

AMPEX

1809023

Auto Tracking Kit

Operation and Maintenance Manual

AMPEX

1809023-02

CHANGE NOTICE

This change is to be collated into manual no. 1809023-01 dated, AUG. 1970
Superseded pages are to be destroyed.

Auto Tracking Kit

Operation and Maintenance Manual

ISSUED: OCTOBER 1970

LIST OF EFFECTIVE PAGES

Page	Issue Date	Page	Issue Date
Title	Oct. 1970	2-13 thru 2-20 ...	Oct. 1970
A	Oct. 1970	3-1 thru 3-2	Original
i	Oct. 1970	4-1 thru 4-14	Original
ii thru iv	Original	5-1 thru 5-4	Original
v thru viii	Oct. 1970	6-1 thru 6-2	Original
1-1 thru 1-2	Original	6-3 thru 6-4	Oct. 1970
2-1	Original	6-5 thru 6-18	Original
2-2	Oct. 1970	6-19 thru 6-38 ...	Oct. 1970
2-3 thru 2-4	Original	7-1 thru 7-4	Original
2-5	Oct. 1970	7-5 thru 7-36	Oct. 1970
2-6 thru 2-9	Original	7-37 thru 7-44 ...	Original
2-10	Oct. 1970	7-45 thru 7-48 ...	Oct. 1970
2-11 thru 2-12 ...	Original	7-49 thru 7-52 ...	Original
		7-53 thru 7-76 ...	Oct. 1970

NOTICE

Only proper use will produce the high performance and reliability for which your Ampex equipment was designed, built, and tested. Therefore, to ensure the best possible performance and reliability, please DO NOT:

- INSTALL or CONNECT,
- OPERATE,
- ADJUST or ALIGN,
- MAINTAIN, or
- REPAIR

the equipment without first consulting the applicable portion(s) of the manual(s).

COMMUNICATING WITH AMPEX

SERVICE INFORMATION AND PARTS

FIELD ENGINEERING BULLETIN SERVICE (See note below)

Ampex provides a continuous technical support program for its products. This program is partially implemented through field engineering bulletins, which are published by the Ampex Technical Support Group. Approved modifications, information on special tools and accessories, and improved operating and maintenance techniques are typical of the information distributed in these bulletins.

If the installation of your system or accessory was supervised by an Ampex Field engineer, you will be sent these bulletins automatically. If this is not the case, contact the nearest Ampex field office or write to:

Ampex Corporation
Video Technical Support Group
401 Broadway, M.S. 3-45
Redwood City, California 94063 USA

SERVICE AND REPLACEMENT PARTS (See note below)

Do not for any reason return material to Ampex without first obtaining a material return authorization or a parts exchange order (except for video heads). Contact your nearest Ampex field office to obtain these forms, service, or replacement parts. If the installation of your system or accessory was supervised by an Ampex field engineer, you will be sent information regarding the location of the nearest field office. Alternatively, write to the Technical Support Group at the address shown above.

NOTE

In order for the technical support program to function properly, the user must ensure that his communication is addressed to the proper department, and that it includes the following information, most of which can be obtained from the system identification nameplate on the equipment.

1. System name
2. Model number (including revision number)
3. System number
4. Serial number
5. Power requirements
6. System modifications and special accessories
7. Date of purchase
8. Name and address of your organization
9. Job function to which communication should be addressed
10. Physical location of equipment

COMMUNICATING WITH AMPEX

INSTRUCTION MANUAL CHANGES

Another part of the Ampex program of technical support for its products is the continuous revision and modification of instruction manuals as the equipment is improved or modified. In order to ensure that you always receive this information, write to:

Ampex Corporation
Audio/Video Technical Publications Department
401 Broadway
Redwood City, California 94063 USA

NOTE

In order to be sure that you always receive information applicable to your equipment, please include the following information when you write to us:

1. System name
2. Model number (including revision number)
3. Serial number
4. Power requirements
5. System modifications and special accessories
6. Approximate date of purchase
7. Name and address of your organization
8. Job function to which communication should be addressed

SAFETY & FIRST AID

Because personnel working with electronic equipment are exposed to the hazard of high voltage, it is imperative that all safety regulations be consistently observed, and that each individual has a clear understanding of basic First Aid methods.

The following typical hazards must be avoided at all times:

1 Do not attempt adjustment of unprotected circuit controls, or lead dress while the power is ON.

2 Do not change heavily loaded or overheated components without due precaution to avoid burns.

3 Do not assume that no dangerous voltage is present when the power is OFF. Charged capacitors may retain dangerous voltages for long periods, and should be discharged through a suitable resistor before any circuit points are touched.

4 At all times avoid placing any parts of the body in series between ground and circuit points, whether or not power is ON.

5 Do not assume that solid-state circuits and semiconductor cases carry only low voltages.

V O 8 6 3 3

For their own protection, and the protection of others, all electronic personnel should become thoroughly familiar with the approved First Aid treatment of burns and shock. There are three principal degrees of burns, recognizable as follows:

1. A first degree burn reddens the skin
2. A second degree burn blisters the skin
3. A third degree burn chars the flesh and frequently places the victim in a state of shock accompanied by respiratory paralysis.

Respiratory paralysis in the victim can cause death within seconds, by suffocation. For this reason it is imperative that the approved method of artificial respiration be initiated immediately and continued until the victim's breathing is normal.

A muscular spasm or unconsciousness may render the victim unable to free himself of the electric power. If this is the case, turn the power OFF immediately.

CAUTION

DO NOT TOUCH HIM, OR YOU MAY SHARE HIS PREDICAMENT.

If the power cannot be turned OFF immediately, very carefully loop a dry rope, article of clothing, length of strong cloth, or a rolled-up newspaper around the victim and pull him free of the power. Carefully avoid touching him or his clothing.

The moment he is clear of the power, place him in a reclining position, cover him with a blanket (or newspapers) to keep him warm, and begin artificial respiration. At the first opportunity, enlist help in the summoning of a doctor. If a doctor cannot be summoned, transport the victim to the doctor, infirmary, or hospital. Be sure that the victim is kept well covered and warm while awaiting professional aid and treatment.

AMPEX

TABLE OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
SECTION I	GENERAL DESCRIPTION	1-1
1-1	General	1-1
SECTION II	INSTALLATION	2-1
2-1	General	2-1
2-5	VR-1200C Auto Tracking Kit Installation Procedure	2-1
2-8	Power Supply Kit Installation Procedure	2-1
2-10	Power Supply Checkout Procedure	2-2
2-11	Accessory Chassis Installation	2-3
2-13	Intersync Servo System Modification	2-3
2-15	Video Signal System Modification	2-5
2-17	Control Panel Modification (VHO Equipped)	2-5
2-19	Control Panel Modification (Standard)	2-7
2-21	Auto Tracking Harness Installation	2-10
2-23	Supply Reel Tension Arm Housing Assembly Modification ..	2-10
2-26	Tension Arm Housing Assembly Adjustment Procedure ..	2-10
2-27	Setup and Checkout Performance Procedures	2-12
2-29	Frequency Adjustment Procedure	2-12
2-30	VR-2000 Auto Tracking Kit Installation Procedure	2-13
2-32	Accessory Chassis Installation	2-13
2-34	Intersync Servo System Modification	2-14
2-36	Control Panel Modification	2-14
2-38	Video Signal System Modification	2-19
2-40	Auto Tracking Harness Installation	2-19
2-42	Supply Reel Tension Arm Housing Assembly Modification ..	2-19
2-44	Power Supply Cable Installation	2-19
2-46	Setup Checkout Performance Procedure	2-19
SECTION III	OPERATION	3-1
3-1	General	3-1
3-2	Operating Controls and Indicators	3-1
3-4	Operating Procedures	3-1
SECTION IV	AUTO TRACKING SYSTEM THEORY	4-1
4-1	General	4-1
4-4	Auto Tracking Oscillator and Control Band	4-1
4-6	320-Hz Oscillator	4-1

TABLE OF CONTENTS (Continued)

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
SECTION IV	AUTO TRACKING SYSTEM THEORY (Continued)	
4-8	Divide-by-16 Counter	4-1
4-10	Phase Shifter	4-3
4-14	10-Hz Trigger	4-5
4-16	10-Hz Low-Pass Filter and 7.5 IPS Level Control	4-5
4-19	Signal Switcher and Amplifier	4-5
4-21	Voltage Regulator	4-7
4-23	Auto Tracking Sweep Generator and Control Board	4-7
4-25	75-Hz Low-Pass Filter and 10-Hz Band-Pass Filter	4-7
4-27	Amplifier, Level Shifter and Synchronous Gate	4-7
4-29	One-Shot and Voltage Translator	4-7
4-33	Integrator/Sweep Generator	4-8
4-35	Level Translator	4-8
4-37	Lamp Dimmer	4-8
4-39	Auto Tracking Tach Delay and Control Board	4-8
4-42	Level Shifters	4-8
4-44	Ninety-Degree Delay Circuit	4-8
4-48	270 \pm 45-Degree Delay Circuitry	4-9
4-52	Level Shifters	4-12
4-55	Power Supply	4-12
SECTION V	MAINTENANCE	5-1
5-1	General	5-1
5-3	Routine Maintenance	5-1
5-6	Corrective Maintenance	5-1
5-9	Voltage Check	5-1
5-10	Frequency Adjustment	5-2
5-12	Signal Level Adjustment	5-2
5-13	Auto Tracking Control Logic Check	5-3
SECTION VI	SCHEMATIC DRAWINGS	6-1
SECTION VII	ASSEMBLY DRAWINGS AND LISTS OF MATERIALS	7-1

LIST OF ILLUSTRATIONS

<i>Figure No.</i>	<i>Title</i>	<i>Page</i>
SECTION I GENERAL DESCRIPTION		
1-1	Videotape Recorder Modified by Auto Tracking	1-2
SECTION II INSTALLATION		
2-1	Servo Chassis Wiring and Harness	2-4
2-2	Auto Tracking	2-6
2-3	Speed Switch S1 Lead Modification	2-6
2-4	Servo Mode Switch S12 Modification	2-8
2-5	Wire Modification at R1 and S18	2-8
2-6	Auto Tracking Harness Installation	2-11
2-7	Tension Arm Housing Assembly (Supply Reel)	2-12
2-8	Relay K22 Installation	2-15
2-9	Servo Mode Switch S12 Modification	2-16
2-10	Wire Modification, Tracking Potentiometer R2	2-17
2-11	Connector Template Positioning	2-18
SECTION III OPERATION		
3-1	Control Panel Modified by Auto Tracking Kit	3-1
SECTION IV AUTO TRACKING SYSTEM THEORY		
4-1	Auto Tracking Overall Functional Block Diagram	4-2
4-2	Auto Tracking Oscillator and Control Functional Block Diagram . .	4-3
4-3	Phase Shifter 20-Microsecond Waveform	4-4
4-4	Auto Tracking Sweep Generator and Control Functional Block Diagram	4-6
4-5	Auto Tracking Tach Delay and Control Functional Block Diagram	4-9
4-6	20-Microsecond Waveform Generator	4-10
4-7	90° Delay Waveforms	4-11
4-8	±12-Volt Power Supply Functional Block Diagram	4-13
SECTION V MAINTENANCE		
5-1	Locations of Adjustment Points, Auto Tracking System	5-2
SECTION VI SCHEMATIC DRAWINGS		
6-1	Accessory Chassis Wiring Diagram	6-5
6-2	Auto Tracking Tach Delay and Control Schematic	6-7

LIST OF ILLUSTRATIONS (Continued)

<i>Figure No.</i>	<i>Title</i>	<i>Page</i>
SECTION VI	SCHEMATIC DRAWINGS (Continued)	
6-3	Auto Tracking Sweep Generator and Control Schematic	6-9
6-4	Auto Tracking Oscillator and Control Schematic	6-11
6-5	Auto Tracking Harness Interconnect Diagram	6-13
6-6	Control Panel (Standard) Schematic	6-15
6-7	Control Panel (VHO Equipped) Schematic	6-17
6-8	Intersync Schematic	6-19
6-9	Power Supply (± 12 VDC) Schematic	6-21
6-10	Signal System Interconnect Diagram	6-23
6-11	Control Panel Schematic	6-25
6-12	Signal System Interconnect Diagram	6-27

LIST OF TABLES

<i>Table No.</i>	<i>Title</i>	<i>Page</i>
2-1	Kit List (VR-1200)	2-2
2-2	Kit List (VR-2000)	2-14

SECTION I

GENERAL DESCRIPTION

GENERAL DESCRIPTION

SECTION I

GENERAL DESCRIPTION

1-1 GENERAL

1-2 The auto tracking kit (Ampex part number 1367287) provides automatic tracking of the videotape recording, in the VR-1200 series Videotape Recorder, by controlling the phase of the capstan. This control is achieved by feeding the drum tach signal, from the intersync servo via the auto tracking electronics circuitry--where the drum tach signal is delayed and returned to the servo. The amount and polarity of drum tach delay is determined by comparing the phase of a 10-Hz signal, recovered from the switcher rf envelope, with a reference 10-Hz trigger. This recovered 10-Hz signal, which varies 180° on opposite sides of the track, results from amplitude modulation of the tape rf signal by mechanical (physical) displacement of the video (quadruplex) heads

longitudinally with respect to the recorded tracks. This mechanical displacement is produced by injecting a small amount of 10-Hz signal into the capstan servo to vary the tape speed slightly above and below nominal.

1-3 Figure 1-1 depicts the areas of modification on the recorder system for the auto tracking kit. Modification to the control panel includes the addition of the MAN/AUTO AUTOMATIC TRACKING switch used for switching the automatic tracking feature in or out. The accessory chassis houses the three printed wiring assemblies which make up the main body of the automatic tracking electronics. The chassis may also house printed wiring assemblies for other optional kits. Depending on system configuration, the chassis may alternatively be located in the side monitor.

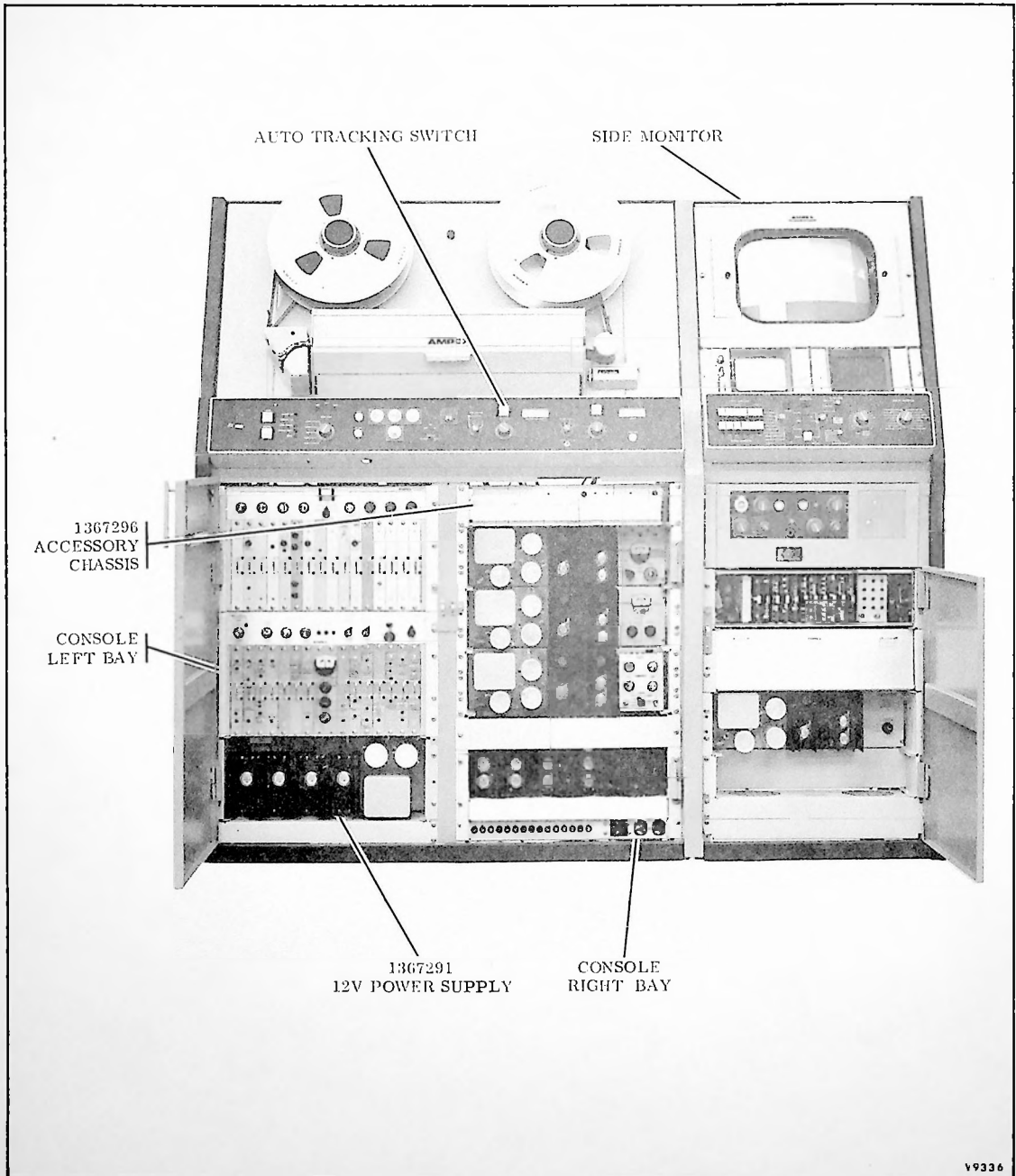


Figure 1-1. Videotape Recorder Modified by Auto Tracking

SECTION II

INSTALLATION

AMPEX

SECTION II
INSTALLATION

2-1 GENERAL

2-2 The Auto Tracking Kit is packed and shipped in a specially constructed container that provides maximum protection to the equipment during transit. Use extreme caution when unpacking to prevent damage to the equipment.

2-3 Each individual auto tracking kit is shipped with all necessary hardware required for installation. Check contents of kit against the packing list accompanying each kit to ensure that all parts are available and not damaged.

2-4 This section contains procedures for installing the Auto Tracking Kit. All applicable schematic diagrams, assembly drawings and lists of materials are located in Sections VII and VIII. Table 2-1 delineates all components included in the Auto Tracking Kit.

2-5 VR-1200 AUTO TRACKING KIT
INSTALLATION PROCEDURE

2-6 The following procedures outline detailed steps that must be performed when installing the kit in a VR-1200 series recorder system. The installation and subsequent modifications can be accomplished in about fifteen hours. The procedures described in the following paragraphs must be completed before the recorder system is returned to service; otherwise, the recorder system will not function properly. Installation of the kit will be most conveniently accomplished if the installation procedures are performed in the order presented.

CAUTION

ENSURE THAT ALL POWER IS REMOVED FROM THE SYSTEM PRIOR TO PERFORMING THE INSTALLATION PROCEDURES. VOLTAGES PRESENT DURING INSTALLATION WILL CAUSE EXTENSIVE DAMAGE TO THE EQUIPMENT.

2-7 Install the power supply kit (part number 1367291) in accordance with the instructions provided in paragraphs 2-8 and 2-9. After power supply kit is installed, perform checkout procedures in accordance with paragraph 2-10. Check out the recorder for correct operation in all functions. If operation is normal, perform the installation procedural starting in paragraph 2-11.

2-8 Power Supply Kit Installation Procedure

2-9 To install the ± 12 VDC Power Supply Kit, perform the procedural steps below:

- ↳ a. Turn off external power source to console.
- ↳ b. Unlatch and open left front equipment bay panel. Also unlatch and open right and middle rear equipment bay panels.
- ↳ c. Locate at bottom of equipment bay, loosen, remove and save four 12-24 screws and washers from blank panel. Remove panel.

Table 2-1. Kit List (VR-1200)

ITEM	DESCRIPTION	QTY	PART NO.
1	Auto Tracking Tach Delay and Control PWA	1	1367309
2	Sweep Generator and Control PWA	1	1367311
3	Auto Tracking Oscillator and Control PWA	1	1367313
4	Control Panel Switch Assembly	1	1367315-01
5	Auto Tracking Harness	1	1367316-01
6	Servo Adaptor Harness	1	1367781-01
7	Instruction Manual	2	1809023
8	Tension Arm Assembly (Supply)	1	1368055-01
9	Control Panel Template	1	1368147-01
10	Extender PWA	1	1368156-01
11	Power Supply Kit	1	1367291-01
12	Accessory Chassis, Final Assembly	1	1368243-02

d. Install power supply chassis, supplied with kit, into compartment and secure with hardware removed in step c.

e. Connect AC Power cable (part number 52596), supplied with kit, between J2 on the power supply back panel and the ac power duct.

f. Remove cable plug J2 from Signal System chassis.

g. Connect cable assembly (part number 1208705-03), supplied with kit, between J1 of the new power supply and J2 on the Signal System chassis.

h. Remove cable plug P14 from Intersync chassis.

i. Install new power supply cable assembly (part number 1367322), supplied with kit, and connect as follows:

1. J14 SERVO (female) plug to J14 on Intersync chassis.

2. J14 SERVO (male) plug to J14 Intersync in system cable harness.

3. J2 SIGNAL SYSTEM (male) plug to J2 Signal System in system cable harness.

4. J1 ACCESSORY -- route towards center bay and spot-tie to existing cable harness for use whenever an accessory chassis is installed.

5. J1 EDITEC -- route and spot-tie to existing cable harness (will be used when an Editec is installed in the system).

6. SYSTEM HARNESS -- Locate P2 connector which is fastened to System Power Supply P2. Loosen and remove two screws from back cover of right angle connector. Clip and remove jumper between pins 3 and 5. Ensure that no wire strands remain that may short out other wires in the connector. Replace cover and tighten screws.

2-10 POWER SUPPLY CHECKOUT PROCEDURE. To perform the pre-operational checkout procedure on the ± 12 vdc power supply, perform the procedural steps below.

a. On the newly-installed power supply, place the ON/OFF switch S1 to OFF.

AMPEX

b. On the System Power Supply, located at the bottom of the center equipment bay, pull out CB14 (the 12 vdc power supply circuit breaker).

c. Turn on main power to console.

d. Using a known accurate voltmeter, connect probes to TP1 (+) and TP3 (-) on new power supply.

e. Set voltmeter scale to greater than 24 volts.

f. Place power supply ON/OFF switch S1 to ON.

g. Observe voltmeter for a reading of 24 ± 0.5 volts. If voltage is not 24 volts, IMMEDIATELY put power supply switch S1 to OFF and refer to schematic diagram Figure 6-1. However, if voltage reading is correct, remove (+) probe from TP1 and connect to TP2 (ground). Observe meter for a reading of $1/2$ of voltage obtained in TP1 position $\pm .1$ volt.

h. Remove probes from TP2 and TP3 and connect probes across +12 (+ on red TP) and -12 (- on white TP) volts on the ± 12 volt power supply of the System Power Supply.

i. Push in CB14, on System Power Supply, and observe meter for a reading of 24 volts.

j. Remove (-) probe from white TP and connect to COM (black) TP and observe meter for a reading of 12 volts.

k. Disconnect voltmeter probes and remove voltmeter.

l. Refer to Instruction Manual 1809967, Volume I, paragraph 8-96, for power supply current capacity. It may be necessary to jumper resistor in the system power supply (± 12 vdc) to keep the shunt current between 250 ma minimum and 1 amp maximum.

m. Checkout procedure is now completed.

2-11 Accessory Chassis Installation

2-12 To install the accessory chassis, perform the procedural steps below:

a. Remove external power source to the recorder system.

b. Remove any blank panel in that bay and install and secure the accessory chassis with the 12-24 screws and nylon washers provided.

2-13 Intersync Servo System Modification

2-14 To modify the servo system, perform the procedural steps below:

a. Disconnect all cables from the rear of the servo chassis.

b. Loosen, remove, and save the screws securing the chassis to the recorder. Remove the chassis.

c. See Figure 2-1 for installation location of harness adapter receptacle J22.

d. Line up the metal bracket of the harness adapter with the side of the chassis, and mark the chassis through the two bracket mounting holes for drilling purposes. (Note: Place the marks so that when the receptacle of the harness adapter is installed, the pins of the receptacle will be recessed within the chassis.)

e. Drill two $1/8$ -inch holes for mounting the adapter.

f. Mount the adapter with the two 4-40 screws provided.

g. Position and spot-tie the harness adapter wires to existing harness.

h. Remove the existing white/violet wire between J009-F and J011-F.

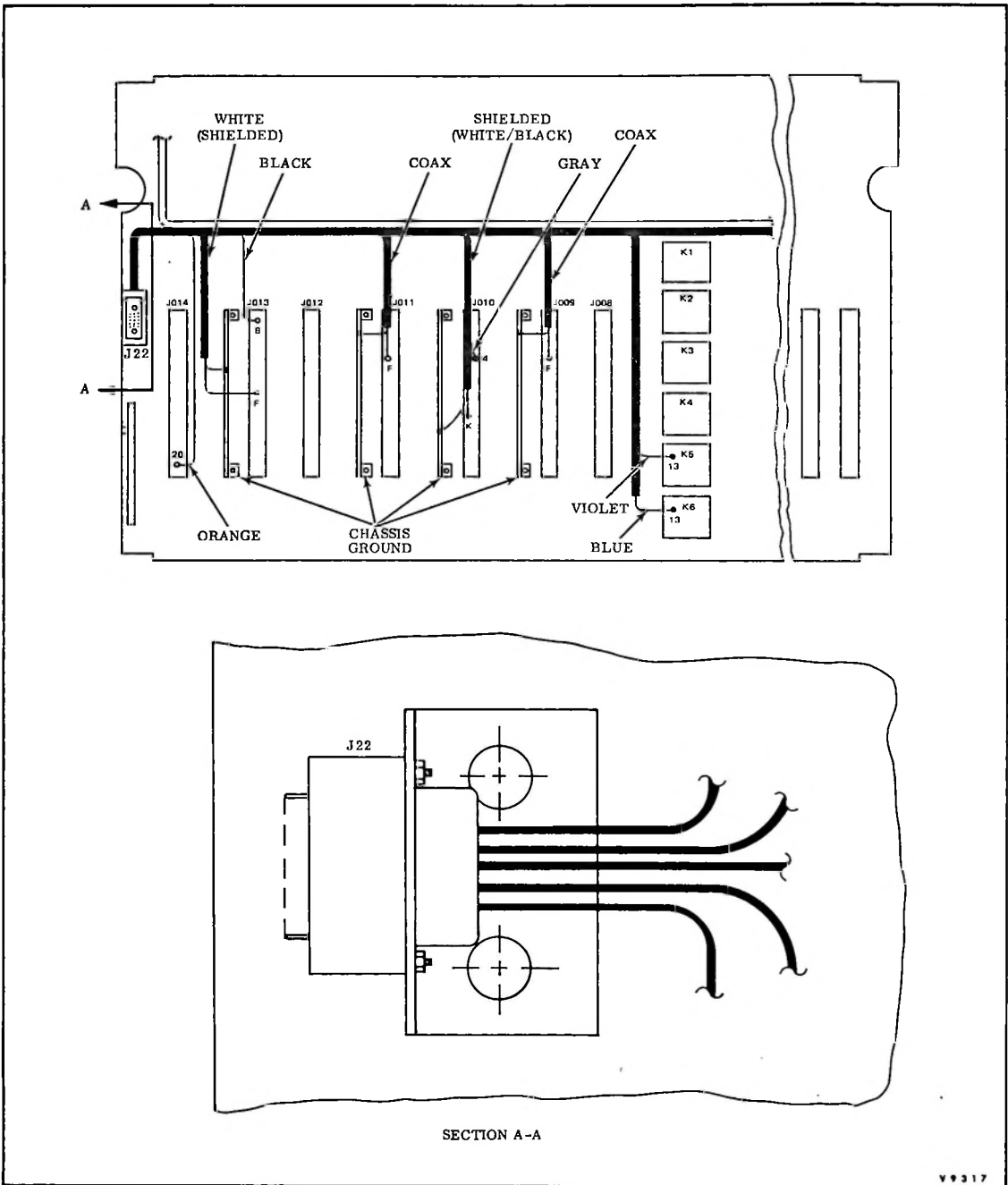


Figure 2-1. Servo Chassis Wiring and Harness

AMPEX

i. Solder the wires to the terminals indicated in Figure 2-1.

j. Connect dummy plug (part number 1368324) to receptacle J22.

NOTE

The dummy plug completes the circuit for the wire removed in step h and will be removed in a later step. The dummy plug can be used to by-pass the auto tracking feature in the event of auto tracking failure.

k. Replace the chassis in the recorder, and secure with screws removed in step b.

l. Reconnect all cables removed in step a.

m. Determine whether the intersync system is working properly by performing the procedures under paragraph 8-47 of Volume I of the VR-1200B Operation and Maintenance Manual (1809967).

2-15 Video Signal System Modification

2-16 To modify the video signal system, perform the procedural steps below:

a. Disconnect all cables from the rear of the video signal system chassis.

b. Remove the chassis holddown screws and remove the chassis.

c. Remove the four screws securing the connector panel to the chassis and remove the panel.

d. Connect and solder a 1-conductor shielded cable (provided by customer) between J006, pin 22, at the rear of the chassis, and the spare UHF connector J19, also at the rear. See wiring diagram (1368150), Figure 7-8.

e. Ground the shielded cable to the chassis, and spot-tie the cable to existing harness.

f. Replace the connector panel, secure the chassis to the recorder, and reconnect all cables.

2-17 Control Panel Modification (VHO Equipped)

2-18 To modify the control panel, perform the procedural steps below:

a. Disconnect all cables from the rear of the control panel.

b. Release the control panel from the recorder frame by turning the captive thumbscrew behind each end of the control panel in a counterclockwise direction.

c. Remove relay K5 from the VHO bracket.

d. Remove terminal boards TB1 and TB4, secured to the outside of the bracket.

e. Remove the four screws securing the bracket, and remove the bracket.

f. Remove, and save for later reinstallation, the following bracket attachments: PWB, connectors J6 and J7, and the K5 relay socket. Discard the bracket.

g. Tape the loose components away from the area above the TRACKING pot.

h. Remove protective coating from double sided tape on back side on template (part number 1368147-01) supplied with kit. Locate template (A part) as shown in Figure 2-2 and press firmly in place.

i. Make sure the area behind the panel to be drilled is clear of components. Using a no. 42 (0.093-inch) drill bit, drill 34 holes (using extreme caution to protect wire harness on backside).

AMPEX

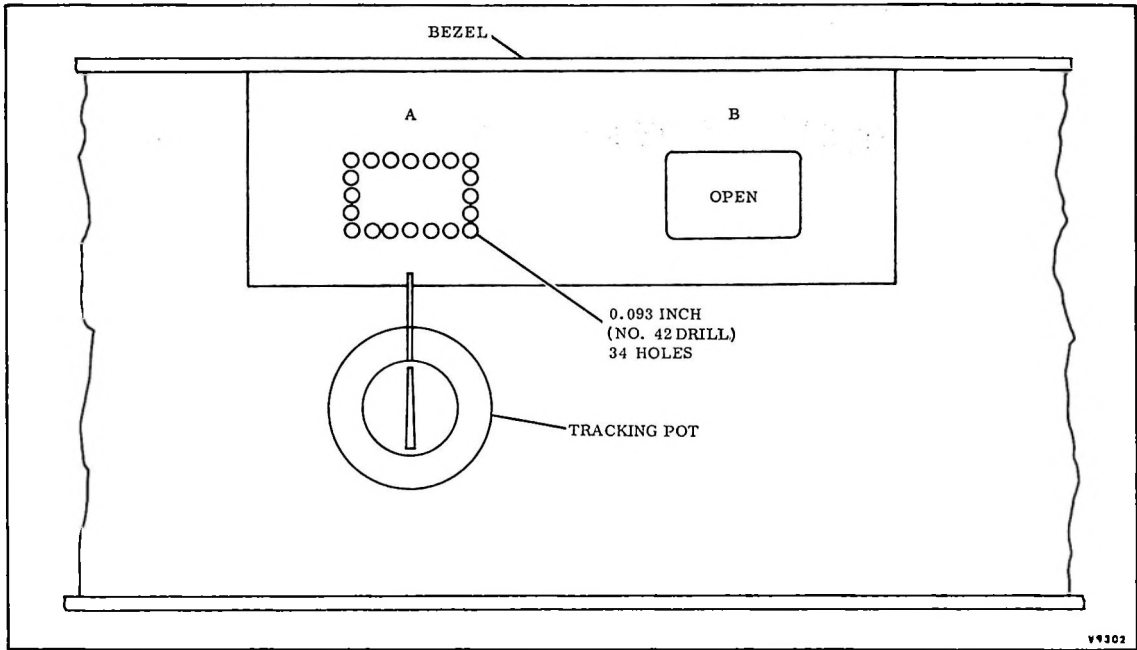


Figure 2-2. Auto Tracking Template

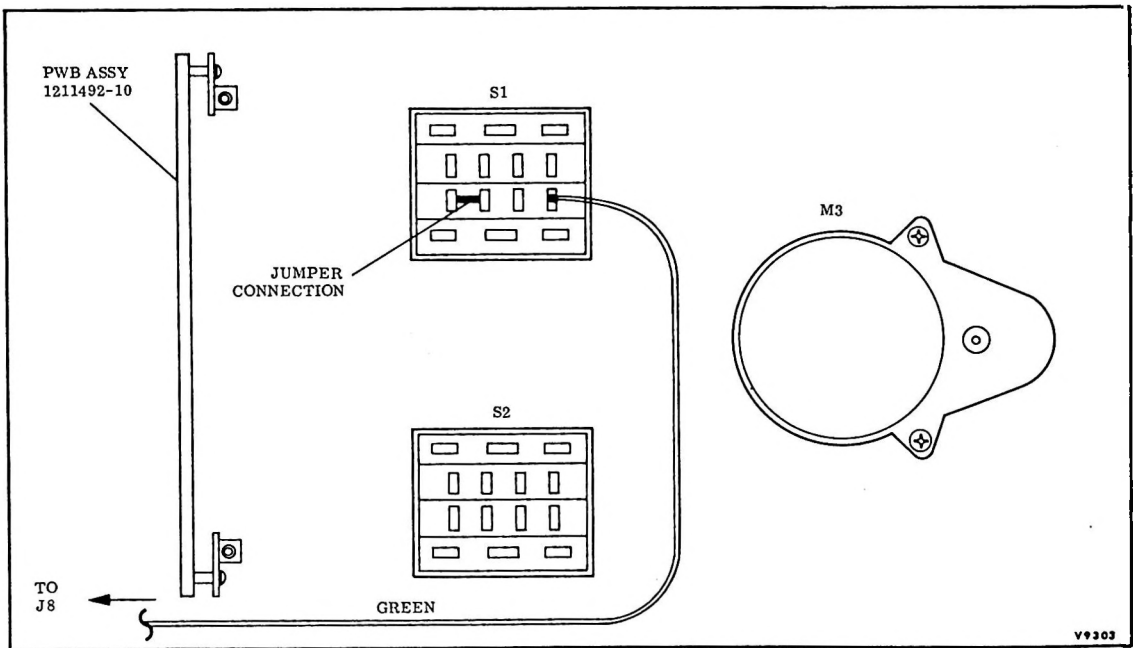


Figure 2-3. Speed Switch S1 Lead Modification

AMPEX

j. Remove template. Change to a number 32 (0.116-inch) drill bit and drill through the existing 34 holes. Press B part of template firmly over cutout area on control panel. Using the template as a guide, file opening to 5-7/64 x 1-17/64 and remove all burrs.

k. Install the PWB, connectors J6 and J7, and the K5 relay socket, removed in step f, on the new bracket (1367783 supplied with the kit). The new bracket should also have new kit components TB5, K6, J8 and connecting harness already installed. The harness in turn should be soldered to the new MAN/AUTO switch (S18).

l. Install the new bracket in the same position as the original bracket using existing hardware.

m. Mount the two black switch barriers in the cutout rectangle and then secure MAN/AUTO switch S18 to the barriers. Refer to any of the three other similar panel switches for mounting details.

n. Route and solder the green lead from J8 to the N/O terminal of SPEED switch S1 as shown in Figure 2-3.

o. Jumper the N/O and N/C terminals as indicated in Figure 2-3.

p. Route and solder the red lead from J8 to the wiper contact of the SERVO MODE switch S12-D as shown in Figure 2-4.

q. Make the following connections at switch S12 as shown in Figure 2-4:

1. Jumper S12-D contacts 1 and 2.
2. Jumper S12-D contacts 3 and 5.

3. Connect contact 2 of S12-D (white/blue wire) to the wiper contact of S12-A.

4. Connect contact 4 of S12-D (brown wire) to E2 of printed wiring board assembly no. 1361078 (board is located on

the same bracket supporting J4 which is in the immediate vicinity of S12).

5. Connect contact 3 of S12-D (brown/white wire) to the A terminal (brown/white wire) of the plug for DS1 (VERT LOCK lamp).

r. Connect the red and black leads from the newly installed MAN/AUTO switch to their respective colors on TB1 located on the newly installed bracket.

s. Remove the two-conductor shielded cable from tracking pot R1 (Figure 2-5). Prepare the two wires and the shield for re-soldering and route the cable to the new terminal board TB5. Solder the red lead to TB5-1, the black lead to TB5-2, and the shield to TB5-3.

t. Connect the two-conductor shielded cable from S18 to the tracking pot R1 as shown in Figure 2-5.

u. Spot-tie loose wiring to existing harness.

v. Stamp the designation "S18" adjacent to the new MAN/AUTO switch.

w. Remove connector bracket that mounts the RWD, FAST FWD, PLAY, and STOP switches by removing the four 6-32 nuts and washers securing the bracket to control panel. Move bracket away from panel and locate tie point E1, located between READY and EE-TAPE switches, (CR3 and white/orange wire). Connect and solder white/orange wire in harness to E1 tie-point, and reinstall bracket.

x. Verify the new wiring against schematic 1368151 (Figure 7-6) before re-installing the panel in the recorder.

y. Reconnect all cables removed in step a.

2-19 Control Panel Modification (Standard)

2-20 To modify the control panel, perform the procedural steps below:

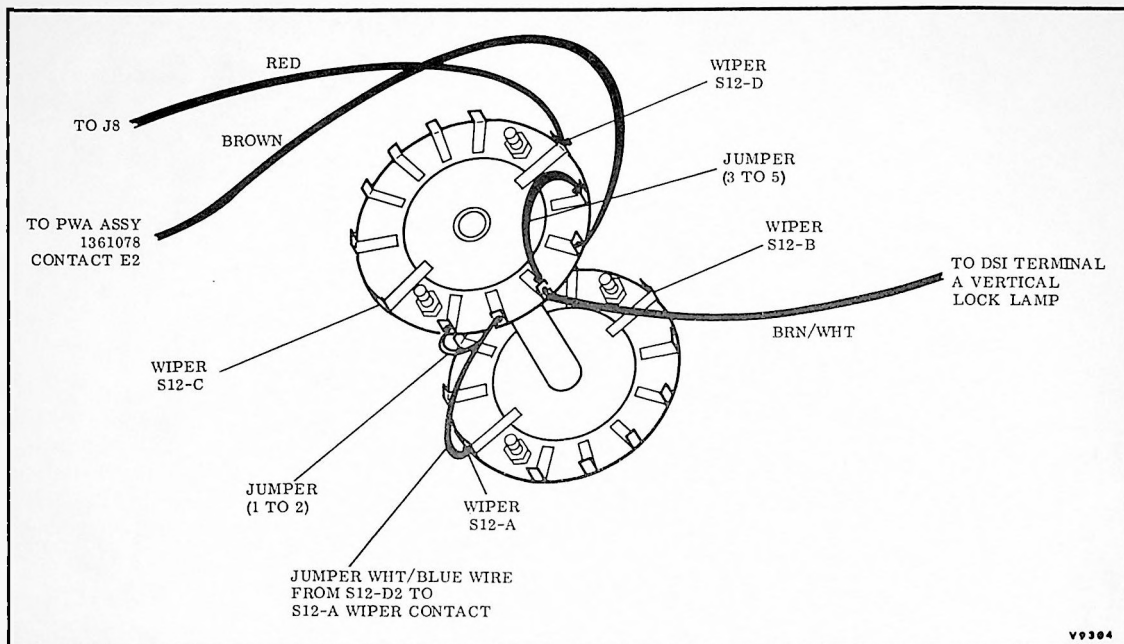


Figure 2-4. Servo Mode Switch S12 Modification

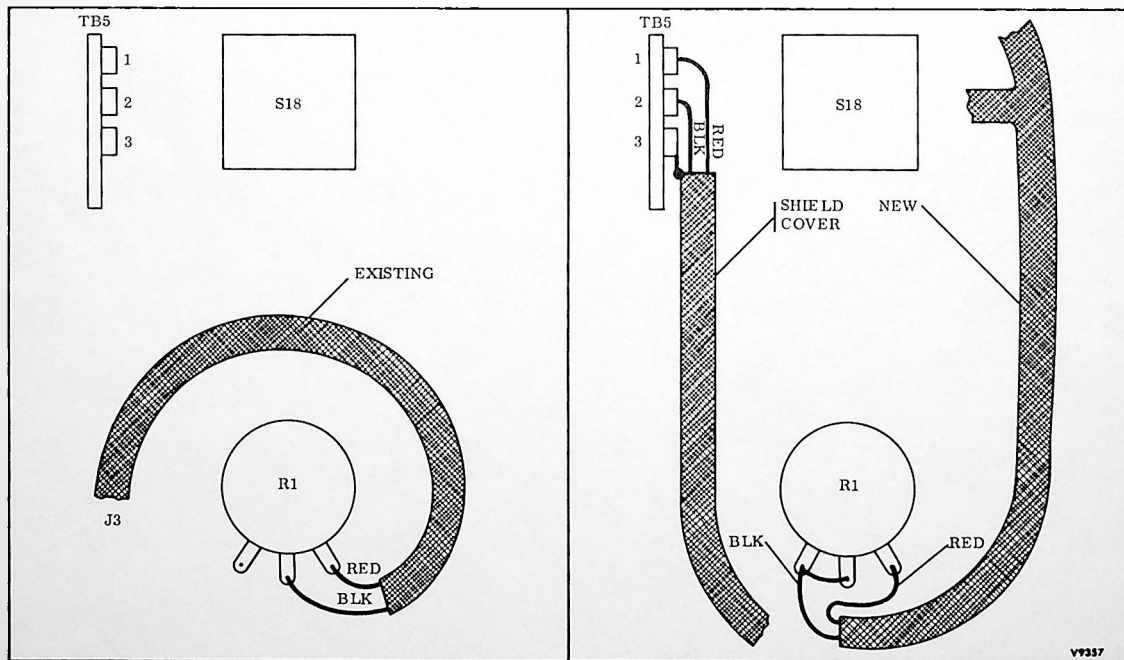


Figure 2-5. Wire Modification at R1 and S18

AMPEX

- a. Disconnect all cables from the rear of the control panel.
- b. Release the control panel from the recorder frame by turning the captive thumbscrew behind each end of the control panel in a counterclockwise direction.
- c. Remove terminal board TB1 from its mounting and tape or tie it out of the way of the area above the TRACKING pot R1.
- d. Remove protective coating from double sided tape on back side of template (part number 1368147-01) supplied with kit. Locate template (A part) as shown in Figure 2-2 and press firmly in place.
- e. Make sure the area behind the panel to be drilled is clear of components. Using a number 42 (0.093-inch) drill bit, drill 34 holes (using extreme caution to protect wire harness on backside).
- f. Remove template. Change to a number 32 (0.116-inch) drill bit and drill through existing 34 holes. Press B part of template firmly over cutout area on control panel. Using the template as a guide, file opening to 5-7/64 x 1-17/64 and remove all burrs.
- g. Install the new bracket (supplied with the kit) over the rear of the TRACKING REC CURRENT meter M1, using the same mounting screws that secure the meter. (The new bracket should already have installed new kit components TB5, J8, and connecting harness. The harness in turn should be soldered to the new MAN/AUTO switch S18.)
- h. Secure terminal board TB1 to the place provided for it on the new bracket.
- i. Mount the two black switch barriers in the cutout area and then secure MAN/AUTO switch S18 to the barriers.
- j. Route and solder the green lead from J8 to the N/O terminal of SPEED switch S1 as shown in Figure 2-3.
- k. Jumper the N/O and N/C terminals as indicated in Figure 2-3.
 1. Route and solder the red lead from J8 to the wiper contact of the SERVO MODE switch S12-D and solder as shown in Figure 2-4.
 - m. Make the following connections at switch S12 as shown in Figure 2-4.
 1. Jumper S12-D contacts 1 and 2.
 2. Jumper S12-D contacts 3 and 5.
 3. Connect contact 2 of S12-D (white/blue wire) to the wiper contact of S12-A.
 4. Connect contact 4 of S12-D (brown wire) to E2 of printed wiring board assembly number 1361078 (the board is located in the immediate vicinity of S12).
 5. Connect contact 3 of S12-D (brown/white wire) to the A terminal (brown/white wire) of the plug for DS1 (VERT LOCK lamp).
 - n. Connect the red and black leads from the newly installed MAN/AUTO switches to their respective colors on TB1 located on the newly installed bracket.
 - o. Remove the 2-conductor shielded cable from tracking pot R1 (Figure 2-5). Prepare the two wires and the shield for re-soldering and route the cable to the new terminal board TB5. Solder the red lead to TB5-1, the black lead to TB5-2, and the shield to TB5-3.
 - p. Connect the 2-conductor shielded cable from S18 to the tracking pot R1 as shown in Figure 2-5.
 - q. Remove connector bracket that mounts the RWD, FAST FWD, PLAY, and STOP switches by removing the four 6-32 nuts and washers securing the bracket to control panel. Move bracket away from panel and locate tie-point E1, located

between READY and EE-TAPE switches (CR3 and white/orange wire). Connect and solder white/orange wire in harness to E1 tie-point, and reinstall bracket.

r. Verify the modification wiring against schematic 1368242 (Figure 7-5).

s. Reconnect all cables removed in step a.

2-21 Auto Track Harness Installation

2-22 Connect the 1367316 harness as shown in the layout of Figure 2-6. The harness has been sized to accommodate either location of the 1367296 accessory chassis. After installation, spot-tie the harness to existing hardware.

NOTE

Dummy plug installed in step 2-14, j, must be removed and saved for emergency use.

2-23 Supply Reel Tension Arm Housing Assembly Modification

2-24 This modification entails replacing the tension arm housing assembly (part number 1211345-10) with a new housing assembly (part number 1368055-01) supplied with the kit, and is required for proper operation of the auto tracking feature.

2-25 To modify the tension arm housing assembly, perform the procedural steps below:

a. Remove external power source to recorder system.

b. Remove right rear console door. For easier access to tension housing assembly, remove left console side panel (as viewed from the front of the console).

c. Place a large "drop cloth" or something similar immediately below the work area to catch any parts inadvertently dropped during modification of housing assembly.

NOTE

Retain all hardware for subsequent installation of new housing assembly.

d. If a reel of tape is installed on the supply reel, remove reel.

e. Remove plug button from tape tension arm assembly. Loosen and remove the 10-32 hex-socket cap screw securing the tape tension arm to its shaft.

f. From rear side of tape transport plate, loosen and remove four 6-32 hex-socket cap screws (1), which secure the housing (2), to the rear side of transport top plate. (See Figure 2-7.)

g. The tension arm housing assembly will hang "free" from its cable harness. The assembly may be pulled out for easier access to housing components by removing the harness clamp located immediately above the assembly.

h. Remove switches S3 and S5 from the old assembly and remount on the new assembly.

i. Installation of new assembly is the reverse order of steps e through g.

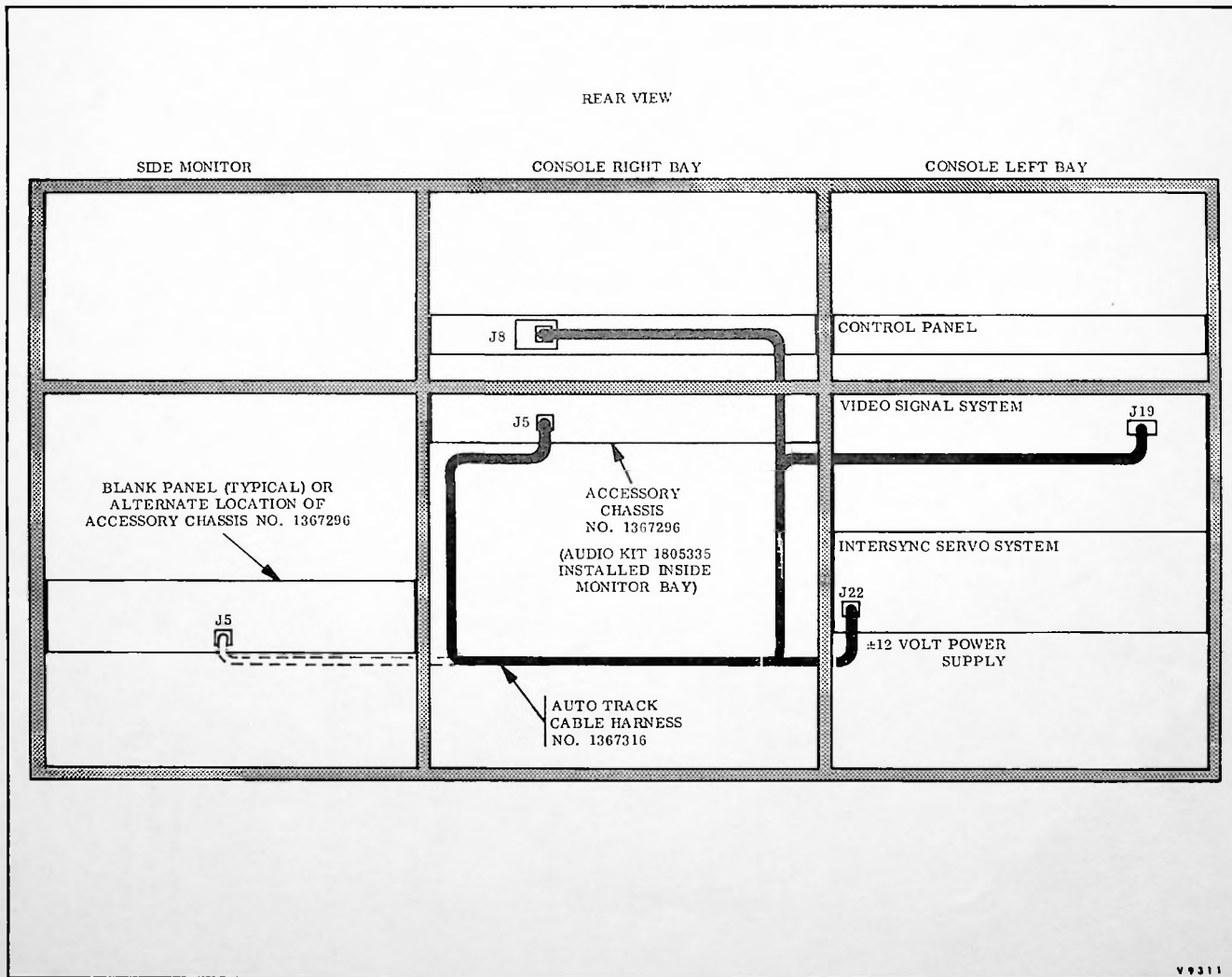
NOTE

Use Loctite grade C (Ampex part number 014-030) on the 10-32 hex-socket cap screw securing the tape tension arm onto the shaft.

j. The auto tracking kit installation procedure is now complete.

k. Perform adjustment procedures in accordance with paragraph 2-26 before tightening the 10-32 hex-socket cap screw (at front of tape transport).

2-26 TENSION ARM HOUSING ASSEMBLY ADJUSTMENT PROCEDURE. The following adjustment procedural steps must be performed immediately after modification has been completed.



AMPLEX

Figure 2-6. Auto Tracking Harness Installation

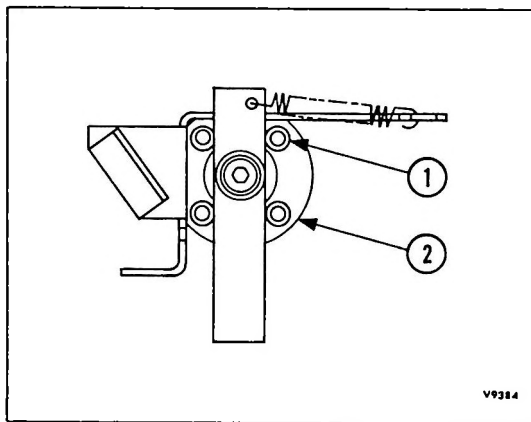


Figure 2-7. Tension Arm Housing Assembly (Supply Reel)

a. Position tape tension arm on its shaft while tightening the associated 10-32 screw so that switch S5 is just actuated, and the arm is approximately 1/16-inch from its stop.

b. The dash pot (Ampex part number 1368059-01) has been preadjusted at the factory and should not require further adjustment. However, the adjustment is not critical to operation of the auto tracking, and can be adjusted so that the tension arm does not "drop-in" and actuate switch S5 while starting large reels of tape.

c. Reconnect external power source to recorder system and perform setup and checkout procedures in accordance with paragraph 2-27.

2-27 Setup and Checkout Performance Procedure

2-28 The following setup and checkout performance procedural steps must be performed after installation of the auto tracking kit.

CAUTION

THE ±12 VOLTS ON THE SYSTEM POWER SUPPLY MUST BE DISABLED WHENEVER PRINTED WIRING ASSEMBLIES (PWA'S) ARE

INSTALLED OR REMOVED FROM THE ACCESSORY CHASSIS. OTHERWISE EXTENSIVE DAMAGE WILL OCCUR TO THE PWA'S.

DISABLING THE ±12 VOLTS IS ACCOMPLISHED BY PULLING OUT CIRCUIT BREAKER CB14 LOCATED ON FRONT PANEL OF THE SYSTEM POWER SUPPLY.

- a. Turn console power switch on.
- b. Install extender board (Ampex part number 1368156-01) into position 6 of the accessory chassis.
- c. Using a known accurate voltmeter, check for +12 volts between pins 1 and 7 (ground); and -12 volts between pins 15 and 8 (ground).
- d. Install auto tracking oscillator and control PWA (part number 1367313) into the extender board.
- e. Connect a voltmeter between pins 2 and 7 (ground), and observe for a reading of $+4.9 \pm 0.3$ vdc. Remove voltmeter.

2-29 FREQUENCY ADJUSTMENT PROCEDURE. Perform the procedural steps below:

- a. With the auto tracking PWA still installed in the extender board, remove J1 jumper from its present position (TEST) and reinstall between jacks B and C.
- b. Using a calibrated oscilloscope connect probe to test point E3 on the PWA and adjust potentiometer R2 for a frequency setting of 10 Hz.

c. Set main control panel SPEED switch to 15 ips position. Adjust potentiometer R1 for a level of 0.6 volt peak-to-peak. Set SPEED switch to 7.5 ips position and above voltage level should decrease to

AMPEX

approximately one-half. (The voltage levels should increase to 2.0 and 1.0 volts peak-to-peak, respectively, on recorders equipped with Ampex part number 1217960-10, capstan motors.)

d. Reinstall J1 jumper between jacks A and B.

e. Set main control panel SERVO-NORM switch to NORM position. Set main control panel MAN/AUTO switch to MAN position.

f. With the oscilloscope probe still connected to test point E3, observe for a reading of -12 vdc.

g. Set MAN/AUTO switch to AUTO position and observe for a voltage change to +5.0 vdc. Remove oscilloscope probe.

h. Pull out CB14 and remove extend-er board and auto tracking PWA 6.

i. Install auto tracking PWA 4 (Ampex part number 1367309), PWA 5 (Ampex part number 1367311) and PWA 6 (Ampex part number 1367313) into their respective slots in the accessory chassis.

j. Push in CB14 and load recorder with a correctly recorded tape.

k. At the main control panel, set the MAN/AUTO switch to MAN.

l. Start the recorder in the playback mode and observe for proper manual tracking operation. Note reading on TRACKING-REC CURRENT meter.

m. Set the MAN/AUTO switch to AUTO and, after lock-up, observe that the meter reading is maintained at within 5% of the reading noted in step l above.

n. Reset the MAN/AUTO switch to MAN, then turn the TRACKING control enough to deliberately produce a mistracking condition.

o. Reset the MAN/AUTO switch to the AUTO position and observe that the TRACKING-REC CURRENT meter indicates lock-up (recovers to the same reading as in step m) within two seconds.

p. Initiate STOP mode; this completes the auto tracking performance check.

2-30 VR-2000 AUTO TRACKING KIT INSTALLATION PROCEDURE

2-31 The following steps must be performed when installing an auto tracking kit in a VR-2000 series recorder system. The installation and subsequent modifications can be accomplished in approximately fifteen hours. The procedures described in the following paragraphs must be completed before the recorder system is returned to service; otherwise, the recorder system will not function properly. Installation of the kit will be most conveniently accomplished if the installation procedures are performed in the order presented.

CAUTION

ENSURE THAT ALL POWER IS REMOVED FROM THE SYSTEM PRIOR TO PERFORMING THE INSTALLATION PROCEDURES. VOLTAGES PRESENT DURING INSTALLATION WILL CAUSE EXTENSIVE DAMAGE TO THE EQUIPMENT.

2-32 Accessory Chassis Installation

2-33 To install the accessory chassis, perform the following steps:

a. Remove external power source to the recorder system.

b. If the Editec accessory is not installed in the recorder system, remove the blank panel in the console left bay just beneath the control panel, and install and secure the accessory chassis with the 12-24 screws and nylon washers provided.

Table 2-2. Kit List

ITEM	DESCRIPTION	QTY	PART NO.
1	Auto Tracking Tach Delay and Control PWA	1	1367309
2	Sweep Generator and Control PWA	1	1367311
3	Auto Tracking Oscillator and Control PWA	1	1367313
4	Control Panel Harness Assembly	1	1368539-01
5	Auto Tracking Harness	1	1368540
6	Accessory Chassis Assembly	1	1368243-04
7	Servo Adapter Harness	1	1367781
8	Instruction Manual	2	1809023
9	Dummy Plug	1	1368324
10	Extender Board	1	1368156-01
11	Tension Arm Assembly (Supply)	1	1368055-01
12	Power Supply Cable	1	1368542-01
13	Control Panel Template	1	1368147-01
14	Connector Template	1	1368541-01

c. If the Editec accessory is installed in the recorder system, remove any blank panel in the bay. Install and secure the accessory chassis with the 12-24 screws and nylon washers provided.

2-34 Intersync Servo System Modification

2-35 Same modification procedure as described for the VR-1200 series; refer to paragraph 2-13, page 2-3.

2-36 Control Panel Modification

2-37 To modify the control panel, perform the following steps:

a. Disconnect all cables from the rear of the control panel.

b. Remove control panel from the console by removing two screws on each slide that attach the slides to their respective brackets. Place the control panel on a work bench.

c. Remove protective coating from double-sided tape on back side of template (Ampex part number 1368147-01) supplied with kit. Position template (A part) as shown in Figure 2-2 and press firmly in place.

d. Make sure the area behind the panel to be drilled is clear of components. Using a number 42 (0.093-inch) drill bit, drill 34 holes (using extreme caution to protect wire harness on backside).

e. Remove template. Change to a number 32 (0.116-inch) drill bit and drill through the existing 34 holes. Press B part of template firmly over cutout area on control panel. Using the template as a guide, file opening to 5-7/64 x 1-17/64 and remove all burrs.

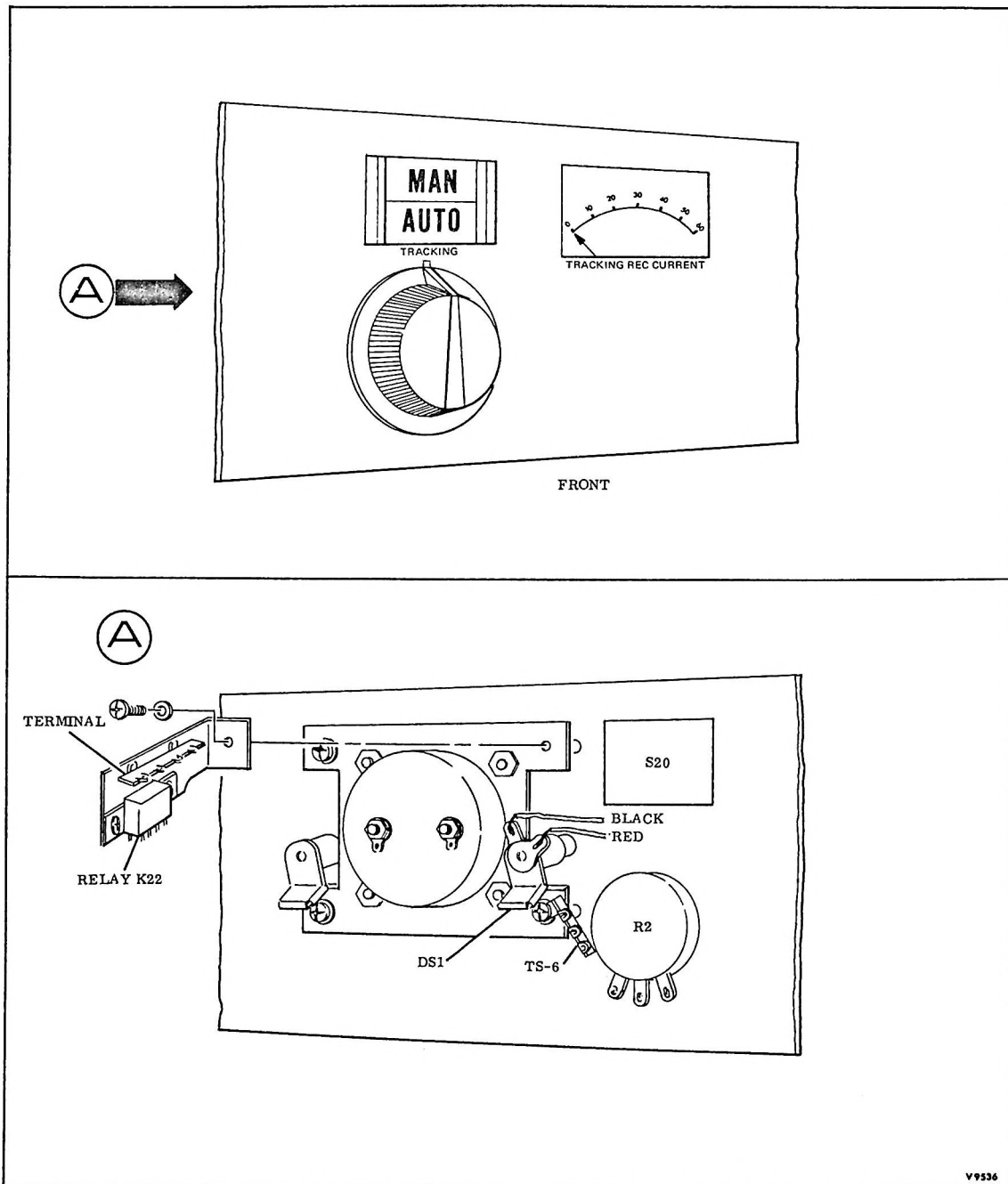
f. Mount the two black switch barriers in the cutout rectangle, and secure MAN/AUTO switch S20, which is already connected to the harness assembly (Ampex part number 1368539), to the barriers. Refer to any of the other three similar switches for mounting details.

g. Mount the relay bracket and terminal board, which is also part of the harness assembly, as shown in Figure 2-8.

h. Route and solder the green lead from S12-E to terminal 11 of SPEED switch S17.

i. Route and solder the red lead from J12 to the wiper contact of the SERVO MODE switch S12-D as shown in Figure 2-9.

AMPEX



V9536

Figure 2-8. Relay K22 Installation

AMPEX

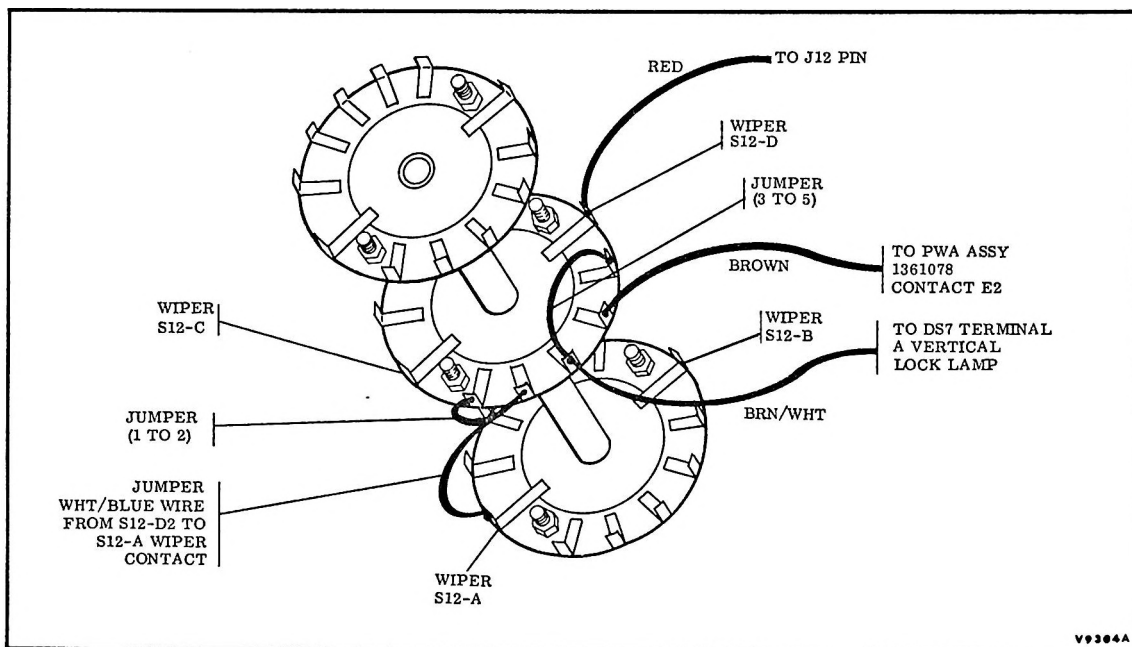


Figure 2-9. Servo Mode Switch S12 Modification

j. Make the following connections at switch S12 as shown in Figure 2-9.

1. Jumper and solder S12-D contacts 1 and 2.
2. Jumper and solder S12-D contacts 3 and 5.
3. Connect and solder contact 2 of S12-D (white/blue wire) to the wiper contact of S12-A6.
4. Connect and solder contact 4 of S12-D (brown wire) to terminal E2 of PWA 1361078 (board located on the same bracket supporting J4, which is in the immediate vicinity of S12).
5. Connect and solder contacts 3 and 5 of S12-D (brown/white wire) to the A terminal (brown/white wire) of the plug for DS7 (VERT LOCK lamp).

k. Connect and solder the red and black leads from the newly installed MAN/AUTO switch S20 to their respective colors on meter lamp DS1, located adjacent to switch S20.

1. Remove the two-conductor shielded cable from tracking potentiometer R2 (Figure 2-10). Prepare the two wires and shield for re-soldering and route the cable to the new terminal board TS6. Connect and solder the red lead to TS6-1, the black lead to TS6-2, and the shield to TS6-3.

m. Connect and solder the 2-conductor shielded cable from switch S20 to tracking potentiometer R2 as shown in Figure 2-10.

n. Spot-tie loose wiring to existing harness.

o. Stamp the designation "S20" adjacent to the newly installed MAN/AUTO switch.

AMPEX

p. Remove the Auto Comp Amplifier from the control panel chassis by disconnecting the cables from the rear connector panel, and loosening and removing the four mounting screws. Remove the amplifier from the chassis.

q. Remove protective coating from double-sided tape on back side of connector template (Ampex part number 1368541) supplied with kit. Position template as shown in Figure 2-11 and press firmly in place.

r. Make sure the area behind the panel to be drilled is clear of components. Using a number 42 (.093-inch) drill bit, drill the 20 holes as shown in Figure 2-11.

s. Remove template. Change to a number 32 (0.116-inch) drill bit and drill through the existing 20 holes. Using template as a guide, file opening to fit rectangular connector. Remove all burrs.

t. Mount and secure the 14-pin rectangular connector (J12) into cutout on rear of control panel with pin "A" toward top of panel.

u. Route the harness assembly toward the newly installed connector J12 and snap the pins into the respective connector pin slots as follows:

White/red lead to pin A
Brown lead to pin B
Orange lead to pin C
Black lead to pin D
Green lead to pin E

v. Spot-tie newly installed harness assembly to existing harness.

w. Replace auto comp amplifier removed in step p, and reconnect appropriate cables.

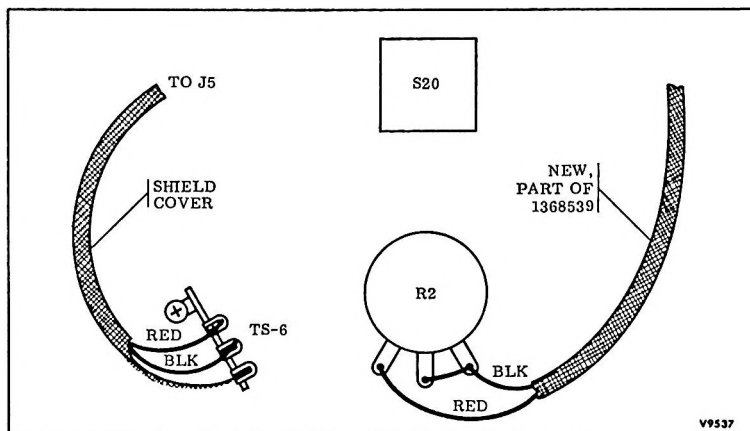


Figure 2-10. Wire Modification, Tracking Potentiometer R2

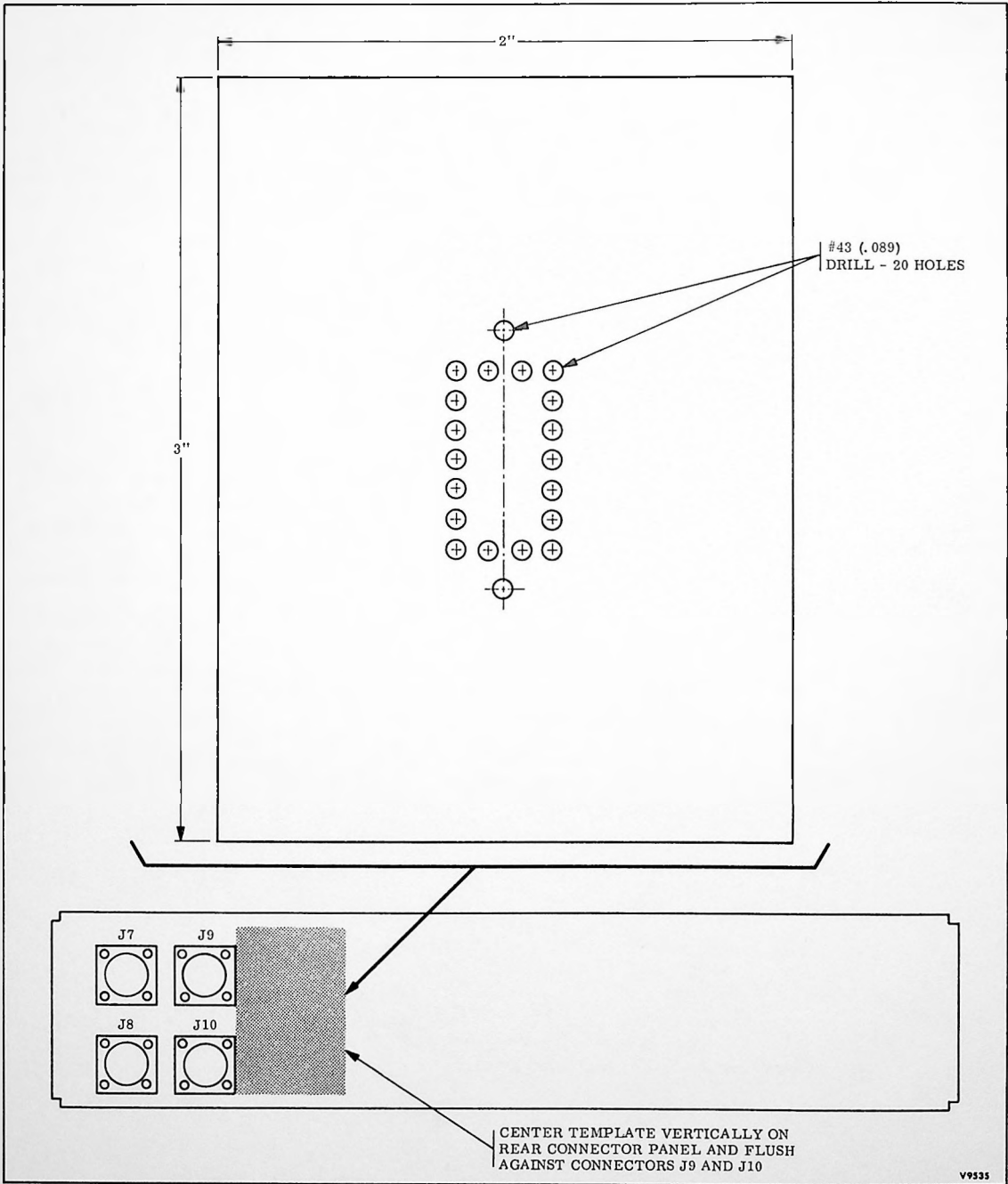


Figure 2-11. Connector Template Positioning

AMPEX

x. Stamp the designation "J12" at the top center of the newly-installed connector J12.

y. Verify the new wiring against schematic Figure 6-8 before re-installing control panel into the console.

z. Replace control panel into console, which was removed in step b. Reconnect all appropriate cables.

2-38 Video Signal System Modification

2-39 To modify the video signal system, perform the following steps:

a. Disconnect all cables from the rear of the video signal system chassis.

b. Remove the chassis holddown screws and remove the chassis.

c. Remove the eight screws securing the connector panel to the chassis and remove the panel.

d. Connect and solder a 24-AWG, 1-conductor shielded wire (provided by the customer) between J017 pin 3 at the rear of the chassis and J19--a spare UHF connector. See wiring diagram Figure 6-13.

e. Ground the shielded cable to the chassis, and spot-tie the cable to existing harness.

f. Replace the connector panel, secure the chassis to the recorder, and reconnect all cables.

2-40 Auto Tracking Harness Installation

2-41 Connect the auto tracking harness (Ampex part number 1368540) to the

connectors in accordance with assembly drawing 1368540. The harness has been sized to accommodate either location of the accessory chassis (Ampex part number 1367296). After installation, spot-tie newly installed harness to existing hardware.

NOTE

Remove dummy plug installed in accordance with paragraph 2-14 and save for emergency use.

2-42 Supply Reel Tension Arm Housing Assembly Modification

2-43 Same modification as described for the VR-1200 series systems, refer to paragraph 2-24 and paragraph 2-26, page 2-10.

2-44 Power Supply Cable Installation

2-45 To install the power supply cable (Ampex part number 1368542), supplied with the kit, perform the following steps:

a. Route and spot-tie power supply between connector J1 on the accessory chassis and TB2 terminals, located at the rear left side of the center bay. Connect loose wires as follows:

Red wire (+12) to TB2-3
 Black wire (COM) to TB2-5
 White wire (-12) to TB2-4
 Shield to TB2-6

b. The auto tracking kit installation is now completed.

2-46 Setup Checkout Performance Procedure

2-47 Perform the setup checkout performance procedure in accordance with paragraphs 2-28 and 2-29.

SECTION III

OPERATION

AMPEX

SECTION III

OPERATION

3-1 GENERAL

3-2 Operating Controls and Indicators

3-3 The only additional control contributed by auto tracking kit installation is the MAN/AUTO switch above the TRACKING potentiometer (Figure 3-1), used for the selection of automatic or manual adjustment of optimum signal playback.

3-4 Operating Procedures

3-5 The operating procedures are confined to the selection of automatic or manual tracking adjustment. In the event that proper operation of the automatic feature is in doubt, a checkout for proper operation should be performed (refer to paragraphs 2-29 through 2-32).

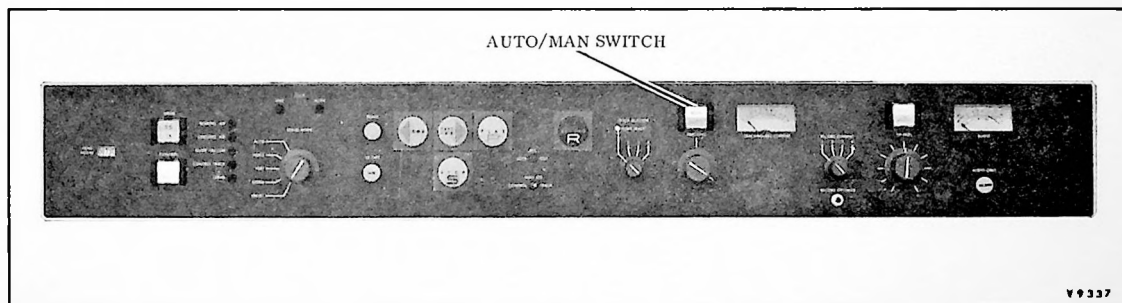


Figure 3-1. Control Panel Modified by Auto Tracking Kit

SECTION IV

THEORY OF OPERATION

SECTION IV

AUTO TRACKING SYSTEM THEORY

4-1 GENERAL

4-2 The auto tracking feature provides automatic tracking of the videotape recording by controlling the phase of the capstan. This control is achieved by feeding the drum tach signal, from the intersync servo via the auto tracking electronics circuitry--where the drum tach signal is delayed and returned to the servo. The amount and polarity of drum tach delay is determined by comparing the phase of a 10-Hz signal, recovered from the switcher rf envelope, with a reference 10-Hz trigger. This recovered 10-Hz signal, which varies 180° on opposite sides of the track, results from amplitude modulation of the tape rf signal by mechanical (physical) displacement of the video (quadruplex) heads longitudinally with respect to the recorded tracks. This mechanical displacement is produced by injecting a small amount of 10-Hz signal into the capstan servo to vary the tape speed slightly above and below nominal.

4-3 The auto tracking unit consists of three printed wiring assemblies (PWA), which are: (1) auto tracking oscillator and control (PWA 6); (2) auto tracking sweep generator and control (PWA 5); and (3) auto tracking tach delay and control (PWA 4); and associated components. Figure 4-1 depicts an overall functional block diagram of the auto tracking unit.

4-4 AUTO TRACKING OSCILLATOR AND CONTROL BAND

4-5 The auto tracking oscillator and control board provides the 10-Hz signal used for varying the speed of the capstan for auto tracking purposes, and to establish a 10-Hz

reference for the auto tracking sweep generator and control circuitry. It is also the +5-volt source for all three auto tracking boards. The auto tracking oscillator and control circuitry consists of the following circuits: (1) 320-Hz oscillator; (2) divide-by-16 counter; (3) phase shifter A1, A2, A3, A7, A8; (4) 10-Hz low-pass filter A12; (5) 7.5-ips level control; (6) signal switcher Q6; (7) amplifier A13; (8) 10-Hz trigger A4; (9) level shifter Q4; (10) inverter A8; (11) voltage translator A9; (12) voltage regulator VR2, Q3; and associated components. Figure 4-2 depicts a functional block diagram of the auto tracking oscillator and control circuitry.

4-6 320-Hz Oscillator

4-7 The 320-Hz oscillator circuit consists of dual transistor Q1, voltage comparator A5, one-shot A10, transistor switch Q2, and associated components. Q1, a constant-current source, is used to charge C1 at a rate determined by R4 and R2. The setting of R2 controls the frequency of the oscillator circuit. The rising sawtooth voltage appears at A5-3 and is compared with the fixed dc level at A5-2. When the sawtooth voltage equals the fixed dc level, A5 triggers one-shot A10 for a 0.10-millisecond positive-going squarewave output at A10-8. This output biases Q2 on and provides a quick discharge path for C1, and the cycle is repeated. The 320-Hz output at A10-8 is applied to the input of divide-by-16 counter A11.

4-8 Divide-by-16 Counter

4-9 The divide-by-16 counter consists of the single circuit A11. The 320-Hz oscillator

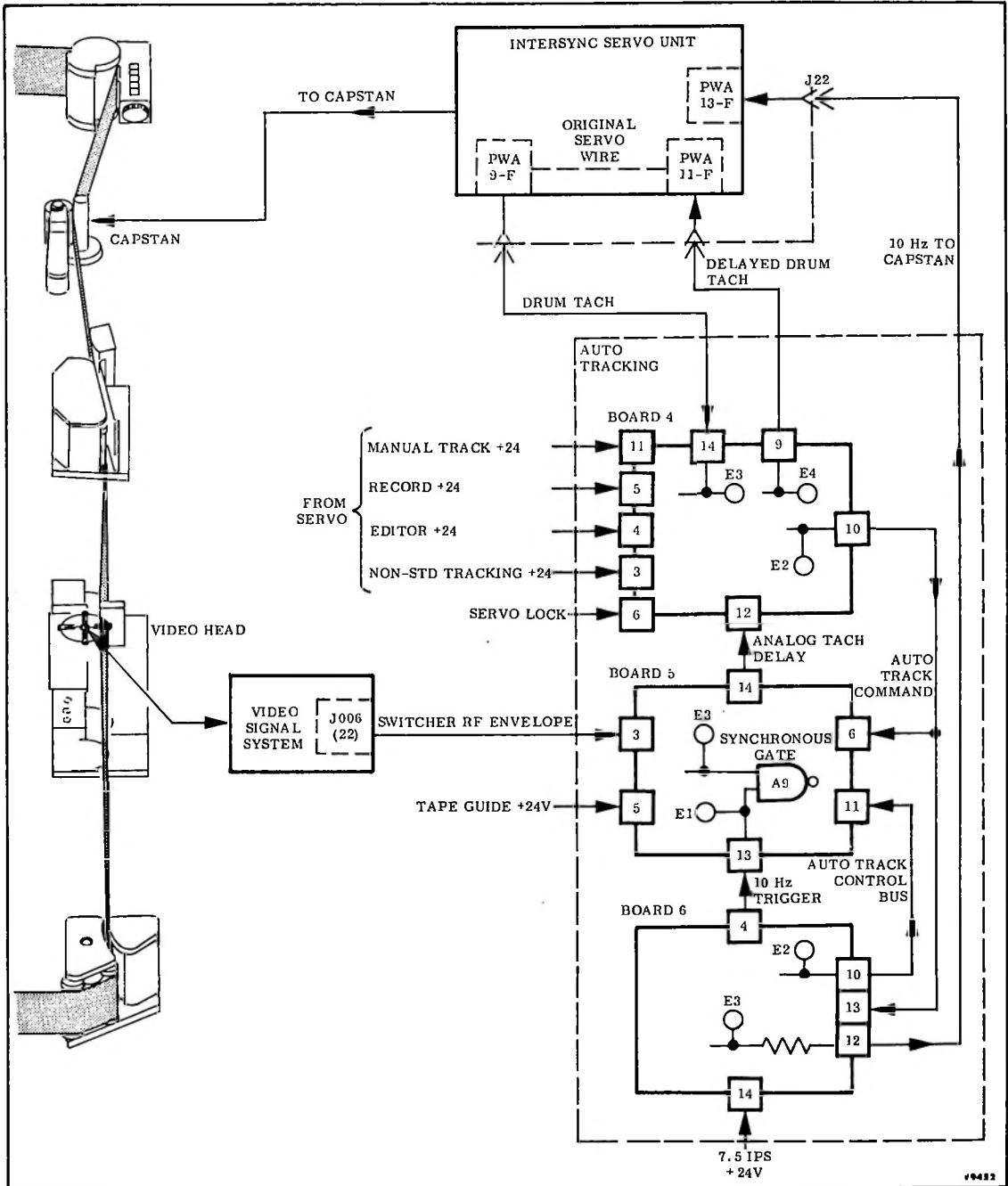


Figure 4-1. Auto Tracking Overall Functional Block Diagram

AMPEX

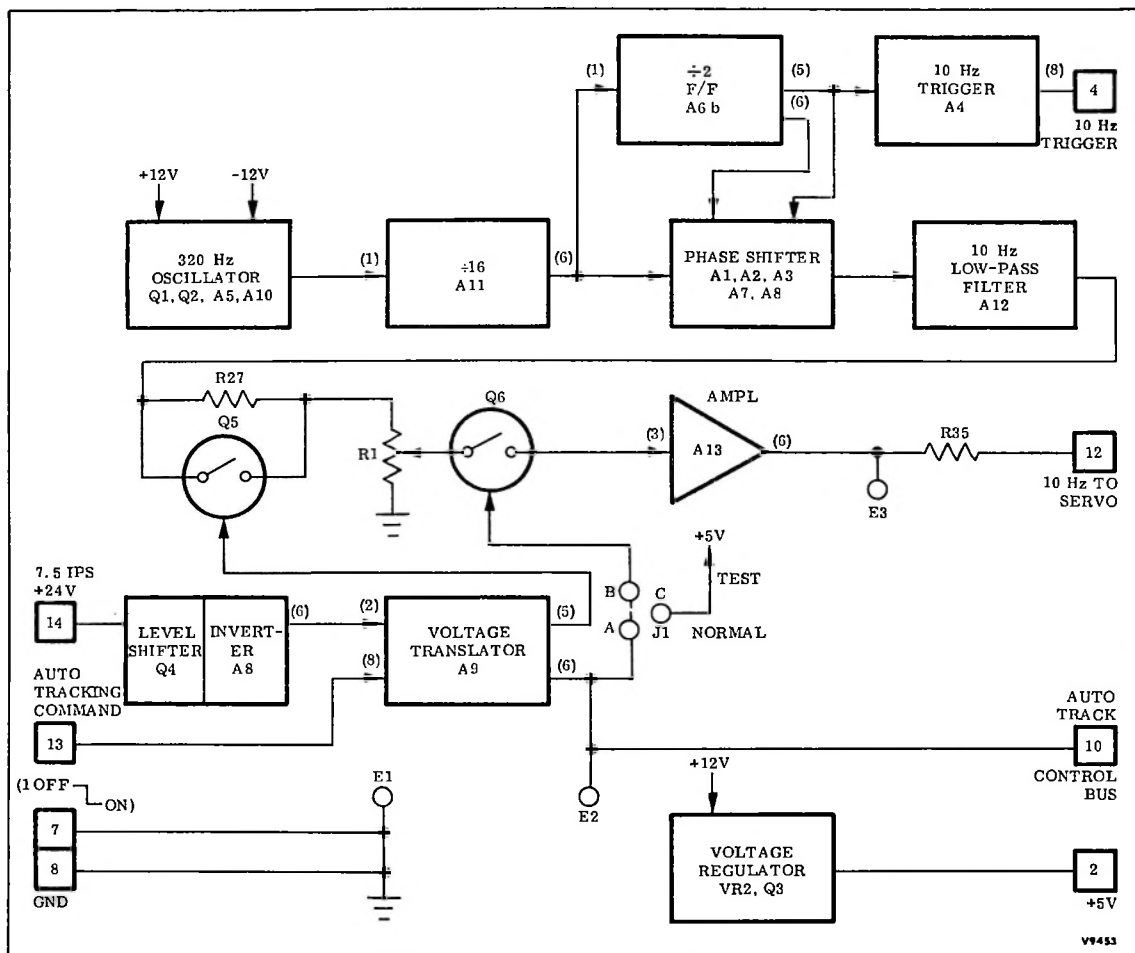


Figure 4-2. Auto Tracking Oscillator and Control Functional Block Diagram

output is applied to the clock input (pin 1) of the divide-by-16 counter, which functions as a typical counter. The output at pin 6 is a 20-Hz squarewave which is applied to a phase shifter circuit and to A6-1 (one-half of a dual J-K flip-flop).

4-10 Phase Shifter

4-11 The phase shifter circuit consists of inverters A1, A8, A2; one-shot A3; dual J-K flip-flops A6; divide-by-16 counter A7; NAND/NOR gates A2, A8; and associated

components. The phase shifter circuit provides a 10-Hz squarewave which is delayed 4.8 milliseconds with respect to the 10-Hz trigger to compensate for various delays in the auto tracking servo loop. Inverter A1, C14 and NAND gate A2 comprise an 18-microsecond pulse-forming circuit, which is timed from the negative edge of the 20-Hz squarewave output of A11-6 (see timing diagram Figure 4-3). This 18-microsecond pulse results from the increase in rise time of the positive-going edge of inverter A1-10 squarewave output, which then increases

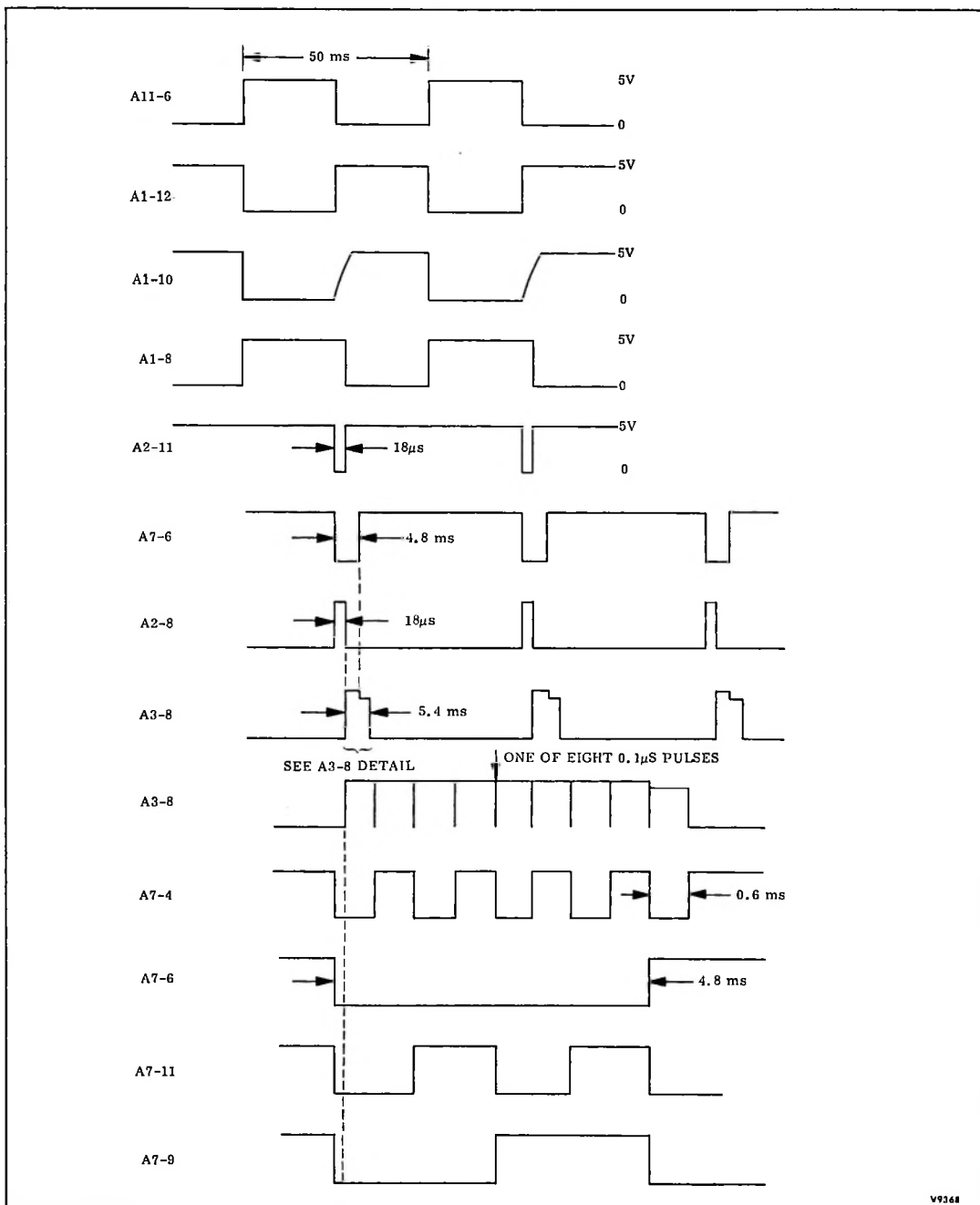


Figure 4-3. Phase Shifter 20-Microsecond Waveforms

the length of the positive portion of the input of NAND gate A2-13.

4-12 When A2-11 output goes "low" (0 V), it clears the divide-by-16 counter A7, causing the output (pin 6) to go low (see timing diagram Figure 4-1). Retriggerable monostable multivibrator A3 is triggered 18 microseconds later by the negative edge of the positive pulse from inverter A2-8. The output from A3-8 is positive (+4 V) for an active period of approximately 0.6 microsecond as determined by C6 and R6. At the end of this active period, A3-8 output returns to 0 V. This negative-going pulse triggers counter A7 and is inverted by A2-3, which in turn retriggers A3-4. This cycle is repeated seven more times until the 4th flip-flop in A7 changes to a high state (+5 V). (See timing diagram Figure 4-3 for waveforms of four series-connected flip-flops within A7.)

4-13 The positive-going transition is inverted at A2-3, triggering A6-13 and setting A2-4 low, preventing A3 from being retriggered. The described triggering of A6-13 occurs at a 20-Hz rate and is delayed by the active period of A3 multiplied eight times by counter A7. In order to prevent a 180° phase ambiguity between A6-5 and A6-8 upon initial turn-on, the low output from A8-3 sets A6-8 high. The resulting 10-Hz output (A6-8), which is applied to the 10-Hz low-pass filter A12, is now of the proper polarity, with both edges delayed by approximately 4.8 milliseconds.

4-14 10-Hz Trigger

4-15 The 10-Hz trigger circuit consists of one-shot A4 and associated components. The one-shot is triggered at a 10-Hz rate by flip-flop A6-5, and its output (A4-8) is a positive-going 1-millisecond pulse which is used as a 10-Hz reference trigger for the auto tracking sweep generator and control PWA.

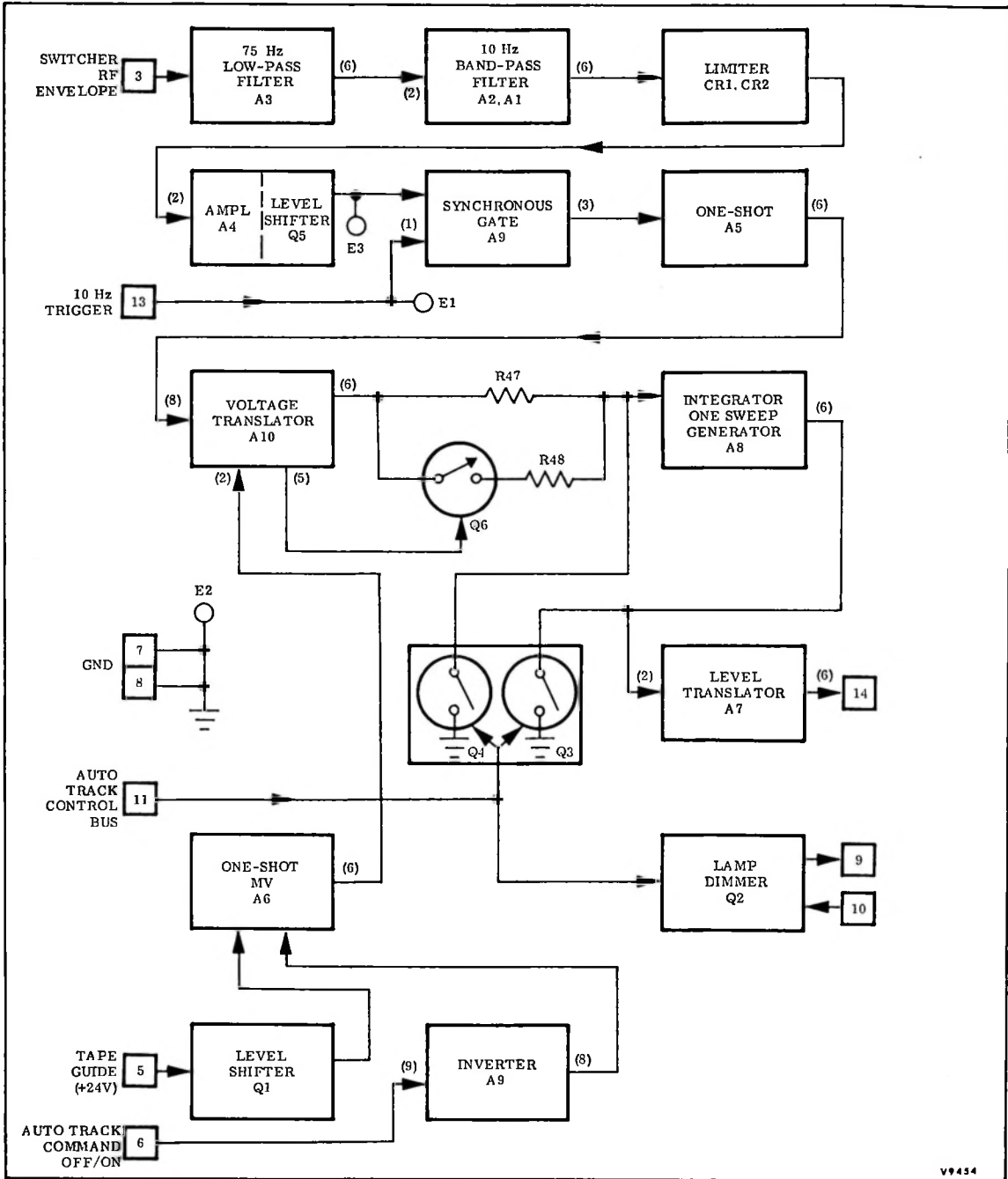
4-16 10-Hz Low-Pass Filter and 7.5-IPS Level Control

4-17 The 10-Hz low-pass filter circuit consists of integrated circuit operational amplifier A12 and associated components. The 7.5-ips level control circuit consists of Q5, R27, A9, A8, Q4, and associated components. The 10-Hz output from the phase shifter is applied to the low-pass filter circuit at A12-2/3, and its output (A12-6) is applied to the 7.5-ips level control circuit.

4-18 The output from the low-pass filter circuit (A12-6) is routed through R27 or Q5 to signal level potentiometer R1. Since the signal level requirements at this point for the 7.5-ips tape speed are only half those required for the 15-ips tape speed, the 10-Hz signal is made to pass through R27 before reaching R1. This is accomplished by applying a +24-volt level at pin 14 during the 7.5-ips mode. This results in voltage level inversions at Q4 collector (level shifter), inverter A8-6, and again at voltage translator A9-5 (-12 V), which biases Q5 negatively and turns off. During the 15-ips mode, when Q5 is biased on by the +12 volts from A9-5, which is limited to +5 volts by CR2, the 10-Hz signal from A12-6 is routed to R1 directly through Q5 without appreciable attenuation.

4-19 Signal Switcher and Amplifier

4-20 The signal switcher circuit consists of Q6 and associated components, and the amplifier circuit consists of an operational amplifier (integrated circuit) A13 and associated components. The 10-Hz signal at signal level potentiometer R1 is routed through signal switcher Q6 in the automatic "on" and test modes to amplifier A13, which amplifies the 10-Hz signal to the proper level for the capstan servo. During the automatic "on" mode, a low logic level is applied to pin 13 of the PWA, which results in its inversion and voltage translator A9-6, applying a positive bias to Q6 and consequently allowing the 10-Hz signal to go on through to the servo. (Refer to paragraphs 4-40 through 4-54 for detailed description of auto tracking "command" logic levels at pin 13.



V9434

Figure 4-4. Auto Tracking Sweep Generator and Control Functional Block Diagram

4-21 Voltage Regulator

4-22 The voltage regulator circuit consists of zener diode VR2 and series regulator Q3. The +5-volt output from this regulator circuit is used throughout all three PWA's in the auto tracking circuitry.

4-23 AUTO TRACKING SWEEP GENERATOR AND CONTROL BOARD

4-24 The auto tracking sweep generator and control board compares the phase of the 10-Hz signal recovered from the rf envelope of the fm playback signal with the 10-Hz reference signal from the auto tracking oscillator and control board. This comparison is used to generate a phase error signal, if any, for further processing by the auto tracking tach delay and control board. The auto tracking sweep generator and control circuitry consists of: (1) 75-Hz low-pass filter A3; (2) 10-Hz band-pass filter A2 and A1; (3) limiter; (4) amplifier A4; (5) level shifter Q5; (6) synchronous gate A9; (7) one-shot A5; (8) voltage translator A10; (9) switch Q6; (10) integrator/sweep generator A8; (11) level translator A7; (12) level shifter Q1; (13) one-shot A6; (14) inverter A9; (15) switches Q4, Q3; (16) lamp dimmer Q2; and associated components. Figure 4-4 depicts a functional block diagram of the auto tracking sweep generator and control circuitry.

4-25 75-Hz Low-Pass Filter and 10-Hz Band-Pass Filter

4-26 The 75-Hz low-pass filter circuit consists of R19, C6, R18, C5, and operational amplifier (IC) A3. The 10-Hz band-pass filter circuit consists of operational amplifiers (IC) A2, A1, and associated components. The rf envelope of the playback signal is applied to pin 3 of the PWA and is processed through the 75-Hz low-pass filter circuit. The filtered output signal from A3-6 is further filtered by the 10-Hz band-pass filter circuit, and the band-pass output of A1-6 (10-Hz signal) is limited to a plus and minus 0.7-volt level by CR1 and CR2.

4-27 Amplifier, Level Shifter, and Synchronous Gate

4-28 The amplifier circuit consists of operational amplifier (IC) A4 and associated components, and the level shifter circuit consists of transistor Q5 and associated components. The output of the limiters is amplified by A4 and shifted to a zero to plus 5 volt logic level by Q5. The Q5 output is applied to pin 2 of the synchronous gate A9, and the incoming 10-Hz signal (at pin 13 of the PWA) is applied to pin 1 of the same gate. A positive-going signal level from Q5 will gate the 10-Hz trigger from the auto tracking oscillator and control board through synchronous NAND gate A9. The negative-going output triggers the one-shot A5.

4-29 One-Shot and Voltage Translator

4-30 The one-shot circuit consists of A5 and associated components. The negative-going transitions (edges) from the synchronous gate A9-3 trigger the one-shot A5, which has a zero-volt output at A5-6 during its active state. Since the triggered output lasts for about 120 milliseconds or 20 milliseconds longer than the 100-millisecond period of the 10-Hz signal, the output at A5-6 will remain low if the next 10-Hz trigger is gated through synchronous gate A9. The output at A5-6 is inverted from a zero or +5-volt level to a plus or minus 12-volt level, respectively, by voltage translator A10. The signal is then limited to about plus and minus 5 volts by VR1.

4-31 At this point the output from VR1 will be coupled through R47 only during normal operation, or through the parallel combination of R47 and R48 (with Q6 turned on) during the initial "high-gain" mode. This mode is initiated by either the tape guide bus going to +24 volts or the auto track command going low at pin 6 (PWA). However, this mode will last for approximately 1.5 seconds after the last of these two events occurs and re-triggers the one-shot A6.

4-32 The low-level 1.5-second output at A6-6 is inverted to +5 volts by voltage

translator A10. This voltage is applied to the gate of Q6 through R45, turning Q6 on for 1.5 seconds and putting R48 and R47 in parallel for this period. The purpose of this operation is to increase the slope of the reversible sawtooth integrator A8 for a more rapid initial lockup of the auto tracking feature.

4-33 Integrator/Sweep Generator

4-34 The integrator/sweep generator circuit consists of operational amplifier (IC) A8 and associated components functioning as an integrator. This circuit integrates the positive or negative dc signal from R47 and R48 corresponding to the phase error of the recovered rf envelope and generates a reversible sawtooth waveform, which in essence is the phase error or analog tach delay signal.

4-35 Level Translator

4-36 The level translator circuit consists of operational amplifier (IC) A7 and associated components. This circuit translates the A8-6 output to a signal with a +2.6-volt zero reference with maximum excursions about this zero reference limited by diodes CR6 and CR7. During manual modes of operation, -12 volts (from pin 11) biases on bidirectional transistors Q3 and Q4, grounding A8-2 and A8-6, disabling integrator A8. During the automatic mode (unless inhibited, refer to paragraph 4-54), Q3 and Q4 are biased off by a +5 volts applied to their bases through pin 11.

4-37 Lamp Dimmer

4-38 The lamp dimmer consists of Q2 and associated components, which comprise a portion of the auto mode lamp circuit. Q2 is turned on for the "bright" lamp illumination and is turned off, placing R49 in series for a "dim" illumination of the lamps.

4-39 AUTO TRACKING TACH DELAY AND CONTROL BOARD

4-40 The auto tracking tach delay and control board develops the auto tracking control

logic and, when appropriate, converts the analog tach delay or phase error signal (from the auto tracking sweep generator and control board) to an actual delay of the drum tach signal. The resultant delayed drum tach output at pin 9 (of the PWA) is phased $\pm 45^\circ$ from the 0° reference phase of the tach input signal, and is used to control the phase of the tape capstan so that tracking for maximum signal strength of the video tracks being played back will occur.

4-41 The auto tracking tach delay and control circuitry consists of: (1) level shifters Q6, Q5; (2) 90-degree delay circuit A10, A9, A8, A6; (3) 270 ± 45 -degree circuit comprised of A3, A2, A1, Q1, A4, A5, A6; (4) drum tach switch A7; (5) level shifter Q7, Q4; (6) level shifter Q3; (7) NAND gate A9; (8) bidirectional switch Q2; and associated components. Figure 4-5 depicts a functional block diagram of the auto tracking tach delay and control circuitry.

4-42 Level Shifters

4-43 This level shifter circuit, consisting of Q6, Q5, and associated components, shifts the incoming (pin 14) drum tach signal from a 0 to -12-volt signal level to a 0 to +5-volt logic level. The output from Q5 collector is fed to the 90-degree delay circuitry and to signal switch A7.

4-44 Ninety-Degree Delay Circuit

4-45 The 90-degree delay circuit consists of pulse-forming circuits comprised of C13, C14, inverters A10, NAND gate A9; one-shot A8; divide-by-two flip-flop A6, and associated components. The output from level shifter Q5 collector is channeled through the two aforementioned pulse-forming circuits, which generate 18-microsecond pulses from both the positive and negative-going edges of the drum tach input signal. (See timing diagram Figure 4-6 and Figure 4-7.)

4-46 Typically, the rise time output at inverter A10-10 is delayed by C13, resulting in a positive pulse output at A10-8, which is

AMPEX

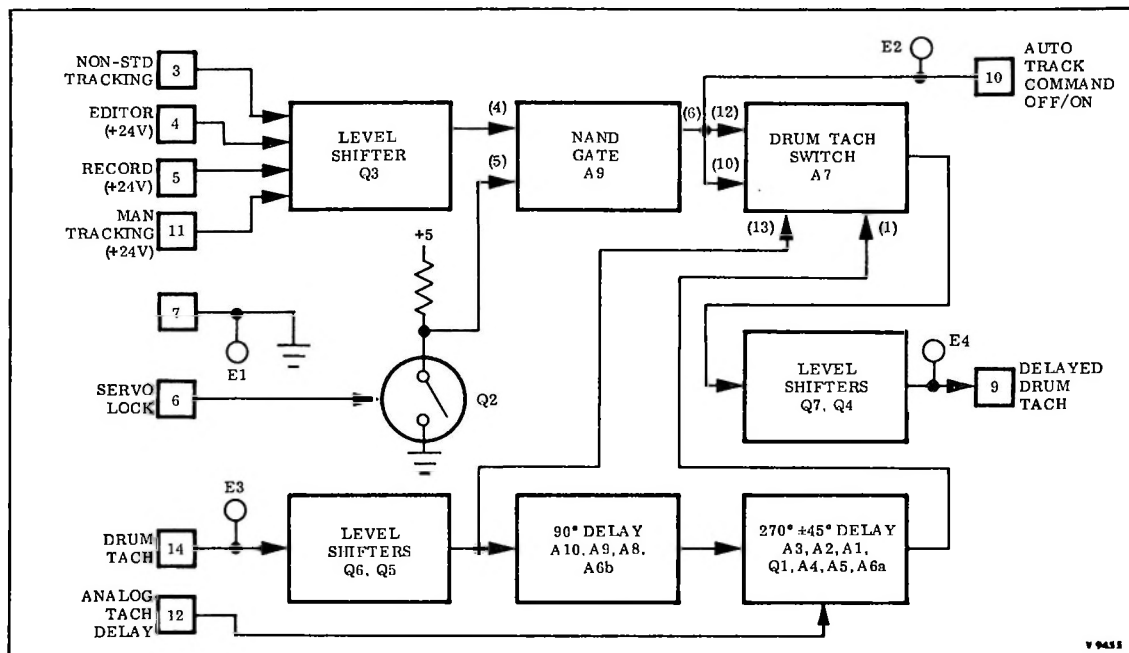


Figure 4-5. Auto Tracking Tach Delay and Control Functional Block Diagram

lengthened by 18 microseconds. These pulses are combined with pulses of normal length at AND gate inputs A9-9 and A9-10, which result in negative-going 18-microsecond output pulses at A9-8. The same pattern follows for the pulses formed in the other channel (delayed by C14) except that the pulses are derived from the negative, rather than the positive-going edges of the Q5 collector output waveform. Since the drum tach switch A7 (wired OR gate) accepts output from both channels, the output of this switch is an 18-microsecond pulse recurring at twice the drum tach rate. The output at A9-3 (other channel) is an 18-microsecond pulse recurring at the drum tach rate of 240 Hz for 525-line standards and 250 Hz for 625-line standards. This A9-3 output is used as a direct set input for the divide-by-two flip-flop A6-10 to prevent a 180° phase ambiguity upon initial turn-on. See timing diagram Figure 4-6.

4-47 The 480-Hz pulses (500 Hz for 625-line standards) are used to trigger one-shot

A8. Each negative-going edge of these pulses triggers the one-shot for a positive-going 1.0-millisecond output pulse. The one-shot output's negative-going edge in turn toggles flip-flop A6-13 so that the output at A6-8 is identical to the Q5 collector output, but delayed for 1.0 millisecond. The 18-microsecond pulses at A9-3 are used to establish an initial reference by presetting flip-flop A6-8 high, so that the proper phase relationship between the Q5 output and Q6-8 outputs will be established. The output at A6-8 is fed to the 270 ±45-degree delay circuitry. See timing diagram Figure 4-7.

4-48 270 ±45-Degree Delay Circuitry

4-49 The 270 ±45-degree delay circuit consists of: (1) pulse-forming circuits comprised of inverters A3; (2) NAND gates A2; (3) voltage comparator A4; (4) latch A5; (5) constant-current source Q1; (6) divide-by-two flip-flop A6; and associated components. The output from A6-8 is channelled to the pulse-forming circuits and their outputs at

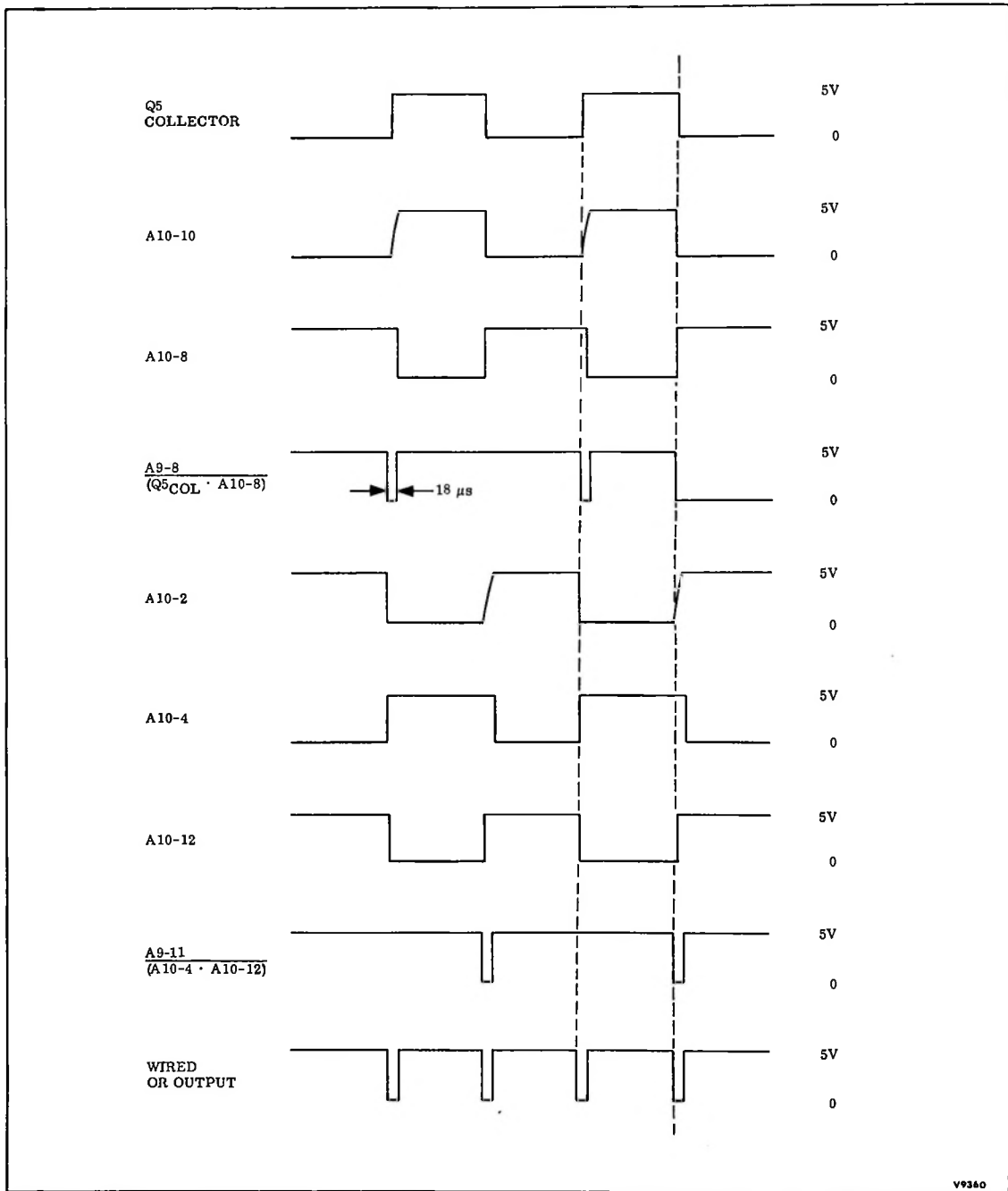


Figure 4-6. 20-Microsecond Waveform Generator

AMPEX

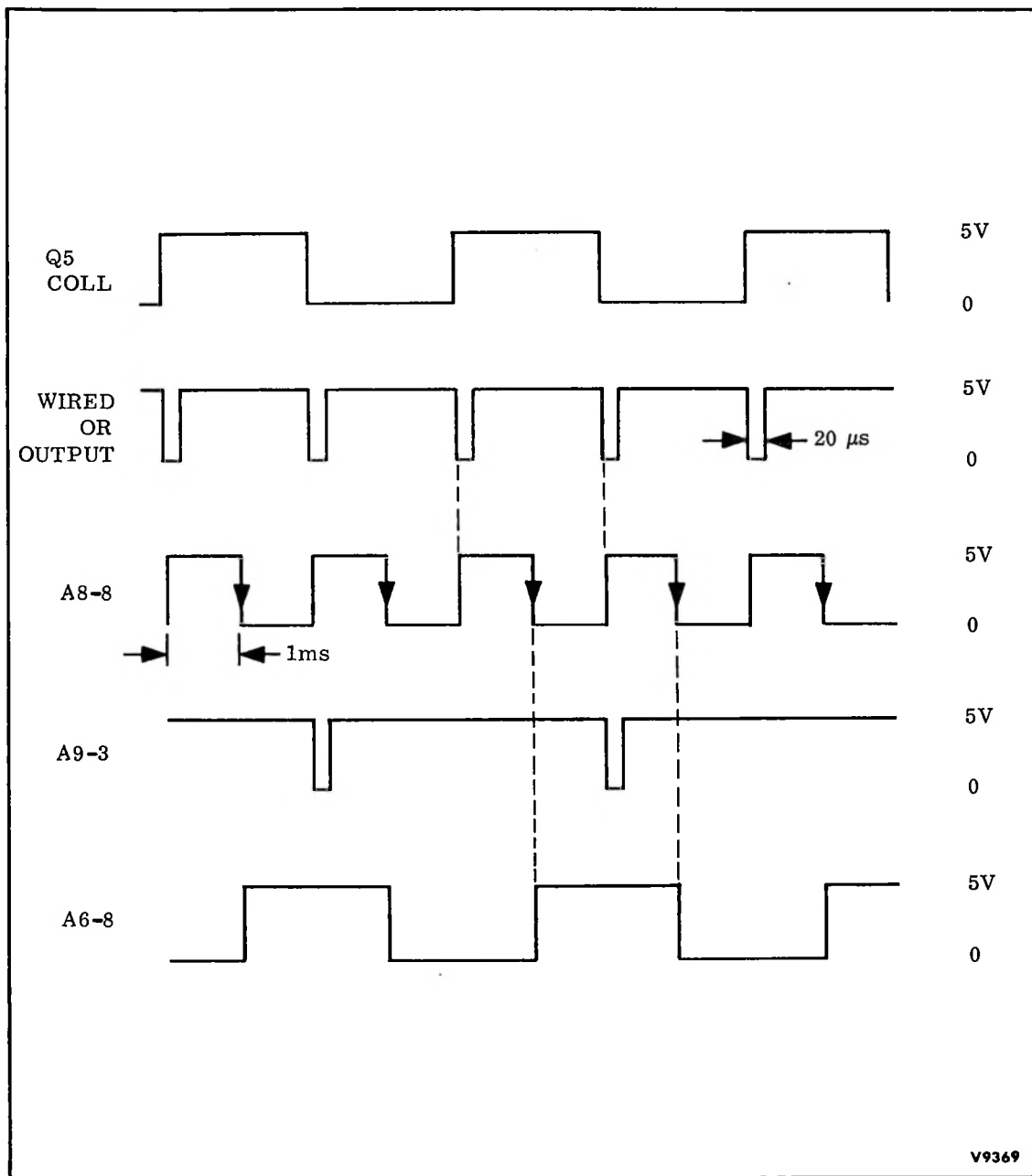


Figure 4-7. 90° Delay Waveforms

NAND gate A2-6 and A2-3 are the same as those at A9-8 and A9-11 (see timing diagram Figure 4-6) respectively described in paragraph 4-46. These output pulses, however, are delayed about 1.0 millisecond because of the delay action of one-shot A8 as previously described. The outputs at A2-6 and A2-3 are then combined to form positive-going 18-microsecond pulses at A2-8 at twice the drum tach rate.

4-50 The output at A2-8 is used to turn on A1 to provide a discharge path for C1 to ground. C1 is charged by constant-current source Q1. The waveform on C1 is a zero to five-volt sawtooth which is applied to pin 3 of voltage comparator A4. The sawtooth voltage is compared to the input at pin 2 of A4. A4-2 receives the analog tach delay or phase error signal from the auto tracking sweep generator and control board through pin 12. The range of the analog tach delay or phase error voltage is from -0.1 to +4.8 volts with a mean or zero phase error signal of +2.6 volts. When the sawtooth amplitude across C1 reaches the level of the analog tach delay or phase error signal at A4-2, the 5-volt logic output goes low at A4-7 to trigger latch A5.

4-51 This negative-going output at A5 toggles divide-by-two flip-flop A6 at twice the drum tach rate, which results in an output at A6-5 equivalent to that at Q5 output. The output, however, is phase-shifted with respect to it from zero degrees for no relative analog tach delay to as much as plus or minus 45 degrees, depending on the magnitude of the analog tach delay or phase error voltage. The net effect of the 270 ± 45 -degree phase shift at A6-5 plus addition of the 90-degree delay at A6-8 is a net change of $360 \pm 45^\circ$ or $0 \pm 45^\circ$. The phase-shifted drum tach output at A6-5 is coupled through drum tach switch A7 (wired OR gate).

4-52 Level Shifters

4-53 The phase-shifted (or direct, depending on operating mode) drum tach output from A7-6 is applied to level shifter circuit comprised of Q7, Q4, and associated components.

This circuit shifts the 0 to +5-volt level back to the 0 to -12-volt signal level at pin 9, which is then routed to the servo unit.

4-54 During any non-automatic mode of operation, +24 volts may be applied to pins 3, 4, 5, and/or 11 of the PWA, which biases level shifter Q3 on and sets NAND gate A9-6 at +5 volts. The result is that the delay circuits are bypassed via A7-13 and A7-11, and the drum tach input signal is routed directly from level shifter Q6 and Q5 collectors to A7-4 through the drum tach switch (wired OR gate) and then via Q7 and Q4 to the output at pin 9. The same result is achieved when the servo lock is not attained and -12 volts then appears at pin 6, biasing bidirectional switch Q2 on and producing the same effect as when +24 volts was applied to pin 3, 4, 5, or 11. The auto tracking command output at pin 10 is also used by the auto tracking sweep generator and control board, and by the auto tracking oscillator and control board.

4-55 POWER SUPPLY

4-56 The 12-volt power supply provides +12 and -12 regulated voltage output to the solid-state components of the Video Signal System. The power supply consists of: (1) power transformer T1; (2) bridge rectifier CR001 through CR004; (3) shunt regulator Q001; (4) shunt regulator Q002; (5) constant current series regulators Q003/Q004; (6) sensors Q8, Q9, Q7, Q5, Q6, Q4; and associated components. Figure 4-8 depicts a functional block diagram of the power supply.

4-57 The input voltage is applied to transformer T1 primary winding. One secondary winding provides 7 vac, which is used as the 60-Hz reference source. The other secondary winding is applied to the bridge rectifier CR001 through CR004. The output of the bridge rectifier, approximately 40 vdc, is filtered by C001 and C002 and applied to series regulators, Q003 and Q004, and to shunt regulators, Q001 and Q002.

4-58 Transistor Q001 is the shunt regulator for the +12-volt output of the power

supply. The +12-volts is sensed at the load and fed back through the voltage divider network, R31, R24, R21, where it is compared with the 6.2-volt zener diode, VR3, by differential amplifier Q8. The difference in voltage is applied to the base of amplifier Q9, then to the base of Q7, and finally to the base of Q001, driving it harder or easier, depending on the load at the output and the need to raise or lower the output voltage to exactly +12 volts.

4-59 Transistor Q002 is the shunt regulator for the -12-volt output of the power supply. The circuit is identical with that described in paragraph 4-58 and operates in the same manner, except that the reference is from zero volt to -12 volts. Therefore, no attempt will be made here to repeat that operation.

4-60 Series regulator Q003 and Q004 maintain the constant current from shunt regula-

tors, Q001 and Q112, and its output voltage is not generally used in the Video Signal System. However, a brief functional description of the circuit is included. Transistors Q3 and Q2 are diode-connected to provide a constant current source of reference and form a temperature-compensating device to balance out the temperature variations of series regulators Q003/Q004. VR1 is a 6.5-volt zener diode that is also temperature-compensated, and is used as a reference source with which to compare the output voltage. Q1 amplifies any difference in voltage, and as an emitter-follower, drives the bases of Q003/Q004, which regulates the output.

4-61 Potentiometers R24 and R11 are precision-set at the factory and no further change in adjustment is needed, unless components within the power supply are changed. The output voltages are adjusted to +12 and -12 volts ± 0.25 volts, and identical within 0.1 volt of each other.

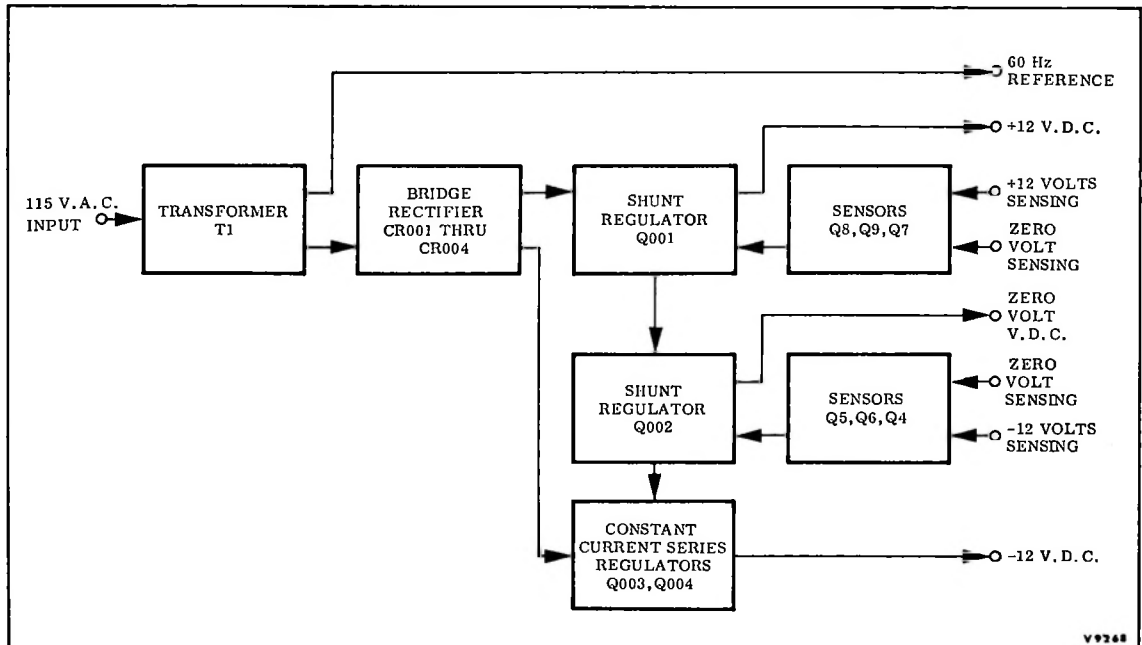


Figure 4-8. ± 12 -Volt Power Supply Functional Block Diagram

SECTION V

ROUTINE & CORRECTIVE
MAINTENANCE

AMPEX

SECTION V
MAINTENANCE

5-1 GENERAL

5-2 This section contains routine and corrective maintenance information for the auto tracking feature.

5-3 ROUTINE MAINTENANCE

5-4 The routine maintenance procedural steps listed below can be performed periodically to determine whether the auto tracking feature is functioning properly.

5-5 Install a correctly recorded tape on the recorder and proceed as follows:

- a. At the main control panel, set the MAN/AUTO switch to MAN.
- b. Start the recorder in the playback mode and check for proper manual tracking operation. Note reading on TRACKING-REC CURRENT meter.
- c. Set the MAN/AUTO switch to AUTO and, after lockup, check that the meter reading is maintained at within 5% of the reading noted in p above.
- d. Reset the AUTO/MAN switch to MAN, then turn the TRACKING control enough to deliberately produce a mis-tracking condition.
- e. Reset the AUTO/MAN switch to the AUTO position and check that the TRACKING-REC CURRENT meter indicates lockup (recovers to the same reading as in step c) within 2 seconds.
- f. Initiate STOP mode; this completes the auto tracking performance check.

5-6 CORRECTIVE MAINTENANCE

5-7 The corrective maintenance procedures for the auto tracking feature are listed below. These procedures are to be performed when it has been determined, by performing the procedural steps of paragraph 5-5, that the auto tracking feature is malfunctioning. For further troubleshooting assistance, refer to the system theory of operation in Section IV.

5-8 In the event of improper circuit operation, or if a component on an auto tracking circuit board has been changed, the following checks and adjustments (see Figure 5-1) should be performed using a recently calibrated voltmeter and oscilloscope:

5-9 Voltage Check

- a. At the system power supply, open (pull out) the 12-volt power supply circuit breaker CB14 and remove auto tracking circuit boards 4, 5, and 6 from the accessory chassis.

NOTE

The ± 12 -volt supply should always be interrupted, by opening CB14, whenever auto tracking circuit boards are removed or reinstalled.

- b. Install the extender board in position 6.
- c. Close (push in) CB14 and wait a few seconds for the voltage to stabilize.

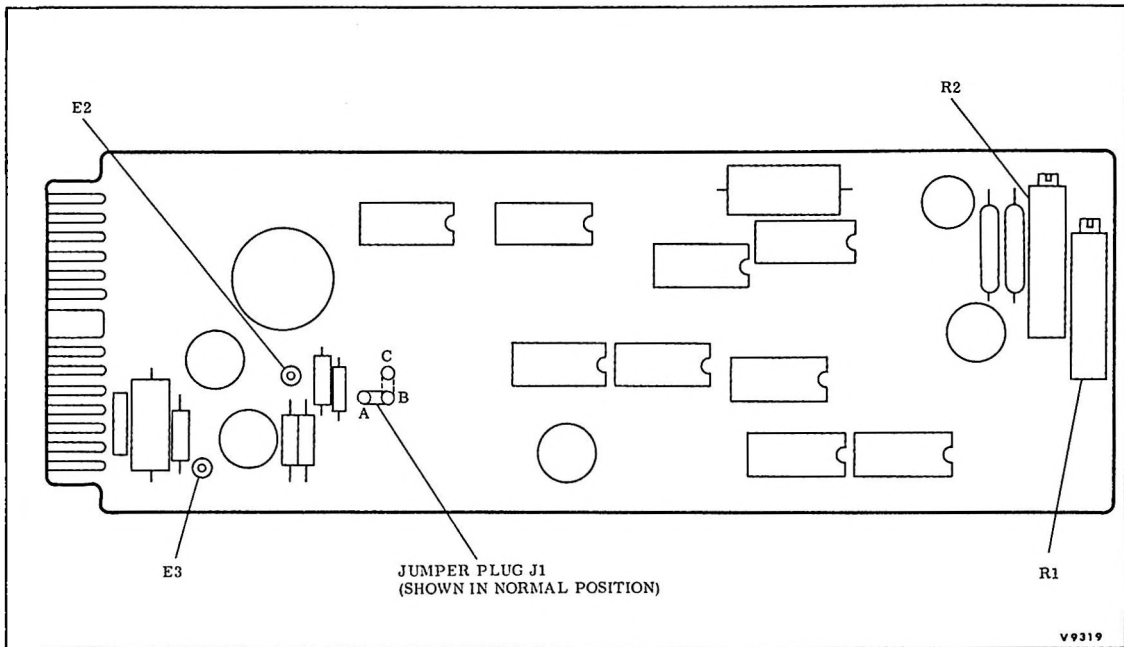


Figure 5-1. Locations of Adjustment Points, Auto Tracking System

d. Using an accurate voltmeter, check for +12 volts between pins 1 and 7, and -12 volts between pins 8 and 15.

e. Again open CB14; then install auto tracking board 6 on the extender.

f. Close CB14, then connect the voltmeter between pins 2 and 7 (ground) on board 6 and check for a reading of $+4.9 \pm 0.3$ volts.

g. This completes the check; disconnect the voltmeter, but leave board 6 on the extender.

5-10 Frequency Adjustment

5-11 On the main control panel, set the SPEED switch to 15 ips, then proceed as follows:

a. On auto tracking board 6, which should still be on the extender, place jumper plug J1 in the TEST position (between jacks B and C).

b. Connect a calibrated oscilloscope to test point E3 and pins 7 and 8 (ground).

c. Adjust potentiometer R2 for a frequency setting of 10 Hz. This completes the adjustment.

5-12 Signal Level Adjustment

a. With the SPEED switch set to 15 ips, adjust potentiometer R1 on board 6 for a level of 0.6 volts peak-to-peak at test point E3.

b. Set the SPEED switch to 7.5 ips; signal level at E3 should fall to approximately 0.3 volt peak-to-peak.

NOTE

The levels specified in steps a and b above are applicable when the recorder is equipped with an Ampex 1211001-02 capstan motor. If an Ampex

1211001-10 motor is used, the signal level should be set at 2.0 volts peak-to-peak (at 15 ips); then it will fall to approximately 1 volt peak-to-peak at 7.5 ips.

c. This completes the adjustment; restore jumper plug J1 to the NORMAL position (between jacks A and B).

5-13 Auto Tracking Control Logic Check

a. Open CB14 and re-install boards 4 and 5 in their correct positions in the accessory chassis. At the main control panel, place the SERVO mode switch to the NORM position; then place the auto tracking MAN/AUTO switch in the MAN position.

b. Close CB14 and, with the oscilloscope still connected to test point E3, use the voltmeter to check the voltage at test point E2; it should be -12 volts. Also, there should be no 10-Hz signal present at test point E3.

c. Place the MAN/AUTO switch in the AUTO position; the voltage at E2 should change to +5 volts, and the 10-Hz signal should then be present at E3.

d. Open CB14, disconnect the oscilloscope, and remove the extender board.

e. Reinstall auto tracking board 6 in its correct position in the accessory chassis.

f. Close CB14; this completes the adjustment.

SECTION VI

SCHEMATIC DIAGRAMS

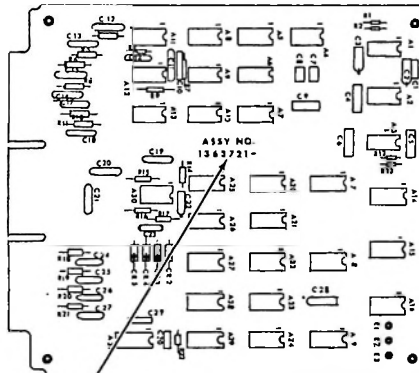
SECTION VI
SCHEMATIC DRAWINGS

This section contains all the necessary schematic diagrams. When applicable, a note on the schematic will reference it to the appropriate assembly drawing. The schematic pertinent to any assembly is listed on the LM of that assembly (see the fol-

lowing section). The section has a two-part index, one listing the drawings in alphabetical order and one listing them in numerical order. Alphabetical listings are generally in direct reading order; e.g., "High Gain Amplifier", not "Amplifier, High Gain".

ALPHABETICAL INDEX TO SCHEMATICS

Title	Assembly No.	Schematic No.	Fig. No.	Page
Auto Search Logic	1363748	1363750	16	8-35
Buffer Store	1363760	1363762	4	8-11
Buffer Store and Buffered Functions Mother Board	1363727	1363729	3	8-9
Buffered Functions Board No. 1	1363763	1363765	5	8-13
Buffered Functions Board No. 2	1363763	1363766	6	8-15
Chroma Inverter	1363757	1363759	19	8-43
Control Unit Logic	1363754	1366183	17	8-39
Decade <=> Comparator	1363767	1363769	10	8-23
Decade <=> Comparator Mother Board	1363742	1363744	9	8-21
Dissolver Logic	1365172	1365174	21	8-47



NUMERICAL INDEX TO SCHEMATICS

Assy. No.	Schematic No.	Title	Fig. No.	Page
1363721	1363723	Store and Sequential Gating	1	8-5
1363724	1363726	Seven-Segment Decoder/Driver	2	8-7
1363727	1363729	Buffer Store and Buffered Functions	3	8-9
1363730	1363732	Keyboard Number Encoder	7	8-17
1363733	1363735	Scratch Pad Memory	8	8-19
1363736	1363738	Serial Decade Counter and Comparator	13	8-29
1363739	1363741	Up/Down Counter Mother Board	11	8-25
1363742	1363744	Decade <=> Comparator Mother Board	9	8-21

ALPHABETICAL INDEX TO SCHEMATICS

<i>Title</i>	<i>Schematic No.</i>	<i>Ref. Assy. No.</i>	<i>Figure No.</i>	<i>Page No.</i>
Accessory Chassis Wiring Diagram	1367775	1368243	6-1	6-5 —
Auto Tracking Tach Delay and Control	1367310	1367309	6-2	6-7 —
Auto Tracking Sweep Generator and Control	1367312	1367311	6-3	6-9 —
Auto Tracking Oscillator and Control	1367314	1367313	6-4	6-11 —
Auto Tracking Harness Interconnect Diagram	1368424*		6-5	6-13 —
Control Panel (Standard)	1368242		6-6	6-15 OK
Control Panel (VHO Equipped)	1368151		6-7	6-17 OK
Control Panel	1368543**		6-8	6-19 OK
Intersync	1368149*		6-9	6-27 OK
Power Supply (± 12 VDC)	1385496	1805099	6-10	6-29 OK
Power Supply Interconnect Diagram	1368255**		6-11	6-31 OK
Signal System Interconnect Diagram	1368150		6-12	6-33 OK
Signal System Interconnect Diagram	1368544**		6-13	6-35 OK

*VR-1200 and VR-2000

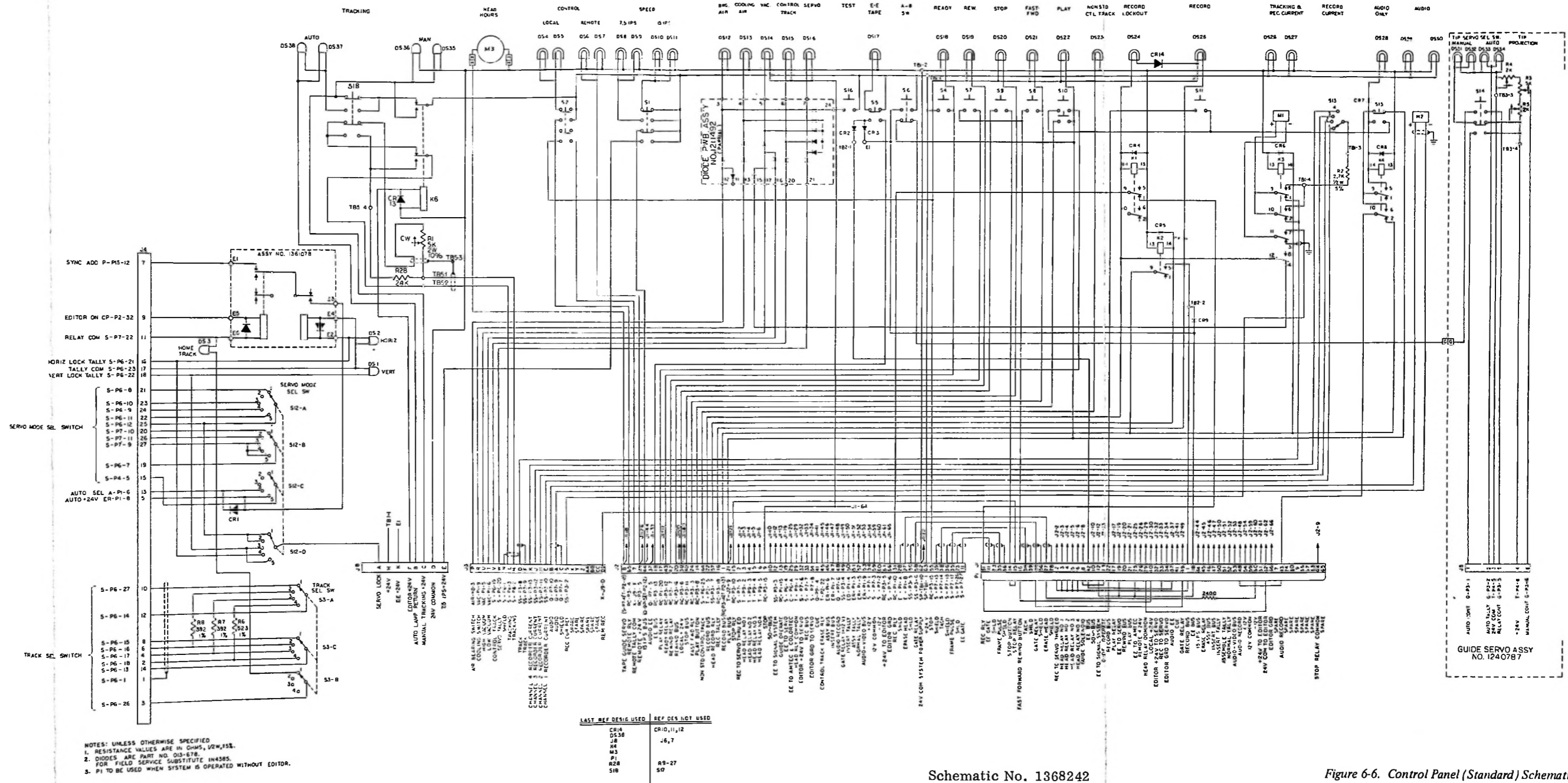
**VR-2000 only

NUMERICAL INDEX TO SCHEMATICS
(By Assembly Number)

<i>Assembly No.</i>	<i>Schematic No.</i>	<i>Title</i>	<i>Figure No.</i>	<i>Page No.</i>
1367309	1367310	Auto Tracking Tach Delay and Control	6-2	6-7
1367311	1367312	Auto Tracking Sweep Generator and Control	6-3	6-9
1367313	1367314	Auto Tracking Oscillator and Control	6-4	6-11
1368243	1367775	Accessory Chassis Wiring Diagram	6-1	6-5
	1368149*	Intersync	6-9	6-27
	1368150	Signal System Interconnect Diagram	6-12	6-33
	1368151	Control Panel (VHO Equipped)	6-7	6-17
	1368242	Control Panel (Standard)	6-6	6-15
	1368255**	Power Supply Interconnect Diagram	6-11	6-31
	1368424*	Auto Tracking Harness Interconnect Diagram	6-5	6-13
	1368543**	Control Panel	6-8	6-19
	1368544**	Signal System Interconnect Diagram	6-13	6-35
1805099	1385496	Power Supply (± 12 VDC)	6-10	6-29

*VR-1200 and VR-2000

**VR-2000 only



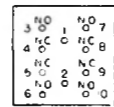
Schematic No. 1368242

Figure 6-6. Control Panel (Standard) Schematic

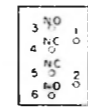
LEGEND

- MAN MANUAL
- REM REMOTE
- LOC LOCAL
- REW REWIND
- REC RECORD
- EE
- BUS BUS-BAR
- SOL SOLENOID
- OPT OPTIONAL
- LK LOCK
- P PLAY
- ED EDITOR
- MEM
- TRK TRACK
- DUB DUBBING
- RF RADIO FREQUENCY
- CR CURRENT
- VM VOLT METER
- SEL SELECTION
- VAC VACUUM
- COMM COMMON
- NC NORMALLY CLOSED
- NO NORMALLY OPEN
- B HEAD BLOWER ASSY
- GM GUIDE MOTOR ASSY
- H HEAD CHANNEL HOUSING
- M MOTOR CONTROL ASSY
- MS MONITOR X SCOPE
- O AUDIO AND CUE
- S SERVO
- SC SEQUENCE CONTROL UNIT
- SS SIGNAL SYSTEM
- T TRANSPORT ASSY
- X EXTERNAL CONNECTOR PANEL
- TS TERMINAL STRIP
- BZ BUZZER
- FF FAST FORWARD
- CTL CONTROL
- H&V HORIZONTAL & VERTICAL

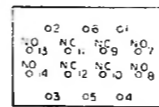
DETAILS SHOWING PIN POSITIONS ON PUSH-BUTTON SWITCHES



DETAIL A



DETAIL B



DETAIL C

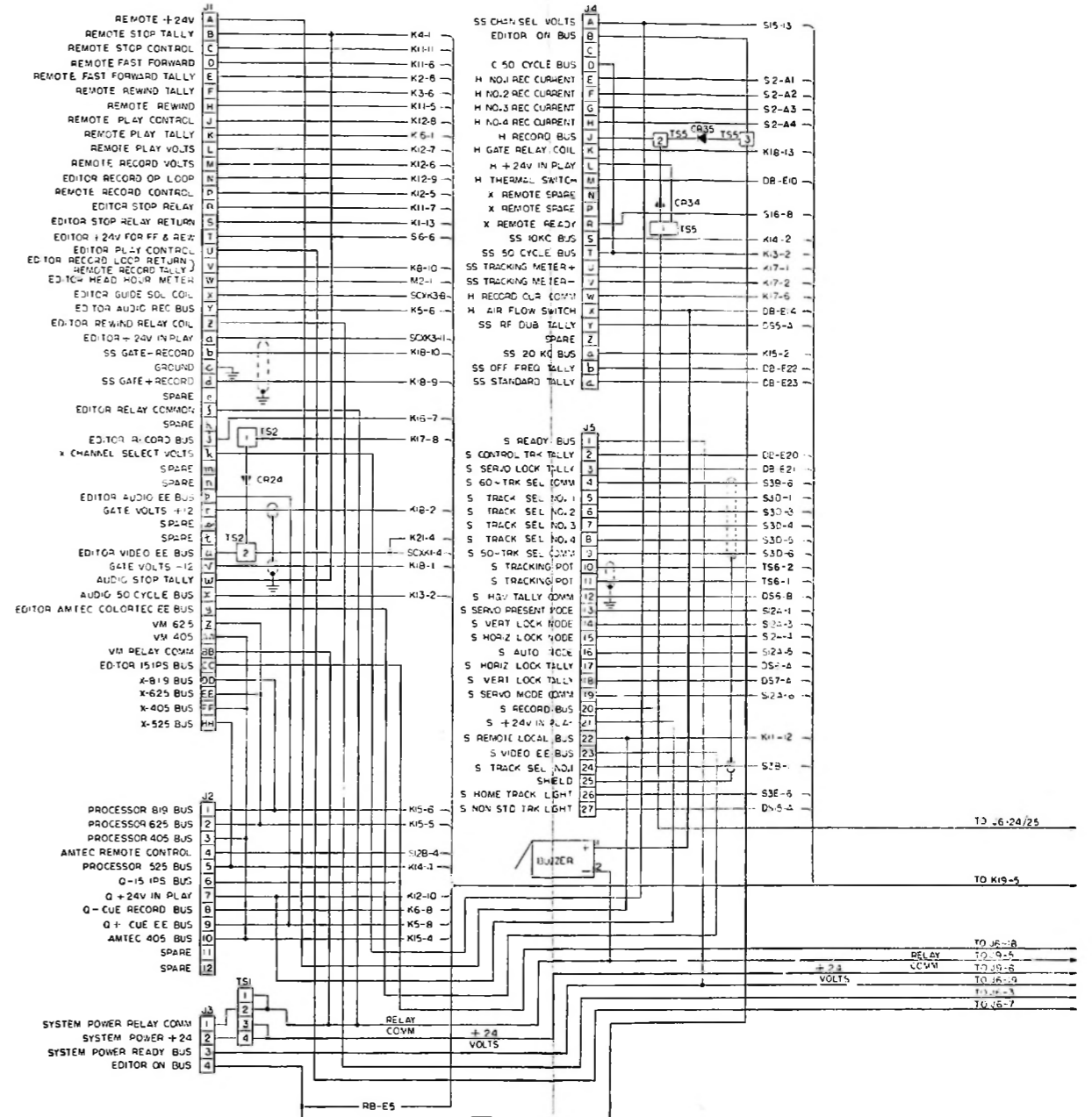


DETAIL D

NOTES: UNLESS OTHERWISE SPECIFIED

1. CODES ARE AMPEX PART NO. 013-678 (N4385).
2. RESISTORS ARE RATED IN OHMS $\pm 5\%$ 1/2W
3. CAPACITORS ARE RATED IN MICROFARADS.

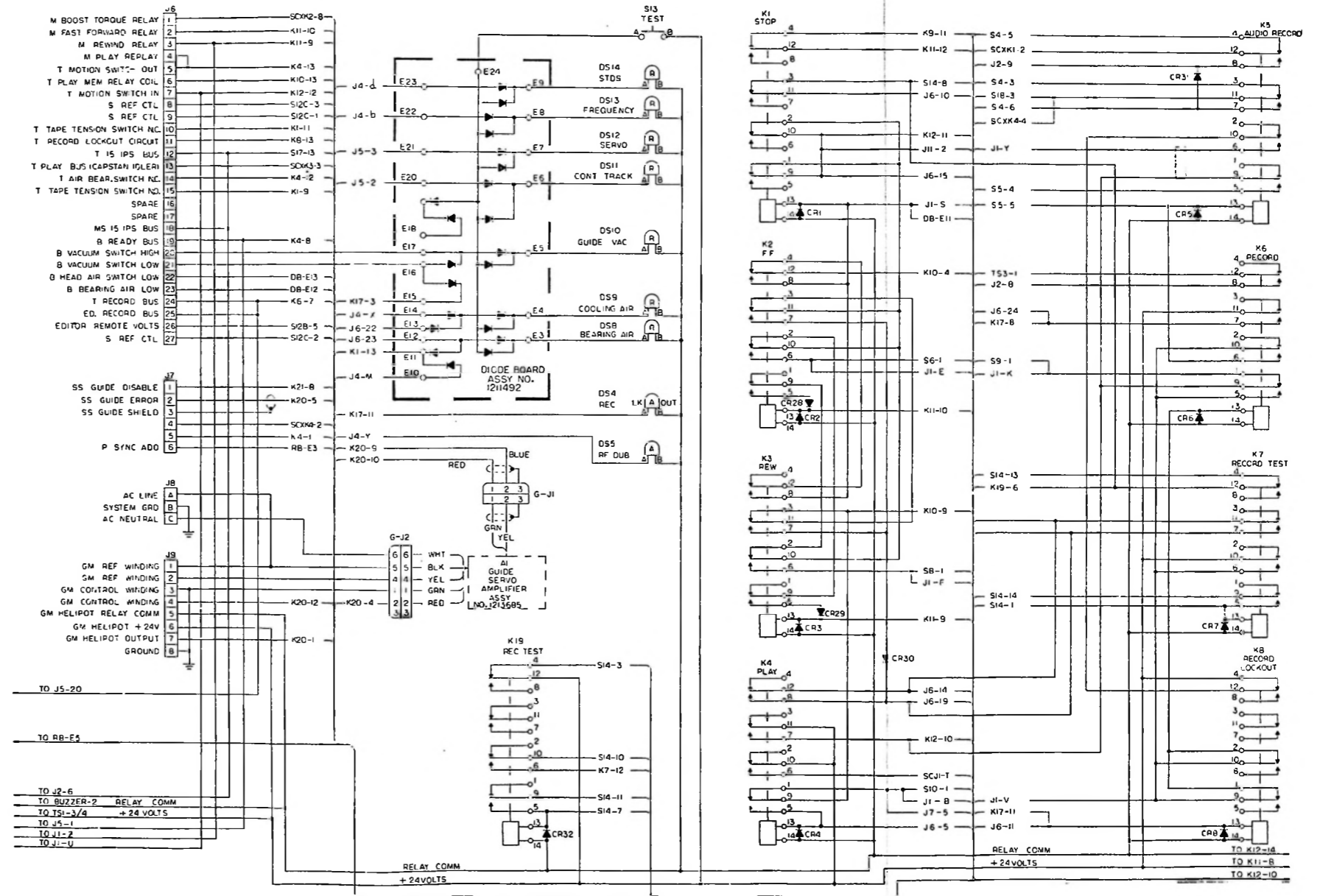
REF	DESIG	LAST USED	NOT USED
C3	-		
CR39	CR16 & 19		
DS15	-		
J12	J10		
M2	-		
GJ2	-		
R15	R4, 5, 10 & 12		
S20	S12 & 13		
K22	-		
T96	-		



Schematic No. 1368543

Figure 6-8. Control Panel Schematic (Sheet 1 of 4)

CHANGED OCT. 1970

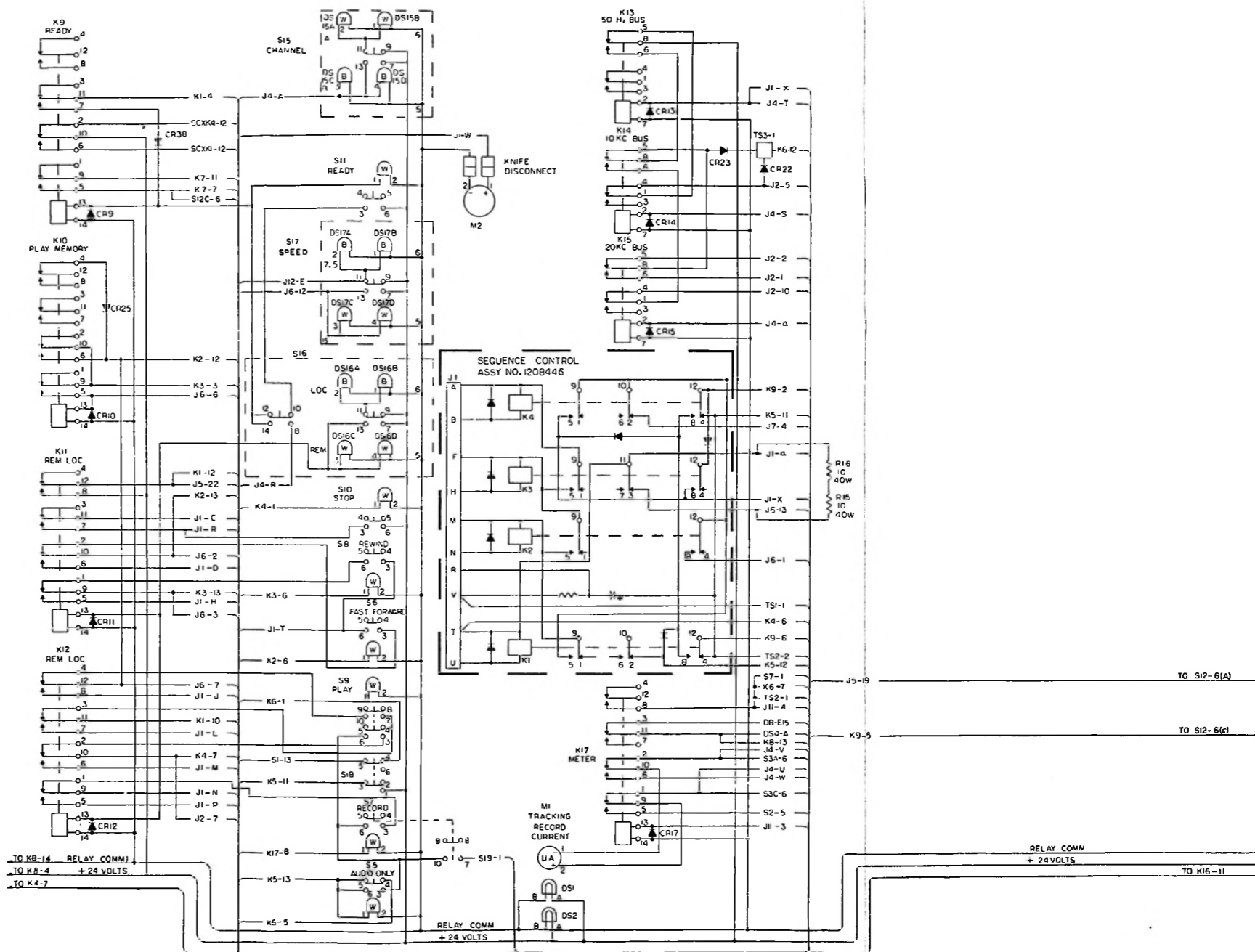


Schematic No. 1368543

Figure 6-8. Control Panel Schematic (Sheet 2 of 4)

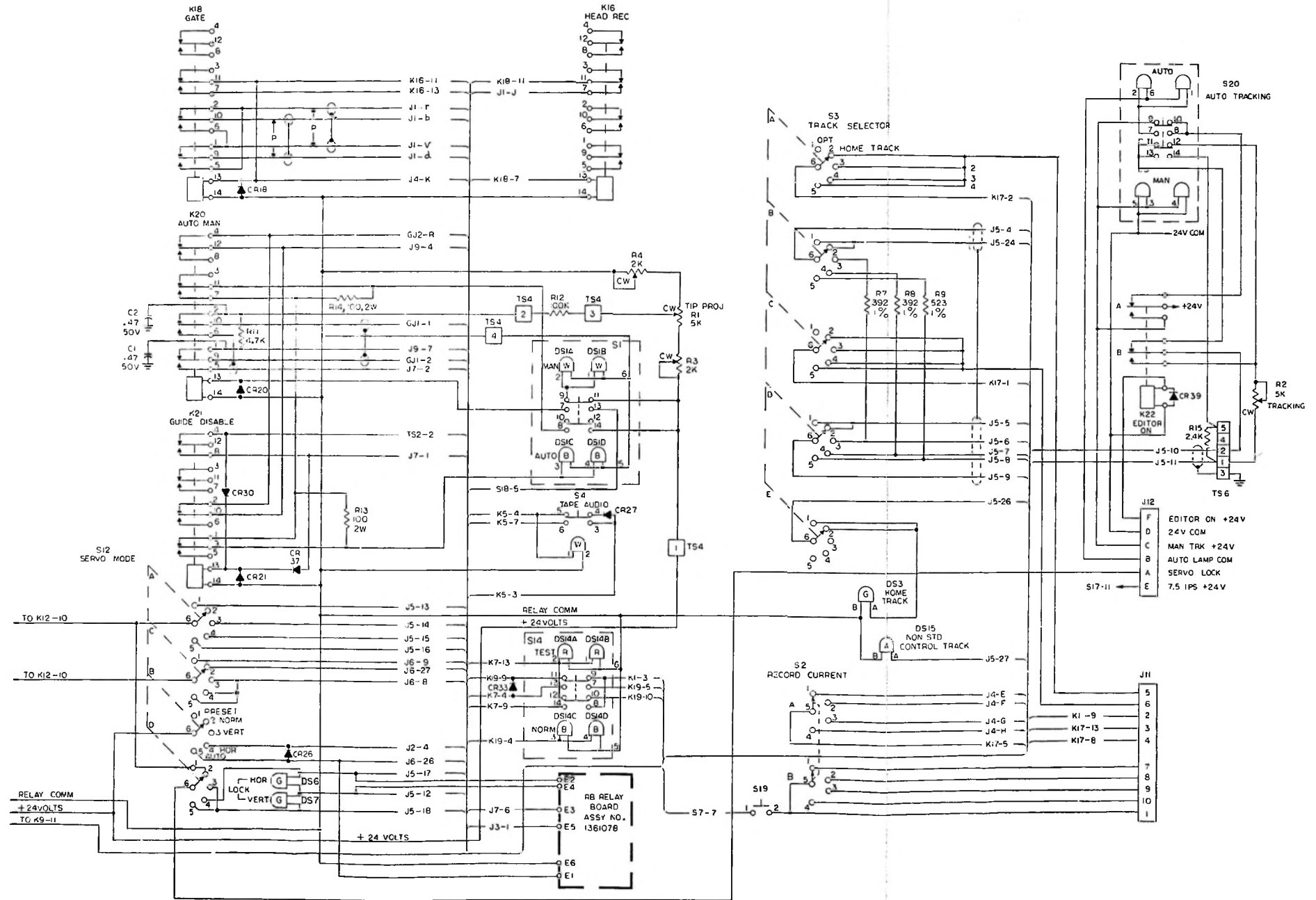
CHANGED OCT. 1970

6-21/22



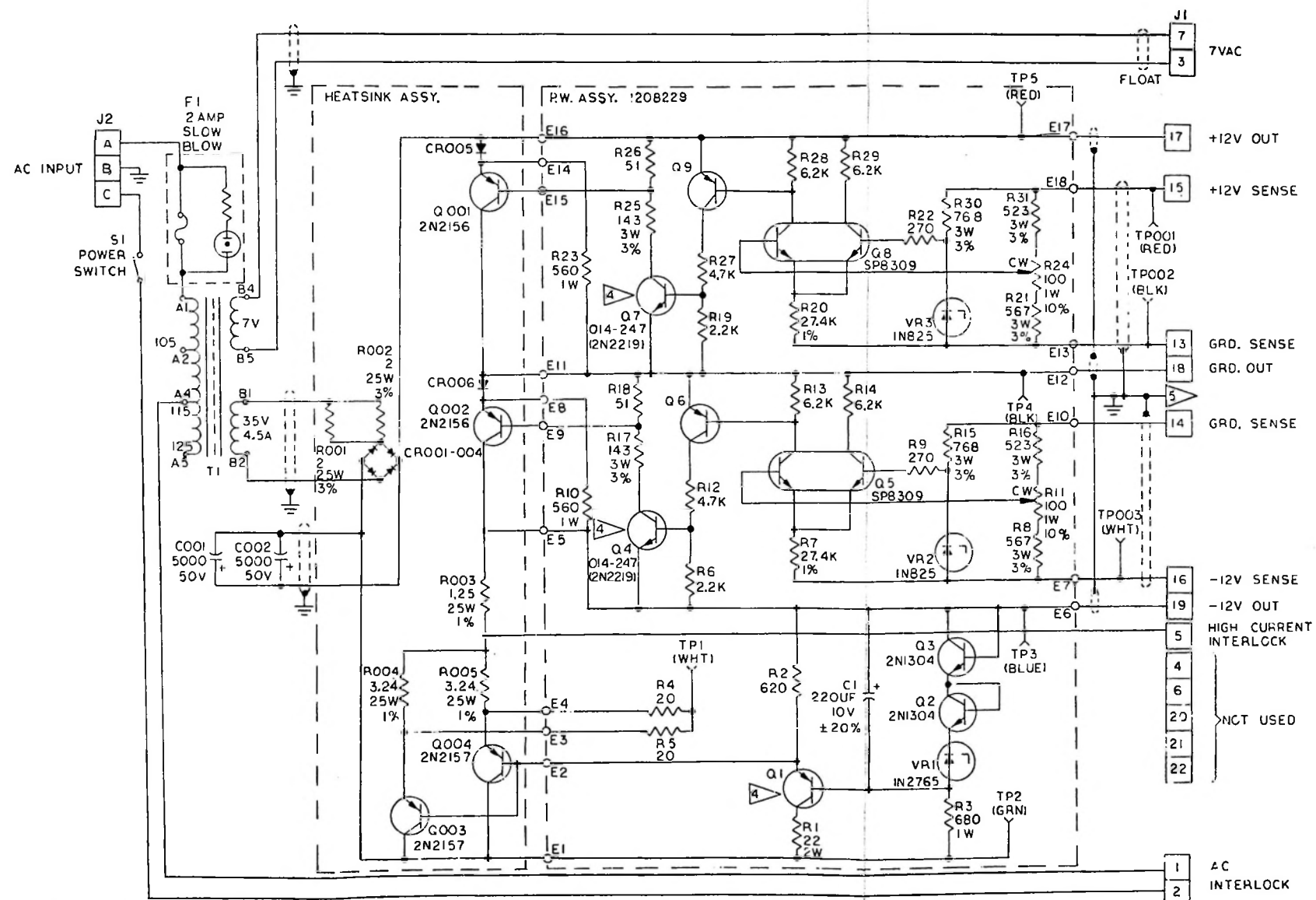
Schematic No. 1368543

Figure 6-8. Control Panel Schematic (Sheet 3 of 4)



'chematic No. 1368543

Figure 6-8. Control Panel Schematic (Sheet 4 of 4)



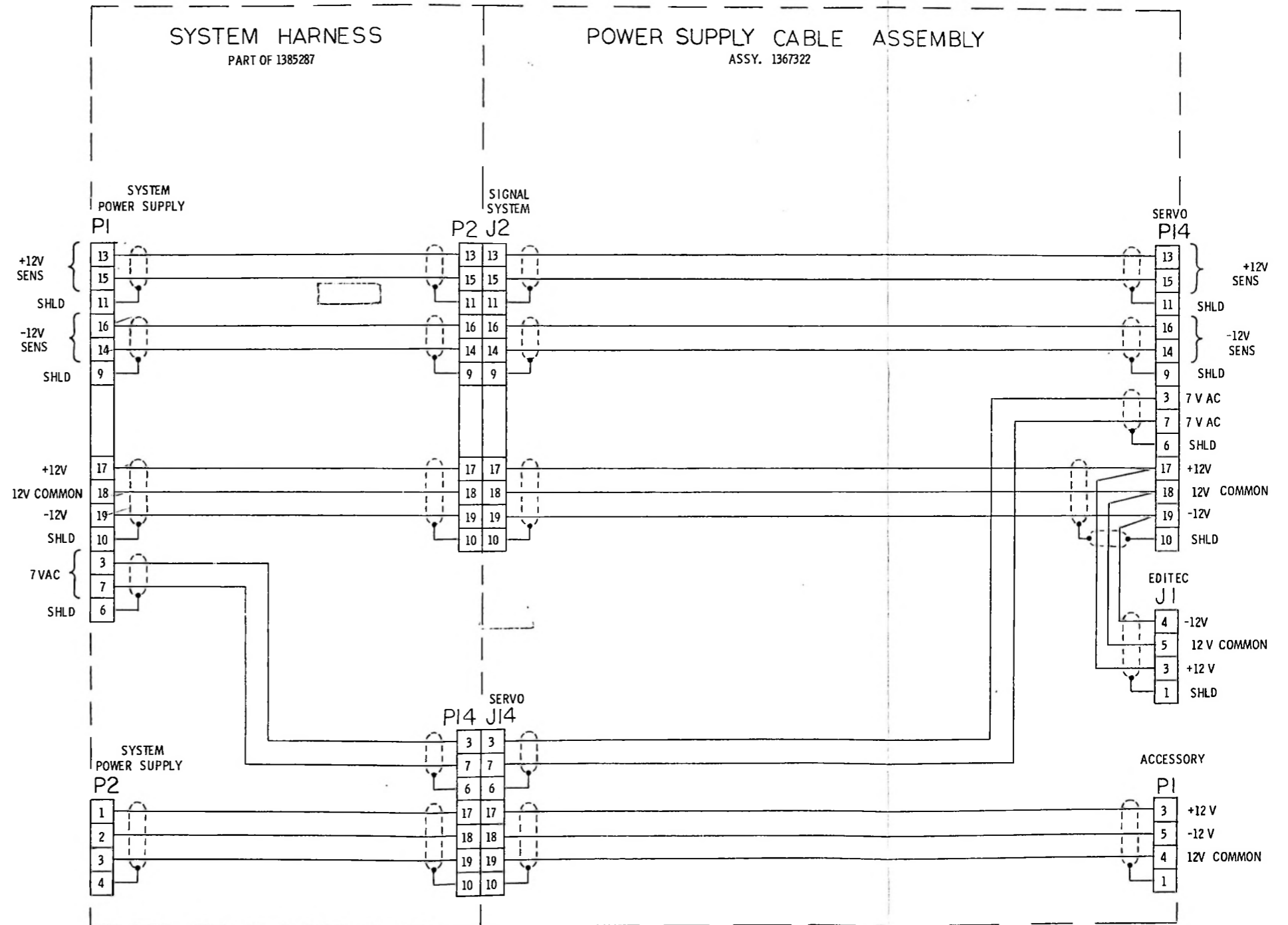
- NOTES: UNLESS OTHERWISE SPECIFIED
- 1. RESISTORS ARE RATED IN OHMS, ±5%, 1/2W.
 - 2. DIODES ARE TYPE IN3210.
 - 3. TRANSISTORS ARE AMPEX PART 014-364 (2N2905A).
 - 4. HEATSINK REQUIRED.
 - 5. CHASSIS GROUND PINS 8-12.

Schematic No. 1385496
 Ref. Assy. No. 1805099

Figure 6-10. Power Supply (±12 VDC) Schematic

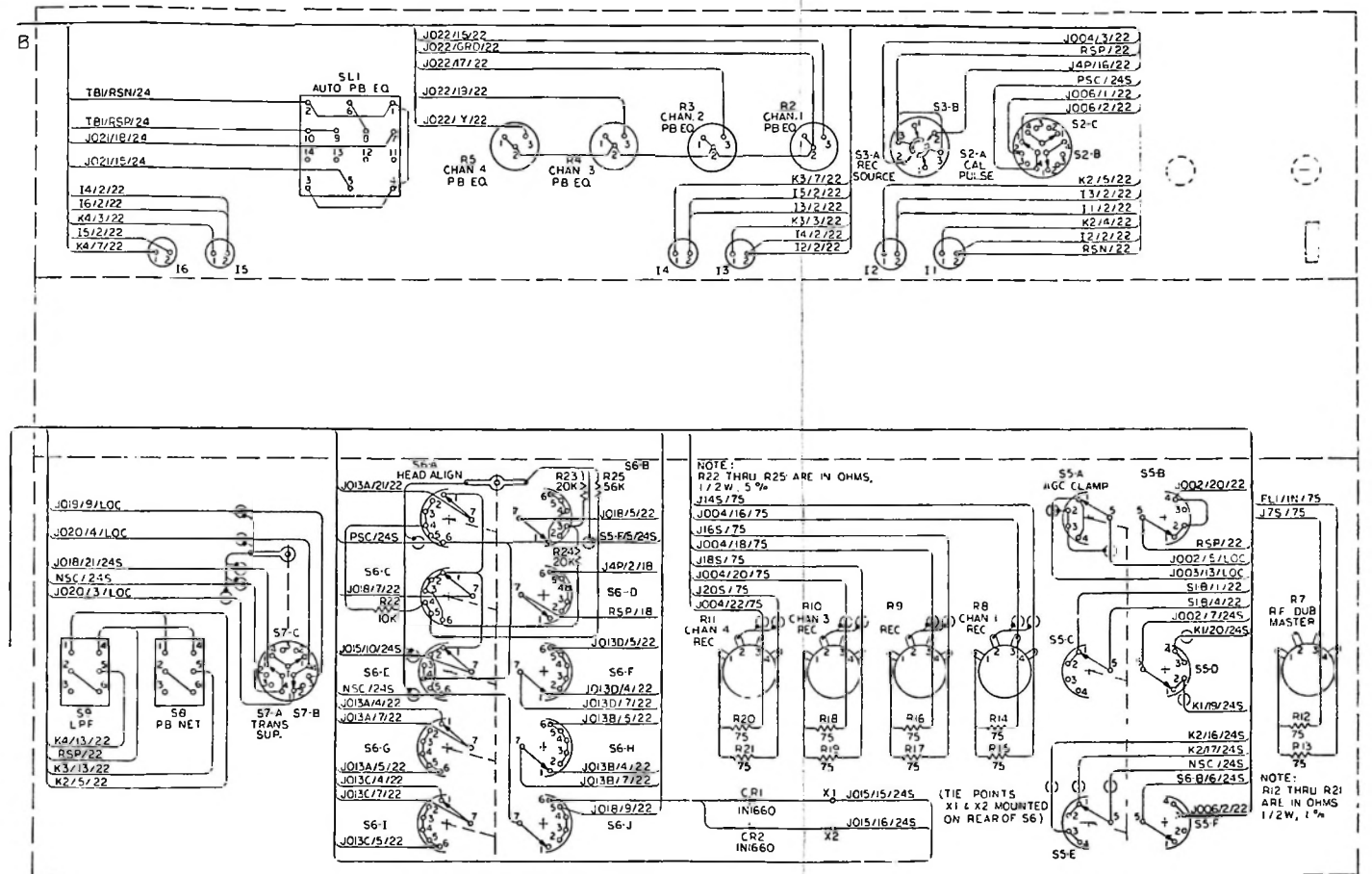
CHANGED OCT. 1970

AMPEX



Schematic No. 1368255

Figure 6-11. Power Supply Interconnect Diagram



WIRE TYPE CODE

24	- NO 24 FLEXIBLE HOOKUP
22	- NO 22 FLEXIBLE HOOKUP
18	- NO. 18 FLEXIBLE HOOKUP
24S	- NO 24 SHIELDED HOOKUP
22SP	- NO. 22 SHIELDED PAIR
18SP	- NO. 18 SHIELDED PAIR
75	- MICROKIT 75 OHM FLEXIBLE COAX
LCC	- LOW CAPACITANCE (HIGH Z) SHIELDED WIRE
RG122U	- RG-122/U COAX
UNLABELED SHORT LEADS - NO. 20 TINNED BARE WITH TEFLON SPAGHETTI AS REQUIRED	

DESTINATION CODE

THREE NUMBERS	= DEST. SYMBOL / PIN NO. / WIRE TYPE SYMBOL
TWO NUMBERS	= DEST. SYMBOL / WIRE TYPE SYMBOL

Schematic No. 1368544

Figure 6-13. Signal System Interconnect Diagram (Sheet 2 of 2)

SECTION VII

LM'S & ASSEMBLIES

LM'S & ASSEMBLIES

SECTION VII

ASSEMBLY DRAWINGS AND LISTS OF MATERIALS

This section contains assembly drawings and lists of materials pertaining to the equipment described in this manual.

This introduction describes the arrangement of the material in the section and its use. The section has a two-part index, one listing the assembly drawings in alphabetical order and one listing them in numerical order. Alphabetical listings are generally in direct-reading order (i. e. , "High Gain Amplifier," not "Amplifier, High Gain").

Each item of a typical LM is explained below. The key number preceding each item corresponds to the same key number on the sample LM, shown on the page immediately following.

- | | |
|--|--|
| <p>① Assembly Title. This is the title assigned the assembly by the Ampex Engineering Department.</p> | <p>⑥ Schematic Reference. This number is assigned to electrical components on the schematic drawings.</p> |
| <p>② Catalog Number of Assembly. This number corresponds to the number stamped on, or affixed to, the assembly during manufacture.</p> | <p>⑦ Part Description. This is an abbreviated explanation of each part used in the complete assembly, to assist the user in identifying parts. Where the same part is listed more than one time on an LM, the statement "Same As . . ." may be given, and refers to the description given for the first listing of the part.</p> |
| <p>③ Item Number. This number is assigned to parts to aid in identifying and locating the parts on the LM or assembly drawing.</p> | <p>⑧ MFR CODE (Manufacturer's Code) This number is the Federal Supply code of the manufacturer of purchased items.</p> |
| <p>④ Ampex Part Number. These are Ampex's document and part control numbers.</p> | <p>⑨ Quantity Required Per Version. This number indicates the quantity of each part required in the complete assembly.</p> |
| <p>⑤ Vendor or Military Number. This is the identification number that Ampex used to purchase the part</p> | <p>⑩ Sheet _ of _. This figure indicates the number of pages comprising the complete list of materials for the assembly.</p> |
| | <p>⑪ NHA (Next Higher Assembly). If applicable, indicates which assembly this LM is subordinate to and upon which LM it may be found.</p> |
| | <p>⑫ Date. This area of the page will contain the date that the LM page</p> |

has been changed, since the manual was issued. Where no changes have been made, there will be no date given.

- ⑬ Control Number. Shows the drawing revision current at time of publication.
- ⑭ Page Number. This is the page number assigned to each page, as

listed in the indexes. In the sample page number 10-178, the 10 signifies the tenth section of the manual, and the -178 indicates the 178th page of the Section.

An explanatory figure on the second page following illustrates how to find a part number or name by cross-referencing the item key numbers between the LM's and the assembly drawings and schematic diagrams.

AMPEX

ELECTRONIC EGG TIMER ASSEMBLY ①				CATALOG NO. 1984269 ②		SHEET 1 OF 1 ⑩		NHA 1776204 ⑪			
ITEM NO. ③	AMPEX PART NO. ④	VENDOR OR MIL. NO. ⑤	SCHEMATIC REFERENCE ⑥	PART DESCRIPTION ⑦	MFR CODE ⑧	QUANTITY REQUIRED PER VERSION					
						-04	-05				
1	1985220-02			PRINTED WIRING ASSEMBLY		1	1	9			
2	212-345	2N5227	Q1, 2, 4	TRANSISTOR	24567	3	3				
3	150-142		Ref Q1, 2, 4	SOCKET, Transistor Mounting	29765	3	3				
4	210-967		R1-R16	RESISTOR, 50k, 1/2W, 5%		16	16				
5	210-957		R17	RESISTOR, 25k, 1/2W, 5%		1	-				
6	210-945		R17	RESISTOR, 15k, 1/2W, 5%		-	1				
7	114-789	1N6452	CR1-8	DIODE		8	8				
8	113-946	1N6784	VR1	DIODE, Zener, 4.6V, 5%	18665	1	-				
9	113-687	1N3582	VR1	DIDOE, Zener, 3.8V, 5%	18665	-	1				
10	1210987-05			PROBE, Egg Temperature, white egg		1	-				
11	1210987-06			PROBE, Egg Temperature, brown egg		-	1				
12	1921346-02			READOUT, Digital, egg temperature		1	1				
14	711-269	#381		LAMP, Miniature, 6V, T-1-3/4		2	2				
15			1066974	SCHEMATIC		REF	-				
16			1066993	SCHEMATIC		-	REF				
17	401-611	3N99	Q3	CHOPPER	56734	1	1				
18	1122334-00			PANEL, Housing		1	1				
19	509-391			SCREW, Self-tapping, #6 x 1/2"		12	12				
20	589-112			WASHER, Flat		12	12				
21	8763224-01			HARNES		1	-				
22	8763224-02					-	1				
23	6000000-09			Label, Identification		1	-				
24	6000000-10			LABEL, Identification		-	1				
25	1669222-01			HOLDER, Egg, size AA		1	1				
26	1669222-02			HOLDER, Egg, size A		1	1				
30	347-899			WATER		A/R	A/R				

SAMPLE

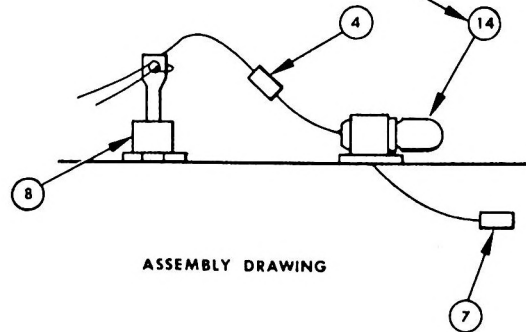
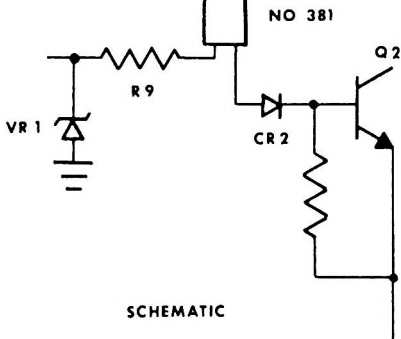
VERSION	USED ON
-04	White eggs
-05	Brown eggs

CHANGED 30 FEBRUARY 1969

1984269C

G. 2-178

		Q1. 2, 4			24567	3	3
3	150-142		Ref Q1. 2, 4	SOCKET, Transistor Mounting	29765	3	3
4	210-967		R1-R16	RESISTOR, 50k, 1/2W, 5%		16	16
5	210-957		R17	RESISTOR, 25k, 1/2W, 5%		1	-
6	210-945		R17	RESISTOR, 15k, 1/2W, 5%		-	1
7	114-789	1N6452	CR1-8	DIODE		8	8
8	113-946	1N6784	VR1	DIODE, Zener, 4.6V, 5%	18665	1	-
9	113-687	1N3582	VR1	DIODE, Zener, 3.8V, 5%	18665	-	1
10	1210987-05			PROBE, Egg Temperature, white egg		1	-
11	1210987-06			PROBE, Egg Temperature, brown egg		-	1
12	1921346-02			READOUT, Digital, egg temperature		1	1
14	711-269	#381		LAMP, Miniature, 6V, T-1-3/4		2	2
15			1066974	SCHEMATIC		REF	-
16			1066993	SCHEMATIC		-	REF
17	491-611	3N99	Q3	CHOPPER	56734	1	1
18	1122334-60			PANEL, Housing		1	1
19	509-.91			SCREW, Self-tapping, #6 x 1/2"		1	1
20	589-11			WASHER, Flat		12	12



V08638

 AMPEX

ALPHABETICAL INDEX TO ASSEMBLIES

<i>Title</i>	<i>Assembly No.</i>	<i>Page No.</i>
AC Cable, Jumper Assembly	52596	7-63
AC Cable, Jumper Assembly	52596	7-61
Accessory Chassis Assembly	1367296	7-15
Accessory Chassis Assembly, LM	1367296	7-13
Accessory Chassis Final Assembly, LM (Only)	1368243	7-11
Auto Tracking Cable Assembly	1367316	7-43
Auto Tracking Cable Assembly, LM	1367316	7-41
Auto Tracking Harness Assembly	1368540*	7-35
Auto Tracking Harness Assembly, LM	1368540*	7-33
Auto Tracking Kit, LM (Only)	1367287	7-9
Auto Tracking Oscillator and Control	1367313	7-27
Auto Tracking Oscillator and Control, LM	1367313	7-25
Auto Tracking Sweep Generator and Control	1367311	7-23
Auto Tracking Sweep Generator and Control, LM	1367311	7-21
Auto Tracking Tach Delay and Control	1367309	7-19
Auto Tracking Tach Delay and Control, LM	1367309	7-17
Control Panel Harness Assembly	1367315	7-39
Control Panel Harness Assembly, LM	1367315	7-37
Control Panel Harness Assembly	1367539*	7-31
Control Panel Harness Assembly, LM	1367539*	7-29
Extender PWA, LM (Only)	1368156**	7-57
Power Supply, ± 12 VDC, 3 Amp, LM (Only)	1805099	7-71
Power Supply, ± 12 VDC, 3 Amp, PWA	1208299	7-75
Power Supply, ± 12 VDC, 3 Amp, PWA, LM	1208229	7-73
Power Supply Adaptor Cable Assembly, LM (Only)	1367322	7-69
Power Supply Cable Assembly	1368542*	7-55
Power Supply Cable Assembly, LM	1368542*	7-53
Power Supply Kit, LM (Only)	1367291	7-59
Power Supply to Signal System Cable Assembly	1208705	7-67
Power Supply to Signal System Cable Assembly, LM	1208705	7-65

*VR-2000 only

**VR-1200 and VR-2000

CHANGED OCT. 1970

ALPHABETICAL INDEX TO ASSEMBLIES (Continued)

<i>Title</i>	<i>Assembly No.</i>	<i>Page No.</i>
Servo Adaptor Harness Assembly	1367781**	7-47
Servo Adaptor Harness Assembly, LM	1367781**	7-45
Tension Arm Housing Assembly (Supply)	1368055**	7-51
Tension Arm Housing Assembly (Supply), LM	1368055**	7-49

**VR-1200 and VR-2000

AMPEX

NUMERICAL INDEX TO ASSEMBLIES

<i>Assembly No.</i>	<i>Title</i>	<i>Page No.</i>
52596	AC Cable, Jumper Assembly, and LM	7-61
1208229	Power Supply, ± 12 VDC, 3 Amp, PWA and LM	7-73
1208705	Power Supply to Signal System Cable Assembly and LM	7-65
1367287	Auto Tracking Kit LM (Only)	7-9
1367291	Power Supply Kit LM (Only)	7-59
1367296	Accessory Chassis Assembly	7-13
1367309	Auto Tracking Tach Delay and Control PWA and LM	7-17
1367311	Auto Tracking Sweep Generator and Control PWA and LM	7-21
1367313	Auto Tracking Oscillator and Control PWA and LM	7-25
1367315	Control Panel Harness Assembly and LM	7-37
1367316	Auto Tracking Cable Assembly and LM	7-41
1367322	Power Supply Adaptor Cable Assembly LM (Only)	7-69
1367781*	Servo Adaptor Harness Assembly and LM	7-45
1368055*	Tension Arm Housing Assembly (Supply), and LM	7-49
1368156*	Extender PWA, LM (Only)	7-57
1368243	Accessory Chassis Final Assembly LM (Only)	7-11
1368539**	Control Panel Harness Assembly and LM	7-29
1368540**	Auto Tracking Harness Assembly and LM	7-33
1368542**	Power Supply Cable Assembly and LM	7-53
1805099	Power Supply, ± 12 VDC, 3 Amp, LM (Only)	7-71

*VR-1200 and VR-2000

**VR-2000 only

AUTO TRACKING KIT				CATALOG NO. 1367287		SHEET 1 OF 1							
NHA *													
ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION							
						-03	-04						
1	1368243-02			ACCESSORY CHASSIS F/A		-	1						
2	1368243-04			ACCESSORY CHASSIS F/A		1	-						
3	1368539-01			HARNESS ASSEMBLY, Control Panel		1	-						
4	1368540-01			HARNESS, Auto Tracking		1	-						
5	1367315-01			SWITCH ASSEMBLY, Control Panel		-	1						
6	1367316-01			HARNESS, Auto Tracking		-	1						
7	1367781-01			ADAPTER HARNESS, Servo		1	1						
8	1809023			INSTRUCTION MANUAL		2	2						
9	1368055-01			TENSION ARM ASSEMBLY, Supply		1	1						
10	1368147-01			TEMPLATE, Control Panel		1	1						
11	1368541-01			TEMPLATE, Connector		1	-						
12	1368542-01			CABLE, Power Supply		1	-						
13	1368149			SCHEMATIC, Intersync		REF	REF						
14	1368150			INTERCONNECT DIAGRAM, Signal System		-	REF						
15	1368151			SCHEMATIC, Control Panel		-	REF						
16	1368242			SCHEMATIC, Control Panel		-	REF						
17	1368424			INTERCONNECT DIAGRAM, Auto Tracking Harness		REF	REF						
18	1368156-01			EXTENDER BOARD		1	1						
19	1368543			SCHEMATIC, Control Panel		REF	-						
20	1368544			INTERCONNECT DIAGRAM, Signal System		REF	-						
21	1367291-01			POWER SUPPLY KIT		-	1						
				VERSION	NEXT ASSY	USED ON							
				-03	CAT	VR2000/2000B							
				-04	CAT	VR1200B							

1367287C

CHANGED OCT. 1970

7-9/10

ACCESSORY CHASSIS FINAL ASSEMBLY

CATALOG NO. 1368243

SHEET 1 OF 1

NHA *

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION			
						-01	-02	-03	-04
1	1367296-01			ACCESSORY CHASSIS ASSEMBLY		1	1	1	-
2	1367292-02			PRINTED WIRING ASSEMBLY, Monitor Sweep		1	-	1	-
3	1367294-03			PRINTED WIRING ASSEMBLY, Monitor Amplifier		1	-	1	-
4	1367294-04			PRINTED WIRING ASSEMBLY, Monitor Amplifier		1	-	1	-
5	1367309-01			PRINTED WIRING ASSEMBLY, Auto Tracking Tach Delay and Control		1	1	-	1
6	1367311-01			PRINTED WIRING ASSEMBLY, Auto Tracking Sweep Generator and Control		1	1	-	1
7	1367313-01			PRINTED WIRING ASSEMBLY, Auto Tracking Oscillator and Control		1	1	-	1
8	1368052-01			PRINTED WIRING ASSEMBLY, Burst Phase Shifter		1	-	1	-
9	1368481-01			BRACKET, Shipping		1	1	1	1
10	1367296-02			ACCESSORY CHASSIS ASSEMBLY		-	-	-	1

Version	Next Assy	Used On
-01	1805260	VR1200C
-02	1367287	VR1200B
-03	1367286	VR1200B
-04	1367287	VR2000/ VR2000B

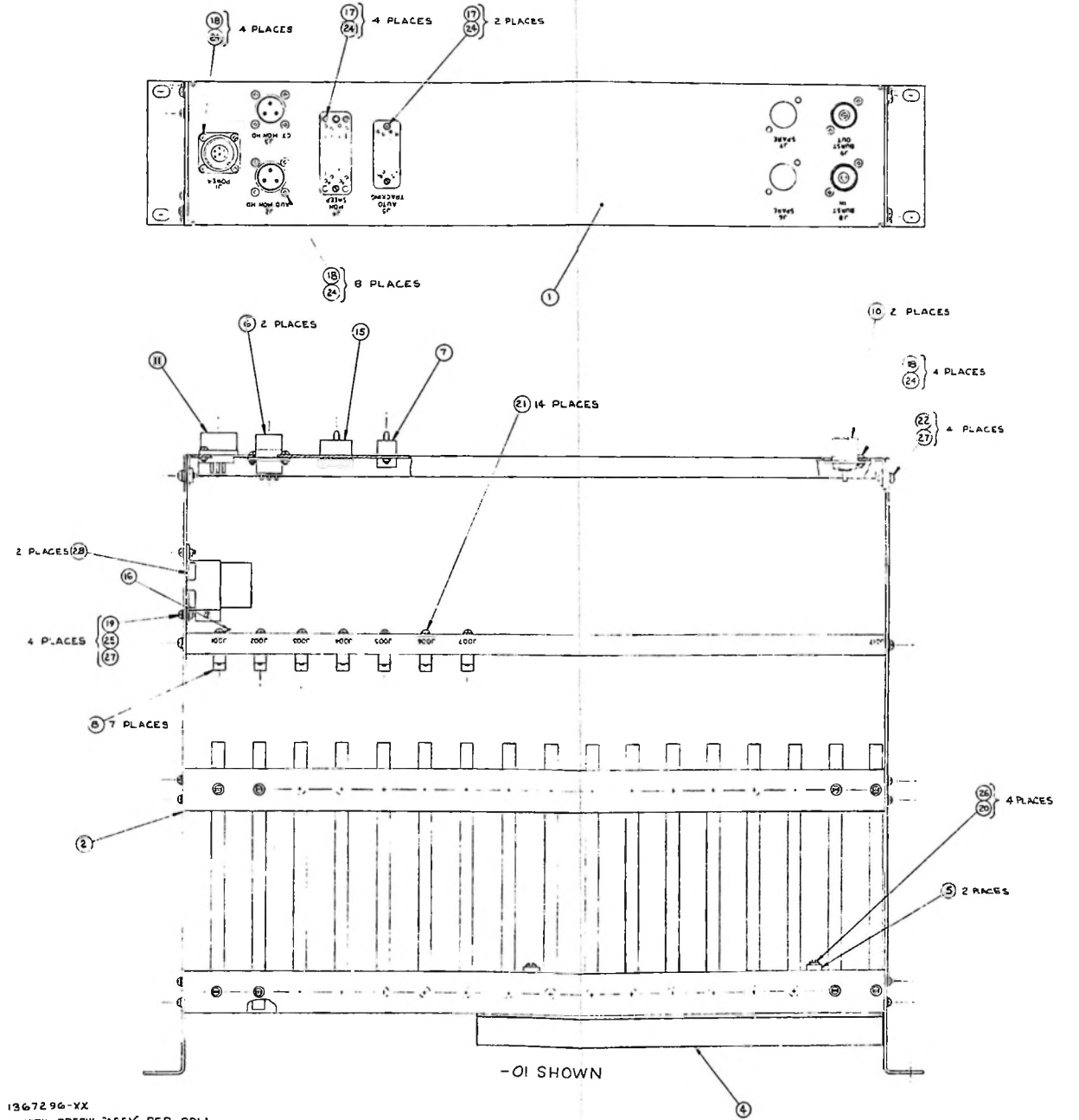
1368243A

CHANGED OCT. 1970

7-11/12

ACCESSORY CHASSIS ASSEMBLY				CATALOG NO. 1367296	SHEET 1 OF 1				
				NHA 1368243					
ITEM NO	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION			
						-01	-02		
1	1367297-01			PANEL, Connector		1	1		
2	1367298-01			CARD RACK		1	1		
3	1367775			WIRING DIAGRAM		REF	REF		
4	1368246-01			BLANK MODULE PANEL		1	1		
5	1368247-01			SUPPORT, Blank Module Panel		2	2		
6	143-008		J2,3	CONNECTOR, Receptacle, 3 pin		2	-		
7	143-120		J5	CONNECTOR, Rectangular Receptacle, 26 pin		1	1		
8	143-534		J001-007	CONNECTOR, Printed Circuit, 15 pin dual		7	-		
9	143-534		J004-6	CONNECTOR, Printed Circuit, 15 pin dual		-	3		
10	146-067		J8,9	CONNECTOR, RF Receptacle, 1 socket		2	-		
11	147-046		J1	CONNECTOR, Receptacle, 6 pin		1	1		
13	166-226			CONTACT, Pin		A/R	A/R		
15	169-719		J4	CONNECTOR, Rectangular Receptacle, 34 pin		1	-		
16	172-004			TERMINAL LUG, Solder, locking, #4 stud		1	1		
17	470-010			SCREW, Cap, hex socket, 4-40 x .375		6	6		
18	471-060			SCREW, Cross-Recessed, pan head, 4-40 x .250		16	8		
19	471-068			SCREW, Cross-Recessed, pan head, 6-32 x .312		4	-		
20	471-075			SCREW, Cross-Recessed, pan head, 6-32 x 1.00		4	4		
21	473-329			SCREW, Assembled Washer, cross-recessed, pan head, 4-40 x .750		14	6		
22	475-058			SCREW, Assembled Washer, cross-recessed, pan head, 6-32 x .375		4	4		
24	496-004			NUT, Assembled Washer, 4-40		22	14		
25	496-005			NUT, Assembled Washer, 6-32		4	4		
26	502-025			WASHER, Lock, internal tooth, #6		4	4		
27	501-009			WASHER, Flat, #6		8	8		
28	563-007		T1,2	TRANSFORMER, Audio		2	-		
63	616-283			CABLE, Shielded and Jacketed, 2 conductor, 22 AWG, black/red		A/R	-		
65	616-404			CABLE, Shielded and Jacketed, 3 conductor, 18 AWG, black/red/white		A/R	A/R		
66	616-568			CABLE, RF, 93 ohm, white, LO-C		A/R	A/R		

AMPEX



NOTES:
 1 PART NO. IS 1367296-XX
 2 MARK PART NO WITH PREFIX 'ASSY' PER BDI-L

Accessory Chassis Assembly
 Drawing No. 1367296B

CHANGED OCT. 1970

AUTO TRACKING TACH DELAY & CONTROL PRINTED WIRING ASSEMBLY

CATALOG NO. 1367309

SHEET 1 OF 1

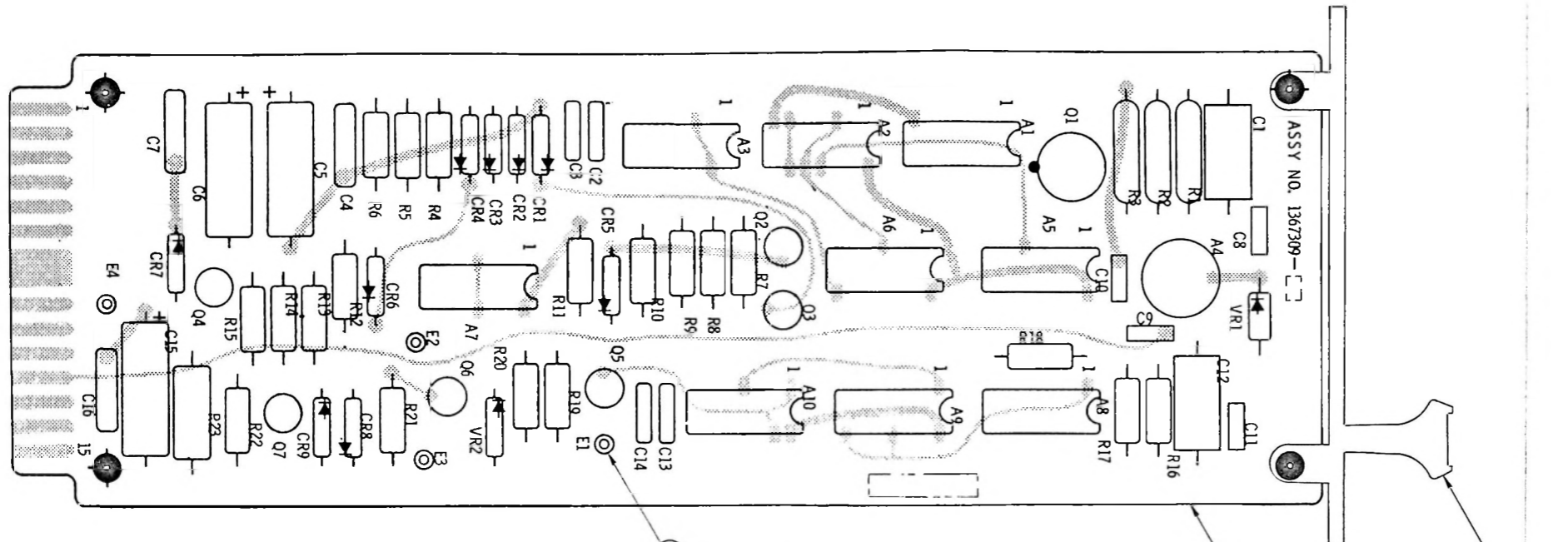
NHA 1368243

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION				
						-01				
3	1367310			SCHEMATIC		REF				
5	1367646-01			PANEL, Front		1				
7	173-620		E1-4	TERMINAL STUD		4				
10	013-257		VR1	DIODE, Zener, 6.2V		1				
11	013-332		VR2	DIODE, Zener, 4.7V		1				
12	013-689		CR1-9	DIODE		9				
15	014-248		Q3, 5, 6	TRANSISTOR		3				
16	014-505		Q4, 7	TRANSISTOR		2				
17	014-600		Q2	TRANSISTOR		1				
18	014-631		Q1	TRANSISTOR, Dual		1				
19	014-712		Q1	SPACER, Dual transistor, TO-5		1				
22	030-094		C4, 7, 16	CAPACITOR, Ceramic, 1 μ F, 25V, 20%		3				
23	030-966		C8-11	CAPACITOR, Ceramic, .01 μ F, 100V, 10%		4				
26	035-816		C2, 3, 13, 14	CAPACITOR, Mylar, .018 μ F, 50V, 5%		4				
31	037-186		C5	CAPACITOR, Tantalum, 120 μ F, 10V		1				
32	037-746		C6, 15	CAPACITOR, Tantalum, 47 μ F, 20V		2				
36	041-013		R13, 14, 22	RESISTOR, Composition, 4.7K ohm, 1/2W, 5%		3				
37	041-014		R11, 15, 19, 21	RESISTOR, Composition, 10K ohm, 1/2W, 5%		4				
39	041-020		R4-6, 12	RESISTOR, Composition, 47K ohm, 1/2W, 5%		4				
40	041-100		R23	RESISTOR, Composition, 470 ohm, 1W, 5%		1				
41	041-239		R18	RESISTOR, Composition, 2.2K ohm, 1/2W, 5%		1				
42	041-357		R7, 9, 10, 20	RESISTOR, Composition, 5.6K ohm, 1/2W		4				
43	041-420		R9	RESISTOR, Composition, 12K ohm, 1/2W, 5%		1				
44	041-454		R17	RESISTOR, Composition, 39 ohm, 1/2W, 5%		1				
45	041-456		R16	RESISTOR, Composition, 36K ohm, 1/2W, 5%		1				
48	048-257		R3	RESISTOR, Metal Film, 3.01K ohm, 1/4W, 1%		1				
49	048-770		R1	RESISTOR, Metal Film, 3.09K ohm, 1/4W, 1%		1				
52	055-810		C1, 12	CAPACITOR, Metalized Polycarb, .1 μ F, 1%, 100V		2				
53	057-208		R2	RESISTOR, Metal Film, 22.1K ohm, 1/4W, 1%		1				
55	280-130		Q2-7	MOUNTING PAD, Transistor, TO-18		6				
56	280-173		A4	SPACER, Integrated Circuit, 8 pin		1				
57	471-060			SCREW, Pan Head, 4-40 x .250		2				
58	501-678			WASHER, Nylon		2				
59	586-152	MC836P	A3, 10	INTEGRATED CIRCUIT		2				
60	586-153	MC846P	A2, 5, 7, 9	INTEGRATED CIRCUIT		4				
61	586-184	MC850P	A6	INTEGRATED CIRCUIT		1				
62	586-274	MC844P	A1	INTEGRATED CIRCUIT		1				
63	586-309	Fairchild μ A9601	A8	INTEGRATED CIRCUIT		1				
64	586-335	LM306	A4	INTEGRATED CIRCUIT		1				

1367309A

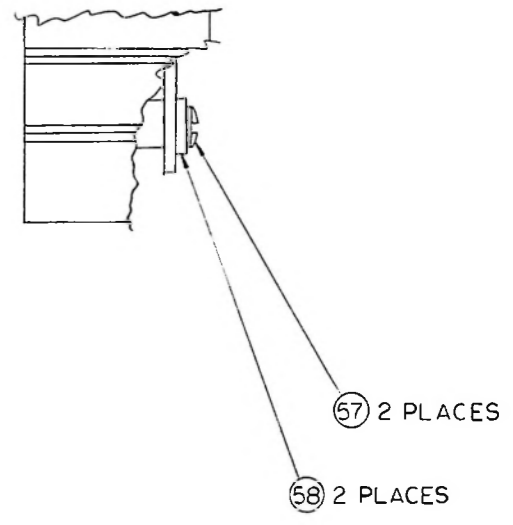
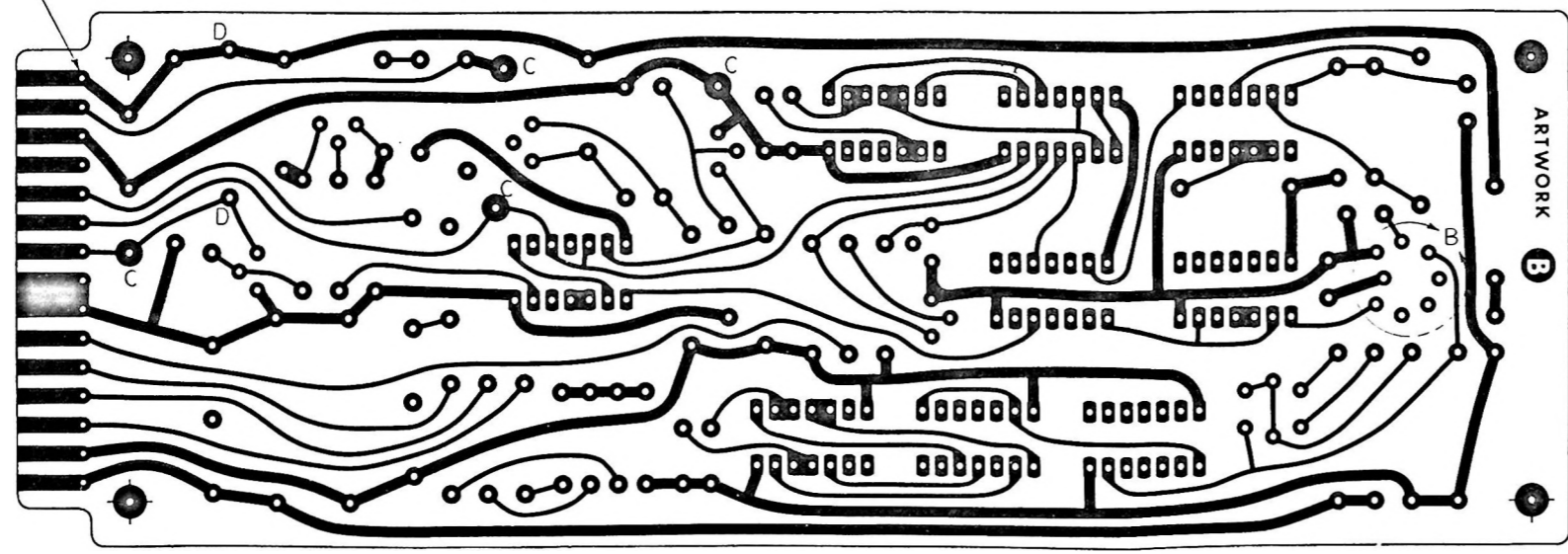
CHANGED OCT. 1970

7-17/18



B HOLE 15 PLACES

7 SWAGE FAR SIDE
4 PLACES EI-4
PART NO. 173-620 REF.



Auto Tracking Tach Delay and Control PWA
Drawing No. 1367309A

AUTO TRACKING SWEEP GENERATOR AND CONTROL
PRINTED WIRING ASSEMBLY

CATALOG NO. 1367311

SHEET 1 OF 2

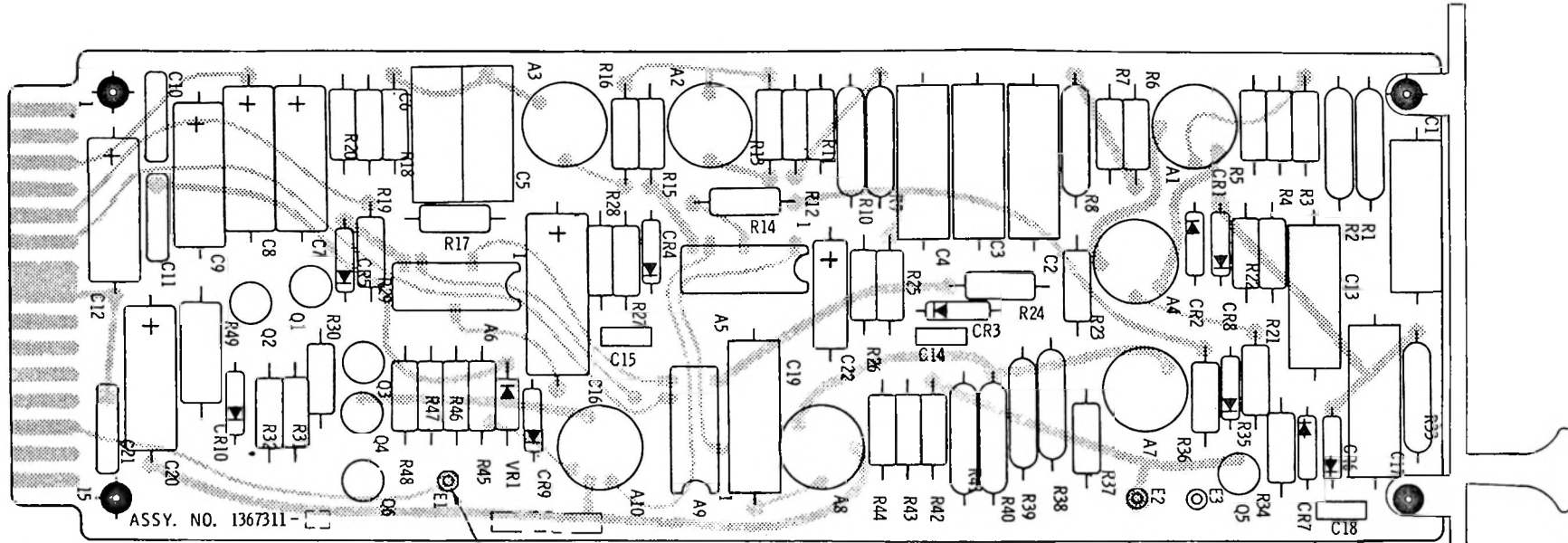
NHA 1368243

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION				
						-01				
3	1367312			SCHEMATIC		REF				
5	1367647-01			PANEL, Front		1				
10	013-450		VR1	DIODE, Zener, 10V		1				
11	013-689		CR1-10	DIODE		10				
14	014-248		Q1,2,5	TRANSISTOR		3				
15	014-600		Q3,4	TRANSISTOR		2				
19	030-094		C10,11,21	CAPACITOR, Ceramic, 1 μ F, 25V, 20%		3				
21	030-966		C14,15,18	CAPACITOR, Ceramic, .01 μ F, 100V, 10%		3				
24	037-186		C9	CAPACITOR, Tantalum, 120 μ F, 10V, 10%		1				
25	037-237		C16	CAPACITOR, Tantalum, 220 μ F, 10V		1				
26	037-746		C7,8,12,20	CAPACITOR, Tantalum, 47 μ F, 20V, 10%		4				
27	037-985		C22	CAPACITOR, Tantalum, 15 μ F, 20V		1				
30	041-013		R20,37	RESISTOR, Composition, 4.7 K Ω , 1/2W, 5%		2				
31	041-014		R4,7,12,16,18,19,22,35	RESISTOR, Composition, 10 K Ω , 1/2W, 5%		8				
32	041-015		R27	RESISTOR, Composition, 27 K Ω , 1/2W, 5%		1				
33	041-020		R29	RESISTOR, Composition, 47 K Ω , 1/2W, 5%		1				
34	041-023		R45	RESISTOR, Composition, 100 K Ω , 1/2W, 5%		1				
35	041-025		R23	RESISTOR, Composition, 150 K Ω , 1/2W, 5%		1				
36	041-028		R5,13	RESISTOR, Composition, 330 K Ω , 1/2W, 5%		2				
37	041-096		R49	RESISTOR, Composition, 100 Ω , 1W, 5%		1				
38	041-239		R14	RESISTOR, Composition, 2.2 K Ω , 1/2W, 5%		1				
39	041-245		R3,11,21,34,46	RESISTOR, Composition, 1 K Ω , 1/2W, 5%		5				
40	041-278		R42	RESISTOR, Composition, 2.7 K Ω , 1/2W, 5%		1				
43	041-309		R6,15	RESISTOR, Composition, 8.2 K Ω , 1/2W, 5%		2				
44	041-330		R43	RESISTOR, Composition, 6.8 K Ω , 1/2W, 5%		1				
45	041-357		R17,32,36	RESISTOR, Composition, 5.6 K Ω , 1/2W, 5%		3				
46	041-373		R24	RESISTOR, Composition, 9.1 K Ω , 1/2W, 5%		1				
48	041-420		R30,31	RESISTOR, Composition, 12 K Ω , 1/2W, 5%		2				
49	041-454		R25,28	RESISTOR, Composition, 39 Ω , 1/2W, 5%		2				
50	041-488		R48	RESISTOR, Composition, 2.7 Meg Ω , 1/2W, 5%		1				
51	041-535		R26	RESISTOR, Composition, 30 K Ω , 1/2W, 5%		1				
52	041-887		R44,47	RESISTOR, Composition, 7.5 Meg Ω , 1/2W, 5%		2				
54	042-481		R40	RESISTOR, Metal Film, 2.47 K Ω , 1/2W, 1%		1				
57	048-672		R41	RESISTOR, Metal Film, 332 Ω , 1/4W, 1%		1				

1367311A

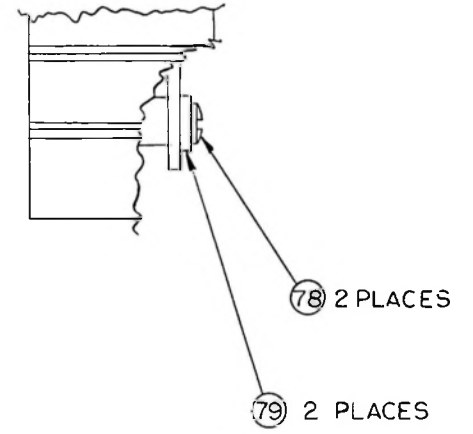
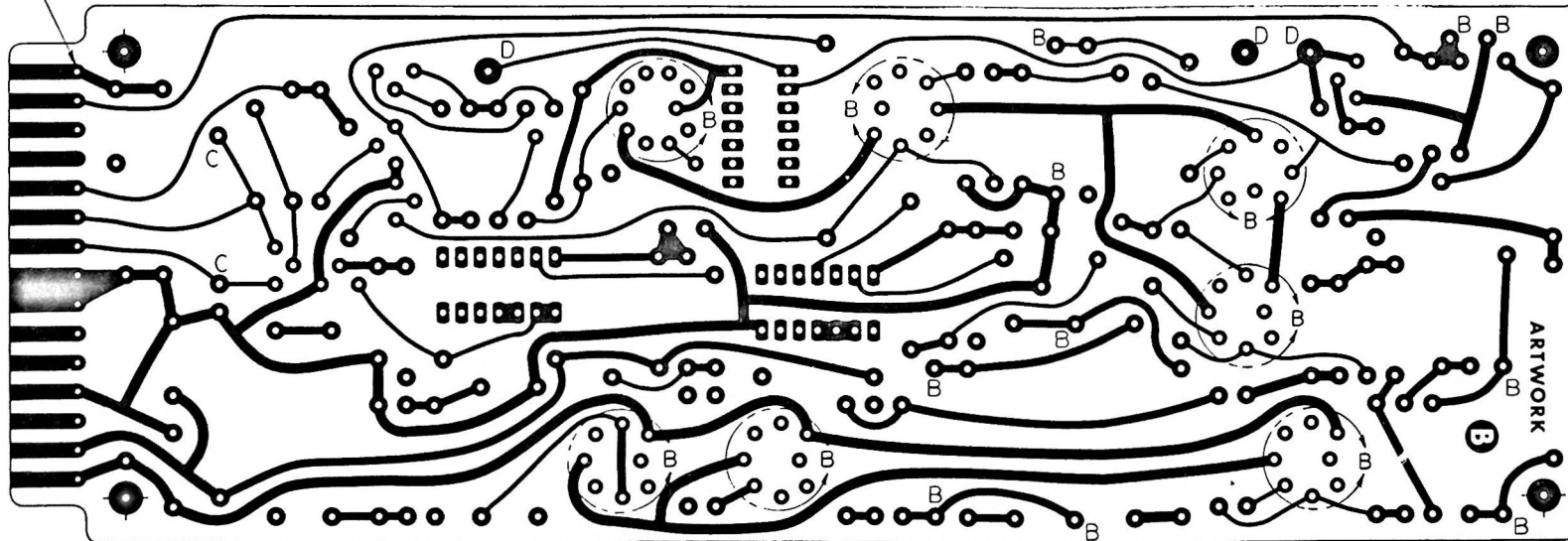
AUTO TRACKING SWEEP GENERATOR AND CONTROL PRINTED WIRING ASSEMBLY					CATALOG NO. 1367311	SHEET 2 OF 2								
						NHA 1368243								
ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION								
						-01								
60	055-156		C5, 6	CAPACITOR, Mylar, .22 μ F, 50V, 5%		2								
62	055-807		C1-4, 19, 13, 17	CAPACITOR, Metalized, polycarb, 1 μ F, 1%		7								
65	057-042		R38, 39	RESISTOR, Metal Film, 10K ohm, 1/4W, 1%		2								
66	057-209		R1, 2, 9, 10	RESISTOR, Metal Film, 22.6K ohm, 1/4W, 1%		4								
67	057-917		R8, 33	RESISTOR, Metal Film, 5.76K ohm, 1/4W, 1%		2								
70	173-620		E1-3	TERMINAL STUD, Turret, swage		3								
73	280-130		Q1-6	MOUNTING PAD, Transistor, TO-18		6								
74	280-173		A1-4, 7, 8	SPACER, Integrated Circuit, 8 pin		6								
75	280-174		A10	SPACER, Integrated Circuit, 10 pin		1								
78	471-060			SCREW, Pan Head, 4-40 x .250		2								
79	501-678			WASHER, Nylon		2								
83	580-133	2N4093 F.E.T	Q6	TRANSISTOR		1								
88	586-153	MC846P	A9	INTEGRATED CIRCUIT		1								
89	586-269	μ A741C	A1-4, 7, 8	INTEGRATED CIRCUIT		6								
90	586-309	μ A9601	A5, 6	INTEGRATED CIRCUIT		2								
91	586-336	DM8800	A10	INTEGRATED CIRCUIT		1								

1367311A



70 SWAGE FAR SIDE
3 PLACES EI-3
PART NO. 173-620 REF.

B HOLE 15 PLACES



5

AUTO TRACKING OSCILLATOR & CONTROL PRINTED WIRING ASSEMBLY CATALOG NO. 1367313

SHEET 1 OF 2

NHA 1368243

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION				
						-01				
3	1367314			SCHEMATIC		REF				
5	1367648-01			PANEL, Front		1				
7	103307-01		R13	STANDOFF		2				
10	013-257		VR1	DIODE, Zener, 6.2V		1				
11	013-689		CR1-3	DIODE		3				
12	013-983		VR2	DIODE, Zener, 5.6V		1				
14	014-248		Q2,4	TRANSISTOR		2				
15	014-631		Q1	TRANSISTOR, Dual		1				
16	014-712		Q1	SPACER, Dual Transistor		1				
17	014-678		Q3	TRANSISTOR, Silicon		1				
18	014-755		Q3	HEATSINK, Transistor		1				
20	030-094		C9,10,24	CAPACITOR, Ceramic, 1μF, 25V, 20%		3				
21	030-966		C4,5,12,13,16,20,21	CAPACITOR, Ceramic, .01μF, 100V, 10%		7				
24	034-177		C2,3	CAPACITOR, Mica, 100PF, 500V, 5%		2				
27	035-814		C17	CAPACITOR, Mylar, .033μF, 50V, 5%		1				
28	035-816		C14,15	CAPACITOR, Mylar, .018μF, 50V, 5%		2				
29	035-893		C18,19	CAPACITOR, Mylar, .1μF, 50V, 5%		2				
33	037-186		C8	CAPACITOR, Tantalum, 120μF, 10V, 10%		1				
34	037-620		C22	CAPACITOR, Tantalum, 100μF, 20V, 10%		1				
35	037-746		C11,23	CAPACITOR, Tantalum, 47μF, 20V, 10%		2				
38	041-013		R26	RESISTOR, Composition, 4.7K ohm, 1/2W, 5%		1				
39	041-014		R9,19,31-33	RESISTOR, Composition, 10K ohm, 1/2W, 5%		5				
40	041-017		R15,24	RESISTOR, Composition, 33K ohm, 1/2W, 5%		2				
41	041-020		R28,35	RESISTOR, Composition, 47K ohm, 1/2W, 5%		2				
42	041-023		R29,30	RESISTOR, Composition, 100K ohm, 1/2W, 5%		2				
43	041-343		R12	RESISTOR, Composition, 680 ohm, 1/2W, 5%		1				
44	041-239		R8,11,21	RESISTOR, Composition, 2.2K ohm, 1/2W, 5%		3				
45	041-245		R14	RESISTOR, Composition, 1K ohm, 1/2W, 5%		1				
47	041-331		R16	RESISTOR, Composition, 3.3K ohm, 1/2W, 5%		1				
48	041-357		R6,25	RESISTOR, Composition, 5.6K ohm, 1/2W, 5%		2				
49	041-454		R10,7,20	RESISTOR, Composition, 39 ohm, 1/2W, 5%		3				
50	041-460		R34	RESISTOR, Composition, 56K ohm, 1/2W, 5%		1				
51	041-604		R27	RESISTOR, Composition, 11K ohm, 1/2W, 5%		1				
53	042-476		R17	RESISTOR, Metal Film, 2.21K ohm, 1/4W, 1%		1				
54	042-485		R3,5	RESISTOR, Metal Film, 3.32K ohm, 1/4W, 1%		2				
55	043-815		R13	RESISTOR, Wirewound, 15 ohm, 5W, 5%		1				
56	044-767		R1	RESISTOR, Variable, cermet, 5K ohm, 1W, 10%		1				

1367313A

AUTO TRACKING OSCILLATOR & CONTROL PRINTED WIRING ASSEMBLY

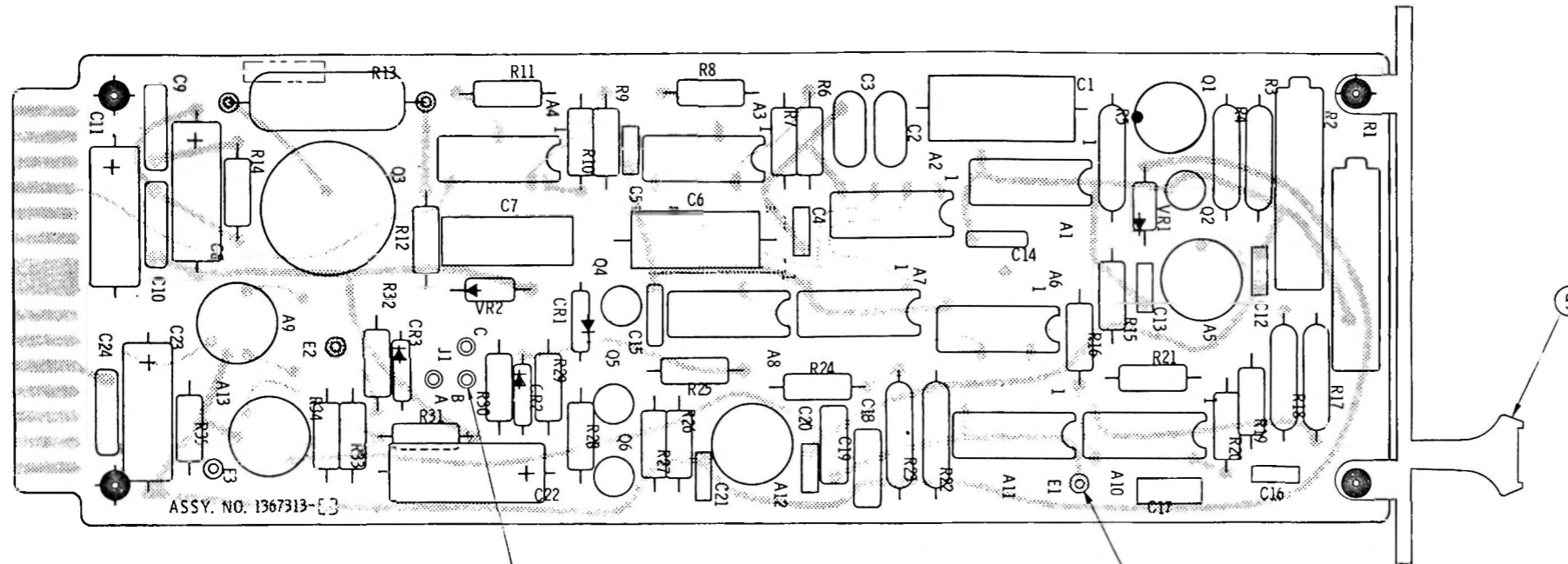
CATALOG NO. 1367313

SHEET 2 OF 2

NHA 1368243

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION					
						-01					
57	044-873		R2	RESISTOR, Variable, cermet, 1K ohm, 1W, 10%		1					
58	048-259		R18	RESISTOR, Metal Film, 1K ohm, 1/4W, 1%		1					
59	048-820		R4	RESISTOR, Metal Film, 4.02K ohm, 1/4W, 1%		1					
60	055-127		C6	CAPACITOR, Mylar, .33μF, 50V, 5%		1					
61	055-484		C7	CAPACITOR, Mylar, .33μF 50V, 10%		1					
63	055-807		C1	CAPACITOR, Metallized, polycarb, 1μF, 1%		1					
65	057-886		R22,23	RESISTOR, Metal Film, 221K ohm, 1/4W, 1%		2					
68	143-981			CONNECTOR, Printed Circuit, tip jack		3					
70	173-620		E1-3	TERMINAL STUD, Turret, swage		3					
73	280-130		Q2,4-6	MOUNTING PAD, Transistor, TO-18		4					
74	280-173		A5,12,13	SPACER, Integrated Circuit, 8 pin		3					
75	280-174		A9	SPACER, Integrated Circuit, 10 pin		1					
76	280-998		Q3	MOUNTING PAD, Transistor, TO-5		1					
77	471-060			SCREW, Pan Head, 4-40 x .250		2					
78	501-678			WASHER, Nylon		2					
79	580-133	2N4093F, E. T.	Q5,6	TRANSISTOR		2					
83	586-152	MC836P	A1	INTEGRATED CIRCUIT		1					
84	586-153	MC846P	A2,8	INTEGRATED CIRCUIT		2					
85	586-184	MC856P	A6	INTEGRATED CIRCUIT		1					
86	586-261	LM302	A12	INTEGRATED CIRCUIT		1					
87	586-269	Fairchild μA741C	A13	INTEGRATED CIRCUIT		1					
88	586-309	Fairchild μA9601	A3,4,10	INTEGRATED CIRCUIT		3					
89	586-335	LM306	A5	INTEGRATED CIRCUIT		1					
90	586-336	DM8800	A9	INTEGRATED CIRCUIT		1					
91	586-416	MC839P	A7,11	INTEGRATED CIRCUIT		2					
94	602-012		J1	PLUG, Shorting		1					

1367313A

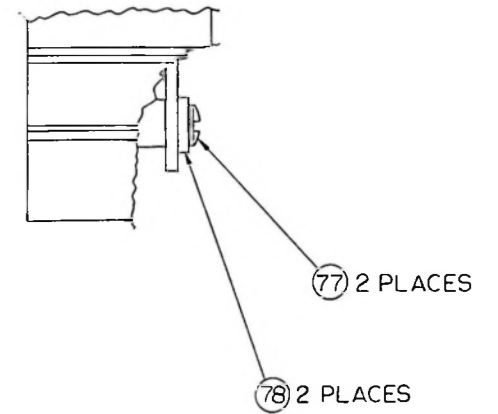
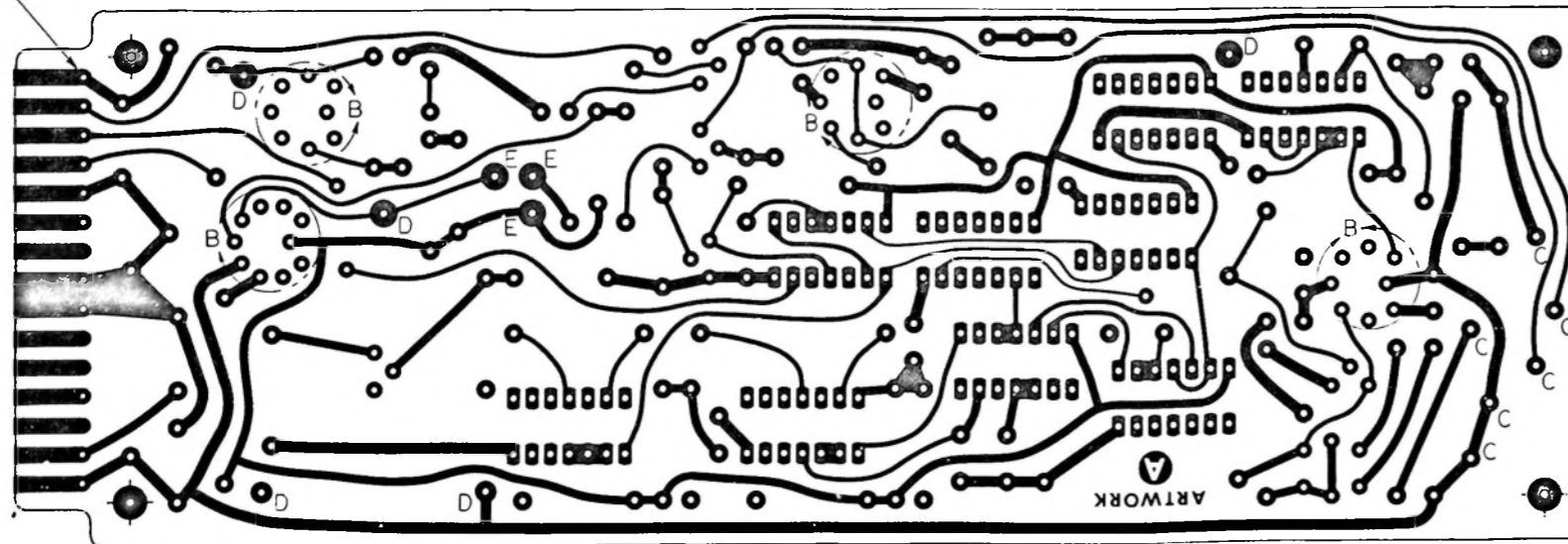


ASSY. NO. 1367313-1

B HOLE 11 PLACES

68 INSTALL NEAR SIDE
3 PLACES
PART NO. 143-981 REF.

SWAGE FAR SIDE 70
3 PLACES EI-3
PART NO. 173-620 REF.



77 2 PLACES

78 2 PLACES

Auto Tracking Oscillator and Control PWA
Drawing No. 1367313A

CONTROL PANEL HARNESS ASSEMBLY

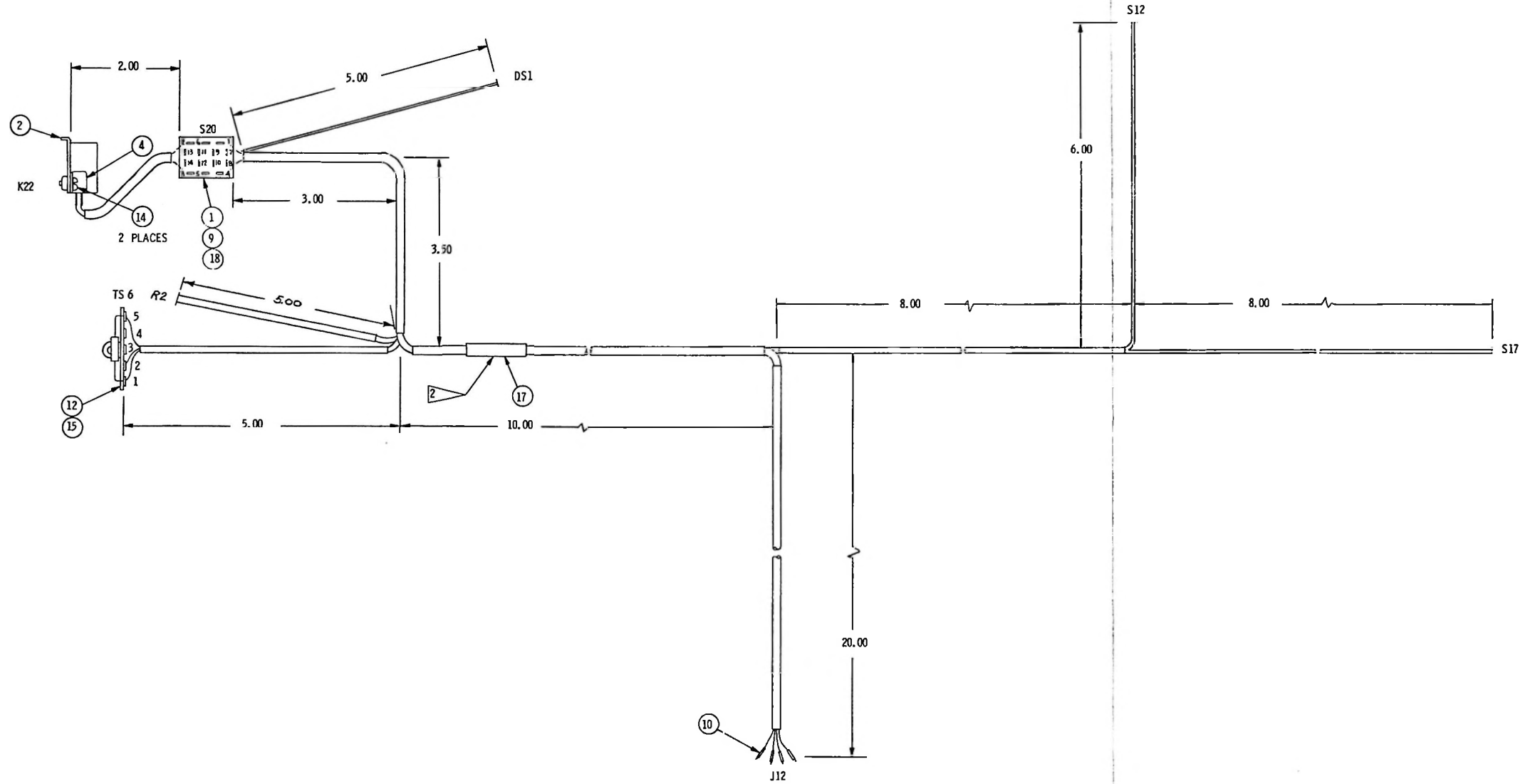
CATALOG NO. 1368539

SHEET 1 OF 1
NHA *

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION					
						-01					
1	1208593-01			LEGEND, Auto/Man		1					
2	1368618-01			BRACKET, Relay, switch assembly		1					
3	013-678		CR39	DIODE		1					
4	020-531		K22	RELAY, 2P2T		1					
5	041-316		R15	RESISTOR, Composition, 2.4K ohm, 1/2W, 5%		1					
6	060-019		S20	LAMP, #327		4					
8	120-410			SWITCH BARRIER **		2					
9	120-413		S20	SWITCH, Pushbutton, DPDT		1					
10	166-226		J12	CONTACT, Pin, 24-26 AWG		A/R					
11	169-587		J12	CONNECTOR, Rectangular Receptacle, 14 pin **		1					
12	180-239		TSG	TERMINAL STRIP		1					
14	473-325			SCREW, Assembled Washer, pan head, cross-recessed, 4-40 x .312		2					
15	475-085			SCREW, Assembled Washer, pan head, cross-recessed, 6-32 x .312		1					
				* 1367287 VR2000B 1367287 VR2000							
				** See note 3 on assembly drawing							

1368539-

AMPEX



NOTES:

- 1. PART NO. IS 1368539-01.
- 2. MARK PART NO WITH PREFIX "ASSY" PER BD1-1.
- 3. ITEMS 8 AND 11 TO BE FASTENED TO ASSY BY CUSTOMER.

Control Panel Harness Assembly
Drawing No. 1368539-

CHANGED OCT. 1970

AUTO TRACKING HARNESS ASSEMBLY

CATALOG NO. 1368540

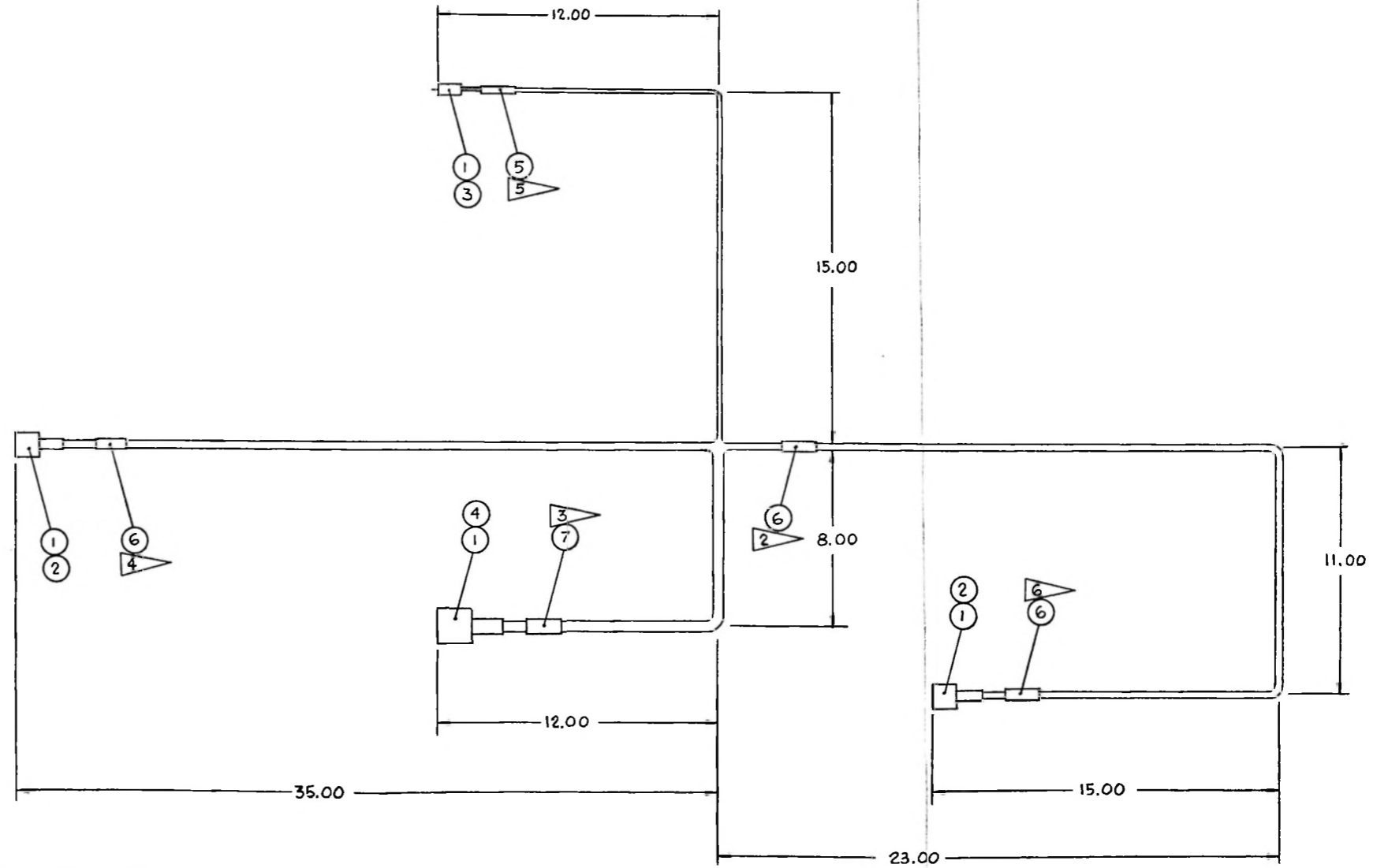
SHEET 1 OF 1

NHA *






ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION								
						-01								
1	166-224		P5,12,22	CONTACT, Socket, 24-26 GA		A/R								
2	166-228		P12,22	CONNECTOR, Body, rectangular, 14 contact		2								
3	143-264		SSP 12	CONNECTOR, Receptacle, RF, 1 contact		1								
4	166-327		P5	CONNECTOR, Body, rectangular, 26 contact		1								
22	616-568			CABLE, RF, 93 ohm, white, lo-c		A/R								
				1367287 VR2000B 1367287 VR2000										

1368540-

AMPEX



NOTES:

1. PART NO. IS 1368540-01.
- 2  MARK PART NO. WITH PREFIX "ASSY" PER BD1-1
- 3  IDENTIFY : ACC CHASS J5
- 4  IDENTIFY : CTL PNL J12
- 5  IDENTIFY : SIG SYS J12
- 6  IDENTIFY : SERVO J22

Auto Tracking Harness Assembly
Drawing No. 1368540-

CHANGED OCT. 1970

7-35/36

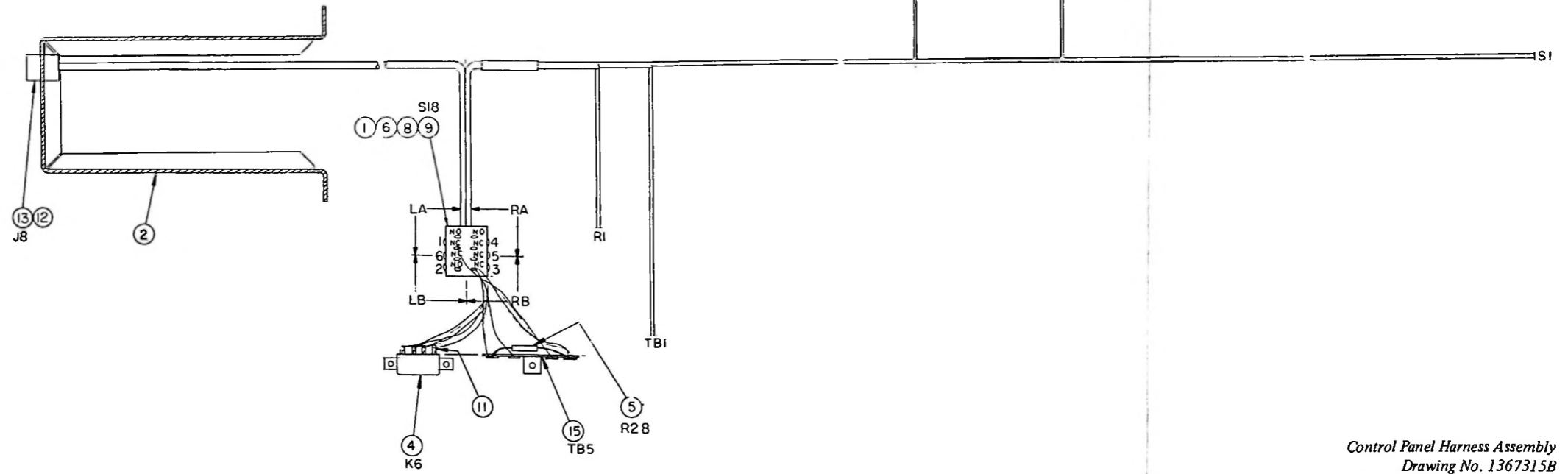
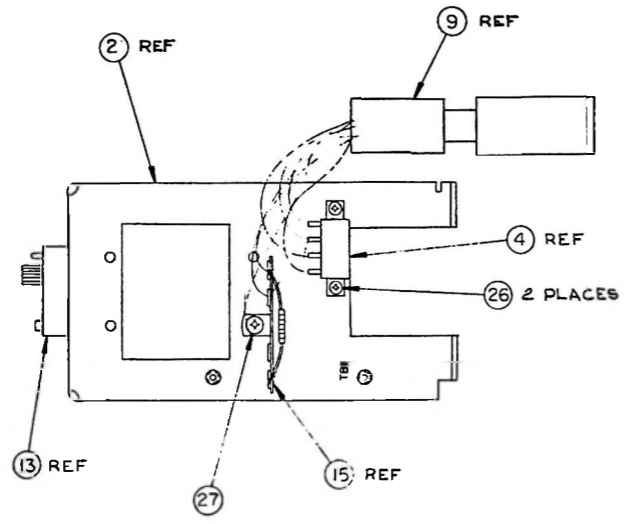
CONTROL PANEL HARNESS ASSEMBLY

CATALOG NO. 1367315

SHEET 1 OF 1

NHA 1800647

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
3	013-678		CR13	DIODE		1														
4	020-531		K6	RELAY, 2P2T		1														
6	060-019			LAMP, #327		4														
9	120-413		S18	SWITCH, Pushbutton, DPDT		1														
12	166-226		J8	CONTACT, Pin		A/R														
13	169-587		J8	CONNECTOR, Rectangular Receptacle, 14 pin		1														
15	180-063		TB5	TERMINAL STRIP		1														
26	473-325			SCREW, Cross-Recessed, pan head, assembled washer, 4-40 x .312		2														
27	475-085			SCREW, Cross-Recessed, pan head, assembled washer, 6-32 x .312		1														



Control Panel Harness Assembly
Drawing No. 1367315B

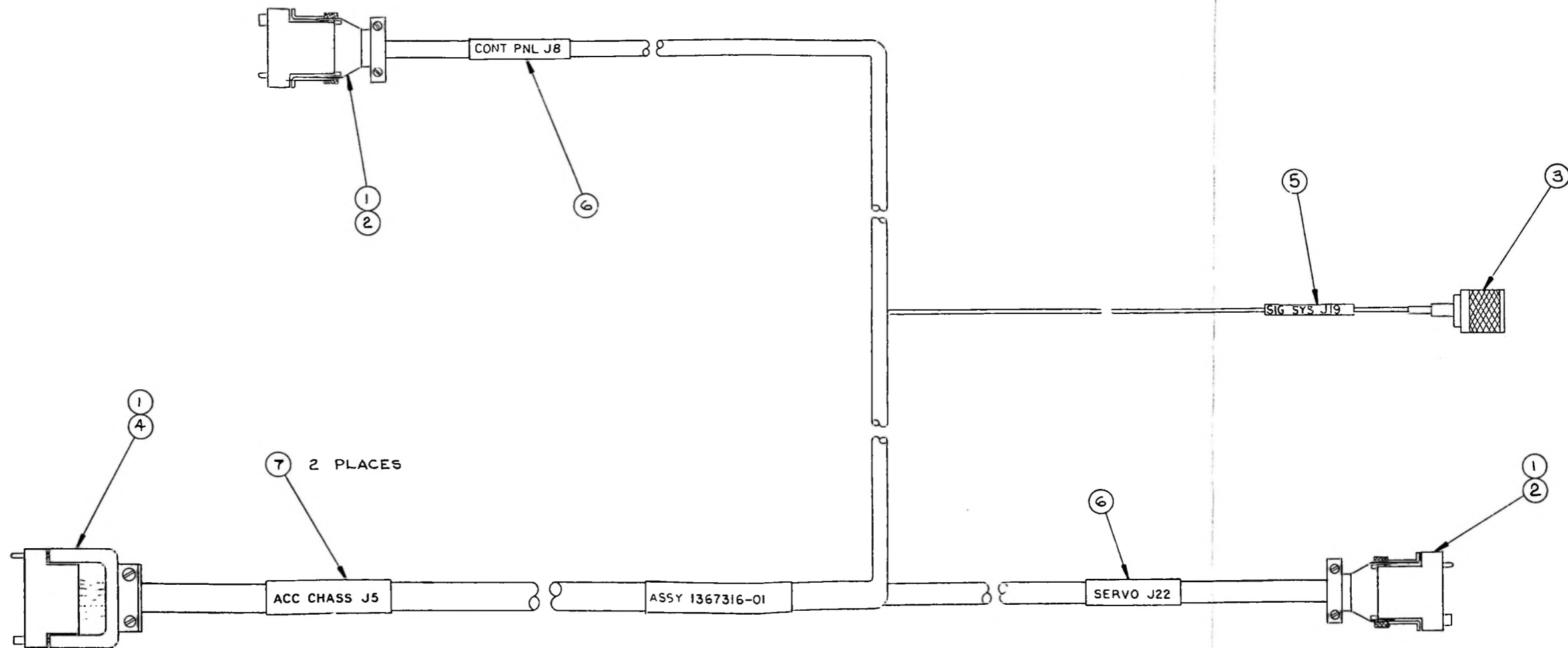
AUTO TRACK CABLE ASSEMBLY

CATALOG NO. 1367316

SHEET 1 OF 1

NHA 1367287

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
1	166-224			CONTACT, Socket, 24-26 GA		A/R														
2	166-228		P8,22	CONNECTOR PLUG, Rectangular, 14 contact		2														
3	143-264		P19	CONNECTOR PLUG, RF, 1 contact		1														
4	166-327		P5	CONNECTOR PLUG, Rectangular, 26 contact		1														



Auto Tracking Cable Assembly
Drawing No. 1367316A

SERVO ADAPTER HARNESS

CATALOG NO. 1367781

SHEET 1 OF 1

NHA 1367287

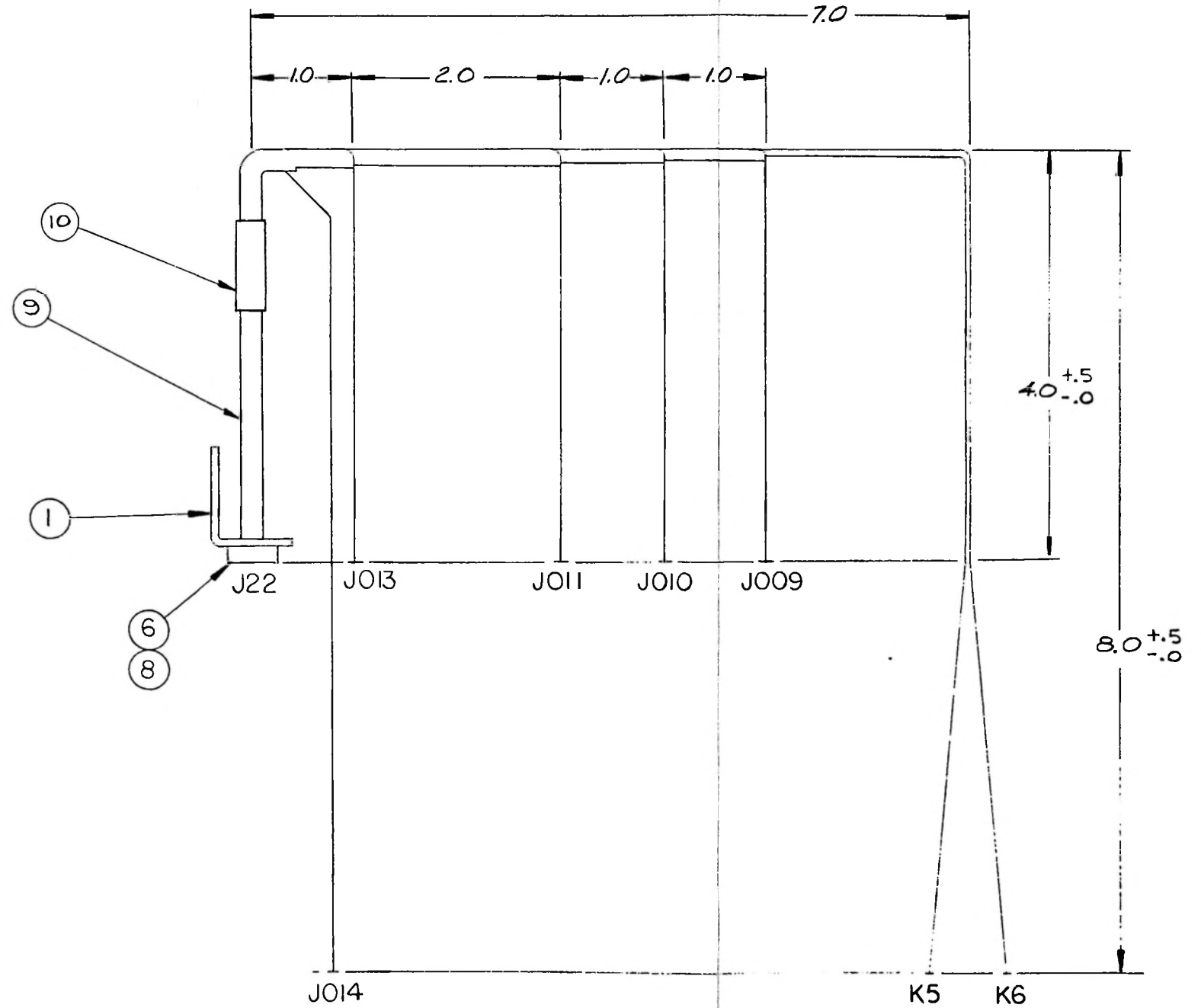
ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION						
						-01						
1	1367782-01			CONNECTOR BRACKET, Servo		1						
6	166-224			CONTACT, Socket, 24-26 GA		A/R						
8	169-587			CONNECTOR, Rectangular Receptacle, 14 contact		1						
18	616-568			CABLE, RF, 93 ohm, lo-c, white		A/R						

1367781A

CHANGED OCT. 1970

7-45/46

AMPEX



Servo Adaptor Harness Assembly
Drawing No. 1367781A

CHANGED OCT. 1970

POWER SUPPLY CABLE

CATALOG NO. 1368542

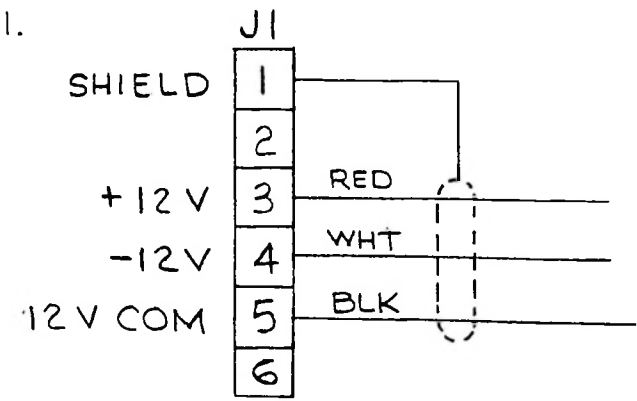
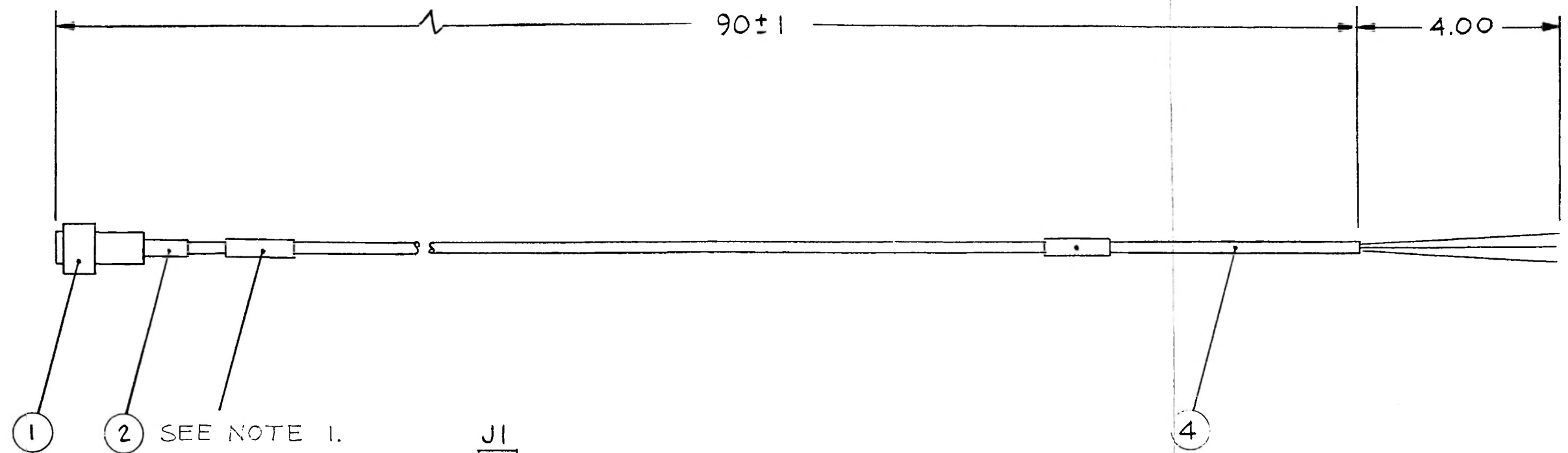
SHEET 1 OF 1

NHA 1367287

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
1	144-995		J1	CONNECTOR, Plug, 6 socket		1														
2	262-002			BUSHING, Sleeve, flanged, .220 I.D.		1														
4	616-284			CABLE, Shielded, 3 conductor, 22 AWG		A/R														

1368542-

AMPEX



SCHEMATIC

NOTES:

1. IDENTIFY J1 ACC CHASS.

Power Supply Cable Assembly
Drawing No. 1368542-

CHANGED OCT. 1970

7-55/56

EXTENDER BOARD PRINTED WIRING ASSEMBLY

CATALOG NO. 1368156

SHEET 1 OF 1

NHA 1367287

ITEM NO	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
2	1368549-01			SUPPORT		2														
3	173-620			TERMINAL STUD, Turret, swage		30														
4	146-092			CONNECTOR, Printed Circuit, 15 pin, dual		1														
5	473-326			SCREW, Assembled Washer, 4-40 x .375		2														

1368156-

POWER SUPPLY KIT				CATALOG NO. 1367291	SHEET 1 OF 1								
				NHA 1367287									
ITEM NO	AMPEX PART NO	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION							
						-01							
1	52596-02			AC CABLE		1							
2	1208705-03			CABLE ASSEMBLY, Power Supply		1							
3	1367322-01			POWER SUPPLY ADAPTER CABLE		1							
5	1805099-03			-12V POWER SUPPLY		1							
6	1368255			INTERCONNECT DIAGRAM		REF							

1367291B

CHANGED OCT. 1970

7-59/60

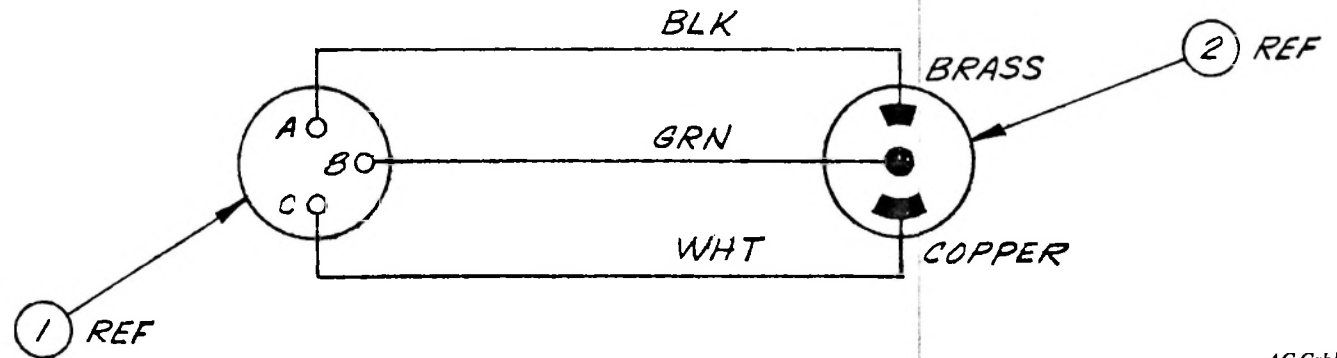
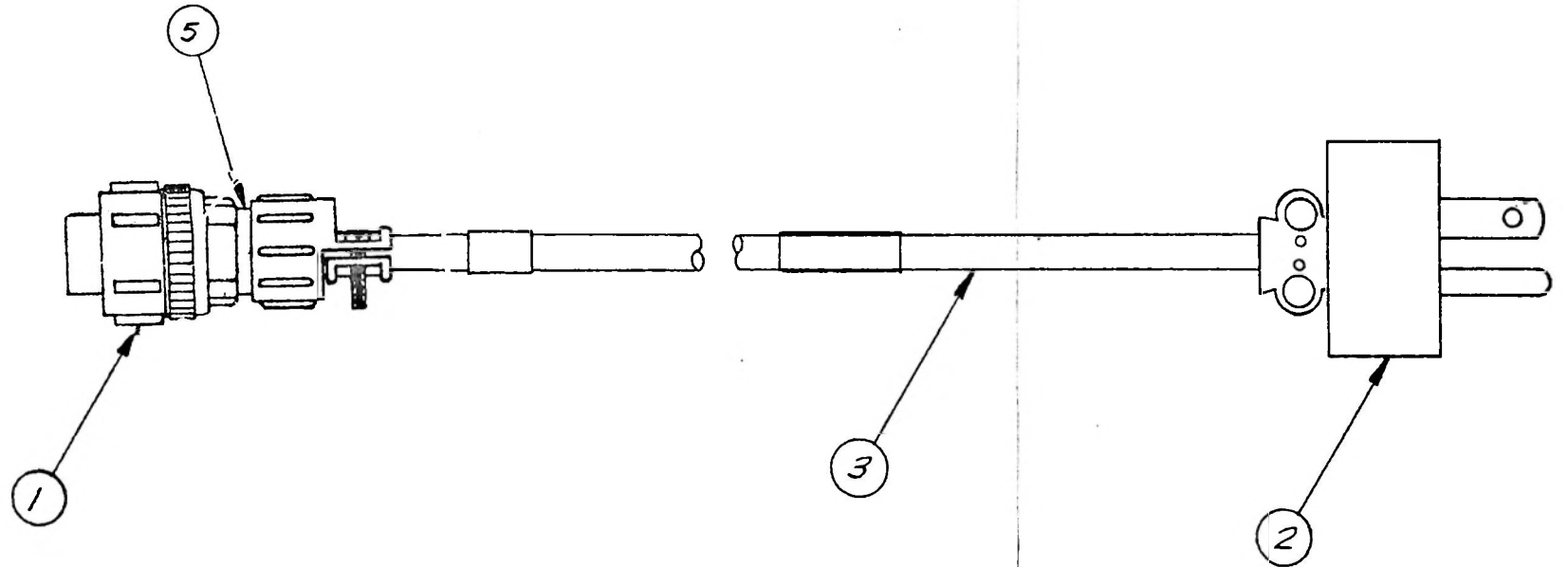
A. C. CABLE-JUMPER ASSEMBLY

CATALOG NO. 52596

SHEET 1 OF 1

NHA 1367291

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
1	140-998			CONNECTOR PLUG, Female, 3 contact		1														
2	147-053			CONNECTOR PLUG, Male, 3 contact		1														
3	616-028			CABLE, 3 Wire, 18 gauge		A/R														



AC Cable, Jumper Assembly
Drawing No. 52596F

POWER SUPPLY TO SIGNAL SYSTEM CABLE ASSEMBLY

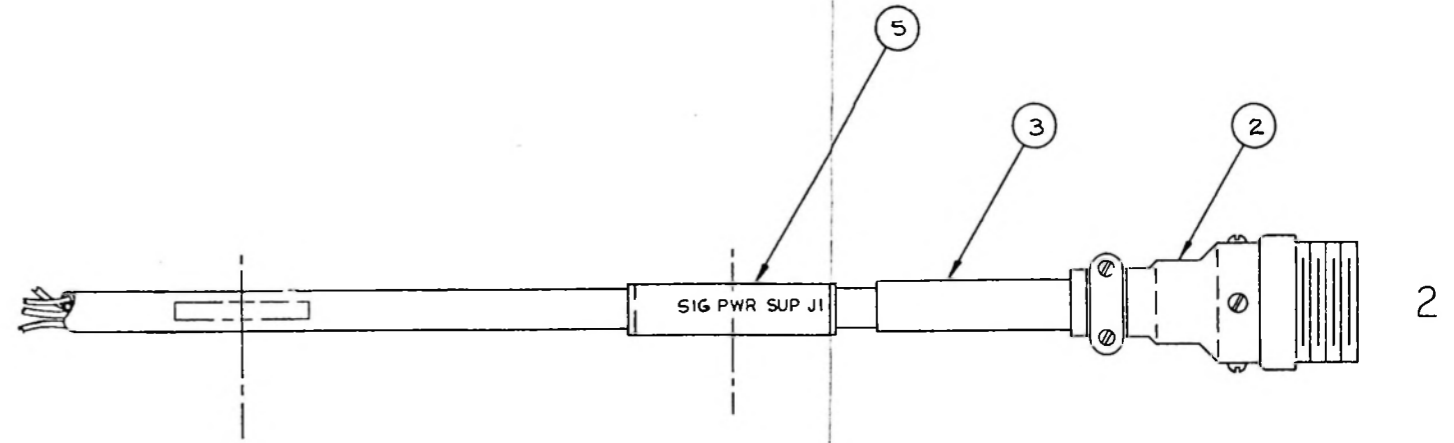
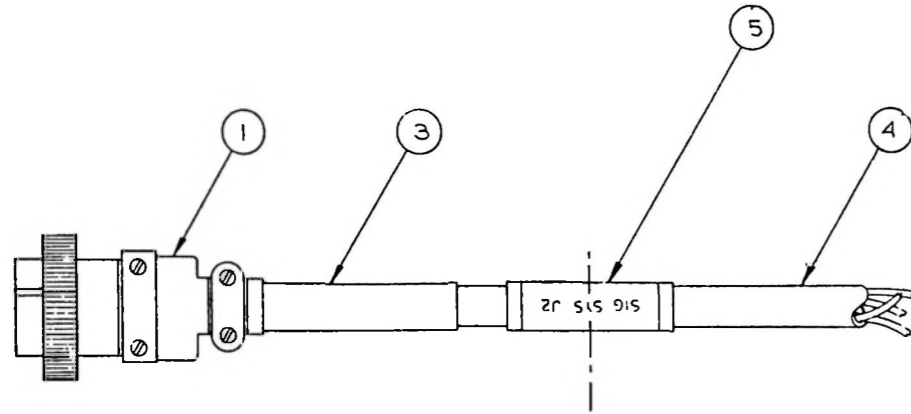
CATALOG NO. 1208705

SHEET 1 OF 1

NHA 1367291

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION			
						-02	-03		
1	144-061		J2	CONNECTOR PLUG, Female, 19 pin		1	1		
2	145-092		J1	CONNECTOR PLUG, Male, 19 pin		1	1		
3	262-004			BUSHING, Rubber		2	2		
G	611-553			WIRE, 18 AWG, white		A/R	A/R		

1208705D



Power Supply to Signal System Cable Assembly
Drawing No. 1208705D

POWER SUPPLY ADAPTER CABLE ASSEMBLY

CATALOG NO. 1367322

SHEET 1 OF 1

NHA 1367291

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION														
						-01														
1	144-061			CONNECTOR PLUG, Circular, 19 socket		1														
2	144-995			CONNECTOR PLUG, Circular, 6 socket		2														
5	145-092			CONNECTOR PLUG, Circular, 19 pin		2														
8	262-002			BUSHING, Rubber		A/R														
9	262-004			BUSHING, Rubber		A/R														
16	616-283			CABLE, Shielded & Jacketed, 2 conductor 22AWG, wht/red		A/R														
17	616-404			CABLE, Shielded & Jacketed, 3 conductor 18AWG		A/R														

1367322A

CHANGED OCT. 1970

7-69/70

12V POWER SUPPLY

CATALOG NO. 1805099

SHEET 1 OF 2

NHA 1367291

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION								
						-03								
2	1208271-01			PLATE, Heatsink		1								
3	1208229-02			BOARD, Printed Wiring		1								
5	1208275-02			WIRING, 12V Power Supply		1								
6	1211376-20			CHASSIS, 12V Power Supply		1								
7	1211379-10			BRACKET, Heatsink		2								
8	1211380-10			HEATSINK ASSEMBLY		1								
9	1217028-10		T1	TRANSFORMER, Specification Drawing, 12V power supply		1								
10	013-212	1N3210	CR001-006	DIODE		6								
11	014-238	2N2156	Q001,002	TRANSISTOR		2								
12	014-578	2N2157	Q003,004	TRANSISTOR		2								
13	031-413			CAPACITOR, Electrolytic, 5000MFD, 50V, -10,+150%		2								
15	172-999			TERMINAL LUG SOLDER, No. 10		6								
16	047-786		R004,005	RESISTOR, Wirewound, 3.24 ohm, 25W, 1%		2								
17	070-019		F1	FUSE, 2 Amp, slo-blo		1								
18	120-003		S1	SWITCH, Toggle, DPST		1								
19	130-017		F1	FUSE HOLDER, 125V		1								
20	51289-01			BRACKET		2								
22	148-011		TP003	TEST JACK, White		1								
23	148-012		TP001	TEST JACK, Red		1								
24	148-013		TP002	TEST JACK, Black		1								
25	301-995			CLAMP, Capacitor		2								
38	6000022-10			IDENTIFICATION PLATE		1								
39	057-894		R003	RESISTOR, Wirewound, 1.25 ohm, 25W, 1%		1								
41	172-003			TERMINAL LUG		1								
42	180-025			TERMINAL STRIP		1								
43	260-058			GROMMET		A/R								
44	302-031			CLAMP, Cable		1								
47	506-013			WASHER, Cable Clamp, #6		2								
49	047-787		R001,002	RESISTOR, Wirewound, 2 ohm, 25W, 3%		2								
50	1385496			SCHEMATIC		REF								
52	471-062			SCREW, Cross-Recessed, pan head, 4-40 x 3/8		4								
53	471-069			SCREW, Cross-Recessed, pan head, 6-32 x 3/8		8								
54	471-071			SCREW, Cross-Recessed, pan head, 6-32 x 1/2		11								
55	475-050			SCREW, Cross-Recessed, pan head, sems, 6-32 x 5/16		4								
56	475-049			SCREW, Cross-Recessed, pan head, sems, 6-32 x 3/8		3								
58	302-036			CLAMP, Cable		1								
59	501-009			WASHER, Flat, #6		14								
60	501-008			WASHER, Flat, #4		4								
61	502-014			WASHER, Lock, #6		2								
62	496-004			NUT, Assembled Washer, 4-40		4								
63	496-005			NUT, Assembled Washer, 6-32		9								

1805099P

12V POWER SUPPLY

CATALOG NO. 1805099

SHEET 2 OF 2

NHA 1367291

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL. NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION							
						-03							
64	496-007			NUT, Assembled Washer, 10-32		4							
65	492-014			NUT, Hex, 4-40		4							

1805099P

12V, 3A POWER SUPPLY PRINTED WIRING ASSEMBLY

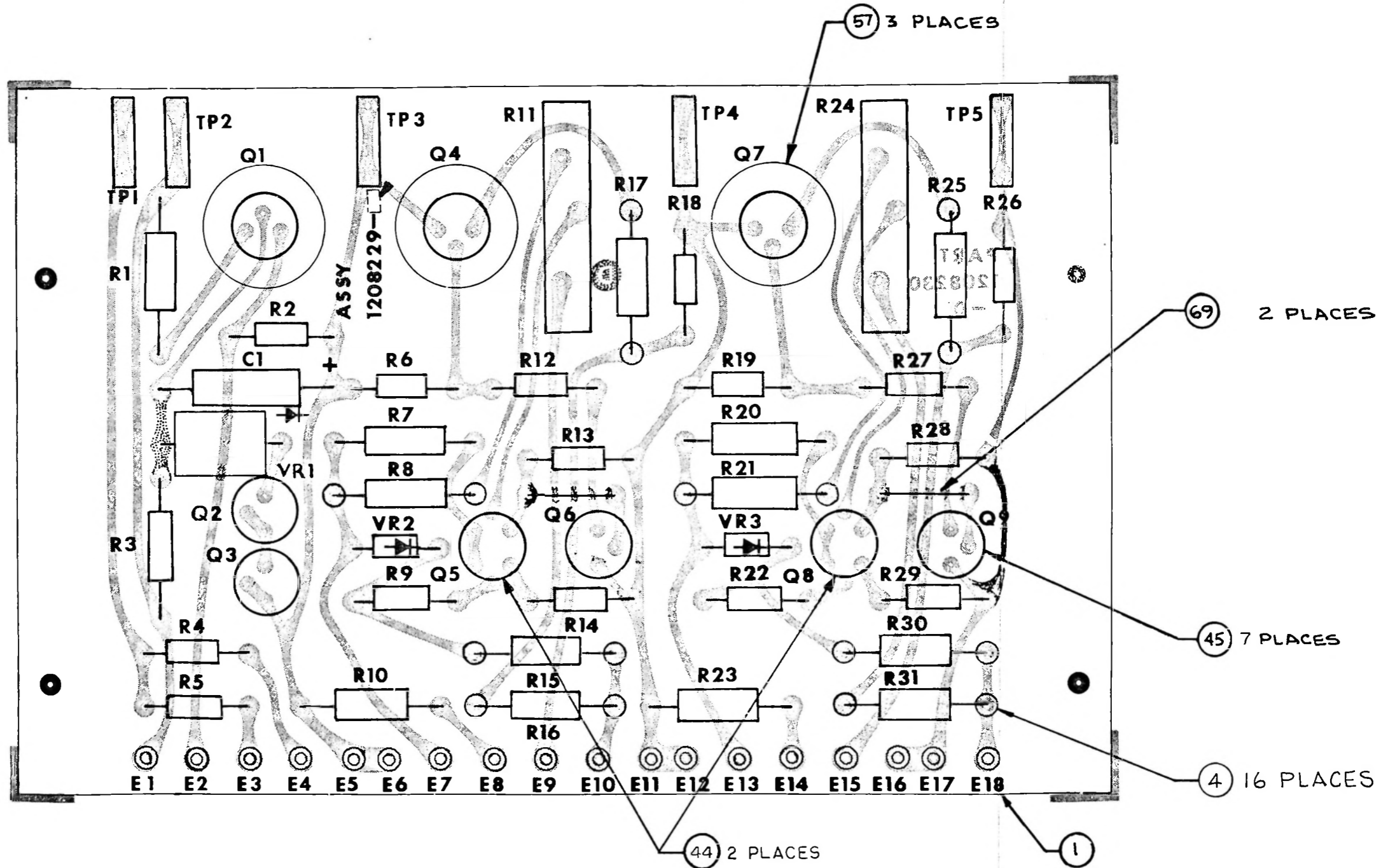
CATALOG NO. 1208229

SHEET 1 OF 1

NHA 1805099

ITEM NO.	AMPEX PART NO.	VENDOR OR MIL NO.	SCHEMATIC REFERENCE	PART DESCRIPTION	MFR CODE	QUANTITY REQUIRED PER VERSION					
						-02					
1	1208230-01			ETCHED BOARD		1					
4	103307-01			STANDOFF		16					
7	013-202	1N825	VR2,3	DIODE		2					
8	581-048	1N2765	VR1	DIODE		1					
11	014-105	2N1304	Q2,3	TRANSISTOR		2					
13	014-247	2N1161	Q4,7	TRANSISTOR		2					
15	014-364		Q1,6,9	TRANSISTOR, CD438		3					
17	014-579	SP8309	Q5,8	TRANSISTOR		2					
21	037-993		C1	CAPACITOR, Tantalum, 220μF, 20%		1					
23	041-006		R2	RESISTOR, Fixed, 620 ohm, 1/2W, 5%		1					
25	041-013		R12,27	RESISTOR, Fixed, 4700 ohm, 1/2W, 5%		2					
27	041-239		R6,19	RESISTOR, Fixed, 2200 ohm, 1/2W, 5%		2					
29	041-273		R9,22	RESISTOR, Fixed, 270 ohm, 1/2W, 5%		2					
31	041-345		R18,26	RESISTOR, Fixed, 51 ohm, 1/2W, 5%		2					
33	041-455		R13,14,28,29	RESISTOR, Fixed, 6200 ohm, 1/2W, 5%		4					
35	041-601		R4,5	RESISTOR, Fixed, 20 ohm, 1/2W, 5%		2					
37	041-999		R10,23	RESISTOR, Fixed, 560 ohm, 1W, 5%		2					
39	041-465		R3	RESISTOR, Fixed, 680 ohm, 1W, 5%		1					
41	041-566		R1	RESISTOR, Fixed, 22 ohm, 2W, 5%		1					
43	042-221		R7,20	RESISTOR, Fixed, 27.4K ohm, 1/2W, 1%		2					
44	280-136		Q5,8	SPACER, Transistor		2					
45	280-998		Q1-4,6,7,9	SPACER, Transistor		7					
47	047-788		R17,25	RESISTOR, Fixed, 143 ohm, 3W, 3%, wirewound		2					
49	047-791		R15,30	RESISTOR, Fixed, 768 ohm, 3W, 3%, wirewound		2					
51	047-789		R16,31	RESISTOR, Fixed, 523 ohm, 3W, 3%, wirewound		2					
53	047-790		R8,21	RESISTOR, Fixed, 567 ohm, 3W, 3%, wirewound		2					
55	044-735		R11,24	RESISTOR, Variable, 100 ohm, 1.5W, 10%		2					
57	435-993			HEATSINK		3					
59	148-027		TP5	TEST JACK, Red		1					
61	148-052		TP4	TEST JACK, Black		1					
63	148-030		TP3	TEST JACK, Blue		1					
65	148-029		TP2	TEST JACK, Green		1					
67	148-028		TP1	TEST JACK, White		1					

1208229H



±12 VDC, 3 Amp Power Supply Printed Wiring Assembly
Drawing No. 1208229H