

**MODIFICATION PROCEDURES****Part A. Tape Transport Mode Alterations****7A.1      GENERAL**

The following instructions give requirements for defeating the mode controls on the Model AG-440 and AG-445 tape transport. A simplified schematic diagram of the tape transport control system is given in Figure 7A-1. All parts are shown on the interior view of the control box assembly, Figure 7A.

**7A.2      MODIFICATION PROCEDURES**

**7A.2.1      MODIFICATION TO ENTER ANY OTHER MODE DIRECTLY FROM THE RECORD MODE.** This defeats the safety feature that normally prevents entering any other mode from the record modes without first stopping tape motion.

- a. Connect a jumper wire from Q601 emitter to the negative side of diode CR605.
- b. Disconnect the base lead of Q601 (to protect the transistor).

**7A.2.2      MODIFICATION TO DEFEAT ALL, OR ANY, OF THE EDIT FUNCTIONS.**

The three edit modes of the AG-440/AG-445 are stop/edit, play/edit, and fastwinding/edit.

- a. To defeat the stop/edit mode, disconnect the lead connected to pin 6 of edit relay K603.
- b. To defeat the play/edit mode, connect one jumper wire from pin 4 to pin 12, and one from pin 2 to pin 10, on edit relay K603.
- c. To defeat the fastwinding/edit mode, connect a jumper wire across the normally closed contacts of EDIT switch S611.
- d. To defeat all edit modes, disconnect the wire from either side (pin 13 or pin 14) of edit relay coil K603 and connect a jumper wire across the normally closed contacts of EDIT switch S611.

7A.2.3

MODIFICATION TO ENTER THE PLAY/EDIT MODE BY PRESSING THE EDIT PUSHBUTTON (WHEN TAPE IS STOPPED) EVEN WHEN THE SAFETY SWITCH IS OPEN.

- a. Disconnect the four wires from the EDIT pushbutton switch S611, and remove the switch. Replace switch with a DPDT momentary pushbutton-controlled micro-switch with two normally-open contacts (Licon 79-2920 or equivalent).
- b. Connect the two wires disconnected from the normally-open contacts of the original switch to either open contact of the new switch. Solder the ends of the other two disconnected wires together, and tape the connection (this forms the same circuit as the jumper wire connected in step c of the preceding paragraph).
- c. Connect the other open contacts on the new switch to pin 8 and pin 12 of edit relay K603.
- d. Connect a jumper wire across pin 7 and pin 9 of edit relay K603.

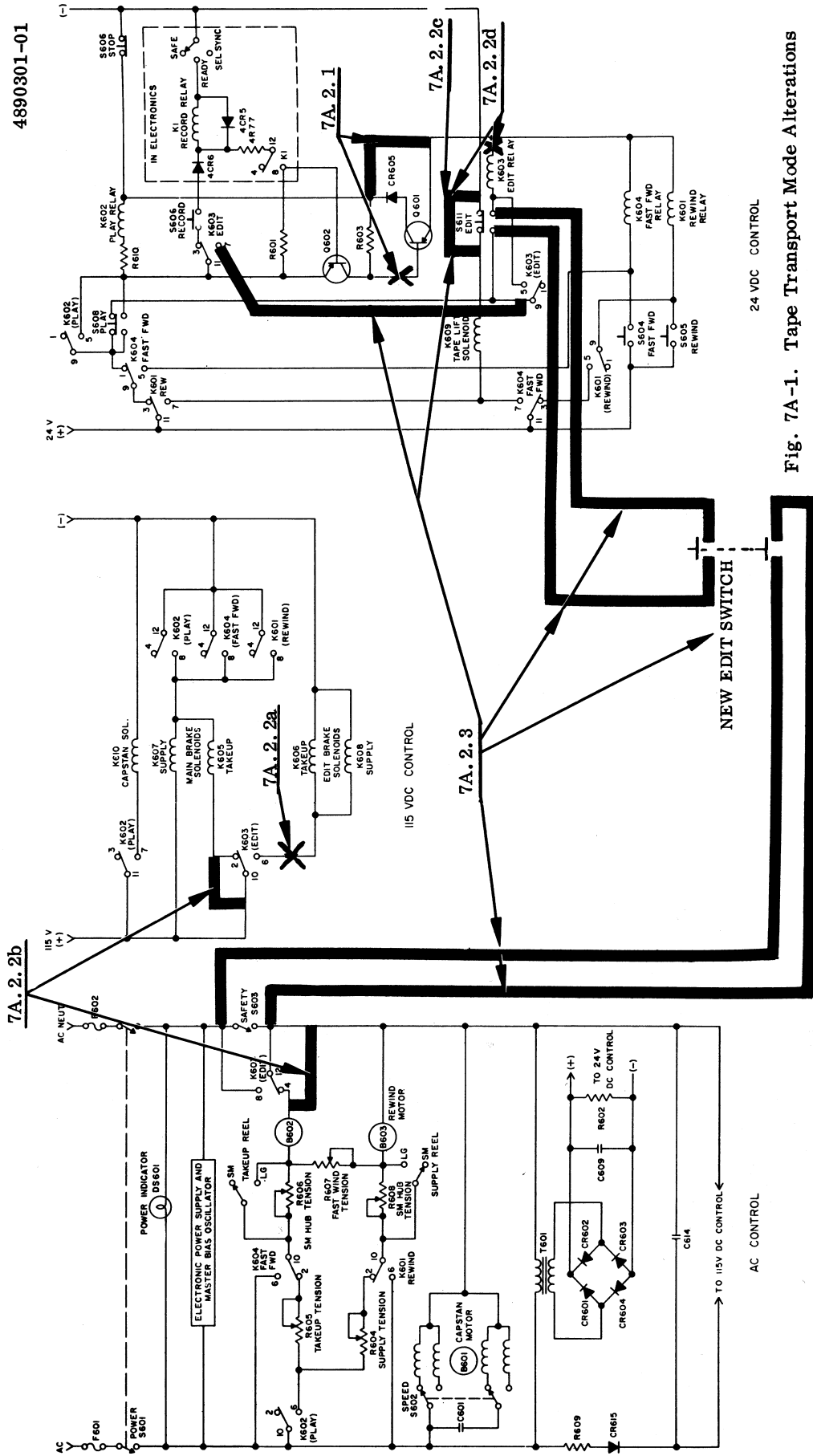


Fig. 7A-1. Tape Transport Mode Alterations

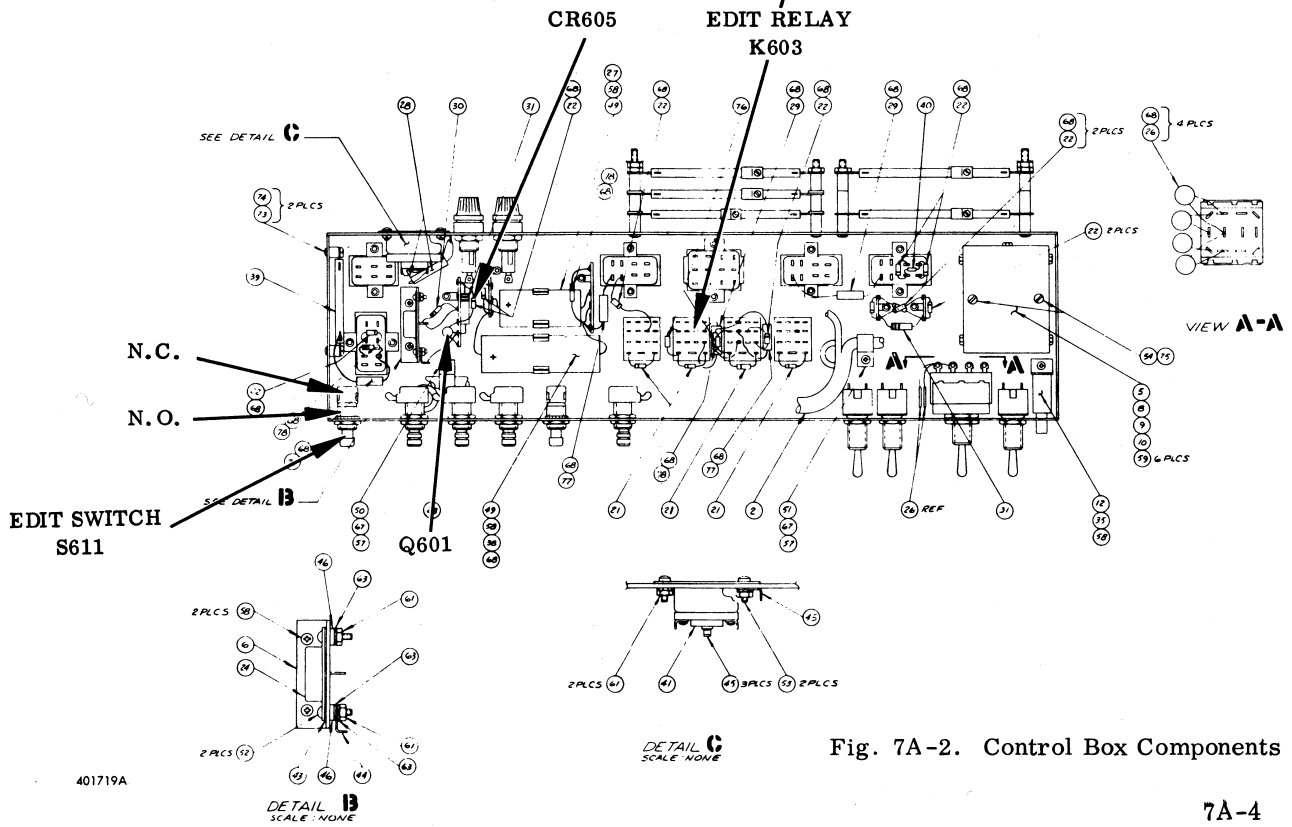
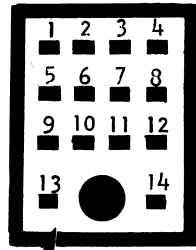


Fig. 7A-2. Control Box Components

## Section 7

**MODIFICATION PROCEDURES****Part B. External Motor Drive Amplifier Addition****7B.1 GENERAL**

To obtain Underwriters' Laboratory approval for the Ampex AG-440B/445B tape transport control panel, it was necessary to disconnect receptacle J604S. The J604S connector was originally provided for external inputs from a motor drive amplifier.

Modification procedures in this section give instructions for wiring receptacle J604S, and describe other wiring changes necessary for operation of the AG-440B/445B with an external motor drive amplifier.

**NOTE**

If the entire installation requires Underwriters' Laboratory approval, all internal wiring, and the motor drive amplifier, must meet Underwriters' Laboratory requirements.

**7B.2 INTERNAL WIRING ADDITIONS AND CHANGES**

Proceed as follows to modify internal wiring of the transport control box:

**Step 1:** Remove transport control box as directed in paragraph 4E.11.2 of this instruction manual (Section 4).

**Step 2:** Locate SPEED switch S602 and receptacle J607S.

**Step 3:** Locate the white-violet wire between terminal A of switch S602 and pin 3 or 4 of receptacle J607S. (Note that there are two white-violet wires soldered to terminal A of S602; determine which wire goes to receptacle J607S.)

**Step 4:** Unsolder white-violet wire from J607S (pin 3 or 4) and from terminal A of switch S602. Remove this white-violet wire from wiring harness.

**Step 5:** Connect and solder a new white-violet wire to S602 terminal A; route wire to J604S; and solder white-violet wire to pin 7 of J604S. (See Figure 7B-1.)

**Step 6:** Locate pin 5 of receptacle J604S and pins 5 and 6 of receptacle J602S.

**Step 7:** Solder violet wire between pin 5 of J604S and pins 5 and 6 of J602S.

**Step 8:** Locate pin 2 of receptacle J606S and pin 1 of receptacle J604S.

**Step 9:** Solder white wire between pin 2 of receptacle J606S and pin 1 of receptacle J604S.

**Step 10:** Transport control box wiring modification is complete. Refer to Figures 7B-1 and 7B-2 to verify wiring changes are correct.

**7B.3**     CONNECTING MOTOR DRIVE AMPLIFIER

**CAUTION**

The output from the motor drive amplifier must be isolated from the main ac power source. Failure to observe this caution may result in extensive damage to transport control circuits.

To connect motor drive amplifier (MDA) to transport control box, the MDA plug, Ampex 145-013 (H. B. Jones, P-308-CCT-L), must be prepared as follows, and then inserted in receptacle J604S:

**Step 1:** Connect input power to the MDA from pins 1 and 5 (low side of ac line) of MDA mating plug. (This connection assigns power control to the tape transport POWER switch and safety switch.)

**Step 2:** Connect MDA precision frequency power output to return to the tape transport through pins 7 (low) and 8 (hot) of MDA mating plug.

**Step 3:** Verify that wiring is correct; then insert MDA mating plug in receptacle J604S. Connection of MDA is complete.

**7B.4**     PREPARING DUMMY PLUG

For occasional use of the equipment with power directly from the power mains, a dummy plug must be used. Use the same mating plug described in paragraph A2-3 and wire it as follows:

Use bare 20-gauge wire to jumper the plug pins 7 and 1 (see Fig. 7B-2). To change operation from the motor drive amplifier to the power line, unplug the amplifier connector from J604S and insert the dummy plug.

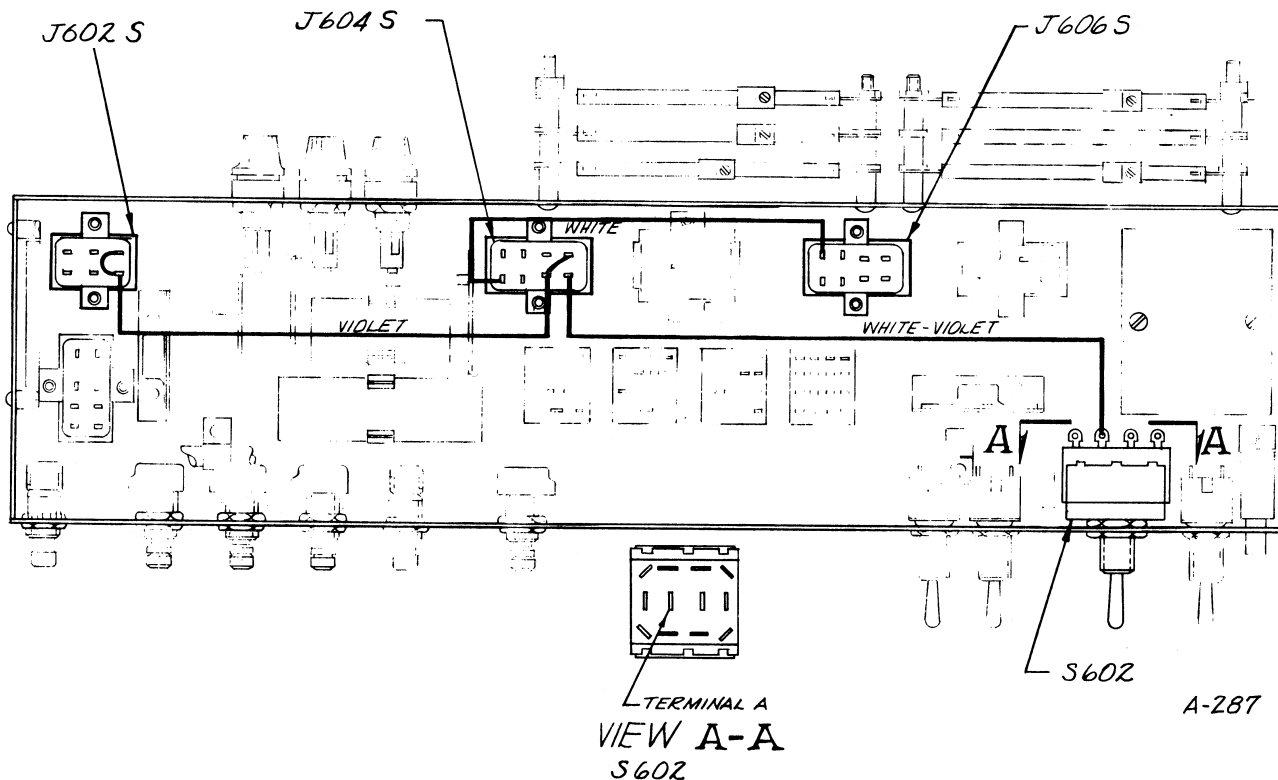
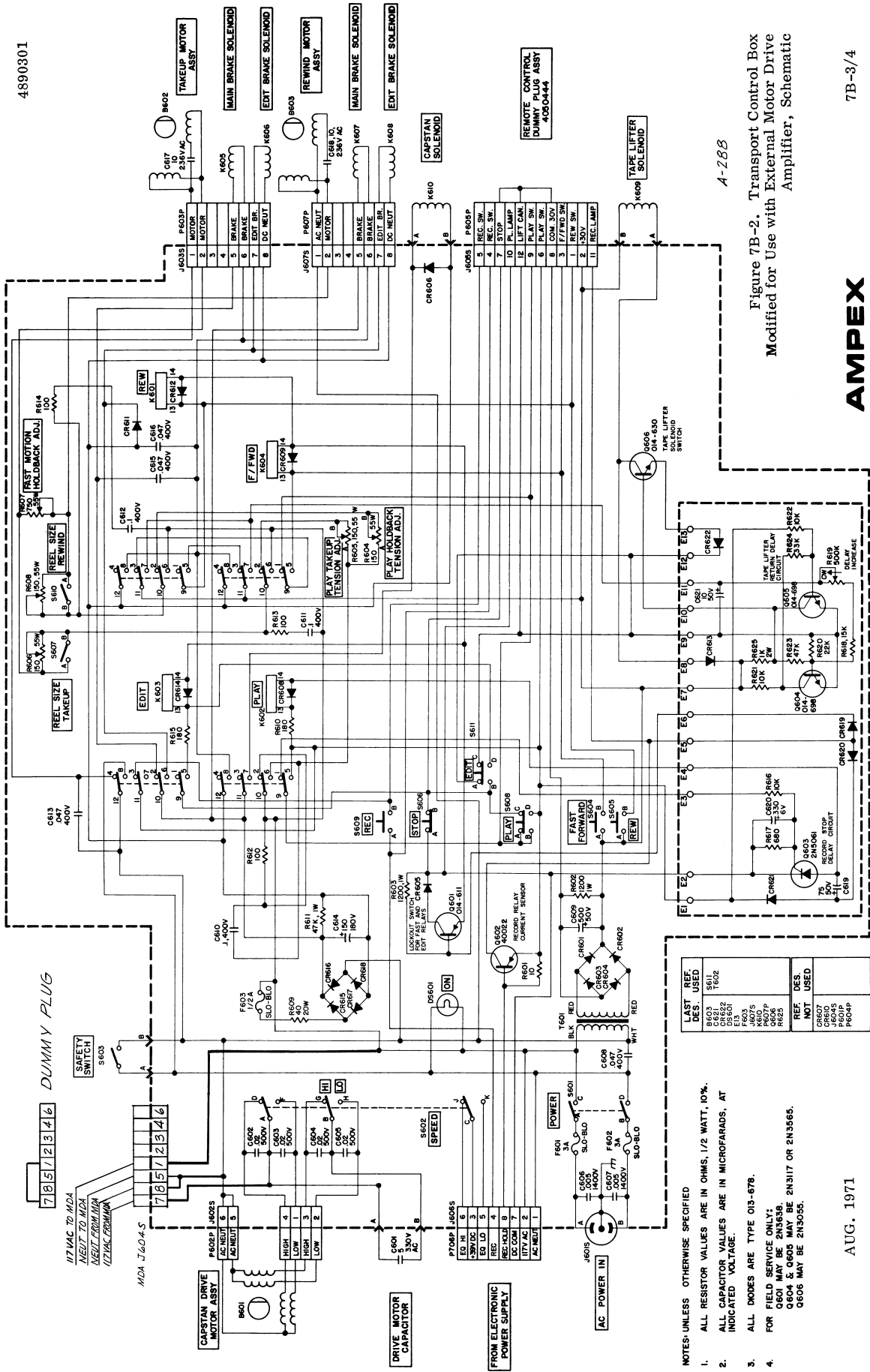


Figure 7B-1. Wiring Changes Required for Connection of External Motor Drive Amplifier



A-288

Figure 7B-2. Transport Control Box Modified for Use with External Motor Drive Amplifier, Schematic

AMPEX

LAST DES.	REF USED
B603	S611
C622	T602
D601	D601
F603	F603
J607S	J607S
K607P	K607P
R625	R625
CR67	CR67
CR60	CR60
CR61P	CR61P
CR64P	CR64P

- NOTES: UNLESS OTHERWISE SPECIFIED
- ALL RESISTOR VALUES ARE IN OHMS, 1/2 WATT, 10%.
  - ALL CAPACITOR VALUES ARE IN MICROFARADS, AT INDICATED VOLTAGE.
  - ALL DIODES ARE TYPE 018-87B.
  - FOR FIELD SERVICE ONLY:  
Q604 & Q605 MAY BE 2N317 OR 2N3565.  
Q606 MAY BE 2N3055.

**MODIFICATION PROCEDURES****Part C. Sel-Sync<sup>®</sup> Remote Control****7C.1**      DESCRIPTION

The remote control Sel Sync system, Catalog No. 4010129, for a AG-440 recorder/reproducer that uses up to four channels, consists of a switching unit (Catalog No. 4020286) and a control unit 4020294-01. The system provides remote control for all the Sel Sync functions.

Equipment with five to eight channels requires the Catalog No. 4010130 system, which contains two of the same switching units (Catalog No. 4020286) and a control unit 4020294-02.

**NOTE**

If receptacle J14 is not included on the record/reproduce electronic unit(s), order Ampex Remote Sel Sync Modification Kit No. 4850111-01, for a recorder/reproducer with up to four channels; or No. 4850111-02, for a

recorder/reproducer with from five to eight channels.

**7C.2**      SWITCHING UNIT**7C.2.1**      **GENERAL**

One switching unit is required for recording up to four channels, and two identical units are required for five to eight channels. The following instructions describe the mounting and connecting of each switching unit (all interconnecting cables required are supplied).

**7C.2.2**      **MOUNTING**

Mount the unit close to the recorder/reproducer (so head cables need not be lengthened) and in a standard 19-inch rack; or in the Ampex console with two electronic supports (Ampex Catalog No. 4260404).

**7C.2.3**      **CONNECTING**

Step 1: Disconnect all record head cables from the J6 (RECORD) receptacle of each

**AMPEX**



record/reproduce unit. Connect the cables to the corresponding REC HEAD receptacles on the switching unit.

**Step 2:** Disconnect all reproduce head cables from the J1 (REPRO) receptacles of each record/reproduce unit. Connect those cables to the REP HEAD receptacles on the switching unit.

**Step 3:** Connect the record head jumper cables (Catalog No. 4050207-09, supplied) between the REC ELECTRONICS receptacle on the switching unit and all J6, RECORD receptacles according to channel numbers.

**Step 4:** Connect the reproduce head jumper cables (Catalog No. 4050471-01, supplied) between the REP ELECTRONICS receptacles on the switching unit and all J1 (REPRO) receptacles according to channel numbers.

#### NOTE

For equipment using two power supplies (5 to 8 channels) a dual power jumper cable, Catalog No. 4050483-01, is supplied.

**Step 5:** On each tape transport power supply, disconnect any one of the cables from receptacles J701 through J704. Connect the 10-prong plug on the Y-type power jumper cable (Catalog No. 4050466-01, supplied) to the vacated receptacle. Connect the disconnected cable to the 10-socket plug on the power jumper cable.

**Step 6:** For each switching unit, connect the 4-prong plug on the power jumper cable to J3 (POWER SUPPLY) receptacle.

**Step 7:** Connect the Catalog No. 4050467-02 cable (supplied) between the switching unit J2 (ELECTRONICS) receptacle, and each record/reproduce unit J14 (four-pin) receptacle.

## 7C.3 CONTROL UNIT

### 7C.3.1 GENERAL

The two versions of the control unit are Catalog No. 4020294-01, for equipment with up to four channels; and Catalog No. 4020294-02, for equipment with up to eight channels. Two 30-foot captive cables provide interconnecting facilities and limit the distance between the control unit and the recorder/reproducer.

### 7C.3.2 MOUNTING

The control unit, furnished in a desk top case, may also be mounted in a console cutout by removing the case and using the unit as a cutout template; small slots in the upper and lower edges are for mounting hardware.

### 7C.3.3 CONNECTING

Connect each 21-prong plug to the switching unit J1 (REMOTE) receptacle. For eight channel equipment, connect the two 21-prong plugs. Connect the 12-prong plug to the tape transport J605S (REMOTE CONTROL) receptacle.

## 7C.4 REMOTE OPERATION

### 7C.4.1 RECORDING

#### 7C.4.1.1 Normal Recording

Step 1: At the recorder/reproducer:

- a. Thread tape on the tape transport.
- b. Select desired tape speed.
- c. Set REEL switches for reel hub sizes in use.
- d. Set desired record and reproduce levels.
- e. Set all RECORD SELECTOR switches to READY (always at ready when using the Sel Sync remote control).

- f. To monitor the recording as it is recorded, set OUTPUT SELECTOR switches on desired channels to REPRO. To monitor the material before it records, set the switches to INPUT.

Step 2: At remote control, the PLAY REPRO pushbutton should be lighted.

Step 3: At remote control, set SAFE-READY switches on channels to be recorded at READY (READY indicators light) and on other channels at SAFE.

#### NOTE

To remove a channel from the record mode at any time, change the channel SAFE-READY switch setting from READY to SAFE. To initiate recording on a channel at any time, change the channel SAFE-READY switch setting from SAFE to READY, and press the RECORD pushbutton.

Step 4: Start recording by pressing the PLAY pushbutton (tape starts and PLAY indicator lights), then pressing the RECORD pushbutton. All channels in the "ready" condition will record (RECORD indicator lights).

Step 5: Stop recording by pressing the STOP pushbutton (tape motion stops).

#### 7C.4.1.2 Sel Sync Recording

Step 1: Make the first recording run according to paragraph 7C.3.1.1).

Step 2: Rewind the tape and align heads to the beginning of the recording. At the recorder/reproducer, set OUTPUT SELECTOR switches for the recorded channels to REPRO.

Step 3: At remote control, set READY-SAFE switch(es) for the recorded channel(s) to SAFE.

Step 4: For the channel(s) to record the second run, set READY-SAFE switch(es) to SAFE.

Step 5: Press the SYNC REPRO pushbutton (pushbutton lights and PLAY REPRO pushbutton goes out).

Step 6: Have the performer don a headset monitor.

Step 7: Press PLAY, then RECORD pushbuttons. The performer hears any previously recorded track so he can sing or play in synchronism with it. Press the STOP pushbutton to stop recording.

Step 8: For each additional recording run, repeat the procedure. Before starting a run, be sure that the remote control READY/SAFE switches for all previously recorded channels are set to SAFE.

#### 7C.4.2 REPRODUCING

Step 1: At the recorder/reproducer:

- a. Thread tape on the tape transport.
- b. Select desired tape speed.
- c. Set REEL switches for reel hub sizes in use.
- d. Set desired reproduce level.
- e. Set desired OUTPUT SELECTOR switches to REPRO.
- f. Set all RECORD SELECTOR switches to SAFE.

Step 2: Press PLAY pushbutton (tape starts in motion in the reproduce mode).

Step 3: Press the STOP pushbutton (tape stops).

## 7C.4.3 FAST-WINDING

For tape editing or cueing, the tape is rapidly wound by pressing the REWIND or FAST FWD pushbuttons. The pushbuttons can be pressed alternately, without first stopping tape motion. When the desired tape area is reached, press the STOP pushbutton (if tape runs off either reel, operation will automatically stop). Either fast-winding mode can also be entered from the stop or play modes, but is locked-out when in the record, or play/edit mode (in play/edit the takeup tension arm doesn't hold the safety switch closed, thus fast-winding is locked-out).

To enter other modes from the fast-winding modes, press the STOP pushbutton, then when tape motion stops, actuate the control for the mode selected.

## CAUTION

Allow fast-winding tape motion to stop before pressing the PLAY pushbutton to avoid breaking or stretching the tape.

Two automatic tape-lifter arms (removing tape from head contact) are automatically actuated in both fast-winding modes. For fast-winding audio monitoring, the EDIT pushbutton is then pressed (this overrides the tape lifter).

## 7C.4.4 EDIT MODE

Fast-winding edit, the only edit mode available at the remote control, is entered by pushing the EDIT pushbutton when operating in the fast-forward or rewind mode; this overrides the tape lifter so audio monitoring is possible. This mode is primarily for quickly reaching a desired tape area (rough cueing).

7C.5 ADJUSTMENTS

## 7C.5.1 GENERAL

Adjustments available, both on the switching unit, are for the Sel Sync and bias trap signal levels. For level adjustments, obtain the applicable Ampex Standard Alignment Tape listed on Table 1.

## 7C.5.2 SEL SYNC LEVEL ADJUSTMENT

Step 1: Set each record/reproduce unit RECORD SELECTOR switch and all READY-SAFE switches to SAFE.

Step 2: Thread the correct Standard Alignment Tape on the tape transport.

Step 3: Set all record/reproduce unit OUTPUT SELECTOR switches to REPRO.

Step 4: Move the alignment tape to the operating-level tone (the first tone on 15 ips tapes, and the last tones on tapes for slower speeds).

Step 5: Initiate the play mode. As the operating level tone is reproduced, adjust all record/reproduce unit REPRODUCE LEVEL controls for a 0 indication on the VU meters. At the remote control, press the SYNC REPRO pushbutton.

Step 6: Rewind tape and replay the operating-level tone as necessary to adjust all SYNC GAIN controls (on the switching unit back panel) for a 0 indication on the VU meters.

Step 7: Remove and store the alignment tape.

## 7C.5.3 SEL SYNC BIAS TRAP ADJUSTMENT

When Sel Sync is used, the bias from a recording channel could leak into an adjacent channel so that nothing would be recorded on the latter channel. Monitoring with the VU meters might also be masked.

Traps provided on the switching unit and on each record/reproduce unit minimize such bias leakage. The bias trap is adjusted at the factory, so there should be no need for readjustment. If the bias from recording channels causes objectionable VU meter indications on channels operating in Sel Sync, adjust as follows: Operate one channel at a time under Sel Sync, and all other channels in the record mode. Adjust each Sel Sync BIAS TRAP control (on the record/reproduce unit back panel) to null the VU meter indication. Operate system from remote control and repeat the above procedure, to adjust each TRAP ADJ control to null the leakage indication.

TAPE SPEED	TYPE OF EQUALIZATION	ALIGNMENT TAPE	
		1/4-inch	1/2-inch
15 ips	NAB	01-31311-01	01-31311-05
	CCIR	01-31313-01	01-31313-05
7-1/2 ips	NAB	01-31321-01	01-31321-05
	CCIR	01-31323-01	01-31323-05
3-3/4 ips	120 micro sec	01-31331-01	-----
	200 micro sec	01-31334-01	

Table 7C-1. Standard Alignment Tapes

REMOTE CONTROL SEL SYNC  
FOUR CHANNELS  
System Catalog No. 4010129-01

Qty -01	DESCRIPTION	Ampex Part No.
1	Switching Unit, Sel Sync	4020286-02
1	Control Unit, Sel Sync	4020294-01
4	Cable, record head	4050207-09
1	Cable, power supply jumper	4050466-01
1	Cable, interconnecting	4050467-02
4	Cable, reproduce head	4050471-01
1	Instruction pamphlet	4890191

REMOTE CONTROL SEL SYNC  
EIGHT CHANNELS  
System Catalog No. 4010130-01

Qty -01	DESCRIPTION	Ampex Part No.
2	Switching Unit, Sel Sync	4020286-02
1	Control Unit, Sel Sync	4020294-02
8	Cable, record head	4050207-09
1	Cable, power supply jumper	4050483-01
2	Cable, interconnecting	4050467-02
8	Cable, reproduce head	4050471-01
1	Instruction pamphlet	4890191

**AMPEX**

SWITCHING UNIT  
Sel Sync

Ref. No.	Qty -02	DESCRIPTION	Ampex Part No.
		Switching Unit, Sel Sync	4020286-02
C1	4	Capacitor, variable; 1,400 to 3,055 pfd	038-011
C2	4	Capacitor, mica; 1,500 pfd, ±5%	056-021
C3	x	Same as C1	
C4	x	Same as C2	
C5	x	Same as C1	
C6	x	Same as C2	
C7	x	Same as C1	
C8	x	Same as C2	
C9	4	Capacitor, ; 2.2 mfd, ±20%, 35 vdc	037-107
C10	x	Same as C9	
C11	x	Same as C9	
C12	x	Same as C9	
CR1	4	Diode, silicon; large signal rectifier	013-678
CR2	x	Same as CR1	
CR3	x	Same as CR1	
CR4	x	Same as CR1	
CR5	8	Diode, silicon; small signal switching	013-599
CR6	x	Same as CR5	
CR7	x	Same as CR5	
CR8	x	Same as CR5	
CR9	x	Same as CR5	
CR10	x	Same as CR5	
CR11	x	Same as CR5	
CR12	x	Same as CR5	
J1	1	Connector, receptacle, female; 21 sockets	146-057
J2	1	Connector, receptacle, male; 15 pins	147-007
J3	1	Connector, receptacle, female; 4 sockets	146-005
J4	8	Connector, receptacle, male; 2 pins	143-009
J5	x	Same as J4	
J6	x	Same as J4	
J7	x	Same as J4	
J8	x	Same as J4	
J9	x	Same as J4	
J10	x	Same as J4	
J11	x	Same as J4	
J12		Connector, receptacle, male; 3 pin	143-008
J13	x	Same as J12	
J14	x	Same as J12	
J15	x	Same as J12	
J16	x	Same as J12	
J17	x	Same as J12	
J18	x	Same as J12	
J19	x	Same as J12	
K1	4	Relay	020-577
K2	x	Same as K1	
K3	x	Same as K1	
K4	x	Same as K1	
Q1	1	Transistor, silicon; npn, power type	014-587
Q2	4	Transistor, silicon; compound npn	014-969
Q3	x	Same as Q2	
Q4	x	Same as Q2	
Q5	x	Same as Q2	
R1	1	Resistor, fixed, composition; 1,000 ohms, ±10%, 1w	041-146
R2	4	Resistor, variable, composition; 5,000 ohms, ±20%, 3/10w, linear taper	4520154-02
R3	x	Same as R2	
R4	x	Same as R2	
R5	x	Same as R2	
R6	4	Resistor, fixed, composition; 68,000 ohms, ±10%, 1/2w	041-070
R7	x	Same as R6	
R8	x	Same as R6	
R9	x	Same as R6	
VR1	1	Diode, Zener, 24 volts	013-712
	4	Spring, relay hold down	020-584
	4	Socket, relay	150-256

CONTROL UNIT  
Sel Sync

4890301-01

Ref. No.	Qty -01	Qty -02	DESCRIPTION	Ampex Part No.
	x	x	Control Unit, four channels	4020294-01
	x	x	Control Unit, eight channels	4020294-02
CR1	3	3	Diode, silicon	013-678
CR2	x	x	Same as CR1	
CR3	x	x	Same as CR1	
DS1	4	8	Lamp, 28 volt, amber; READY	132-099
DS2	x	x	Same as DS1	
DS3	x	x	Same as DS1	
DS4	x	x	Same as DS1	
DS5	-	x	Same as DS1	
DS6	-	x	Same as DS1	
DS7	-	x	Same as DS1	
DS8	-	x	Same as DS1	
DS9	2	2	Lamp, 28 volt; SYNC REPRO	060-019
DS10	x	x	Same as DS-9; PLAY REPRO	
DS11	1	1	Lamp, 28 volt, red; RECORD	132-100
DS12	1	1	Lamp, 28 volt, green; PLAY	060-338
K1	1	1	Relay, 4 pole double throw	020-144
R1	3	3	Resistor, fixed, composition; 180 ohms, ±10%, 1/2W	041-257
R2	x	x	Same as R1	
R3	x	x	Same as R1	
S1	4	8	Switch, dpdt; READY-SAFE	120-842
S2	x	x	Same as S1	
S3	x	x	Same as S1	
S4	x	x	Same as S1	
S5	-	x	Same as S1	
S6	-	x	Same as S1	
S7	-	x	Same as S1	
S8	-	x	Same as S1	
S9	2	2	Switch, pushbutton; SYNC REPRO	120-726
S10	x	x	Same as S9; PLAY REPRO	
S11	3	3	Switch, momentary; normally open; REWIND	4620144-10
S12	x	x	Same as S11; FAST FORWARD	
S13	1	1	Switch, momentary; normally open; RECORD	4620144-30
S14	x	x	Same as S11; PLAY	
S15	2	2	Switch, momentary; normally closed; STOP	4620144-20
S16	x	x	Same as S15; EDIT	
	1	1	Bracket, relay	4260128-01
	1	1	Bracket, switch	4260127-01
	1	1	Button, "PLAY REPRO"	4100066-01
	1	1	Button, "SYNC REPRO"	4100066-02
	3	3	Button, white	4100183-01
	1	1	Button, yellow	4100183-02
	1	1	Button, red	4100183-03
	1	1	Button, green	4100183-04
	1	-	Cable assembly, captive; 21 terminal	4050481-01
	-	1	Cable assembly, captive; 21 terminal	4050482-01
	1	1	Cable assembly, captive; 12 terminal	
	1	1	Housing, remote Sel Sync	
			Back	4150197-01
			Front	4150198-01
			Base	4330097-01
			Feet, rubber	250-017
	1	1	Panel, switch	4290686-01
	6	10	Retainer, lamp	435-069
	1	1	Socket, relay	150-119

**AMPEX**

4890301-01

8 CHANNEL

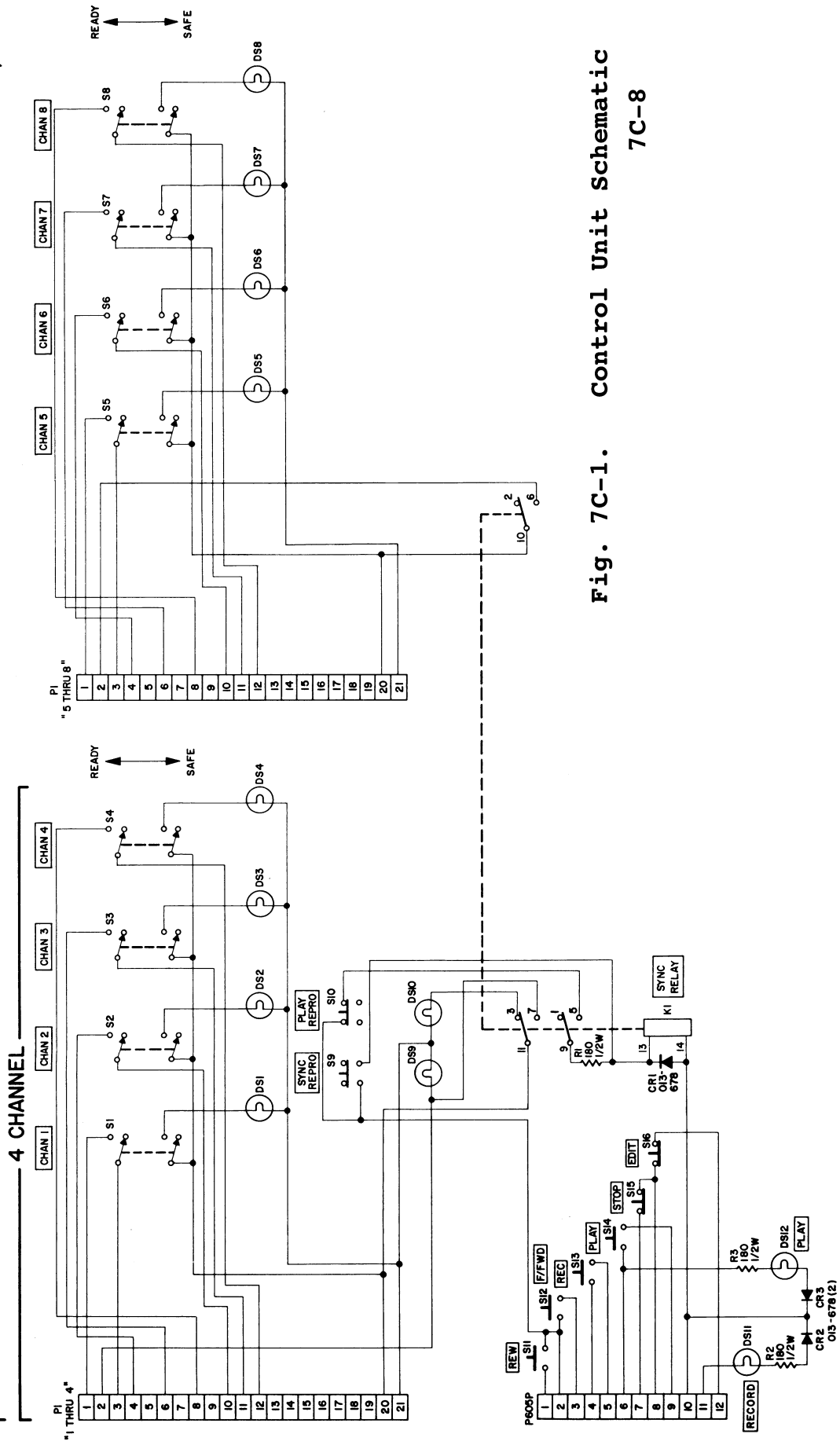


Fig. 7C-1. Control Unit Schematic  
7C-8

4890301-01

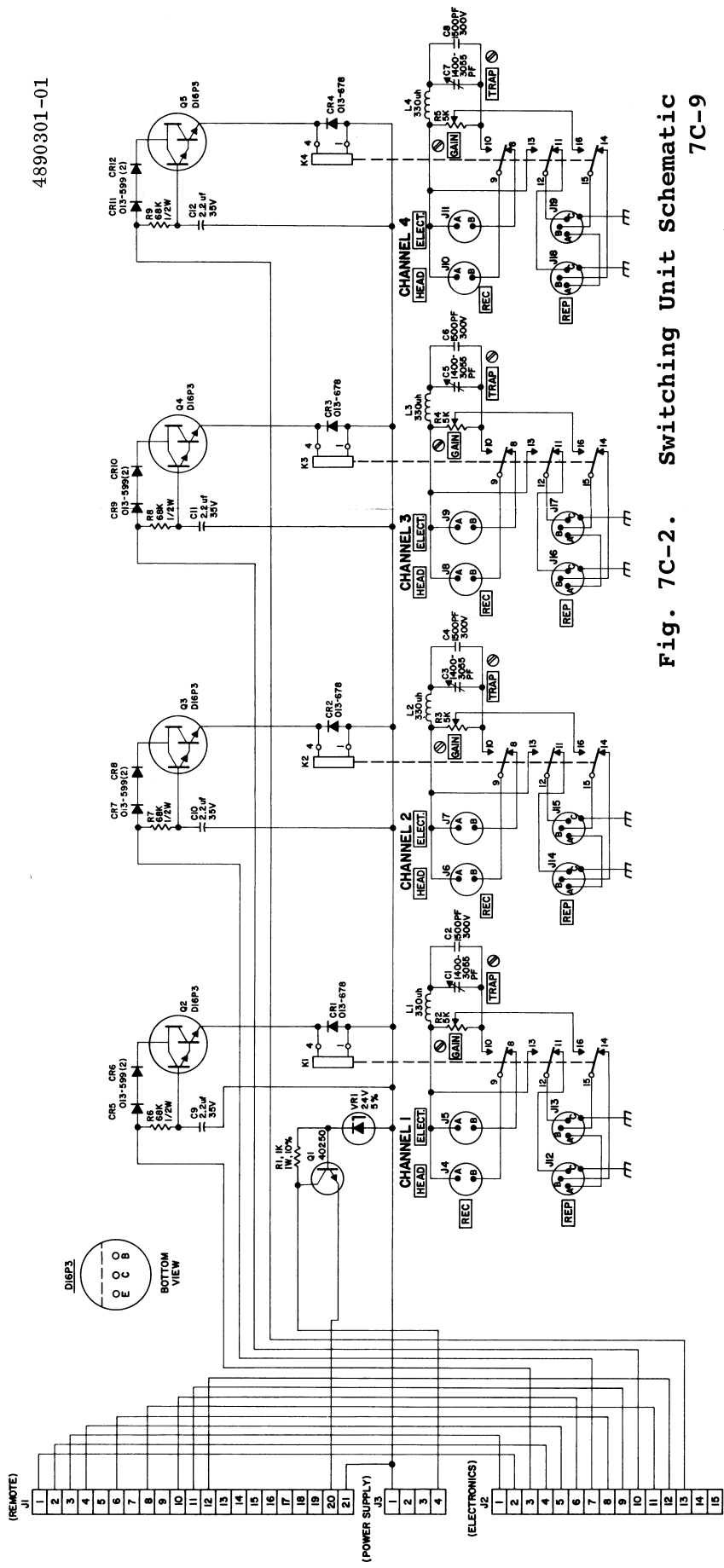


Fig. 7C-2. Switching Unit Schematic  
7C-9