

**AMPEX**

**DOCUMENT NO. 4940045-03**

# AG 440-8 Recorder/Reproducer

Instruction Manual

**DECEMBER, 1969**

**ERRATA**Date July 18, 1970PUBLICATION AG-440-8No. 4940045-03Errata 1REASON FOR ERRATA Update and improvement of Recorder/Reproducer

Page Reference	Nature of Errata
A	Change Page Number <u>Title Page</u>  ii from Original to July 1970 2 from October 1969 to July 1970 3 from Original to July 1970 4 from April 1969 to July 1970 11 from Original to July 1970 17 from December 1969 to July 1970 18 from December 1969 to July 1970 19 from December 1969 to July 1970
ii	Delete the following Figure numbers from List of Illustrations:  Figure 1, Y-Cable for Motor Drive Amplifier on page 4. Figure 14, Location of Mounting Screws for the Drive Motor on page 11.
2	After the word "Crosstalk" insert the words "Playback Only".
3	Delete all of paragraph relating to Dimensions except: Console: 65 inches high (to top of electronic housing), 24-1/2 inches wide, 30 inches deep. Add the following to the paragraph: "The AG-440-8 is not factory equipped for rack mounting."
3	Under MODIFICATIONS NO. 2 change sentence to read as follows: Line power fuses F601, F602, and F603 are now 5-amp Slo-Blo fuses.
3	Under MODIFICATIONS NO. 6 change R610 to R630, 10 ohms, 55 watts.

## ERRATA

No. 4940045-03

Page Reference	Nature of Errata
4	In the fourth line from the top change the word boxed to boxes. Delete remainder of page 4, including Figure 1, beginning with the second paragraph: A Y-cable (see----
11	Delete entire page including Figure 14.
17	From item 33 delete the reference R604, 605.
17	Delete item 36.
18	From item 76 delete the reference R610.
19	Add the reference F601, F602, F603 to item 85 and change QTY REQD PER DASH NUMBER in the -06 column from 2 to 3.
22	Change fuse ratings of F601, F602, and F603 to read 5A.

LIST OF EFFECTIVE PAGES

Page Number Title Page	Issue
A	December 1969
i	April 1969
ii	Original
1	April 1969
2	October 1969
3	Original
4	April 1969
5	Original
6	April 1969
7	April 1969
8	April 1969
9	Original
10	Original
11	Original
12	Original
13	December 1969
14	December 1969
15	December 1969
16	December 1969
16a	December 1969
17	December 1969
18	December 1969
19	December 1969
20	Original
21	Original
22	December 1969
23	Original
24	Original
25	Original
26	April 1969
27	April 1969
28	April 1969



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This document is to be used in conjunction with the standard AG 440 manual. At the present time information pertaining to standard AG 440 equipment is contained in two documents - Document No. 4890172 (AG 440 and AG 445) and Document No. 4890301 (AG 440B and AG 445B). Both of these volumes are supplied along with this modification description for use with the 8-channel machine.



IWA 045-02

AG 440-8 RECORDER/REPRODUCER  
CATALOG NO. 4010138-01

Described in this document is the Ampex 8-channel Magnetic Tape Recorder and Reproducer Model AG 440-8. The unit consists of an AG 440 Recorder/Reproducer which has been modified to include an additional four channels and to accommodate 1-inch tape. This document is to be used in conjunction with the standard AG 440 manual; the information contained herein is supplementary to and supersedes data in that manual.

Ampex Doc. No. 4940045

SPECIFICATIONS FOR THE AG 440-8

Tape Speeds	7-1/2 and 15 ips, Metric Conversion Table	
	<u>ips</u>	<u>CM/sec</u>
	7-1/2	19.05
	15	38.10
Frequency Response	15 ips $\pm 2$ dB, 30-18,000 Hz 7-1/2 ips $\pm 2$ dB, 40-10,000 Hz +2, -4, 40-15,000 Hz	
Signal-to-Noise Ratio	15 ips and 7-1/2 ips, 60 dB Peak record level to unweighted noise (30 to 18,000 Hz). Includes bias, erase and playback amplifier noise using Ampex 404 series or equivalent tape.	
Crosstalk	Better than 60 dB at 500 Hz	
Flutter	15 ips below 0.08% rms 7-1/2 ips below 0.1% rms	
Playback Output	+8 dBm into 600 ohm restrappable for +4 dBm output, balanced or unbalanced. Maximum of +29 dBm before clipping.	
Record Input	100K ohm unbalanced bridging with dummy plug supplied or 20K ohm balanced bridging with plug-in transformer supplied with each electronics (-17 dBm produces recommended operating level)	
Electronic Adjustments	Accessible-from-front: equalization, reproduce level, record level, reproduce calibration, record calibration, bias adjustment, bias calibration, erase adjustment. SEL-SYNC level and bias trap adjustment on rear of chassis.	
Start/Stop	Start: tape at full speed in less than 1/10 sec. Stop: at 15 ips, tape moves less than 3 inches after pressing stop button.	
Playback Timing Accuracy	$\pm 0.2\%$ ( $\pm 3.6$ seconds in 30 minutes recording time)	

## SPECIFICATIONS

Tape Width	1-inch tape
Reel Size	Standard up to 10-1/2 inch reels, adjustable up to 11-1/2 inch reels.
Equalization	All standard models supplied with NAB equalization. CCIR curves available on special order.
Power Requirements	117 Volts nominal @ 4.6 amps. Machines are supplied with 3 wire grounding power cord.
Dimensions	Standard 19-inch wide panels with commercial notching for rack mounting. Tape transport: uses 15-3/4 inches of rack space (10-1/2-inch NAB reels overhand 1-1/8 inches from side edges and 2-5/8 inches above transport). Electronics: 28 inches of rack space. Console: 65 inches high (to top of electronics housing), 24-1/2 inches wide, 30 inches deep.

## MODIFICATIONS

Modifications to the basic AG 440 machine include the additional four channels, changes to the tape transport control box, the addition of a torque delay box, the addition of a power boost assembly, and an additional power supply. For improved ventilation, a fan has been installed below the tape transport.

Following are the changes which have been made to the control box circuitry. (Refer to Figure 16, Dwg. No. 4840184, the revised tape transport wiring diagram. See also Figure 2, 3, and 4.)

1. Resistors R604 and R605 are now 35 ohms, 55 watts, variable to 10%.
2. Line power fuses F601 and F602 are now 5-amp Slo-Blo fuses.
3. Receptacle J604S on the control box chassis, previously available as an input for a 60 Hz amplifier, now receives the cable from the power boost assembly.
4. The reel size takeup and rewind switches are not functional on the AG 440-8. The position of these switches is of no significance, since they are internally by-passed.
5. Resistors R606 and R608, the small reel takeup and supply tension adjustments, are not functional.
6. Fixed resistor R610 has been added in series with R604 and R605.

The Torque Delay box is mounted on the rear of the console and delays the torque to the supply motor until the tape is up to speed. (See Figure 18)

The power boost assembly, which is mounted on the back of the tape transport (see Figure 5), provides additional torque to the takeup reel to facilitate the handling of 1-inch tape. It also provides a momentary full-takeup torque to start tape motion in the PLAY and RECORD modes. The power supply boxes have been placed on nut plates and mounted on the shelf at the rear of the console (see Figure 6). The additional power supply handles the added four channels on the AG 440-8. The upper four channels on the console are provided with 39 volts dc ( $-1/2 + 1$ ) by the left-hand (-03 version) supply box, while the lower four channels are powered by the right-hand (-04 version) power supply box. The -03 version contains a master bias oscillator; the -04 version does not. (See Figures 7 and 8.) A jumper wire between the two power supplies carries bias to the -04 version.

A Y-cable (see Figure 1) is supplied in the event that a motor drive amplifier is to be used with the AG 440-8. The stem of the Y-cable is connected to receptacle J607S on the control box and the rewind motor cable is plugged into one of the two receptacles (which may be used interchangeably) at the other end of the Y-cable.

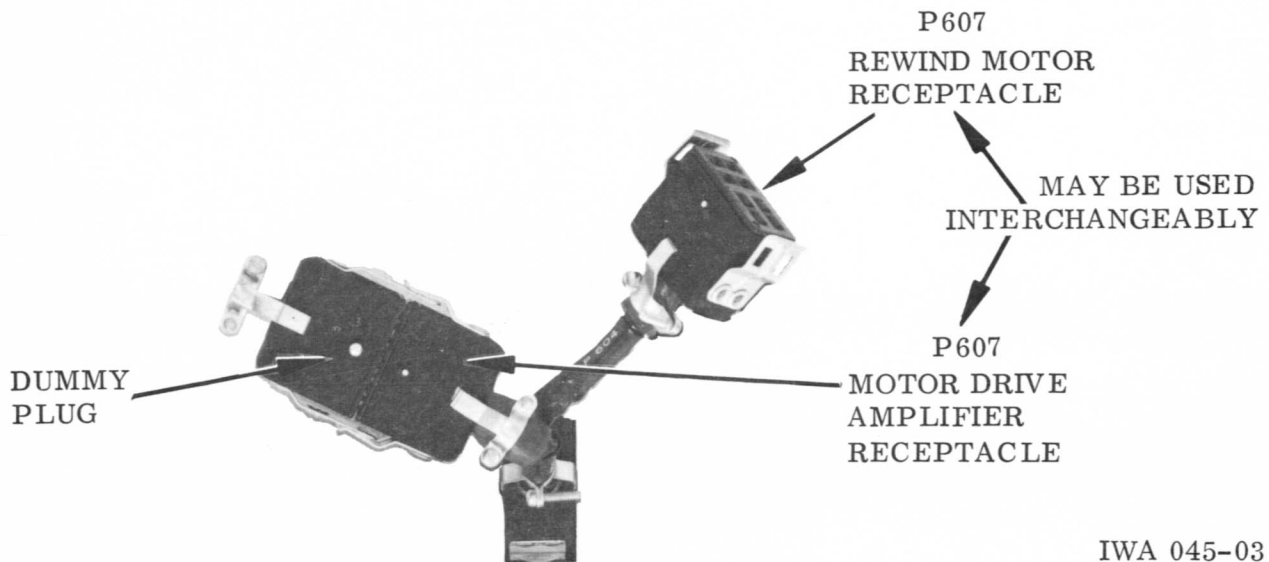
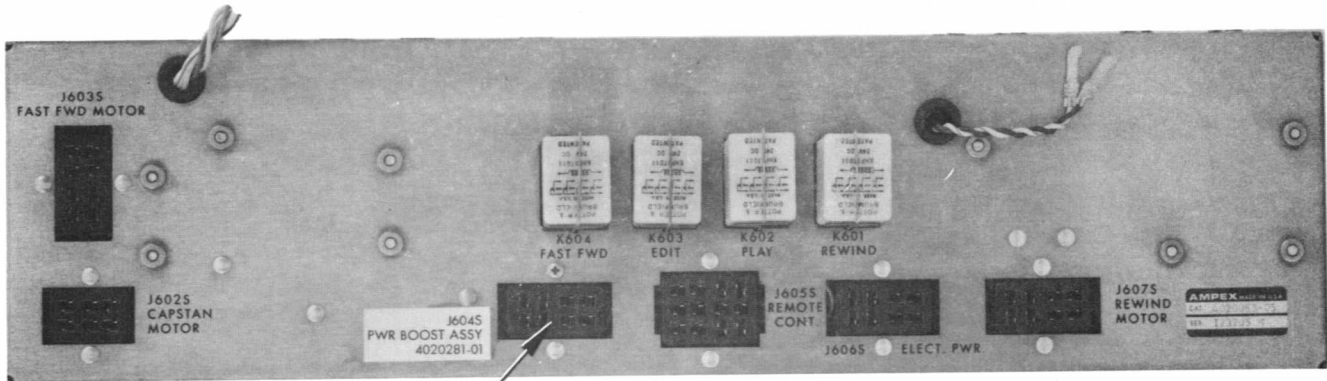


Figure 1. Y-Cable for MDA

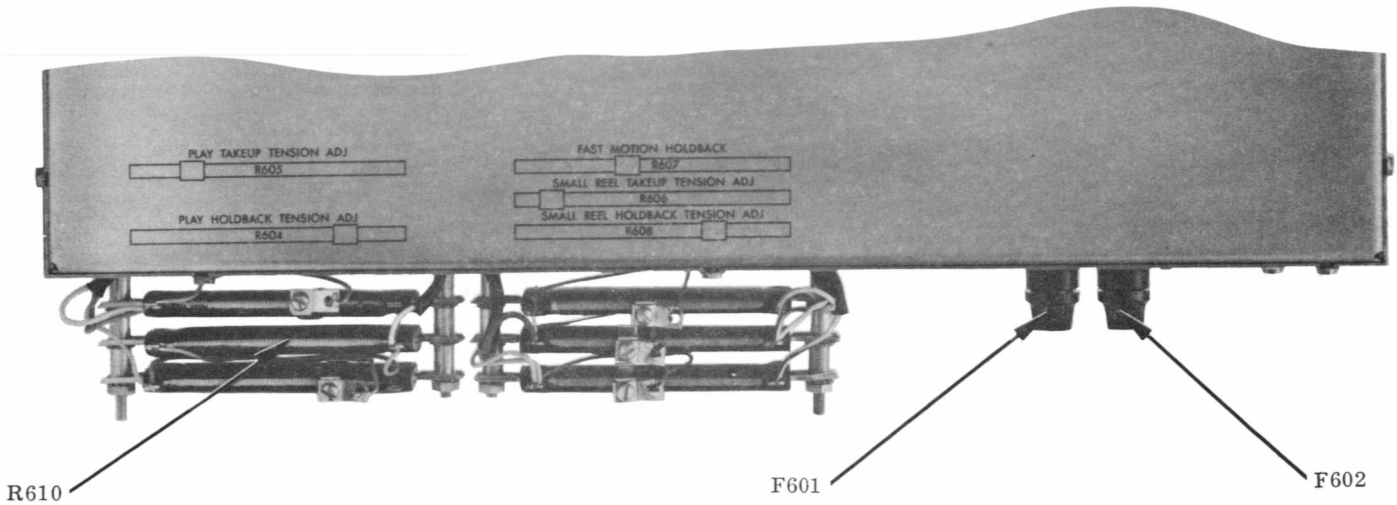
To connect a motor drive amplifier, remove the dummy plug from the Y-cable and connect the motor drive amplifier cable. If the motor drive amplifier is disconnected, the dummy plug should be replaced in the unused receptacle. If no motor drive amplifier is used with the AG 440-8, simply leave the dummy plug in place at all times.



RECEPTACLE FOR  
POWER BOOST  
ASSEMBLY

IWA 045-04

Figure 2. Control Box, Rear Panel



R610

F601

F602

IWA 045-05

Figure 3. Control Box, Front Panel

Ampex Doc. No. 4940045



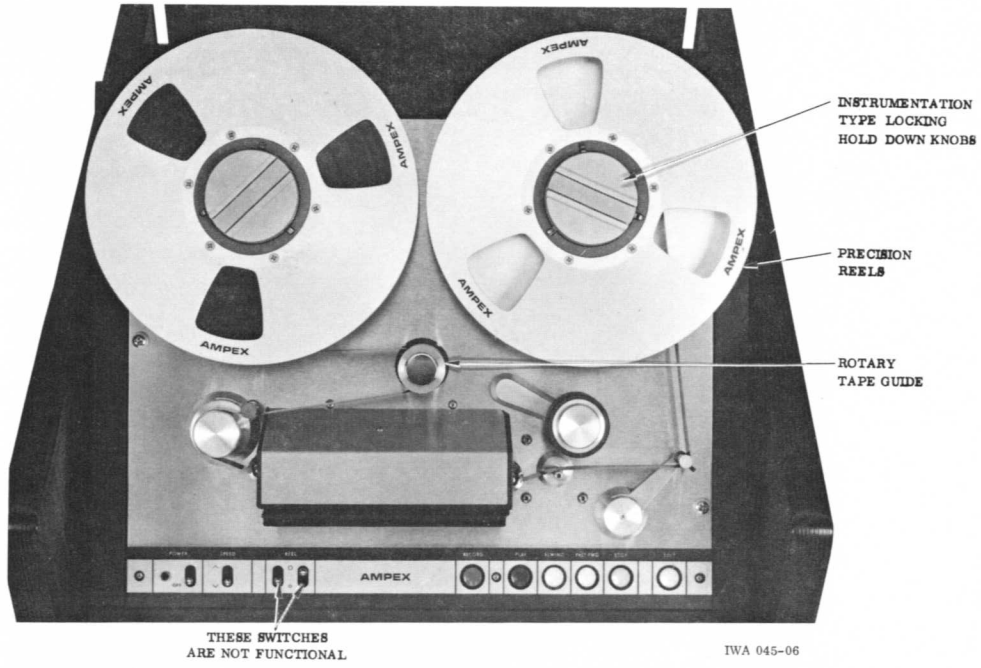


Figure 4. Tape Transport

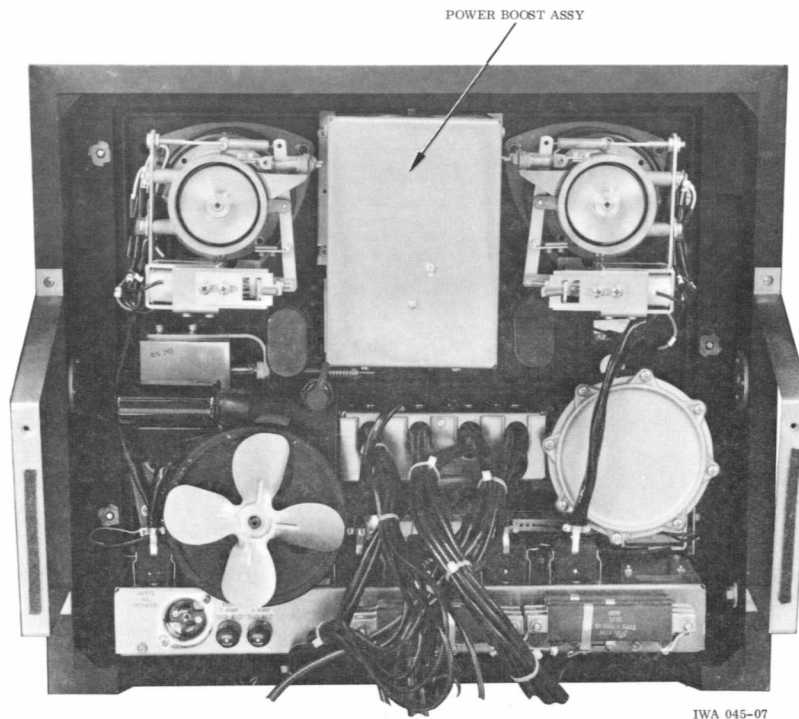
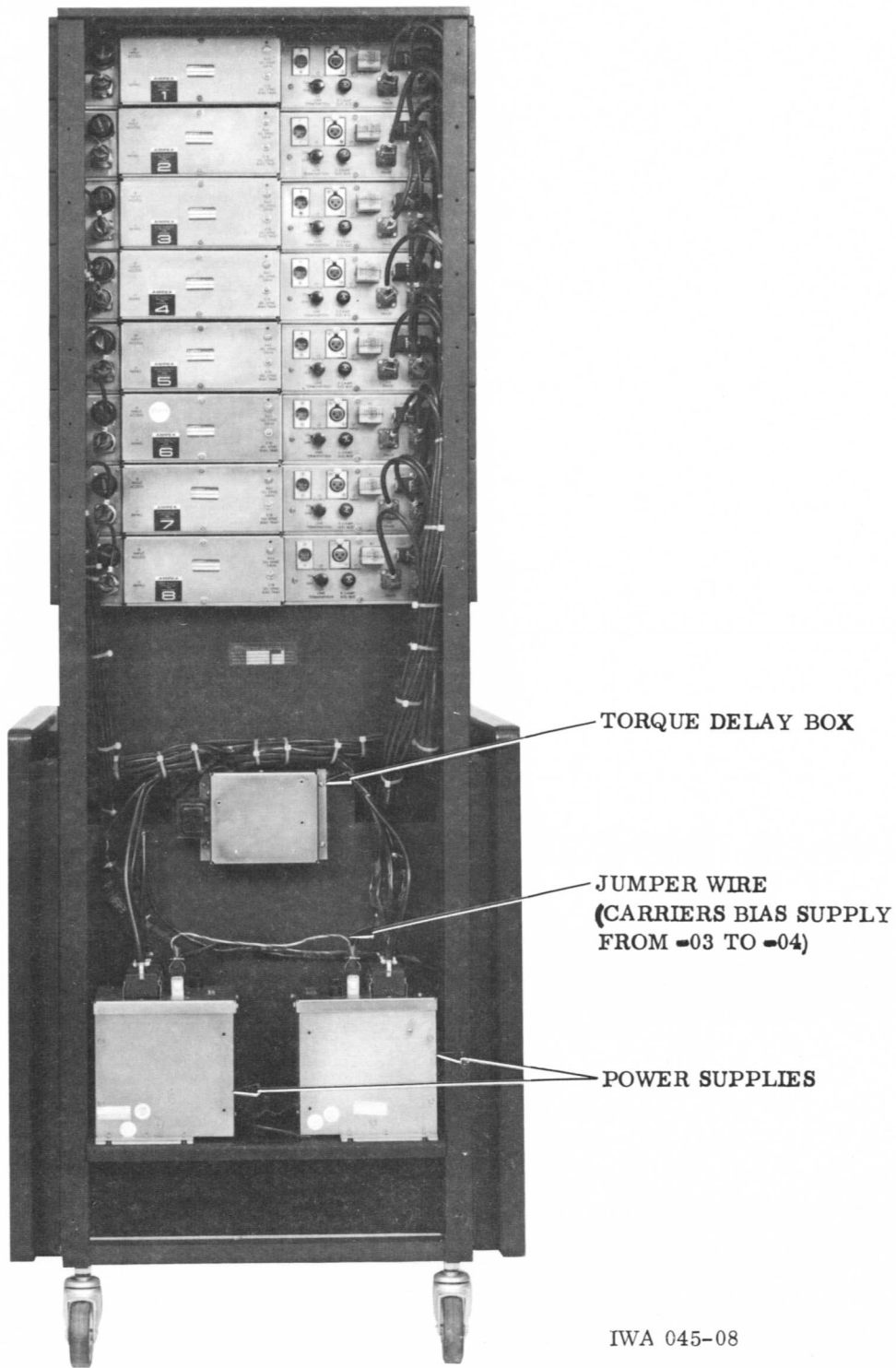


Figure 5. Tape Transport, Rear



TORQUE DELAY BOX

JUMPER WIRE  
(CARRIERS BIAS SUPPLY  
FROM -03 TO -04)

POWER SUPPLIES

IWA 045-08

Figure 6. AG 440-8, REAR VIEW

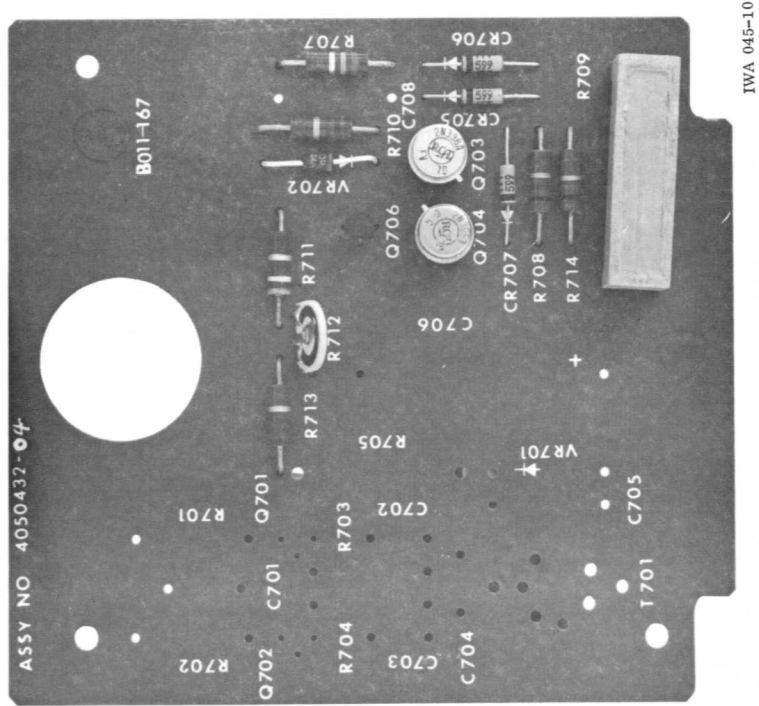


Figure 8. Power Supply PCB, -04 Version

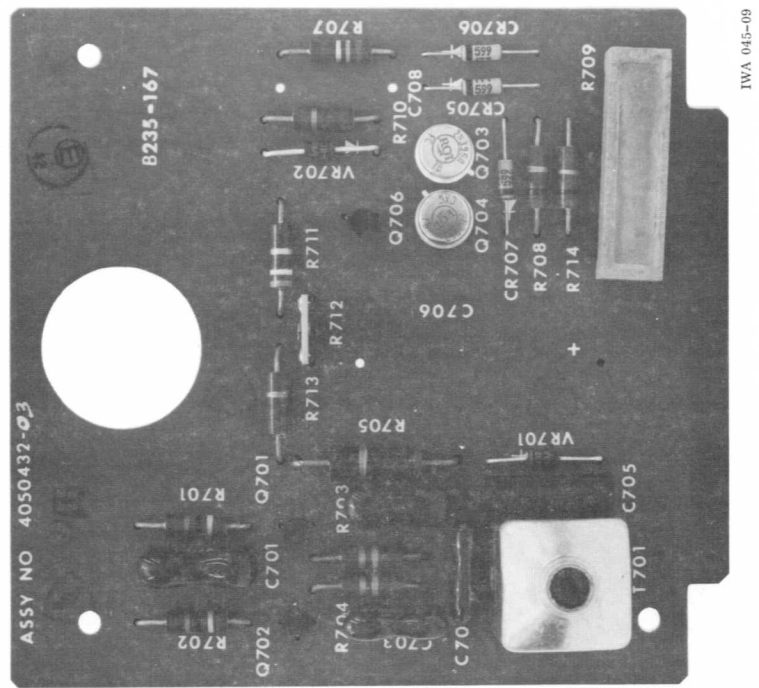
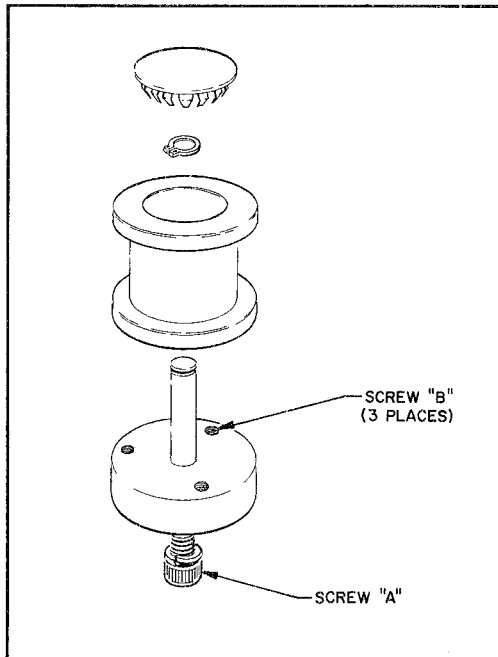


Figure 7. Power Supply PCB, -03 Version

**TAPE TRACKING ALIGNMENT PROCEDURE**

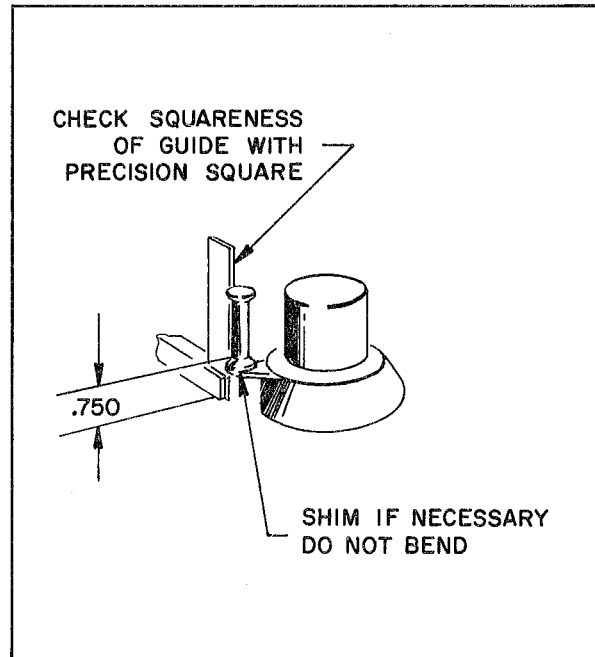
Care should be taken when making tape tracking adjustments on the AG 440-8. In order to ensure satisfactory performance the following procedure should be used.

1. Check to see that the tape is satisfactory. Place the machine in the PLAY mode and observe whether the tape rides high or low in the guides. Reverse the reels. If the tape now rides on the opposite sides of the guides this indicates that the tape is longer on one side than the other and should be replaced.
2. Check the vertical alignment of the rotating guide. During the PLAY mode the tape tension at the top and bottom of the tape should be equal around this guide. Adjustments are made as shown on Figure 9. Remove the rotating part of the guide, then tilt the base in the required direction to produce equal tape tension. To do this, loosen screw "A" on the under side of the transport slightly, then tilt the base by means of the 3 adjusting screws "B". Never turn these screws more than 1/8 turn without replacing the rotating element and rechecking the tape tension. Tighten screw "A" when satisfactory tension is achieved.
3. Check alignment of the tape guide on the reel idler tension arm (See Figure 10). The reel idler tape guide arm must be free moving but should not have any vertical play. (This is lapped fit; therefore, when the arm is moved a slightly "viscous" feeling should be noted.) While the tape is running, check the "squareness" of the guide with a precision square. If the guide is not square, twisting of the arm may be necessary.



IWA 045-11

Figure 9. Rotary Tape Guide



IWA 045-12

Figure 10. Reel Idler Tape Guide

4. Check the alignment of the take-up tension arm guide; the tape-guiding edge should position at .750 inches above the deck (See Figure 11). Using a precision square, check the "squareness" of the guide. If it is not square, twisting of the arm may be necessary. If the arm is too low, shim the guide; if it is too high, remove the shims.

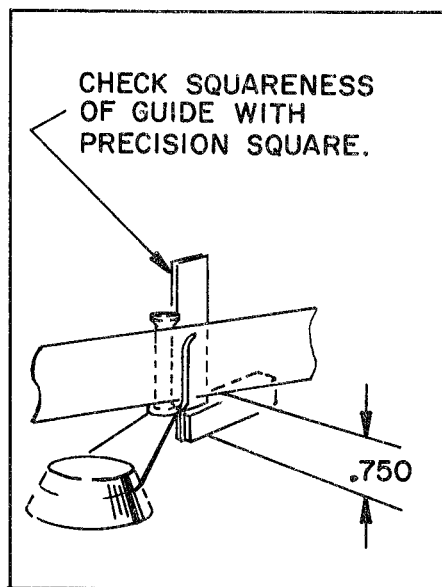
**CAUTION**

**DO NOT BEND THE ARM.**

5. To check the guides on the head housing, the head assembly must be removed (See Figure 12). The dimension .781 inches is from the lower surface of the guide to the face of the mounting bases on the underside of the head casting. The guides should also be checked for "squareness" by placing the head assembly on a flat surface and using a precision square.

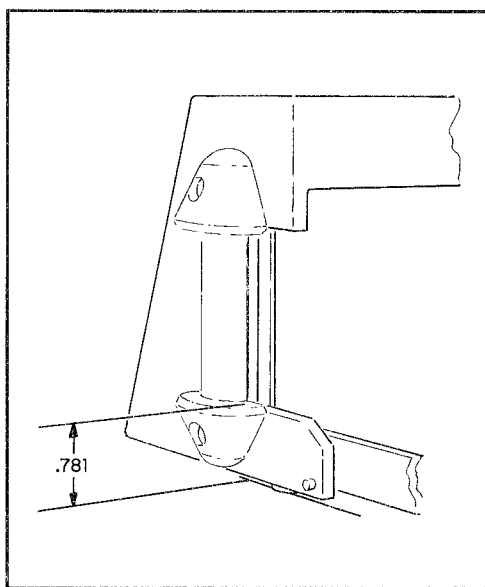
Note that these guides have been set at the factory by means of precision gauges. If any adjustment is necessary it should only be performed by qualified Ampex personnel.

6. The central guide Figure 13 can be checked while the head assembly is removed. Unfasten the single retaining screw and lift the guide complete with base. Check the height (.781 inches) with a micrometer and either add or remove shims to obtain the correct dimension.



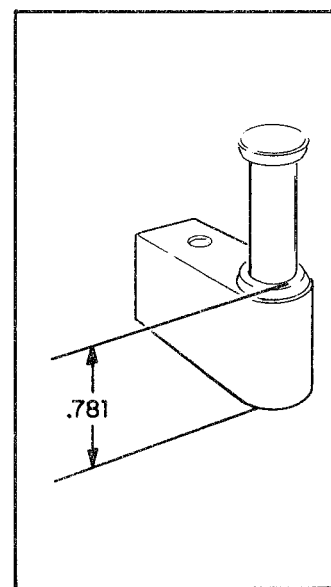
IWA 045-13

Figure 11. Take-up Tension Arm Guide



IWA 045-14

Figure 12. Tape Guide on Head Housing



IWA 045-15

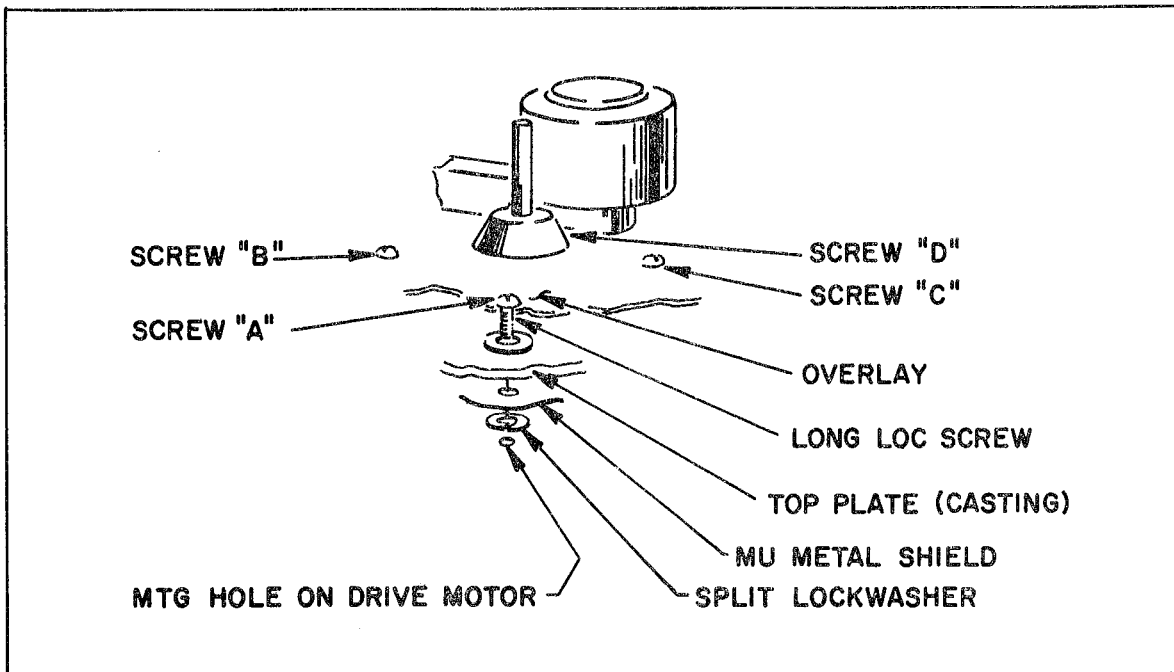
Figure 13. Tape Guide Between Heads

7. Alignment of the drive motor and head must be accomplished in unison, while the heads are mounted and the tape is threaded (See Figure 14). (The mounting screws of the drive motor are tightened or loosened in pairs for this adjustment; they are "Long-Loc" self-locking screws. A heavy lock washer, sandwiched between the drive motor and the shield, serves as a stiff spring.) Tighten each of the four screws; then back off each screw one-half turn. Place the machine in the PLAY mode and observe the position of the tape as it moves through the exit guide. If the tape rides high in the exit guide loosen screws "C" and "D"; if the tape rides low, loosen screws "A" and "B".

NOTE

Start with small adjustments and repeat if necessary. When the position of the tape in the exit guide has been properly adjusted, stop and start the machine and observe the crawl of the tape on the capstan idler. If the tape does not crawl up or down the idler when the machine is started in the PLAY mode, it is properly adjusted.

Head azimuth adjustment can now be made. Recheck the capstan alignment after completing azimuth adjustment, as a realignment may be necessary if azimuth was too far off during the first alignment.



IWA 045-16

Figure 14. Location of Mounting Screws for the Drive Motor

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## PARTS LIST AND SCHEMATIC

Included on the following pages are a list of materials pertaining to the modification and the schematic diagram of the modified tape transport.

# AMPEX

## 8 Channel Tape Recorder, 1-inch Tape Catalog No. 4010138

ITEM NO.	PART NUMBER	DWG. SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER																		
					-01																		
1	4020084-05	D	CONSOLE ASSY		1																		
2	4020260-05	LM	ELECTRONICS ASSY W/OUT EQUALIZERS		8																		
3	4020269-01	C	EQUALIZER ASSY, 7 $\frac{1}{2}$ -15 NAB		8																		
4	4020270-01	D	EQUALIZER ASSY, REPRODUCE NAB		8																		
5	4020274-03	LM	POWER SUPPLY ASSY		1																		
6	4020274-04	LM	POWER SUPPLY ASSY		1																		
7	<del>4020280-03</del>	<del>LM</del>	<del>TRANSPORT ASSY, 7<math>\frac{1}{2}</math>-15 60 CY.</del>		<del>1</del>																		
8	4020300-02	D	HEAD ASSY, 1" TAPE		1																		
9	4041048-03	C	SCRAPE FLUTTER IDLER ASSY		1																		
10	<del>4050416-01</del>	<del>C</del>	<del>CABLE ASSY, POWER</del>		<del>1</del>																		
11	4050442-01	C	CABLE ASSY, ELECTRONICS INTERCONNECT		8																		
12	4050455-01	D	BOX ASSY, HEAD CABLE MOUNTING		1																		
13	4050456-01	D	CABLE ASSY, POWER SUPPLY EXTENSION		1																		
14	4050457-01	D	CABLE ASSY, POWER SUPPLY JUMPER		1																		
15	4110109-01	C	LABEL, ELECTRONICS		1																		
16	4110109-02	C	LABEL, ELECTRONICS		1																		
17	4110109-03	C	LABEL, ELECTRONICS		1																		
18	4110109-04	C	LABEL, ELECTRONICS		1																		
19	4110109-05	C	LABEL, ELECTRONICS		1																		
20	4110109-06	C	LABEL, ELECTRONICS		1																		
21	4110109-07	C	LABEL, ELECTRONICS		1																		
22	4110109-08	C	LABEL, ELECTRONICS		1																		
23	4110200-10	C	PLATE, SYSTEM SERIAL NO.		1																		
24	4110273-43	D	MARKING CHART, NAMEPLATE, 60 CY.		1																		
25	4290643-01	C	SHIELD, RESISTOR (CONTROL BOX)		1																		
26	4580200-01	C	TRANSFORMER, BRIDGING		8																		
27	4600008-10	B	SHIELD, P/B HEAD, CONNECTOR		8																		
28	4690003-50	D	REEL ASSY, 10 $\frac{1}{2}$ x 1 TAPE		2																		
29	4050459-01	C	CABLE ASSY, FAN		1																		
30	018-294		ADHESIVE, SPRAY #77		a/r																		
31	144-003		CONNECTOR, PLUG, FEMALE, 3 PIN		8																		
32	145-009		CONNECTOR, PLUG, MALE, 3 PIN		8																		
33	<del>404-005</del>		<del>PIN, ESCUTCHEON, #16 x 3/8</del>		<del>2</del>																		
34	430-016		RING, RETAINER, 7/8"		8																		
35	470-384		SCREW #8-32 x 1/2, BUTTON HD, SOC.		2																		
36	471-084		SCREW #8-32 x 1 LG, PAN HD, XREC.		2																		
37	472-416		SCREW #10-24 x 7/16 LG, PAN HD, XREC.		2																		

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## 8 Channel Tape Recorder, 1-inch Tape (Cont'd)

ITEM NO.	PART NUMBER	DWG. SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER															
					-01															
38	472-889		SCREW #12-24 x 3/4, OVAL HD, XREC	16																
39	472-967		SCREW #12-24 x 1-1/4, OVAL HD, XREC.	3																
40	496-006		NUT #8-32, KEPS	2																
41	501-010		WASHER #8, FLAT	10																
42	502-004		LOCKWASHER #8	10																
43	502-005		LOCKWASHER #10	2																
44	503-087		WASHER #12, WHITE	19																
45	718-022		JIFFY BAG #7, 14 x 20	1																
46	302-336		CLAMP, CABLE, STRAP, BLUE	4																
47	471-081		SCREW #8-32 x 5/8 LG, PAN HD, XREC.	8																
48	4020280-04	LM	TRANSPORT ASSY, 7 1/2 - 15 60 Hz	1																
49	4260117-01	B	STRAP, RETAINING POWER SUPPLY	4																
50	4030099-01	B	TAPE GUIDE ASSY	1																
51	4020303-01	LM	TORQUE DELAY ASSY	1																
52	476-222		SCREW #6 x 7/16 LG WOOD, ROUND HD SLOTTED	4																
53	501-009		WASHER #6, FLAT	4																
54	4980076		WARRANTY CARD (DOMESTIC)	1																
55																				
56	4980152		WARRANTY CERTIFICATE	1																
57	4930504-01	B	NUTDRIVER, MODIFIED	1																
58	4050416-02	C	CABLE ASSY, POWER	1																
59																				
60																				
61																				
62																				
63																				
64																				
65																				
66																				
67																				
68																				
69																				
70																				
71																				
72																				
73																				
74																				
75																				
76																				
77																				
78																				
79																				
80	4840188	C	SCHEMATIC, TORQUE DELAY ASSY	REF																
81	4939002	D	TAPE TRACKING ALIGNMENT PROCEDURE	REF																
82	83-0119	B	CHECK-OUT SPECIFICATION	REF																

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# AMPEX

## Tape Transport Assembly, 1-inch Tape Catalog No. 4020280

ITEM NO.	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER									
					-01	-02	-03	-04						
1	4010825-02	C	OIL KIT, MOTOR		1	1	1	1						
2	<del>4020293-02</del>	<del>D</del>	<del>CONTROL BOX ASSY</del>											
3	4030279-14	C	CAPSTAN IDLER ASSY, 7 $\frac{1}{2}$ -15		1	1	1	1						
4	4030259-04	C	TAPE LIFTER ASSY		1	1	1	1						
5	<del>4030092-02</del>	<del>D</del>	<del>TAKE-UP ASSY</del>											
6	<del>4030093-02</del>	<del>D</del>	<del>REWIND ASSY</del>											
7	4030272-02	C	SOLENOID ASSY, CAPSTAN IDLER		1	1	1	1						
8	4030273-02	B	SOLENOID ASSY, TAPE LIFTER		1	1	1	1						
9	4040406-20	B	DUST CAP ASSY, CAPSTAN		1	1	1	1						
10	<del>4030196-20</del>	<del>C</del>	<del>FLYWHEEL ASSY, DAMPED</del>											
11	4040591-02	B	CAPACITOR ASSY		1	1	1	1						
12	4030094-01	B	ARM ASSY, CAPSTAN IDLER		1	1	1	1						
13	4040970-04	D	REEL IDLER ASSY		1	1	1	1						
14	4040974-06	D	TAKE-UP TENSION ARM ASSY		1	1	1	1						
15	4040990-03	C	TOP PLATE ASSY		1	1	1	1						
16	4040991-02	C	ESCUTCHEON ASSY		1	1	1	1						
17	4040993-11	D	DRIVE MOTOR ASSY, 7 $\frac{1}{2}$ -15 60~		1	1	1	1						
18	4020281-01	D	POWER BOOST ASSY		1	1	1	1						
19	<del>4030135-10</del>	<del>B</del>	<del>ROTARY TAPE GUIDE ASSY</del>											
20	4030135-30	B	ROTARY TAPE GUIDE ASSY				1	1						
21	4050361-10	B	CAPACITOR ASSY		2	2	2	2						
22	4050436-01	B	SAFETY SWITCH ASSY		1	1	1	1						
23	4100182-01	B	PUSHBUTTON (WHITE)		3	3	3	3						
24	4100182-02	B	PUSHBUTTON (YELLOW)		1	1	1	1						
25	4100182-03	B	PUSHBUTTON (RED)		1	1	1	1						
26	4100182-04	B	PUSHBUTTON (GREEN)		1	1	1	1						
27	4110266-02	D	ESCUTCHEON, PUSHBUTTON (RIGHT)		1	1	1	1						
28	4110267-02	C	GUARD, REEL		2	2	2	2						
29	4130103-01	B	PAD, TOGGLE SWITCH		4	4	4	4						
30	4170184-01	A	SHIELD, SWITCH		1	1	1	1						
31	4170237-10	A	LABEL, OILING INSTRUCTION		1	1	1	1						
32	<del>4020293-04</del>	<del>D</del>	<del>CONTROL BOX ASSY</del>											
33	4230160-10	B	ARM SOLENOID		1	1	1	1						
34	4220103-01	B	SPACER, REEL IDLER FLYWHEEL		1	1	1	1						
35	<del>4270252-01</del>	<del>C</del>	<del>SPRING TAPE LIFTER RETURN</del>											
36	4270117-01	C	SPRING TAPE LIFTER SOLENOID		1	1	1	1						
37	4290641-01	C	SHIELD, DRIVE MOTOR		1	1	1	1						

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Tape Transport Assembly, 1-inch Tape  
(Cont'd)

ITEM NO.	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER							
					-01	-02	-03	-04				
38	4330256-01	A	PLATE, MOTOR CAPACITOR MTG		2	2	2	2				
39	4330090-01	D	FACING, TOP PLATE		1	1	1	1				
40	4330255-01	A	PLATE, TAPE LIFTER SOLENOID MOUNTING		1	1	1	1				
41	4330257-01	B	PLATE, CAPSTAN SOLENOID MOUNTING		1	1	1	1				
42	4400594-01	A	SCREW, MODIFIED		2	2	2	2				
43	4440113-10	B	WASHER, .315 I.D. X .005 THK	a/r	a/r	a/r	a/r	A/R				
44	4440113-20	B	WASHER, .315 I.D. X .010 THK	a/r	a/r	a/r	a/r	A/R				
45	4440113-30	B	WASHER, .315 I.D. X .003 THK	a/r	a/r	a/r	a/r	A/R				
46	4440025-30	B	WASHER, LAMICOID .015 THK		1	1	1	1				
47	4270252-02	C	SPRING TAPE LIFTER RETURN								1	
48												
49	475-100		SCREW, #6-32 x 1/2 LG, PAN HD, XREC, SEM			1	1	1				
50	477-049		SCREW, #10-32 x 3/8 LG, SET, CUP POINT			3	3	3				
51	502-005		WASHER #10, LOCK SPRING		4	4	4	4				
52	087-359		GREASE, RPM #1	a/r	a/r	a/r	a/r	A/R				
53	6000035-02	C	LABEL, IDENTIFICATION		1	1	1	1				
54	472-415		SCREW, #10-24 x 3/8, MACH, PAN HD, XREC.		4	4	4	4				
55	501-011		WASHER #10 FLAT		4	4	4	4				
56	<del>502-005</del>		<del>WASHER #10 LOCK SPRING</del>									
57	087-056		GREASE, #107	a/r	a/r	a/r	a/r	A/R				
58	302-007		CLAMP, CABLE 1/4 I.D.		1	1	1	1				
59	406-005		PIN, "ROLLPIN" .028 WALL, .125 DIA x .75 LG		1	1	1	1				
60	472-481		SCREW, #10-24 x 11/16, BINDER HD, SLOT, SELF-LOCK		4	4	4	4				
61	470-427		SCREW, #6-32 x 3/8, CAP, HEX. SOC. BUT. HD		3	3	3	3				
62	473-123		SCREW, #8-32 x 1/2, MACH. HEX. HD		2	2	2	2				
63	471-081		SCREW, #8-32 x 5/8, MACH, XREC, PAN HD		4	4	4	4				
64	471-334		SCREW, #6-32 x 1/4, MACH. FLAT HD, XREC		1	1	1	1				
65	471-865		SCREW, #10-24 x 5/8, MACH, PAN HD, XREC		2	2	2	2				
66	<del>475-024</del>		<del>SCREW, #8-32 x 5/8, SEM, PAN HD, SLOTTED</del>									
67	475-080		SCREW, #6-32 x 1-1/8, SEM, PAN HD, XREC		2	2	2	2				
68	475-095		SCREW, #6-32 x 7/8, SEM, PAN HD, XREC		3	3	3	3				
69	477-046		SCREW, #8-32 x 5/8, SET, CUPPOINT, HEX. SOC.		1	1	1	1				
70	477-047		SCREW, #10-32 x 1/4, SET, CUPPOINT, HEX. SOC.		1	1	1	1				
71	477-115		SCREW, #8-32 x 1/8, SET, CUPPOINT, HEX. SOC.		1	1	1	1				
72	492-451		SCREW, 5/8-18, SELF-LOCKING, HEX.		1	1	1	1				
73	493-012		NUT, 1/4-20, SELF LOCKING, HEX.		6	6	5	6				
74	496-006		NUT, #8-32, KEPS		4	4	4	4				
75	501-006		WASHER, 1/4, FLAT		6	5	5	6				
76	501-010		WASHER #8, FLAT		10	10	10	10				
77	501-021		WASHER #6, FLAT		2	4	4	4				
78	501-908		WASHER #10, FLAT, .062 THK		2	2	2	2				
79	502-133		WASHER #8, LOCK SPRING		2	2	2	2				
80	502-016		LOCKWASHER #10, FLAT, EXT. TOOTH		2	2	2	2				
81	591-001		FAN, 5" DIA.		1	1	1	1				
82	501-040		WASHER, FLAT, .171 I.D. X .375 O.D. X .062 THK		2	2	2	2				

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## Tape Transport Assembly, 1-inch Tape (Cont'd)

ITEM NO.	PART NUMBER	DWG. SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER															
					-03	-04														
83	435-164		CLIP, CABLE		1	1														
84	470-165		BOLT #1/4 - 28 x 1/2 LG, HEX SOCKET CAP HD	(20)	1	1														
85	501-012		WASHER, .265 I.D. x .500 O.D. x .064 THK	(20)	1	1														
86	475-022		SCREW, #8-32 x 3/8, SEM, PAN HD, SLOTTED		1	1														
87																				
88	4030300-01	D	TAKE-UP ASSY			1														
89	4030301-01	D	REWIND ASSY			1														
90	4020293-06	D	CONTROL BOX ASSY			1														
91	4030196-40	C	FLYWHEEL ASSY, DAMPED			1														
92																				
93																				
94																				
95																				
96																				
97																				
98																				
99																				
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126																				
127	4840184	D	SCHEMATIC, TAPE TRANSPORT	REF REF																

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# AMPEX

## Control Box Catalog No. 4920293

ITEM NO.	PART NUMBER	DWG SIZE	D	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER						
						-01	-02	-03	-04	-05	-06	
1	<del>4050971-04</del>	D		CHASSIS, CONTROL BOX				1				
2	<del>4050419-04</del>	D		HARNASS ASSY, CONTROL BOX				1		1		
3	4050444-01	B		DUMMY PLUG, REMOTE CONTROL P605P				1	1	1	1	
4	4050472-02	C		P.W.BOARD ASSY, RECORD AND TAPE LIFT DELAY				1	1	1	1	
5	4170108-02	C		INSULATOR, TRANSFORMER WRAPAROUND				1	1	1	1	
6	4260399-01	B		BRACKET, TRANSISTOR MOUNTING		2	2	2	2	2	2	
7	4041015-01	D		COVER ASSY, CONTROL BOX				1	1	1	1	
8	4580198-01	C		TRANSFORMER, POWER T601				1	1	1	1	
9	4600149-01	C		SHIELD, POWER TRANSFORMER				1	1	1	1	
10	4600150-01	C		SHIELD, POWER TRANSFORMER		2	2	2	2	2	2	
11	4620064-01	B		SWITCH, PUSHBUTTON S608, 611		2	2	2	2	2	2	
12	4610083-01	B		LAMP HOLDER, PILOT LIGHT				1	1	1	1	
13	4620053-01	B		SWITCH, SPEED, 3PDT TOGGLE S602			1	1	1	1	1	
14	4620144-10	D		SWITCH, PUSHBUTTON NO S604, 605		2	2	2	2	2	2	
15	4620144-20	D		SWITCH, PUSHBUTTON NC S606			1	1	1	1	1	
16	4620144-30 <del>4620040-00</del>	D		SWITCH, PUSHBUTTON NO S609			1	1	1	1	1	
17	<del>THRU-99</del>	B		WIRE, #22 GA, BUNCH TINED	S.P. 477							
18	4620199-01	C		SWITCH, POWER S601			1	1	1	1	1	
19	4620200-01	C		SWITCH, REEL SIZE S607, 610		2	2	2	2	2	2	
20	6000035-02	C		LABEL, IDENTIFICATION			1	1	1	1	1	
21												
22	013-678			DIODE, SILICON CD451 CR601 THRU 606,608,609, 611,612,614 THRU 618		15	15	15	15	15	15	
23	014-611			TRANSISTOR, 2N3638 Q601			1	1	1	1	1	
24	014-728			TRANSISTOR, 40022 Q602			1	1	1	1	1	
25	020-144			RELAY, 4PDT K601, 602, 603, 604		4	4	4	4	4	4	
26	030-001			CAPACITOR, CERAMIC .02MFD,500V C602, 603 604, 605		4	4	4	4	4	4	
27	031-134			CAPACITOR, ELECT. 500MFD,50V C609			1	1	1	1	1	
28	030-465			CAPACITOR, .005 MFD,1400V C606, 607		2	2	2	2	2	2	
29	035-985			CAPACITOR, .047 MFD,400V,20% C608,613, 615,616		4	4	4	4	4	4	
30	041-032			RESISTOR, FIXED, COMP. 10 OHMS, 1/2W, 10% R601			1	1	1	1	1	
31	041-147			RESISTOR, FIXED, COMP. 1.2K OHMS, 1W, 10% R602, 603		2	2	2	2	2	2	
32	059-013			RESISTOR 750 OHMS, 55W, ADJ R607			1	1	1	1	1	
33	059-014			RESISTOR 150 OHMS, 55W, 10% ADJ R604,605 606,608		4	2	4	2	4	2	
34	014-630			TRANSISTOR, 2N3055 Q606			1	1	1	1	1	
35	060-323			LAMP, 120V, .025 AMP DS601			1	1	1	1	1	
36	070-002			FUSE, 3AMP SLO-BLO F601, 602		2		2		2		
37	085-001			FUSEHOLDER, SHORT BODY		2	2	2	2	3	3	

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## Control Box (Cont'd)

ITEM NO.	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQU PER DASH NUMBER						
					-01	-02	-03	-04	-05	-06	
38	031-624		CAPACITOR, ELEC. 150 MFD, 180V	C614		1	1	1	1	1	1
39	059-236		RESISTOR, WW, 40 OHMS, 20W	R609		1	1	1	1	1	1
40	041-166		RESISTOR, FIXED, 47K, 1W, 10%	R611		1	1	1	1	1	1
41	<del>147-079</del>		<del>CONNECTOR, POWER, 3 CONTACTS, MALE</del>	<del>J6015</del>		1					
42	150-119		SOCKET, RELAY		4	4	4	4	4	4	4
43	014-703		WASHER, MICA, TRANSISTOR MOUNTING		2	2	2	2	2	2	2
44	172-003		TERMINAL, SOLDER LUG, #6, LOCK		2	2	2	2	2	2	2
45	172-010		TERMINAL, SOLDER LUG, #6, PLAIN		4	4	3	3	3	3	3
46	503-089		WASHER, SHOULDER, NYLON (24) (34)		4	4	4	4	4	4	4
47	611-199		WIRE, #24 GA, STRANDED, VIO	a/r	a/r	a/r	a/r	a/r	a/r	a/r	a/r
48	260-017		GROMMET, 3/8 I.D. X 5/8 O.D. X 1/4 THK		2	2	2	2	2	2	2
49	301-011		CLAMP, CAPACITOR		2	2	2	2	2	2	2
50	302-006		CABLE CLAMP, PLASTIC 7/16 I.D.		2	2	2	2	2	2	2
51	145-501		CONNECTOR, POWER, 3 CONTACT, MALE	J6015			1	1	1	1	1
52	471-071		SCREW, #6-32 X 1/2 LG, PAN HD, XREC (24) (34)		4	4	4	4	4	4	4
53	471-069		SCREW, #6-32 X 3/8 LG, PAN HD, XREC (41)		2	2	2	2	2	2	2
54	471-521		SCREW, #6-32 X 2, ROUND HD (8)		2	2	2	2	2	2	2
55	472-408		SCREW, #8-32 X 1-3/4 LG, PAN HD, XREC (32,33)		2	2	2	2	2	2	2
56	472-409		SCREW, #8-32 X 2 LG, PAN HD, XREC (32,33)		2	2	2	2	2	2	2
57	475-058		SCREW #6-32 X 3/8 LG, SEMS, PAN HD, XREC (86) (87)	(50, 51)	6	6	5	6	6	6	6
58	475-064		SCREW #6-32 X 1/4 LG, SEMS, PAN HD, XREC (6,12,49)		7	7	7	7	7	7	7
59	476-998		SCREW #6-32 X 1/4 LG, HEX HD, SELF TAPPING (8)		6	6	5	6	6	6	6
60	476-200		SCREW #6 X 3/16, HEX HD, SELF TAPPING (7)		5	5	5	5	5	5	5
61	496-005		NUT, #6-32, KEPS (34) (24,41)		6	6	5	6	6	6	6
62	496-006		NUT, #8-32 KEPS (55,56)		6	6	5	6	6	6	6
63	501-009		WASHER #6, FLAT (86,87) (34) (24)		8	8	3	8	8	8	8
64	501-617		WASHER, #8, FLAT, 3/64 THK (32,33,81,82)		4	8	4	8	4	8	8
65	502-347		LOCKWASHER, FLAT, 7/16, INT. TOOTH (11,13,14,15,16,18,19)		10	10	10	10	10	10	10
66											
67	506-013		WASHER, #6 "D", CABLE CLAMP (50,51)		2	2	2	2	2	2	2
68	600-036		SLEEVING, TEFLON, CLEAR #20	a/r	a/r	a/r	a/r	a/r	a/r	a/r	a/r
69	600-288		SLEEVING, FIBER GLASS, BLACK #8	a/r	a/r	a/r	a/r	a/r	a/r	a/r	a/r
70	615-002		WIRE, #22 GA, BARE SOLID	a/r	a/r	a/r	a/r	a/r	a/r	a/r	a/r
71	280-026		SPACER, PLAIN		2			2			
72	600-131		SLEEVING, THERMO FITTING, 1/8, CLEAR	a/r	a/r	a/r	a/r	a/r	a/r	a/r	a/r
73	471-064		SCREW, #4-40 X 1/2, MACH, PAN HD, XREC (39)		2	2	2	2	2	2	2
74	496-004		NUT, #4-40, KEPS (73)		2	2	2	2	2	2	2
75	502-025		LOCKWASHER, #6, FLAT, INT. TOOTH (54)		2	2	2	2	2	2	2
76	041-257		RESISTOR, 180 OHMS, 1/2W, 10%	R610, 615	2	2	2	2	2	2	2
77	035-999		CAPACITOR, .1 MFD, 400V, 20%	C610, 611, 612	3	3	3	3	3	3	3
78	041-038		RESISTOR, 100 OHMS, 1/2W, 10%	R612, 613, 614	3	3	3	3	3	3	3
79	020-492		SPRING, RELAY HOLD DOWN		4	4	4	4	4	4	4
80	<del>605-60-02</del>	0	<del>HARNES ASSY, CONTROL BOX</del>			1					1
81	059-166		RESISTOR, 35 OHMS, 55W, 10% ADJ.	R604, 605		2		2		2	
82	059-188		RESISTOR, 10 OHMS, 55W, 10%	R630		1		1		1	

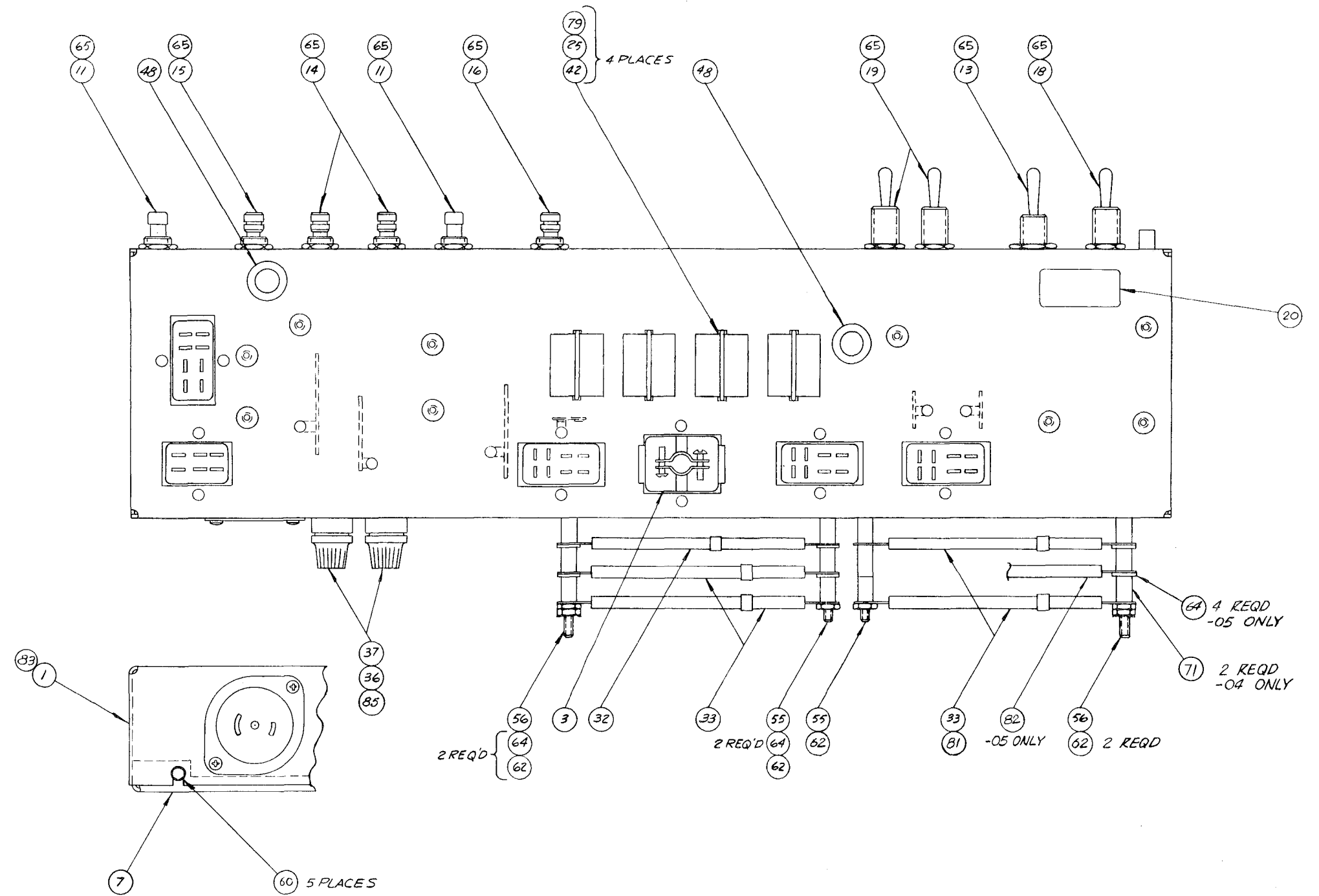
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## Control Box (Cont'd)

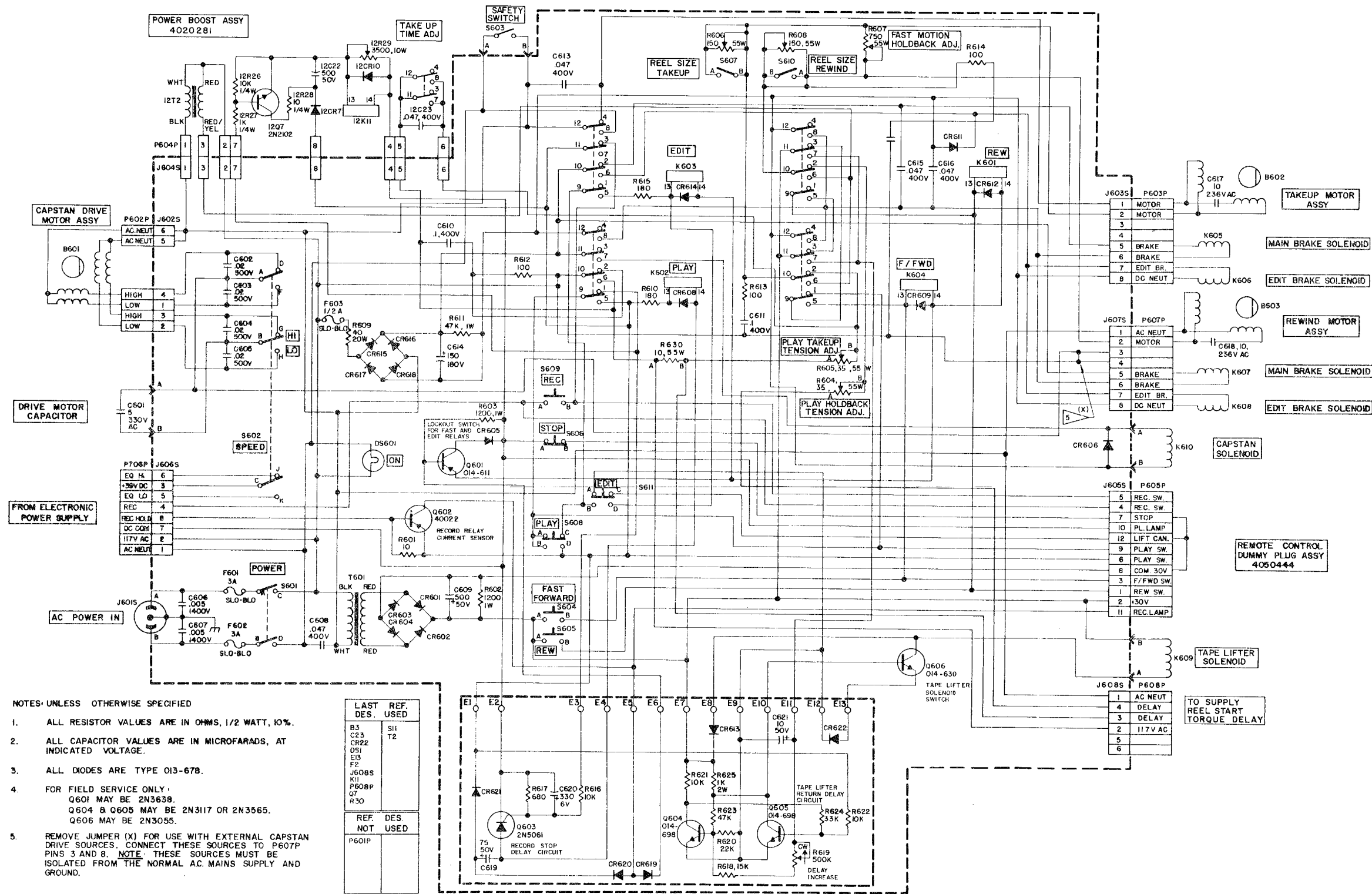
ITEM NO	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER					
					.01	.02	-03	-04	-05	-06
83	<del>4040971-05</del>	<del>D</del>	<del>CHASSIS, CONTROL BOX</del>							
84	070-026		FUSE, 1/2 AMP 125V, SLO-BLO F603						1	1
85	070-020		FUSE, 5 AMP SLO-BLO		2		2			2
86	<del>4050472-01</del>	<del>C</del>	<del>PCB ASSEMBLY</del>							
87	280-163		SPACER, 1" LONG, #6-32 THRU		2	2	2	2	2	2
88	144-013		CONNECTOR, RECT. PLUG, 6 SOC. J608S							1
89	262-003		BUSHING, SLEEVE, FLANGED .312 I.D.							1
90	600-010		SLEEVING, PLASTIC, BLK.		a/r		a/r		a/r	
91	<del>614-686</del>		<del>WIRE #22 GA, BUNCH TINNED, BLK</del>		A/R	A/R	a/r	a/r		
92	614-690		WIRE #22 GA, BUNCH TINNED, YEL		A/R	A/R	a/r	a/r	a/r	a/r
93	614-692		WIRE #22 GA, BUNCH TINNED, BLU		A/R		a/r		a/r	
94	614-693		WIRE #22 GA, BUNCH TINNED, VIO		A/R	A/R	a/r	a/r	a/r	a/r
95	614-694		WIRE #22 GA, BUNCH TINNED, GY		A/R		a/r		a/r	
96	614-695		WIRE #22 GA, BUNCH TINNED, WHT		A/R	A/R	a/r	a/r	a/r	a/r
97	617-299		WIRE #22 GA, BUNCH TINNED, WHT/BLK		A/R	A/R	a/r	a/r	a/r	a/r
98	617-306		WIRE #22 GA, BUNCH TINNED, WHT/VIO		A/R	A/R	a/r	a/r	a/r	a/r
99										
100										
101										
102										
103	4040971-06	D	CHASSIS, CONTROL BOX						1	
104	4040971-07	D	CHASSIS, CONTROL BOX							1
105	4050419-05	LH	HARNESS ASSY, CONTROL BOX						1	
106	4050460-03	LH	HARNESS ASSY, CONTROL BOX							1
107										
108										
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126	4840183	D	SCHEMATIC	REF		REF		REF		
127	4840184	D	SCHEMATIC		REF		REF		REF	

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NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTOR VALUES ARE IN OHMS, 1/2 WATT, 10%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, AT INDICATED VOLTAGE.
3. ALL DIODES ARE TYPE 013-678.
4. FOR FIELD SERVICE ONLY:  
Q601 MAY BE 2N3638.  
Q604 & Q605 MAY BE 2N3117 OR 2N3565.  
Q606 MAY BE 2N3055.
5. REMOVE JUMPER (X) FOR USE WITH EXTERNAL CAPSTAN DRIVE SOURCES. CONNECT THESE SOURCES TO P607P PINS 3 AND 8. NOTE: THESE SOURCES MUST BE ISOLATED FROM THE NORMAL AC MAINS SUPPLY AND GROUND.

LAST DES.	REF. USED
B3	S11
C23	T2
CR22	
DS1	
E13	
F2	
J608S	
K11	
P608P	
Q7	
R30	
REF. DES.	NOT USED
P601P	

Fig. 16. AG 440-8 TRANSPORT, SCHEMATIC

Dwg. No. 4840184

# AMPEX

## Head Assembly, 1-inch Tape Catalog No. 4020300

ITEM NO.	PART NUMBER	DWG. SIZE	D	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER														
						-01	-02													
1	4270167-10	B		SPRING, HEAD ADJUST		4	4													
2	4350025-01	B		SHIM, ERASE HEAD, .010 THK	a/r/a/r															
3	4350025-02	B		SHIM, ERASE HEAD, .002 THK	a/r/a/r															
4	4350025-03	B		SHIM, ERASE HEAD, .003 THK	a/r/a/r															
5	4350025-04	B		SHIM, ERASE HEAD, .005 THK	a/r/a/r															
6	4350035-01	C		SPRING, EXTENSION HEAD, GATE		1	1													
7	<del>4350041-01</del>	<del>B</del>		<del>TAPE GUIDE ASSY</del>		<del>2</del>														
8	4350043-02	D		BASE, HEAD MOUNTING		1	1													
9	4350044-01	B		PLATE, PLAYBACK, POS #4		1	1													
10	4350045-01	B		SHIELD, CAN, REC. POS #3		1	1													
11	4350046-01	B		PLATE, RECORD, POS #3		1	1													
12	4350047-01	B		SHIELD, POS #4		1	1													
13	4350048-01	B		SHIELD, POS #3		1	1													
14																				
15	4350038-03	C		OVERLAY, HEAD HOUSING		1	1													
16	4350051-01	B		SHIELD, CAN ASSY, PLAYBACK, POS #4		1	1													
17	4350058-01	D		GATE ASSY, HEAD		1	1													
18	1232483-01	D		ERASE HEAD ASSY, 8 TRACK		1	1													
19	1231917-02	D		RECORD HEAD ASSY, 8 TRACK		1	1													
20	1231917-01	D		PLAYBACK HEAD ASSY, 8 TRACK		1	1													
21	120187-09	C		NAMEPLATE, HEAD ASSY		1	1													
22																				
23	018-019			ADHESIVE	a/r/a/r															
24	401-008			PIN, COTTER, .063 DIA x .750 LG		1	1													
25	403-006			PIN, GROOVED, HEADLESS, .094 DIA. x .625 LG		2	2													
26	<del>470-425</del>			<del>SCREW #4-40 x 1/4 LG, CAP SOCKET, BUTTON HD</del>		<del>4</del>														
27	471-006			SCREW, #2-56 x 7/16 LG, PAN HD, SLOTTED		2	2													
28	471-010			SCREW, #4-40 x 1/4 LG, PAN HD, XREC		4	4													
29	470-014			SCREW, #4-40 x 3/4 LG, CAP, HEX SOC.		4	4													
30	473-099			SCREW, #10-32 x 3/8 LG, PAN HD, XREC		1	1													
31	477-404			SCREW, SET, #4-40 x 1/2 LG, OVAL PT, HEX SOC.		4	4													
32	492-008			NUT, #4-40, HEX		2	2													
33	492-034			NUT, #6-32, SMALL PATTERN		2	2													
34	493-001			NUT, #4-40, HEX, SELF LOCKING		2	2													
35	501-002			WASHER #4, FLAT		4	4													
36	501-155			WASHER #2, FLAT		2	2													
37	502-001			LOCKWASHER #2, SPRING		2	2													

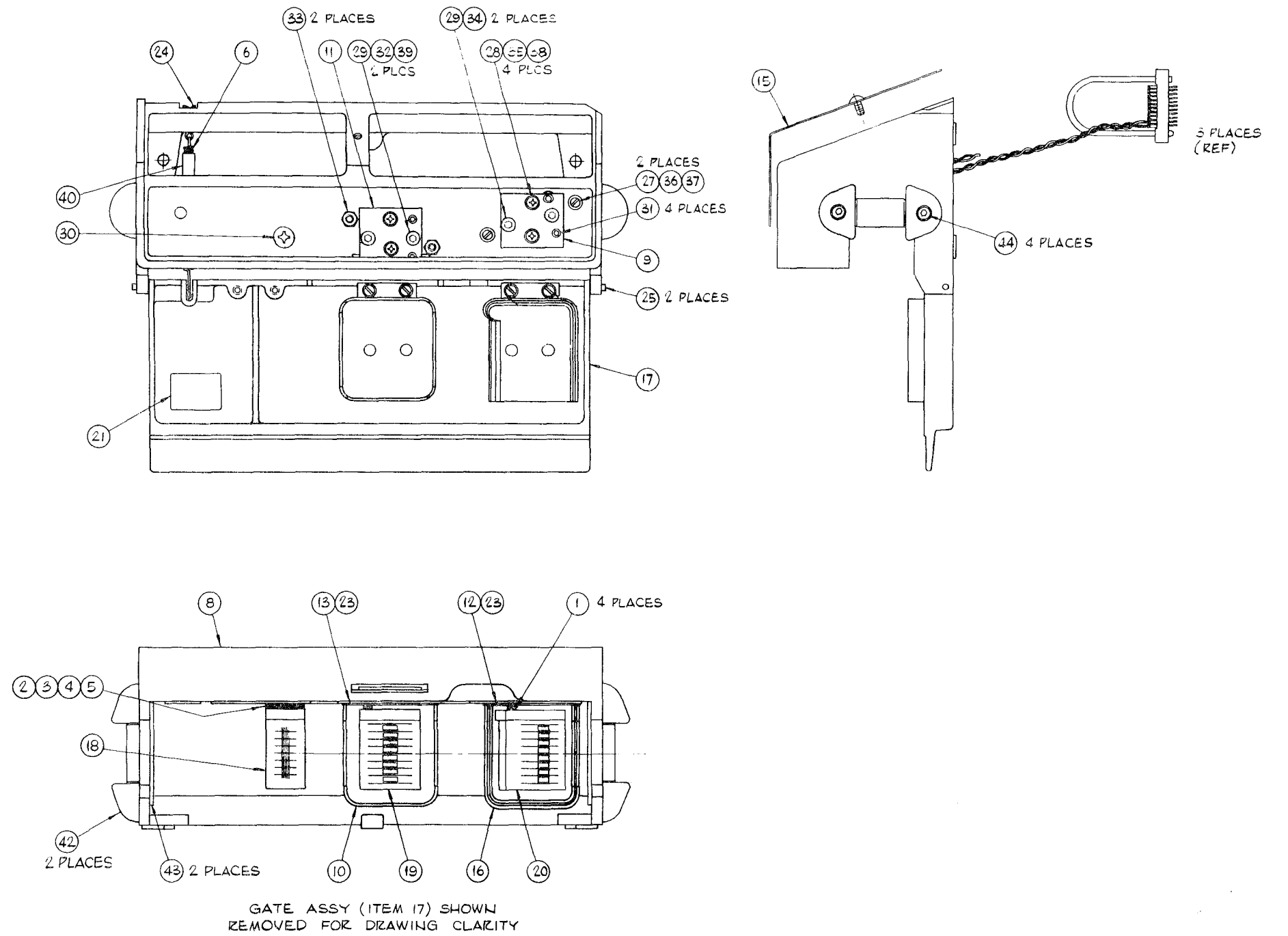
UC 670 (7-66) PRINTED IN U.S.A.

# AMPEX

## Head Assembly, 1-inch Tape (Cont'd)

ITEM NO.	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER															
					-01	-02														
38	502-002		LOCKWASHER, #4, SPRING		4	4														
39	502-062		LOCKWASHER, #4, DOUBLE COIL		2	2														
40	600-001		SLEEVING, .186 I.D.		1	1														
41																				
42	4210154-01	C	TAPE GUIDE			2														
43	4330267-01	B	NUT PLATE, HEAD			2														
44	470-070		SCREW, #6-32 x 7/16 LG, CAP, HEX SOCK			4														
45																				
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Ampex Doc. No. 4940045

IWA 045-20  
Figure 17. Head Assembly, 1-inch Tape  
Dwg. No. 4020300

# AMPEX

ITEM NO.	PART NUMBER	DWG. SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER															
					-01															
1	4041086-01	D	CHASSIS, TORQUE DELAY		1															
2	4050500-01	C	PRINTED WIRING ASSY		1															
3	4260133-01	B	BRACKET, TRANSISTOR		1															
4	<del>4580194-01</del>	<del>C</del>	<del>TRANSFORMER, POWER</del>	<del>T1</del>	<del>1</del>															
5	4580194-02	C	TRANSFORMER, POWER	T1	1															
6																				
7	014-703		INSULATOR, TRANSISTOR (2)		1															
8	014-820		TRANSISTOR, DTS-410 (2)	05	1															
9	044-360		RESISTOR, VAR, 25K (1)	R8	1															
10	044-916		RESISTOR, VAR, 5K (1)	R9	1															
11																				
12	087-388		COMPOUND, SILICON (5)		A/R															
13																				
14	145-012		CONNECTOR, 6 PIN, MALE		1															
15	172-003		TERMINAL LUG, SOLDER, #6 (2)		1															
16	180-023		TERMINAL STRIP, A1,D,A1 (3)		1															
17																				
18	251-004		BUTTON, PLUG (1)		2															
19	260-005		GROMMET, .31 I.D. (1)		1															
20	260-006		GROMMET, .22 I.D. (1)		2															
21																				
22	302-007		CLAMP, CABLE, .25 I.D. (1)		1															
23																				
24	471-066		SCREW, #6-32 x .19, PAN HD, XREC (3)		1															
25	471-069		SCREW, #6-32 x .38, PAN HD, XREC (3)(15)		2															
26	471-071		SCREW, #6-32 x .50 PAN HD, XREC (2)		2															
27	475-051		SCREW, SEMS, #6-32 x .25 PAN HD, XREC (2)		3															
28	492-049		NUT, 3/8 - 32 (7)(8)		2															
29	496-005		NUT, #6-32, KEPS (3)(2)		4															
30																				
31	501-009		WASHER, #6, FLAT (2)		3															
32	502-077		WASHER, 3/8, INT TOOTH (7)(8)		2															
33	503-013		WASHER, SHOULDER (2)		2															
34	506-013		WASHER, D (15)		1															
35																				
36	600-010		SLEEVING, #5		A/R															
37																				

TORQUE DELAY BOX

Drwg. No. 4020303 Sh. 1

Ampex Doc. No. 4940045

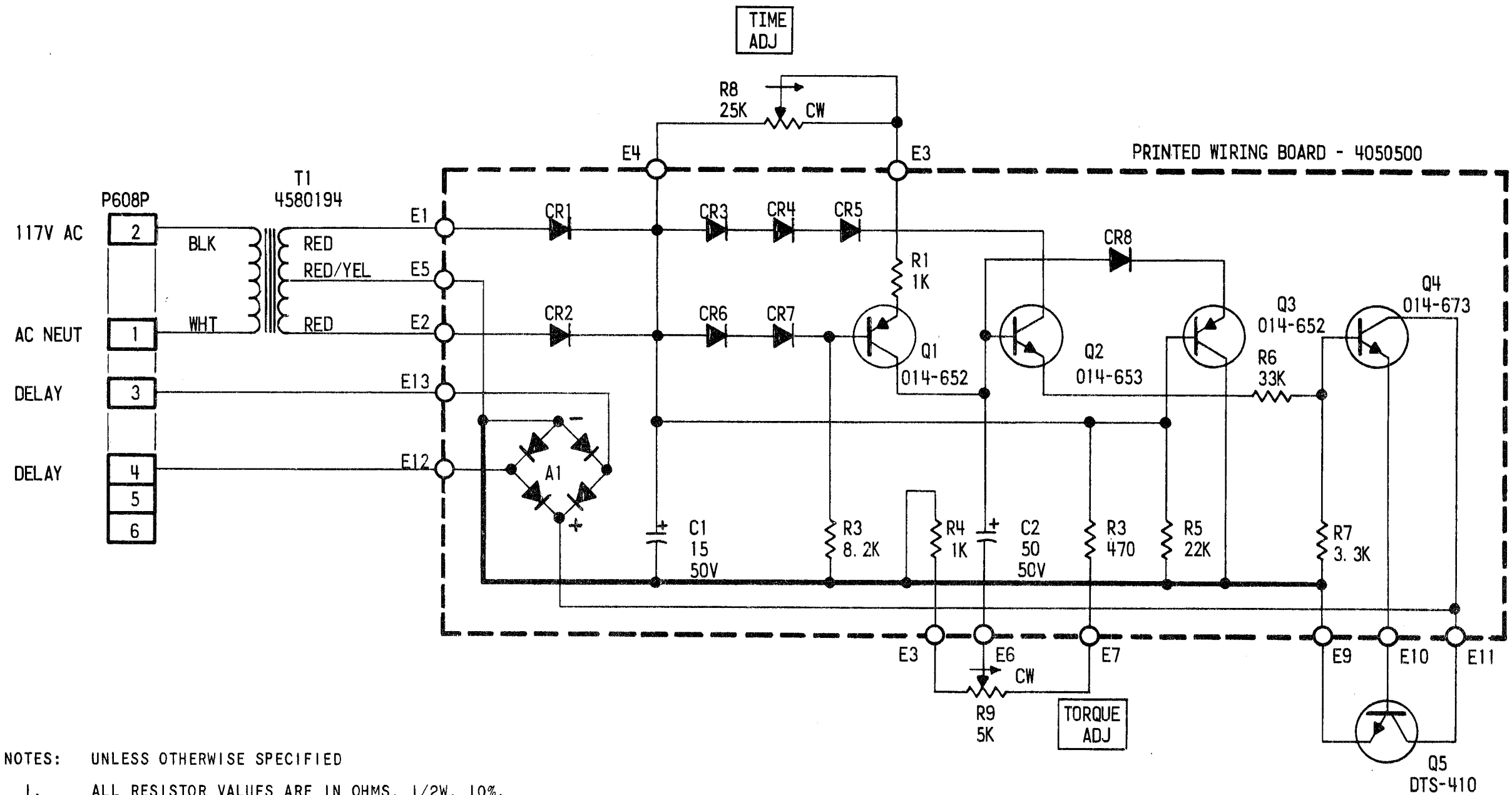
# AMPEX

ITEM NO.	PART NUMBER	DWG. SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER															
					-01															
38																				
39	614-686		WIRE, #22 AWG, BLK	A/R																
40	614-687		WIRE, #22 AWG, BRN	A/R																
41	614-688		WIRE, #22 AWG, RED	A/R																
42	614-689		WIRE, #22 AWG, ORN	A/R																
43	614-690		WIRE, #22 AWG, YEL	A/R																
44	614-691		WIRE, #22 AWG, GRN	A/R																
45	614-692		WIRE, #22 AWG, BLU	A/R																
46	614-693		WIRE, #22 AWG, VIO	A/R																
47	614-694		WIRE, #22 AWG, GY	A/R																
48	614-695		WIRE, #22 AWG, WHT	A/R																
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TORQUE DELAY BOX

Drwg. No. 4020303 Sh. 2

Ampex Doc. No. 4940045



- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTOR VALUES ARE IN OHMS, 1/2W. 10%.
  2. ALL CAPACITOR VALUES ARE IN MICROFARADS, AT INDICATED VOLTAGE.
  3. ALL DIODES ARE TYPE 013-678.
  4. FOR FIELD SERVICE ONLY:  
 Q1 & Q3 USE 2N3906.  
 Q2 USE 2N3904.  
 Q4 USE 2N3583.

Fig. 18 TORQUE DELAY SCHEMATIC

Drwg. No. 4840188 IWA 045-21