THE GREEN PLAY INDICATOR WILL ILLUMINATE WHEN SPOOL SPEED IS OBTAINED.

If your synchronizer does not use the spool modes of the ATR-100 when shuttling tape, then you should contact the manufacturer of your synchronizer to see about modifying either the software, hardware or interface to make use of the spooling feature.

USER BIT OPTIONS

User bit options are selected when the User Bit Select line (PUB) goes low. This is done by shorting pin 1 to pin 2 of the 9 position 'D' user bit connector on the Input/Output Interface (less than 8 mili-Amps flow thru this circuit when this happens). The User Bit Option remains selected as long as these connections remain shorted together. An appropriate switch (not provided) should be installed in a convenient location for selection of these options.

User Bit Option 1

User bit option 1 is selected when the user bit select line (PUB) goes low, and switch SW4-7 is OFF. In this mode, the user bit data from the time code signal is processed as if it was time code, and the time code data from the time code signal is left alone.

User Bit Option 2

User bit option 2 is selected when the user bit select line (PUB) goes low, and switch SW4-7 is ON. In this mode, the user bit data of the time code signal is processed and relocated into the time code data position of the time code signal, and the time code data is not processed but relocated into the user bit data position of the time code signal.

Normal head cleaning procedures for the recorder should include cleaning of the Center Track Head just as often as cleaning the other heads (every 2 to 6 hours of use). Clean by gently rubing a cotton swab moistened with isopropyl alcohol over the face of the head. Alow head to completely dry before coming in contact with tape.

Visually check the tape path over the Center Track Head to ensure that there are no signs of uneven wear (indicating mis-allignment of heads or guides). Also check that BOTH the erase and read/write gaps of the Center Track Head are coming in contact with the tape. Both gaps must make contact with tape for proper operation. If the Center Track Head, or other heads and tape guides are not properly mounted and alligned, then proper tape-to-head position will not be maintained, thus preventing proper operation of the Center Track System. or causing crosstalk.

The various functions of the jumpers (shorting plugs) are described as follows:

JUMPER FUNCTIONS

JUMPER	POS	FUNCTION
J1	A-B	NORMAL OPERATION
J1	B-C	INHIBIT GETBYTE FUNCTION (NMI)
J2	A-B	NORMAL OPERATION
J2	B-C	INHIBIT WATCHDOG INTERRUPT (RESET)
J3	A-B	NORMAL OPERATION
J3	B-C	INHIBIT TOOFAST INTERRUPT (IRQ)
J4	A-B	NORMAL OPERATION
J4	C-D	INHIBIT PROCESSED TIME CODE OUTPUT TO MUX
J4	E-F	ENABLES PROCESSED TIME CODE OUTPUT TO MUX
J5	A-B	NORMAL OPERATION
J5	C-D	FORCES INPUT BYPASS TO OUTPUT
J5	E-F	FORCES PROCESSED TIME CODE TO OUTPUT
J6	A-B	NORMAL OPERATION
J6	C-D	FORCES INPUT ONLY
J6	E-F	FORCES TAPE ONLY

SELF DIAGNOSTICS

The functions for each of the active Dip Switch positions are defined as follows:

DIP SWITCH FUNCTIONS (SW4)

(0=OFF 1=ON x=DON'T CARE)

SWITCH POSITION 1 2 3 4 5 6 7 8	FUNCTION SELECTED
0 0 0 x x x 0 x	NORMAL OPERATION, USER BIT OPTION 1
0 0 0 x x x 1 x	NORMAL OPERATION, USER BIT OPRION 2
1 0 0 x x x x x	RAM TEST
0 1 0 x x x x x	ROM TEST
1 1 0 x x x x x	PORT TEST
0 0 1 x x x x x	STANDARD / SPEED TEST

RAM TEST

RAM TEST verifies the 128 bytes of internal RAM as functioning properly. To invoke this test, set SW4 switch positions as shown in the above table, then press RESET button SW1. The system will automatically test the internal RAM until either ROM TEST is selected, ot the RAM TEST switch position is changed and RESET button SW1 is pressed. During RAM TEST, both of the two yellow LEDs should be lit. If the two yellow LEDs start Flashing, then an error was detected.

ROM TEST

ROM TEST verifies that the data contained in the ROM has not been changed. It is invoked by setting SW4 switch positions as shown in the above table, then press the RESET button SW1. If no error was detected, the two yellow LEDs will remain lit. If an error was detected, the two yellow LEDs will flash.

PORT TEST

The PORT TEST requires that time code signal be present an the input, and a time code reader (with user bit data section of the time code signal selected to be displayed) connected to the output. Invoke PORT TEST by setting SW4 switch positions as shown in the above tabel, then press the RESET button SW1. Inserted into the user bit data secton of the time code signal appearing at the output, will appear various conditions of the input and output ports as described in the following table.

USER SECTION	PORT DATA
FRAMES	LS NYBBLE OF THE OUTPUT PORT
TEN FRAMES	MS NYBBLE OF THE OUTPUT PORT
SECONDS	LS NYBBLE OF THE MODSPDN REG
TEN SECONDS	MS NYBBLE OF THE MODSPDN REG
MINUTES	NYBBLE OF THE REPRODUCE OFFSET SWITCH SW2
TEN MINUTES	NYBBLE OF THE RECORD OFFSET SWITCH SW3
HOURS	LS NYBBLE OF THE DIAGNOSTIC REGISTER
TEN HOURS	MS NYBBLE OF THE DIAGNOSTIC REGISTER

STANDARD / SPEED TEST

The STANDARD / SPEED TEST requires time code signal be present at the input, and a time code reader (with the user bit data section of the time code signal selected to be displayed) connected to the output. Invoke STANDARD / SPEED TEST by setting SW4 switch positions as shown in the above table, then press RESET button SW1. Inserted into the user bit data section of the time code signal appearing at the output, will appear the following data in the respective positions as shown in the table below.

USER SECTION	DATA
FRAMES	SPEED LS NUMBER
TEN FRAMES	SPEED LS+1 NUMBER
SECONDS	SPEED LS+2 NUMBER
TEN SECONDS	SPEED MS NUMBER
MINUTES	FRAME STANDARD LS NUMBEER
TEN MINUTES	FRAME STANDARD MS NUMBER
HOURS	FRAME STANDARD 0=NDF F=DROP FRAME
TEN HOURS	FRAME STANDARD 0=NDF D=DROP FRAME

CENTER TRACK TIME CODE SYSTEM - PARTS LIST

000-10101 CTTC SYSTEM - SHIP KIT

1	000-10119	CTTC OPERATOR'S MANUAL
1	001-10125	CTTC MAIN PCA FINAL ASSY
1	001-10126	CTTC I/O FINAL ASSY
1	001-10130	1/4" CTTC HEAD INSTALLATION KIT
1	001-10135	1/4" FULL TRACK SMPTE TEST TAPE

CENTER TRACK HEAD INSTALLATION KIT - PARTS LIST

001-10130 1/4" CENTER TRACK HEAD INSTALLATION KIT

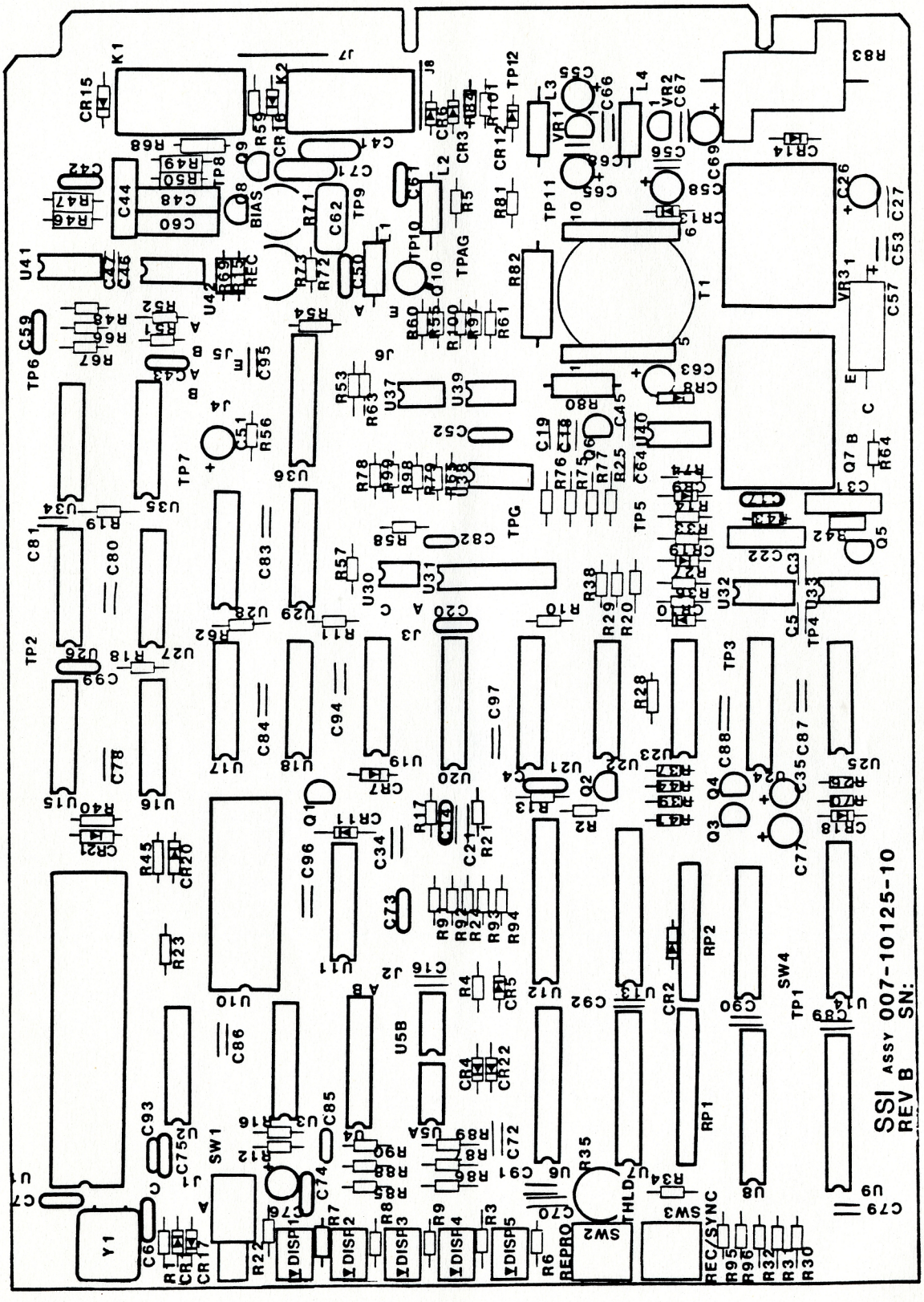
.....

1	001-10131	1/4" CENTER TRACK HEAD
1	001-10132	CENTER TRACK HEAD CABLE ASSY, 3"
1	001-10133	CENTER TRACK HEAD CABLE ASSY, 2"
1	842-10385-01	PIN, HEAD RETAINING
1	842-40018-02	SHIM, HEAD, CENTER TRACK
2	909-00010-01	WIRE, JUMPER, 1"
2	940-00250-01	SPRING, COMPRESSION
2	970-00125-01	RING, RETAINING
1	981-04040-11	SCREW, 4-40 X 1/2
1	996-00004-01	WASHER,FLAT, #4

ITEM	QTY	UM	PART NUMBER	DESCRIPTION	REF
1	1	EA	001-10120-10	CTTC SHIELD-HANDLE ASSEMBLY	
2	1	EA	008-10125-10	FAB B, BARE PCB, CTTC MAIN	
3	1	EA	114-20010-01	RES,FXD,1W,5%,1.0K OHMS	R82
4	1	EA	122-00010-01	RES,FXD,1/4W,5%,10 OHMS	R81
5	1	EA	122-00020-01	RES,FXD,1/4W,5%,20 OHMS	R42
6	1	EA	122-00047-01	RES,FXD,1/4W,5%,47 OHMS	R68
7	2	EA	122-10010-01	RES,FXD,1/4W,5%,100 OHMS	R61,84
8	2	EA	122-10027-01	RES,FXD,1/4W,5%,270 OHMS	R62,78
9	4	EA	122-10030-01	RES,FXD,1/4W,5%,300 OHMS	R6-9
10	1	EA	122-10039-01	RES,FXD,1/4W,5%,390 OHMS	R97
11	2	EA	122-10047-01	RES,FXD,1/4W,5%,470 OHMS	R57,100
12	2	EA	122-10062-01	RES,FXD,1/4W,5%,620 OHMS	R53,56
13	9	EA	122-20010-01	RES,FXD,1/4W,5%,1.0K OHMS	R21,33,49,50,55,
14			122-20010-01	RES,FXD,1/4W,5%,1.0K OHMS	R59,69,79,85
15	1	EA	122-20012-01	RES,FXD,1/4W,5%,1.2K OHMS	R45
16	2	EA	122-20022-01	RES,FXD,1/4W,5%,2.2K OHMS	R3,72
17	1	EA	122-20030-01	RES,FXD,1/4W,5%,3.0K OHMS	R87
18	16	EA	122-20047-01	RES,FXD,1/4W,5%,4.7K OHMS	R1,11,12,15,19,22,
19			122-20047-01	RES,FXD,1/4W,5%,4.7K OHMS	R23,25-27,48,58,
20			122-20047-01	RES,FXD,1/4W,5%,4.7K OHMS	R60,63,90,92
21	2	EA	122-20051-01	RES,FXD,1/4W,5%,5.1K OHMS	R24,65
22	1	EA	122-20062-01	RES,FXD,1/4W,5%,6.2K OHMS	R43
23	1	EA	122-20075-01	RES,FXD,1/4W,5%,7.5K OHMS	R70
24	16	EA	122-30010-01	RES,FXD,1/4W,5%,10K OHMS	R4,5,13,14,17,29
25			122-30010-01	RES,FXD,1/4W,5%,10K OHMS	R30,32,34,38,66,
26			122-30010-01	RES,FXD,1/4W,5%,10K OHMS	R74,75,77,94,101
27	1	EA	122-30011-01	RES,FXD,1/4W,5%,11K OHMS	R40
28	1	EA	122-30012-01	RES,FXD,1/4W,5%,12K OHMS	R88
29	1	EA	122-30018-01	RES,FXD,1/4W,5%,18K OHMS	R31
30	1	EA	122-30020-01	RES,FXD,1/4W,5%,20K OHMS	R54
31	1	EA	122-30022-01	RES,FXD,1/4W,5%,22K OHMS	R76
32	2	EA	122-30030-01	RES,FXD,1/4W,5%,30K OHMS	R47,86
33	3	EA	122-30033-01	RES,FXD,1/4W,5%,33K OHMS	R2,44,64
34	2	EA	122-30047-01	RES,FXD,1/4W,5%,47K OHMS	R10,51
35	1	EA	122-30051-01	RES,FXD,1/4W,5%,51K OHMS	R20
36	1	EA	122-30062-01	RES,FXD,1/4W,5%,62K OHMS	R18
37	1	EA	122-30091-01	RES,FXD,1/4W,5%,91K OHMS	R39
38	3	EA	122-40010-01	RES,FXD,1/4W,5%,100K OHMS	R16,89,96
39	1	EA	122-40022-01	RES,FXD,1/4W,5%,220K OHMS	R46
40	1	EA	122-40036-01	RES,FXD,1/4W,5%,360K OHMS	R41
41	1	EA	122-40039-01	RES,FXD,1/4W,5%,390K OHMS	R95
42	1	EA	122-40051-01	RES,FXD,1/4W,5%,510K OHMS	R98
43	1	EA	122-40056-01	RES,FXD,1/4W,5%,560K OHMS	R93
44	1	EA	122-50010-01	RES,FXD,1/4W,5%,1.0M OHMS	R52
45	1	EA	122-50020-01	RES,FXD,1/4W,5%,2.0M OHMS	R99
46	1	EA	122-50047-01	RES,FXD,1/4W,5%,4.7M OHMS	R91
47	4	EA	122-60010-01	RES,FXD,1/4W,5%,10M OHMS	R28,36,37,67
48	1	EA	123-90056-01	RES,FXD,1/2W,5%,5.6 OHMS	R80
49	1	EA	160-00012-01	RES,FXD,10W,5%,10 OHMS	R83
50	2	EA	170-30010-09	RES,PAK,10-P SIP,10K OHMS X 9	RP1,2

ITEM	QTY	UM	PART NUMBER	DESCRIPTION	REF
51	1	EA	185-30010-01	RES,VAR,TRIM POT,10K OHMS	R73
52	1	EA	185-30020-01	RES,VAR,TRIM POT,20K OHMS	R35
53	1	EA	185-30050-01	RES,VAR,TRIM POT,50K OHMS	R71
54	2	EA	202-30010-01	CAP, CER,0.01UF	C34,64
55	36	EA	202-40010-01	CAP, CER,0.10UF	C3,5,16,18,19,27
56			202-40010-01	CAP, CER,0.10UF	C45-47,52,53,56
57			202-40010-01	CAP, CER,0.10UF	C66-68,72,78-97
58	3	EA	202-50010-01	CAP, CER,1.0UF	C73,74,75
59	1	EA	202-50022-01	CAP, CER,2.2UF	C59
60	1	EA	210-00100-35	CAP,ELECT,100 UF 35V	C57
61	1	EA	220-50056-01	CAP,TANT,DIP,5.6 UF 25V	C35
62	8	EA	220-60010-01	CAP,TANT,DIP,10 UF 35V	C26,51,55,58,65,
63			220-60010-01	CAP,TANT,DIP,10 UF 35V	C69,76,77
64	1	EA	220-60015-01	CAP,TANT,DIP,15 UF 25V	C63
65	2	EA	232-00018-01	CAP,MICA,18PF	C6,7
66	1	EA	232-00022-01	CAP,MICA,22PF	C43
67	2	EA	232-00047-01	CAP,MICA,47PF	C41,42
68	1	EA	232-00082-01	CAP,MICA,82PF	C17
69	1	EA	232-10016-01	CAP,MICA,160PF 1%	C50
70	1	EA	232-10018-01	CAP,MICA,180PF	C99
71	3	EA	232-10020-01	CAP,MICA,200PF	C4,14,21
72	1	EA	232-10033-01	CAP,MICA,330PF	C20
73	1	EA	232-10039-01	CAP,MICA,390PF	C71
74	1	EA	232-10082-01	CAP,MICA,820PF	C70
75	1	EA	232-10091-01	CAP,MICA,910PF	C61
76	1	EA	232-20024-01	CAP,MICA,2400PF	C62
77	2	EA	240-20010-01	CAP,MYLAR,0.0010 UF	C22,60
78	1	EA	240-20022-01	CAP,MYLAR,0.0022 UF	C31
79	1	EA	240-20068-01	CAP,MYLAR,0.0068 UF	C48
80	1	EA	240-30010-01	CAP,MYLAR,0.010 UF	C44
81	5	EA	300-14004-01	DIODE, SIL, 1N4004	CR12-16
82	12	EA	302-10914-01	DIODE, SIL, 1N914	CR1,7-11,17-22
83	5	EA	303-10270-01	DIODE, GER, 1N270	CR2-6
84	1	EA	310-22222-01	TRANS, 2N2222	Q10
85	5	EA	310-23904-01	TRANS, 2N3904	Q1,2,3,5,6
86	1	EA	310-23906-01	TRANS, 2N3906	Q4
87	1	EA	312-04409-01	TRANS, D44C9	Q7
88	2	EA	318-01086-01	TRANS, FET P1086E	Q8,9
89	1	EA	360-00002-02	LED, RED	DISP4
90	2	EA	360-00002-04	LED, YELLOW	DISP2,3
91	1	EA	360-00002-05	LED, GREEN	DISP1
92	1	EA	360-00003-02	LED, RED, SMALL	DISP5
93	3	EA	370-00001-01	OPTO, ISOLATOR, 4N28	U30,37,39
94	1	EA	420-03405-01	IC, V-REG, +5V LM340T-5	VR3
95	1	EA	420-07815-02	IC, V-REG, +15V LM78L15	VR2
96	1	EA	420-07915-02	IC, V-REG, -15V LM79L15	VR1
97	1	EA	430-00072-01	IC, LIN, OP-AMP TL072	U33
98	1	EA	430-05532-01	IC, LIN, OP-AMP NE5532	U41
99	4	EA	431-00311-01	IC, LIN, COMP LM311N	U5A,5B,38,42
100	1	EA	431-00339-01	IC, LIN, COMP QUAD LM339N	U22

ITEM	QTY	UM	PART NUMBER	DESCRIPTION	REF
101	1	EA	433-00398-01	IC, LIN, OP-AMP LF398N	U32
102	2	EA	450-00000-03	IC, DIG, 74LS00 TTL	U19,26
103	2	EA	450-00000-08	IC, DIG, 74C00 CMOS	U15,35
104	1	EA	450-00004-03	IC, DIG, 74LS04 TTL	U2
105	1	EA	450-00004-08	IC, DIG, 74C04 CMOS	U3
106	1	EA	450-00008-03	IC, DIG, 74LS08 TTL	U16
107	2	EA	450-00021-03	IC, DIG, 74LS21 TTL	U18,29
108	3	EA	450-00074-03	IC, DIG, 74LS74 TTL	U23,25,31
109	2	EA	450-00074-08	IC, DIG, 74C74 CMOS	U11,27
110	1	EA	450-00086-08	IC, DIG, 74C86 CMOS	U34
111	1	EA	450-00138-03	IC, DIG, 74LS138 TTL	U4
112	1	EA	450-00153-03	IC, DIG, 74LS153 TTL	U36
113	1	EA	450-00157-03	IC, DIG, 74LS157 TTL	U24
114	2	EA	450-00164-08	IC, DIG, 74C164 CMOS	U17,28
115	2	EA	450-00221-03	IC, DIG, 74LS221 TTL	U20,21
116	3	EA	450-00240-08	IC, DIG, 74C240 CMOS	U6,7,13
117	1	EA	450-00323-03	IC, DIG, 74LS323 TTL	U9
118	1	EA	450-00374-03	IC, DIG, 74LS374 TTL	U12
119	2	EA	450-00568-03	IC, DIG, 74LS568 TTL	U8,14
120	1	EA	455-03612-01	IC, LIN, S-HOLD DS3612N	U40
121	1	EA	460-06802-03	IC, MPU, 68B02	U1
122	1	EA	473-02732-03	IC, MEM, EPROM, 2732, <200NS	U10
123	2	EA	530-00001-01	INDUCTOR, CHOKE, FERRITE	L3,4
124	1	EA	530-20068-01	INDUCTOR, AXL, 6800UH	L1
125	1	EA	530-90047-01	INDUCTOR, AXL, 4.7UH	L2
126	1	EA	550-00001-01	TRANSFORMER, 2:1	T1
127	1	EA	590-08000-01	XTAL, 8.0MHZ	Y1
128	3	EA	601-00001-03	CONNECTOR, PINS, 1X3 SIP	J1-3
129	3	EA	601-00002-06	CONNECTOR, PINS, 2X3 DIP	J4-6
130	6	EA	602-00002-01	JUMPER PLUG, 2-POS DIP SHUNT	J1-6
131	1	EA	610-00024-01	SOCKET, IC, 24-P DIP	U10
132	1	EA	610-00040-01	SOCKET, IC, 40-P DIP	U1
133	1	EA	673-00001-01	SWITCH, PUSHBUTTON, SPST	SW1
134	1	EA	678-00008-01	SWITCH, 8-POS DIP	SW4
135	2	EA	678-00016-01	SWITCH,ROTARY DIP,16-POS	SW2,3
136	2	EA	690-00022-01	RELAY,DPDT,24V, A DS2EM-DC24V	K1,2
137	15	EA	710-00001-01	TEST POINT, A S 7-815-31BT	TP1-12,TPG,TPAG
138	4	IN	900-00022-01	WIRE,BARE,22 AWG TINNED COPPR	J7,J8,R83
139	2	IN	910-00022-01	TUBING,TEFLON,22 AWG	J7,J8,C57
140	2	EA	921-00003-01	HEAT SINK, TO-220	Q7,VR3
141	1	EA	921-00004-01	HEAT SINK, TO-220, TOP	VR3
142	A/R	OZ	921-90000-01	HEAT SINK COMPOUND	Q7,VR3
143	2	EA	990-00256-08	SCREW,PHPH,2-56 X 1/2	R83
144	2	EA	990-00632-06	SCREW,PHPH,6-32 X 3/8	Q7,VR3
145	4	EA	995-00256-02	NUT,HEX,SP,2-56	R83
146	2	EA	995-00632-01	NUT,HEX,6-32	Q7,VR3
147	8	EA	996-00002-01	WASHER,FLAT,#2	R83
148	2	EA	996-00002-02	WASHER,LOCK,SPLIT,#2	R83
149	2	EA	996-00006-03	WASHER,LOCK,INT,#6	Q7,VR3



SSI MAIN CENTER TRACK TIME CODE CIRCUIT BOARD ASSEMBLY

COMPONENT LOCATIONS

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
4	PRELIMINARY	2/26/85	
A	PROTOTYPE	2/26/85	
A1	ECO: R1,12,16,23,RESET,U2-5,U19-12,C4	8/5/85	
B	ECO 101,102,103,104 : CR22,R83,83.6	7/29/86	

GETBYTE
TOOFAST
MODSPDN
POWER DOWN
"RESET" PUSH BUTTON S1
WATCHDOG
CR17
THUMB WHEEL SWITCHES
RP1 10K SIP
RP2 10K SIP
OFFSET
TAPE/TAPE
DIAGNOST
DISP3 USER BITS (YEL)
DISP2 DROP FRAME (YEL)
TO PAGE 2
GET BYTE
TOO FAST
DATA BUS
READWORD
COUNT
LOAD
RESTCP
GETBYTE INHIBIT
TAPE OUT INHIBIT
MONITOR SWITCH
TAPE / INPUT
RECORD DATA
GOODFRAME
REV/FWD
TOO SLOW
OUTPUT
PUB
PUB GND
SSA
SSB
SYNC/REPRO
SAFE/RECORD
BIAS
BIAS GND
+24v
GROUND
-24v
TAPE / TAPE
BCS
CR22
CR18
RESET
POWER UP
RAMP
BCS
RECORD DATA
RECORD HD
RECORD HD GND
"REC LEVEL"
"BIAS"
ERASE HEAD
DIGITAL GND
ANALOG GND
TPG
L3 FERRITE CHOKE
L4 FERRITE CHOKE

NOTES:
1. ALL RESISTORS ARE 1/4W 5% CARBON FILM TYPE UNLESS OTHERWISE NOTED. ALL VALUES ARE SHOWN IN OHMS.
2. ALL CAPACITOR VALUES ARE SHOWN IN MICROFARADS, AND CERAMIC MONOLITIC 50V 20% UNLESS OTHERWISE NOTED.
3. ALL DIODES ARE IN4148 TYPE UNLESS OTHERWISE NOTED.

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APPROVALS	DATE	STRATEGIC SOUND INC.	
DRAWN	1/2/85	-SCEMATIC-	
CHECKED		CENTER TRACK TIME CODE - MAIN PCB	
		SIZE	DRAWING NO. 009-10125-10 REV B
		PAGE 45	SHEET 1 OF 2

BISHOP GRAPHICS, INC. REORDER NO. 30623

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	SEE PAGE 1		

TO PAGE 1

GET BYTE
TOO FAST
DATA BUS
READ WORD
COUNT
LOAD
RESTCP
GET BYTE INHIBIT
TAPEOUT INHIBIT
MONITOR SWITCH
TAPE/INPUT
RECORD DATA
GOOD FRAME
REV/FWD
TOO SLOW

RECORD HD
RECORD HD GND
RECORD / PLAY HEAD
SHLD
TIME CODE IN

TIME CODE OUT
SHLD

DISP 1 TIME CODE PRESENT (GRN)
DISP 5 TOO FAST (RED)

TOO SLOW
TOO FAST
MONITOR SWITCH
RECORD DATA
TIME CODE IN
TAPE OUT INHIBIT
GOODFRAME
RESTCP
REV/FWD
SYNC
COUNT
READWORD
LOAD
FWD/REV
DATA
NRZ DATA
Φ1 CLOCK
Φ2 CLOCK
THRESHOLD

IC	+5V	GND	.1	IC	+5V	GND	.1	IC	+5V	GND	.1	IC	+5V	GND	.1
U1	8	21,1	C93	U10	24	12	C86	U18	14	7	C84	U27	14	7	C80
U2	14	7	C93	U11	14	7	C96	U19	14	7	C94	U28	14	7	C83
U3	14	7	C86	U12	20	10	C91	U20	16	8	C97	U29	14	7	C83
U4	16	8	C85	U13	20	10	C92	U21	16	8	C97	U31	14	7	C82
U6	20	10	C91	U14	20	10	C89	U23	14	7	C88	U34	14	7	C81
U7	20	10	C92	U15	14	7	C78	U24	16	8	C88	U35	14	7	C81
U8	20	10	C79	U16	14	7	C78	U25	14	7	C87	U36	16	8	C95
U9	20	10	C79	U17	14	7	C84	U26	14	7	C80	U40	8	4	C45

UN-USED

U34 (74C86) · U15 (74C00) · U33 (TL072) · U2 (74LS04) · U23 (74LS74) · U21 (74LS221)

LAST USED	
R101	L4
C77	SW4
Q10	TP12
CR22	J6
U42	T1
VR3	K2
Y1	DISP 5

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STRATEGIC SOUND INC.

-SCHEMATIC-

CENTER TRACK TIME CODE - MAIN PCB

APPROVALS	DATE
DRAWN	1/3/85
CHECK	

SIZE | DRAWING NO. 009-10125-10 | REV B

PAGE 46

DO NOT SCALE DRAWING | SHEET 2 OF 2

BISHOP GRAPHICS, INC. REORDER NO. 70025

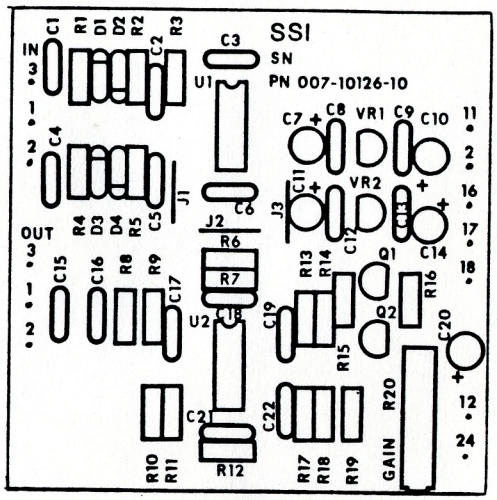
STRATEGIC SOUND, INC. CTTC INPUT/OUTPUT ENCLOSURE, TOP ASSEMBLY

B.O.M. 001-10126-10 REV B 10-8-86 SHEEET 1 OF 2

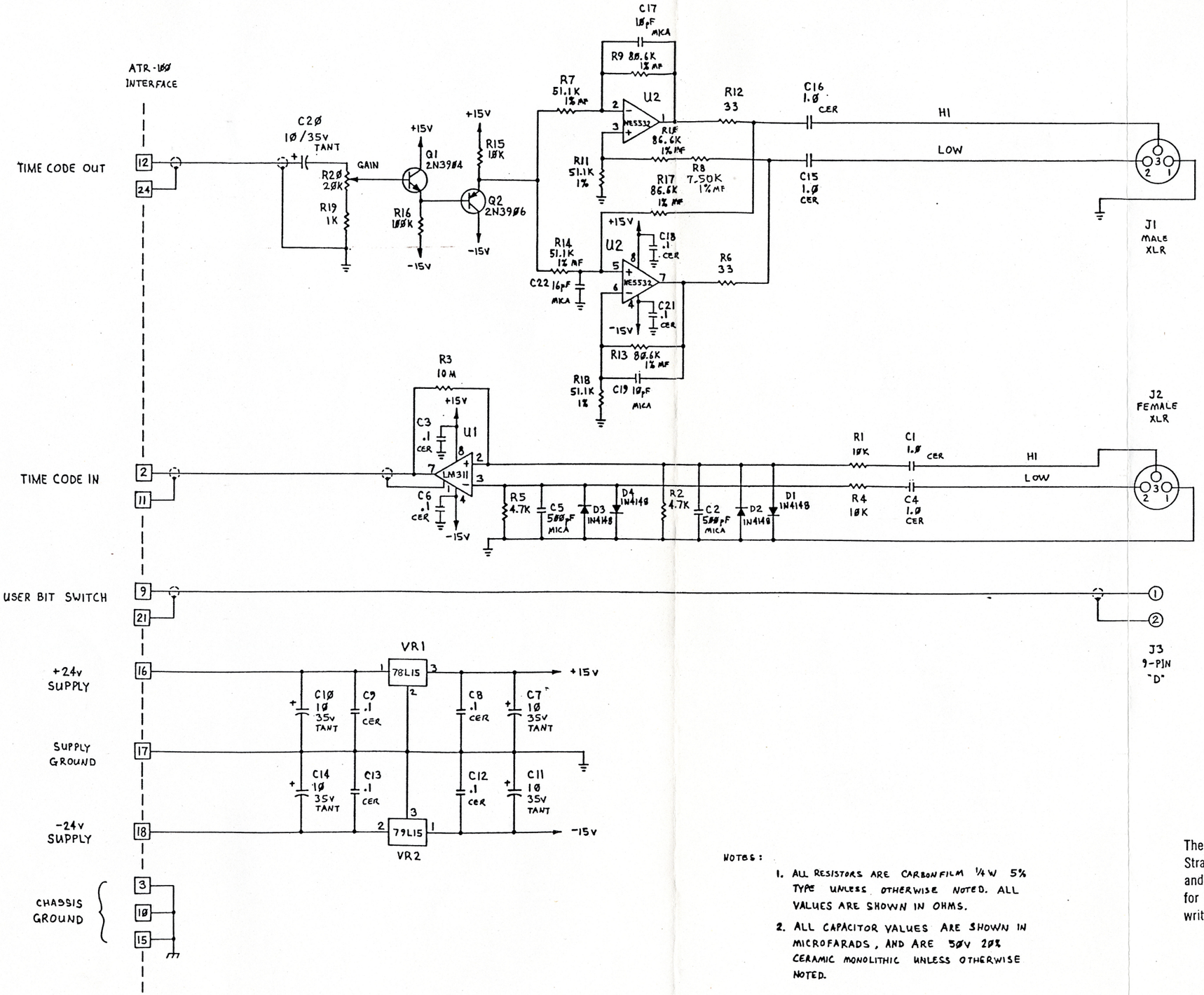
ITEM	QTY	UM	PART NUMBER	DESCRIPTION	REF
1	1	EA	001-10127-01	ENCLOSURE,CTTC-I/O,BOTTOM	
2	1	EA	001-10128-01	ENCLOSURE,CTTC-I/O,TOP	
3	1	EA	003-00004-01	LABEL,SERIAL NUMBER	
4	1	EA	006-10126-10	PCA, REV B, CTTC-I/O ASSY	
5	1	EA	650-00003-01	CONN,3POS,MALE XLR	J5
6	1	EA	650-00003-02	CONN,3POS,FEMALE XLR	J4
7	1	EA	650-00009-01	CONN,9POS,FEMALE MINI-D	J6
8	1	EA	650-00024-01	CONN,24POS,MALE-D (CENTRNIX)	P7
9	8	IN	901-00003-24	WIRE,24AWG,TWISTED TRIPLE	J4,J5
10	48	IN	902-22004-01	CABLE,3 TWSTD PAIRS, SHIELDED	P7
11	14	IN	910-00001-01	TUBING,TEFLON,22AWG	*
12	3	IN	910-00002-01	TUBING,HEAT SHRINK,1/16"	
13	2	IN	910-00003-01	TUBING,HEAT SHRINK,3/8"	
14	1	EA	930-00001-01	STRAIN RELEIF, .3ID	
15	4	EA	930-00002-01	FEET,RUBBER,ADHESIVE,SM SQ	
16	6	EA	990-10440-04	SCREW,SIM,PHPH,4-40 X 1/4	
17	4	EA	990-20440-04	SCREW,FHPH,4-40 X 1/4	J4,J5
18	2	EA	992-12440-04	STANDOFF,M-F,4-40 X 1/4	J6
19	2	EA	995-00440-01	NUT,HEX,4-40	J6
20	4	EA	995-00440-04	NUT,HEX,KEP,4-40	J4,J5
21	4	EA	996-00004-01	WASHER,FLAT,#4	J6
22	4	EA	996-00004-02	WASHER,LOCK,SPLT,#4	J6
23	2	EA	996-00006-01	WASHER,FLAT,#6	

STRATEGIC SOUND, INC. CENTER TRACK TIME CODE I/O CTIO PCA
006-10126-10
B.O.M. 10-2-86 REV B

ITEM	QTY	UM	PART NUMBER	DESCRIPTION	REF
1	1	EA	008-10126-10	BARE PCB, CTTC I/O	
2	2	EA	122-00033-01	RES,FXD,1/4W,5%,33 OHMS	R6,12
3	1	EA	122-20010-01	RES,FXD,1/4W,5%,1.0K OHMS	R19
4	2	EA	122-20047-01	RES,FXD,1/4W,5%,4.7K OHMS	R2,5
5	3	EA	122-30010-01	RES,FXD,1/4W,5%,10K OHMS	R1,4,15
6	1	EA	122-40010-01	RES,FXD,1/4W,5%,100K OHMS	R16
7	1	EA	122-60010-01	RES,FXD,1/4W,5%,10M OHMS	R3
8	1	EA	131-10750-01	RES,FXD,MF,1/8W,1%,7.50K OHMS	R8
9	4	EA	131-20511-01	RES,FXD,MF,1/8W,1%,51.1K OHMS	R7,11,14,18
10	2	EA	131-20806-01	RES,FXD,MF,1/8W,1%,80.6K OHMS	R9,13
11	2	EA	131-20866-01	RES,FXD,MF,1/8W,1%,86.6K OHMS	R10,17
12	1	EA	185-30020-01	RES,VAR,TRIM POT,20K OHMS	R20
13	8	EA	202-40010-01	CAP, CER,0.10UF	C3,6,8,9,12,13,18, C21
14	4	EA	202-50010-01	CAP, CER,1.0UF	C1,4,15,16
15	5	EA	220-60010-01	CAP,TANT,DIP,10 UF 35V	C7,10,11,14,20
16	2	EA	232-00010-01	CAP,MICA,10PF,5%	C17,19
17	1	EA	232-00015-01	CAP,MICA,15PF,5%	C22
18	2	EA	232-10051-01	CAP,MICA,510PF,5%	C2,5
19	4	EA	302-10914-01	DIODE, SIL, 1N914 (1N4148)	D1-4
20	1	EA	310-23904-01	TRANS, 2N3904	Q1
21	1	EA	310-23906-01	TRANS, 2N3906	Q2
22	1	EA	420-07815-02	IC, V-REG, +15V LM78L15	VR1
23	1	EA	420-07915-02	IC, V-REG, -15V LM79L15	VR2
24	1	EA	430-05532-01	IC, LIN, OP-AMP NE5532	U2
25	1	EA	431-00311-01	IC, LIN, COMP LM311N	U1
26	3	IN	900-00022-01	WIRE,BARE,22 AWG TINNED COPPR	J1-3
27	2	IN	910-00022-01	TUBING,TEFLON,22 AWG	J1-3


SSI
SN
PN 007-10126-10
IN
OUT
C1
R1
D1
D2
R2
R3
C2
C3
U1
C4
J1
C5
C6
J2
R6
R7
U2
J3
C7
C8
VR1
C9
C10
C11
VR2
C12
C13
C14
R4
D3
D4
R5
R13
R14
Q1
Q2
R16
C15
C16
R8
R9
C17
C19
R15
C20
R20
C21
C22
R10
R11
R12
R17
R18
R19
GAIN
1
2
3
11
12
16
17
18
24

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	ECO 102-104	10/2/96	CC



NOTES:

1. ALL RESISTORS ARE CARBON FILM 1/4 W 5% TYPE UNLESS OTHERWISE NOTED. ALL VALUES ARE SHOWN IN OHMS.
2. ALL CAPACITOR VALUES ARE SHOWN IN MICROFARADS, AND ARE 50V 20% CERAMIC MONOLITHIC UNLESS OTHERWISE NOTED.

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		STRATEGIC SOUND INC.	
APPROVALS	DATE	SCHEMATIC - CENTER TRACK TIME CODE - INPUT / OUTPUT PCB ASSY	
DRAWN CB	12/31/96		
CHECKED		SIZE D	DRAWING NO 009-10126-10 REV B
		PAGE 50	SHEET 1 OF 1

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NOTES:

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ALLIGNMENT AND CALIBRATION PROCEDURE

To realize the specified performance of this system, allignment and calibration procedures MUST be carefully performed initially upon completion of installation. They must also be performed after making any adjustments or replacements whatsoever to any one or more of these HEADS: Audio Record, Audio Reproduce, or Center Track; Also, whenever any service or repair has been performed on any ot the Main CTTC PC Board analog circuits.

First, a complete head allignment MUST be performed on the AUDIO heads. To perform this allignment, refer to AMPEX ATR-100 manual. This is required whenever there has been movement of the Audio heads. PERFORM THIS ALLIGNMENT NOW, PRIOR TO PROCEDING FURTHER.

The following procedures are to be followed in the same sequence as presented here in this manual to obtain optimal performance from the SSI Center Track Time Code System.

The following items are required for proper allignment and calibration of the CTTC System.

1. A synchronyzer with a Time Code generator and 2 channels of readers (master and slave).

2. An Oscilloscpe or AC Voltmeter with a bandwidth greater than 200kHz.

3. A small flat blade screw driver.

CENTER TRACK HEAD ALLIGNMENT PROCEDURE

1. The Center Track head does not require nearly as accurate of azimuth allignment as do the audio heads. To allign the Center Track head, verify that the large notch in the azimuth gear is centered in front of the Center Track head. If it is not centered, carefully rotate the azimuth gear until it is centered (figure 21).

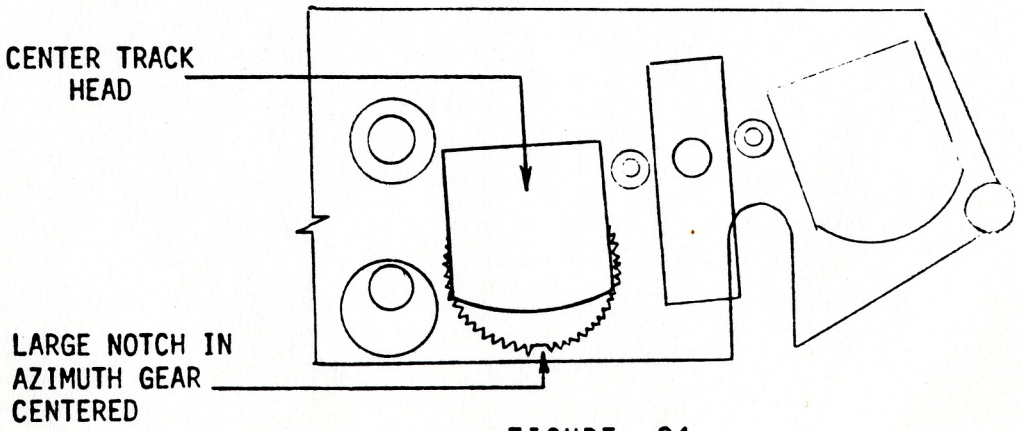


FIGURE 21

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7. Connect oscilloscope to Test Point Eight, TP8 (figure 25). While playing the full track test tape, and with the time code channel in 'Reproduce' mode, measure the voltage at TP8 and make note of this voltage for future referance. (Should be between xxmV and xxmV peak to peak, or 44mV and 68mV rms.)

8. Place the synchronyzer into a mode where the error (difference) between the time code signal arriving at the master channel reader and the slave channel reader is displayed on the synchronizer. With both the audio channnel being used, and the Center Track Time Code channel into 'Reproduce'. Play the full track time code tape while watching the error signal on the synchronizer, adjust the 'REPRO' code delay fine adjustment switch, SW2 (figure 25) for minimun offset error.

9. Place both the audio channel being used, and the Center Track Time Code channel into 'Sync'. Play the full track time code tape while watching the error signal on the synchronizer, adjust the 'REC/SYNC' code delay/ advance fine adjustment switch, SW3 (figure 25) for minimum offset error.

10. Now remove the full track time code tape from the transport, and load a reel of blank tape for adjusting the Center Track BIAS and RECORD levels.

11. Because Time Code is a digital signal recorded onto and reproduced off of tape, bias and record levels are not nearly as critical as with analog signals. Thus the calibration procedure is much simpler. Connect an oscilloscope to Test Point twelve, TP12 (figure 25) 'Record Current'. Place Time code channel into 'Input' 'Record' mode. Disconnect time generator from input of Time Code channel. While recording tape and while watching scope, adjust 'BIAS' trim pot R71 for 800mV peak to peak (or to maximum sinusoidal waveform, without showing signs of saturation or distortion of sinusoidal waveform).

12. With Time Code Generator connected to the Time Code channel Input. Connect oscilloscope to Test Point eight TP8 (figure 25). Place Time Code channel into 'Ready' 'Sync' mode. Reset tape timer. With time code present at input of Time Code channel, record section of tape (about 20 seconds) with Center Track Time Code. Rewind the tape to the starting point of the section of tape just recorded. Play back that same section of tape while watching the oscilloscope. Take note of the peak to peak voltage waveform measured. If the voltage is less than that measured in step #7 above (about 140mV peak to peak), then turn 'RECORD' trim pot R73 (figure 25) clockwise slightly; if its less than that measured in step #7 above, then turn R73 counter-