SECTION I

GENERAL DESCRIPTION

1-1 INTRODUCTION

1-2 This manual describes the Signal Monitoring Kit, part number 4850131, an equipment-update conversion unit for the Ampex MM-1000 Audio Recorder/Reproducer. When the Kit is installed in older models of the MM-1000, it updates the Recorder/Reproducer to a later configuration. The information in this manual pertains only to the Kit and its interface with the MM-1000. For additional information on the Recorder/Reproducer, refer to Ampex manual number 4890304.

1-3 In MM-1000-16 Recorder/Reproducers prior to serial no. 237, or MM-1000-8 units prior to serial no. 178, the selector switch for the monitoring meter in each record/reproduce channel has three positions: REPRO, INPUT, and BIAS. In units of serial number 237 and higher in sixteen channel, or number 178 and higher in eight channel, the selector switch positions are NORMAL, SETUP, and BIAS. Installation of the Signal Monitoring Kit will convert the earlier MM-1000 Recorder/Reproducers to the later configuration.

1-4 The NORMAL position can be used to provide automatic selection of the output signal, by means of the operating mode. This enables the MM-1000 to be adapted to a desired recording technique by choosing the appropriate combination of switch settings. Table 3-1 in the Operation Section, shows various combinations of settings that can be used.

1-5 The SETUP position can be used to select appropriate monitoring signals during alignment adjustments. These combinations are also shown in Table 3-3.

1-6 This conversion kit also adds the feature of enabling the remote control accessory, Ampex catalog no. 4010153, to select the output signal when the system is under remote control.

SECTION II

INSTALLATION

2-1 GENERAL

2-2 This section provides instructions for installing the Signal Monitoring Kit into the MM-1000. The changes are shown in heavy lines on the schematics, Figures 5-2, 5-3, and 5-4. A qualified technician can normally complete the modification process in about 20 hours for an 8-channel system, or 30 hours for a 16-channel system. (This does not include the time required for modification checkout; refer to Section III.) Before beginning installation, remove the kit from its shipping container and check the contents against the packing list to make sure all parts are included. Also check each part for visible flaws or signs of damage in shipment. Notify the Ampex Corporation or its authorized representative of any discrepancy.

2-3 KIT CONTENTS

2-4 Parts contained in the modification kit are listed in Table 2-1.

2-5 TOOLS REQUIRED

2-6 Only ordinary technician's hand tools and soldering equipment are required to install the modification kit.

2-7 MODIFICATION OF ELECTRONICS ASSEMBLIES

2-8 To modify the MM-1000 electronics assemblies for compatibility with the Signal Monitoring Kit, perform the steps which follow.

a. Disconnect the ac power input connector from the MM-1000.

b. Remove the electronics cover panels from the rear of the console bridge, and the transport rear and side panels.

c. Identify each electronics assembly with its channel number. This prevents interchanging the assemblies, which would necessitate complete re-alignment.

d. Disconnect all cables from the electronics assemblies. Remove the assemblies from the transport and remove the top and bottom covers from one of the electronics assemblies.

e. Place the selected electronics assembly bottom-down upon a suitable working area.

NOTE

The catalog number and dash number assigned to the Electronics Assemblies is shown on a label on the rear of each chassis unit. Six assembly versions have been assigned to MM-1000 Recorders and some require slightly different changes for this modification. Perform the steps applicable to the assemblies.

f. On electronics assemblies with catalog number 4952201-01 only:

1. Remove the white/black wire from contact 2, connector 4J14; reconnect and solder it to contact 3, connector 4J14.

2. Locate the terminal strip mounted on the rear of the electronics chassis next to connector J5 (OUTPUT). Remove the 1KΩ resistor 4R81, which is in parallel with capacitor 4C46 (250μF, 50 vdc) between terminals 1 and 4. Replace the resistor with a 4.7KΩ, ½W resistor, ite: 23 on the kit parts list.

Table 2-1. Kit List

ITEM NO.	PART NUMBER	DESCRIPTION	QUANTITY	
			-01	-02
1	4260128-01	BRACKET, Relay	1	1
2	020-144	RELAY, 4-Pole, 2-Throw, 24 vdc	1	2
3	020-492	RETAINER SPRING	1	1
4	150-992	SOCKET, Relay	1	1
5	471-062	SCREW, Cross-recessed, Pan Head, 4-40 x .375 Lg	2	2
6	496-004	NUT, Lock, Hexagonal, Captive Washer, 4-40	2	2
7	180-023	TERMINAL STRIP	1	1
8	013-678	DIODE, IN4385	1	1
9	4050555-01	PRINTED WIRING ASSEMBLY, Monitor Relay	8	16
10	617-306	WIRE, Stranded, Insulated, 22 AWG, White/Violet	10'	20'
11	614-690	WIRE, Stranded, Insulated, 22 AWG, Yellow	4'	8'
12	617-299	WIRE, Stranded, Insulated, 22 AWG, White/Black	10'	20'
13	617-303	WIRE, Stranded, Insulated, 22 AWG, White/Yellow	4'	8'
14	614-688	WIRE, Stranded, Insulated, 22 AWG, Red	10'	20'
15	617-054	WIRE, Stranded, Insulated, 20 AWG, Violet	40'	80'
16	617-056	WIRE, Stranded, Insulated, 20 AWG, White/Black	40'	80'
17	617-279	WIRE, Stranded, Insulated, 18 AWG, White/Gray	8"	8"
18	617-278	WIRE, Stranded, Insulated, 18 AWG, White/Violet	8"	8"
19	302-388	STRAP, Cable	16	30
20	600-092	SLEEVING, Plastic, Shrink, .250	1'	1'
21	600-093	SLEEVING, Plastic, Shrink, .250	6"	6"
22	169-114	CONNECTOR, Contact, Socket, 18 AWG	5	5
23	041-056	RESISTOR, 4.7KΩ, ¼W	8	16
24	296-004	CORD, Lacing	12'	24'
25	302-379	STRAP, Cable	16	30
26	302-365	STRAP, Cable	8	8
27	1222089-10	LABEL, Identification, Modification	10	18
28	4170293-01	LABEL, Switch Position Identification	10	18
29	169-213	TOOL, Extractor, Winchester 107-1001	1	1
30	4890235	INSTRUCTION MANUAL	1	1

-01 — 8-Channel Version *-02 — 16-Channel Version*

g. On electronics assemblies with catalog number 4952201-02 only: remove the white/black wire from contact 2, connector 4J14; reconnect and solder it to pin 3 and connector 4J14.

h. On electronics assemblies with catalog numbers 4952201-03, 4952201-04, 4952201-05, and 4020260-06 only:

1. Locate the white/red wire between contact 2 of relay 4K1 and contact 4 of connector 4J14; disconnect and remove it completely.

2. Remove the white/yellow wire from contact 2 of connector 4J14. Reconnect and solder it to pin 1 of connector 4J14, along with existing white/green wire.

NOTE

The remaining steps apply to all versions of the electronics assemblies.

i. Locate the terminal strip which is fastened to the chassis front panel by means of the vu meter mounting stud; the terminal strip contains two 560Ω, 2W resistors (5R75 and 5R76). Disconnect the white/orange and orange wires from the terminal strip. Unscrew the nut on the mounting stud and remove the terminal strip. Replace the nut on the stud, but do not tighten it.

j. Locate the other end of the orange wire, removed from the resistor terminal strip; this end of the orange wire is connected to the vu meter lamp socket. Route the wire to the terminal strip on the other meter mounting stud. Connect and solder it to the ground lug of the terminal strip.

k. Locate OUTPUT SELECTOR switch 5S2 (see Figure 2-1). Unsolder the following shielded cables from the switch:

1. The center conductor of the white/orange cable from terminal 1, and the shield from terminal 2.

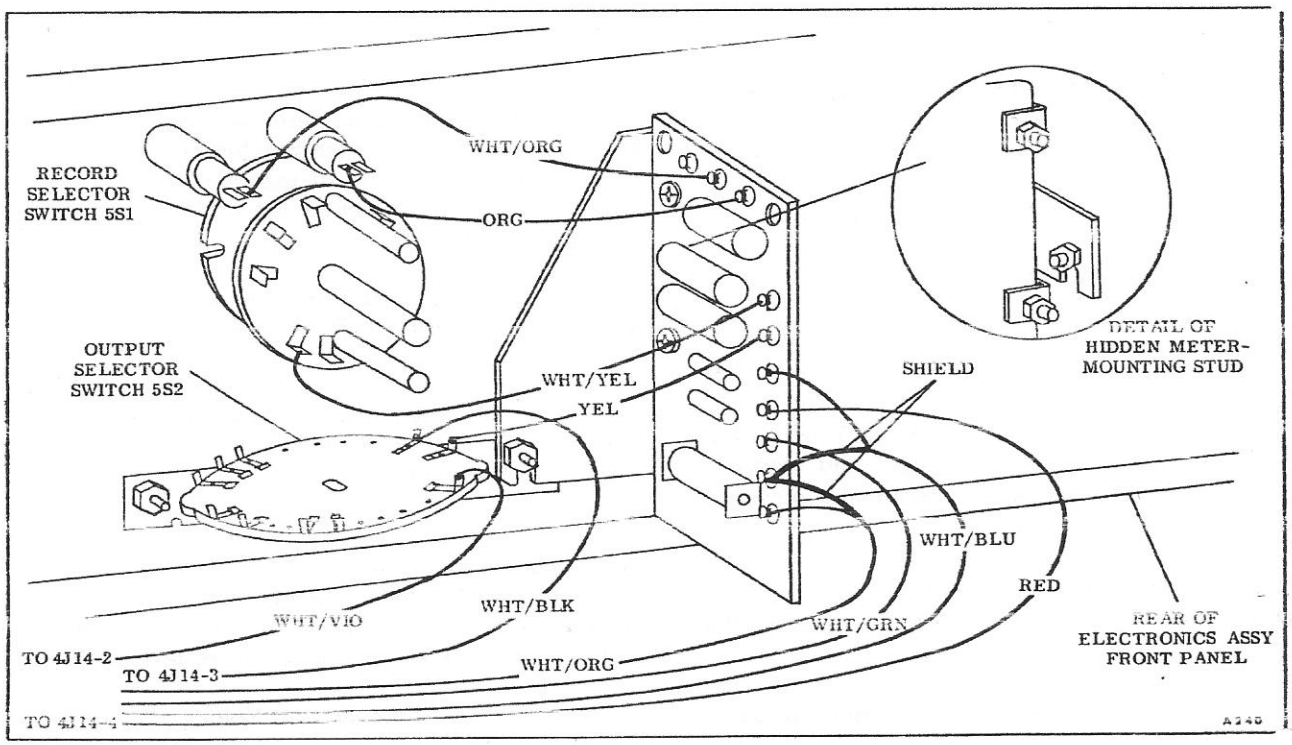


Figure 2-1. Installation in Electronics Assembly

2. The center conductor of the white/blue cable from terminal 18, and the shield from terminal 2.

3. The center conductor of the white/green cable from terminal 17 (the shield is floating).

l. Cut the following wires to the indicated lengths and prepare leads for soldering. Cut 8 wires of each color for converting an 8-channel MM-1000 or 16 wires of each color for converting a 16-channel machine:

1. 2½-inch lengths of yellow wire.

2. 12-inch lengths of 22-gauge white/black wire.

3. 12-inch lengths of 22-gauge white/violet wire.

4. 12-inch lengths of red wire.

5. 5-inch lengths of white/yellow wire.

m. Connect and solder the following wires to OUTPUT SELECTOR switch 5S2 (see Figure 2-1).

1. A yellow wire to terminal 18.

2. A white/black wire to terminal 17.

3. A white/violet wire to terminal 1.

n. Locate RECORD SELECTOR switch 5S1 (see Figure 2-1) and connect and solder a length of white/yellow wire to terminal 5, together with the existing white/yellow wire.

o. Install the printed wiring board assembly, part number 4050555-01, item 9 of the kit parts list, as follows (see Figure 2-1):

1. Loosen mounting nut on OUTPUT SELECTOR switch 5S2 and back it off to the end of the stud, but do not remove it completely.

2. Insert the printed wiring board assembly from the top side, sliding its mounting bracket over the monitor switch stud and the meter mounting stud. Tighten both nuts to secure the bracket.

p. Connect and solder the following wires to printed wiring board assembly 4050555-01:

1. Route the white/orange wire (previously disconnected from the resistor terminal strip in step *i* above) from the READY lamp socket to terminal E2, and connect and solder it.

2. Route the orange wire (previously disconnected from the resistor terminal strip) from the RECORD lamp socket to terminal E3, and connect and solder it.

3. Connect and solder the center conductor of the white/green cable (disconnected from switch 5S2, terminal 17, in step *k-3* above) to terminal E8. Leave the shield floating.

4. Connect and solder red wire to terminal E7.

5. Strip the shield of the white/blue cable (disconnected from terminal 18) to expose a 1-inch length of center conductor. Form the shield to a ¼-inch length of pigtail and route it to pin E9. Connect and solder the center conductor to terminal E6.

6. Route a yellow wire from 5S2 terminal 18 to terminal E5 and connect and solder both ends.

7. Route a white/yellow wire from switch 5S1 terminal 5 to terminal E4 and connect and solder both ends.

8. Reposition the electronics assembly to gain access to the bottom side. Twist together the shields of the white/orange cable (disconnected from 5S2 terminal 1) and the white/blue cable, and connect and solder the shields to terminal E9.

9. Connect and solder the center connector of the white/orange cable to terminal E10.

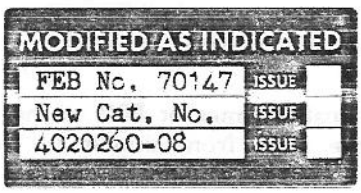
p. Route and connect the following wires through the wiring harness to connector 4J14. Lace them to the harness bundle using the lacing cord from the kit.

1. A red wire from terminal E7 on printed wiring board to 4J14-4.

2. A white/violet wire from terminal 1 of switch 5S2 to 4J14-2.

3. A white/black wire from terminal 17 of switch 5S2 to 4J14-3.

q. Using a typewriter, fill in the modification label, item 27 of the parts list, with the following information:



Remove the backing from the label and apply it to the rear of the chassis, adjacent to the existing label.

r. Rest the electronics assembly on its back side with front facing upwards; clean the surface area over the etched lettering indicators for the monitor switch with denatured alcohol. Remove the backing from the NORMAL/SETUP/BIAS indicator label, item 28 of parts list, and apply over existing lettering. Take care to center label with switch center position.

s. This completes the modification to the electronics assembly. Replace the top and bottom cover panels of the electronics assembly and repeat the procedure for each of the remaining units.

2-9 MODIFICATION OF THE SYSTEM WIRING HARNESS

2-10 Perform the conversion of the MM-1000 system wiring harness in accordance with the following procedure. Figure 5-3 (schematic drawing 4840216, in the back of this manual) shows the system wiring harness as modified.

a. Disassemble the P14 connectors in the cable harness to the electronics assemblies by removing the drivescrew and loosening the cable clamps.

b. On systems equipped with electronics assemblies with catalog numbers 4952201-01 and 4952201-02 only:

1. Disconnect the wire on contact 2 of the connector P14.

2. Connect and solder the wire removed from P14-2 to contact 3 of connector P14. Perform this change on all channels equipped with electronics assemblies which have catalog numbers 4952201-01 and 4952201-02.

NOTE

The remaining instructions apply to all versions of the system.

c. Remove the jumper wire between pins 1 and 2.

d. Locate connector D1P2 on the control unit. Disconnect and disassemble the connector by removing the two drivescrews and loosening the cable clamp.

e. Disconnect the two white/black wires from contact 13. Pull them outside the cable clamp and prepare for splicing. Prepare an 8-foot length of 20-gauge white/black wire and dress for splicing. Slip a 1½-inch length of .375 diameter shrink-tubing over the leads prior to splicing. Splice the three white/black leads together and solder. Slide the shrink-tubing over the splice and heat it.

f. Prepare a 5-foot length of 20-gauge white/black wire with stripped leads for soldering. Route the white/black wire through the cable clamp of connector D1P2. Using a half-inch length of .250 diameter shrink-tubing for insulation, connect and solder the lead to contact 13 of connector D1P2. Route the other end of this lead through the wiring harness to the REMOTE control connector (J1), on the lower rear of the transport console. Secure the lead to the harness bund. using cable ties, items 19 and 25 of the parts list.

g. Prepare an 8-foot length of 20-gauge violet wire and dress the leads for soldering. Route the wire through the cable clamp of connector D1P2 and connect it, along with the existing wires to contact 1 of connector D1P2. Reassemble connector D1P2 and reconnect it to the control unit.

h. Remove the side duct cover, to gain access to the wiring harness, by pressing the duct cover inward and sliding downward to release; pull upwards and out to remove the cover.

i. Route the 8-foot lengths of white/black and violet wire along the wiring harness in the side duct to connector F1P14 (channel 2 electronics assembly) in the overhead bridge. Secure the wires to the harness, using cable ties.

j. Cut the wires to proper length and route them through the cable clamp of connector F1P14, the white/black lead to contact 2 and the violet lead to contact 4. Prepare 3-foot lengths of 20-gauge white/black and violet leads and dress them for soldering. Connect both white/black leads to contact 2 and both violet leads to contact 4 of F1P14 and solder them. Route the 3-foot leads through the cable clamps and harness and into connector F2P14 (channel 4 electronics). Cut the leads to length, dress, and solder the white/black lead to contact 2 and the violet lead to contact 4 of F2P14.

k. Similarly, install wires in the remaining channels, following the wiring list below. Route the leads through the cable clamps and secure them to the harness with cable ties. In each case, connect the white/black leads to contact 2 and the violet lead to contact 4 of F2P14.

1. 3-foot lengths from connector F2P14 to F3P14 (channel 6).

2. 3-foot lengths from connector F3P14 to F4P14 (channel 8).

3. 5½-foot lengths from connector F4P14 to E1P14 (channel 1).

4. 3-foot lengths from connector E1P14 to E2P14 (channel 3).

5. 3-foot lengths from connector E2P14 to E3P14 (channel 5).

6. 3-foot lengths from connector E3P14 to E4P14 (channel 7).

l. Reassemble all P14 connectors and reconnect them to their electronics assemblies.

2-11 ADDITIONAL CONNECTIONS IN 16-CHANNEL UNITS

2-12 If the recorder/reproducer is an MM-1000-16, perform the additional steps given below. Wiring diagram (Figure 5-4 in the back of this manual) shows the system wiring harness as modified, for channels 9 through 16.

NOTE

These steps apply to all versions of 16-channel systems.

a. Locate connector P5B of the control panel, near the right front corner of the MM-1000. Disconnect P5B and disassemble it.

b. Prepare 6-foot lengths each of 20-gauge white/black and violet wires and dress them for soldering.

c. Remove the existing wires from contacts 25 and 27 of connector P5B. Route the two new wires through the connector cable clamp to the two wires just disconnected. Use ½-inch lengths of .250-diameter shrink tubing for insulation and solder both white/black (90) leads to contact 27 and both violet leads to contact 25 of P5B.

d. Reassemble the connector and reconnect it to the control panel. Route the two leads through the wiring harness to connector 16P14 (channel 16 electronics). Secure the wires to the harness, using cable ties. Cut the wires to length, dress them for soldering, and connect the white/black wire to contact 2 and the violet wire to contact 4 of connector 16P14.

e. Prepare a 3-foot length each of 20-gauge white/black wire and violet wire. Dress the leads for soldering. Route the leads through the cable clamp for connector 16P14, and connect and solder both white/black leads to contact 2 and both violet wires to contact 4 of 16P14.

f. Similarly, install wires in the remaining channels, following the wiring list below. Route the wires through cable clamps and secure them to the harness with cable ties. In each case, connect the white/black wires to contact 2 and the violet wires to contact 4 of the connectors.

1. 3-foot lengths from 16P14 to 14P14 (channel 14).

2. 3-foot lengths from 14P14 to 12P14 (channel 12).

3. 3-foot lengths from 12P14 to 10P14 (channel 10).

4. 5½-foot lengths from 10P14 to 9P14 (channel 9).

5. 3-foot lengths from 9P14 to 11P14 (channel 11).

6. 3-foot lengths from 11P14 to 13P14 (channel 13).

7. 3-foot lengths from 13P14 to 15P14 (channel 15).

g. Reassemble all P14 connectors and reconnect them to their electronics assemblies.

2-13 INSTALLATION OF RELAY K1

NOTE

These steps apply to all versions of the system.

a. Remove the power (remote control connector and ac input connector) panel from the console frame. Mark and drill the panel according to Figure 2-2, taking care not to place excessive strain on wiring connections.

b. Mount the relay socket, item 4 of the kit parts list, on the relay bracket, item 1, using the retainer spring, item 3 of the parts list.

c. Connect the diode, item 8 of the parts list, between terminals 13 and 14 of the relay socket, with the cathode (banded end) to pin 13 (do not solder).

d. Mount the assembled relay bracket and the terminal strip TS1 (item 7 of the parts list) on the connector panel using items 5 and 6 of the parts list.

e. Connect a yellow wire from terminal 13 of the relay socket to terminal 1 of terminal strip TS1. Connect a wire from terminal 14 of the

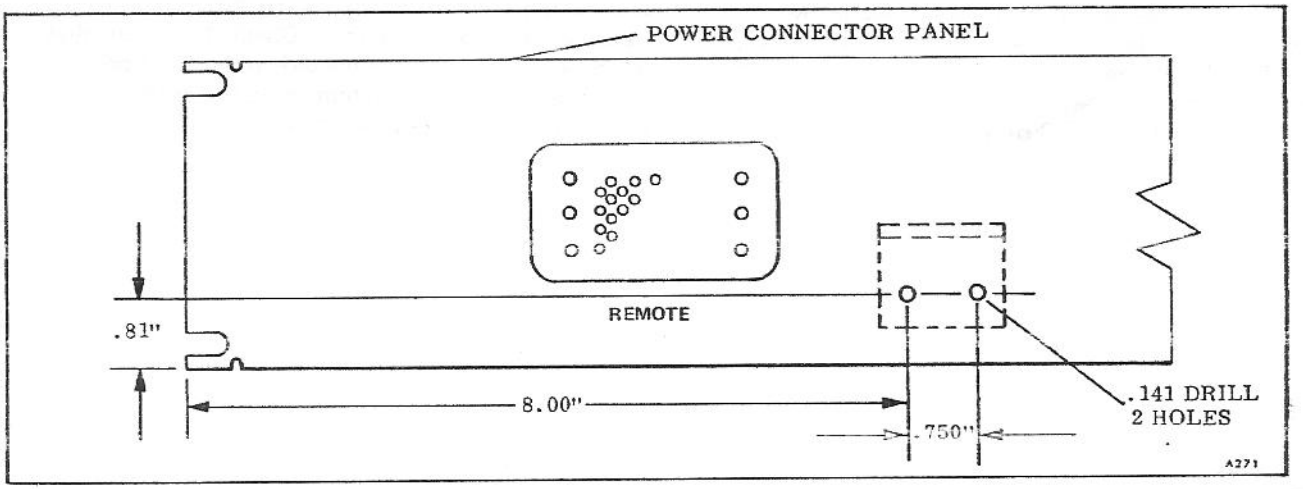


Figure 2-2. Relay Bracket Mounting

relay socket to terminal 3 of terminal strip TS1. Solder terminals 13 and 14 of the relay socket.

f. Prepare a 6-inch length of 20-gauge white/black wire and dress the leads for soldering. Solder a connector contact, item 22 of the parts list, to one end and insert the connector contact into receptacle CA of the REMOTE connector block. Connect the other end of the lead to terminals 9 and 10 of the relay socket (do not solder).

g. Locate the white/black wire installed on pin 13 of D1P1 in step *e* of the wiring harness modification. Connect this wire to terminals 9 and 10 of the relay socket and solder both wires to both terminals.

h. Using the extractor tool, item 29 of the parts list, remove the connector contact and wire from receptacle A of the REMOTE connector. Remove the contact, dress the lead, and connect the wire to terminal 1 of terminal strip TS1.

i. Prepare the 8-inch white/gray wire (item 17 of the parts list) for soldering. Solder a connector contact, item 22 of the parts list, to one end of the wire and insert the connector contact into receptacle A of the REMOTE connector. Connect and solder the other end, and the other wires connected there, to terminal 1 of TS1.

j. Using the extractor tool, remove the connector contact and wire from receptacle N of the REMOTE control connector. Remove the connector contact, dress the lead for soldering, and connect it to terminal 3 of TS1.

k. Prepare a 6-inch length of 18-gauge white/violet wire for soldering. Solder a connector contact, item 22 of the parts list, on one end of the wire and insert the contact into receptacle N of the REMOTE connector. Connect the other end of the wire to terminal 3 of TS1 and solder it with the other wires there.

l. Using the extractor tool, remove the connector contact and wire from receptacle r of the REMOTE connector. Remove the connector contact, dress the lead for soldering, and connect it to both terminals 1 and 2 of relay socket K1. Prepare an 8-inch length of 20-gauge white/black wire for soldering. Solder a connector contact, item 22 of the parts list, to one end of the wire and insert it into receptacle r of the REMOTE connector. Connect and solder the other end to both terminals 1 and 2 of the relay socket.

NOTE

If an Ampex Remote Control Unit, catalog no. 4940173, or a customer-provided unit is used, install a jumper between terminals 1 and 9 of relay socket K1 for proper operation of the remote control. *Do not* install this jumper when using Ampex no. 4010153 Remote Control Unit.

m. Install relay K1, item 2 of the parts list, in the socket. Re-install the power connector panel in the console frame. Check to ensure that all connectors are reconnected properly. Apply ac power and check the system using the Modification Checkout procedure given in Section III.

SECTION III

OPERATION

3-1 SCOPE

3-2 This section provides instructions for operating the MM-1000 Recorder/Reproducer after the Signal Monitoring Kit has been installed. Only those procedures which are relevant to the signal monitoring modification are given here; for further information, see Ampex Manual 4890304. These instructions are divided into two groups. The first group gives an initial checkout procedure to be performed immediately after installation. The second group details the output signals which are monitored with various combinations of MM-1000 switch positions.

3-3 MODIFICATION CHECKOUT

3-4 When installation has been completed, perform the following steps:

a. Parallel all input connections of the MM-1000 and apply a 5-kHz reference signal to the input at 0 vu level.

b. Thread the Ampex alignment tape normally used on the transport. To reproduce the set level section, adjust output level for -10 vu indication on the monitor. Place MASTER PLAY/SYNC to SYNC and adjust Sel-Sync GAIN controls for -5 vu on meter. Set the controls as indicated in Table 3-1. The outputs as observed on the meter must coincide with the table if the modification is correct.

c. Rewind the alignment tape and remove the reel. Thread a reel of tape suitable for recording on the transport. Place in the record mode and observe the output signal; it must coincide with Table 3-2.

d. Readjust the Sel-Sync gain and reproduce level for 0 vu. This completes the modification checkout. Reinstall all cover panels and side panels.

3-5 NORMAL OPERATION

3-6 Table 3-3 shows the output signals available with various combinations of switch settings after the conversion is completed. The difference lies in the automatic selection of the monitor signal for those channels with the CHANNEL SELECTOR switches set in RECORD. The input signal is monitored in stop mode; and depending on the setting of the OUTPUT SELECTOR switch on the electronics assemblies, the input signal or playback signal (or Sel-Sync signal) can be monitored in playback and automatically switched to the input or playback signal in record mode. The NON-RECORD and SEL-SYNC positions of the CHANNEL SELECTOR switches and the BIAS position of the OUTPUT SELECTOR switch operate as before.

*Trademark, Ampex Corporation

*Table 3-1. Available Output Signals, Playback Mode**

SWITCH POSITIONS			OUTPUT	VU METER READING
CHANNEL SELECTOR	OUTPUT SELECTOR	MASTER PLAY/SYNC		
RECORD	NORMAL	PLAY	Playback Signal	-10
RECORD	NORMAL	SYNC	Sel-Sync Signal	-5
RECORD	SET UP	Both	Input Signal	0
NON-RECORD	NORMAL or SET UP	PLAY	Playback Signal	-10
NON-RECORD	NORMAL or SET UP	SYNC	Sel-Sync Signal	-5
SEL-SYNC	NORMAL or SET UP	Both	Sel-Sync Signal	-5

**The RECORD SELECTOR switch must be in READY position.*

Table 3-2. Available Output Signals, Record Mode

SWITCH POSITIONS			OUTPUT	VU METER READING
CHANNEL SELECTOR	OUTPUT SELECTOR	MASTER PLAY/SYNC		
RECORD	NORMAL	Both	Input Signal	0
RECORD	SET UP	Both	Playback Signal	-10

Table 3-3. Available Output Signals, Operating

SWITCH POSITIONS			OUTPUT SIGNAL AVAILABLE IN EACH MODE		
CHANNEL SELECTOR	OUTPUT SELECTOR	MASTER PLAY/SYNC	STOP	PLAYBACK	RECORD
RECORD	NORMAL	PLAY	Input	Playback	Input
RECORD	SET UP	PLAY	Input	Input	Playback
NON-RECORD	NORMAL or SET UP	PLAY	Playback	Playback	Playback
SEL-SYNC	NORMAL or SET UP	PLAY	Sel-Sync	Sel-Sync	Sel-Sync
RECORD	NORMAL	SYNC	Input	Sel-Sync	Input
RECORD	SET UP	SYNC	Input	Input	Playback
NON-RECORD	NORMAL or SET UP	SYNC	Sel-Sync	Sel-Sync	Sel-Sync
SEL-SYNC	NORMAL or SET UP	SYNC	Sel-Sync	Sel-Sync	Sel-Sync

SECTION IV

THEORY OF OPERATION

4-1 GENERAL

4-2 This section describes the internal operation of the MM-1000 electronics when the changes supplied by the Signal Monitoring Kit have been made. The schematic diagrams affected by these changes are provided at the end of this manual. The obsolete schematics in the MM-1000 manual may be replaced with these revised drawings.

4-3 THEORY OF CIRCUIT CHANGES

4-4 See schematic drawing Figure 5-2, and Figure 4-1, a simplified block diagram. The reproduce amplifier in each of the electronics assemblies may be considered in two sections: a preamplifier and an output amplifier, with an external loop via contacts A and D of 5J3 in which the REPRODUCE LEVEL control is inserted. Relay 5K3 is inserted in this external loop by the signal monitoring conversion. The signal to the output amplifier can be either from the preamplifier (5K3 de-energized) or from contact 4 of the record amplifier (5K3 energized). The signal from the record amplifier produces an input signal monitor through the electronics assembly. The signal from the preamplifier will produce either playback or Sel-Sync output, depending on whether the reproduce head or the record head is connected to the preamplifier by the CHANNEL SELECTOR switches.

4-5 One side of the coil of relay 5K3 receives +24 volts from pin 4 of 4J14. When the other side is connected to ground, the relay operates; when +24 volts is connected to the ground side, the relay is inhibited and remains de-energized. Since the RECORD SELECTOR switch of the electronics assemblies (5S1F) is in the READY position, contacts 5 and 6 connect the winding of 5K3 to pin 8 of connector J11. When the CHANNEL mode SELECTOR control (S1, on Figure 5-1) is in the RECORD position (or the remote control is in the READY position in REMOTE) for the active channel, 24 volts common is connected to pin 8 and 5K3 is energized.

4-6 Changing the CHANNEL SELECTOR switch to the SEL-SYNC position de-energizes relay 5K3 in that channel. Another set of contacts on the switch connects +24 volts to the channel relay in the Sel-Sync unit. Operation of the channel relay disconnects the reproduce head from the reproduce amplifier and connects the record head to the reproduce amplifier, to produce the Sel-Sync output.

4-7 When OUTPUT SELECTOR 5S2 is in NORMAL position and the system is not in record mode, a +24-volt "not record" level at pin 2 of 4J14 inhibits 5K3 from operating. Thus the reproduced signal is automatically monitored during playback. However, the "not record" voltage is interrupted by operation of relay K1 (which was added in this conversion) when the LOCAL/REMote switch is in REM for remote control. During playback, for those channels which have the selector switch of the remote control in the READY position and the READY/PLAY switch in the MONITOR INPUT position, the +24 volts goes out to the remote control on J1-CA (see Figure 5-3). This allows the remote control to select the record input or reproduce signal for output.

4-8 When the OUTPUT SELECTOR switch is moved to the SETUP or the BIAS position, the "not record" inhibiting voltage is not connected to 5K3 during playback. In record mode, +24 volts at 4J11-4 operates relay 4K1 and contacts 12, 8 and 6, 10 connect the +24 volts through the OUTPUT SELECTOR switch to inhibit 5K3. The result is that the input signal is monitored in playback and the reproduced signal is monitored during record mode.

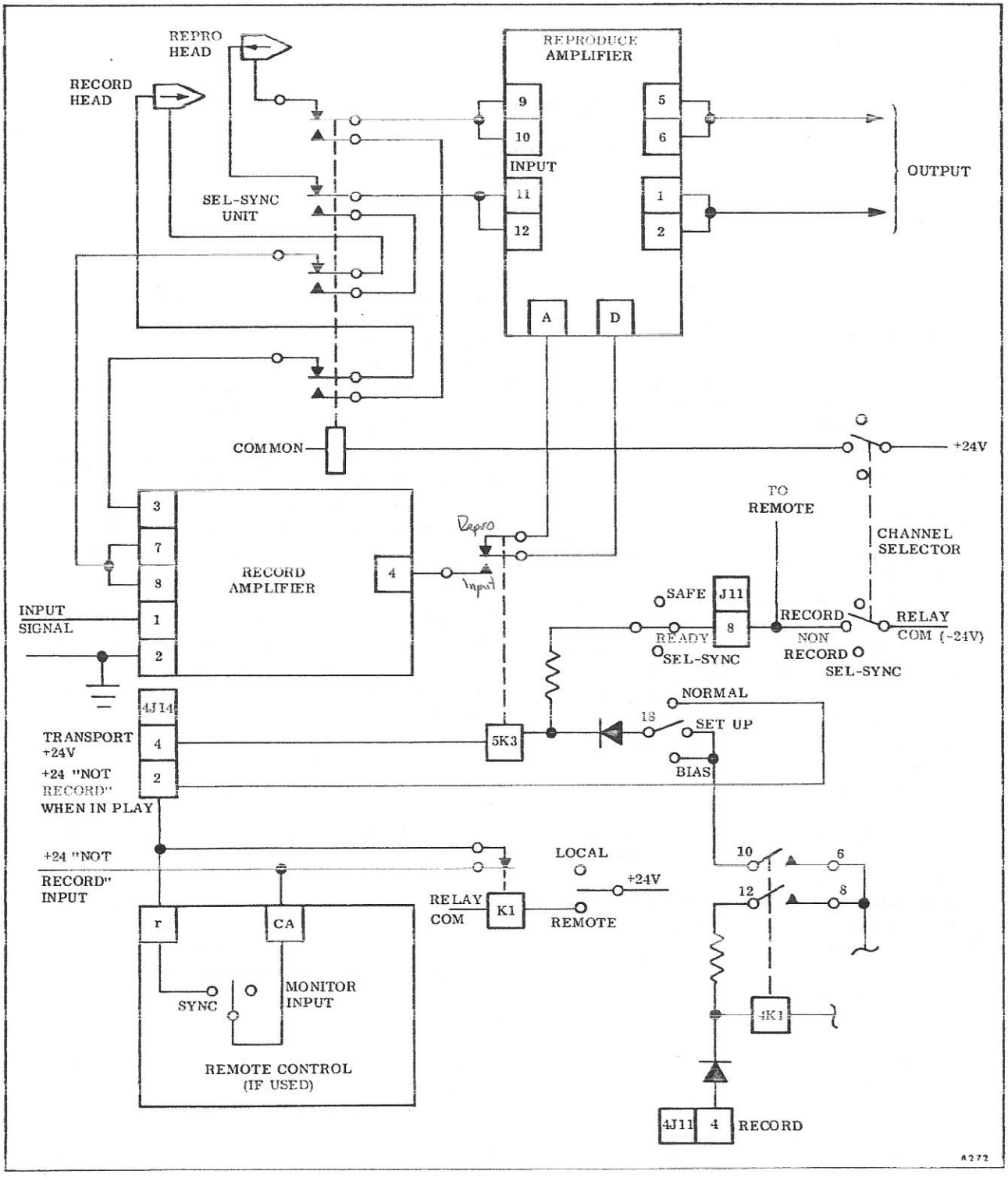


Figure 4-1. Simplified Block Diagram