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TECHNICAL MANUAL FOR

TM-7 TAPE TRANSPORT

REVIEWED BY _____ PROJECT ENGINEER

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SECTION I
GENERAL DESCRIPTION

1-1. SCOPE.

This technical manual describes the installation, operation, theory of operation, and maintenance of the Ampex TM-7 Tape Transport. Section I includes a general description of the equipment and lists performance characteristics. Figure 1-1 shows a typical horizontal installation.

1-2. GENERAL DESCRIPTION.

The tape transport moves computer grade magnetic tape across a dual-stack magnetic read/write head assembly in response to commands from either an operator control panel or from remote equipment. Tape is moved in either the forward or reverse direction, or held at a standstill, by a servo controlled capstan.

The capstan draws tape from the storage loops in the vacuum chamber. The reel motors are servo controlled to maintain the correct supply of tape within the chambers.

The tape is held in contact with the capstan by uniform tension derived from the vacuum columns. The vacuum columns remain active during the rewind operation to provide the tension required for proper tape packing. Precision tape guides ensure accurate tape tracking.

The read/write head assembly reads information from the tape (to external equipment) and writes information on the tape (from external equipment).

A two channel photosense head detects reflective markers fixed to the tape. The photosense signals are amplified and are provided to both the transport control electronics and to the external equipment.

Electromechanical interlocks protect the operator, the tape, and the equipment in the event of failure. Programming is inhibited while the equipment stabilizes and the vacuum pressure builds up.

The Data Electronics is described in the Data Electronics technical manual.

1-3. PERFORMANCE CHARACTERISTICS.

Performance characteristics are listed in Table 1-1. Performance characteristics for the Data Electronics are listed in the Data Electronics technical manual.

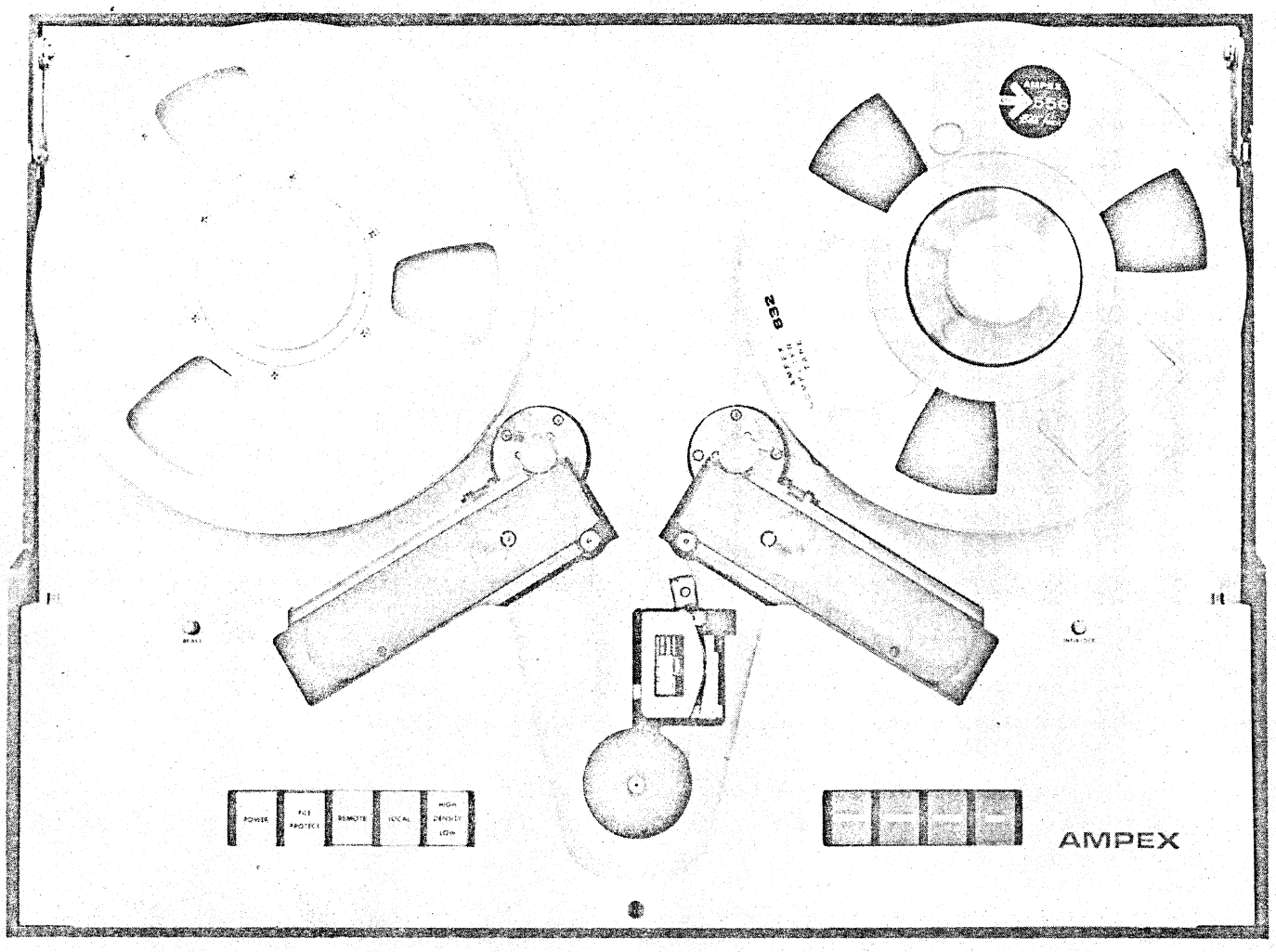


Figure 1-1.
TM-7 Tape Transport

TABLE 1-1
PERFORMANCE CHARACTERISTICS

TAPE WIDTH	1/2 inch
POWER REQUIREMENTS	Voltage: 115 VAC nominal or 230 VAC nominal
	Frequency: 48 to 62 cps
REWIND SPEED	2400 ft in less than 3 minutes
TAPE SPEED	Single speed from 10 to 45 ips
START/STOP TIME AT 36 IPS	10 ms for start or stop
START DISTANCE	0.156 inch to 0.234 inch
STOP DISTANCE	0.133 inch to 0.195 inch
LONG TERM SPEED VARIATION	±3% of operational speed
INSTANTANEOUS SPEED VARIATION (SHORT TERM)	±5% of operational speed after start time
INTERCHANNEL TIME DISPLACEMENT (ITD) at 36 IPS	10 μsec
PEAK DYNAMIC SKEW AT 36 IPS	6 μsec
MAX STATIC SKEW AT 36 IPS	7 μsec
PACKING DENSITY	200/556 cpi or 556/800 cpi or 200/800 cpi

1-4. MAJOR ASSEMBLIES.

The major assemblies of the tape transport are the blower assembly, the cable assemblies, the optional data electronics assembly, the enclosure, the power supplies, and the transport assembly.

1-5. BLOWER ASSEMBLY.

A blower fan-pack assembly is provided in the TM-7200 cabinet. A blower (option) is available for the standard Ampex 19-inch rack type enclosure. These assemblies provide cooling for the tape transport.

1-6. CABLE ASSEMBLIES.

Cable and harness assemblies are determined by transport mounting and by power supply selection.

1-7. DATA ELECTRONICS ASSEMBLY (OPTION).

The optional data electronics assembly contains the printed circuit board assemblies which control the writing and reading of data on the tape passing over the magnetic head assembly.

1-8. ENCLOSURES.

The tape transport is designed for vertical installation in either a standard 19-inch rack type mounting or for horizontal installation in the Ampex TM-7200 enclosure.

1-9. POWER SUPPLIES.

Three power supply options are provided. The transport power supply and the logic power supply are used when the optional data electronics assembly is supplied. The transport power pack may be used when the optional data electronics assembly is not supplied.

1-10. Transport Power Supply (Option). The transport power supply provides +24V, +12V, and -12V unregulated DC voltages for capstan operation. Receptacles for AC power input and for remote input and output lines are located on the supply. A circuit breaker on the supply provides overload protection for the AC power input to the tape transport. The supply has two AC convenience receptacles, which are connected directly to the AC power input. A fuse on the supply provides overload protection for the convenience receptacles. A voltage

stepdown transformer in the supply provides 24 VAC for the control relay in the supply. The relay is used in the power on-off circuit. AC operating power is distributed from the transport power supply to the other assemblies of the transport.

When this option is selected, a regulated logic power supply (+12V, -6V, and -12V) must be provided.

1-11. Logic Power Supply (Option). The logic power supply provides +12V, -12V, and -6V regulated DC voltages for the transport electronics circuitry and for the optional data electronics circuitry.

1-12. Transport Power Pack (Option). The transport power pack provides +24V, +12V, and -12V unregulated DC voltages for capstan power and +12V, -6V, and -12V regulated DC voltages for logic power. A receptacle for AC power input is located on the power pack. A circuit breaker on the power pack provides overload protection for the AC power input to the tape transport. The power pack has two AC convenience receptacles, which are connected directly to the AC power input. A fuse on the power pack provides overload protection for the convenience receptacles. A voltage stepdown transformer in the power pack provides 24 VAC for the control relay in the power pack. The relay is used in the power on-off circuit. AC operating power is distributed from the transport power pack to the other assemblies of the tape transport.

When this option is selected, the remote input and output lines are connected directly to the transport electronics assembly.

1-13. TRANSPORT ASSEMBLY.

The transport assembly consists of all tape drive components mounted on a web-reinforced precision casting. Also mounted on the transport assembly are the reel retainers, reel servo supply, transport electronics, transistor bracket, vacuum blower, and the magnetic head, operator control panel, and write-enable switch assemblies.

1-14. Magnetic Head Assembly. The standard head assembly is either a 7-track dual-stack read/write head assembly, capable of reading or writing in IBM (727, 729II, 729IV) compatible format, or an ASCII 9-track unit capable of reading and writing in IBM 360 compatible format. An erase head is supplied as an optional feature. A tape cleaner and a photosense assembly are mounted on the head assembly.

The tape cleaner provides for collection of shed materials from the oxide surface of the magnetic tape. A low-velocity air-flow through the tape cleaner removes the particles.

The photosense assembly provides IBM compatible BOT (beginning-of-tape; at-load-point) and EOT (end-of-tape) photosensing of reflective tabs on the back of the tape.

1-15. Operator Control Panel Assembly. The operator control panel (OCP) assembly provides local control for the tape transport. Two OCP assemblies are available. Selection is determined by whether the tape transport is to be mounted horizontally or vertically.

1-16. Reel Retainers. Reel retainers are a selective feature. IBM or NAB compatible quick-release or conventional screw-down reel retainers may be selected for either the fixed or the file reel. The fixed reel may be a permanently-mounted precision reel assembly.

1-17. Reel Servo Supply. The reel servo supply provides power for the reel motors and reel brakes and distributes power to the vacuum blower.

1-18. Transistor Bracket. The transistor bracket provides a heat sink for the capstan-drive power-amplifier transistors mounted on it. The bracket is used to support one end of the transport electronics assembly.

1-19. Transport Electronics Assembly. The transport electronics assembly contains the printed circuit board (PCB) assemblies which control the tape transport.

1-20. Vacuum Blower. The vacuum blower provides cooling for the capstan motor and other transport assembly components, and also provides the vacuum for the vacuum chambers, the vacuum-interlock switches, and the tape cleaner.

1-21. Write Enable Switch Assembly. A write enable switch assembly is provided for either the IBM or the NAB compatible file reel.

SECTION II
INSTALLATION

2-1. INTRODUCTION.

This section provides information for the installation of the tape transport.

2-2. GENERAL

The tape transport is designed for horizontal mounting in the Ampex TM-7200 console cabinet or for vertical mounting in a standard 19-inch rack-type enclosure.

The interconnecting cabling diagram for the tape transport is included in Section VII.

2-3. CUSTOM INSTALLATIONS.

Tape reels and overlay panels must be removed to install mounting screws for standard 19-inch rack-type tape transport installation. Interconnecting cable lengths will determine power supply locations.

2-4. UNPACKING.

Custom-built crates are designed for shipping Ampex equipment. When an enclosure is supplied with the equipment, the components are installed in the cabinet and are ready for installation and operation. When no cabinet is supplied, customized shipping crates are provided for the components.

No special unpacking instructions are required. Care should be exercised during unpacking. The equipment should be checked for shipping damage prior to application of power.

2-5. PHYSICAL DIMENSIONS.

Table 2-1 lists assembly dimensions and weights. The approximate weight of a system can be calculated by adding the weights of the selected assemblies.

TABLE 2-1
PHYSICAL DIMENSIONS

ASSEMBLY	HEIGHT	WIDTH	DEPTH	WEIGHT
Transport	26"	19"	15"	130 lb
Access Door	26"	19"	3-7/8"	20 lb
Data Electronics (Option)	14"	19"	6-1/2"	30 lb
Transport Power Supply	7"	19"	8"	25 lb
Logic Power Supply	5-1/4"	19"	9"	45 lb
Transport Power Pack	5-1/4"	19"	11"	35 lb
TM-7200 Console	46"	28-1/4"	21"	75 lb
Console Fan Pack	5-1/4"	19"	12"	15 lb
Standard 19" Enclosure	67"	25"	27"	90 lb
Blower	8-3/4"	19"	12"	28 lb

2-6. POWER REQUIREMENTS.

The tape transport is wired for 115 volt operation unless otherwise specified. Maximum operating current at 115 VAC is 8 amperes. Tapped transformers in the power supplies provide for operation with either 115 ±11.5 VAC or 230 ±23 VAC input voltage. AC input power is applied at receptacle J1 on the transport power supply or the transport power pack, whichever is supplied.

Console blowers may be operated at either 115 VAC or 230 VAC, depending upon terminal jumper positions. Blowers for the standard 19-inch rack cabinet are available for 115 VAC or 230 VAC operation.

2-7. INPUT/OUTPUT SIGNALS AND CONNECTIONS.

The input/output signals to the tape transport consist of remote-control command and status signals and read/write data signals. When the data electronics option is supplied, connector J4 on the transport power supply provides connections for all input signals from

the customer to the system and connector J5 on the supply provides connections for all output signals from the system to the customer. These input and output signals are described in the Data Electronics technical manual.

When the data electronics option is not supplied, connector J10 on the transport electronics assembly provides connections for the remote-control command and status signals. Table 2-2 herein lists the input/output signals and pin designations for connector J10. Connector P1 on the read head cable provides connections for the read head output signals. Table 2-3 lists the pin designations for connector P1. Connector P2 on the write head cable provides connections for the write data inputs to the write heads and connections for the optional erase head. Table 2-4 lists the pin designations for connector P2.

2-8. INPUT/OUTPUT CONNECTORS.

Mating connectors for customer fabricated cables are provided.

2-9. COMMAND SIGNALS.

Command signals to the transport electronics assembly must fulfill the following requirements. The FALSE level must be 0.00 ±1.25 volts. The TRUE level may be -10 to -25 volts. Input impedance shall be not less than 2000 ohms, nor more than 3000 ohms. Input lines from the remote source shall incorporate source ground. Command signals are listed in Table 2-2.

2-10. Select. When FALSE, the select line disables tape motion inputs to the transport electronics and also disables status outputs from the transport electronics. A select TRUE level will enable the remote inputs if the transport is in the ready and remote status. Transport ready requires that all interlocks are closed. Remote is TRUE when the REMOTE pushbutton, on the OCP, has been pressed.

2-11. Forward/Reverse*. When the forward/reverse line is at the TRUE level, forward direction is selected. When at the FALSE level, reverse direction is selected. The forward/reverse level must be established 5 μsec prior to a RUN command. A change in level on this line, while the tape is in motion, will cause the tape to stop.

2-12. Run/Stop*. Transition from the FALSE to the TRUE level on the run/stop line will cause the capstan to move the tape. The direction of the tape motion is determined by the previously established forward/reverse line. Transition from the TRUE to the FALSE level will cause tape motion to stop.

*Used when Run/Stop-Fwd/Rev logic is supplied.

TABLE 2-2
TRANSPORT ELECTRONICS CONNECTIONS

J10 PIN NO.	SIGNAL	TYPE
1	Forward/Reverse (-/+)*	Command
2	Run/Stop (-/+)**	Command
3	Rewind Command (-)	Command
4	Rewind and Lockout (-)	Command
5	Select (-)	Command
6	Beginning-of-Tape (-)	Status
7	High/Low Density Select (-/+)	Command (Output)
8	End-of-Tape (-)	Status
9	Rewinding (-)	Status
10	Ready (-)	Status
11	Ground	--
12	Ground	--
13	Ground	--
14	Unit Select (-)	Status
15	Write Enable Switch (C)	Status
16	Write Enable Switch (NC)	Status
17	Write Enable Switch (NO)	Status
18	Select and Remote Ind (+)	Status
19	High/Low Density Status (-/+)	Status
20	Ground	--

*Reverse/Stop when Fwd/Stop-Rev/Stop logic is supplied.
**Forward/Stop when Fwd/Stop-Rev/Stop logic is supplied.

TABLE 2-3
READ HEAD CABLE CONNECTIONS

SIGNAL	P1 PIN NO.
Read Track 1	2 12
Read Track 2	23 33
Read Track 3	4 14
Read Track 4	25 35
Read Track 5	6 16
Read Track 6	27 37
Read Track 7	8 18
Read Track 8	29 39
Read Track 9	21 31
Shield Ground Head Ground	22 9

TABLE 2-4
WRITE HEAD CABLE CONNECTIONS

SIGNAL	P2 PIN NO.
Write Track 1 Shield Ground 1	2 12 22
Write Track 2 Shield Ground 2	23 33 13
Write Track 3 Shield Ground 3	4 14 24
Write Track 4 Shield Ground 4	25 35 15
Write Track 5 Shield Ground 5	6 16 26
Write Track 6 Shield Ground 6	27 37 17
Write Track 7 Shield Ground 7	8 18 28
Write Track 8 Shield Ground 8	29 39 19
Write Track 9 Shield Ground 9	21 31 11
Erase Head Hot Power Ground Shield Ground Erase	20 30 40
Head C.T. (Write Pwr)	10
Head Ground	9

2-13. Forward/Stop* . A transition to the TRUE level on the forward/stop line will cause the capstan to move the tape in the forward direction. A transition to the FALSE level, while the tape is in motion, will cause the tape to stop.

2-14. Reverse/Stop**. A transition to the TRUE level on the reverse/stop line will cause the capstan to move the tape in the reverse direction. A transition to the FALSE level, while the tape is in motion, will cause the tape to stop.

2-15. Rewind. A transition to the TRUE level on the rewind line will initiate a high speed rewind cycle. The tape will rewind to the BOT photosense tab and the capstan will place the tape at the load point. The transport will remain in remote mode.

2-16. Rewind and Lockout. A transition to the TRUE level on the rewind and lockout line will initiate a high speed rewind cycle and return the transport to local mode. The tape will rewind to the BOT photosense tab and the capstan will place the tape at the load point. Press ing the REVERSE pushbutton will then cause the tape to unload.

2-17. High/Low Density Select. The high/low density select line is a command output from the operator control panel. The line is used to select the read strobe delay required for the bit-packing density on the tape. When high density is selected, the line is at the TRUE level. When low density is selected, the line is at the FALSE level.

2-18. STATUS SIGNALS.

Status signals are returned to the external equipment through connector J10 of the transport electronics assembly and are provided for the operator control panel through connector J9. Output levels, with a 25-foot cable, are -12 ±2 volts (5 ma max to the load) and 0.00 ±1.25 volts (5 ma max from the load). Status signals to the external equipment are enabled when in the remote mode. The indicator outputs, to the operator control panel, are active in either remote or local mode. Status signals are listed in Table 2-2

2-19. Ready. The ready line remains at the FALSE level until all tape transport interlocks are closed. The ready output is active in the remote mode only.

2-20. Unit Select. The unit select line acknowledges that the tape transport has been selected by a TRUE level at the select input. The unit select output is active in the remote mode only.

*Used when Fwd/Stop-Rev/Stop logic is supplied.

2-21. Select and Remote Indicator. The select and remote indicator line is driven by a line driver having a passive output. The line driver must be terminated with an indicator lamp returned to -12 volts. When so terminated, the line driver output is 0 volts whenever the unit select line is at the TRUE level, otherwise, the line driver output is 125 ohms returned to ground. This output is active in the remote mode only.

2-22. Beginning-Of-Tape (At Load-Point). A TRUE level on the beginning-of-tape (BOT) line indicates that the BOT photosense tab is being sensed. The BOT output is active in the remote mode only.

2-23. End-of-Tape. A TRUE level on the end-of-tape (EOT) line indicates that the EOT photosense tab is being sensed. The EOT output is active in the remote mode only.

2-24. Rewinding. A TRUE level on the rewinding line indicates that the tape is rewinding. The rewinding status output is active in the remote mode only.

2-25. High/Low Density Status. The high/low density status line acknowledges the density select level. A TRUE level indicates that high density has been selected. A FALSE level indicates that low density has been selected. The density status line is active in the remote mode only.

2-26. Write Enable Status. Three lines are provided to indicate the state of the write enable switch: the Write Enable Switch (C) line, the Write Enable Switch (NC) line, and Write Enable Switch (NO) line. When a file-protect condition exists, the Write Enable Switch (C) line is connected to the Write Enable Switch (NC). When a write-enable condition exists, the Write Enable Switch (C) line is connected to the Write Enable (NO) line. The Write Enable Switch (NO) line is connected to ground in the data electronics. These lines are active in both the remote and local modes.

2-27. DATA SIGNALS.

The magnetic head assembly is designed for writing and reading NRZI (non-return-to-zero, change on ONEs) digital type information. An instantaneous change in the direction of write current causes a ONE to be written on the magnetic tape. A reversal of the magnetic flux direction on the tape will be sensed by the read head and will be interpreted as a ONE.

Write current requirements and read signal outputs are provided for Ampex 838 tape at a tape speed of 36 ips and a bit-packing density of 800 bpi, using a 7-track head. These requirements are for direct connection to the heads; refer to the Data Electronics technical manual for data signal requirements of the data electronics.

2-28. Write Data. The amplitude of the write input signals shall be 60 ma peak. A DC current flow of 60 ma through the optional erase head coil will reduce all previously written data to less than 3 percent.

2-29. Read Data. The read head provides a 20 mv (peak-to-peak) output.

2-30. ENVIRONMENT.

2-31. OPERATING ENVIRONMENT.

The tape transport is designed for operation in a fixed position under the following conditions:

Ambient Air Temperature	60° to 90°F
Relative Humidity	40% to 70% (with no condensation)
Altitude	0 to 7500 feet

When enclosed, sufficient air must pass over the equipment in the enclosure to maintain the exhaust air temperature (above the transport at the top of the enclosure) at less than 120°F. The inlet air temperature shall be less than 90°F. Capstan motor and servo motor housing surface temperatures must not exceed 170°F. Printed circuit boards and the servo power amplifier temperatures must not exceed 120°F.

2-32. STORAGE AND SHIPPING ENVIRONMENT.

Sudden temperature changes which will cause condensation must be avoided.

Ambient Air Temperature	-30° to +150°F
Relative Humidity	95% maximum
Altitude	0 to 40,000 feet

SECTION III
OPERATION

3-1. INTRODUCTION.

This section lists controls and indicators. Controls and interlocks are explained and tape loading instructions are presented.

3-2. CONTROLS AND INDICATORS.

All operator controls and indicators except the REEL BRAKE switch are located on the operator control panel of the transport, as shown in Figure 1-1.

3-3. POWER Switch. The POWER switch is an alternate-action (push ON, push OFF) pushbutton indicator switch. When the switch is ON and power is applied to the tape transport, the POWER indicator is ON.

3-4. FILE PROTECT Indicator. The FILE PROTECT indicator is ON when the write enable ring is not in place. This notifies the operator that the information presently on the tape or file is protected.

3-5. REMOTE Switch. The REMOTE switch is a momentary-ON pushbutton indicator switch that switches the transport to remote or automatic control. When the transport is in the remote mode of operation, the REMOTE indicator is ON.

3-6. LOCAL Switch. The LOCAL switch is a momentary-ON pushbutton indicator switch that switches the transport to local or manual control. When the transport is in the local or manual mode of operation, the LOCAL indicator is ON.

3-7. HIGH/LOW DENSITY Switch. The HIGH/LOW DENSITY switch is an alternate-action (push HIGH, push LOW) pushbutton indicator switch controlling the read strobe delay during the read mode of operation. When the transport is in the high-density mode of operation, the HIGH portion of the HIGH/LOW DENSITY indicator is ON. When the transport is in the low-density mode, the LOW portion of the HIGH/LOW DENSITY indicator is ON.

3-8. FORWARD Switch. The FORWARD switch is a momentary-ON pushbutton switch which initiates movement of tape in the forward direction at the normal speed. The FORWARD switch also bypasses the short/long loop sensors in the vacuum chambers. Thus, if the tape is threaded in the chambers but is not in the normal operating position, the reel servos are enabled to move tape into the correct operating position in the chambers by pressing the FORWARD switch. If the FORWARD pushbutton is kept pressed for approximately one-half second, the tape will move forward to permit loading of the tape into the vacuum chambers.

3-9. REVERSE Switch. The REVERSE switch is a momentary-ON pushbutton switch which initiates movement of tape in the reverse direction at the normal speed.

3-10. REWIND Switch. The REWIND switch is a momentary-ON pushbutton switch which initiates movement of tape in the reverse direction at a high speed until the load point is reached.

3-11. RESET (STOP) Switch. The RESET (STOP) switch is a momentary-ON pushbutton switch which stops all tape movement and resets the forward/reverse control circuits. Reset returns the transport to local mode.

3-12. REEL BRAKE SWITCH.

The REEL BRAKE switch is a pull to set, push to reset switch. When the operating rod of the switch is pulled to the out position, the reel brakes are disengaged and the vacuum is turned off to facilitate tape loading and unloading. The REEL BRAKE switch is reset to the normal operating position by closing the transport access door. The switch may also be reset by hand.

3-13. INTERLOCKS.

If a power supply fails, the vacuum system fails, the tape access door is opened, or tape is improperly positioned in either vacuum chamber, power is removed from the servo motors and the reel brakes are applied.

3-14. Power On. The vacuum interlocks prevent operation of the tape transport until the equipment has stabilized and the vacuum has reached the operating level. This takes 3 to 4 seconds.

3-15. Power Off. When the POWER switch is set to the OFF position, the transport ready relay is first deenergized which disconnects power from and then short circuits the capstan motor armature, thus preventing movement of tape due to turn-off transients in the servo system.

3-16. Tape Access Door. The tape access door is provided with an interlock which will stop the tape transport should the access door be opened during operation. To operate the tape transport with the access door open, pull the operating rod of the interlock switch to the out position. This will bypass the interlock. To return the interlock to normal operation, close the access door.

3-17. Vacuum Failure. If the extreme limits (long or short) of permissible tape position are exceeded in either vacuum storage chamber, tape motion will be stopped.

3-18. PHOTOSENSE TAB CONTROL.

The two channel photosense unit automatically stops tape motion and gives an output to remote equipment when reflective tabs on the tape are sensed. Placement of reflective tabs in two channels on the tape is shown in Figure 3-1.

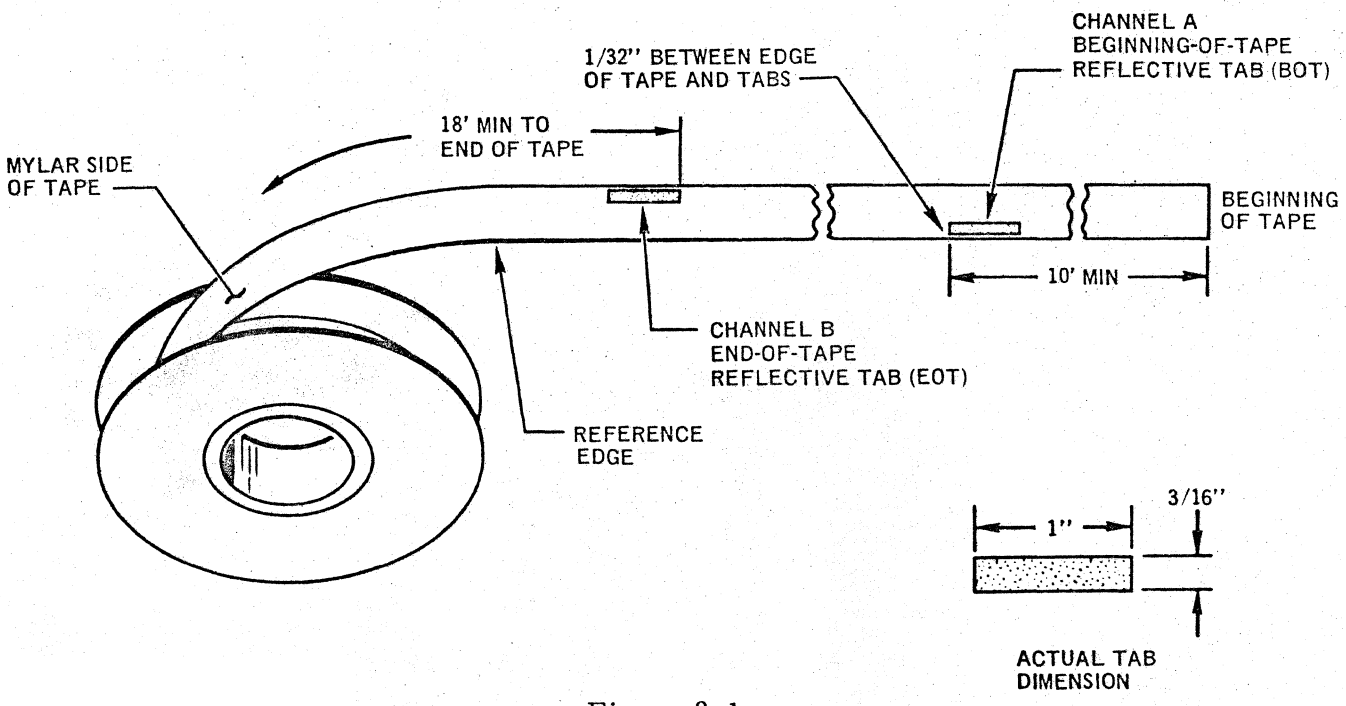


Figure 3-1
Reflective Tab Placement Diagram

3-19. LOADING THE TAPE. (See Figure 1-1.)

CAUTION

Follow the procedures of paragraph 5-3 for tape transport cleaning.

Use Ampex Part No. 087-007 head cleaner and a cotton swab to clean the head and the tape guides before starting to load the tape. As the tape reel brakes must be released while the tape is being loaded, power to the transport must be switched ON during the following steps.

Step 1: (IBM Compatible Reel Retainer) Slip the file reel over the reel retainer. Hold the reel firmly against the turntable surface and turn the retainer knob clockwise to the mechanical stop. Ensure that the reel is snugly mounted on the retainer and is flush against the turntable.

(NAB Compatible Reel Retainer) Slip the file reel over the reel retainer. Hold the reel firmly against the turntable surface and rotate the retainer handle approximately 120 degrees clockwise, at which point the reel retainer handle will lock into position. Ensure that the reel is snugly mounted on the retainer and is flush against the turntable.

Step 2: Pull the operating rod of the REEL BRAKE switch to the out position.

Step 3: Unwind 6 to 8 feet of tape leader from the reel.

Step 4: Starting where the tape leaves the file reel, place the tape around the file servo tachometer spindle.

Step 5: Pass the tape across the end of the vacuum chamber, on the file side of the transport, between the loop retaining plate and the mouth of the chamber.

Step 6: Pass the tape across the read/write heads and around the capstan.

Step 7: Pass the tape across the end of the other vacuum chamber.

Step 8: Pass the tape around the fixed servo tachometer generator spindle and attach it to the fixed reel (the reel rotates clockwise during wind). Wind at least three extra turns of tape on the fixed reel.

Step 9: Close the tape access door, thus resetting the REEL BRAKE switch and turning on the vacuum. The REEL BRAKE switch may also be reset by hand if the access door is kept open.

NOTE

At least one second must be allowed between Steps 9 and 10 to let the vacuum reach a level which will pull the tape into the vacuum chambers.

Step 10: Press the FORWARD pushbutton. This will enable the reel servos to form loops in the vacuum chambers. (Refer to paragraph 3-8.) If the FORWARD pushbutton is held ON for about one-half second, the tape will move forward to the load point under the capstan control.

SECTION IV
THEORY OF OPERATION

4-1. SCOPE.

This section includes details of the operation of the tape drive and the control electronics. (The control electronics is located in the transport electronics assembly.) The tape drive (Figure 4-1) is comprised of the capstan servo system and the reel servo system. Commands from the control electronics cause the tape drive to move tape forward, reverse, or keep tape at a standstill.

4-2. CAPSTAN SERVO SYSTEM.

In response to commands from the control electronics, the capstan servo system controls the direction and velocity of capstan motion. Direction commands are also delivered to the reel servo systems. The capstan servo system is comprised of the capstan motor and capstan, the capstan tachometer, and the capstan servo control. Binary signals from the control electronics are summed together to form a three-level signal. A negative level constitutes a forward command; a zero volt level is a stop command. A positive level is a reverse command. The threshold level for each command signal is low enough to cancel the effect of input drift or of spurious signals.

Gentle handling of the tape is accomplished by making full use of the start and stop times. The sloping output signal from the ramp generator provides linear acceleration and deceleration. Linear acceleration and deceleration produces the lowest peak tape tension. The output of the ramp generator is maintained at a constant slope by the integrating capacitor. The power amplifier compares the ramp generator output with the signal generated by the capstan tachometer to provide servo control of the capstan speed. When the ramp generator reaches saturation, the output remains at a constant level to maintain a constant capstan speed.

During rewind, the rate of acceleration is decreased by increasing the value of integrating capacitance. The lower rate of acceleration is provided to enable the tape reel servo systems to maintain control of the tape loops in the vacuum chambers. The power amplifier output is increased during rewind to drive the capstan at the rewind speed.

4-3. CAPSTAN MOTOR AND CAPSTAN.

The capstan motor is a DC-driven printed-circuit motor. The printed-circuit motor has a high-torque-to-low-inertia ratio which permits rapid acceleration at low power. The capstan is mounted on the capstan motor shaft. Tape is held in contact with the capstan during all modes of operation. Tape speed across the read/write head is dependent upon the peripheral speed of the capstan.

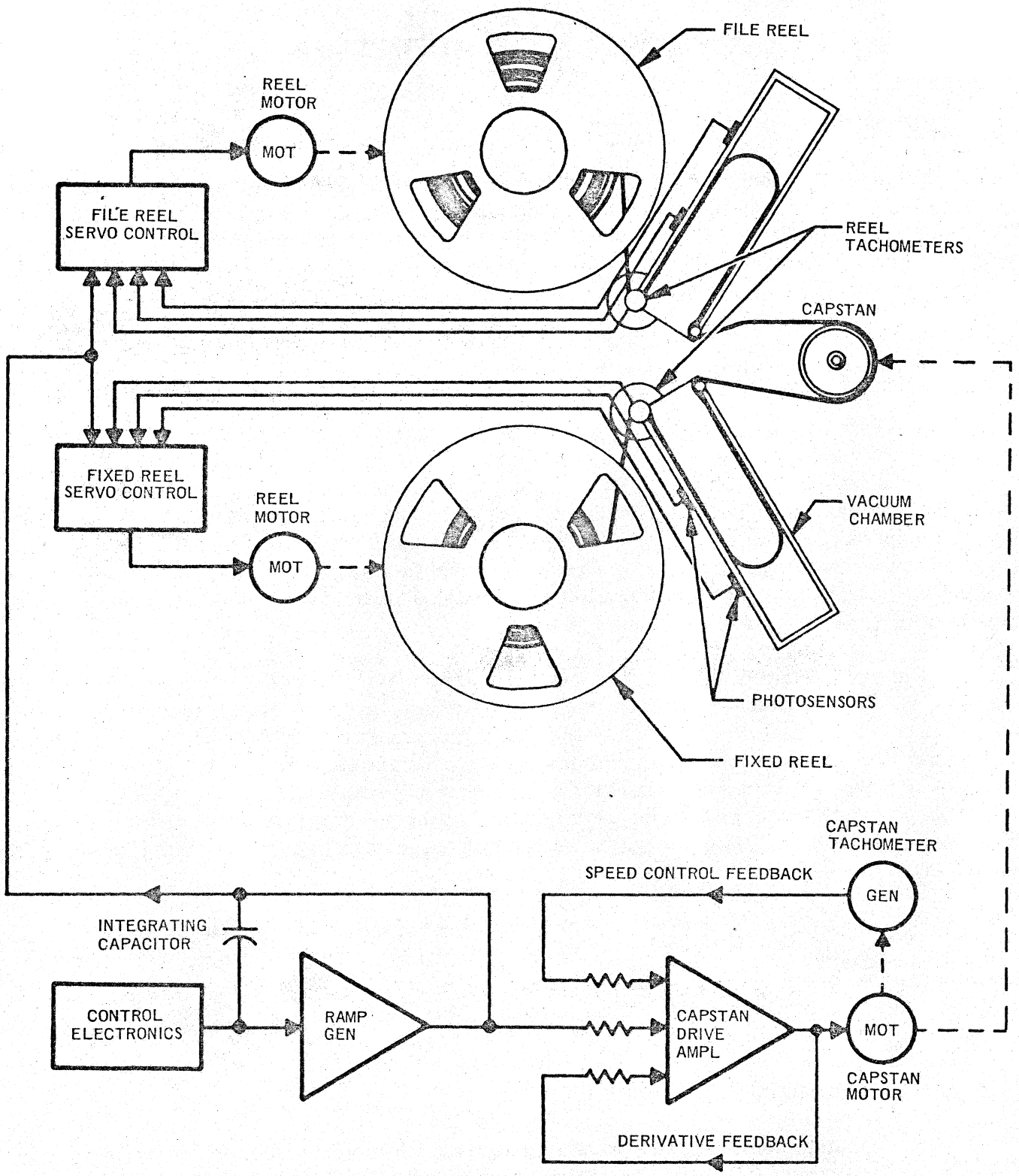


Figure 4-1
Tape Drive, Flow Diagram

4-4. CAPSTAN TACHOMETER.

The capstan tachometer is directly coupled to the shaft of the capstan motor. The tachometer provides a DC output proportional to the speed of the capstan motor. This DC output is applied to the capstan servo control.

4-5. CAPSTAN SERVO CONTROL.

The capstan servo control consists of a bipolar power amplifier and one control PCB assembly. The power amplifier is located on the transistor bracket and the transport electronics assembly. The PCB assembly is located in the transport electronics assembly card cage.

4-6. CAPSTAN SERVO OPERATION. (See Figure 4-2.)

The capstan control and drive circuitry is located on the capstan servo control PCB (CS). The capstan output circuitry is located on the transistor bracket. The ramp generator of the capstan servo system is an operational amplifier with an integrating capacitor and a current limiter. The current limiter provides constant current to the integrator until the ramp generator reaches saturation, producing a constant rate of change in the output. The constant current necessary is provided by the input signal (from the control electronics) which always exceeds the limiting value of the current limiter. A zero clamp circuit is connected from the output of the operational amplifier to the input of the current limiter. When tape is in motion, the integrating capacitor is charged. If the integrating capacitor is charged and the input signal goes to ZERO, the zero clamp drives the operational amplifier back to zero at the constant rate determined by the integrating capacitor, thus forming the deceleration ramp. Once the ramp generator reaches saturation, the output of the ramp generator is controlled by two adjustable resistors. One resistor controls the forward speed, the other resistor controls the reverse speed. With independent control of the forward and reverse speeds, compensation for electrical or mechanical differences between the directions can be maintained, providing more accurate overall operation.

4-7. Power Amplifier. The ramp generator output signal is summed with the signal from the capstan tachometer. The resultant signal is applied to the input stage of the power amplifier. The input stage consists of a dead-band amplifier which prevents capstan creep due to input drift when no signal is applied. The output of the dead-band amplifier is bipolar and is applied to an inverter stage and a preamplifier stage.

When the dead-band amplifier output is at zero volts, both the inverter stage and the preamplifier stage are cut off. When the inverter stage is cut off, the reverse driver and output stages are cut off. When the preamplifier stage is cut off, the forward driver and output stages are cut off. The output from the power amplifier is zero volts.

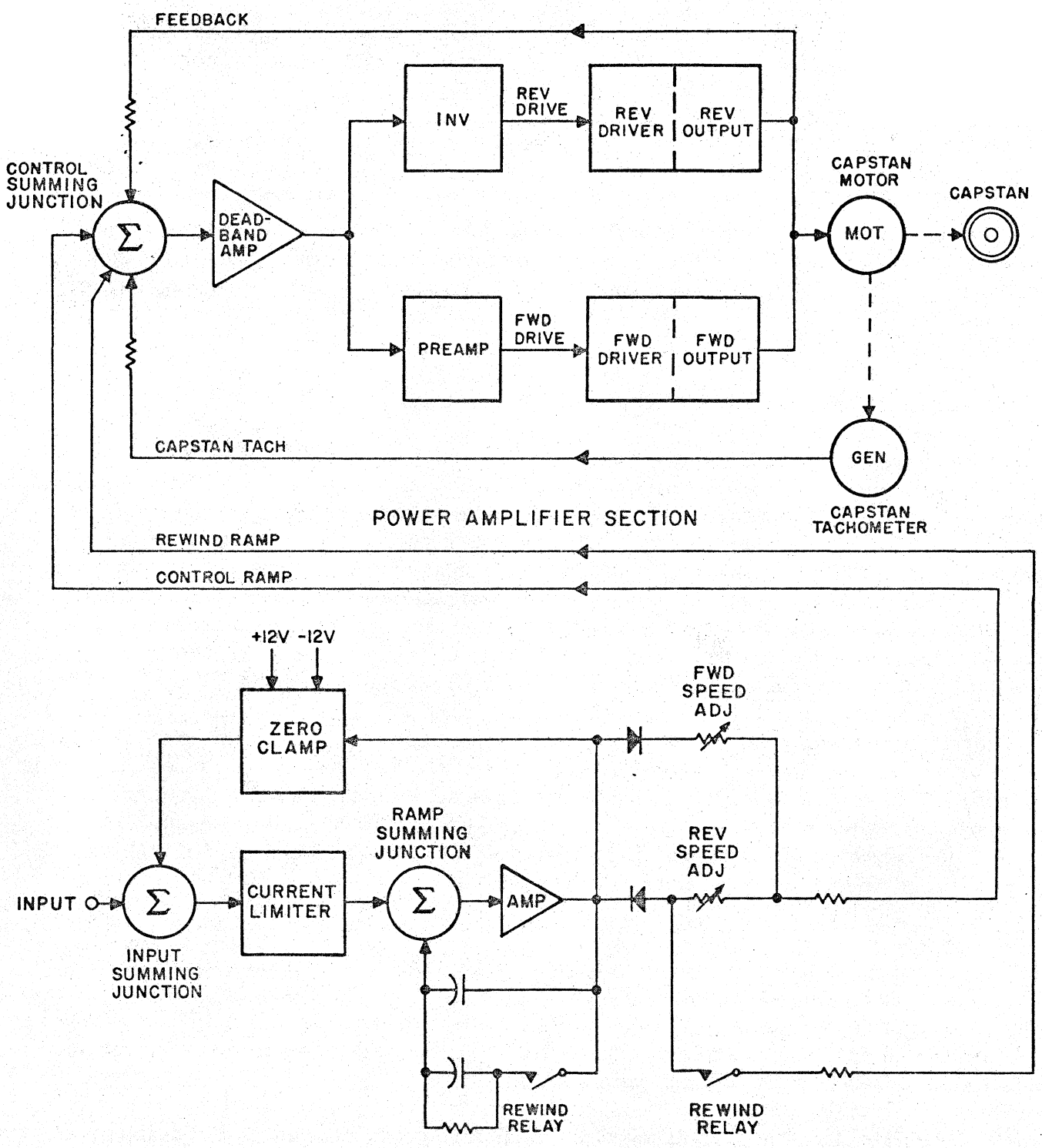


Figure 4-2
Capstan Servo System, Flow Diagram

When the dead-band amplifier output is positive (reverse-drive command), the inverter stage conducts and forward biases the reverse driver and output stages. The reverse output stage produces a positive voltage output, which drives the capstan motor in the reverse direction. The voltage from the reverse output stage is a function of the inverter input.

When the dead-band amplifier output is negative (forward-drive command), the pre-amplifier stage conducts and forward biases the forward driver and output stages. The forward output stage produces a negative voltage output, which drives the capstan motor in the forward direction. The voltage from the forward output stage is a function of the pre-amplifier input.

4-8. REEL SERVO SYSTEMS.

The file reel servo system maintains the supply of tape in the file reel vacuum chamber by feeding tape into the chamber as tape is withdrawn by the capstan. The fixed reel servo system removes tape from the fixed reel vacuum chamber as tape is fed into the chamber by the capstan. Each system is independent of the other. Each system is comprised of a tape reel motor and reel servo control circuits. The reel servo supply provides power for both systems.

4-9. TAPE REEL MOTOR.

Each tape reel motor is a DC series split-phase motor. Separate field windings are provided for forward and reverse operation. A brake assembly is attached to the rear of each motor. The brake is applied to stop tape motion when power is removed from the brake solenoid. A constant drag is also provided by the brake to provide the required damping for servo operation.

4-10. REEL SERVO CONTROL.

Reel motor speed and direction are governed by outputs from the reel servo control circuits. Outputs from the reel servo control circuits are determined by feedback obtained from the loop position sensors and the reel servo tachometers.

4-11. Loop Position Sensors. Two photocells sense the position of the tape loop in each vacuum chamber. One photocell senses the tape loop position during forward operation. The other photocell senses the tape loop position during reverse operation. An excitation lamp opposite each photocell provides a light source for the photocell. When the light source

is exposed by the tape loop, an output current is produced. The outputs of the photocells are applied to the reel servo circuitry, which maintains the proper amount of tape in the vacuum chamber. In forward operation, a short loop is maintained in the file reel vacuum chamber and a long loop is maintained in the fixed reel vacuum chamber. In reverse or rewind operation, a long loop is maintained in the file reel vacuum chamber and a short loop is maintained in the fixed reel vacuum chamber.

4-12. Reel Tachometer. The reel tachometer is mounted between the vacuum chamber and the tape reel. The tachometer produces a DC output proportional to the speed of shaft rotation. The tachometer monitors the velocity of tape passing between the tape reel and the vacuum chamber. The DC output is applied to the input of the reel servo circuitry which controls the reel motor speed. A DC output from the ramp generator, which is proportional to tape velocity between the capstan and the chambers, is also applied to the reel servo circuitry.

4-13. REEL SERVO OPERATION. (See Figure 4-3.)

The reel servo circuitry is mounted on the reel servo control (RC). The input to the reel servo control system consists of five signals: ramp output, reel tachometer, forward loop sense, reverse loop sense, and rewind. These five inputs are summed in various combinations in four summing networks: forward drive network, forward inhibit network, reverse drive network, and reverse inhibit network. The outputs of the summing networks are applied to the forward and reverse drive amplifiers (Figure 4-4). The forward drive amplifier consists of three cascaded stages: an amplifier, an emitter follower, and another amplifier. The reverse drive amplifiers consists of three cascaded amplifiers. In this way a phase shift occurs in the reverse drive amplifier that does not occur in the forward drive amplifier. This properly polarizes the outputs to drive the windings of the reel motors. An inhibit bias is applied directly to each amplifier to prevent reel creep or oscillation when no signal is applied. Driving power is applied to the reel motors only when it is necessary to drive the reels. When driving power is not required, the reels are allowed to coast. Normal counter-torque and drag friction prevent the tape from unwinding from the reel.

4-14. Forward. In forward operation, tape loop motion is centered around the forward loop sense photocell. In operation, the ramp generator in the capstan servo system applies a forward or reverse signal to the ramp input. For forward operation, this signal is at a positive level. The positive polarity inhibits the reverse drive amplifier through the reverse inhibit network and enables the forward drive amplifier. As the capstan starts to move, tape is drawn from the vacuum chamber. When the loop of tape exposes the forward loop sense photocell, the output of the photocell amplifier is summed with the output of the tachometer in the forward drive network. The summed signal causes the reel to drive tape in the forward direction faster than tape is being drawn by the capstan, replacing the tape loop in the

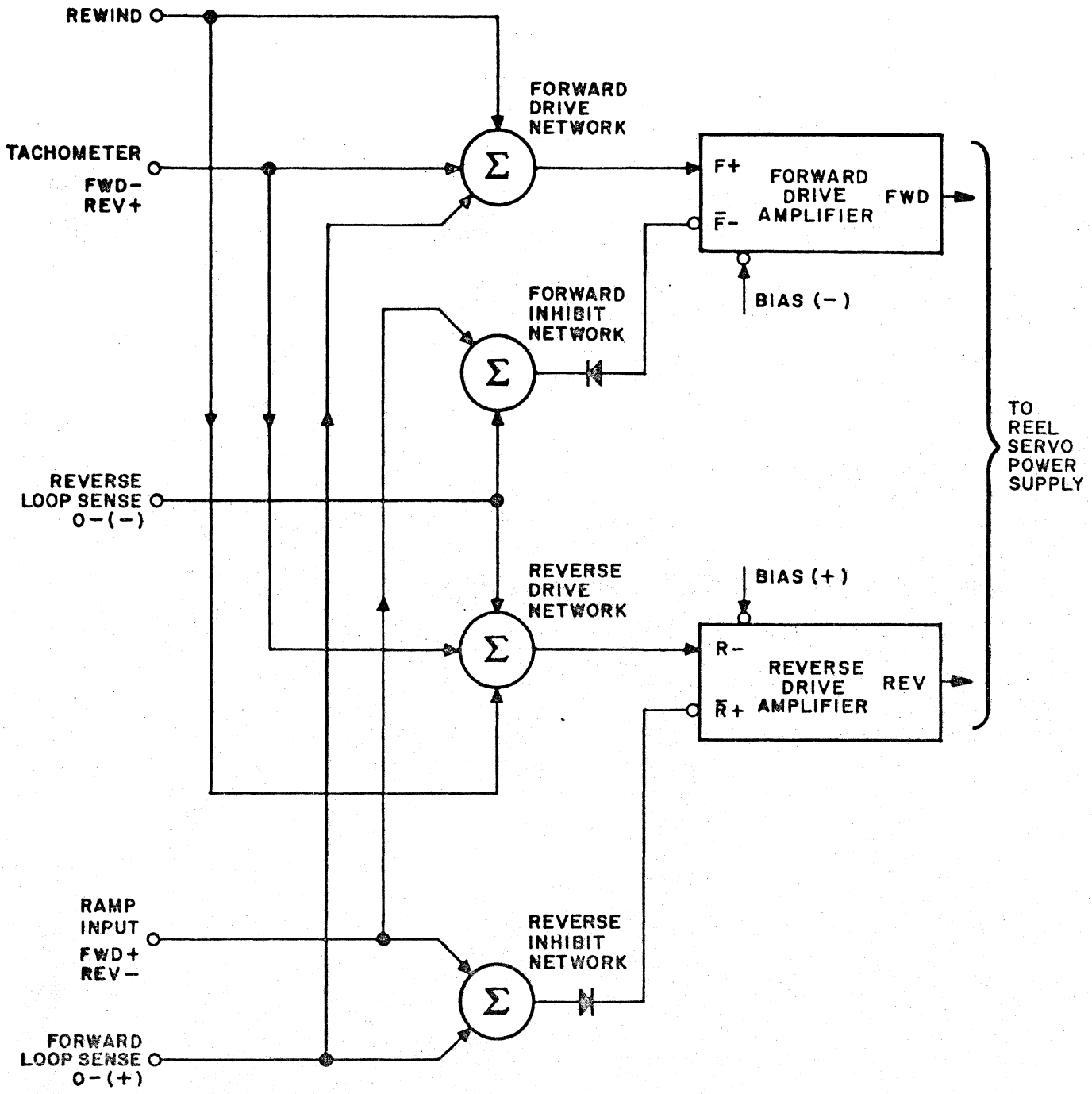


Figure 4-3
Reel Servo Logic

vacuum chamber. When the forward loop sense photocell is no longer exposed, reel drive is shut off. With reel drive shut off, the reel coasts with only counter-torque and the drag of the reel brakes slow it down. As the reel slows, the tape loop exposes the forward loop sense photocell, and drive is once more applied to the reel motor. This intermittent operation continues until capstan motion is stopped. The forward loop sense photocell output also inhibits reverse reel drive.

4-15. Stop. When a stop command is programmed, the forward/reverse input goes to zero. This removes the inhibiting bias from the reverse amplifier. The output of the tachometer, being negative, inhibits the forward drive amplifier and energizes the reverse drive amplifier through the reverse drive network. The reverse drive amplifier applies power to the reel motor to stop reel rotation. If, however, the forward loop sense photocell is exposed, reverse drive is inhibited until the tape loop covers the photocell.

4-16. Turnaround. When a turnaround (a stop followed by an immediate start in the opposite direction) is programmed, the forward/reverse input goes negative and cancels out the reverse drive inhibiting output from the forward loop sense photocell. The reel tachometer input enables the reverse drive immediately, regardless of the position of the loop, and the reel is driven to a stop. The servo control operates as if the motion command has been programmed with the tape stopped.

4-17. Reverse. For reverse operation, servo control is as described previously except that the levels of the input signals are reversed and tape loop motion is centered around the reverse loop sense photocell. The input polarity reversal inhibits the forward drive amplifier and enables the reverse drive amplifier.

4-18. Rewind. The reel servo system is designed to control tape motion at normal speed. For rewind, acceleration and deceleration rates must be lower. The rate of acceleration or deceleration is controlled by the ramp generator. During rewind, a negative sloping signal is produced at the ramp input to the reel servo. The ramp input inhibits the forward drive amplifier and enables the reverse drive amplifier. The rewind input to the reel servo is also connected to the output from the ramp generator. The rewind input sets a bias level on the reverse drive network causing tape to be driven. The output of the reel tachometer exceeds the bias applied to the reverse drive network when tape speed between the reel and the vacuum chamber is 10-percent slower than the tape speed across the read/write head. When the tape loop in the vacuum chamber exposes the reverse loop sense photocell, the photocell output is added to the bias, causing reel speed to increase until the tape speed between the reel and the vacuum chamber is 10-percent faster than the tape speed across the read/write head.

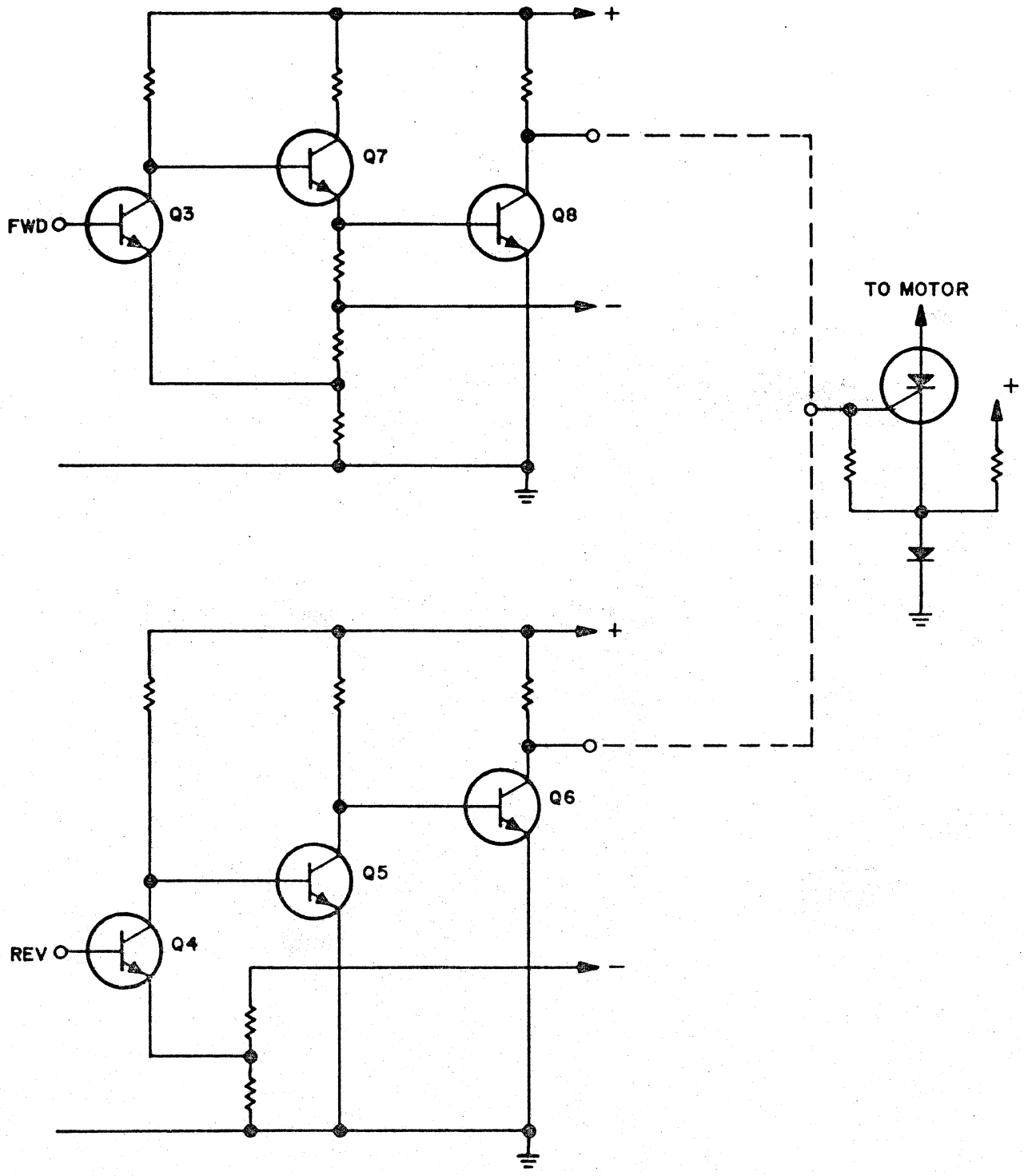


Figure 4-4
Reel Amplifier, Simplified Schematic

4-19. REEL SERVO SUPPLY.

The reel servo supply provides power for the reel motors, the reel brakes, and the vacuum blower motor. A fuse provides protection from overload in the primary circuit. Another fuse provides overload protection to the input of the bridge-type rectifier consisting of diodes CR1, CR2, CR3, and CR4.

AC voltage is supplied to the vacuum blower motor through rewind relay K5. Pulsating DC voltage is applied to the reel motors through K5. During rewind, K5 is energized and applies increased voltage to these two circuits.

When energized, servo ready relay K4 on the transport electronics assembly applies a contact closure to terminals 4 and 5 of terminal strip TS2 on the reel servo supply. This applies power to the reel motor control circuits and the reel brakes. When power is applied to the reel brakes, the brakes release. If the contact closure is removed, power is removed from the reel motors and the reel brakes are applied.

The fixed reel motor control circuit consists of silicon controlled rectifiers SCR1 and SCR2 and associated circuitry. A small amount of power is applied to the reel motor through diodes CR8 and CR9 to compensate for the tension on the tape produced by the vacuum in the vacuum chambers. This holds the reel steady when tape is not being driven. When the fixed reel motor forward input is positive, SCR1 conducts, applying pulsating DC voltage to the forward winding of the reel motor. When power is applied to the reel motor, diodes CR8 and CR9 are reverse biased. The reel motor is driven in the forward direction by the pulsating DC voltage. The reel motor is stopped when the fixed reel motor forward input is returned to zero. When the fixed reel motor forward input is at zero, SCR1 is biased to cutoff. Diode CR5 provides back bias for SCR1, SCR2, SCR3, and SCR4 to prevent reel motor oscillation under no signal conditions. When the fixed reel motor reverse input is positive, SCR2 conducts, applying pulsating DC voltage to the reverse winding of the reel motor. The operation of the reverse circuit is the same as the operation of the forward circuit.

The file reel motor control operates the same as the fixed reel motor control.

During normal operation, the REEL BRAKE switch on the tape transport connects the brakes to terminal 5 of terminal strip TS2 on the reel servo supply. When the K4 contact closure previously described is applied, the reel brakes are released by power obtained through the energized ready relay. When the REEL BRAKE switch is set to the tape loading position (operating rod of the switch pulled to the out position), the reel brakes are connected to terminal 1 of TS2 and the brakes are released by power through the deenergized ready relay. With power applied, the reel brakes release.

4-20. REWIND OPERATION.

When a rewind command is programmed, the rewind signal from the control electronics gates on the rewind relay driver on CS. The rewind relay driver energizes rewind relay K2 (located on the transport electronics assembly), which performs the following functions:

(a) Connects a capacitor-diode network in parallel with the ramp generator to lessen the acceleration of the tape.

(b) Applies a reverse command to the input of the capstan servo system.

(c) Connects the rewind input of the reel servo control to the output of the ramp generator to provide rewind bias to the reel servo control.

(d) Connects the input of the rewind relay driver to the output of the ramp generator to keep K2 energized during rewind.

(e) Connects a resistor across the reverse-speed-control potentiometer of the capstan servo circuitry to provide a higher speed reference for the capstan servo drive system.

The rewind relay driver also energizes rewind relay K5 (located in the reel servo supply), increasing the power applied to the vacuum and reel motors. The increased vacuum ensures uniform tape packing during rewind. Rewind continues until the BOT tab is sensed by the photosense assembly or the RESET (STOP) pushbutton is pressed.

When the BOT tab is sensed by the photosense assembly, the trailing edge of the tab produces a signal that sets the forward flip-flop. The control electronics applies a forward command signal to the input of the ramp generator which balances out the reverse command for rewind. The ramp generator begins deceleration rundown, slowing the capstan and reel servo systems. The rewind relay driver holds rewind relay K2 energized, thus providing slower deceleration of the tape. When the velocity of the tape is at a safe level, the output of the ramp generator drops below the level required to gate on the rewind relay driver and K2 is deenergized. The tape speed then decreases at the normal rate. When K2 is deenergized, the reverse command signal is removed from the capstan servo input, leaving the forward signal applied to the input of the ramp generator. Tape is driven forward to the BOT tab. When the tab is sensed by the photosense assembly, the forward command signal is removed (forward flip-flop is reset) and the tape stops.

If the RESET (STOP) pushbutton is pressed during rewind, stop rewind relay K1 on the transport electronics assembly is energized. K1 removes the reverse command applied to the input of the capstan servo system. The control circuit goes to zero. The ramp generator begins deceleration rundown, stopping the capstan and the tape reels.

4-21. VACUUM BUFFER STORAGE.

The vacuum buffer storage isolates the capstan servo system from the reel servo system. With the capstan drive system isolated from the reel drive system, the capstan drive system accelerates a minimum of tape mass. As tape is drawn from the vacuum buffer storage, it is replaced by the reel servo system. The vacuum provides proper and equal tape tension on both sides of the capstan. The vacuum buffer storage consists of a vacuum motor unit assembly and two vacuum chamber assemblies. If the vacuum fails or the tape is in an abnormal position, the vacuum interlock switches interrupt the capstan servo system and the reel servo system and the brakes are applied to the reel motors. If the tape loop is too short, air is admitted to the vacuum area through the hole in the glass of the vacuum chamber, lowering the vacuum. If the tape loop is too long, the vacuum interlock switch sense port is exposed to the air directly.

4-22. CONTROL ELECTRONICS.

The control electronics accepts tape input control signals from the external equipment, issues tape control commands to the tape drive system, and returns status signals to the external equipment. Tape command interlocks are provided by the control electronics to ensure that erroneous command sequences will not cause tape damage or system malfunction. The control electronics also includes the necessary logic for rewind-to-load-point and other computer oriented functions. In the descriptions of the control electronics logic functions that follow, an UP level indicates relatively positive as compared to the relatively-negative DOWN level. The operator control panel (optional equipment) provides switches and indicators to permit local operation of the tape transport for loading of tape and for maintenance.

NOTE

If the operator control panel option is not taken, equivalent circuitry should be connected to connector J9 of the transport electronics assembly. (See the operator control panel schematic in Section VII.)

4-23. PRINTED CIRCUIT BOARD (PCB) ASSEMBLIES.

The control electronics circuitry is located on four PCB assemblies. Table 4-1 lists the printed circuit boards, assembly numbers, and schematic numbers. Refer to Section VI for detailed description of the operation of the circuits on the PCB assemblies.

TABLE 4-1
PRINTED CIRCUIT BOARDS

CONTROL ELECTRONICS

CODE	PRINTED CIRCUIT BOARD	PART NUMBER*	SCHEMATIC NUMBER	BOARD LOCATION
RLD	Rewind Logic	3118222-01	3118224	J1
LLA	Local/Remote Logic	3107102-10	3107103	J2
PHB	Photoamplifier	3107262-10	3107073	J3
FLA	Forward/Reverse Logic	3107082-10	3107083	J4

TAPE DRIVE ELECTRONICS

CODE	PRINTED CIRCUIT BOARD	PART NUMBER*	SCHEMATIC NUMBER	BOARD LOCATION
CSA	Capstan Servo Control	3107097-10	3107098	J6
RCA	Reel Servo Control	3107092-10	3107093	J7

* Typical for 36 ips

4-24. WRITE ENABLE SWITCH ASSEMBLY.

When no write enable ring is installed in the file reel, the write enable switch (S12) contacts are as shown in the transport electronics schematic in Section VII and the FILE PROTECT indicator on the operator control panel is ON. When the write enable ring is in place on the file reel, the plunger of S12 is forced back by the ring. The solenoid within the switch retracts the plunger to prevent drag on the tape reel. When the plunger is retracted, the write enable switch is actuated to the other position and removes power from the FILE PROTECT indicator lamp.

When the tape transport interlock circuit is interrupted, power is removed from the write enable switch solenoid and the write enable switch contacts return to their original position.

4-25. PHOTOSENSE HEAD.

The photosense head is attached to the read/write head assembly. The photosense head consists of a light source and the necessary photoelectric elements to sense the light reflected from reflective markers on the tape.

4-26. POWER ON SEQUENCING.

Circuit breaker CB1 on the transport power supply (or the transport power pack) must be set to the ON position before the AC input power at J1 can be applied to the tape transport. When the POWER pushbutton switch on the operator control panel is in the ON position, AC relay K1 on the transport power supply or pack is energized, and power is applied to the tape transport. The operating power for AC relay K1 is provided by transformer T1 on the transport power supply or pack. Voltage limiter VR1 on the transport power supply or pack limits the peak voltage applied to the relay coil.

When power is applied to the tape transport, the transport is not ready for operation until transport ready relay K3 (on the transport electronics assembly) is energized through the transport-ready-relay interlock circuits. (See Figure 4-5.) The transport-ready-relay interlock circuit is complete when the power supplies are operating, the reel access door interlock switch is closed, and the vacuum interlock switches sense the proper vacuum pressure. While the transport ready relay is not energized, an UP level is applied to the TRANSPORT READY input to the local/remote logic PCB (LL). With the UP level applied to the TRANSPORT READY input, the MASTER RESET output from LL is at the UP level. The UP level MASTER RESET prevents any tape motion by resetting and inhibiting the outputs of the forward/reverse logic PCB (FL) and the rewind logic PCB (RL). The UP level on the TRANSPORT READY input sets LL for local mode operation. When all interlocks are closed, the transport ready relay is energized and applies a DOWN level to the TRANSPORT READY input of LL, which causes the MASTER RESET signal to go to a DOWN level. The LOCAL pushbutton indicator is ON, indicating that the transport is ready for operation in the local mode. The transport ready relay is deenergized whenever an interlock is opened, stopping tape motion and returning the tape transport to the local mode.

4-27. LOCAL MODE OPERATION.

The local mode is selected by any of the following:

(a) Pressing the LOCAL pushbutton. When the LOCAL pushbutton is pressed, an UP level is applied to the LOCAL PB input to LL.

(b) Pressing the RESET pushbutton. When the RESET (STOP) pushbutton is pressed, an UP level is applied to the RESET PB input to LL.

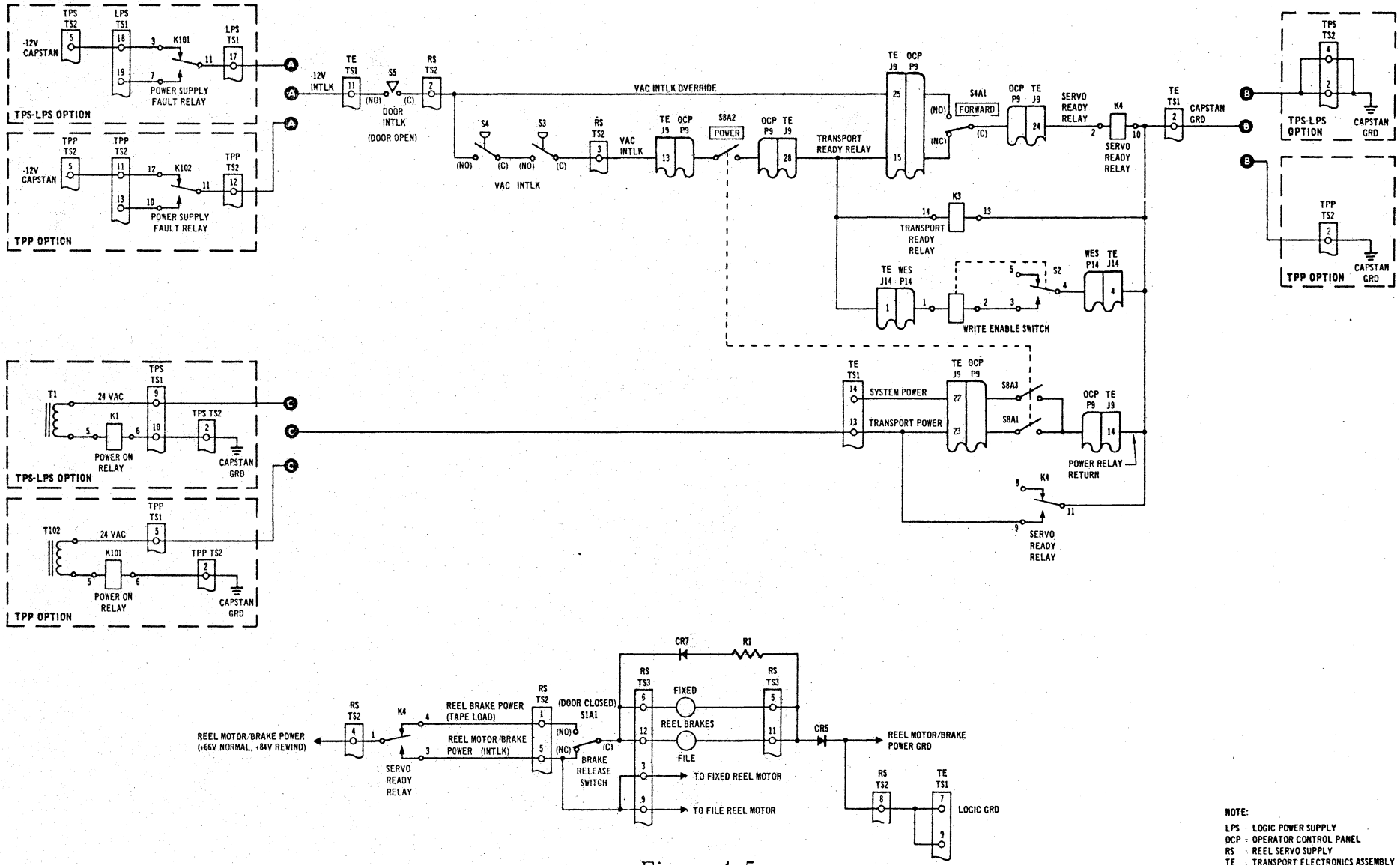


Figure 4-5
TM-7 Interlock Circuits

NOTE:
LPS - LOGIC POWER SUPPLY
OCP - OPERATOR CONTROL PANEL
RS - REEL SERVO SUPPLY
TE - TRANSPORT ELECTRONICS ASSEMBLY
TPP - TRANSPORT POWER PACK
TPS - TRANSPORT POWER SUPPLY
WES - WRITE ENABLE SWITCH ASSEMBLY

(c) Upon receipt of a DOWN level on the REWIND AND LOCKOUT input to RL, the GO LOCAL output from RL goes to the DOWN level, resetting LL to the local mode.

(d) When an interlock is opened or during power on sequencing as described previously.

When the tape transport is in the local mode, the OCP ENABLE and LOCAL (+) outputs from LL go to the UP level and the LOCAL INDICATOR output is enabled. The OCP ENABLE output enables the FORWARD, REVERSE, and REWIND pushbutton switches on the operator control panel. The LOCAL INDICATOR output lights the LOCAL indicator. The LOCAL (+) output enables the EOT input to FL. Inputs and outputs to the external equipment are disabled.

4-28. Forward. When the FORWARD pushbutton is pressed, an UP level is applied to the FORWARD PB input to FL. This sets the FWD (-) output from FL to the DOWN level, causing the tape drive system to move tape in the forward direction.

4-29. Reverse. When the REVERSE pushbutton is pressed, an UP level is applied to the REVERSE PB input to FL. This sets the REV (+) output from FL to the UP level, causing the tape drive system to move tape in the reverse direction.

4-30. Stop. Once initiated, tape motion will continue until the MASTER RESET goes to the UP level or a BOT or EOT tab is sensed. When the RESET (STOP), REMOTE, or LOCAL pushbutton is pressed, the respective PB input to LL goes to the UP level causing the MASTER RESET output to go to the UP level, which resets the FWD (-) and REV (+) outputs of FL, stopping tape motion. When the BOT tab is sensed, the BOT (+) output from the photoamplifier PCB (PH) goes to the UP level, resetting the FWD (-) and REV (+) outputs from FL. When the EOT tab is sensed, the EOT (+) output from PH goes to the UP level, resetting the FWD (-) and REV (+) outputs from FL, stopping tape motion.

NOTE

If the REVERSE pushbutton is pressed while tape is being driven in the forward direction or the FORWARD pushbutton is pressed while tape is being driven in the reverse direction, an UP level will be applied to the reverse run output, the FWD (-) and REV (+) outputs will be summed at the capstan servo system input and produce a stop command, causing tape motion to stop. The RESET (STOP) pushbutton must be pressed before the tape transport can accept further commands.

4-31. Rewind. When the REWIND pushbutton is pressed, an UP level is applied to the REWIND PB input to RL. If the rewinding flip-flop on RL is in the reset state, the REWIND PB input is enabled and sets the REWIND (-) output to the DOWN level. The DOWN level REWIND (-) output is applied to the tape drive system, initiating high speed tape rewind. The DOWN level REWIND (-) signal also sets the REWINDING (+) output to the UP level, which disables the rewind command inputs to RL and enables the BOT (+) input to FL. Tape rewinding continues until the RESET (STOP) pushbutton is pressed or the BOT tab is sensed by the photosense head. If the RESET (STOP) pushbutton is pressed, tape motion is stopped as described in paragraph 4-30. The MASTER RESET signal also resets the REWIND and REWINDING outputs from RL. As the BOT tab passes the photosense head, the BOT (+) output from PH applies an UP level to the BOT (+) inputs of RL and FL. The BOT (+) input to RL resets the REWIND output and triggers a time delay circuit that will reset the REWINDING output approximately 500 milliseconds later. The 500 millisecond delay holds the REWINDING output TRUE while tape motion is stopped and the reel servo system stabilizes. The REWIND (-) output at the UP level initiates a rewind stop sequence in the tape drive system.

If the BOT tab does not overshoot the photosense head following rewind, the REWINDING output from RL is reset by the 500-millisecond time delay circuit on RL and rewind is complete.

If the BOT tab overshoots the photosense head, the negative-going BOT (+) signal produced when the BOT tab overshoots sets the FWD (-) output of FL to the UP level, which causes the tape drive system to reverse tape motion (turnaround) to the forward direction as soon as the rewind relays are deenergized. The UP level FWD (+) output also enables the TIME DELAY (+) input to RL (pin 22). When the BOT tab is returned to the photosense head, the BOT (+) output from PH goes to the UP level and resets the REWINDING output from RL (through the TIME DELAY input) and the FWD output from FL; this stops tape motion and rewind is complete.

4-32. Density Control. The HIGH/LOW DENSITY pushbutton switch controls the HI/LO DENSITY SELECT output which is applied to RL and to either the data electronics when supplied or to the external equipment when the data electronics is not supplied. The input to RL is not enabled during local operation and has no effect; the HI/LO DENSITY STATUS output from RL remains at the UP level during local operation. The HI/LO DENSITY SELECT output is supplied to the external equipment through pin 7 of J10 on the transport electronics assembly input/output when the data electronics is not supplied. When the HIGH/LOW DENSITY pushbutton switch is in the HIGH position, the HI/LO DENSITY SELECT output is -12 volts; the output is 0 volts when the switch is in the LOW position.

4-33. REMOTE MODE OPERATION.

Remote mode is selected when the REMOTE pushbutton is pressed. When the REMOTE pushbutton is pressed, an UP level is applied to the REMOTE PB input to LL. The REMOTE PB input disables the LOCAL INDICATOR output, resets the OCP ENABLE

output to a DOWN level, and enables the REMOTE INDICATOR output and the SELECT (-) input of LL. The DOWN level OCP ENABLE output from LL removes control from the FORWARD, REVERSE, and REWIND pushbuttons on the operator control panel. The REMOTE INDICATOR output lights the REMOTE pushbutton indicator "white".

A DOWN level SELECT (-) input to LL causes the UNIT SELECT (-) and SELECT & REMOTE (-) outputs from LL to go to the DOWN level and enables the SELECT & REMOTE INDICATOR output of LL. The SELECT & REMOTE INDICATOR output lights the REMOTE pushbutton indicator "red". The SELECT & REMOTE (-) output is applied to RL and sets the UNIT SELECT (+) output from RL to an UP level. The SELECT & REMOTE (-) input to RL also enables the REWIND COMMAND (-) and REWIND AND LOCKOUT (-) inputs to RL. The UNIT SELECT (+) output from RL performs the following functions:

(a) Enables the HI/LO DENSITY and READY (+) inputs to RL and the REWINDING (+) input to the REWINDING STATUS (-) circuit of RL. The READY (-) output from RL goes to the DOWN level when the READY (+) input is enabled.

(b) Enables the BOT (-) and EOT (-) outputs to the external equipment.

(c) Enables the RUN/STOP and FWD/REV inputs (or the optional FWD/STOP and REV/STOP inputs) to FL.

4-34. Forward and Reverse (Run/Stop and Fwd/Rev Inputs). When the standard forward/reverse logic PCB is supplied, a direction level must be established prior to the run transition to move tape at normal speed in either the forward or reverse direction. An interval of 5 microseconds (minimum) should separate the commands. A DOWN level on the forward reverse input line to FL followed (after 5 μsec) by a transition to the DOWN level on the run/stop input line to FL will cause the tape to run forward. An UP level on the forward/reverse line followed by a DOWN level on the run/stop line will cause the tape to run in the reverse direction. A transition from 0 volts to -12 volts on the run/stop line constitutes a run command. A transition from -12 volts to 0 volts constitutes a stop command. Forward and reverse are selected as follows:

(a) Forward. When the FWD/REV input to FL is set to -12 volts, the RUN/STOP input controls the forward run output. The transition of the RUN/STOP input to -12 volts sets the FWD (-) output from FL to the DOWN level. A DOWN level FWD (-) output from FL causes the tape drive system to move tape in the forward direction.

(b) Reverse. When the FWD/REV input to FL is set to 0 volts and the BOT tab is not sensed, the RUN/STOP input controls the REV (+) output from FL. If the BOT tab is sensed, the run command is ignored. The transition of the RUN/STOP input to -12 volts sets the REV (+) output from FL to the UP level. An UP level REV (+) output from FL causes the tape drive system to move tape in the reverse direction.

4-35. Forward and Reverse (Fwd/Stop and Rev/Stop Inputs). When the forward/reverse logic -C PCB is supplied, a level transition on one of the two direction lines establishes the direction and run command required to move tape at normal speed in either the forward or the reverse direction. A transition to the DOWN level on the FWD/STOP input line to FL will cause the tape to run forward. A transition to the DOWN level on the REV/STOP input line to FL will cause the tape to run in the reverse direction. A transition to the DOWN level on both lines will cause tape motion to stop (caused by improper input to the logic circuits of the tape drive system). A transition from 0 volts to -12 volts constitutes a run command. A transition from -12 volts to 0 volts constitutes a stop command. Forward and reverse are selected as follows:

(a) Forward. A transition to -12 volts at the FWD/STOP input to FL sets the FWD (-) output from FL to the DOWN level. A DOWN level FWD (-) output from FL causes the tape drive system to move tape in the forward direction.

(b) Reverse. When the BOT tab is not sensed, a transition to -12 volts at the REV/STOP input to FL sets the REV (+) output from FL to the UP level. An UP level REV (+) output from FL causes the tape drive system to move tape in the reverse direction.

4-36. Stop. Once initiated, tape motion continues as long as the RUN/STOP input (or the optional FWD/STOP or REV/STOP input) remains at -12 volts unless the BOT tab is sensed or the RESET (STOP), REMOTE, or LOCAL pushbutton is pressed. The FWD (-) or REV (+) output from FL is reset by the BOT or MASTER RESET (+) input to FL. The FWD (-) or REV (+) output from FL is also reset by the transition of the RUN/STOP input (or the optional FWD/STOP or REV/STOP input) to 0 volts. The MASTER RESET (+) input to FL is set to the UP level by the respective PB input to LL when the RESET (STOP), REMOTE, or LOCAL pushbutton is pressed. When the RESET (STOP) or LOCAL pushbutton is pressed, the tape transport is set to local mode.

NOTE

When the EOT tab is sensed in the remote mode, tape motion is not stopped. The EOT (-) output to the external equipment indicates the EOT tab is being sensed. The external equipment must set the RUN/STOP input (or the optional FWD/STOP or REV/STOP input) to zero volts to stop tape motion. This is provided so that if an operation is being performed when the EOT tab is sensed, the operation can be completed before the tape is stopped.

4-37. Rewind. When the REWIND COMMAND (-) input to RL goes to the DOWN level, the REWIND (-) output is set to the DOWN level, causing the tape drive system to initiate tape rewind. Tape rewinding continues until the BOT tab is sensed by the photosense head or the RESET (STOP) pushbutton is pressed. If the STOP pushbutton is pressed, tape motion is stopped as described in paragraph 4-30; the MASTER RESET (+) signal also resets the tape transport to local mode. When the BOT tab is sensed by the photosense head, tape motion is stopped as described in paragraph 4-31.

NOTE

The REWIND COMMAND (-) input must be disabled by the external equipment during forward and reverse commands. The RUN/STOP input (or the optional FWD/STOP and REV/STOP inputs) must be disabled by the external equipment during rewind.

4-38. Rewind and Lockout. When the REWIND AND LOCKOUT (-) input to RL goes to the DOWN level, it causes the tape to be rewound as described in paragraph 4-37. The DOWN level REWIND AND LOCKOUT (-) input to RL causes the GO LOCAL (-) output to go to the DOWN level, which resets the tape transport to the local mode.

NOTE

The REWIND AND LOCKOUT (-) input must be disabled by the external equipment during forward and reverse commands. The RUN/STOP (or the optional FWD/STOP and REV/STOP inputs) must be disabled by the external equipment during the rewind and lockout operation.

4-39. Density Select Output. During remote mode operation, the HI/LO DENSITY input to RL is enabled by the SELECT & REMOTE (-) input. When the HIGH/LOW DENSITY pushbutton switch is in the HIGH position, the HI/LO DENSITY STATUS output from RL is at the DOWN level; when the switch is in the LOW position, the output is at the UP level. The HI/LO DENSITY STATUS output is supplied to the external equipment through pin 7 of J10 on the transport electronics assembly when the data electronics is not supplied.

4-40. READ/WRITE HEAD ASSEMBLY.

The tape transport uses a dual head assembly for read and write functions. Head operation is electrically independent of other tape transport components (except when the optional data electronics is supplied) although accurate tape contact with the head assembly is derived mechanically from related transport parts. Read/write amplifiers and detectors are required to reproduce or deliver data signals to and from the head when the optional data electronics is not supplied. An erase head may be incorporated as an optional feature.

SECTION V
MAINTENANCE

5-1. GENERAL.

The TM-7 Tape Transport is designed to require minimum maintenance and service.

Figures 5-1 and 5-2 assist in rapid identification of major components.

A listing of the tools and test equipment used in maintenance of the tape transport will be found at the end of this section.

CAUTION

Do not insert test probes into connector pins. This practice may cause permanent damage to the connectors and result in poor connections. All significant signals necessary for troubleshooting are provided with test points on the chassis or the PCB.

Lubrication of the tape transport is not necessary.

5-2. PREVENTIVE MAINTENANCE.

A program of planned preventive maintenance will prevent unscheduled down time. Maintenance procedures may be scheduled by either the number of eight-hour shifts, or by the hours of running time. (Refer to Table 5-1.)

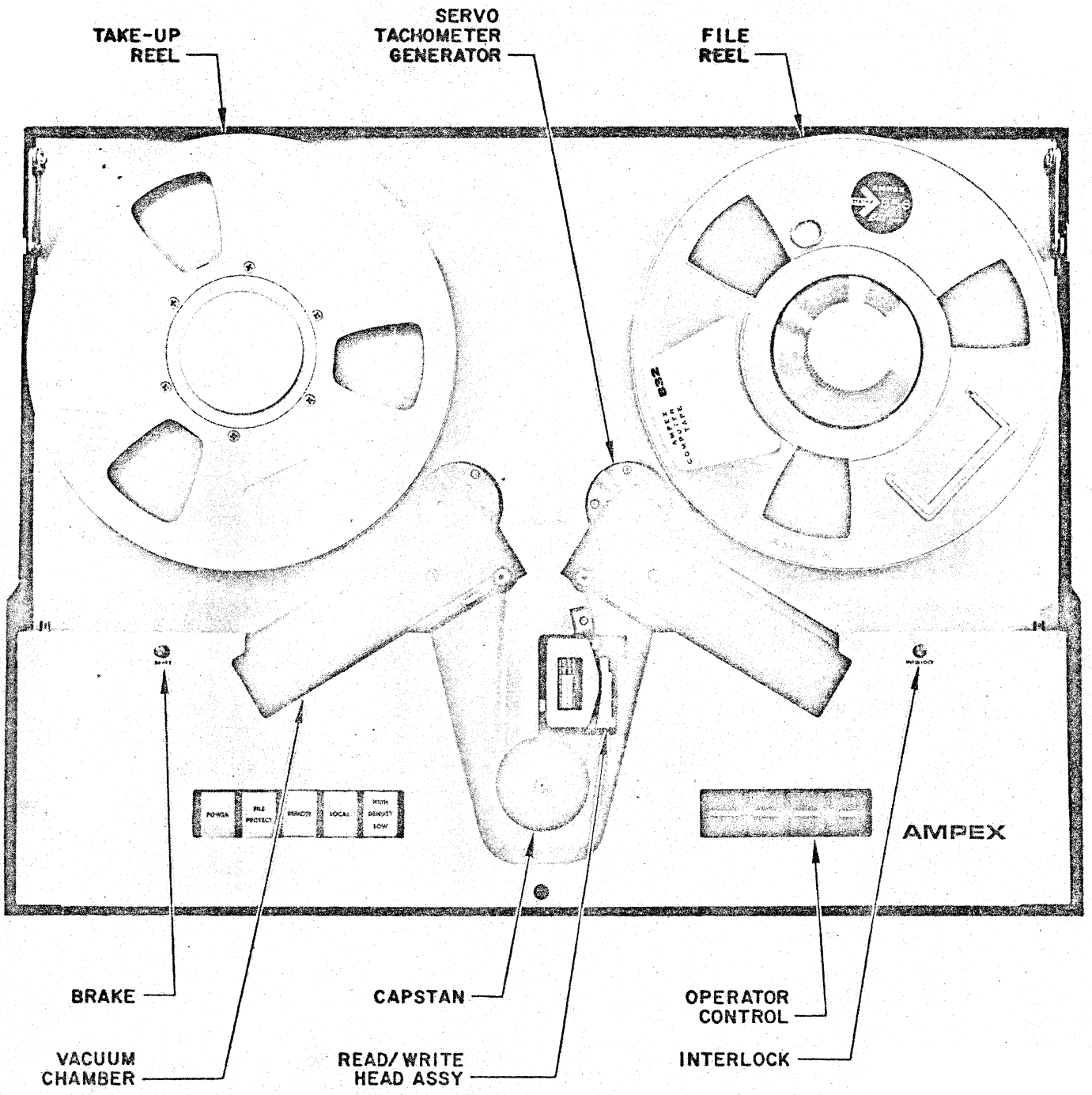


Figure 5-1.
TM-7 Tape Transport, Front View

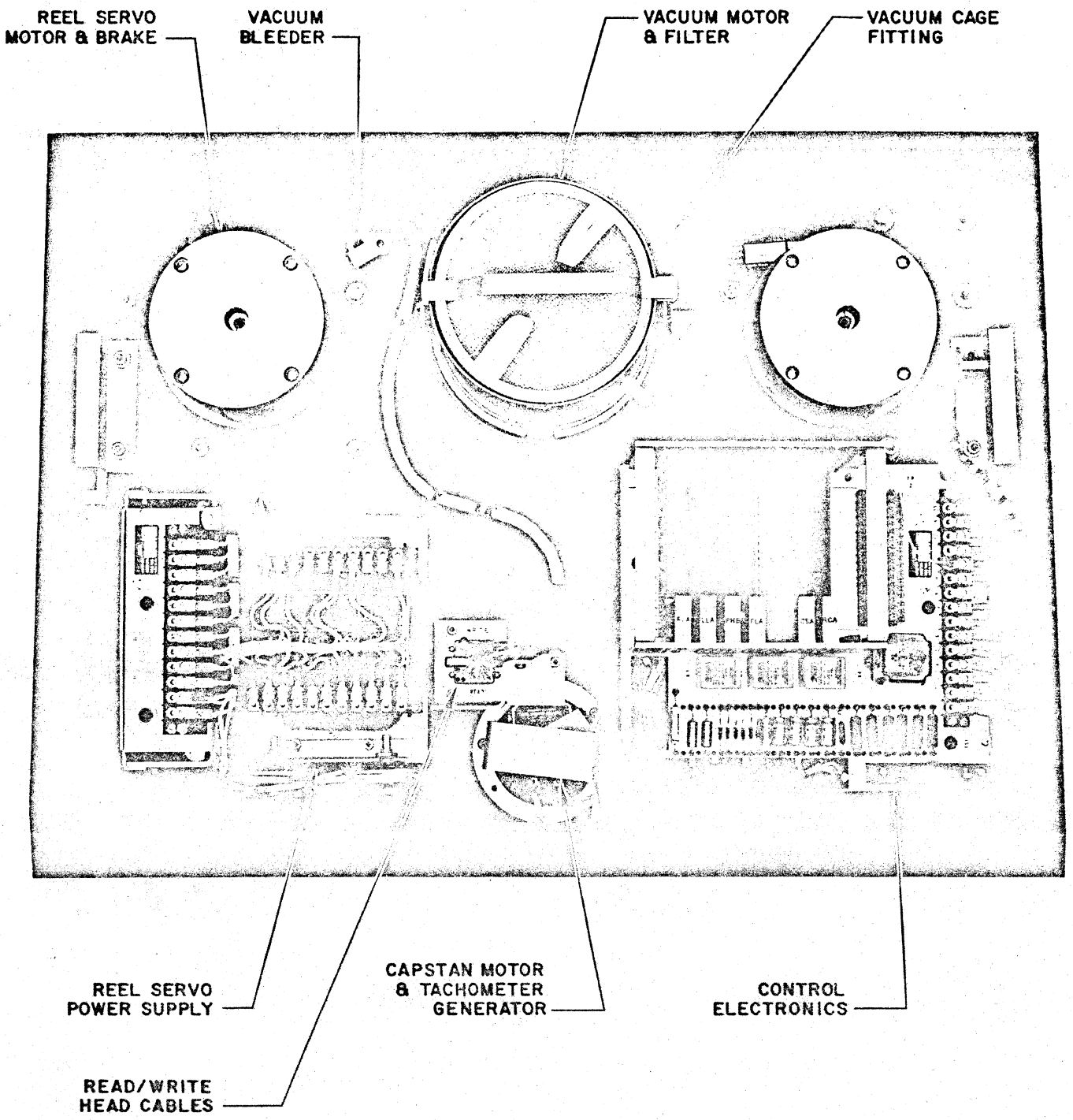


Figure 5-2.
TM-7 Tape Transport, Rear View

TABLE 5-1.
SCHEDULE OF PREVENTIVE MAINTENANCE

MAINTENANCE OPERATION	FREQUENCY		APPROX. MIN. EA.	QTY	TOTAL TIME	TEXT REF.
	SHIFTS	HOURS				
Clean transport	1	8	3	1	3	5-3
Clean tape cleaner cartridge	15	120	3	1	3	5-4
Check tape tracking	100	800	5	1	5	-
Clean cabinet	65	1,500	10	1	10	5-5
Clean vacuum motor filter & check brushes	100	800	15	1	15	5-6
Check reel brake torque	100	800	5	2	10	5-10
Replace vacuum unit motor	500	4,000	15	1	15	5-44
Check reel brake linings	500	4,000	10	2	20	5-9
Check capstan brushes	625	5,000	20	1	20	-
Check reel motor brushes	625	5,000	3	2	6	5-40
Replace loop sensor assembly	1,250	10,000	5	4	20	-
Replace photosense head assembly	1,250	10,000	5	1	5	5-37
Replace capstan and reel tachometers	3,750	30,000	20	3	60	5-36

5-3. CLEANING THE TAPE TRANSPORT.

Clean the tape transport as follows:

CAUTION

Solvents such as carbon tetrachloride may dissolve the head lamination adhesive. Use Ampex Head Cleaner (Catalog No. 087-077) for the head and metal guides. Denatured alcohol may be used for the capstan, vacuum chambers and all rubber components.

Ampex Head Cleaner shall not be used to clean rubber parts as its use will damage the rubber.

Cleaning agents must not come in contact with the tape. Cleaning agents must not be allowed to penetrate bearings.

Step 1: Use a clean, lint-free cloth, or cotton swab moistened with Ampex Head Cleaner to carefully wipe off all oxide and dirt that may have gathered on or around head stacks, head cover, and tape cleaner.

Step 2: Carefully place a clean, lint-free cloth or cotton swab moistened with alcohol against the capstan. Rotate the capstan by hand until all oxide and dirt are removed.

Step 3: Using a clean, lint-free cloth or cotton swab moistened with alcohol, thoroughly clean inside of the vacuum chamber. Remove oxide and dirt from the loop sensor and lamp windows.

Step 4: Clean vacuum chamber door by repeating above procedure.

Step 5: Carefully place a clean, dry, lint-free cloth or cotton swab against the vacuum chamber roller guide and rotate slowly to remove oxide and dirt.

Step 6: Using a clean, lint-free dry cloth or cotton swab, thoroughly clean the surface of the photosense head.

5-4. EMPTYING THE TAPE CLEANER CARTRIDGE. Use an Allen wrench to remove the head cleaner cartridge retaining screw. The head assembly and tape cleaner bracket should not be disturbed. Remove the tape cleaner cartridge and gently tap the cartridge body to remove accumulated oxide. Reinstall cartridge and retaining screw, using care that mating faces are free of particles which could upset position.

5-5. CLEANING THE SYSTEM. The cabinet, the tape transport and the cabinet blower filter should be thoroughly cleaned.

CAUTION

The window of the tape access door is plastic. Clean with a soft cloth moistened with denatured alcohol. Do not clean window with dry cloth.

5-6. CLEANING THE VACUUM MOTOR FILTER. Remove dirt from the filter with a vacuum cleaner. Wash the filter in plain water.

CAUTION

Vacuum motor unit filter must be dry. Moisture introduced into the vacuum system will affect system reliability.

5-7. VACUUM UNIT MOTOR BRUSHES INSPECTION.

Step 1: Remove the brush retaining screws. (See Figure 5-3.)

Step 2: Rotate the brush, now secured by the motor field lead so that the length of the brush can be measured.

Step 3: Replace the brush if the length of the brush extending beyond the housing is less than 9/16 inch. Note: A new brush extends 7/8 inch.

5-8. ADJUSTMENTS.

5-9. REEL MOTOR BRAKE ADJUSTMENTS. The rotational torque on each reel should be 15-25 oz.-in. when power is applied to the brake and 200-400 oz.-in. when power is removed.

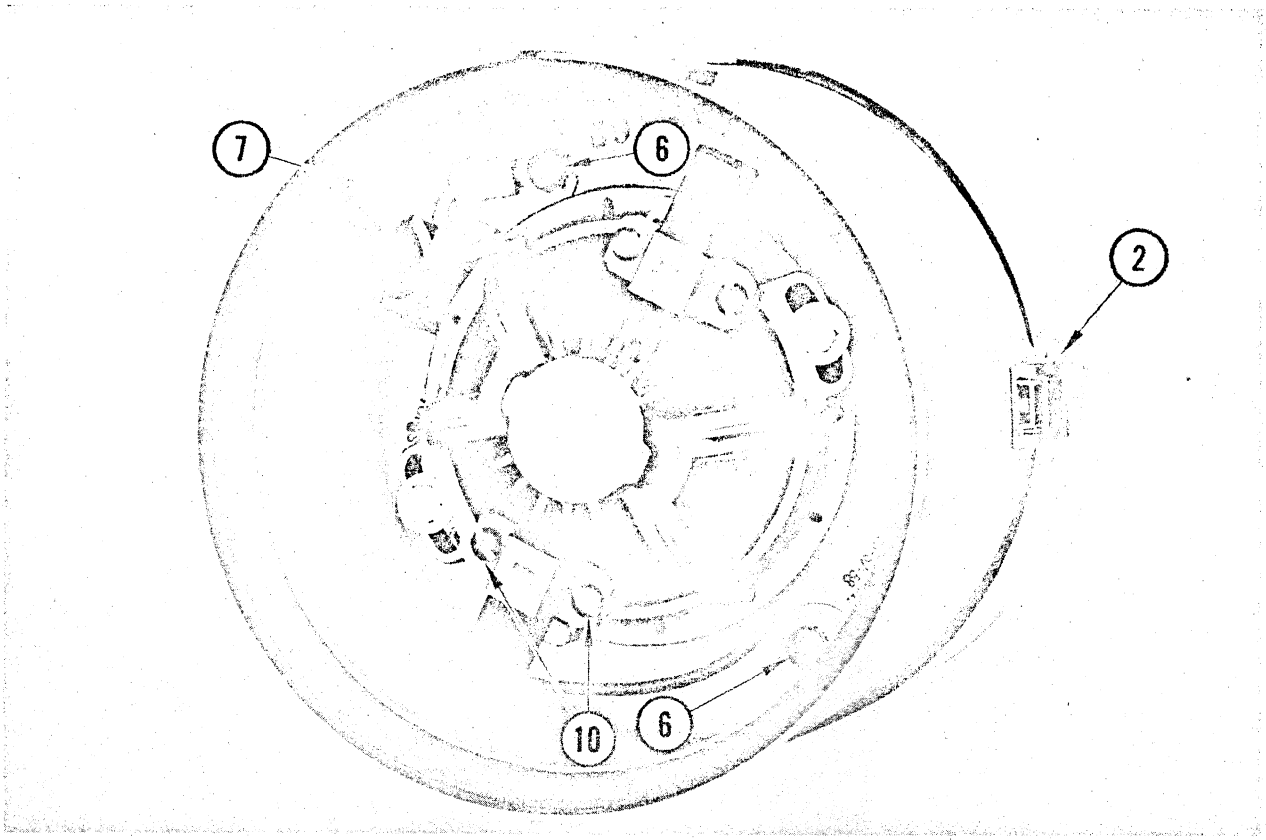


Figure 5-3.
Vacuum Unit Motor and Brushes

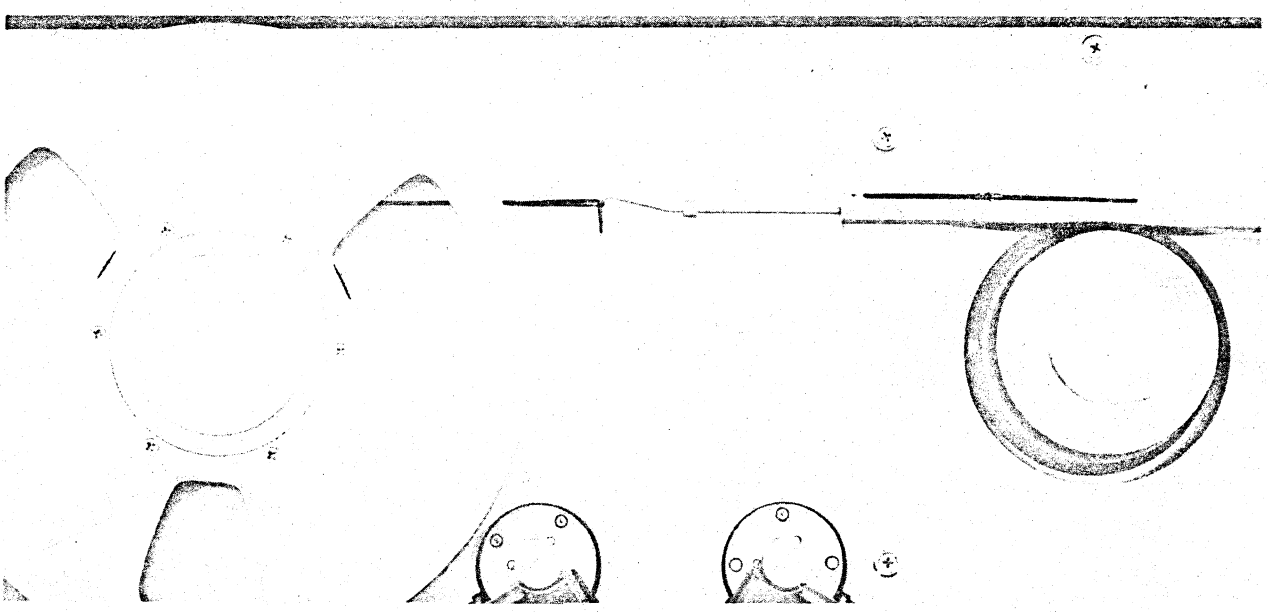


Figure 5-4.
Drag Torque Adjustment

5-10. REEL BRAKE DRAG TORQUE ADJUSTMENT. (See Figure 5-4.)

5-11. TEST EQUIPMENT REQUIRED. The following equipment is required.

1. 5 feet of nylon cord.
2. Spring balance measuring 0 to 20 ounces ±10%.

5-12. ADJUSTMENT PROCEDURE.

Step 1: Wrap the cord several times around the empty reel hub.

Step 2: Connect the spring balance to the free end of the cord.

Step 3: Apply power to the transport and pull the brake release switch out.

Step 4: Pull the spring balance until the reel rotates. Measure the tension in the spring balance.

Step 5: Rotate the drag torque adjusting screw at the rear of the brake, concentric with the brake shaft, until a tension reading corresponding to Table 5-2 is obtained.

TABLE 5-2.
DRAG TORQUE.

TYPE OF REEL	TORQUE OZ.-IN.			TENSION OZ.		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
Fixed or NAB Reel	15	20	25	6.7	9	11
IBM Reel	15	20	25	6	8	10

5-13. VACUUM ADJUSTMENTS.

5-14. TEST EQUIPMENT. The following test equipment is required to adjust the vacuum of the tape transport:

1. Vacuum gauge, 0 to 30 in. of water accurate to ±5%.
2. AC voltmeter accurate to ±3%.

5-15. ADJUSTMENT PROCEDURE. Perform the following steps.

Step 1: Connect the vacuum gauge to the vacuum test fitting (on the vacuum switch bracket located between the vacuum unit and motor assembly).

CAUTION

Do not operate tape transport in rewind with vacuum gauge connected.

Step 2: Adjust the tape loop in the file reel vacuum chamber so that the loop is halfway between the loop sensing photocells.

Step 3: Adjust the bleeder valve for 24 inches of vacuum at nominal line voltage.

Step 4: Disconnect the vacuum gauge. Replace the cap on the vacuum test fitting.

5-16. POWER SUPPLY ADJUSTMENTS.

5-17. POWER PACK ADJUSTMENTS. Use a digital voltmeter with an accuracy of ±0.25% (Digitek 202-B or equivalent). Terminal board TS2 is located on the power pack chassis.

Step 1: Adjust the +12 volt potentiometer (R9) to give within ±0.5% of +12 volts (between +11.94 and +12.06 volts). Use TS2-7 as the 0 volt reference and measure +12 volts across TS2-6 and TS2-7.

Step 2: Adjust the -12 volt potentiometer (R23) to give within ±0.5% of -12 volts (between -11.94 and -12.06 volts) and measure -12 volts across TS2-8 and TS2-7.

Step 3: Adjust the -6 volt potentiometer (R44) to give within ±0.5% of -6 volts (between -5.97 and -6.03 volts) and measure -6 volts across TS2-10 and TS2-7.

5-18. LOGIC POWER SUPPLY ADJUSTMENTS. Perform the following steps.

Step 1: Adjust the +12 volt potentiometer (R10) to give within ±0.5% of +12 volts (between +11.94 and +12.06 volts). Use TS1-8 as the 0 volt reference and measure +12 volts across TS1-5 and TS1-8.

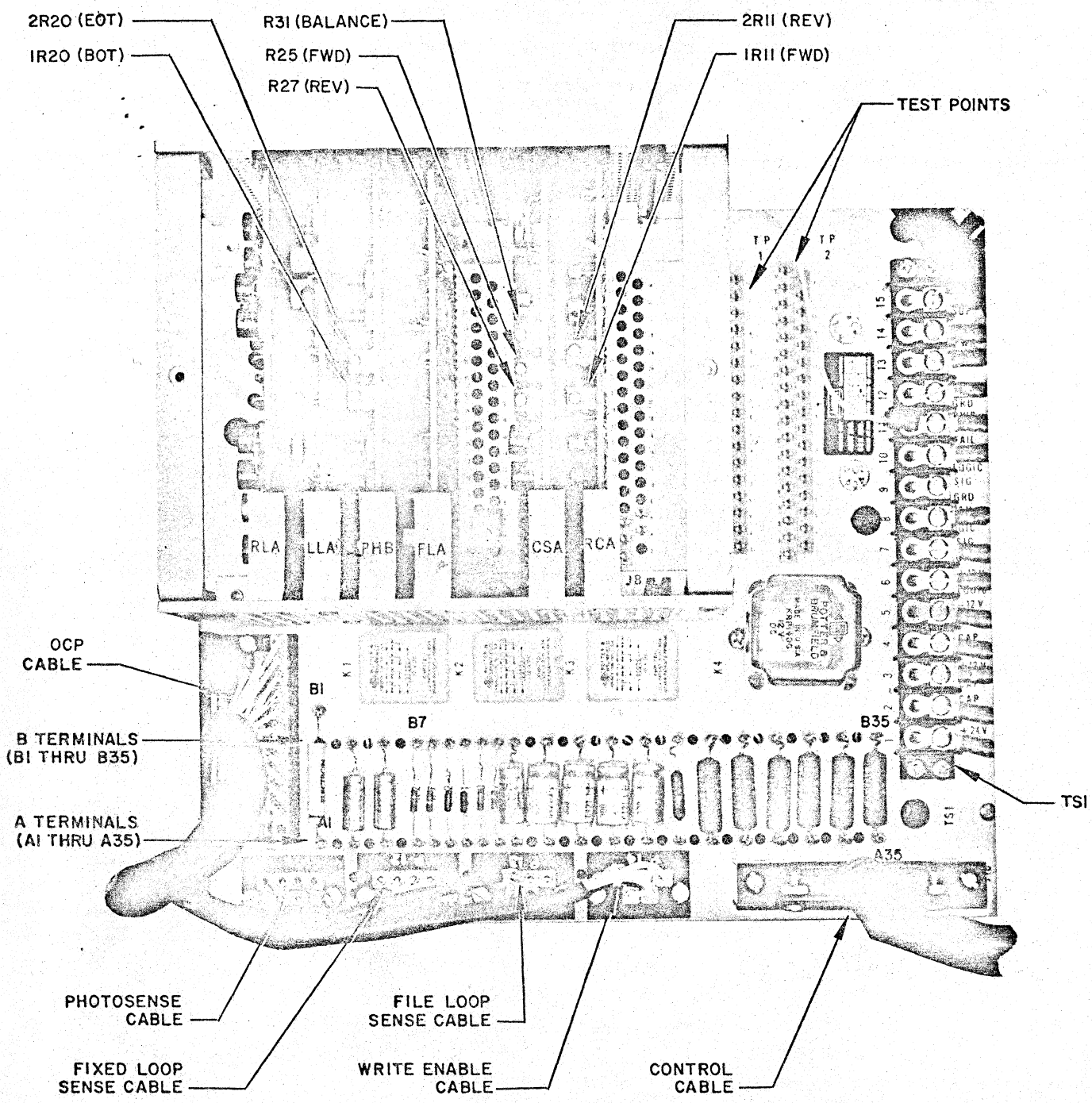


Figure 5-5.
Control Electronics

Step 2: Adjust the -12 volt potentiometer (R26) to give within ±0.5% of -12 volts (between -11.94 and -12.06 volts). Use TS1-4 as the 0 volt reference and measure -12 volts across TS1-2 and TS1-4.

Step 3: Adjust the -6 volt potentiometer (R48) to give within ±0.5% of -6 volts (between -5.97 and -6.03 volts). Use TS1-12 as the 0 volt reference and measure -6 volts across TS1-10 and TS1-12.

5-19. TAPE DRIVE SYSTEM ADJUSTMENTS. The tape drive system adjustments are accomplished by potentiometers on the capstan servo amplifier PCB (CS-A) and reel servo control PCB (RC-A). See Figure 5-5, Control Electronics.

NOTE

Verify that power supply outputs are within 0.5% of nominal value before making tape drive system adjustments.

Perform the following steps:

Step 1: Apply power to the transport. Load the tape, looping the tape around the head assembly. (Do not place tape around the capstan.) Provide sufficient tape within the vacuum chambers to form proper loop lengths.

Step 2: Adjust 1R11, 2R11 on the reel servo PCB (RC-A) fully clockwise.

Step 3: Connect jumper wires as follows: TP2-14 to TP2-15; TP2-21 to TP2-22.

Step 4: Apply power to the transport and turn the transport on in the normal manner.

Step 5: Depress the RESET (STOP) pushbutton. If the capstan is creeping, adjust R31 on the capstan servo (CS-A) PCB until the creep stops.

5-20. DEAD BAND ZERO.

Grasp the capstan and turn it by hand gently. The capstan will turn easily up to a certain velocity above which rapidly increasing resistance will be felt, due to servo action. Adjust R31 until the velocity at which the servo action commences is the same both in forward and reverse. The servo is then set up to be in the middle of the dead band during standby.

5-21. CAPSTAN SPEED ADJUSTMENT.

METHOD A. Using Master Tape and Counter.

Step 1: Load a master tape (556 bpi) and loop the tape around the capstan.

Step 2: Connect the frequency counter as in Figure 5-6.

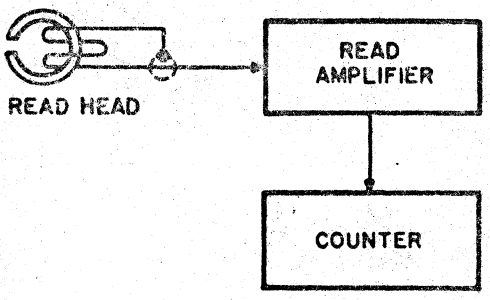


Figure 5-6.
Method A Test Setup

Step 3: Press the FORWARD pushbutton. Adjust R25 on CS-A until the frequency counter reads 20,016 cycles per second ±0.25% corresponding to a tape speed of ~~36~~ 45 inches per second. SEE ADDENDUM

Step 4: Press the RESET (STOP) pushbutton. Press the REVERSE pushbutton. Adjust R27 as for R25 with the tape moving in the reverse direction.

Step 5: Recheck the speed in forward direction and readjust R25, if necessary.

METHOD B. Using Strobe Lamp.

Step 1: Refer to Step 1 for Method A except a master tape need not be used.

Step 2: Press the FORWARD pushbutton. Adjust R25 on CS-A using the strobe lamp until the capstan is rotating at 331 rpm ±2 rpm.

Step 3: Press the RESET pushbutton. Press the REVERSE pushbutton. Adjust R27 as for R25.

Step 4: Recheck the speed in forward and readjust R25, if necessary.

5-22. REEL SERVO SPEED ADJUSTMENT.

Step 1: While the tape is moving in the forward direction, adjust 1R11 on the reel servo (RC-A) PCB counterclockwise while observing the loop in the file reel vacuum chamber. The oscillations of the tape loop about the forward loop sense photocell will decrease in amplitude as 1R11 is turned counterclockwise. Adjust 1R11 until the oscillation becomes about 1 inch.

Step 2: Stop the forward tape motion and run the tape in the reverse direction. Repeat Step 1 above, adjusting 2R11 while observing the loop of tape in the fixed reel chamber.

5-23. PHOTOSENSE ADJUSTMENT. The following equipment is required to adjust the photosense:

1. Test tape with reflective tabs attached (Figure 3-1).
2. Voltmeter (5,000 ohm per volt or greater).

Adjust the photosense as follows:

Step 1: Connect the voltmeter to TP1-20 on the test point panel section of the card cage. Ground the voltmeter to signal ground TP1-35. With the tape under the photosense head, adjust 1R20 on the photoamplifier (PH-B) PCB until the voltmeter indicates a transition from a low state (-6 volts) to a high state (0 volts). (See Figure 5-5.)

Step 2: Move the tape until a reflective tab is beneath the outer section of the photosense head. (See Figure 3-1 for correct lateral placement.) Counting the number of turns, adjust 1R20 on the photoamplifier PCB, in a counterclockwise direction until the voltmeter indicates a transition from a high state (0 volts) to the low state (-6 volts). There should be at least three turns before the transition occurs.

Step 3: Adjust 1R20 in a clockwise direction halfway back to the point of transition located in Step 2.

Step 4: Connect the voltmeter to TP1-21 and repeat Steps 1, 2, and 3 adjusting 2R20, and positioning a tab under the inner section of the photosense head during Step 2.

5-24. CHECKING OPERATION PARAMETERS.

5-25. START AND STOP TIME CHECKOUT.

5-26. START TIME DEFINITION. Start time is defined as the time from the application of a RUN command until the tape passing over the head has obtained a total speed variation of 8% or less from nominal speed. Start time is 10 ms maximum.

5-27. STOP TIME DEFINITION. Stop time is defined as the time from the application of a STOP command until all tape motion over the read/write head has ceased. Stop time is 10 ms maximum.

Start and stop times are checked by observing the output of the ramp generator which is in proportion to the tape speed. Read output from a read amplifier will correspond to the ramp generation output verifying that no slippage or equipment malfunction exists.

The following equipment is required to check start and stop time.

1. Calibrated oscilloscope Tektronix 535 or equivalent.
2. Prerecorded tape, NRZ signal recorded at 556/800 bit density.
3. Read amplifier.

Check the start and stop time as follows:

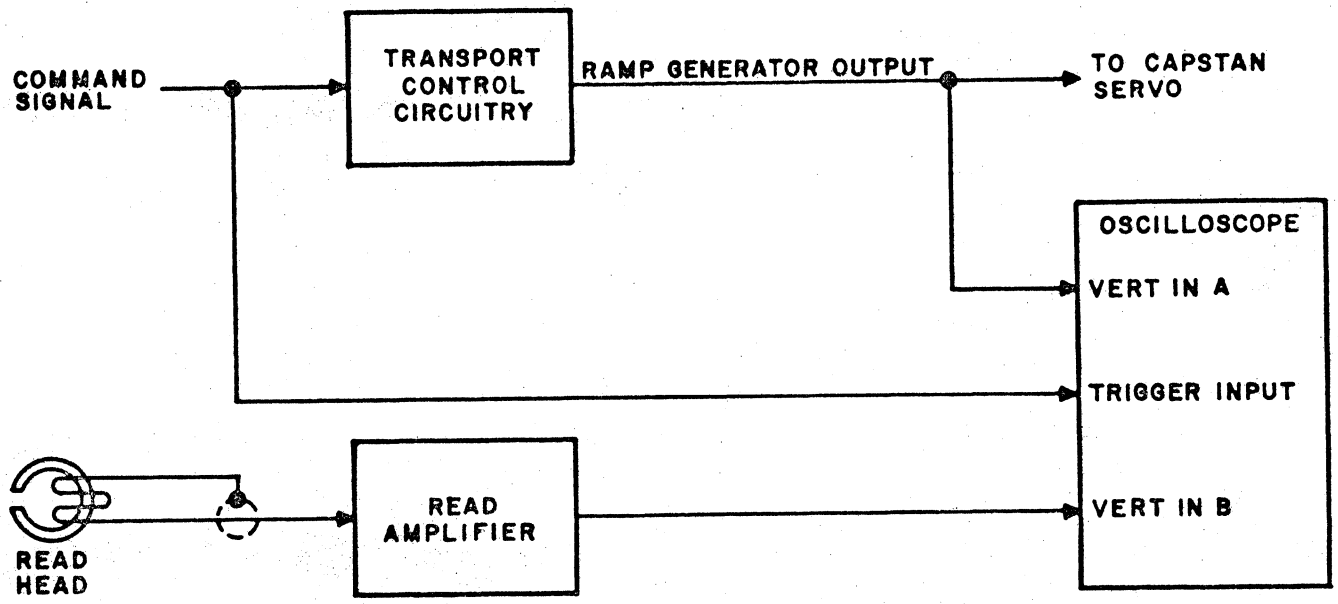
Step 1: Connect equipment in accordance with Figure 5-7.

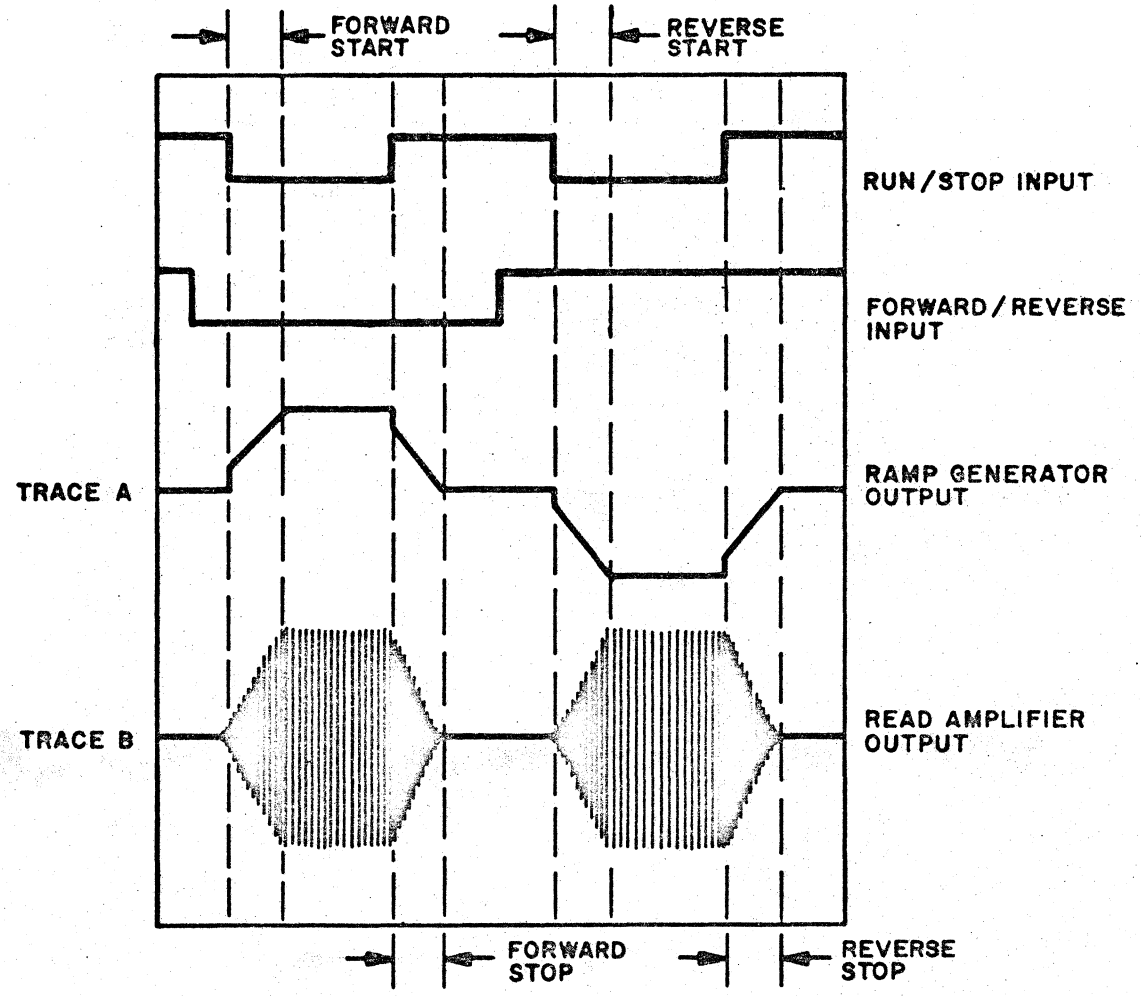
Step 2: Thread prerecorded tape on tape transport.

Step 3: Cycle transport to operate in forward and reverse at a convenient rate. The output of the ramp generator must reach terminal voltage within 10 ms max. from initiation of RUN command as shown in Figure 5-7. The output of the ramp generator must reach 0 volts within 10 ms max. from initiation of STOP command.

5-28. START AND STOP DISTANCE.

5-29. START AND STOP DISTANCE DEFINITION. Start distance is the length of tape that moves across the read/write head during the maximum





NOTE:
All Start and Stop Times to be 10 ms ±1.5 ms

Figure 5-7.
Start and Stop Time Measurement, Test Setup

start time. Stop distance is the length of tape that moves across the read/write head during stop time. The start and stop characteristics of the TM-7 are linear. Start and stop distance in inches may be calculated, for a typical case with an actual start/stop time of 9 ms and a tape speed of 36 ips, in the following manner.

Start distance =

(max start time -1/2 actual start time) x tape speed x 10^{-3} inches

$= (10 - \frac{9}{2}) \times 36 \times 10^{-3}$ inches = 0.198 inches

Stop distance =

1/2 actual stop time x tape speed x 10^{-3} inches

$= 1/2 \times 9 \times 36 \times 10^{-3}$ inches = 0.162 inches

5-30. AVERAGE SPEED VARIATION CHECKOUT.

Average speed variation is variation from specified nominal speed, averaged over any interval of 1 second occurring 10 ms or more after a RUN command. Maximum variation should be 3%, including variations due to line voltage, frequency and temperature.

The following test equipment is used to measure average speed variation.

1. Master tape with a known data frequency NRZ signal.
2. Read amplifier.
3. Counter

Check out average speed variation as follows:

Step 1: Connect equipment as shown in Figure 5-6 (set counter for a repetitive 1 second count time) and thread test tape on transport.

Step 2: Under normal operating conditions, the reading should not deviate more than 0.5% while reading at least a half reel of tape.

5-31. INTERCHANNEL TIME DISPLACEMENT ERROR CHECKOUT. The following procedure permits measurement of interchannel time displacement error of any data track from any other data track or reference track. The procedure does not permit separation of errors introduced by write and read electronics.

The following equipment is required to measure ITDE:

1. Master tape with a NRZ signal recorded at 556 bpi.
2. Dual trace oscilloscope.
3. Read amplifiers (customer supplied).

Perform the following steps:

Step 1: Connect the test equipment as shown in Figure 5-8.

Step 2: Depress the FORWARD DRIVE switch. A presentation such as is shown in Figure 5-9 should appear on the oscilloscope.

Step 3: Switch non reference input of oscilloscope to other tracks in turn to measure ITDE of each track with respect to reference track. The ITDE shall be as specified in Section I.

5-32. PHOTOSENSE CHECKOUT. A test tape with reflective tabs attached is required to check the operation of the photosense circuit. Tape should be spliced in accordance with normal shop procedure.

Check the photosense as follows:

Step 1: Thread the tape transport in a normal manner.

Step 2: Run the tape through completely. The tape transport should operate without interruption. If the tape stops on a splice, decrease the photosense sensitivity (R20) until this condition disappears, then repeat paragraph 5-23.

5-33. MAGNETIC HEAD ASSEMBLY CHECKOUT. Perform the following steps:

Step 1: Clean head stacks. Refer to paragraph 5-3.

Step 2: Thread a blank tape known to be in good condition on tape transport.

Step 3: Program tape transport in forward mode.

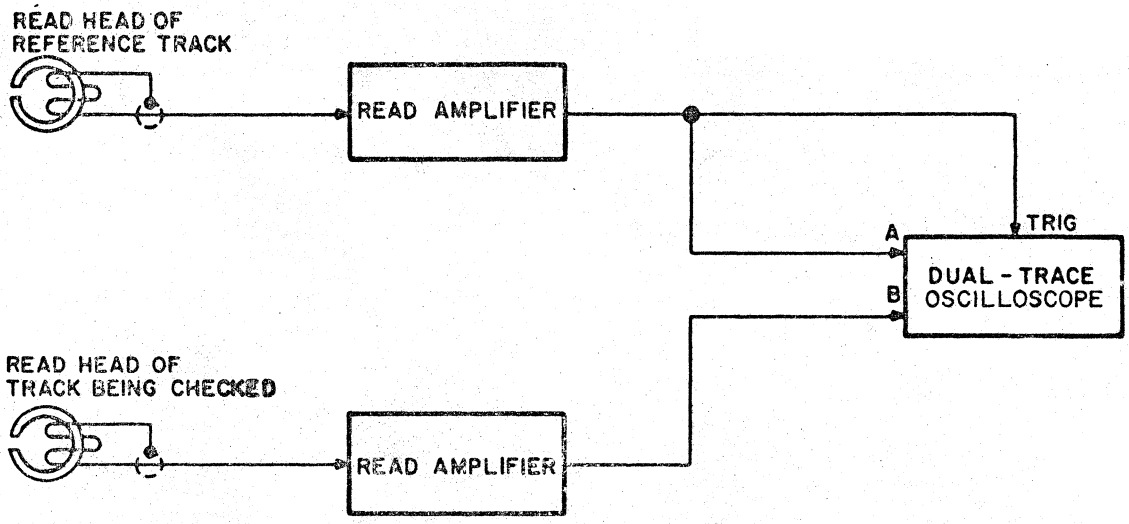


Figure 5-8.
Interchannel Time Displacement Error, Test Setup

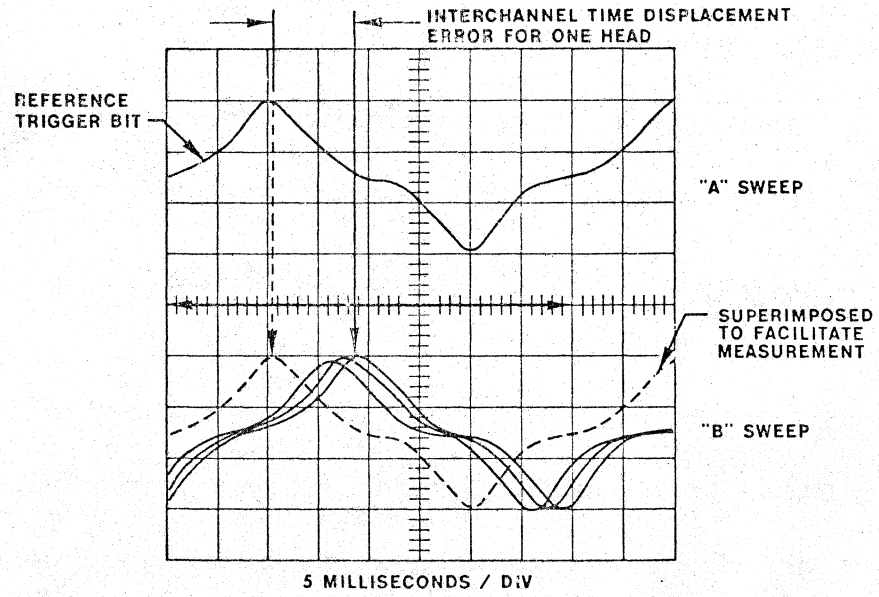


Figure 5-9.
Interchannel Time Displacement Error, Waveshape

Step 4: Operate all write amplifiers at a 7.2 KC bit rate (200 bits per inch). All write amplifier inputs should be connected in parallel and in phase.

NOTE

Track No. 1 is the track nearest the operator.

Step 5: With tape moving across read/write head stacks, monitor read head output tracks.

Step 6: When read pulse width on all tracks at the 25% level exceeds 26 μsec with a simultaneous decrease in read output voltage below 25 millivolts (peak-to-peak), the head assembly should be replaced. Refer to paragraph 5-37, Removal and Replacement of Head Assembly.

5-34. REMOVAL AND REPLACEMENT PROCEDURES.

5-35. OVERLAY PLATES REMOVAL AND REPLACEMENT. Three overlay plates cover the mechanism of the tape transport. These are the chamber area overlay, the capstan area overlay, and the reel area overlay. Remove these overlay plates as follows:

Step 1: Remove the tape.

Step 2: Remove the chamber area overlay plate by unscrewing the captivated thumb screws on each edge of the overlay in the tape reel area.

Step 3: Remove the capstan area overlay plate. The capstan area overlay plate is held in place by three screws.

Step 4: Remove the fixed reel and hub assembly. The reel and hub assembly is held in place by three screws.

Step 5: Remove the reel area overlay plate. The reel overlay plate is held in place by four screws located under each tape reel and two screws located at the corners nearest the chamber area.

Step 6: Reassemble by reversing the procedure followed during disassembly.

5-36. CAPSTAN MOTOR AND TACHOMETER REMOVAL AND REPLACEMENT.

WARNING

Disconnect electrical power to prevent injury to personnel or damage to equipment.

Step 1: Remove the overlays over the chambers and capstan motor (paragraph 5-35).

Step 2: Unplug the head cables from the rear of the read/write head assembly.

Step 3: Disconnect the electrical wiring from capstan motor and tachometer (4 leads).

Step 4: Remove the four Allen head screws holding the capstan motor to the mounting bracket. Lift the capstan motor and tachometer out through the rear of the tape transport casting.

Step 5: Remove the tachometer guard from the assembly. Remove the screw holding the generator bracket. Loosen the setscrew holding the shaft of the tachometer. Remove the tachometer by sliding its shaft from the inside of the capstan motor shaft.

Step 6: Install the replacement capstan motor. (See Figure 5-2.)

5-37. READ/WRITE AND PHOTOSENSE HEAD REMOVAL AND REPLACEMENT.

WARNING

The head assembly is a precision instrument which should be treated with extreme care.

Step 1: Remove the chamber area overlay plate by unscrewing the captivated thumb screws on each edge of the plate.

Step 2: Remove the capstan area overlay plate. The capstan area overlay plate is held in place by three screws.

Step 3: To remove the photosense head assembly, remove the two Phillips head screws which secure the photosense assembly to the head assembly. The photosense thread is moved to one side permitting the head to be removed.

Step 4: Remove the three screws securing the read/write head assembly to the tape transport casting.

Step 5: Lift the read/write head assembly out to disconnect the connectors.

5-38. REEL BRAKE SWITCH REMOVAL AND REPLACEMENT. Perform the following steps:

WARNING

Disconnect electrical power to prevent injury to personnel or damage to equipment.

Step 1: Remove the overlay plates (paragraph 5-35).

Step 2: Unscrew the two screws with large heads holding reel brake switch assembly to the tape transport plate. Lift switch assembly off the transport casting.

Step 3: Unscrew switch from the wiring harness.

Step 4: Transfer mounting hardware to new switch assembly.

Step 5: Reassemble by reversing procedure followed during disassembly.

5-39. REEL MOTOR ASSEMBLY REMOVAL AND REPLACEMENT. Perform the following steps:

Step 1: Remove reel (supply or takeup) from reel motor to be replaced.

WARNING

Disconnect electrical power to prevent injury to personnel or damage to equipment.

Step 2: Remove reel brake (paragraph 5-41).

Step 3: Remove reel motor fanning strip from TS3 on side of reel servo power supply.

CAUTION

Note the position of any shims found under the flange of the reel motor for replacing during reassembly.

Step 4: Remove reel motor from tape transport. Reel motor is held in place by four Allen head screws.

Step 5: Remove reel holddown assembly from the shaft of reel motor.

Step 6: Install reel holddown assembly and turntable without shims on new motor.

Step 7: Install reel motor with shims removed in Step 4.

Step 8: Thread tape on transport.

Step 9: Apply power and program tape transport forward and reverse. Check the tape tracking at reel of newly installed reel motor. If tape rubs front flange of reel, stop tape and insert shims between reel holddown assembly and turntable. Shim as necessary to obtain proper tape tracking.

5-40. REEL MOTOR BRUSH REMOVAL AND REPLACEMENT. The reel motor brushes can be replaced by removing insulating caps from the sides of the reel motor. Then remove spring loaded brush. Insert replacement brush and reinstall insulated cap.

5-41. REEL MOTOR BRAKE AND BRAKE LINING REMOVAL AND REPLACEMENT.

Step 1: Apply power to the transport and pull the brake release switch out. Check that the brake is then in the energized position so that the reel may rotate freely.

CAUTION

To prevent loss of parts of the assembly due to spring action, note that the brake should not be removed in the deenergized condition.

Step 2: With power applied, remove the four screws from the rear of the brake housing. Remove the brake assembly from the reel motor. (See Figure 5-10.)

Step 3: Unscrew the brake adjusting nut. Remove the reel brake lining assembly.

Step 4: To replace the brake lining assembly with a new part, place the new lining assembly onto the motor brake shaft and reassemble the brake assembly, reversing the procedure outlined in Steps 1, 2 and 3.

Step 5: To replace the complete brake assembly, place the lining assembly removed in Step 3 into the brake housing. Remove the four mounting screws from the end plate. Place the end plate on the brake housing and secure using the four long screws removed in Step 2.

Step 6: Turn power off.

Step 7: Disconnect the brake from TS-3 on the side of the reel servo power supply.

Step 8: Connect new brake assembly to TS-3.

CAUTION

Do not remove the four long screws from the rear of the brake assembly before applying power to the transport.

Step 9: Apply power to the transport.

Step 10: Install the new brake assembly by reversing the procedure outlined in Steps 1, 2 and 5.

Step 11: Adjust the reel brake drag torque.

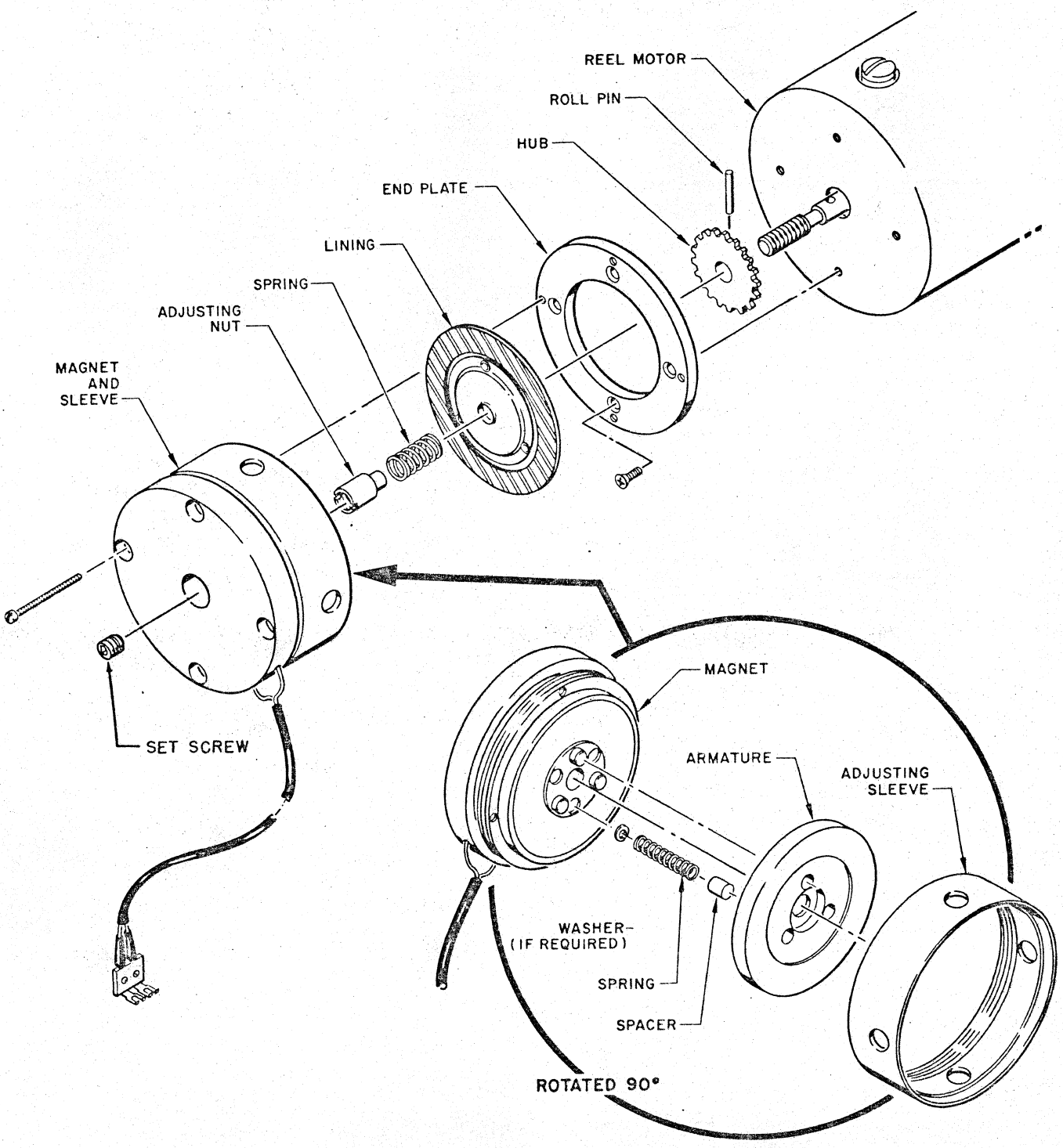


Figure 5-10.
Reel Motor Brake, Exploded View

5-42. TAPE TRANSPORT COVER DOOR REMOVAL AND REPLACEMENT. The cover door is held in place on the mounting frame by two pivot pins. Remove the nut which secures the stop bracket to the tape access door and unscrew the two pivot pins. Replacement of the tape access door is accomplished by reversing the disassembly sequence.

5-43. VACUUM CHAMBER REMOVAL AND REPLACEMENT. Perform the following steps:

Step 1: Remove the control panel overlay by unscrewing the captivated screws at either edge of the overlay in the tape reel area.

Step 2: Unplug the cables (J13 or J14) connecting the light sources and the photocells from the card cage.

Step 3: Remove the glass cover on the top of the vacuum chamber. The glass is held in place by friction clips.

Step 4: Remove the three Allen head screws securing the vacuum chamber in place.

Step 5: Remove the vacuum chamber.

Step 6: Reassemble by reversing the procedure followed during disassembly.

5-44. VACUUM UNIT MOTOR ASSEMBLY, FILTER, MOTOR AND BRUSH REMOVAL AND REPLACEMENT. (See Figure 5-3.) Steps 1 and 2 are the only steps required to replace the entire vacuum unit motor assembly. Steps 3, 4, and 5 are the only steps necessary for the removal and replacement of the filter. Steps 6 through 9 are used for vacuum motor removal and replacement. Steps 6 through 12 are used for brush removal and replacement.

Step 1: Disconnect power cable from vacuum motor assembly.

Step 2: Unsnap latches (Figure 5-3) on sides of motor housing assembly.

Step 3: Unlatch lever arm which holds filter in motor housing assembly.

Step 4: Remove filter using the attached loops. Clean and replace filter as described in paragraph 5-6.

CAUTION

Damage to equipment may result if filter is not thoroughly dry before installation.

Step 5: Replace clean filter in motor housing and latch the lever arm.

Step 6: Remove filter (Steps 3 and 4). Insert forefinger and pull out the back pressure valve plate. Loosen screws (Figure 5-3) which secure vacuum unit motor to motor housing assembly.

Step 7: Remove the power connector (Figure 5-3) from the motor housing assembly by pressing the two nylon legs toward the center of the connector; then push the connector through to the inside.

Step 8: Rotate vacuum unit motor until attaching hardware is clear of slotted brackets. Remove vacuum unit motor from the motor housing assembly.

Step 9: If the brushes are being replaced, continue to Step 10. If the vacuum motor is being replaced, reassemble the vacuum unit motor assembly by reversing the disassembly procedure.

NOTE

Replace the brush assembly when the brush does not extend at least 9/16 inches (released condition) beyond the brass case of the brush assembly.

Step 10: Remove the entire brush assembly by removing the hardware (Figure 5-3) from the brush assembly bracket and the motor frame. Using a pair of long nose pliers, extract the brush connector clip from the brush assembly. Be careful not to break the brush connector clip.

Step 11: Insert the brush connector clip into the replacement brush assembly. Position the brush assembly on the motor. Secure in place using the hardware removed in Step 10.

Step 12: When brush replacement has been completed, reassemble the vacuum unit motor assembly by reversing the disassembly procedure.

5-45. WRITE ENABLE SWITCH ASSEMBLY REMOVAL AND REPLACEMENT. Remove and replace the write enable switch assembly in the following manner:

Step 1: Remove the panel overlays (paragraph 5-35).

Step 2: Remove the two screws holding the write enable switch to the casting. Lift the write enable switch out of the casting.

Step 3: Disconnect the electrical connections of the write enable switch assembly from the wiring harness.

Step 4: Replacement of the write enable switch assembly is the reverse of disassembly.

5-46. REEL TACHOMETER ASSEMBLY REMOVAL AND REPLACEMENT. Remove and replace the reel tachometer assembly in the following manner:

Step 1: Remove the panel overlays (paragraph 5-35).

Step 2: Remove the vacuum chamber (paragraph 5-43).

Step 3: Disconnect the electrical connection at the rear of the tachometer.

Step 4: Remove the four screws holding the reel tachometer assembly to the casting. Lift the assembly out of the casting.

Step 5: Remove the reel tachometer pulley from the shaft of the tachometer.

Step 6: Replacement of the reel tachometer assembly is the reverse of disassembly.

Step 7: Check the tracking of the tape transport and adjust the position of the reel tachometer pulley as necessary.

5-47. DOOR INTERLOCK SWITCH REMOVAL AND REPLACEMENT. The removal and replacement of the door interlock switch is exactly the same as for the reel brake switch. (Refer to paragraph 5-38.)

5-48. OCP ASSEMBLY REMOVAL AND REPLACEMENT. Perform the following steps:

Step 1: Remove the chamber panel overlay. (Refer to paragraph 5-35.)

Step 2: Remove the screws holding the OCP brackets to the casting (3 screws for each bracket, 6 in all).

Step 3: Remove the OCP assembly from the casting. Unplug the cable from the card cage and draw the cable with the plug through the casting.

Step 4: Replacement of the OCP is the reverse of disassembly.

5-49. TOOLS AND TEST EQUIPMENT.

Table 5-3 lists the general nature of tools and test equipment required to maintain the TM-7. Manufacturer's names and numbers are given only as a guide; any equivalent tool or test equipment may be used.

TABLE 5-3
SUGGESTED TOOLS

TOOL	RECOMMENDED EQUIPMENT
Gauge, thickness	Starrett #66
Mirror, inspection	G.C. #5090
Penlight, heavy duty	Eveready #315
Pliers, diagonal cutting, 5"	Klein #202-5
Pliers, long nose, 6"	Klein #303-6
Pliers, needle nose, 6"	Utica #777-6
Pliers, 7-1/2"	Proto #242
Scale, spring balance, 0 to 32 oz	Ampex #650-105
Scale, steel, 6"	Starrett #384
Scissors, 2-1/2" blade	Wiss #173E
Screwdriver, screw starter	Pearson #3
Screwdriver set, Phillips	Proto #9600A
Screwdriver set, standard	Snap-On #SD-130K
Screwdriver, stub, large	Xcelite #R-5166
Screwdriver, stub, medium	Xcelite #R-3164
Screwdriver, stub, small	Xcelite #R-184
Scribe	Starrett #70A
Soldering aid	Walsco #2530
Soldering iron, low-voltage	Weller #W-TCP
Stripper, wire	Miller #100
Wrench, adjustable, 6"	Crescent #AT16
Wrench, bristol	Allen #DS-060
Wrench set, Allen, handled, 0.35" through 9/64"	Allen #6075
Wrench set, open end, 15° and 75°, 3/16" through 3/4"	Williams #1142PR

SECTION VI
CIRCUIT DESCRIPTIONS

6-1. INTRODUCTION.

This section contains detailed circuit descriptions of typical printed circuit board assemblies used in the transport electronics. The circuit descriptions are in alphabetical sequence by the mnemonic code of the PCB. Block diagrams and logic diagrams are included as an aid to the detailed explanation of the operation of each circuit. Schematic diagrams and assembly drawings of the PCB assemblies are located in Section VII.

Circuit descriptions of special circuit board assemblies, when required, are included in special addenda.

6-2. PCB CROSS REFERENCE.

Table 6-1 is a cross-reference list which provides the mnemonic code designation, part numbers, schematic numbers, and location of each printed circuit board in the transport electronics card cage.

TABLE 6-1
PCB CROSS-REFERENCE LIST

CODE	DESCRIPTION	PART NO.	SCHEMATIC	LOCATION
CSA	Capstan Servo Control		3107098	J6
	45 IPS	3112170-10		
	36 IPS	3107097-10		
	20 IPS	3112171-10		
	15 IPS	3112369-10		
	Forward/Reverse Logic			J4
FLA	Run/Stop-Fwd/Rev	3107082-10	3107083	
FLC	Fwd/Stop-Rev/Stop	3112360-10	3112361	
LLA	Local/Remote Logic	3107102-10	3107103	J2
PHB	Photoamplifier	3107262-10	3107073	J3
RCA	Reel Servo Control		3107093	J7
	45 IPS	3112167-10		
	36 IPS	3107092-10		
RLD	Rewind Logic -D	3118222-01	3118224	J1

1. GENERAL DESCRIPTION.

The capstan servo control PCB contains a ramp generator for control of tape acceleration, a dead-band circuit to inhibit tape creepage, and two stages of a power amplifier. The ramp generator comprises a zero clamping circuit, a current limiter circuit, and an amplifier. The power amplifier outputs are fed to the power transistors located on the transistor bracket. A relay driver circuit is also contained on the PCB.

2. THEORY OF OPERATION. (See Figure 1.)

Transistors Q1 and Q2 form a relay driver circuit. When the REWIND (-) or the REWIND HOLD (-) input is negative, Q1 conducts harder, which causes the voltage at the base of Q2 to go negative. (The collector of Q1 is returned to -12 volts through the coil of an external relay; quiescent current flow through Q1 and R17 is not great enough to actuate the relay.) Q2 is biased to saturation; and grounds one side of the coil of the external relay, which energizes the relay.

The input of the servo system is a summation of the FWD (-), REV/RWD (+/open circuit), and the +12 volt BIAS inputs. Diodes CR3, CR6, CR9, and CR10, in conjunction with resistors R10 and R12, form the zero clamping circuit. The current limiter comprises diodes CR4, CR5, CR7, and CR8 in conjunction with resistors R11 and R13. The current is limited when the input provides enough current to back bias either CR4 or CR7. This provides the operational amplifier (consisting of Q3, Q4, Q5, Q6, and CR13) with a means of generating a linear ramp for the input until saturation is reached. The ramp rate of rise is dependent on the values of R11, R13, and the timing capacitor (connected externally between the ramp output, pin 18, and the ramp input, pin 15). Transistors Q3 and Q4 form a differential amplifier. Transistor Q5 is the output driver; positive signals are conducted through CR13 and Q5. Transistor Q6 is an inverter stage used for the negative output. Potentiometer R25, in conjunction with CR14, controls the forward capstan speed. Potentiometer R27 and CR15 control the reverse capstan speed.

The output from the operational amplifier is applied to the summing junction at the input of the dead-band amplifier. The other inputs to the control summing junction are the FEEDBACK, the CAPSTAN TACH, and the RWD RAMP IN signals. Diodes CR16, CR17, CR18, and CR19, in conjunction with resistors R29 and R23, form a dead-band circuit which prevents capstan creep caused by input drift or error. Transistors Q7, Q8, and Q9 form a class A amplifier. Zener diode VR1 and resistor R38 provide a constant current supply for Q8. Potentiometer R31 provides for balancing the capstan servo system.

In the following discussion of the power amplifier, refer to Figure 2.

2. THEORY OF OPERATION. (Continued)

The output of Q9 supplies the input (input "X") to transistors Q10 and Q11 which are located on the capstan servo control PCB. Transistors Q1 through Q6 are located on the transistor bracket.

Transistors Q2, Q4, and Q6 are the power amplifiers for inverter Q10. The inverter provides correct phase relationship in the subamplifier. Transistor Q2, an emitter follower, is the driver stage. Two emitter followers in parallel, Q4 and Q6, provide current gain. Equal sharing of the load is insured by resistors R6 and R9. The output of this amplifier section is used to conduct the positive voltage to the capstan motor.

Transistors Q1, Q3, and Q5 are the power amplifiers for emitter follower Q11. Q1, an emitter follower, is the driver stage. Two emitter followers in parallel, Q3 and Q5, provide current gain. Equal sharing of the load is insured by resistors R5 and R8. The output of this amplifier section is used to conduct negative voltage to the capstan motor.

In reverse drive (input "X" is positive), the emitter of Q11 swings more positive and Q1 is cut off. When Q1 is cut off, Q3 and Q5 are cut off. Q10 conducts harder and the collector voltage swings more negative, which causes Q2 to conduct. When Q2 conducts, Q4 and Q6 conduct, and the output to the capstan motor is positive. The output is a function of input "X".

In forward drive (input "X" is negative), the collector of Q10 swings more positive and Q2 is cut off. When Q2 is cut off, Q4 and Q6 are cut off. Q11 conducts harder and the emitter voltage swings negative, which causes Q1 to conduct. When Q1 conducts, Q3 and Q5 conduct and the output to the capstan motor is negative. The output is a function of input "X".

In standby (input "X" is zero), Q10 and Q11 conduct at a level that causes Q2 and Q1 to be cut off. Q4, Q6, Q3, and Q5 are cut off, and the output to the capstan motor is zero.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	25 ma max surge 20 ma average
-12 VDC ±3%	14 ma max
+12 VDC ±15% with 5A load	10 amp max surge 5 amp average
-12 VDC ±15% with 5A load	10 amp max surge 5 amp average
+24 VDC ±15% with 150 ma load	170 ma max surge 115 ma average

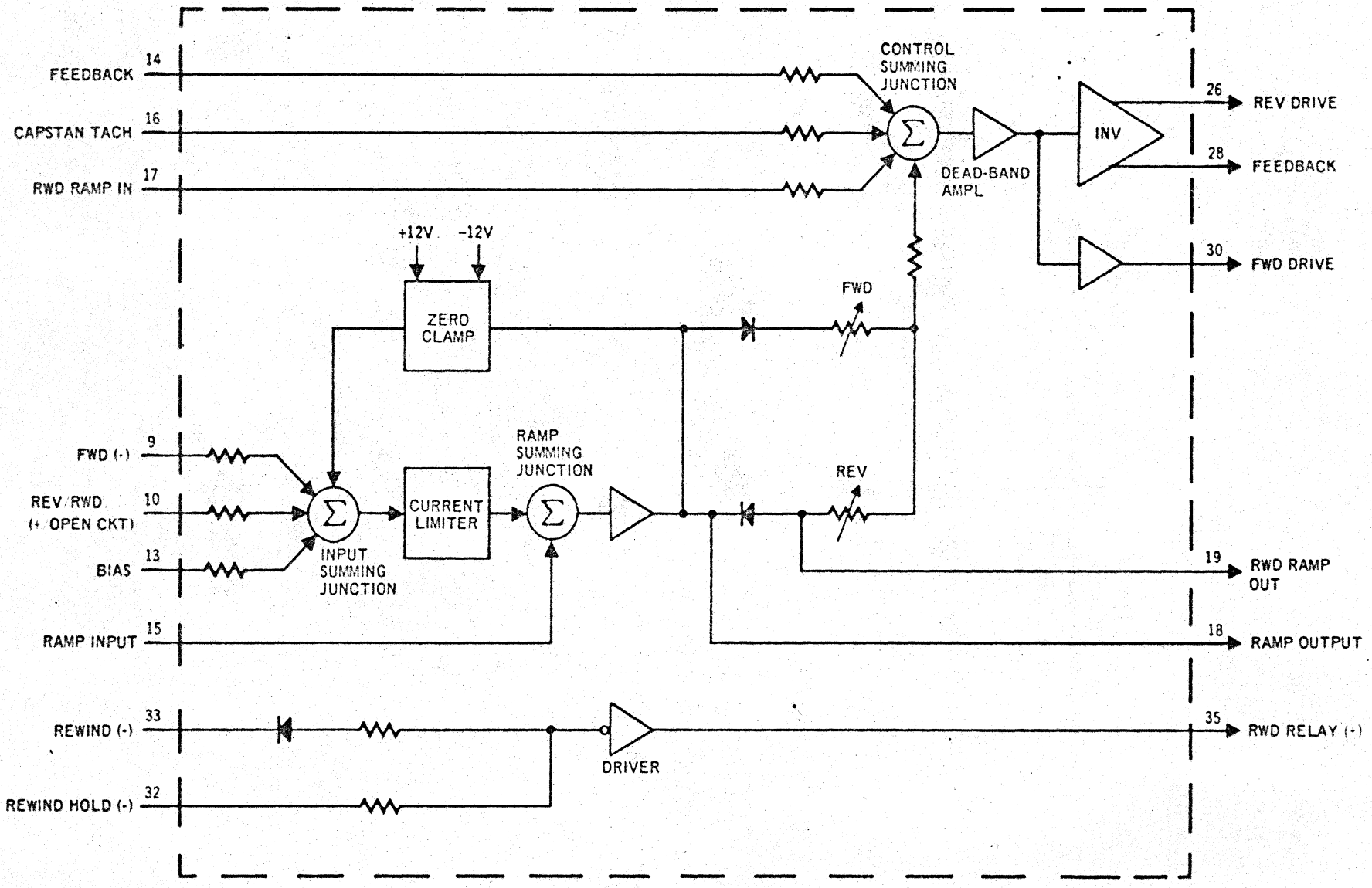


Figure 1
Capstan Servo Control, Flow Diagram

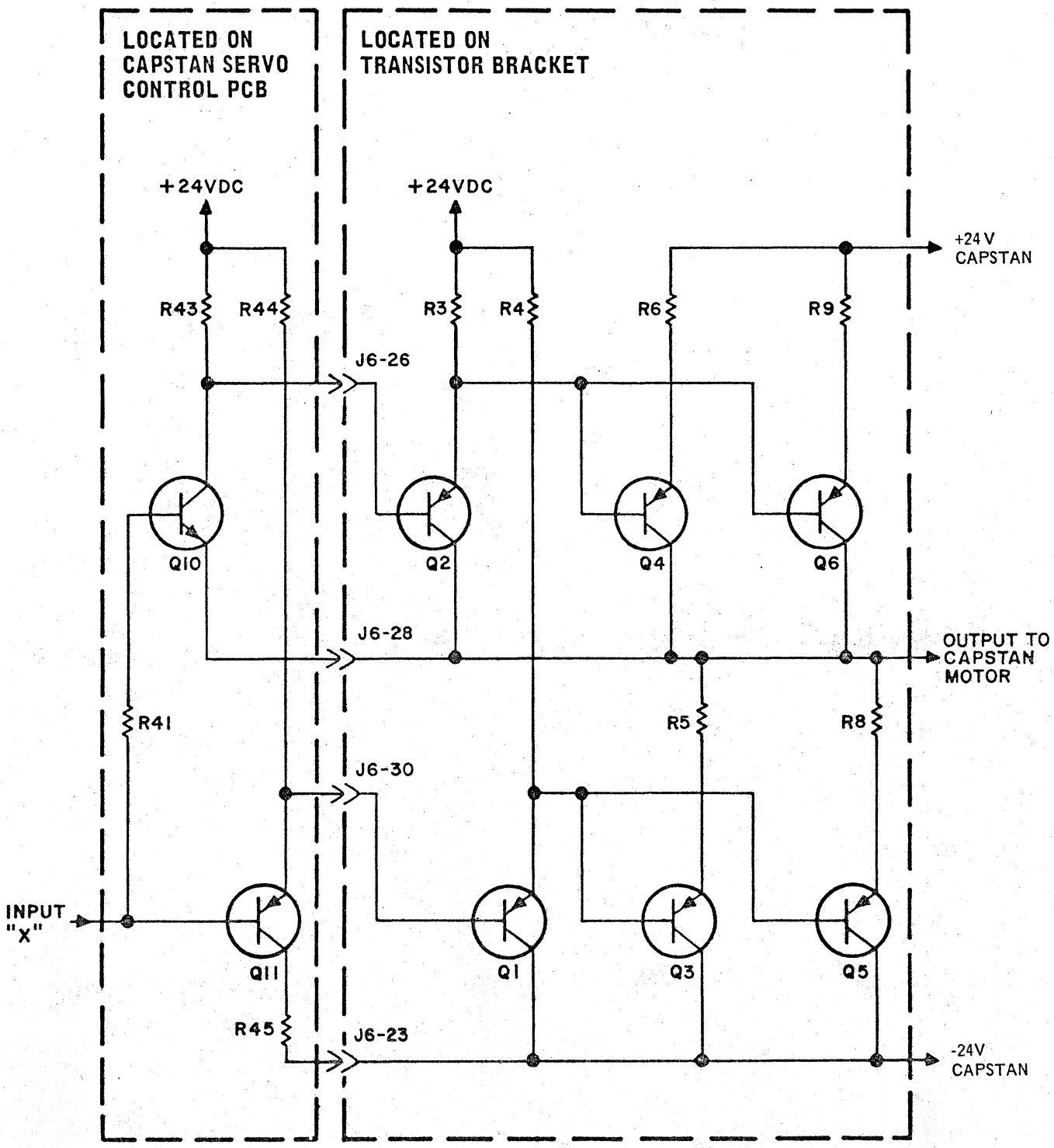


Figure 2
Capstan Servo Control, Power Output Circuit

1. GENERAL DESCRIPTION.

The forward/reverse logic PCB provides all logic necessary to perform the forward/reverse function. Nine input signals are mechanized to provide four output signals for forward/reverse operation. Signal levels used in the following circuit descriptions are nominal. Tables 1 and 2 list operating signal levels. FWD/REV input signals are programmed to be selected 5 microseconds before RUN/STOP input signals.

2. THEORY OF OPERATION. (See Figure 1.)

FWD (-) Output (Pin 28). FWD (-) output can be affected by FORWARD PB input, MASTER RESET input, BOT input, or mechanization of one of the following logic equations:

(a) FWD (-) = (FWD) (RUN) (UNIT SELECT)

(b) FWD (-) = (BOT going off tab) (REWINDING)

(c) $\overline{\text{FWD}}$ (-) = (STOP) (UNIT SELECT)

(d) $\overline{\text{FWD}}$ (-) = (EOT) (LOCAL)

When the FORWARD PB input momentarily goes to zero volts, CR9 is forward biased and the voltage at the base of Q4 swings positive, which causes Q4 to be cut off. The negative-going voltage at the collector of Q4 is coupled through R10 to the base of Q5; the negative-going voltage drives Q5 to saturation. The forward flip-flop, consisting of Q4 and Q5, is then in the set state. The FWD (-) output is at -6 volts.

When the MASTER RESET input momentarily goes to zero volts, CR6 is forward biased and the voltage at the base of Q5 swings positive, which causes Q5 to be cut off. The negative-going voltage at the collector of Q5 is coupled through R11 to the base of Q4; the negative-going voltage drives Q4 to saturation. The forward flip-flop is then in the reset state. The FWD (-) output is at zero volts.

When the BOT input makes a positive transition from -6 volts to 0 volts, a +6 volt pulse is produced by the differentiator circuit comprised of R18 and C12 and is coupled through OR gate diode CR13 to the base of Q5; the positive pulse resets the forward flip-flop. The FWD (-) output is at zero volts.

*Run/Stop and Fwd/Rev inputs.

2. THEORY OF OPERATION. (Continued)

For mechanization of logic equation (a), the FWD/REV input must be at -12 volts, the UNIT SELECT input must be at 0 volts, and the RUN/STOP input must make a negative transition from 0 volts to -12 volts. With the FWD/REV input at -12 volts, Q9 is cut off. When Q9 is cut off, AND gate transistor Q10 is cut off, which allows control of the AND gate output by the input to AND gate diode CR21. When the RUN/STOP input goes to -12 volts, Q6 and Q7 are cut off; CR21 is forward biased and Q8 is biased to saturation. The UNIT SELECT input at 0 volts enables the differentiator AND gate circuit comprised of R20 and C14 and a +6 volt pulse is coupled through OR gate diode CR11 to the base of Q4; the positive pulse sets the forward flip-flop. The FWD (-) output is at -6 volts. The negative pulse from C13 back biases OR gate diode CR12 and has no effect on the forward flip-flop circuit. When Q9 is cut off, AND gate diode CR23 is forward biased, which causes Q11 to be cut off. The negative pulse from C15 back biases CR19 and has no effect on the reverse flip-flop circuit.

For mechanization of logic equation (b), the REWINDING input must be at 0 volts and the BOT input must make a negative transition from 0 volts to -6 volts. When the BOT input goes to -6 volts, Q3 is biased to saturation. The REWINDING input at 0 volts enables the differentiator AND gate circuit comprised of R14 and C10 and a +6 volt pulse is coupled through OR gate diode CR10 to the base of Q4; the positive pulse sets the forward flip-flop. The FWD (-) output is at -6 volts.

For mechanization of logic equation (c), the UNIT SELECT input must be at 0 volts and the RUN/STOP input must make a positive transition from -12 volts to 0 volts. When the RUN/STOP input goes to 0 volts, Q6 and Q7 are biased to saturation and Q8 is cut off. The UNIT SELECT input at 0 volts enables the differentiator AND gate circuit comprised of R19 and C13 and a +6 volt pulse is coupled through OR gate diode CR12 to the base of Q5; the positive pulse resets the forward flip-flop. The FWD (-) output is at 0 volts. The negative pulse from C14 back biases OR gate diode CR11 and has no effect on the forward flip-flop circuit.

For mechanization of logic equation (d), the LOCAL input must be at 0 volts and the EOT input must make a positive transition from -6 volts to 0 volts. The LOCAL input at 0 volts enables the differentiator AND gate circuit comprised of R15 and C11 and a +6 volt pulse is coupled through OR gate diode CR14 to the base of Q5; the positive pulse resets the forward flip-flop. The FWD (-) output is at 0 volts.

FWD (+) Output (Pin 26). FWD (+) output is the complement signal of FWD (-). Output voltages and their derivations are the same.

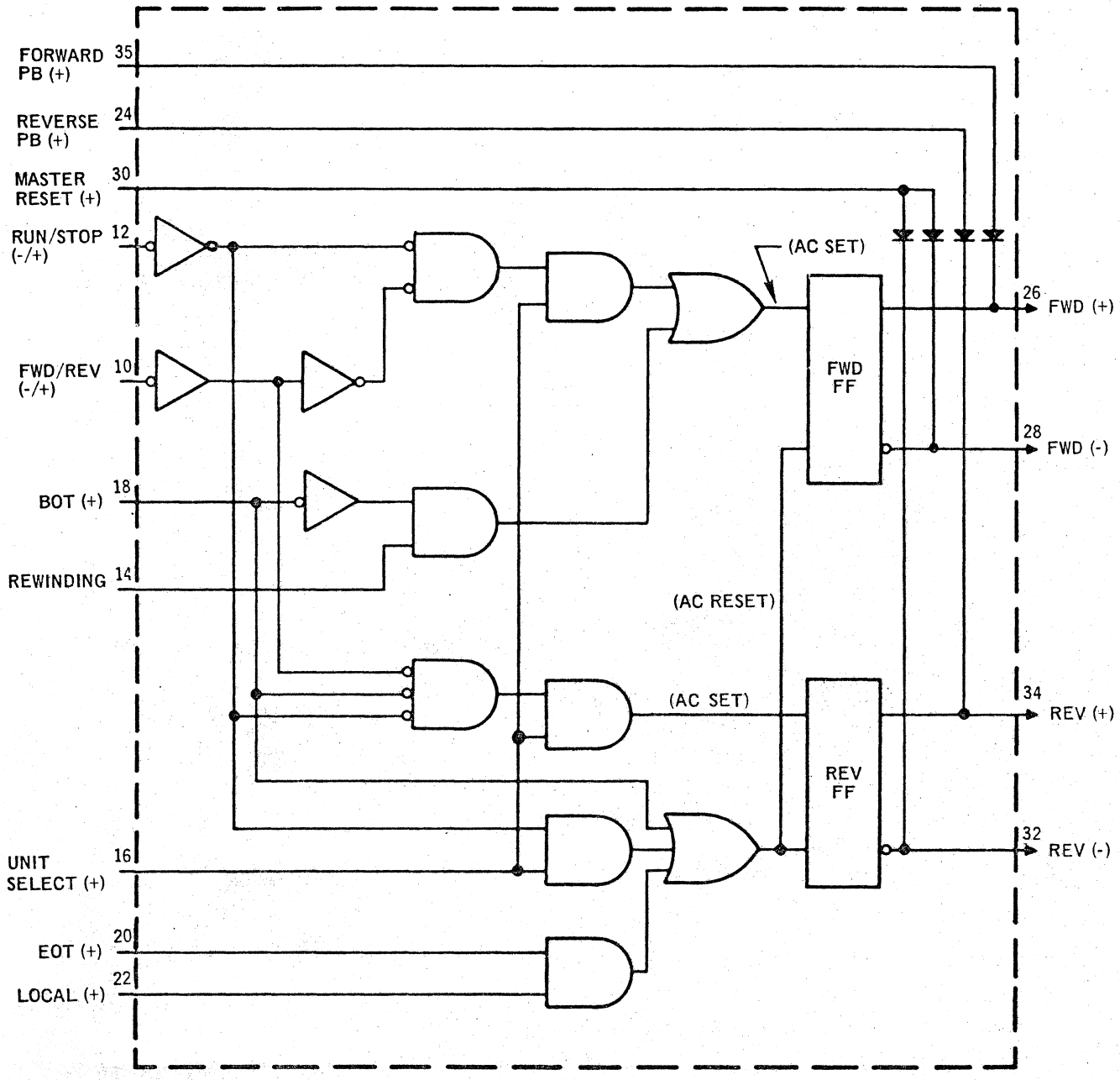


Figure 1
Forward/Reverse Logic, Logic Diagram
(3107082-10)

2. THEORY OF OPERATION. (Continued)

REV (+) Output (Pin 34). REV (+) output can be affected by REVERSE PB input, MASTER RESET input, BOT input, or mechanization of one of the following logic equations:

(a) REV (+) = (REV) (RUN) (UNIT SELECT) $\overline{(BOT)}$

(b) $\overline{REV}$ (+) = (STOP) (UNIT SELECT)

(c) $\overline{REV}$ (+) = (EOT) (LOCAL)

When the REVERSE PB input momentarily goes to zero volts, CR4 is forward biased and the voltage at the base of Q1 swings positive, which causes Q1 to be cut off. The negative-going voltage at the collector of Q1 is coupled through R2 to the base of Q2; the negative-going voltage drives Q2 to saturation. The reverse flip-flop, consisting of Q1 and Q2, is then in the set state. The REV (+) output is at zero volts.

When the MASTER RESET input momentarily goes to zero volts, CR1 is forward biased and the voltage at the base of Q2 swings positive, which causes Q2 to be cut off. The negative-going voltage at the collector of Q2 is coupled through R3 to the base of Q1; the negative-going voltage drives Q1 to saturation. The reverse flip-flop is then in the reset state. The REV (+) output is at -6 volts.

When the BOT input makes a positive transition from -6 volts to 0 volts, a +6 volt pulse is produced by the differentiator circuit comprised of R18 and C12 and is coupled through OR gate diode CR16 to the base of Q2; the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts.

For mechanization of logic equation (a), the FWD/REV input must be at 0 volts, the UNIT SELECT input must be at 0 volts, the BOT input must be at -6 volts, and the RUN/STOP input must make a negative transition from 0 volts to -12 volts. With the FWD/REV input at 0 volts, Q9 is biased to saturation. When Q9 is saturated, AND gate diode CR23 is back biased, and AND gate transistor Q10 is biased to saturation. When Q10 is saturated, the AND gate comprised of Q10 and CR21 is disabled and Q8 is cut off. The BOT input at -6 volts back biases AND gate diode CR24; since CR23 is also back biased, the AND gate output is controlled by the input to AND gate diode CR22. When the RUN/STOP input goes to -12 volts, Q6 and Q7 are cut off; CR22 is back biased, which causes Q11 to be biased to saturation. The UNIT SELECT input at 0 volts enables the differentiator AND gate circuit comprised of R21 and C15 and a +6 volt pulse is coupled through CR19 to the base of Q1; the positive pulse sets the reverse flip-flop. The REV (+) output is at zero volts. The negative pulse from C13 back biases OR gate diode CR15 and has no effect on the reverse flip-flop circuit. The negative pulse from C14 back biases OR gate diode CR11 and has no effect on the reverse flip-flop circuit.

2. THEORY OF OPERATION. (Continued)

For mechanization of logic equation (b), the UNIT SELECT input must be at 0 volts and the RUN/STOP input must make a positive transition from -12 volts to 0 volts. When the RUN/STOP input goes to 0 volts, Q6 and Q7 are biased to saturation and Q11 is cut off. The UNIT SELECT input at 0 volts enables the differentiator AND gate circuit comprised of R19 and C13 and a +6 volt pulse is coupled through OR gate diode CR15 to the base of Q2; the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts. The negative pulse from C15 back biases CR19 and has no effect on the reverse flip-flop circuit.

For mechanization of logic equation (c), the LOCAL input must be at 0 volts and the EOT input must make a positive transition from -6 volts to 0 volts. The LOCAL input at 0 volts enables the differentiator AND gate circuit comprised of R15 and C11 and a +6 volt pulse is coupled through OR gate diode CR17 to the base of Q2; the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts.

REV (-) Output (Pin 32). REV (-) output is the complement signal of REV (+). Output voltages and their derivations are the same.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	32 ma max
-12 VDC ±3%	82 ma max
- 6 VDC ±4%	40 ma max

TABLE 1
FORWARD/REVERSE LOGIC, INPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
10	Fwd/Rev (-/+)	0 to -1 volt	-8.5 to -12 volts
12	Run/Stop (-/+)	0 to -1 volt	-8.5 to -12 volts
14	Rewinding (+)	0 to -0.5 volt	-5.8 to -7 volts
16	Unit Select (+)	0 to -0.5 volt	-5 to -6.2 volts
18	BOT (+)	0 to -1 volt	-5.9 to -6.6 volts
20	EOT (+)	0 to -1 volt	-5.9 to -6.6 volts
22	Local (+)	0 to -0.5 volt	-5 to -6.2 volts
24	Reverse PB (+)	0 volts	Open circuit
30	Master Reset (+)	0 to -0.5 volt	-7 to -12.36 volts
35	Forward PB (+)	0 volts	Open circuit

TABLE 2
FORWARD/REVERSE LOGIC, OUTPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
26	Fwd (+)	0 to -1 volt	-5.9 to -6.6 volts
28	Fwd (-)	0 to -1 volt	-5.9 to -7 volts
32	Rev (-)	0 to -1 volt	-5.9 to -6.6 volts
34	Rev (+)	0 to -1 volt	-5.9 to -7 volts

1. GENERAL DESCRIPTION.

The forward/reverse logic PCB provides all logic necessary to perform the forward/reverse function. Ten input signals are mechanized to provide four output signals for forward/reverse operation. Signal levels used in the following circuit descriptions are nominal. Tables 1 and 2 list operating signal levels.

2. THEORY OF OPERATION. (See Figure 1.)

FWD (-) Output (Pin 28). FWD (-) output can be affected by FORWARD PB input, MASTER RESET input, BOT input, or mechanization of one of the following logic equations:

(a) FWD (-) = (FWD) (UNIT SELECT)

(b) FWD (-) = (BOT going off tab) (REWINDING)

(c) $\overline{\text{FWD}}$ (-) = (STOP) (UNIT SELECT)

(d) $\overline{\text{FWD}}$ (-) = (EOT) (LOCAL)

When the FORWARD PB input momentarily goes to zero volts, CR13 is forward biased and the voltage at the base of Q1 swings positive, which causes Q1 to be cut off. The negative-going voltage at the collector of Q1 is coupled through R2 to the base of Q2, causing Q2 to saturate. The forward flip-flop, consisting of Q1 and Q2, is then in the set state. The FWD (-) output is at -6 volts.

When the MASTER RESET input momentarily goes to zero volts, CR1 is forward biased and the voltage at the base of Q2 swings positive, which causes Q2 to be cut off. The negative-going voltage at the collector of Q2 is coupled through R3 to the base of Q1, causing Q1 to saturate. The forward flip-flop is then in the reset state. The FWD (-) output is at zero volts.

When the BOT input makes a positive transition from -6 volts to 0 volts, a +6 volt pulse is produced by the differentiator circuit comprised of C12 and R23 and is coupled through OR gate diode CR12 to the base of Q2; the positive pulse resets the forward flip-flop. The FWD (-) output is at zero volts.

For mechanization of logic equation (a), the UNIT SELECT input must be at 0 volts and the FWD/STOP input must make a negative transition from 0 volts to -12 volts. When the FWD/STOP input goes to -12 volts, Q6 and Q7 are cut off and Q8 is saturated. The UNIT SELECT input at 0 volts enables the differentiator circuit comprised of C14 and R21 and a

*Fwd/Stop and Rev/Stop inputs.

2. THEORY OF OPERATION. (Continued)

+6 volt pulse is coupled through OR gate diode CR9 to the base of Q1; the positive pulse sets the forward flip-flop. The FWD (-) output is at -6 volts. The negative pulse from C13 back biases OR gate diode CR10 and has no effect on the forward flip-flop circuit.

For mechanization of logic equation (b), the REWINDING input must be at 0 volts and the BOT input must make a negative transition from 0 volts to -6 volts. When the BOT input goes to -6 volts, Q3 is biased to saturation. The REWINDING input at 0 volts enables the differentiator circuit comprised of C10 and R18 and a +6 volt pulse is coupled through OR gate diode CR8 to the base of Q1; the positive pulse sets the forward flip-flop. The FWD (-) output is at -6 volts.

For mechanization of logic equation (c), the UNIT SELECT input must be at 0 volts and the FWD/STOP input must make a positive transition from -12 volts to 0 volts. When the FWD/STOP input goes to 0 volts, Q6 and Q7 are saturated and Q8 is cut off. The UNIT SELECT input at 0 volts enables the differentiator circuit comprised of C13 and R19 and a +6 volt pulse is coupled through OR gate diode CR10 to the base of Q2; the positive pulse resets the forward flip-flop. The FWD (-) output is at zero volts. The negative pulse from C14 back biases OR gate diode CR9 and has no effect on the forward flip-flop circuit.

For mechanization of logic equation (d), the LOCAL input must be at 0 volts and the EOT input must make a positive transition from -6 volts to 0 volts. The LOCAL input at 0 volts enables the differentiator circuit comprised of C11 and R22 and a +6 volt pulse is coupled through OR gate diode CR11 to the base of Q2; the positive pulse resets the forward flip-flop. The FWD (-) output is at zero volts.

FWD (+) Output (Pin 26). FWD (+) output is the complement signal of FWD (-). Output voltages and their derivations are the same.

REV (+) Output (Pin 34). REV (+) output can be affected by REVERSE PB input, MASTER RESET input, BOT input, or mechanization of one of the following logic equations:

(a) $REV\ (+) = (REV)\ (UNIT\ SELECT\ \overline{(BOT)}$

(b) $\overline{REV}\ (+) = (STOP)\ (UNIT\ SELECT)$

(c) $\overline{REV}\ (+) = (EOT)\ (LOCAL)$

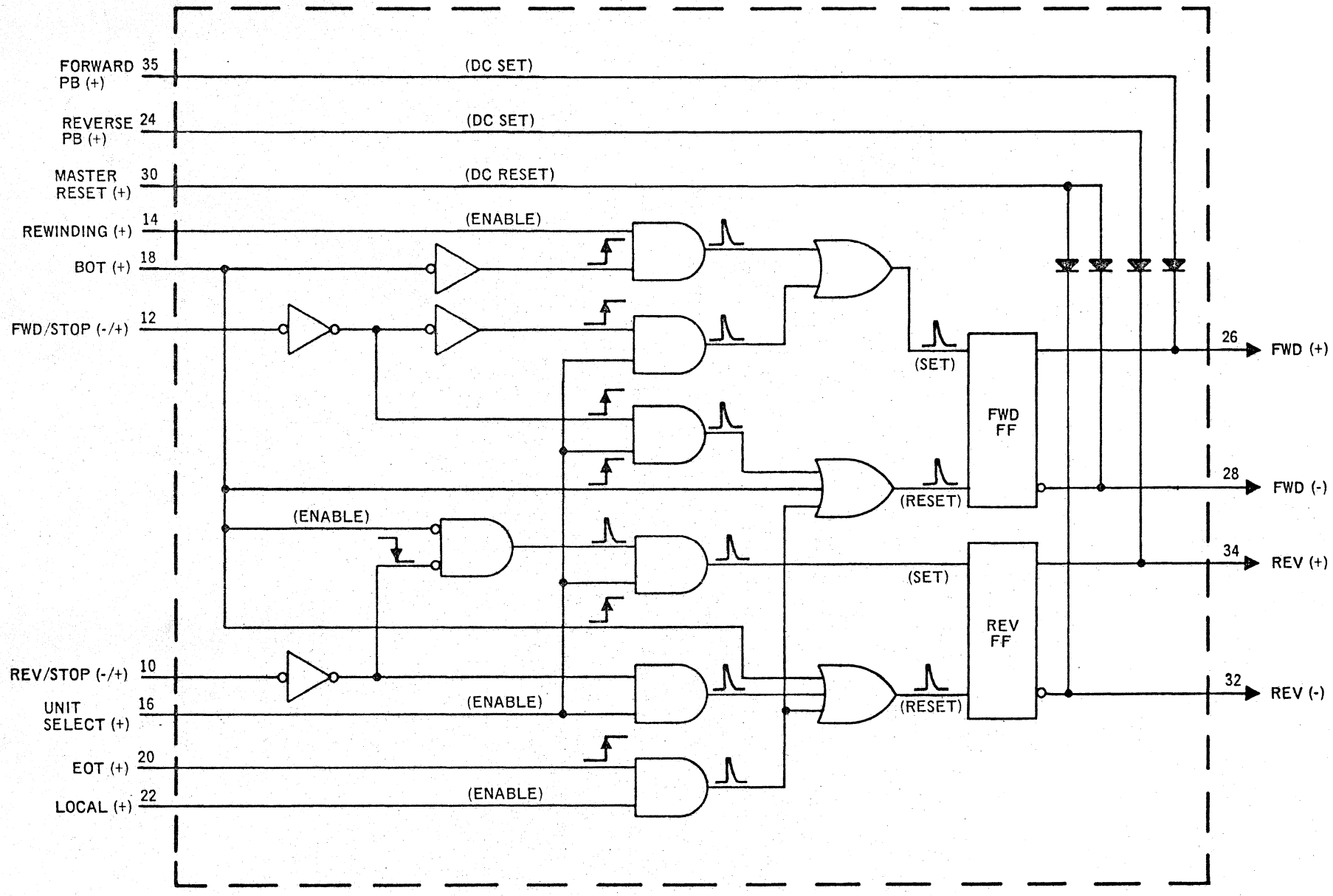


Figure 1
Forward/Reverse Logic -C, Logic Diagram
(3112360-10)

2. THEORY OF OPERATION. (Continued)

When the REVERSE PB input momentarily goes to zero volts, CR6 is forward biased and the voltage at the base of Q4 swings positive, which causes Q4 to be cut off. The negative-going voltage at the collector of Q4 is coupled through R9 to the base of Q5, causing Q5 to saturate. The reverse flip-flop, consisting of Q4 and Q5, is then in the set state. The REV (+) output is at zero volts.

When the MASTER RESET input momentarily goes to zero volts, CR4 is forward biased and the voltage at the base of Q5 swings positive, which causes Q5 to be cut off. The negative-going voltage at the collector of Q5 is coupled through R10 to the base of Q4, causing Q4 to saturate. The reverse flip-flop is then in the reset state. The REV (+) output is at -6 volts.

When the BOT input makes a positive transition from -6 volts to 0 volts, a +6 volt pulse is produced by the differentiator circuit comprised of C12 and R23 and is coupled through OR gate diode CR13 to the base of Q5; the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts.

For mechanization of logic equation (a), the UNIT SELECT input must be at 0 volts, the BOT input must be at -6 volts, and the REV/STOP input must make a negative transition from 0 volts to -12 volts. The BOT input at -6 volts back biases AND gate diode CR22, which allows the input at AND gate diode CR21 to control Q11. When the REV/STOP input goes to -12 volts, Q9 and Q10 are cut off. CR21 is back biased, which allows the voltage at the base of Q11 to go positive; Q11 becomes saturated. The UNIT SELECT input at 0 volts enables the differentiator circuit comprised of C16 and R24 and a +6 volt pulse is coupled through CR16 to the base of Q4; the positive pulse sets the reverse flip-flop. The REV (+) output is at zero volts. The negative pulse from C15 back biases OR gate diode CR15 and has no effect on the reverse flip-flop circuit.

For mechanization of logic equation (b), the UNIT SELECT input must be at 0 volts and the REV/STOP input must make a positive transition from -12 volts to 0 volts. When the REV/STOP input goes to 0 volts, Q9 and Q10 are saturated. The UNIT SELECT input at 0 volts enables the differentiator circuit comprised of C15 and R20 and a +6 volt pulse is coupled through OR gate diode CR15 to the base of Q5 the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts. If CR22 is back biased, Q11 is cut off. The negative pulse from C16 back biases CR16 and has no effect on the reverse flip-flop circuit.

2. THEORY OF OPERATION. (Continued)

For mechanization of logic equation (c), the LOCAL input must be at 0 volts and the EOT input must make a positive transition from -6 volts to 0 volts. The LOCAL input at 0 volts enables the differentiator circuit comprised of C11 and R22 and a +6 volt pulse is coupled through OR gate diode CR14 to the base of Q5; the positive pulse resets the reverse flip-flop. The REV (+) output is at -6 volts.

REV (-) Output (Pin 32). REV (-) output is the complement signal of REV (+). Output voltages and their derivations are the same.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	32 ma max
-12 VDC ±3%	82 ma max
- 6 VDC ±4%	40 ma max

TABLE 1
FORWARD/REVERSE LOGIC -C, INPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	LOW LEVEL	HIGH LEVEL
10	Rev/Stop (-/+)	0 to -1 volt	-8.5 to -12 volts
12	Fwd/Stop (-/+)	0 to -1 volt	-8.5 to -12 volts
14	Rewinding (+)	0 to -0.5 volt	-5.6 to -6.6 volts
16	Unit Select (+)	0 to -0.5 volt	-5 to -6.2 volts
18	BOT (+)	0 to -1 volt	-5.9 to -6.6 volts
20	EOT (+)	0 to -1 volt	-5.9 to -6.6 volts
22	Local (+)	0 to -0.5 volt	-5 to -6.2 volts
24	Reverse PB (+)	0 volts	Open circuit
30	Master Reset (+)	0 to -0.5 volt	-7 to -12.36 volts
35	Forward PB (+)	0 volts	Open circuit

TABLE 2
FORWARD/REVERSE LOGIC -C, OUTPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	LOW LEVEL	HIGH LEVEL
26	Fwd (+)	0 to -1 volt	-5.9 to -6.6 volts
28	Fwd (-)	0 to -1 volt	-5.9 to -7 volts
32	Rev (-)	0 to -1 volt	-5.9 to -6.6 volts
34	Rev (+)	0 to -1 volt	-5.9 to -7 volts

1. GENERAL DESCRIPTION.

The local/remote logic PCB provides all logic necessary to perform the local/remote functions. Seven input signals are mechanized to provide ten output signals for local/remote operation. REMOTE PB input is the only input which permits transfer from local to remote operation. Transfer from remote to local is accomplished in several ways as explained in the text. Signal levels used in the following circuit descriptions are nominal. Refer to Tables 1 and 2 for operating signal levels.

2. THEORY OF OPERATION. (See Figure 1.)

TRANSPORT READY (-) Input (Pin 13). The TRANSPORT READY (-) input must be at -12 volts before normal tape drive will be enabled. When the TRANSPORT READY (-) input is at 0 volts, Q4 conducts and -6 volts is applied through forward biased CR10 to the base of Q6. The READY (+) output is -6 volts. Q6 conducts and the MASTER RESET (+) output goes to 0 volts. The MASTER RESET (+) output sets the flip-flops in the forward/reverse logic PCB to the stop condition, preventing tape motion. The 0 volt output from Q6 also forward biases CR9 and CR12, which disables the LOCAL INDICATOR (+) and REMOTE INDICATOR (+) outputs.

When the TRANSPORT READY (-) input is at -12 volts, Q4 is cut off and the READY (+) output goes to +6 volts, developed by voltage divider resistors R31 and R30. Q6 is cut off and the MASTER RESET (+) output goes to -12 volts. CR9 and CR12 are back biased, enabling the input to the LOCAL INDICATOR (+) and REMOTE INDICATOR (+) circuits. CR7 is back biased, enabling the local/remote flip-flop circuit.

When the TRANSPORT READY (-) input goes to 0 volts, Q4 conducts and -6 volts is applied through CR7 and R10 to the base of Q1 and Q1 conducts. When Q1 conducts, Q2 is cut off and Q3 conducts. The OCP ENABLE (+) and the LOCAL (+) outputs go to 0 volts. CR14 is forward biased and disables the SELECT (-) input.

LOCAL PB Input (Pin 30). When the LOCAL PB input is at 0 volts and TRANSPORT READY (-) input is at -12 volts, Q2 is cut off by the voltage applied through CR3 and R4. With Q2 cut off, Q1 and Q3 are conducting, and the OCP ENABLE (+) and LOCAL (+) outputs go to 0 volts. CR8 and CR9 are back biased and enable the local indicator driver circuit. Q7 and Q8 are conducting and the LOCAL INDICATOR (+) output is 0 volts. CR14 is forward biased and disables the SELECT (-) input. Q14 conducts and the SELECT & REMOTE (-) output is 0 volts. The SELECT & REMOTE INDICATOR (+) output driver circuits are disabled. Q12 conducts and Q13 is cut off. The UNIT SELECT (-) output goes to 0 volts. The LOCAL (-) output goes to -6 volts. CR11 is forward biased and disables the REMOTE INDICATOR (+) driver circuit.

2. THEORY OF OPERATION. (Continued)

RESET PB Input (Pin 28). When the RESE nput is at 0 volts and the TRANSPORT READY (-) input is at -12 volts, Q y the voltage applied through CR5 and R4. The circuit then operates the same as r LOCAL PB input.

GO LOCAL (-) Input (Pin 22). When the GO) input is at -6 volts and the TRANSPORT READY (-) input is at -12 volts, Q n by the voltage applied through CR6 and R10. The circuit then operates the sam bed for LOCAL PB input.

REMOTE PB Input (Pin 26). When the REM it is at 0 volts and the TRANSPORT READY (-) input is at -12 volts, Q y the voltage applied through CR4 and R5. When Q1 is cut off, Q2 conducts an off. The OCP ENABLE (+) output goes to 0 volts. CR8 is forward biased and c LOCAL INDICATOR driver circuit. CR11 and CR12 are back biased and ena MOTE INDICATOR circuit. Q9 and Q10 are conducting and the REMOTE INDICA put is 0 volts. CR14 is back biased and the SELECT (-) input is enabled.

SELECT (-) Input (Pin 9). When the circuit e condition described for REMOTE PB input and the TRANSPORT READY (volts, a SELECT (-) input at -12 volts cuts off Q11. When Q11 is cut off, Q1 nd Q13 conducts. The UNIT SELECT (-) output goes to -6 volts. Q14 is cut and Q16 are conducting. The SELECT & REMOTE (-) output goes to -12 volts LECT & REMOTE INDICATOR (+) output goes to 0 volts.

OCP RESET (+) Input (Pin 11). When the O (+) input is at 0 volts, Q5 conducts and the READY (+) output goes to -6 volts. Q6 the MASTER RESET (+) output goes to 0 volts. CR9 and CR12 are forward bias ble the local and remote indicator driver circuits.

When the OCP RESET (+) input is at -12 v ut off.

3. POWER REQUIREMENTS.

VOLTAGE	T
+12 VDC ±3%	ax
-12 VDC ±3%	ax
- 6 VDC ±4%	ax

TABLE 1
LOCAL/REMOTE LOGIC, INPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
9	Select (-)	0 ±1.25 volts	-12 ±2 volts
11	OCP Reset (+)	0 volts	Open circuit
13	Transport Ready (-)	Open circuit	-10.0 to -12.36 volts
22	Go Local (-)	0 to -1 volt	-5.8 to -7 volts
26	Remote PB (+)	0 volts	Open circuit
28	Reset PB (+)	0 volts	Open circuit
30	Local PB (+)	0 volts	Open circuit

TABLE 2
LOCAL/REMOTE LOGIC, OUTPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
15	Ready (+)	+4 to +6 volts	-4 to -6.2 volts
16	Unit Select (-)	0 to -1 volt	-5 to -6.2 volts
17	Select & Remote (-)	0 to -0.5 volt	1.15K +10% returned to -11 volts ±3 volts
18	Select & Remote Indicator (+)	0 to -0.5 volt	125 ohms ±3% returned to ground
19	Local Indicator (+)	0 to -0.5 volt	125 ohms ±3% returned to ground
20	Remote Indicator (+)	0 to -0.5 volt	125 ohms ±3% returned to ground
24	Local (+)	0 to -0.5 volt	-5 to -6.2 volts
32	Local (-)	0 to -0.5 volt	-5 to -6.2 volts
34	OCP Enable (+)	0 to -0.5 volt	-10 to -12.36 volts
35	Master Reset (+)	0 to -0.5 volt	-7 to -12.36 volts

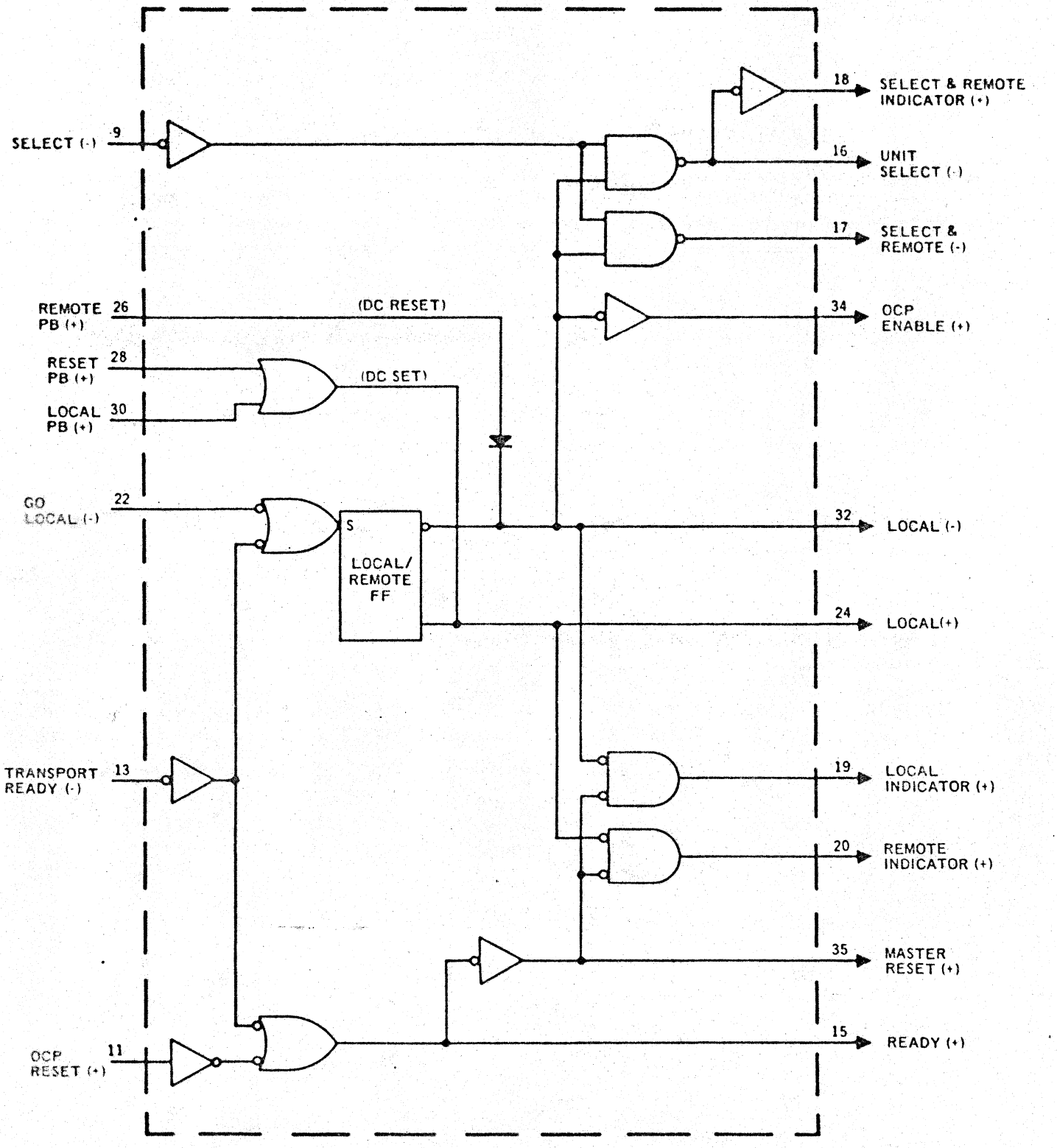


Figure 1
Local/Remote Logic, Logic Diagram

1. GENERAL DESCRIPTION.

The photoamplifier PCB assembly contains two identical circuits; one circuit is used in the BOT tab sense circuit, the second circuit is used in the EOT tab sense circuit. Each circuit comprises an input amplifier, a differential amplifier, and two NAND gate/drivers. One NAND gate/driver is used with positive-logic input, the other with negative-logic input.

In the following circuit description, the BOT circuit is described. Operation of the EOT circuit is identical. Signal voltages used in the circuit description are nominal; refer to Tables 1 and 2 for operating voltage levels.

2. THEORY OF OPERATION. (See Figure 1.)

Input Amplifier. Transistor Q1 is used in a common base configuration and operates class A, with the emitter voltage clamped to approximately -0.6 volt. The current through R2 is determined by the setting of potentiometer R20 since the common base configuration maintains constant voltage across R1 and R20. The current through R1 and R20 is provided by two parallel sources, Q1 and the photovoltaic cell (BOT sensor). As the amount of light striking the photocell increases, the current through it increases proportionally, thus decreasing the current demand on Q1 and decreasing the current through R2.

The back of the tape reflects a small amount of light, producing an off-tab or "gray" current. Potentiometer R20 is adjusted to provide output voltage levels from the input amplifier that will change the state of the differential amplifier during on-tab condition, and permit the differential amplifier to return to the quiescent state during off-tab condition.

The output of transistor Q1 appears across collector load resistor R2 and is directly coupled to the base of Q2. Q2 isolates and amplifies the output of Q1. Capacitor C1 filters noise spikes from the output of Q1. The output of Q2 is directly coupled to the base of transistor Q3 in the differential amplifier.

Differential Amplifier. The differential amplifier comprises Q3 and Q4 and is designed to give a change in output voltage when the input increases above a fixed threshold. In the quiescent state, Q3 is cut off and transistor O4 is saturated.

An on-tab positive-going input from the input amplifier places Q3 in conduction and biases transistor Q4 to cutoff. The output voltage from the collector of Q4 goes to -12 volts. While the on-tab input signal is applied, Q3 remains in conduction and Q4 is cut off. When an off-tab signal is applied, the circuit is restored to the quiescent state.

2. THEORY OF OPERATION. (Continued)

The collector of Q3 is connected to the base of inverter Q8. When Q3 is cut off (off-tab), Q8 conducts and the BOT OUTPUT (-) output is at 0 volts. When Q3 conducts (on-tab), Q8 is cut off and the BOT OUTPUT (-) output is at -12 volts. The output from the collector of Q8 is also applied to one input of the negative-logic input NAND gate/driver.

The collector of Q4 is connected to the base of inverter Q5. When Q4 conducts (off-tab), Q5 is cut off. When Q4 is cut off (on-tab), Q5 conducts. The output from the collector of Q5 is applied to one input of the positive-logic input NAND gate/driver.

Negative-Logic Input NAND Gate/Driver. The negative-logic input NAND gate/driver comprises diodes CR3, CR4, CR11, and transistor Q9. When the input to one of the diodes is at 0 volts, that diode is forward biased and Q9 is cut off by a positive base voltage. The BOT (+) output is at -12 volts. When the inputs to all three diodes are at -12 volts (or open circuit), all the diodes are reverse biased and Q9 is biased on by a negative base voltage. The BOT (+) output is at 0 volts.

Positive-Logic Input NAND Gate/Driver. The positive-logic input NAND gate/driver comprises diodes CR1, CR2, CR8, and transistors Q6 and Q7. When the input to one of the diodes is at -12 volts, that diode is forward biased and Q6 is biased on by a negative base voltage. Driver Q7 is cut off by the positive voltage at the collector of Q6 and the BOT (-) output is at 0 volts (through CR9). When the inputs to all three diodes are at 0 volts (or open circuit), all the diodes are reverse biased and Q6 is cut off by a positive base voltage. The collector of Q6 goes to -12 volts and Q7 is biased on. The BOT (-) output is at -12 volts.

Exciter Lamp (Pins 34 and 35). R1 is used as a dropping resistor when a 5-volt photocell exciter lamp is used. The lamp is driven by the -6 volt supply.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	35 ma max
-12 VDC ±3%	45 ma max

TABLE 1
PHOTOAMPLIFIER, INPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
9	BOT Sensor (+)	100 μa min increase over low level (on tab)	0 to 120 μa (off tab)
10	BOT Sensor Return		
11	Rewinding (-)	0 to -1 volt	-5.8 to -7 volts
12	Unit Select (+)	0 to -1 volt	-5 to -6.2 volts
13	BOT NAND Input (-)	0 to -1 volt	-5 to -12 volts
14	BOT NAND Input (-)	0 to -1 volt	-5 to -12 volts
23	EOT NAND Input (-)	0 to -1 volt	-5 to -12 volts
24	EOT NAND Input (-)	0 to -1 volt	-5 to -12 volts
25	EOT NAND Input (+)	0 to -1 volt	-5 to -12 volts
26	Unit Select (+)	0 to -1 volt	-5 to -6.2 volts
28	EOT Sensor	100 μa increase over low level (on tab)	0 to 120 μa (off tab)
30	EOT Sensor Return		

TABLE 2
PHOTOAMPLIFIER, OUTPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
16	BOT Output (-)	0 to -1 volt	3.9K ±5% to -12 volt supply
17	BOT (+)	0 to -1 volt	1.5K ±5% to -12 volt supply
18	BOT (-)	0 to -1 volt	-12 ±2 volts*
19	EOT (-)	0 to -1 volt	-12 ±2 volts*
20	EOT (+)	0 to -1 volt	1.5K ±5% to -12 volt supply
21	EOT Output (-)	0 to -1 volt	3.9K ±5% to -12 volt supply

*-5 to -6.2 volts when used with circuits having a diode limiter circuit returned to -6 volts.

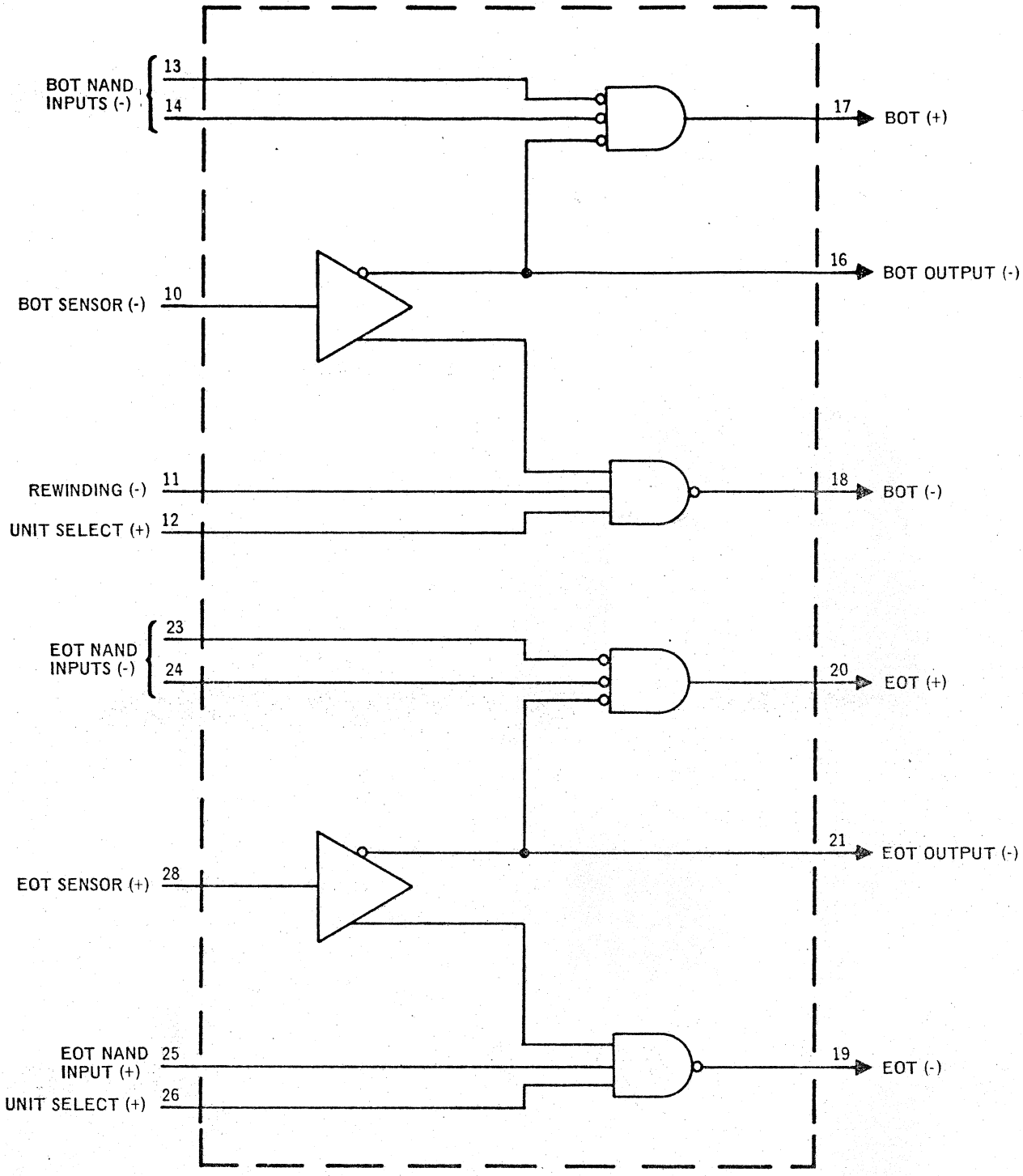


Figure 1
Photoamplifier, Logic Diagram

1. GENERAL DESCRIPTION.

The reel servo control PCB contains four photocell amplifiers and two servo amplifiers. Each servo amplifier consists of two three-stage subamplifiers. The input of the first gain stage is a summing junction. Resistor/diode networks combine outputs of the photocell amplifiers with inputs from the reel tachometers and the ramp generator. These combined signals govern the switching of power to the reel motors. In the following circuit descriptions, only the file reel servo circuit is discussed. Operation of the fixed reel servo circuit is identical.

2. THEORY OF OPERATION. (See Figure 1.)

Forward. In forward operation, the RAMP OUTPUT input to pins 12 and 24 is +11.5 ±0.5 volts. This signal disables the reverse drive amplifier at the base of Q4 through R16 and CR5. The forward loop sense from Q1 sets the forward drive amplifier by causing a positive signal to be applied at the base of Q3 through R3 and R10. Q3 then conducts. The collector of Q3 moves toward ground and the emitter of Q7 goes slightly negative (-0.3 to -0.5 volts), causing Q8 to become reverse biased and cut off. Current then flows through R29 and Output B (FILE FWD) into the gate of the forward drive SCR located on the reel servo power supply. The forward drive SCR is maintained in the conducting state by the forward drive amplifier. The SCR will conduct until the negative output from the reel tachometer through R11, R13, and R30 balances the input from forward loop sense amplifier Q1. This input appears at the base of Q3 which is the forward drive summing junction. R11 is adjusted so that tachometer input to the summing junction corresponds to the required tape speed between the reel and the vacuum chamber.

Stop. If the capstan stops when the reel is going in the forward direction, the ramp input is zero and the reel tachometer input is negative. The reverse drive amplifier is inhibited through R3, R17, and CR5 if the tape loop is outside the forward loop sense. When the reel carries the tape loop back over the forward loop sense, the reverse drive amplifier is no longer inhibited. It is then activated by the negative tachometer input through R11, R21, and R30 until the reel stops and the tachometer output goes to zero.

Turnaround. If the capstan is programmed for reverse while the reel is going forward, the ramp input through R16 goes negative and cancels the inhibition on the reverse drive amplifier through R3, R17, and CR5. The tachometer output being negative activates the reverse drive amplifier through R11, R21, and R30 until the tachometer output drops to zero. Thereafter, the reel servo operation is the same as for reverse. Output B at pin 16 is 24 to 28 ma into the forward SCR gate.

2. THEORY OF OPERATION. (Continued)

Reverse. Reverse operation is similar to forward operation except that the RAMP OUTPUT input is -11.5 ±0.5 volts. The RAMP OUTPUT input inhibits the forward drive amplifier through R7, R8, and CR3. The reverse loop sense from Q2 applies a negative signal to the base of Q4 through R6, R18, and R20, activating the reverse drive amplifier. Q2 (turned off during standby) is turned on by the reverse loop sense. This same signal through R8, R9, and CR3 inhibits the forward drive amplifier. The tachometer input to the base of Q4 through R11, R21, and R30 is positive and cancels the negative loop sense input from Q4 at the required reel to vacuum chamber tape speed. Q4 is conducting during standby. The negative input to Q4 turns Q4 off. Positive current through R25 now flows into the base of Q5, causing the Q5 collector to move towards ground sufficiently to back bias Q6, thus turning Q6 off and the reverse drive SCR on.

Rewind. During rewind operation, the REWIND RAMP input is connected in parallel with the RAMP OUTPUT input. This same signal, at the REWIND RAMP input, activates the reverse drive amplifier through R19 and is summed with the positive tachometer output at the base of Q4. The reel speeds up until the tachometer output through R11, R21, and R30 balances the REWIND RAMP input. This corresponds to a speed less than the speed of the tape over the capstan and the tape loop moves toward the reverse loop sense. When the tape is outside the reverse loop sense, the loop sense input from Q2 through R6 and R18 is added to the REWIND RAMP input. The reel runs faster than the tape speed on the capstan, and the loop of tape moves back toward the loop sense. In this manner, the loop is maintained near the reverse loop sense at any capstan speed from zero to full rewind speed. When the tape stops from rewind, the forward drive amplifier is activated and the reel is slowed to zero speed. This is accomplished by the positive tachometer input at Q3 through R13 exceeding the sum of the rewind input via R12 and the inhibition via R7. The ramp decreases toward zero and Q3 goes into conduction. Operation is then the same as forward.

Phase Advance. The phase advance inputs via pins 18 and 34 increase the stability margins of the reel servos and prevent excessive speed oscillations.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	160 ma max
-12 VDC ±3%	10 ma max

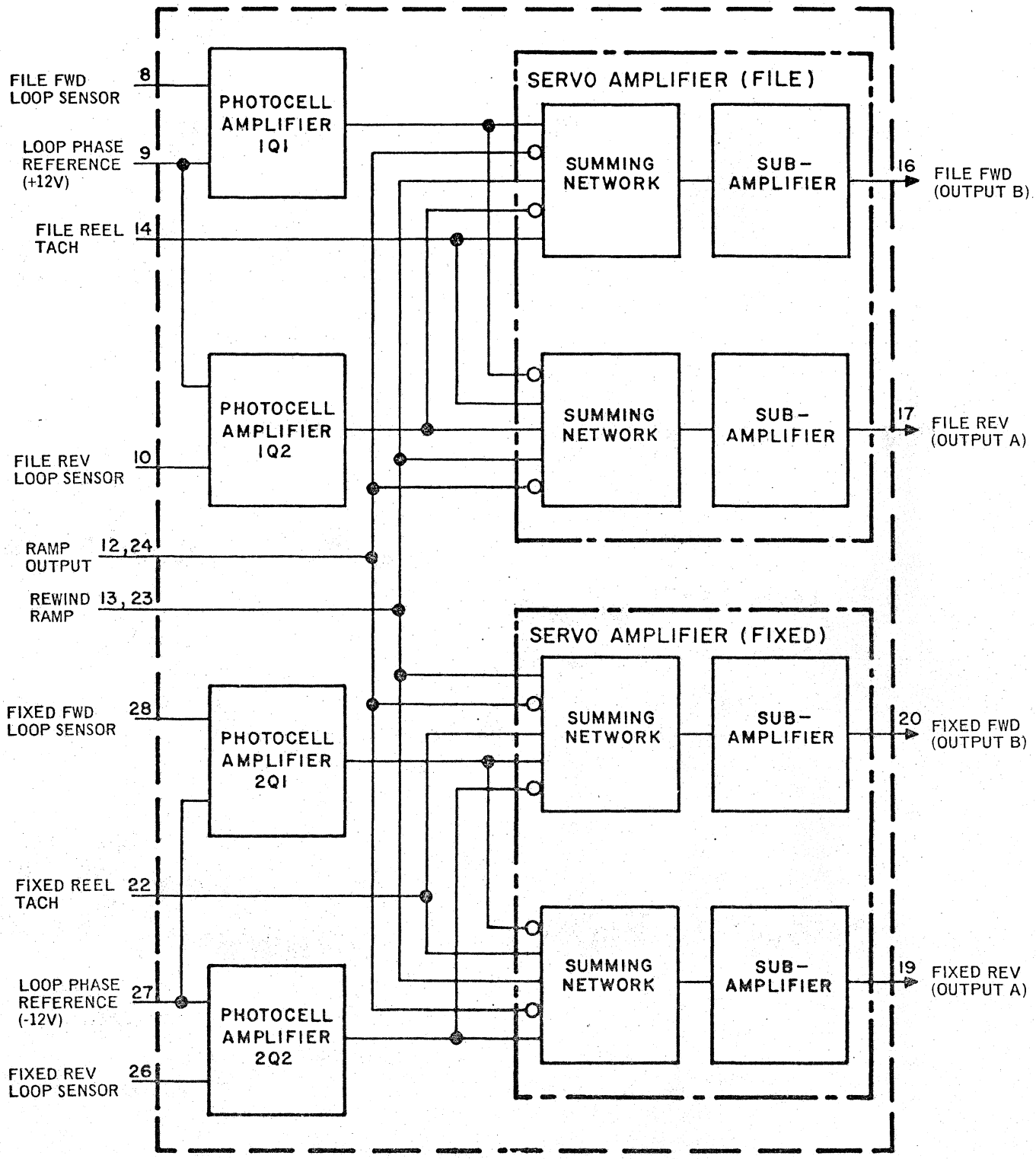


Figure 1
Reel Servo Control, Block Diagram

1. GENERAL DESCRIPTION.

The rewind logic PCB assembly provides the logic necessary to perform the rewind function. Several unit select logic circuits are also located on the assembly. Signal levels used in the following circuit descriptions are nominal. Refer to Tables 1 and 2 for operating signal levels.

2. THEORY OF OPERATION. (See Figure 1.)

REWIND (-) Output (Pin 28). The REWIND (-) output can be affected by the MASTER RESET input, the BOT input, or mechanization of one of the following logic equations.

(a) REWIND (-) = (REWIND PB) (Rewinding FF not set)

(b) REWIND (-) = (REWIND COMMAND) (SELECT & REMOTE) (Rewinding FF not set)

(c) REWIND (-) = (REWIND & LOCKOUT) (SELECT & REMOTE) (Rewinding FF not set)

When the MASTER RESET input momentarily goes to zero volts, OR gate diode CR3 is forward biased and the voltage at the base of Q2 swings positive, which causes Q2 to be cut off. The negative-going voltage at the collector of Q2 is coupled through R4 to the base of Q1, causing Q1 to saturate. The rewind flip-flop, consisting of Q1 and Q2, is then in the reset state. The REWIND (-) output is at zero volts.

When the BOT input goes to zero volts, OR gate diode CR4 is forward biased and the voltage at the base of Q2 swings positive, which resets the rewind flip-flop. The REWIND (-) output is at zero volts.

For mechanization of logic equation (a), the rewinding flip-flop must be in the reset state and the REWIND PB input must go to zero volts from an open circuit condition. When the rewinding flip-flop is in the reset state, the collector of Q5 is at -6 volts. R17 and C3 comprise an AND gate which is enabled by the -6 volts at the collector of Q5. The REWIND PB input voltage transition to zero volts is coupled through C3 as a positive pulse. The positive pulse is coupled through R4 to the base of Q1, causing Q1 to be cut off. The negative-going voltage at the collector of Q1 is coupled through R2 to the base of Q2, causing Q2 to saturate. The rewind flip-flop is then in the set state. The REWIND (-) output is at -6 volts.

For mechanization of logic equation (b), the rewinding flip-flop must be in the reset state, the SELECT & REMOTE (-) input must be at -12 volts, and the REWIND COMMAND (-) input must make a transition from 0 volts to -12 volts. When the rewinding flip-flop is in the reset state, the collector of Q5 is at -6 volts; this negative voltage is applied to the anode of

2. THEORY OF OPERATION. (Continued)

AND gate diode CR12. The output from the OR gate, consisting of diodes CR16 and CR17, is enabled by the negative voltage at CR12. The SELECT & REMOTE (-) input at -12 volts is applied to AND gate diode CR14; the negative voltage enables the output from AND gate transistor Q9. When the REWIND COMMAND (-) input goes to -12 volts, Q8 and Q9 are cut off. The negative voltage level at the collector of Q9 is coupled through OR gate diode CR16 and causes Q3 to be saturated. The positive-going voltage at the collector of Q3 is coupled (as a positive pulse) through CR4 and CR6 to the base of Q1; the positive pulse sets the rewind flip-flop. The REWIND (-) output is at -6 volts.

For mechanization of logic equation (c), the rewinding flip-flop must be in the reset state, the SELECT & REMOTE (-) input must be at -12 volts, and the REWIND & LOCKOUT (-) input must make a transition from 0 volts to -12 volts. When the rewinding flip-flop is in the reset state, the collector of Q5 is at -6 volts; this negative voltage is applied to the anode of AND gate diode CR12. The output from the OR gate consisting of diodes CR16 and CR17 is enabled by the negative voltage at CR12. The SELECT & REMOTE (-) input at -12 volts is applied to AND gate diode CR15; the negative voltage enables the output from the other AND diode, CR25. When the REWIND & LOCKOUT (-) input goes to -12 volts, Q15 and Q16 are cut off. The negative voltage level at the collector of Q16 is coupled through AND gate diode CR25 and OR gate diode CR17 and causes Q3 to be saturated. The positive-going voltage at the collector of Q3 is coupled (as a positive pulse) through CR4 and CR6 to the base of Q1; the positive pulse sets the rewind flip-flop. The REWIND (-) output is at -6 volts.

REWIND (+) Output (Pin 26). The REWIND (+) output is the complement signal of REWIND (-). Output voltages and their derivations are the same.

REWINDING (-) Output (Pin 32). The REWINDING (-) output can be affected by the MASTER RESET input, the rewind flip-flop in the set state, the BOT input, or mechanization of the following logic equation.

$$\overline{\text{REWINDING}}\ (-) = [\text{FORWARD}\ (+)]\ [\text{TIME DELAY}\ (+)]$$

The rewinding flip-flop cannot be reset while the rewind flip-flop is set.

When the MASTER RESET input momentarily goes to zero volts, CR8 is forward biased and the voltage at the base of Q5 swings positive, which causes Q5 to be cut off. The negative-going voltage at the collector of Q5 is coupled through R13 to the base of Q4, causing Q4 to saturate. The rewinding flip-flop, consisting of Q4 and Q5, is then in the reset state. (The MASTER RESET input also resets the rewind flip-flop.) The REWINDING (-) output is at zero volts.

2. THEORY OF OPERATION. (Continued)

When the rewind flip-flop is in the set state, the collector of Q1 is at -6 volts; the negative voltage level is coupled through R12 to the base of Q5, causing Q5 to be saturated. The positive-going voltage at the collector of Q5 is coupled through R13 to the base of Q4, causing Q4 to be cut off. The rewinding flip-flop is then held in the set state. The REWINDING (-) output is at -6 volts.

When the BOT input makes a transition from -6 volts to 0 volts, the positive-going voltage is coupled (as a positive pulse) through C8, the input of a single-shot multivibrator consisting of Q6 and Q7. In the quiescent condition, Q7 is saturated and Q6 is cut off. The positive pulse from C8 is coupled through C9 to the base of Q7, causing Q7 to be cut off. When Q7 is cut off, the voltage at the base of Q6 goes positive, which causes Q6 to saturate. Timing capacitor C9 starts charging through R21 and Q6; current flow through R21 holes Q7 cut off. Approximately 500 milliseconds after the positive pulse input, the charge on timing capacitor C9 reaches a level where current flow through R21 is insufficient to hold Q7 cut off. Q7 is biased on and Q6 is cut off. The positive-going voltage at the collector of Q7 is coupled through C10 (as a positive pulse) and OR gate diode CR11 to the base of Q5; the positive pulse resets the rewinding flip-flop. (The BOT input reset the rewind flip-flop when the time-delay sequence was initiated.) The REWINDING (-) output is at zero volts. Timing capacitor C9 discharges when the single-shot stage is in the quiescent condition.

For mechanization of the logic equation, the FORWARD (+) input must be at 0 volts and the TIME DELAY (+) input must make a transition from -6 volts to 0 volts. The FORWARD (+) input at zero volts enables the differentiator AND gate consisting of R18 and C7. When the TIME DELAY (+) input makes a transition from -6 volts to 0 volts, the positive-going voltage is coupled (as a positive pulse) through C7 and OR gate diode CR13 to the base of Q5; the positive pulse resets the rewinding flip-flop (providing that the rewind flip-flop has been reset). The REWINDING (-) output is at zero volts.

REWINDING (+) Output (Pin 30). The REWINDING (+) output is the complement signal of REWINDING (-). Output voltages and their derivations are the same.

GO LOCAL (-) Output (Pin 9). The GO LOCAL (-) output is controlled by the REWIND & LOCKOUT (-) input. When the REWIND & LOCKOUT (-) input goes to -12 volts, Q15 and Q16 are cut off. CR26 is reverse biased and the GO LOCAL (-) output is at -12 volts (through 3.6K resistor R51). When the REWIND & LOCKOUT (-) input is at 0 volts, Q16 is saturated and CR26 is forward biased; the GO LOCAL (-) output is at zero volts.

2. THEORY OF OPERATION. (Continued)

UNIT SELECT (+) Output (Pin 17). The UNIT SELECT (+) output is controlled by the SELECT & REMOTE (-) input. When the SELECT & REMOTE input is at -12 volts, Q10 is biased to saturation. The UNIT SELECT (+) output is at zero volts (the collector voltage of Q10). When the SELECT & REMOTE (-) input is at 0 volts, Q10 is cut off and the UNIT SELECT (+) output is -12 volts (through R34).

REWINDING STATUS (-) Output (Pin 34). The REWINDING STATUS (-) output is affected by mechanization of the following logic equation.

REWINDING STATUS (-) = (SELECT & REMOTE) (Rewinding FF set)

For mechanization of the logic equation, the SELECT & REMOTE (-) input must be at -12 volts and the rewinding flip-flop must be in the set state. The SELECT & REMOTE (-) input at -12 volts causes Q10 to be saturated and 0 volts to be applied to AND gate diode CR19. When the rewinding flip-flop is in the set state, zero volts is applied to AND gate diode CR18. With 0 volts applied to both AND gate diodes, Q11 is cut off and line driver Q12 is biased to saturation. The REWINDING STATUS (-) output is -12 volts (through 125 ohm resistor R38).

When the input to either AND gate diode is negative, Q11 is biased to saturation and Q12 is cut off. The REWINDING STATUS (-) output is zero volts (through CR20).

HI/LOW DENSITY STATUS (-/+) Output (Pin 19). The HI/LO DENSITY STATUS output is affected by the SELECT & REMOTE (-) input and the HI/LO DENSITY input.

When the SELECT & REMOTE (-) input is at -12 volts, Q10 is biased to saturation and 0 volts is applied to AND gate diode CR27. When the HI/LO DENSITY input is at -12 volts, AND gate transistor Q17 is cut off. With the AND gate transistor cut off and 0 volts applied to the AND gate diode, Q18 is cut off and line driver Q19 is biased to saturation. The HI/LO DENSITY STATUS output is -12 volts (through 125 ohm resistor R56).

When either the SELECT & REMOTE (-) input or the HI/LO DENSITY input is at 0 volts, Q18 is biased to saturation and Q19 is cut off. The HI/LO DENSITY STATUS output is zero volts (through CR28).

2. THEORY OF OPERATION. (Continued)

READY (-) Output (Pin 20). The READY (-) output is controlled by a three input AND gate, consisting of diodes CR21, CR22, and CR23. When the inputs to the three AND gate diodes are all at 0 volts, Q13 is cut off and line driver Q14 is biased to saturation. The READY (-) output is -12 volts (through 125 ohm resistor R43).

When the input to any of the three AND gate diodes is at -6 volts (or more negative), Q13 is biased to saturation and Q14 is cut off. The READY (-) output is 0 volts (through CR24).

The input to CR21 is from the collector of Q10, which is at 0 volts when the UNIT SELECT (-) input is at -12 volts. The input to CR22 is the READY (+) input. The input to CR23 is the READY INHIBIT (-) input.

3. POWER REQUIREMENTS.

VOLTAGE	CURRENT
+12 VDC ±3%	8 ma max
-12 VDC ±3%	81 ma max
- 6 VDC ±4%	18 ma max

TABLE 1
REWIND LOGIC, INPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
11	REWIND AND LOCKOUT (-)	0 ±1.25 volts	-12 ±2 volts
12	REWIND COMMAND (-)	0 ±1.25 volts	-12 ±2 volts
14	REWIND PB (+)	0 volts	Open circuit
15	READY INHIBIT (-)	0 to -1 volt	-5.9 to -12 volts
16	SELECT & REMOTE (-)	0 to -1 volt	-10 to -12.36 volts
18	HI/LO DENSITY (-/+)	0 volts	-12 volts
21	BOT (+)	0 to -1 volt	-5.9 to -6.6 volts
22	TIME DELAY (+)	0 to -1 volt	-5.9 to -6.6 volts
24	FWD (+)	0 to -1 volt	-5.9 to -6.6 volts
33	READY (+)	+4 to +6.2 volts	-4 to -6.2 volts
35	MASTER RESET (+)	0 to -1 volt	-7 to -12.36 volts

TABLE 2
REWIND LOGIC, OUTPUT SIGNAL LEVELS

PIN NO.	SIGNAL DESIGNATION	HIGH LEVEL	LOW LEVEL
9	GO LOCAL (-)	0 to -1 volt	-5.8 to -7 volts*
17	UNIT SELECT (+)	0 to -1 volt	-5 to -6.2 volts
19	HI/LO DENSITY STATUS (-/+)	0 to -1 volt	-10 to -12.36 volts
20	READY (-)	0 to -1 volt	-10 to -12.36 volts
26	REWIND (+)	0 to -1 volt	-5.8 to -7 volts
28	REWIND (-)	0 to -1 volt	-5.8 to -7 volts
30	REWINDING (+)	0 to -1 volt	-5.8 to -7 volts
32	REWINDING (-)	0 to -1 volt	-5.8 to -7 volts
34	REWINDING STATUS (-)	0 to -1 volt	-10 to -12.36 volts

*Established by current flow through external circuits normally used.

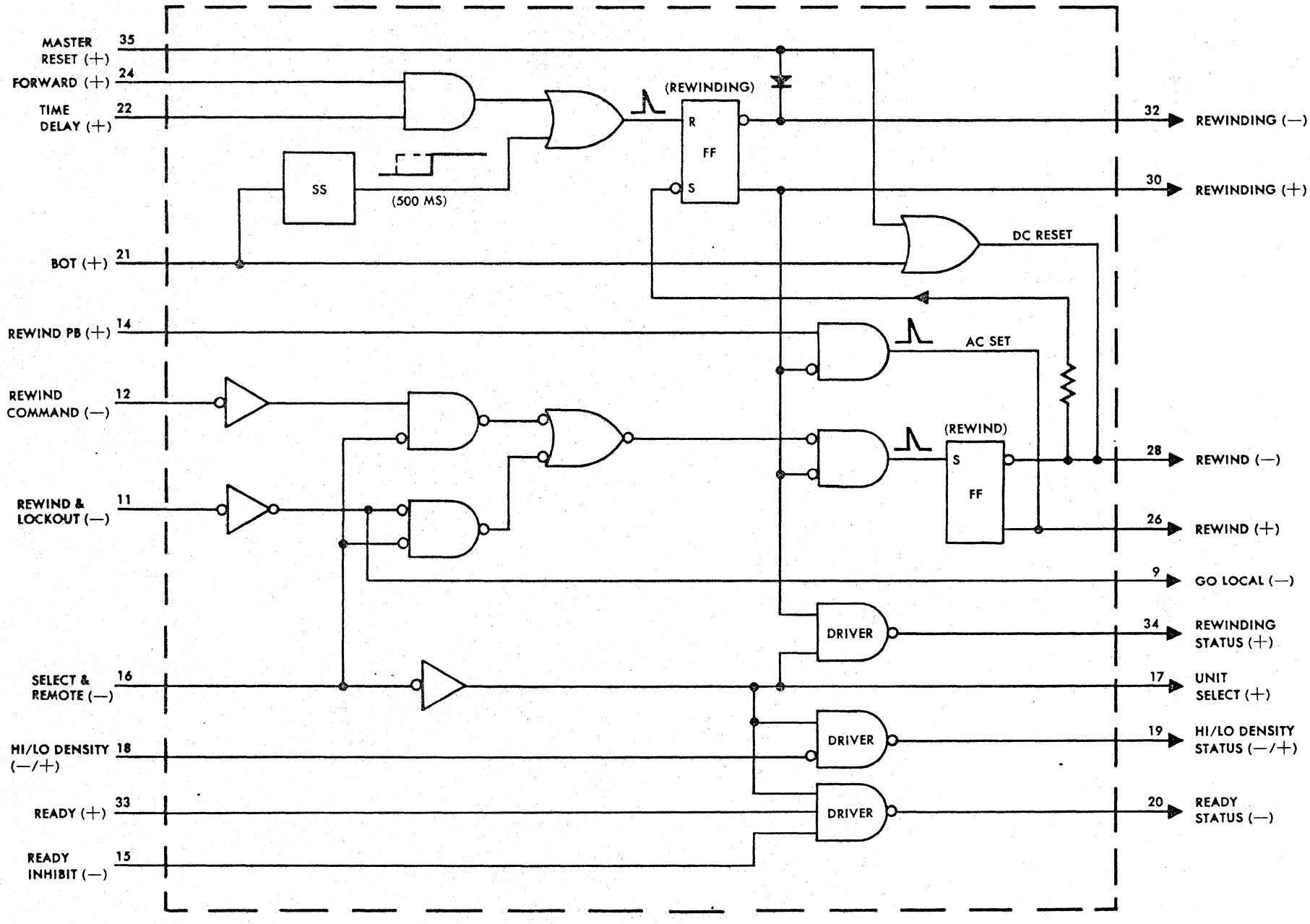


Figure 1
Rewind Logic -D, Logic Diagram

SECTION VII
DRAWINGS

7-1. INTRODUCTION.

Drawings in this section are located in the sequence shown in the following list.

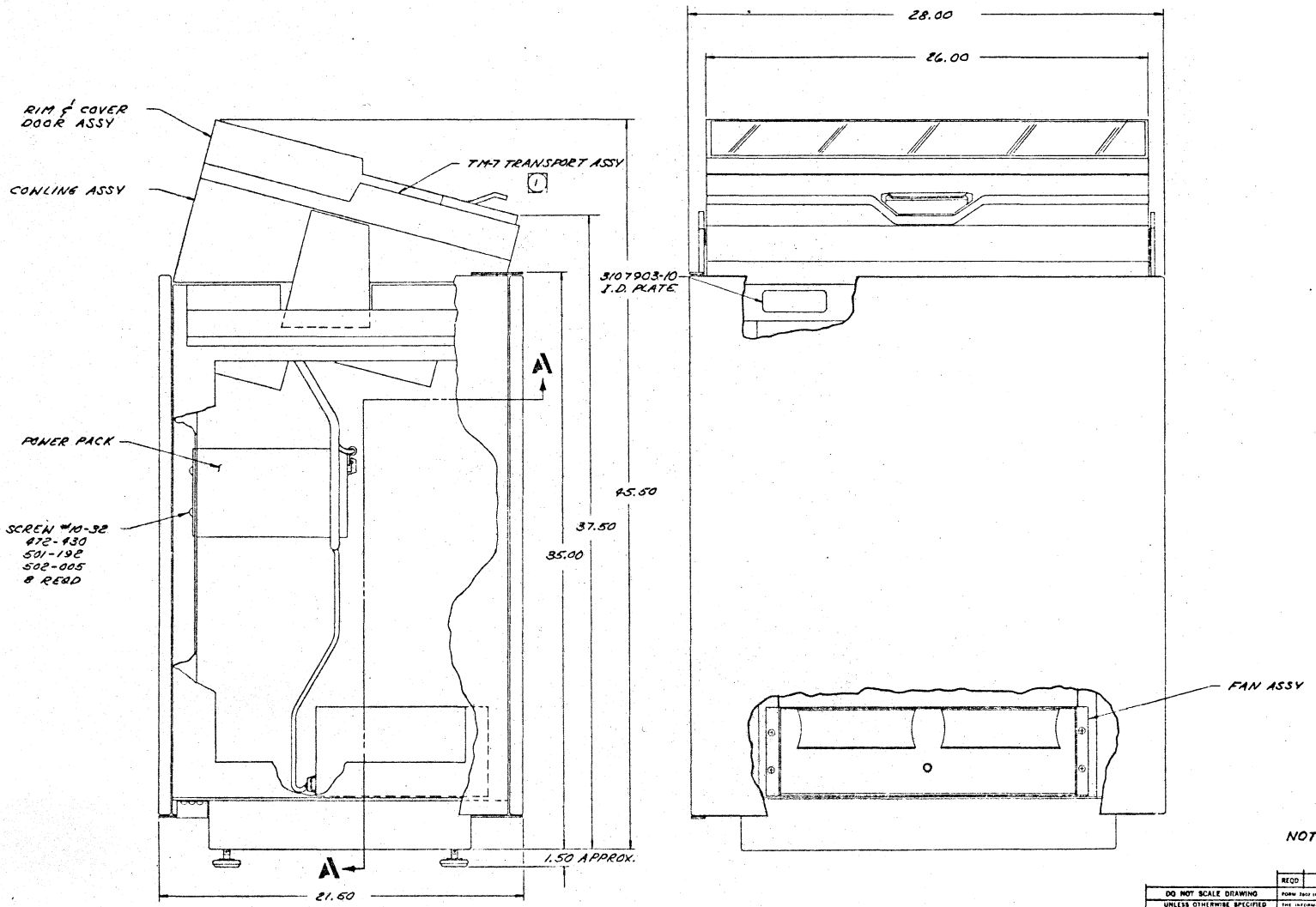
LIST OF DRAWINGS

DESCRIPTION	SCHEMATIC	ASSY DWG
Cable Diagrams		
TM-7 with Logic Power Supply (Unshared DE)	3107263	---
TM-7 with Logic Power Supply (Shared DE)	3107228	---
TM-7 with Logic Power Supply & Transport Power Supply	3111604	---
TM-7 with Power Pack	3111605	---
Operator Control Panels		
Part No. 3108382-10 & 3108384-10	3108394	3108381
Outline and Installation Drawings		
TM-7 without Data Electronics		
Tape Transport (only)	---	3108303
Tape Transport with Power Pack (Console Cabinet)	---	3111624
Tape Transport with Logic Power Supply and Transport Power Supply (Console Cabinet)	---	3111625
Tape Transport (Ampex 19" Rack Cabinet)	---	3113074
Tape Transport Custom Hinge Assy & Installation	---	3111483
TM-7 with Data Electronics (Unshared)		
Tape Memory System (Console Cabinet)	---	3108580
Tape Memory System (Ampex 19" Rack Cabinet)	---	3109928
TM-7 with Data Electronics (Shared)		
Tape Memory System (4 - 1 x 1 Console Cabinets)	---	3114741
Tape Memory System (1 - 1 x 4 Cabinet)	---	3117294

LIST OF DRAWINGS
(Continued)

DESCRIPTION	SCHEMATIC	ASSY DWG
Power Supply		
Capstan Power Supply & I/O Panel		
Part No. 3111752-10 & 3111601-10	3119640	3119639
Logic Power Supply -D		
Part No. 3109850-10 & 3111340-10	3109852	3111546
Regulator Board	3109852	3109853
Part No. 3117240-10 & 3117245-10	3117242	3117241
Regulator Board	3117242	3109853
Transport Power Pack		
Part No. 3108396-10 & 3111626-10	3108411	3111627
Regulator Board	3111899	3109907
Transport Power Supply		
Part No. 3108640-10 & 3111338-10	3108647	3108648
Part No. 3108645-10 & 3111551-10	3108647	3108648
Part No. 3111150-10 & 3111552-10	3108647	3108648
Printed Circuit Boards		
CSA Capstan Servo Control	3107098	3112172
FLA Forward/Reverse Logic	3107083	3119599
FLC Forward/Reverse Logic -C	3112361	3118158
LLA Local/Remote Logic	3107103	3107260
PHB Photoamplifier	3107073	3107257
RCA Reel Servo Control	3107093	3112169
RLD Rewind Logic -D	3118224	3118223
Reel Servo Supply		
Part No. 3108351-10 & 3111326-10	3108352	3111325
Part No. 3113078-10 & 3113095-10	3113078	3115106
Tape Transport Basic Assy		
Part No. 3112217-10	3108558	3111517
Transport Electronics Assy		
Part No. 3108628-10	3108637	3108628
Transport Control Electronics Logic		
Forward/Reverse-Run/Stop	3108649	--
Forward/Stop-Reverse/Stop	3115425	--

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
B	ERN 101-36			



2 FOR CABLE CONNECTIONS SEE 3111605

☑ FOR INSTALLATION SEE 3108303.

NOTES:

REQD	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
FULL ANGLES.
DECIMALS ANGLES
XX ± .03 XXX ± .010 ± 1°
BREAK ALL SHARP EDGES APPROX. .010
C BSURF AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
√ PER MIL STD-10

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PROJ		
SUPER		
PROJ		
ENGR		
ENGR		
CHKR		
DFTSMN		

MATERIAL

FINISH

FINAL A/A	TM7
NEXT ASSY	1ST USED ON
APPLICATION	

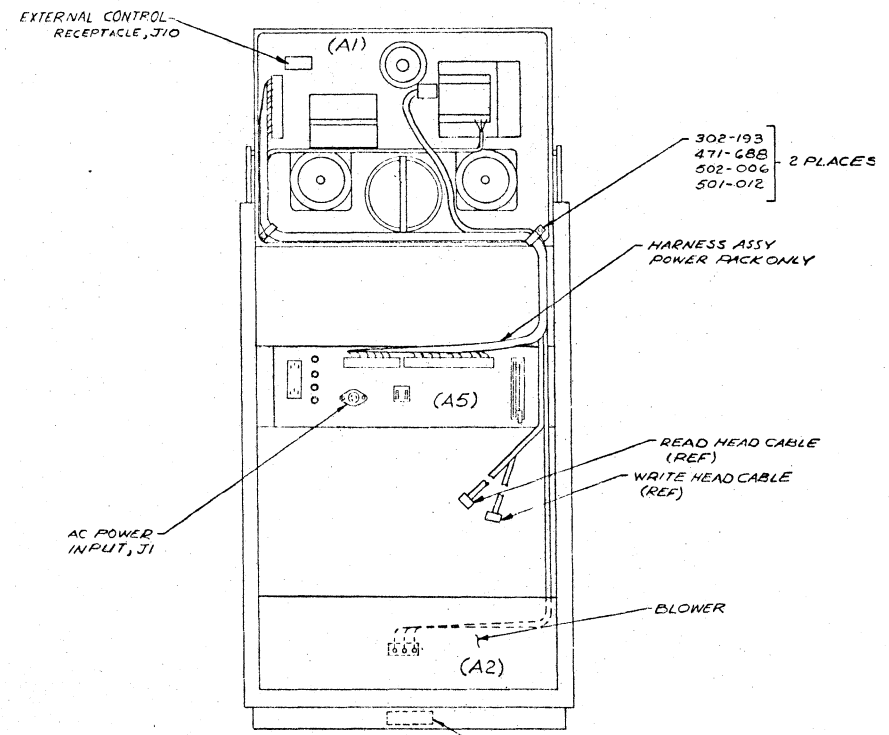
AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
TM7 W/POWER PACK OUTLINE & INSTALLATION

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111624 SHT 1 OF 2	B

SCALE NONE

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	FE SHEET 1			



SECTION **A-A**

TAPE TRANSPORT
ROTATED 90°

NOTES: UNLESS OTHERWISE SPECIFIED

REQD	PART NO	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
XX ± .03 XXX ± .010 ± 1°
BREAK ALL SHARP EDGES APPROX .010
CRBHT AND SPOTFACE CORNER
FINISH 010
ROUGHNESS OF ALL MACHINED SURFACES
✓ PER MIL STD 10

PROJ ENGR
PROD SUPER
PROD ENGR
CHKR
DFTSMN

FINAL B/M	TM 7
NEXT ASSY.	1ST USED ON
APPLICATION	

MATERIAL
FINISH

AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
TM 7 W/POWER PACK
OUTLINE & INSTALLATION

CODE IDENT. NO | SIZE D | DWG. NO. 3111624 SHT 2 OF 2 | ISSUE B

SCALE NONE

REVISIONS				
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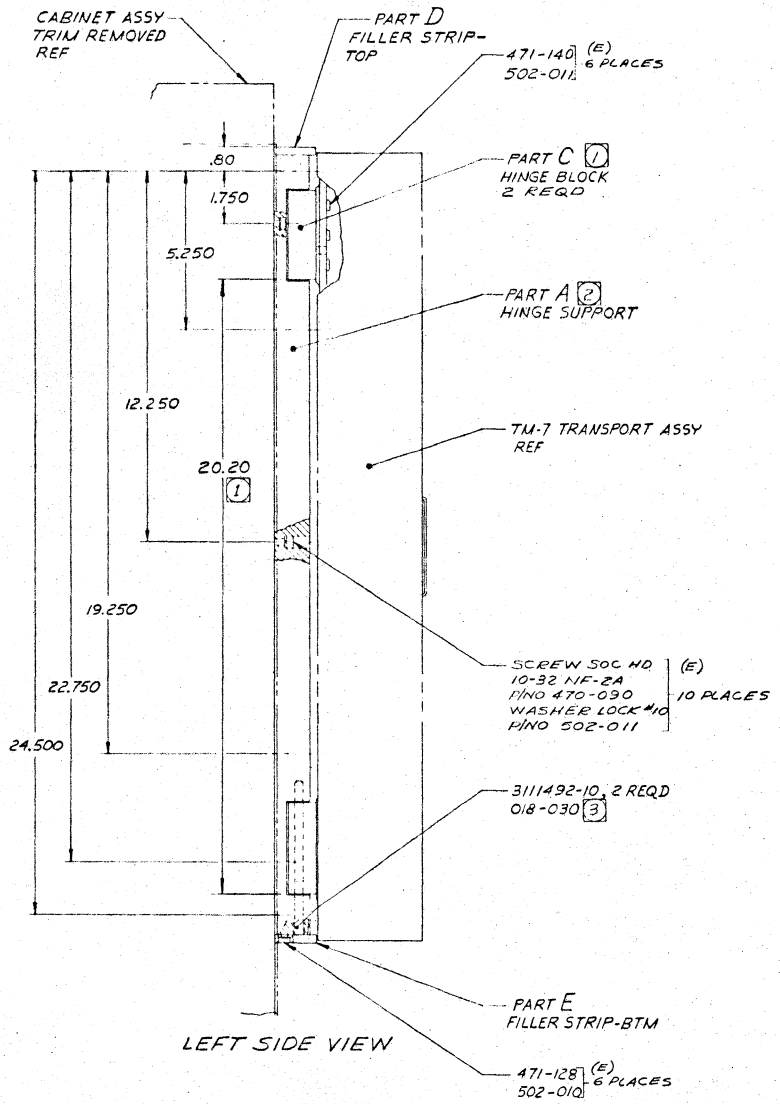
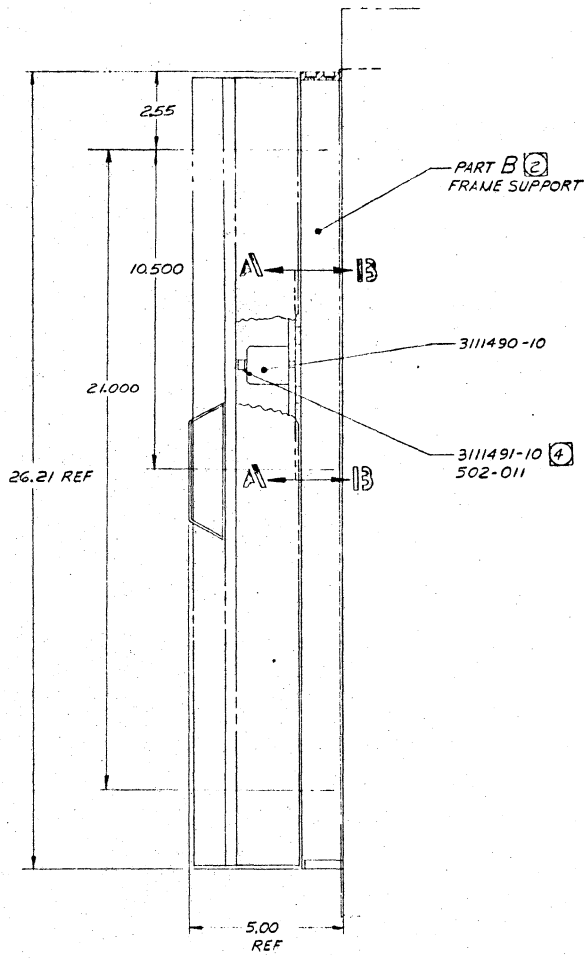
B	ECN 3623	TKROVICH	11-69	



LEFT SIDE VIEW



RIGHT SIDE VIEW

3111483

6. PART NO TO BE AS SHOWN IN P/M.
5. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

[4] ADJUST, IF NECESSARY, FRAME SUPPORT, FASTENER BLOCK AND TRANSPORT ASSY. (ON HINGE BLOCK) SO THAT CAPTIVE SCREW (3111491-10) ALIGNS WITH MOUNTING HOLE IN FRAME SUPPORT.

[3] LIFT TRANSPORT ASSY. BY USE OF LIFT-EYE (3111505-10) AND ALIGN HINGE BLOCK WITH HINGE SUPPORT. INSERT HINGE PINS (3111492-10) AND PLACE LOCTITE "C" (018-030) ON LAST THREE (3) THREADS BEFORE TIGHTENING.

[2] MOUNT HINGE SUPPORT (PART A) TO LEFT MOUNTING SURFACE AND FRAME SUPPORT (PART B) TO RIGHT MOUNTING SURFACE. DO NOT TIGHTEN DOWN FRAME SUPPORT (PART B).

[1] MOUNT HINGE BLOCK (PART C) TO TM-7 TRANSPORT. DO NOT TIGHTEN DOWN. ALIGN HINGE BLOCKS TO DIMENSION AS SHOWN.

NOTES

REFERENCES

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
XX ± .01 XXX ± .005 ±
BREAK ALL SHARP EDGES APPROX .010 CHORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

PROJ SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
HINGE ASSY & INSTALLATION
19" VERTICAL MOUNTING

3109889	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111483	B

SCALE 1:2 SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
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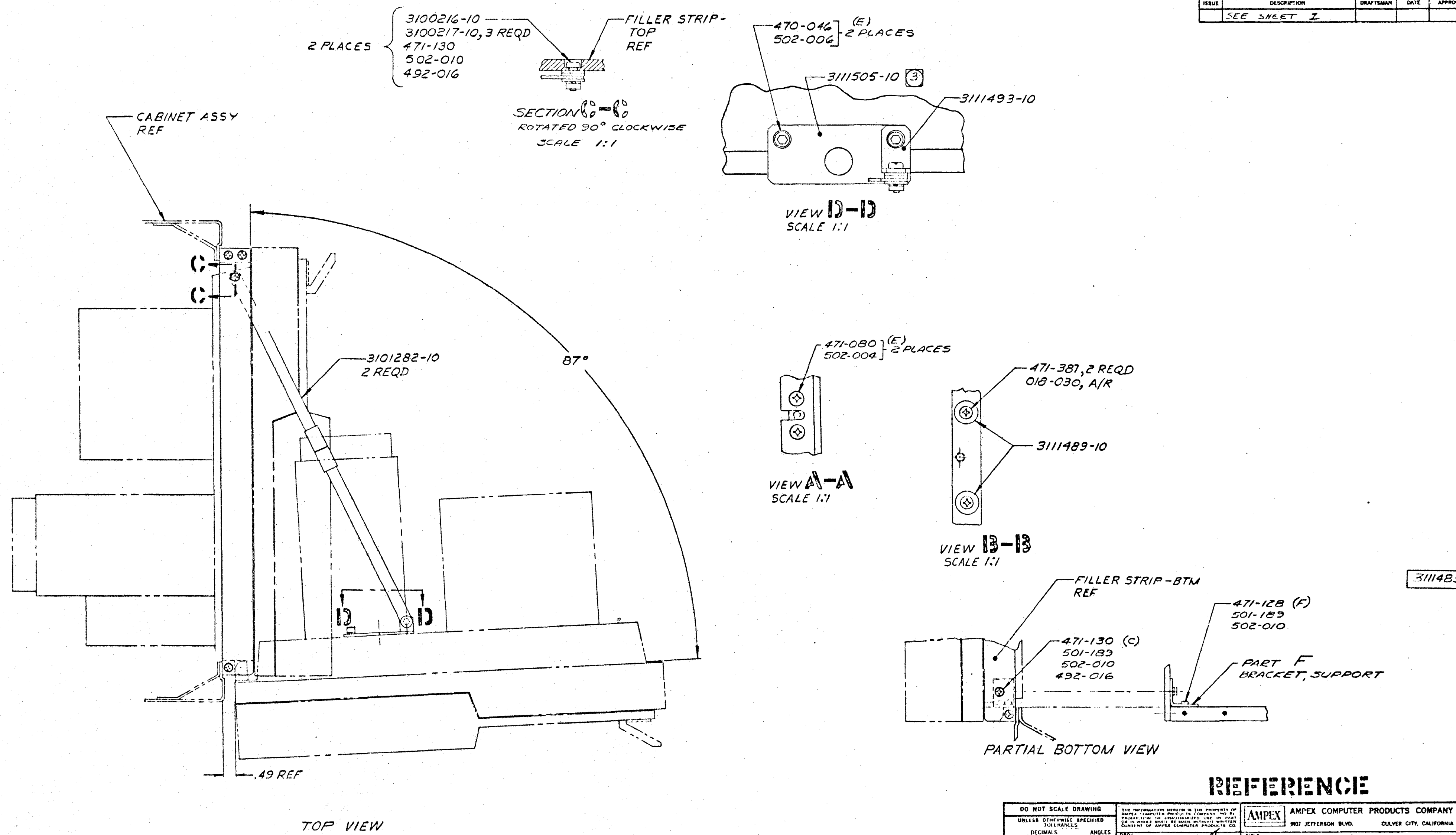

3111483

REFERENCE

3109889	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

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UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

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CHKR
DFTSMN

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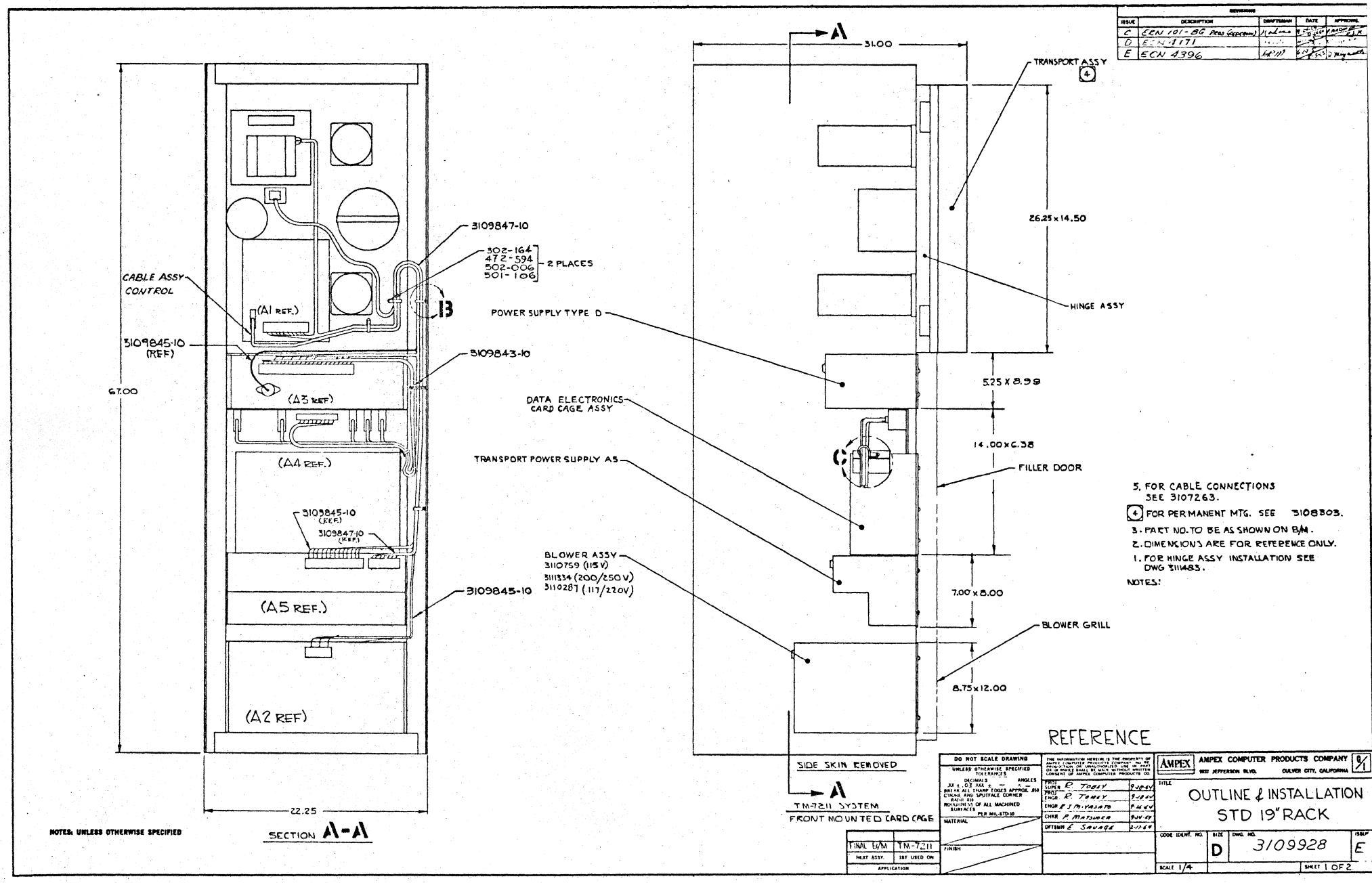
TITLE: HINGE ASSY & INSTALLATION 19" VERTICAL MOUNTING

CODE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3111483	B

SCALE 1:2 — SHEET 2 OF 2



ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
C	ECN 101-86 Prod Release			
D	ECN 1171			
E	ECN 4396			

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DECIMALS .XX ± .03 .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX .010 CHAMF AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

FINAL B/M	TM-7211
NEXT ASSY.	1ST USED ON
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SUPER	R. Tobey	9-64
PROJ ENGR	R. Tobey	9-64
ENGR	J. Yasaitis	9-64
CHKR	R. Matsuda	9-64
DFTSMN	E. Savage	9-64

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
OUTLINE & INSTALLATION STD 19" RACK

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3109928	E

SCALE 1/4 SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
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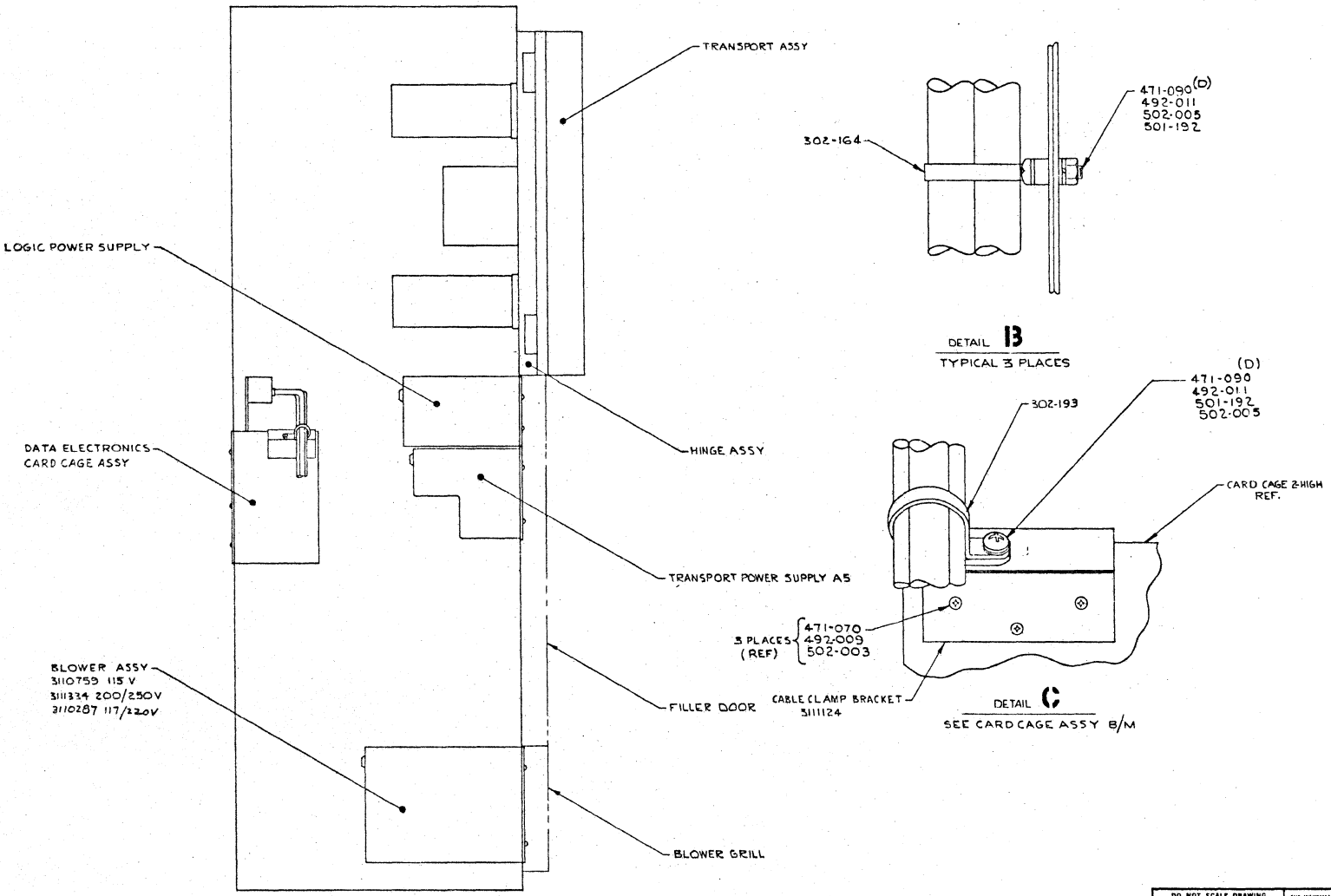

REAR MOUNTED CARD CAGE

DETAIL B
TYPICAL 3 PLACES

DETAIL C
SEE CARD CAGE ASSY B/M

NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING		AMPEX COMPUTER PRODUCTS COMPANY 9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA	D/1
UNLESS OTHERWISE SPECIFIED TOLERANCES: DECIMALS .XX ± .03 .XXX ± — ANGLES ± — BREAK ALL SHARP EDGES APPROX. .010 CHAMF AND SPOTFACE CORNER RADII .010 ROUGHNESS OF ALL MACHINED SURFACES PER MIL STD 10	DRVN SUPER PROJ ENGR ENGR See SH 1 CHKR DFTSMN Eugene E. Savage 7-17-64	TITLE OUTLINE & INSTALLATION STD 19" RACK	
MATERIAL		CODE IDENT. NO.	SIZE D / DWG. NO. 3109928 / ISSUE E
FINISH		SCALE 1/4	SHEET 2 OF 2
NEXT ASSY. / 1ST USED ON / APPLICATION			

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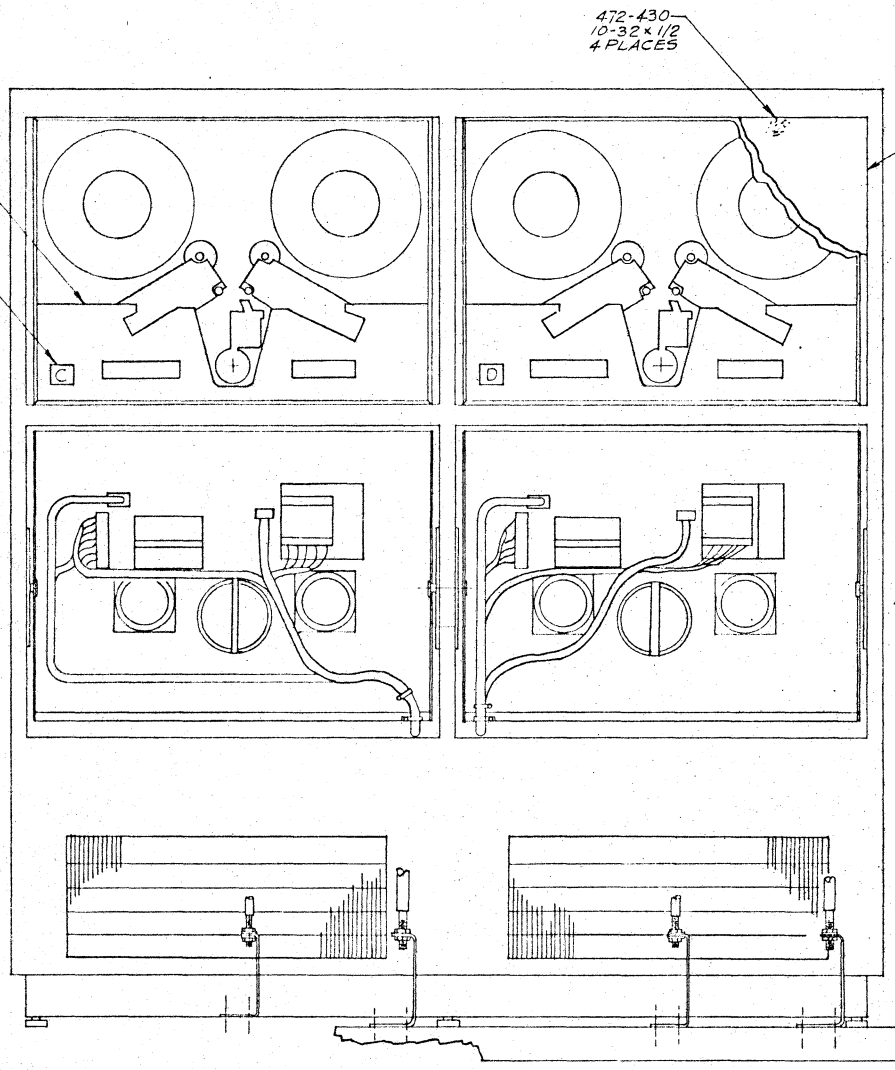
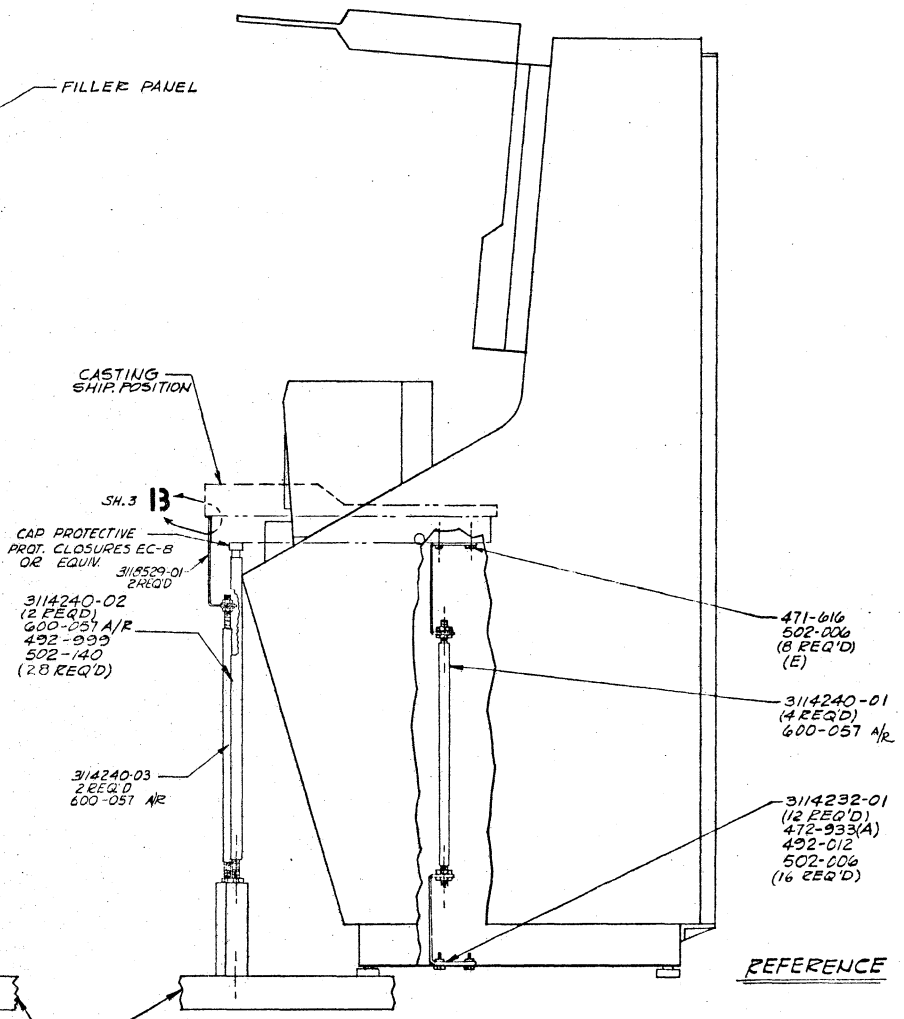


FRONT VIEW

TRANSPORTS "A" & "B" SHOWN IN SERVICE POSITION.
COVERS OF TRANSPORTS "C" & "D" REMOVED FOR CLARITY



REFERENCE

DO NOT SCALE DRAWING		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		
DECIMALS	TOLERANCES	ANGLES
XX ±	XXX ±	±
BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII APPROX. .010		
ROUGHNESS OF ALL MACHINED SURFACES — MIL STD 10		✓
MATERIAL		
FINISH		
FAL	TM 7212	
NEXT ASSY.	1ST USED ON	
APPLICATION		

DRFT	[illegible]	5-6-66
SUPER		
PROJ		
ENGR	J.	5-6-66
ENGR	[illegible]	5-6-66
CHKR	[illegible]	5-20-66
DRTSMN	[illegible]	4/18/66

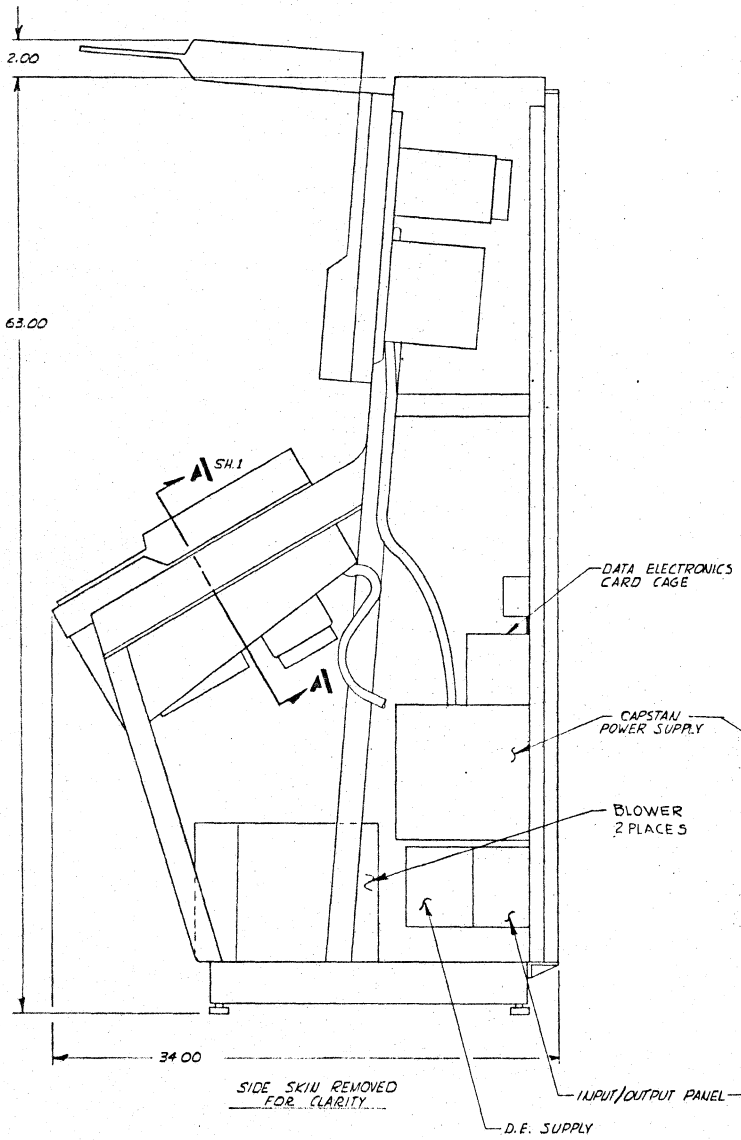
AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

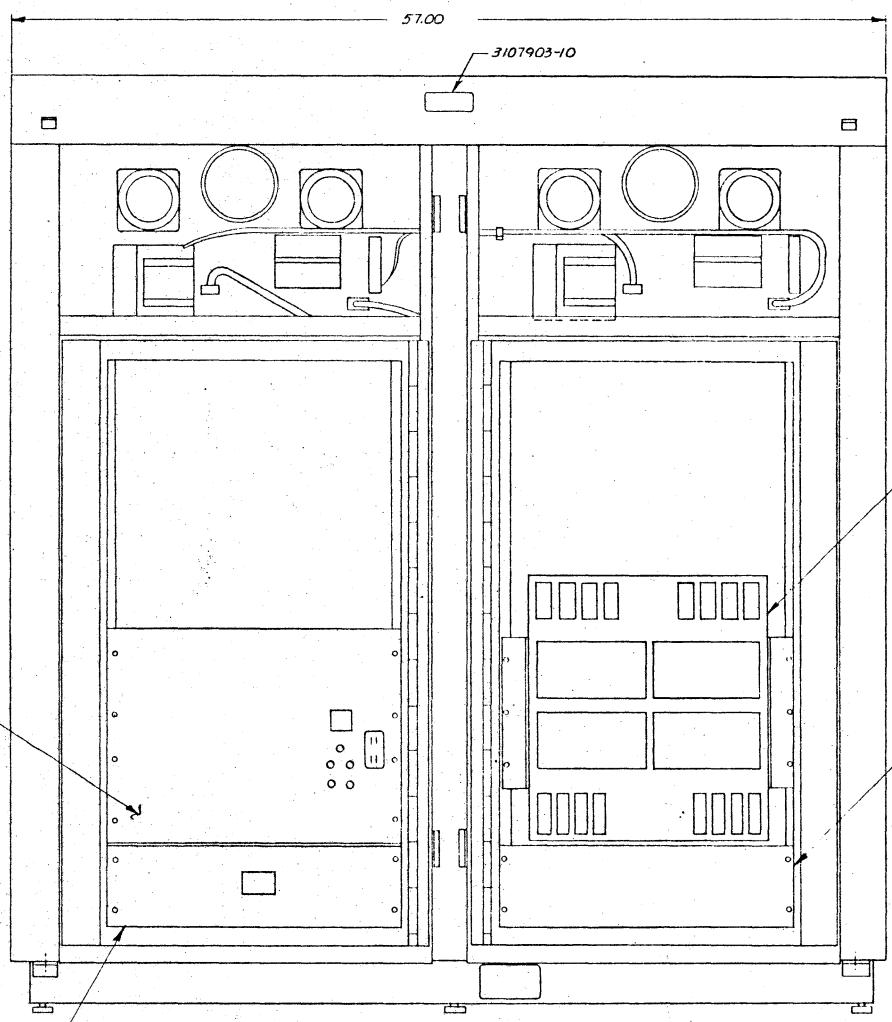
TITLE: OUTLINE & INSTALLATION
TM 7212

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117294

SCALE 1/4 SHEET 1 OF 3

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	SEE SHT 1				





REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
DECIMALS
.XX± — .XXX± — ±
BREAK ALL SHARP EDGES APPROX .010 (.25 MM) AND SPOTFACE CORNER VALVE APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES — PER MIL STD 10 ✓
MATERIAL
FINISH

DRAWN
CHKD
ENGR
OTHER
DFTSMAN

FAL	TM7212
NEXT ASSY.	1ST USED ON
APPLICATION	

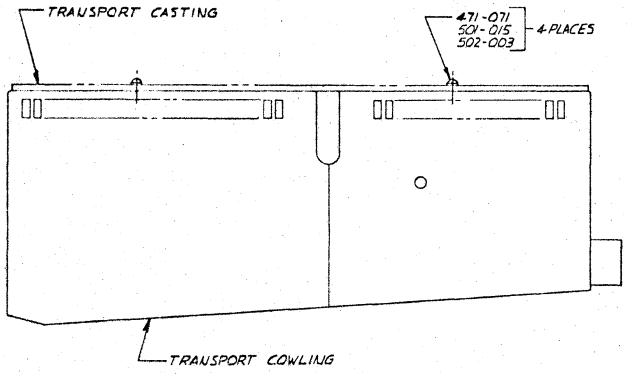
AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

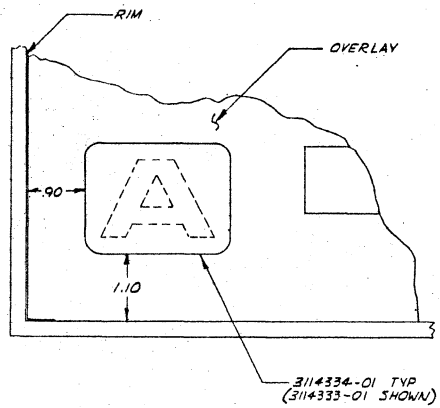
TITLE
OUTLINE & INSTALLATION
TM7212

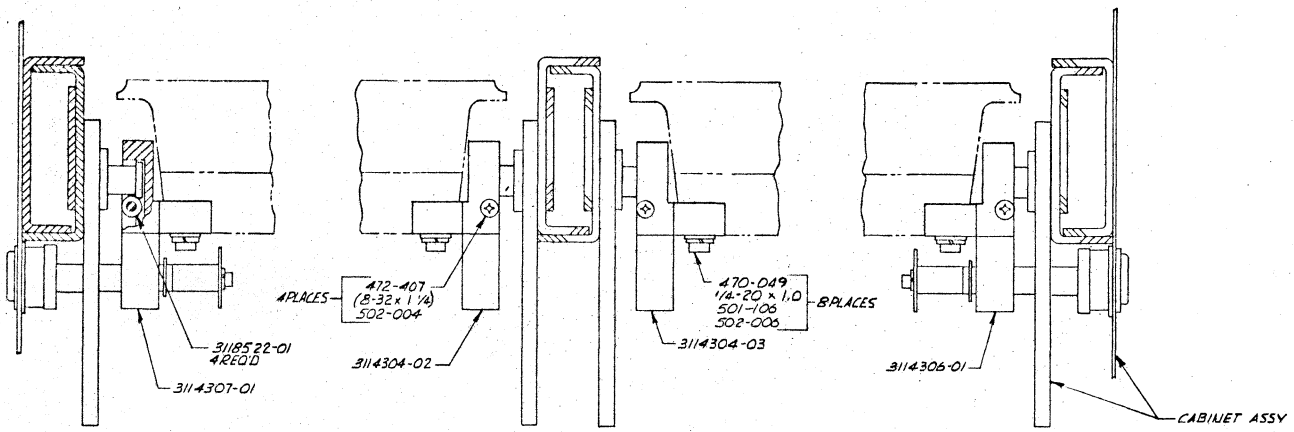
SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117294

SCALE 1/4 SHEET 1 OF 3

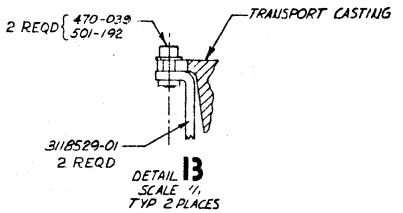
REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	SEE SHT 1				







SECTION A-A
SCALE 1/1
COWLING, RIM & COVER REMOVED FOR CLARITY



REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
.XX± — .XXX± — ±
BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES — PER MIL STD-10
MATERIAL
FINISH

DWG NO 3117294

PROJ SUPER	
PROJ ENGR	
ENGR	
CHKR	
DFTSMN	

PAL	TM7212
NEXT ASSY.	1ST USED ON
APPLICATION	

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

TITLE
OUTLINE & INSTALLATION
TM-7212

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117294

SCALE NOTED SHEET 2 OF 3

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	ERN 101-KB	27 Jan 67	[signature]	30 67	[signature]

VERSION TABLE 1						
TWO STANDARD LINE VOLTAGES (115 VAC & 220 VAC) VARIATIONS AROUND THESE VOLTAGES MAY BE USED IF CONNECTIONS ARE MADE AS INDICATED.				PART A (SEE CHART 2)	PART C	PART B
PART NO.	INPUT POWER	JUMPERS ON TS3	JUMPER ON TS1	CB1	F1	F5
3119637-01	115 VAC	AS PER WIRE LIST	9-10	126-039	070-020	070-042
3119638-01	220 VAC	1-3,5-7,2-9	9-11	126-027	070-002	070-016
-09	250 VAC	1-3,6-7,2-10	↕	↕	↕	↕
-08	240 VAC	1-4,6-7,2-10				
-07	235 VAC	1-3,5-7,2-10				
-06	230 VAC	1-4,6-8,2-10				
-05	225 VAC	1-3,5-8,2-10				
-04	215 VAC	1-4,5-8,2-10				
-03	210 VAC	1-4,5-7,2-9	↕	↕	↕	↕
3119638-02	200 VAC	1-4,5-8,2-9	9-11	126-027	070-002	070-016
3119637-04	125 VAC	1-3,3-7,2-6,6-10	9-10	126-039	070-020	070-042
-03	110 VAC	1-3,3-7,2-5,5-9	↕	↕	↕	↕
3119637-02	100 VAC	1-4,4-8,2-5,5-9	9-10	126-039	070-020	070-042

TABLE 2

FUSE & CB VALUES		
FUSE	LINE VOLTAGE	DESCRIPTION
F1	100 TO 125	BLOWER 5A SLOW BLOW
F5	100 TO 125	CAPSTAN TRANS 4A FAST BLOW
CB1	100 TO 125	SYSTEM 30A
F1	200 TO 250	BLOWER 3A SLOW BLOW
F5	200 TO 250	CAPSTAN TRANS 2A FAST BLOW
CB1	200 TO 250	SYSTEM 15A

11. ALL FOUR (4) DASH VERSIONS OF 3119637 HAVE IDENTICAL PARTS. ONLY VARIATION IS JUMPER CONNECTIONS ON TS3.
10. ALL NINE (9) DASH VERSIONS OF 3119638 HAVE IDENTICAL PARTS. ONLY VARIATION IS JUMPER CONNECTIONS ON TS3.
9. FOR INPUT VOLTAGES OTHER THAN 115 VAC SEE TABLES 1 & 2 , SHEET 1.
8. MARK NAME INFORMATION PER MIL-STD-130.
7. PART NO. TO BE AS SHOWN IN VERSION TABLE.
6. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
5. FOR WIRE LIST SEE B/M 3119641, ISS. B FOR 115 VAC INPUT.
4. FOR SCHEMATIC SEE 3119640, ISS. B.
3. FOR TECHNICAL REQUIREMENT SPEC. SEE 3111580, ISS.
2. FOR ASSY SPEC. SEE 3111579, ISS.
1. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

NOTES:

REFERENCE

NEXT ASSY.	1ST USED ON
3119637	TM-7212
3119638	TM-7212
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

DECIMALS TOLERANCES ANGLES

.XX± — .XXX± — ± —

BREAK ALL SHARP EDGES APPROX. .010. C'BORE AND SPOTFACE CORNER RADII APPROX. .010

ROUGHNESS OF ALL MACHINED SURFACES —— PER MIL STD 10 ✓

MATERIAL

FINISH

DWG. NO. 3119639

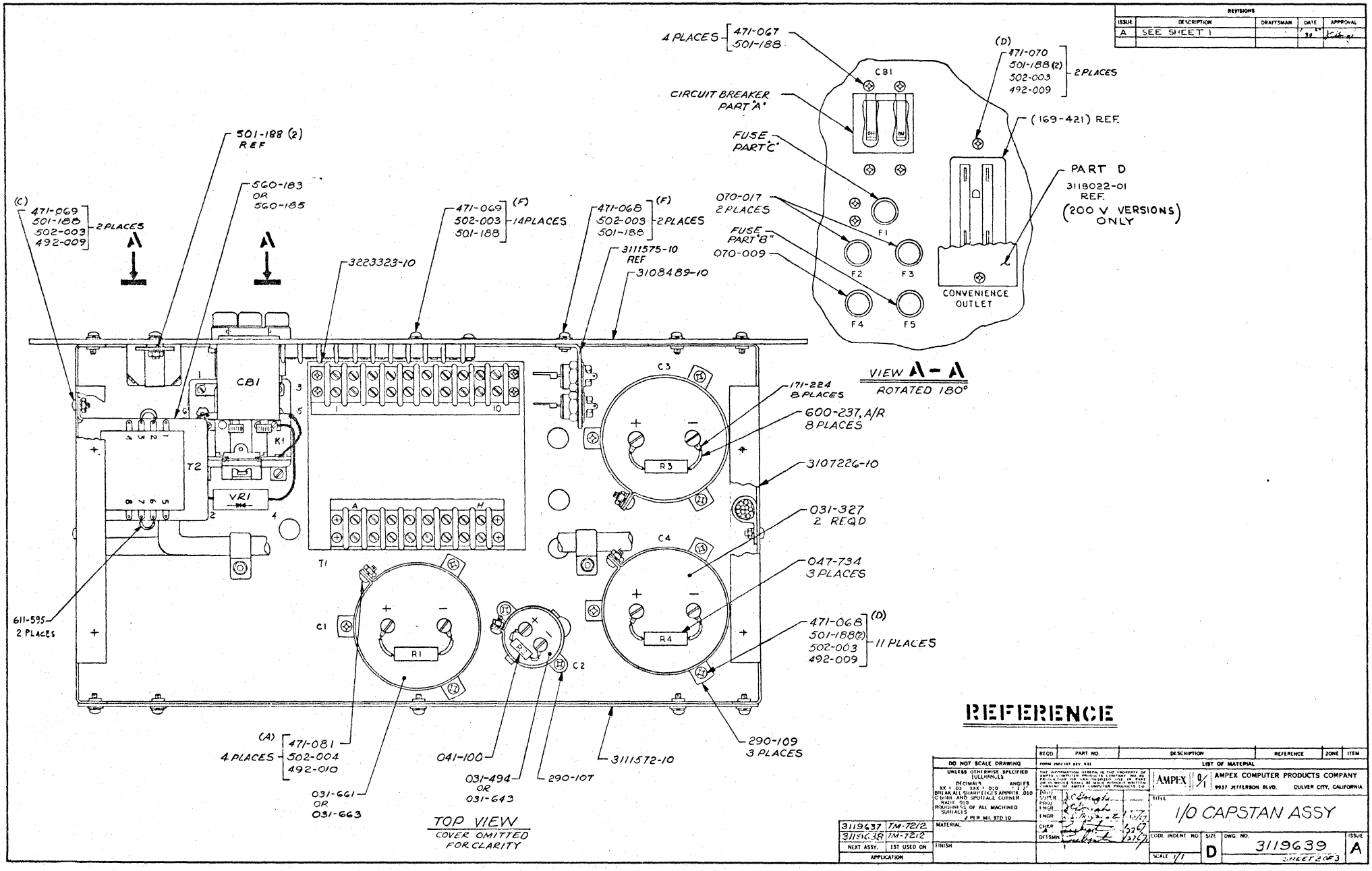
PROJ SUPER	[signature]	1-10-67
PROJ ENGR		
ENGR	[signature]	1 27 67
CHKR	[signature]	27 Jan 67
DFTSMN	D.W. Gibbs	1 20 67

AMPEX COMPUTER PRODUCTS DIVISION P.O. BOX 329, CULVER CITY, CALIF.

TITLE: I/O CAPSTAN ASSY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3119639

SCALE: None SHEET 1 OF 3



REFERENCE

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	SEE SHEET 1		5/8	

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES: DECIMALS XX ± .03 XXX ± .010; ANGLES ± 1°; BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII .010; ROUGHNESS OF ALL MACHINED SURFACES √ PER MIL STD 10

THE INFORMATION HEREIN IS THE PROPERTY OF AMPEX COMPUTER PRODUCTS COMPANY AND IS PROTECTION OF ITS PROPRIETARY USE IN PART OR AS A WHOLE IS NOT PERMITTED WITHOUT THE WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.

DRAWN J.C. Gough 11/67
PROJ
ENGR
ENGR
CHK'D
DFTSMN

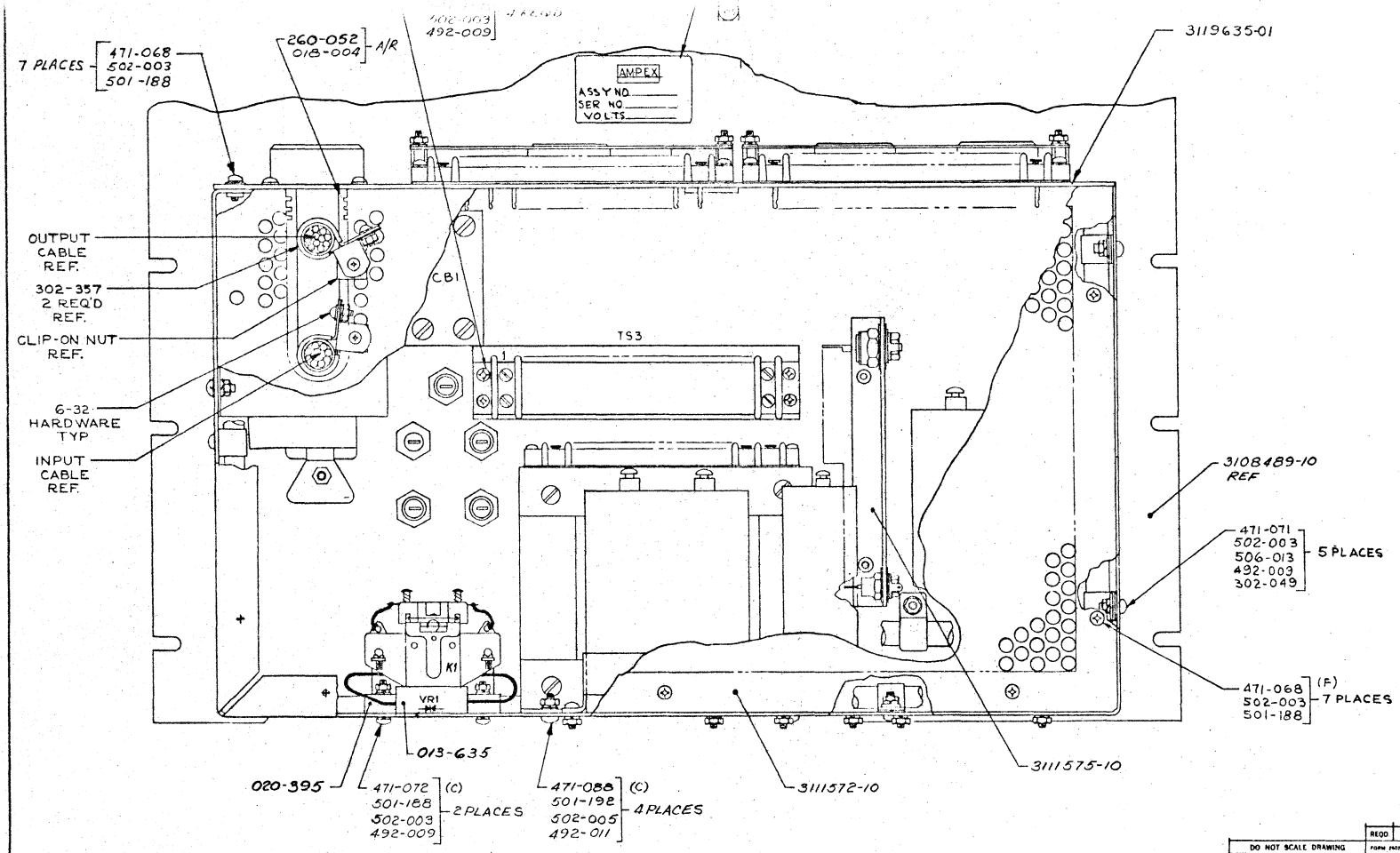
AMPEX AMPEX COMPUTER PRODUCTS COMPANY 9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: I/O CAPSTAN ASSY

3119637	TM-72/2	MATERIAL	
3119638	TM-72/2		
NEXT ASSY.	1ST USED ON	FINISH	
APPLICATION			

CODE IDENT NO. | SIZE D | DWG. NO. 3119639 | ISSUE A

SCALE 1/1 | SHEET 2 OF 3



REAR VIEW

REFERENCE

REQD	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM
		LIST OF MATERIAL			

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
XX ± .03 XXX ± .010 ± 1°
BREAK ALL SHARP EDGES APPROX .010
CBORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
√ PER MIL STD 10

THE INFORMATION HEREON IS THE PROPERTY OF AMPEX COMPUTER PRODUCTS COMPANY AND IS FURNISHED FOR PROTECTION OF FUNCTION, WITH LOAN & RETURN OR IN WHOLE SHALL BE MADE WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.

AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

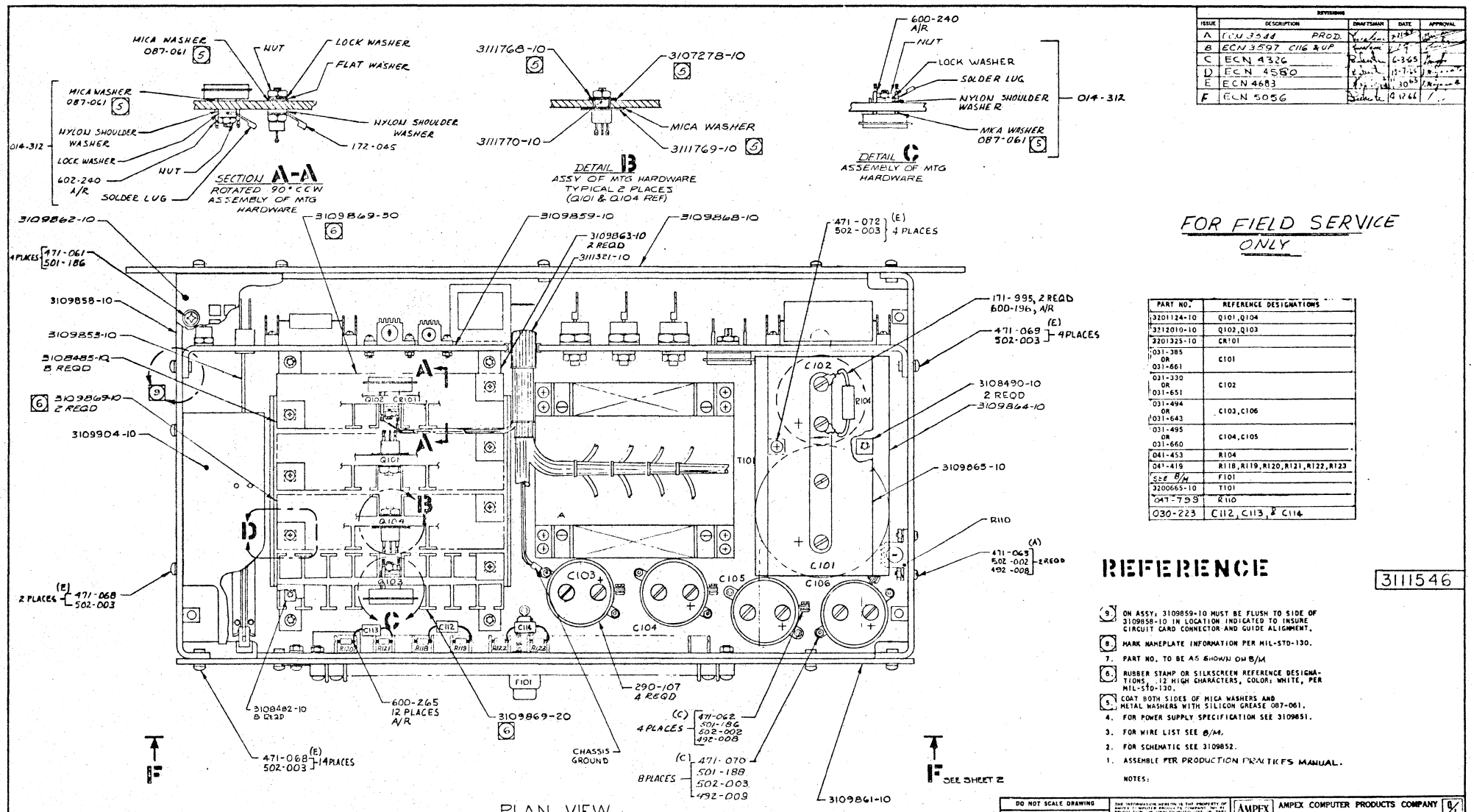
PROJ
SUPER
FIELD
ENGR
ENGR
CHKR
DFTSMN

TITLE: I/O CAPSTAN ASSY

MATERIAL
FINISH

SEE SHEET 1
NEXT ASSY. 1ST USED ON
APPLICATION

CODE IDENT. NO. | SIZE | DWG. NO. | ISSUE
SCALE 1/1 | D | 3119639 | A
SHEET 3 OF 3



PLAN VIEW

COVER CUT AWAY FOR CLARITY

FOR FIELD SERVICE ONLY

PART NO.	REFERENCE DESIGNATIONS
3201124-10	Q101, Q104
3212010-10	Q102, Q103
3201325-10	CR101
031-385 OR 031-661	C101
031-330 OR 031-651	C102
031-494 OR 031-643	C103, C106
031-495 OR 031-660	C104, C105
041-453	R104
041-419	R118, R119, R120, R121, R122, R123
SEE B/M	F101
3200665-10	T101
041-799	R110
030-223	C112, C113, & C114

REFERENCE

3111546

(9) ON ASSY: 3109859-10 MUST BE FLUSH TO SIDE OF 3109858-10 IN LOCATION INDICATED TO INSURE CIRCUIT CARD CONNECTOR AND GUIDE ALIGNMENT.

(8) MARK NAMEPLATE INFORMATION PER MIL-STD-130.

7. PART NO. TO BE AS SHOWN ON B/M

(6) RUBBER STAMP OR SILKSCREEN REFERENCE DESIGNATIONS, .12 HIGH CHARACTERS, COLOR: WHITE, PER MIL-STD-130.

(5) COAT BOTH SIDES OF MICA WASHERS AND METAL WASHERS WITH SILICON GREASE 087-061.

4. FOR POWER SUPPLY SPECIFICATION SEE 3109851.

3. FOR WIRE LIST SEE B/M.

2. FOR SCHEMATIC SEE 3109852.

1. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

NOTES:

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 3544 PROD.		7-15-65	
B	ECN 3597 C116 & UP		7-9	
C	ECN 4326		6-3-65	
D	ECN 4580		11-7-65	
E	ECN 4683		1-30-66	
F	ECN 5056		4-12-66	

3111340	TM-7
3109850	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

DECIMALS: XX ± .02, XXX ± .010

ANGLES ±

BREAK ALL SHARP EDGES APPROX. .010 L'MORE AND SPURFACE CORNER RADII .010

ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-18

MATERIAL

FINISH

PROJ

SUPER

PROJ

ENGR

ENGR

CHKR

DFTSMN

AMPEX COMPUTER PRODUCTS COMPANY 9/1

9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

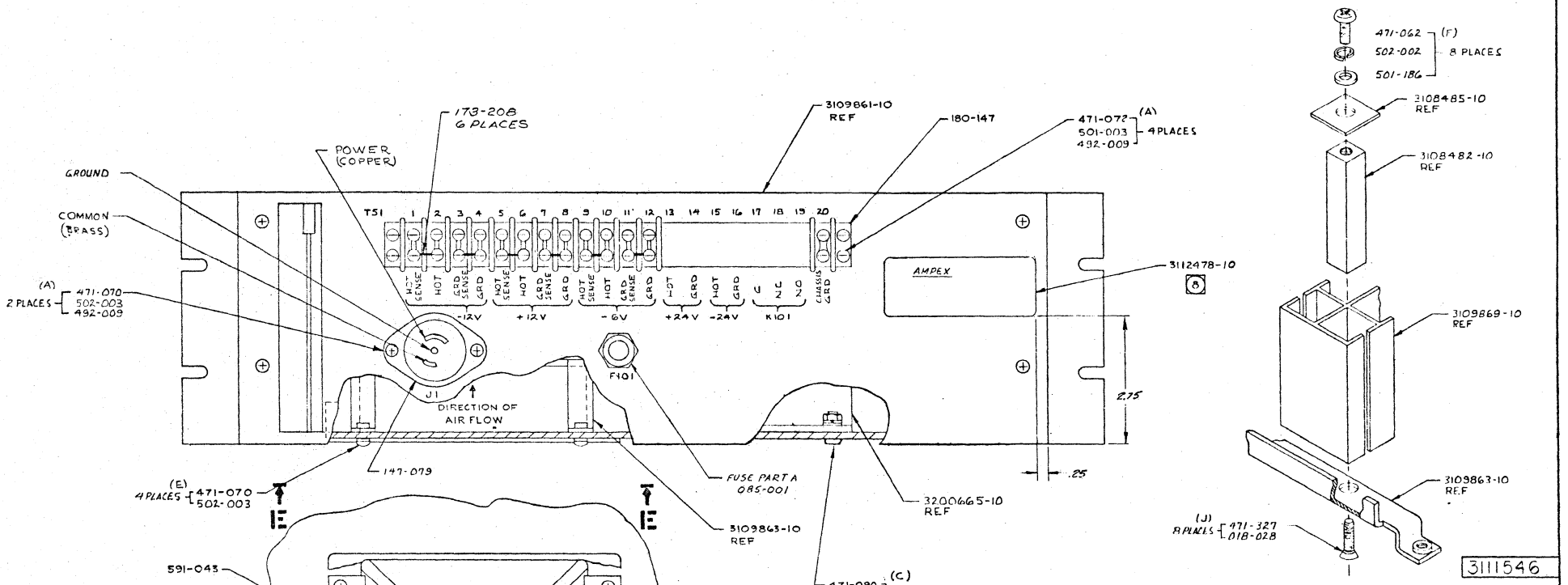
TITLE: POWER SUPPLY ASSY

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111546	F1

SCALE 1:1

SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHEET 1			



VIEW F-F

FAN INSTALLATION

VIEW E-E

3111546

DETAIL D
TYPICAL
SCALE : NONE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
XX ± .02 X °
BREAK ALL SHARP EDGES APPROX. .010
CRNRS AND SPOTFACE CORNER
RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

FIRST SUPPLIER
PROJ ENGR
ENGR
CHKR SEE SHEET 1
DFTSMN

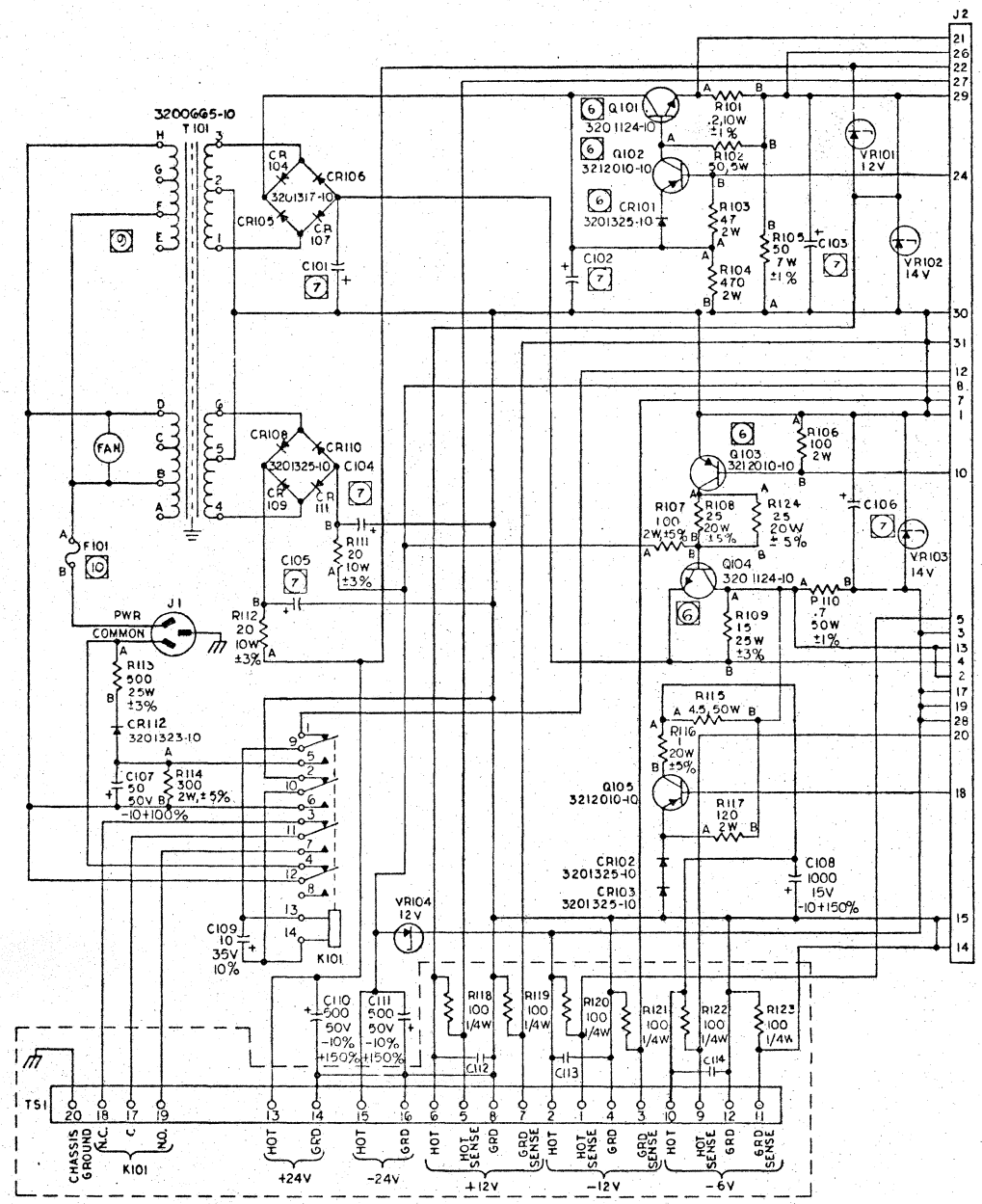
SEE SHEET 1 OF 2
NEXT ASSY. 1ST USED ON
APPLICATION

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
POWER SUPPLY ASSY

CODE IDENT. NO. | SIZE D | DWG. NO. 3111546 | ISSUE F

SCALE 1:1 | SHEET 2 OF 2



REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	ECN 5056	4-15-66			
B	ECN 5983	9/6/66			
C	ECN 7099		DWSLL		
D	ECN 7189		RFISS		
E	ECN 7259	1-6-67		1/6/67	

TABLE I

INPUT POWER	CONNECT		JUMPER				FUSE
	F101A TO	K101-12 TO	FROM	TO	FROM	TO	SLOW BLOW
100 V	T101B	T101C	T101B	T101F	T101C	T101G	3A
110 V	T101A	T101C	T101A	T101E	T101C	T101G	3A
125 V	T101A	T101D	T101A	T101E	T101D	T101H	3A
200 V	T101B	T101G	T101C	T101F	——	——	2A
210 V	T101A	T101G	T101C	T101F	——	——	"
215 V	T101B	T101G	T101D	T101F	——	——	"
220 V	T101A	T101G	T101C	T101E	——	——	"
225 V	T101A	T101G	T101D	T101F	——	——	"
230 V	T101B	T101H	T101D	T101F	——	——	"
235 V	T101A	T101G	T101D	T101E	——	——	"
240 V	T101A	T101H	T101D	T101F	——	——	"
250 V	T101A	T101H	T101D	T101E	——	——	2A

VALUE CHART	
REFERENCE DESIGNATION	VALUE
C101	28,500 μF, -10%, +150%, 25V OR 38,000 μF, -10%, +100%, 25V
C102	11,300 μF, -10%, +150%, 25V OR 14,000 μF, -10%, +100% 25V
C103 C106	3,200 μF, -10%, +150%, 25V OR 6,300 μF, -10% +100%, 25V
C104 C105	3,300 μF, -10%, +150%, 35V OR 4,500 μF, -10%, +100%, 35V

10. SEE TABLE I
9. TRANSFORMER IS SHOWN WIRED FOR 115V AC INPUT. FOR INPUT VOLTAGES OTHER THAN 115VAC SEE TABLE I.
8. C112, C113, & C114 TO BE 2.2 MFD 25V ± 20%.
7. SEE VALUE CHART.
6. TO BE MOUNTED ON HEAT SINK.
5. ALL DIODES TO BE 3263028-10.
4. ALL TRANSISTORS TO BE 3212091-10.
3. ALL RESISTOR VALUES ARE IN OHMS ±5%, 1/2 W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS ± 20%, 35V.
1. FOR ASSEMBLY SEE 3117240 & 3117245.

NOTES: UNLESS OTHERWISE SPECIFIED

3117240	TM-7-1-11-12
3117245	TM-7-1-11-12
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS xx± — xxx± ··· FRACTIONS ± — ANGLES ± —
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES —— PER MIL STD 10
MATERIAL
FINISH

DWG ON

PROJ	
SUPER	
PROJ ENGR	
ENGR	
CHKR	
DFTSMAN	

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

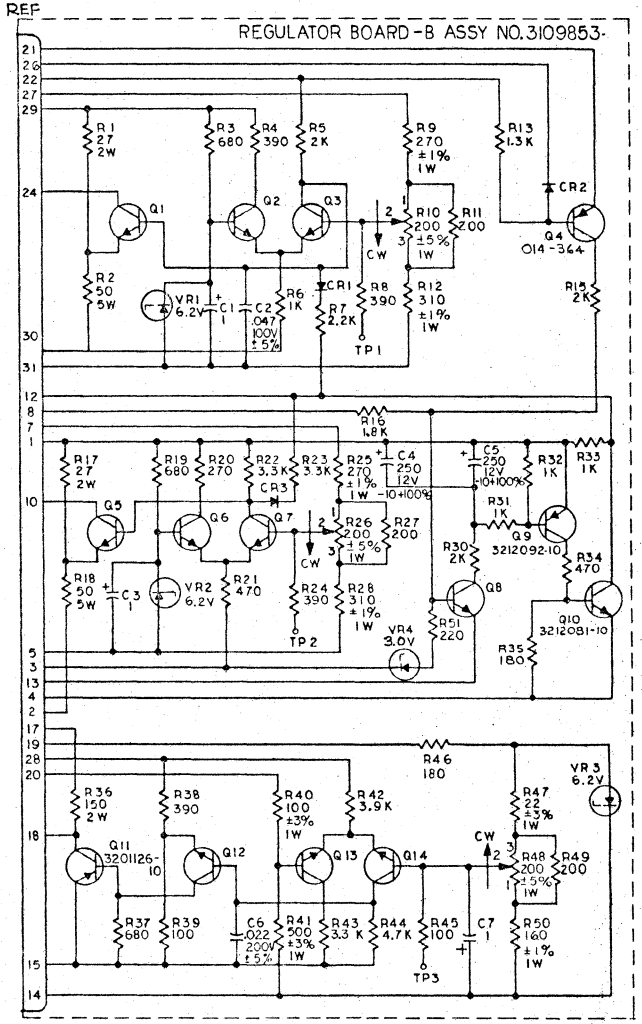
TITLE
SCHEMATIC
LOGIC PWR SUPPLY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117242

SCALE ——— SHEET 1 OF 2

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
D	SEE SHEET #1				
E	" " " "		—		—

P2
REF



3117240	TM-9-7-11-12
3117245	TM-7-9-11-12
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
XX± —— XXX± —— ±
BREAK ALL SHARP EDGES APPROX .010, C'BORE AND SPOTFACE CORNER RADII APPROX. .010
ROUGHNESS OF ALL MACHINED SURFACES —— PER MIL STD 10
MATERIAL
FINISH

PROJ	
SUPER	
PROJ ENGR	
ENGR	
CHKR	SEE SHEET 1
DFTSMN	

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 388, CULVER CITY, CALIF.

TITLE
SCHEMATIC
LOGIC PWR SUPPLY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117242

SCALE —— SHEET 2 OF 2

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	ECN 5056	15 [illegible]	[illegible]	[illegible]	[illegible]
B	ECN 7027	9-22-66	DW. S. Ebbs	" "	R.S.M.
C	ECN 7099	10-13-66	DW. S. Ebbs	" "	[illegible]

PART NO	REFERENCE DESIGNATIONS
3201124-10	Q101, Q104
3212010-10	Q102, Q103
3201325-10	CR101
031-385 OR 031-661	C101
031-383 OR 031-651	C102
031-494 OR 031-643	C103, C106
031-495 OR 031-660	C104, C105
041-453	R104
041-419	R118, R119, R120, R121, R122, R123
SEE VERSION TABLE	F101
3200665-10	T101
047-799	R110
030-223	C112, C113, & C114
043-847	R105

VERSION TABLE

PART NO.	INPUT POWER	CONNECT		JUMPER				FUSE	FUSE PART NO.
		F101A TO	K101-12 TO	FROM	TO	FROM	TO	SLOW BLOW	PART "A"
3117240-01	100V	T101B	T101C	T101B	T101F	T101C	T101G	3A	070-002
-02	110V	T101A	T101C	T101A	T101E	T101C	T101G	3A	070-002
-03	115V	AS WIRE PER WIRE LIST						3A	070-002
3117240-04	125V	T101A	T101D	T101A	T101E	T101D	T101H	3A	070-002
3117245-01	200V	T101B	T101G	T101C	T101F	——	——	2.0A	070-312
-02	210V	T101A	T101G	T101C	T101F	——	——	↑	↑
-03	215V	T101B	T101G	T101D	T101F	——	——		
-04	220V	T101A	T101G	T101C	T101E	——	——		
-05	225V	T101A	T101G	T101D	T101F	——	——		
-06	230V	T101B	T101H	T101D	T101F	——	——		
-07	235V	T101A	T101G	T101D	T101E	——	——		
-08	240V	T101A	T101H	T101D	T101F	——	——	↓	↓
3117245-09	250V	T101A	T101H	T101D	T101E	——	——	2.0A	070-312

12. WIRES FROM FAN (BLK & WHT TWIST. PAIR) REMAIN ON T101 D & E IN ALL CASES.
11. ALL FOUR (4) DASH VERSIONS OF 3117240 HAVE IDENTICAL PARTS ONLY VARIATION IS JUMPER & CONNECTIONS ON T101 TERMINALS.
10. ALL NINE (9) DASH VERSIONS OF 3117245 HAVE IDENTICAL PARTS. ONLY VARIATION IS JUMPER & CONNECTIONS ON T101 TERMINALS
9. ON ASSY: 3109859-20 MUST BE FLUSH TO SIDE OF 3109858-20 IN LOCATION. INDICATED TO INSURE CIRCUIT CARD CONN. AND GUIDE ALIGN.
8. MARK NAMEPLATE INFORMATION PER MIL-STD-130.
7. PART NO TO BE AS SHOWN ON VERSION TABLE
6. MARK REFERENCE DESIGNATIONS, .12 HIGH CHARACTERS, COLOR: WHITE, PER MIL-STD-130.
5. COAT BOTH SIDES OF MICA WASHERS AND METAL WASHERS WITH SILICON GREASE 087-061.
4. FOR POWER SUPPLY SPECIFICATION SEE 3117244.
3. FOR WIRE LIST SEE 3117243. WIRING IS FOR 115 VAC INPUT. ISSUE B
2. FOR SCHEMATIC SEE 3117242. ISSUE C
1. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

NOTES:

REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS XX± .XXX± TOLERANCES ANGLES ±
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX. .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

3117245	TM 7.9-11
3117240	TM 7.9-11
NEXT ASSY.	1ST USED ON
APPLICATION	

DWG NO. 3117241

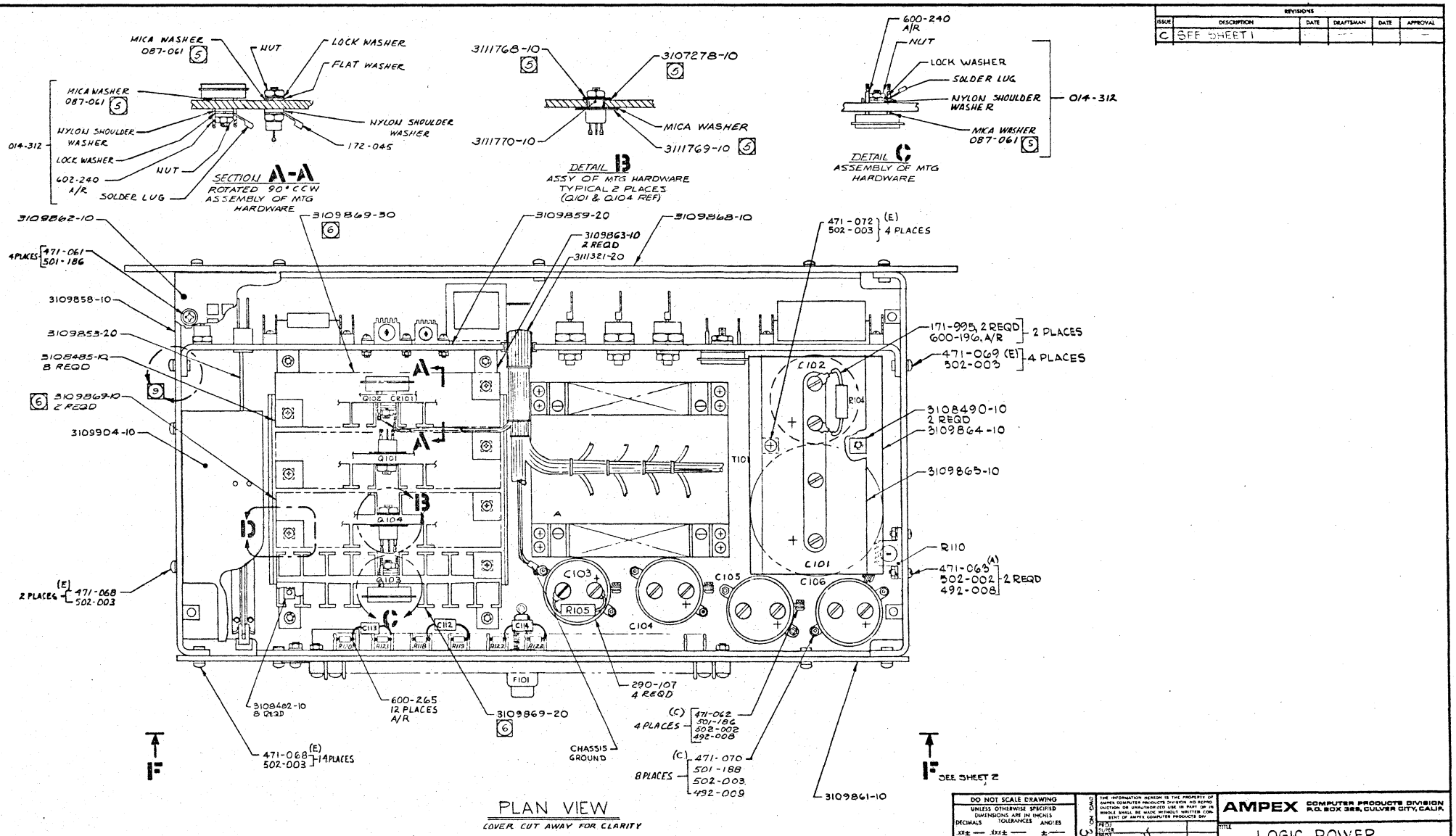
PROT. SUPER		
PROT. ENGR		
ENGR		
CHKR		
DFTSMN		

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

TITLE: LOGIC POWER SUPPLY ASSY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117241

SCALE 1:1 SHEET 1 OF 3



PLAN VIEW

COVER CUT AWAY FOR CLARITY

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
C	SEE SHEET 1	-	---	-	-

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
.xx± .xxx± ±
BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII APPROX. .010
ROUGHNESS OF ALL MACHINED SURFACES PER MC 310-19
MATERIAL
FINISH

3117235	TM7.9-11
3117240	TM7.9-11
NEXT ASSY.	1ST USED ON
APPLICATION	

PROJ	
DESIGNER	
DRAFT	
ENGR	
ENGR	
CHKR	
OPTSMN	

DWG 3117241

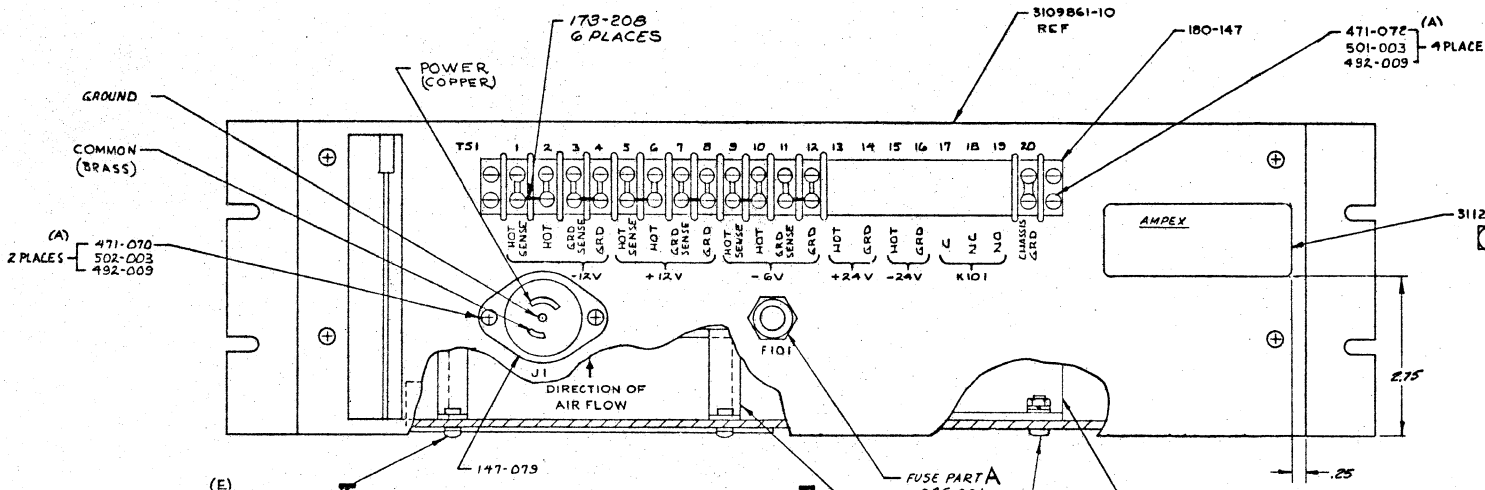
AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

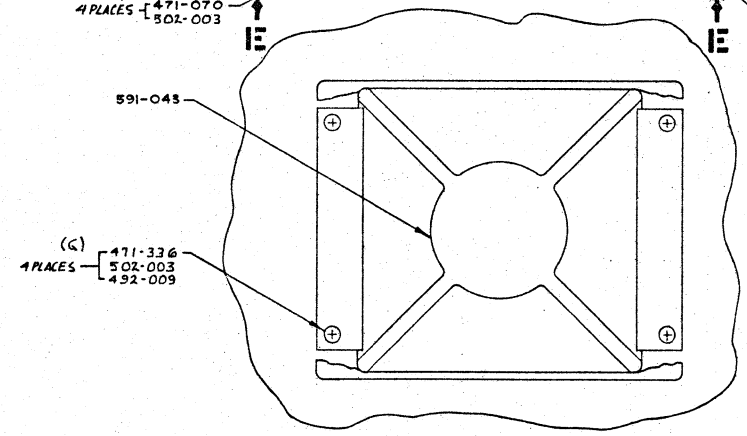
TITLE: LOGIC POWER SUPPLY ASSY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117241

SCALE 1:1 SHEET 2 OF 3

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
C	SEE SHEET 1				

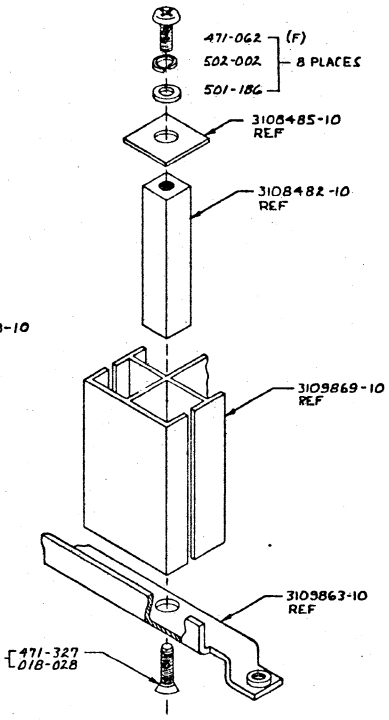




VIEW F-F

FAN INSTALLATION

VIEW E-E



DETAIL D
TYPICAL
SCALE : NONE

3117245	TM,9,11
3117240	TM,9,11
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
XX± ——— XXX± ——— ±——
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX. .010
ROUGHNESS OF ALL MACHINED SURFACES ——— PER MIL STD 10 ✓
MATERIAL
FINISH

DWG NO 3117241

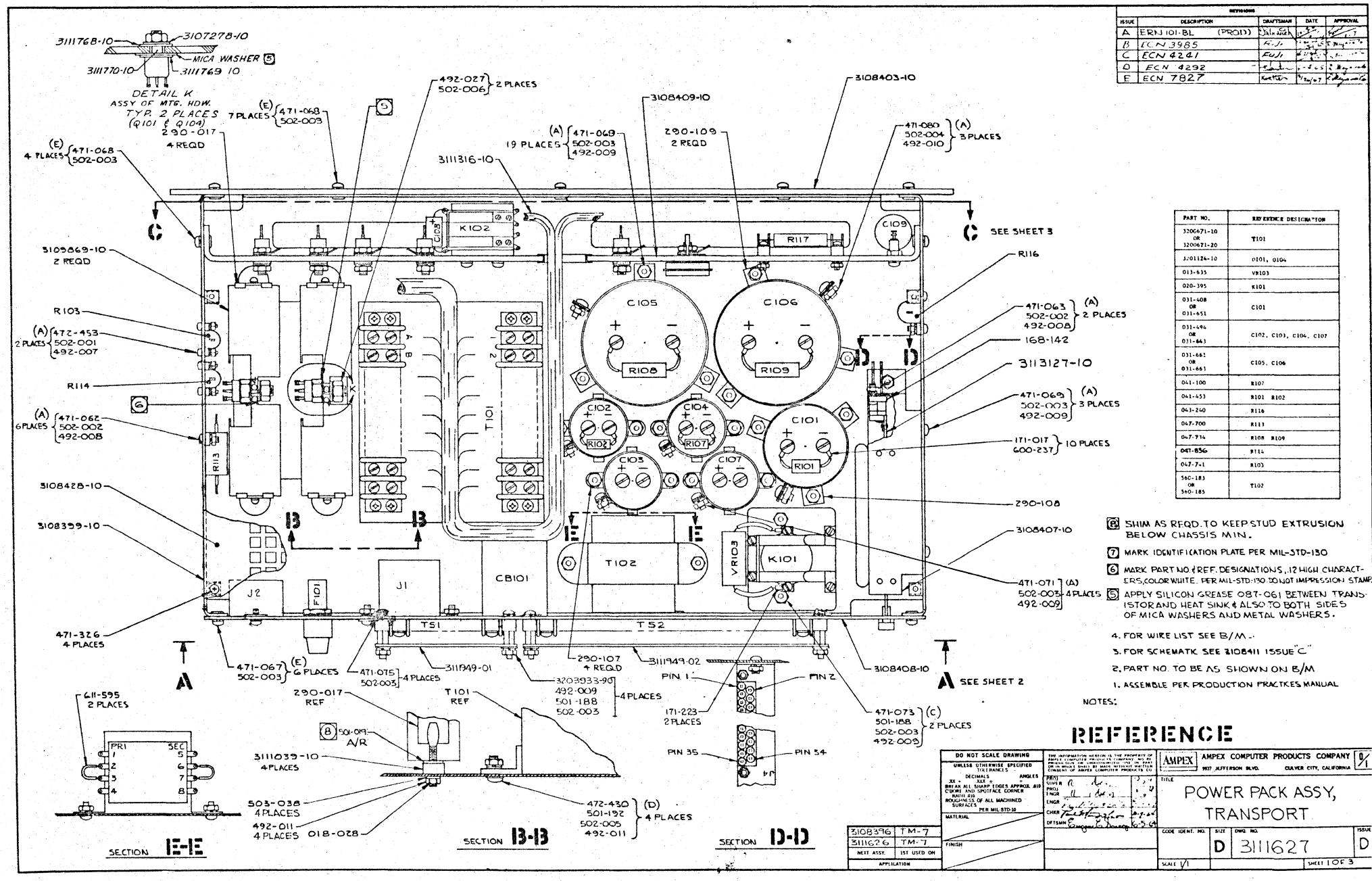
PROJ
SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

AMPEX COMPUTER PRODUCTS DIVISION P.O. BOX 388, CULVER CITY, CALIF.

TITLE
LOGIC POWER SUPPLY ASSY

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3117241

SCALE 1:1 SHEET 3 OF 3



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 101-BL (PROD)			
B	ECN 3985			
C	ECN 4241			
D	ECN 4292			
E	ECN 7827			

PART NO.	REFERENCE DESIGNATION
3206671-10 OR 3206671-20	T101
3201124-10	Q101, Q104
013-635	VR103
020-395	K101
031-608 OR 031-651	C101
031-494 OR 031-643	C102, C103, C104, C107
031-662 OR 031-663	C105, C106
041-100	R107
041-453	R101 R102
043-240	R116
047-700	R117
047-714	R108 R109
047-856	R114
047-741	R103
560-183 OR 560-185	T102

6 SHIM AS REQD. TO KEEP STUD EXTRUSION BELOW CHASSIS MIN.

7 MARK IDENTIFICATION PLATE PER MIL-STD-130

6 MARK PART NO. & REF. DESIGNATIONS, .12 HIGH CHARACTERS, COLOR WHITE. PER MIL-STD-130. DO NOT IMPRESSION STAMP.

5 APPLY SILICON GREASE 087-061 BETWEEN TRANSISTOR AND HEAT SINK & ALSO TO BOTH SIDES OF MICA WASHERS AND METAL WASHERS.

4. FOR WIRE LIST SEE B/M.

3. FOR SCHEMATIC SEE 3108411 ISSUE "C"

2. PART NO. TO BE AS SHOWN ON B/M

1. ASSEMBLE PER PRODUCTION PRACTICES MANUAL

NOTES:

REFERENCE

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

DECIMALS .XX ± .XXX ± ANGLES

BREAK ALL SHARP EDGES APPROX .010 C'SKORE AND SPOTFACE CORNER RADII .010

ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

APPLICATION

3108396	TM-7
3111626	TM-7
NEXT ASSY.	1ST USED ON

PROJ
SUPER
PROJ
ENGR
ENGR
CHKR
DFTSMN

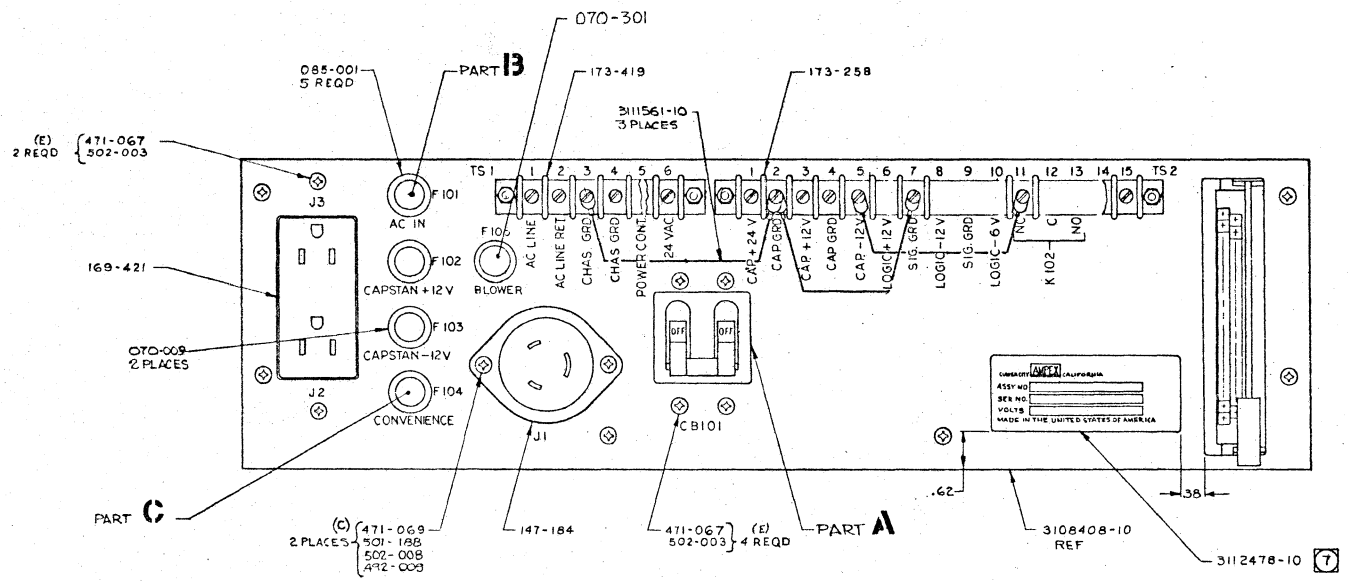
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
POWER PACK ASSY, TRANSPORT

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111627	D

SCALE 1/1 SHEET 1 OF 3

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHEET 1	—	—	—



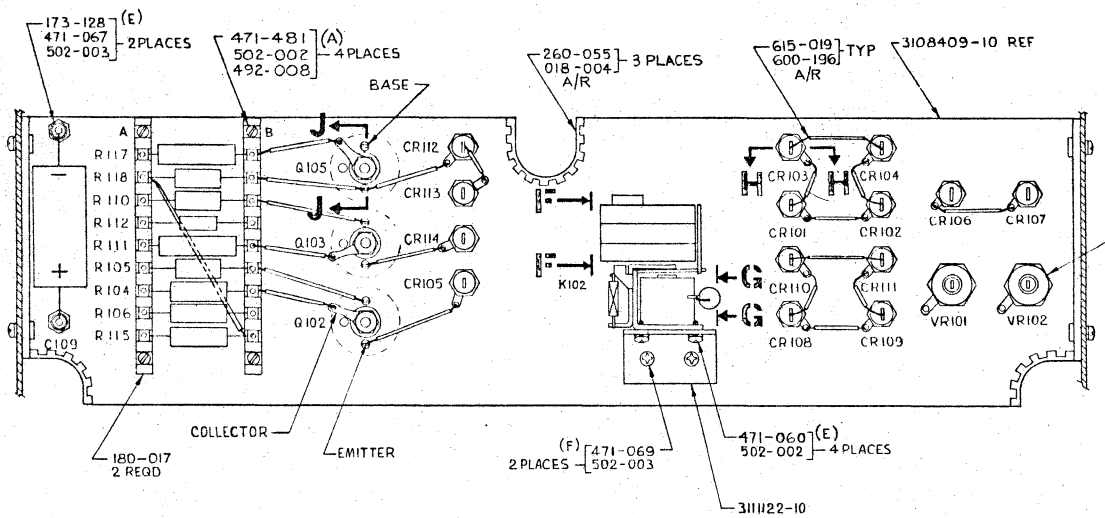
VIEW A-A

3111627

REFERENCE

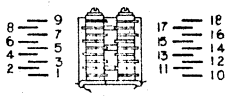
DO NOT SCALE DRAWING	THE INFORMATION HEREON IS THE PROPERTY OF AMPEX CORPORATION (WHETHER COMPLETED OR NOT) AND IS NOT TO BE USED, COPIED, REPRODUCED OR PUBLISHED IN WHOLE OR IN PART OR IN WHOLE OR PART WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.	AMPEX COMPUTER PRODUCTS COMPANY 9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA	D/1
UNLESS OTHERWISE SPECIFIED TOLERANCES DECIMALS ANGLES XX ± .1 ± 1° XXX ± .05 BREAK ALL SHARP EDGES APPROX .010 CURVE AND SPOTFACE CORNER RADII .010 ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10	PROJ SUPER PROJ ENGR SEE SHEET 1 ENGR CHKR DFTSMN	TITLE POWER PACK ASSY, TRANSPORT	
MATERIAL FINISH		CODE IDENT. NO.	SIZE D
SEE SHEET 1 NEXT ASSY. / 1ST USED ON APPLICATION		DWG. NO. 3111627	ISSUE D
		SCALE 1/1	SHEET 2 OF 3

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHEET 1	—	—	—



SECTION C-C

SCALE 1:1
ROTATED 180°

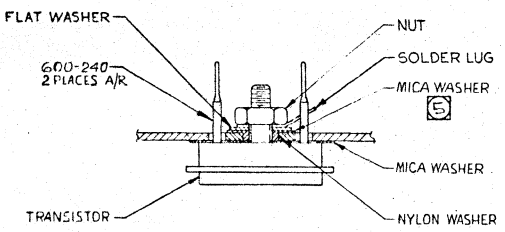


VIEW F-F

K102 - PIN LOCATION

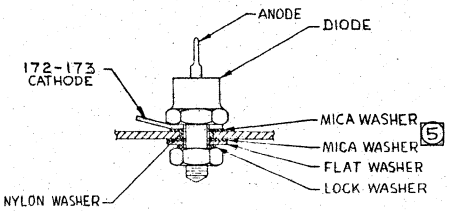
PART NO.	REFERENCE DESIGNATION
3201325-10	CR101, CR102, CR103, CR104, CR105, CR106, CR107, CR108, CR109, CR110, CR111, CR112, CR113, CR114
3212010-10	Q102, Q103, Q105
013-636	VR101, VR102
020-601	K102
041-454	C109
037-118	C108
041-096	R112
041-375	R110
041-614	R105
041-731	R118
054-214	R104, R115
047-281	R111
043-625	R106
047-819	R117

3111627



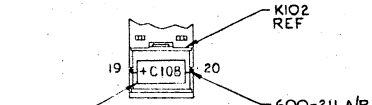
SECTION J-J

SCALE 2:1
ROTATED 90° CW
(MTG KIT 014-312)
3 PLACES



SECTION H-H

SCALE 2:1
ROTATED 180°
(MTG-KIT INCLUDED)
14 PLACES



VIEW G-G

REFERENCE

DO NOT SCALE DRAWING			
UNLESS OTHERWISE SPECIFIED TOLERANCES			
DECIMALS	ANGLES		
XX ± .01	±		
XXX ± .005			
BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII .010			
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10			
MATERIAL			
FINISH			

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PROT SUPER	SEE SHEET 1	
PROJ ENGR		
ENGR		
CHKR		
DFTSMN		5/15/64

SEE SHEET 1	
NEXT ASSY.	1ST USED ON
APPLICATION	

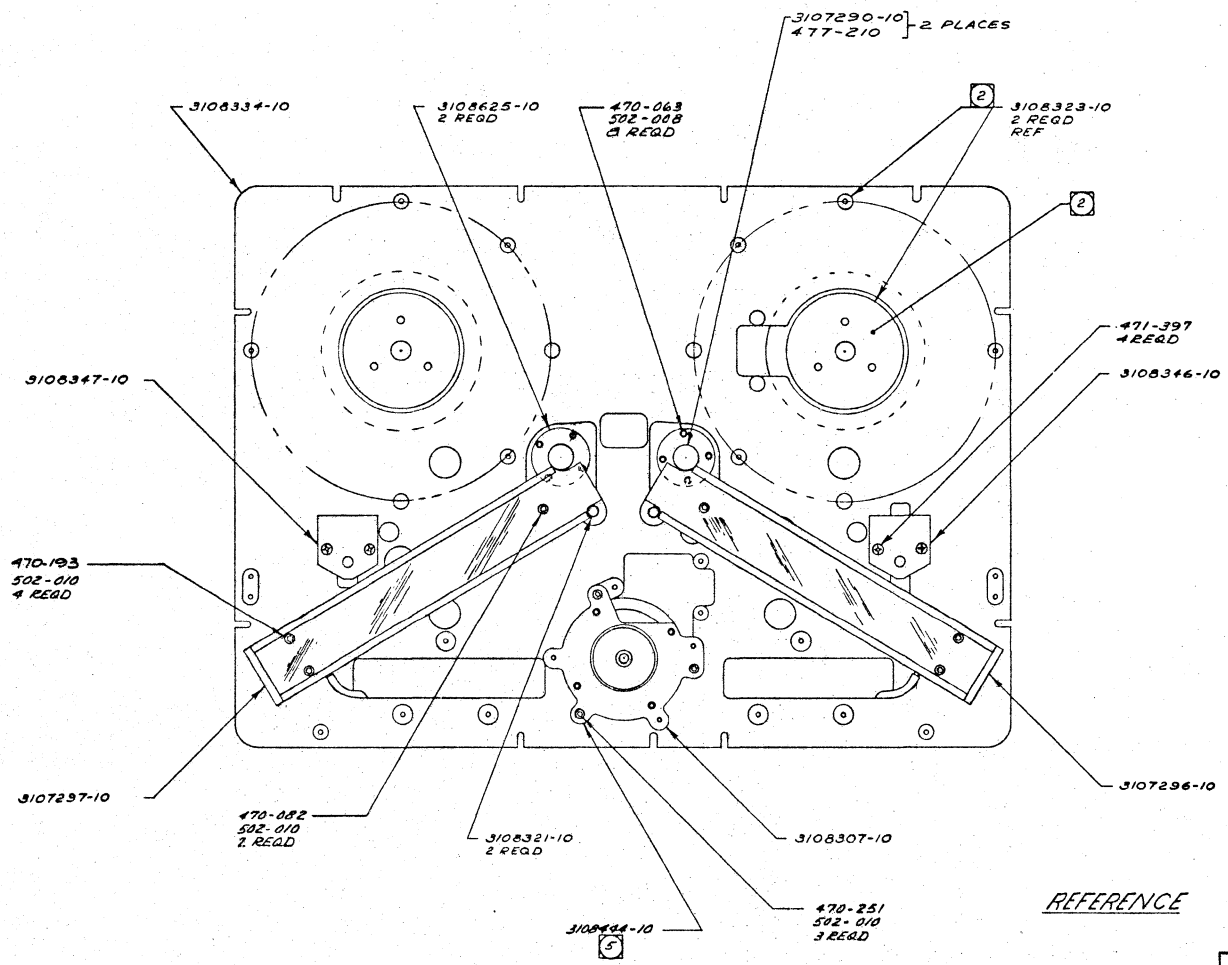
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
POWER PACK ASSEMBLY, TRANSPORT

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111627	D

SCALE 1:1 UNLESS NOTED — SHEET 3 OF 3

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 3543		7-11-69	



FRONT VIEW

REFERENCE

5. SHIM AS REQUIRED FOR TRACKING & DESKEW.
4. PART NO. TO BE AS SHOWN IN B/M.
3. FOR SCHEMATIC SEE 3108558.
2. REEL MOTOR ASSY'S (3108323-10) TO BE SHIMMED WITH 3100212-10, 3100213-10, 3100215-10 OR 3101312-10 AS REQUIRED TO ACHIEVE .002 PARALLELISM BETWEEN SURFACE OF TURNTABLE AND ADJACENT BOSSES ON 5 INCH RADIUS - FRONT SIDE.

NOTES: 1. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.

~~NOTES: UNLESS OTHERWISE SPECIFIED~~

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS
DECIMALS ANGLES
.XX ± .01 ±
BREAK ALL SHARP EDGES APPROX. .010
CHAMF AND SPURFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

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DES.		
SUPER		
PROJ.		
ENGR		
CHKR		
DFTSMN		

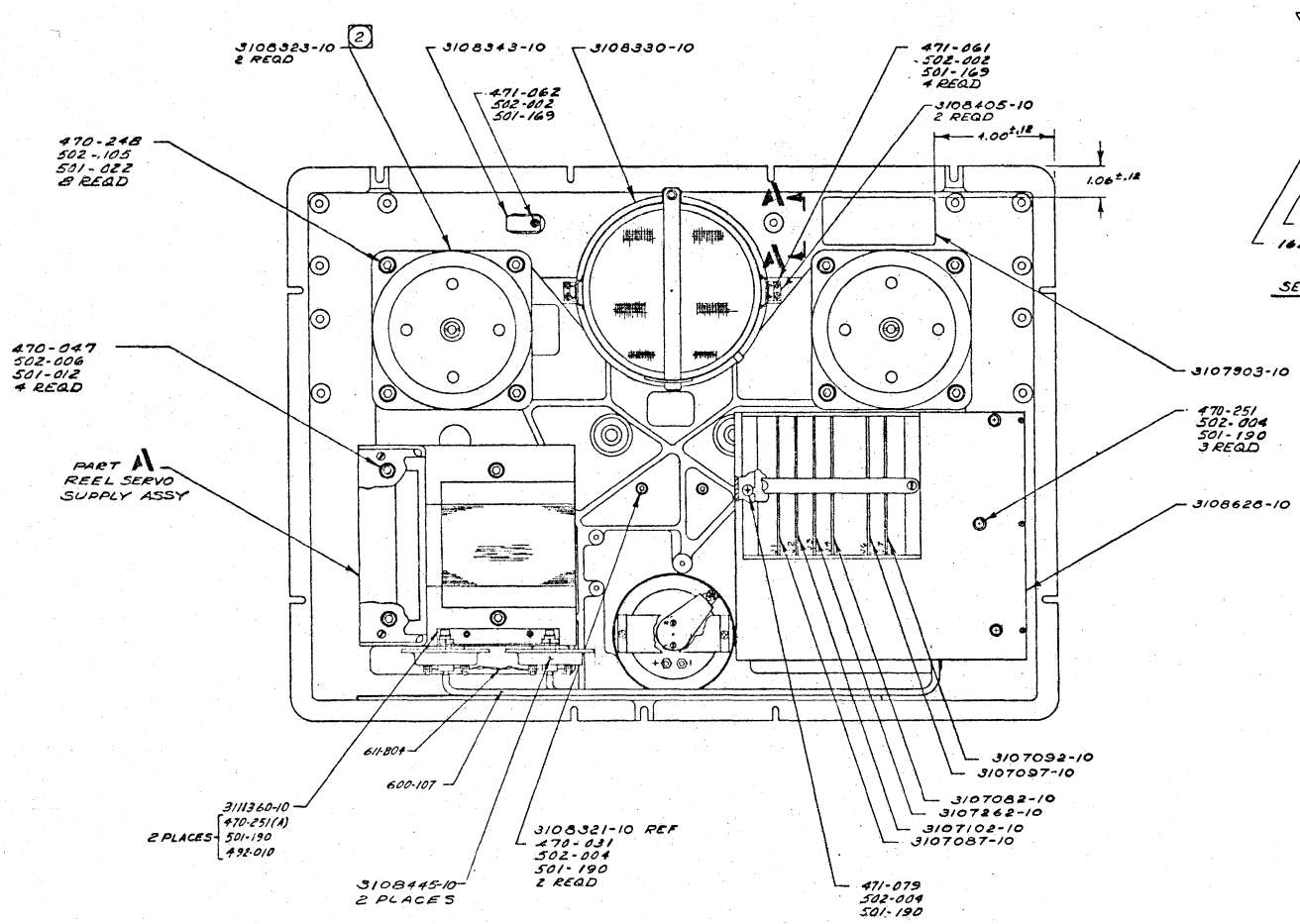
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
TRANSPORT ASSEMBLY
BASIC

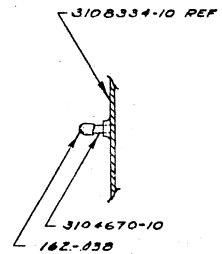
CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111517	A

SCALE 1:2 SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	SEE SH 1 OF 2			



REAR VIEW



SECTION A-A

3111517

REFERENCE

	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS XX ± .02 XXX ± .005
ANGLES ± 1°
BREAK ALL SHARP EDGES APPROX .010 CHORD AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

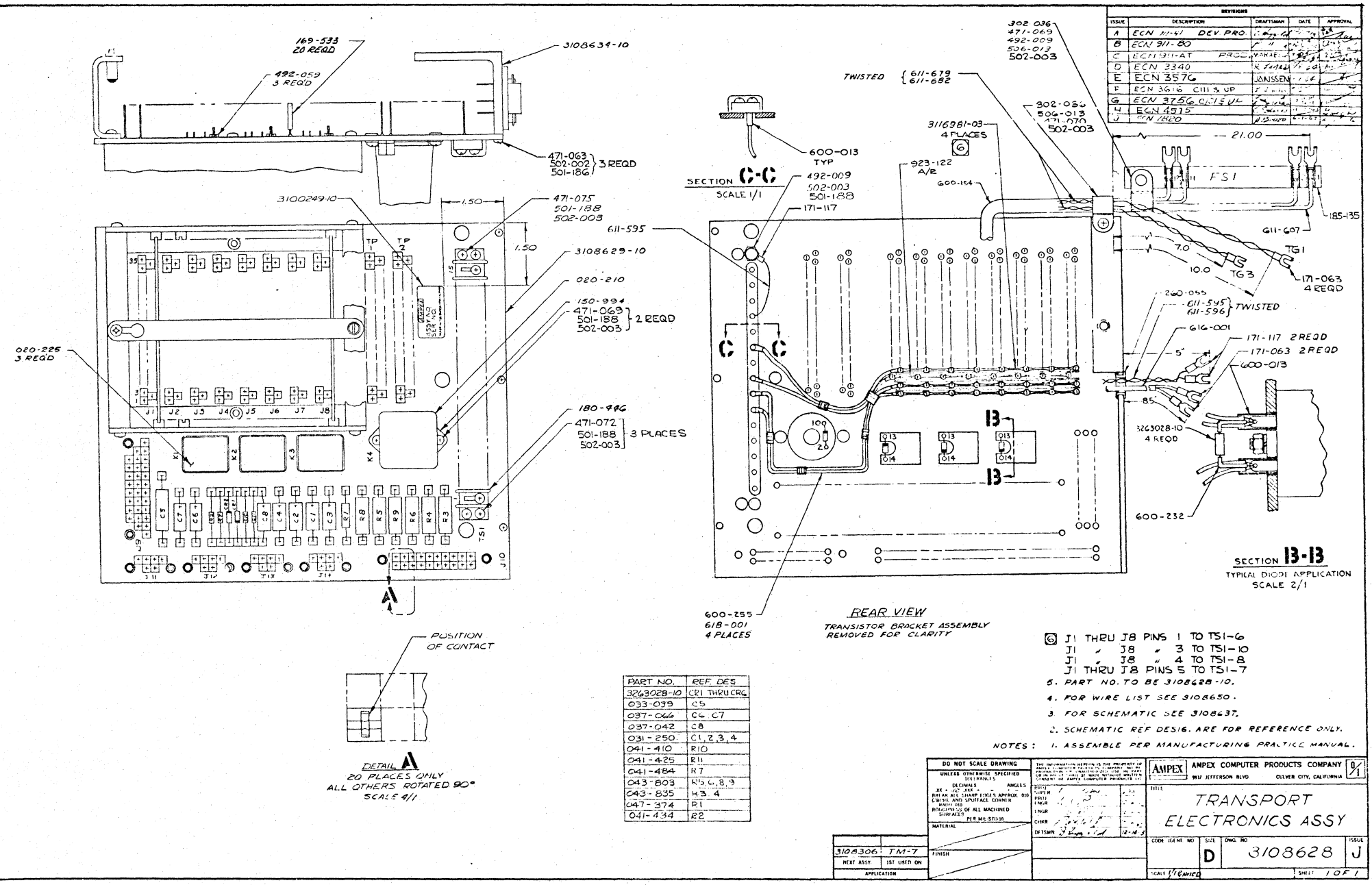
PROJ
SUPR
PROJ
ENGR
ENGR
CHKR SEE SH 1 OF 2
DFTSMN Shaffer 2.4.68

AMPEX COMPUTER PRODUCTS COMPANY 9/1
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
TRANSPORT ASSEMBLY
BASIC

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111517	A

SCALE 1:2 SHEET 2 OF 2



PART NO.	REF DES
3263028-10	CR1 THRU CR6
033-039	C5
037-066	C6 C7
037-042	C8
031-250	C1,2,3,4
041-410	R10
041-425	R11
041-484	R7
043-803	R5,6,8,9
043-835	R3, 4
047-374	R1
041-434	R2

6 J1 THRU J8 PINS 1 TO TS1-6
J1 " J8 " 3 TO TS1-10
J1 " J8 " 4 TO TS1-8
J1 THRU J8 PINS 5 TO TS1-7

5. PART NO. TO BE 3108628-10.
4. FOR WIRE LIST SEE 3108650.
3. FOR SCHEMATIC SEE 3108637.
2. SCHEMATIC REF DESIG. ARE FOR REFERENCE ONLY.

NOTES: 1. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 11-41 DEV PRO			
B	ECN 911-80			
C	ECN 911-AT PROD			
D	ECN 3340			
E	ECN 3576	JANSSEN		
F	ECN 3616 CH13 UP			
G	ECN 3756 CH15 UP			
H	ECN 4515			
J	ECN 1860			

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DECIMALS ANGLES
XX ± .02 ± .5°
BREAK ALL SHARP EDGES APPROX. .010
CHEMICAL AND SPUTTER COATING
RADII .010
ROUGHNESS OF ALL MACHINED SURFACES 125 PER MIL-STD-10
MATERIAL
FINISH

DRAWN
CHECKED
ENGR
ENGR
ENGR
QUALITY
DFTSMN

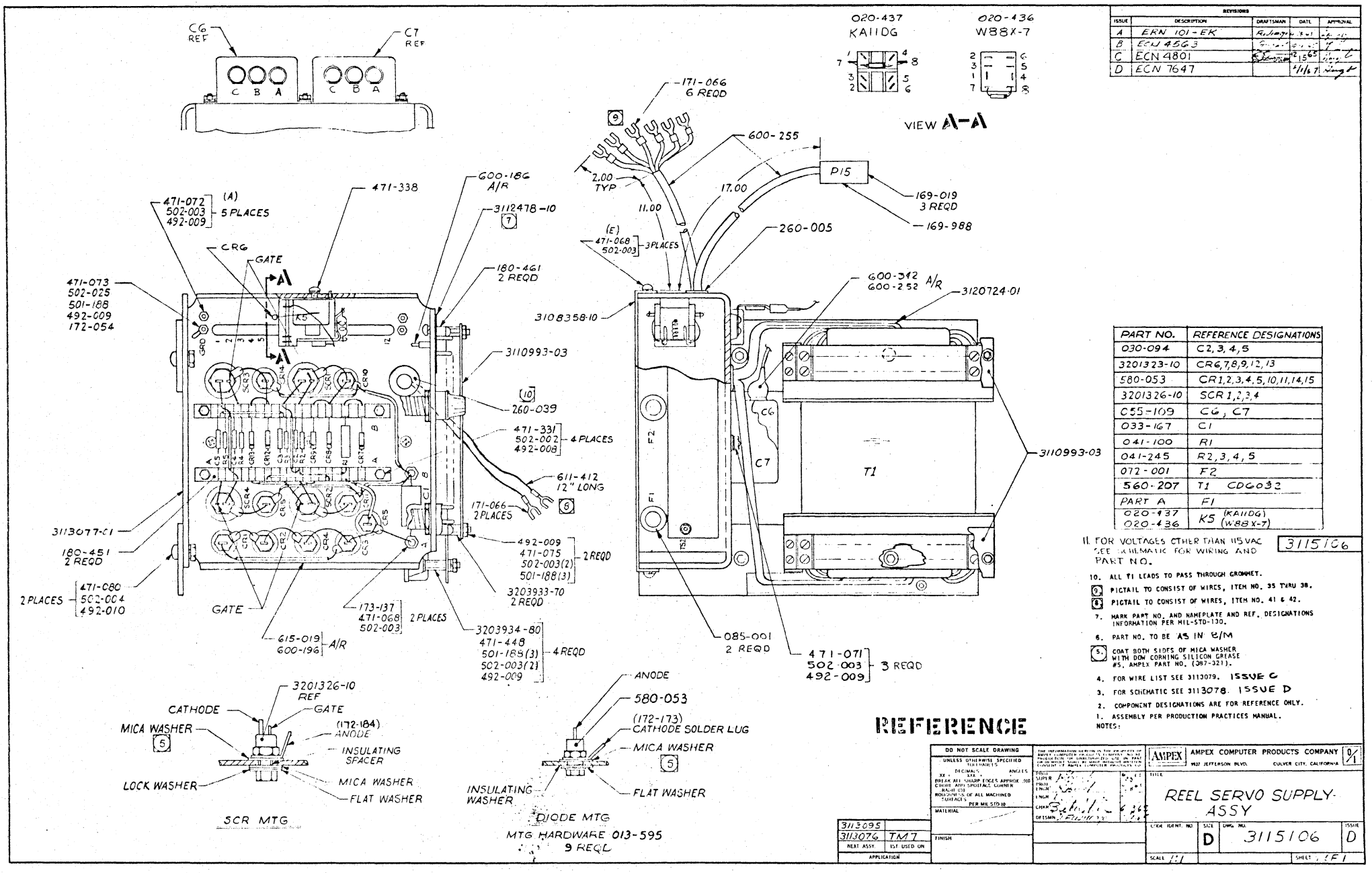
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD CULVER CITY, CALIFORNIA

TITLE
TRANSPORT ELECTRONICS ASSY

CODE IDENT NO	SIZE	DWG NO	ISSUE
	D	3108628	J

SCALE 1/1 REVISED SHEET 1 OF 1

3108306	TM-7
NEXT ASSY	1ST USED ON
APPLICATION	



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 101-EK			
B	ECN 4563			
C	ECN 4801		12/15/65	
D	ECN 7647		5/16/67	

PART NO.	REFERENCE DESIGNATIONS
030-094	C2, 3, 4, 5
3201323-10	CR6, 7, 8, 9, 12, 13
580-053	CR1, 2, 3, 4, 5, 10, 11, 14, 15
3201326-10	SCR 1, 2, 3, 4
C55-109	C6, C7
033-167	C1
041-100	R1
041-245	R2, 3, 4, 5
072-001	F2
560-207	T1 CDG032
PART A	F1
020-437 020-436	K5 (KA11DG) (W88X-7)

11. FOR VOLTAGES OTHER THAN 115 VAC SEE SCHEMATIC FOR WIRING AND PART NO. 3115106
10. ALL T1 LEADS TO PASS THROUGH GROMMET.
9. PIGTAIL TO CONSIST OF WIRES, ITEM NO. 35 THRU 38.
8. PIGTAIL TO CONSIST OF WIRES, ITEM NO. 41 & 42.
7. MARK PART NO. AND NAMEPLATE AND REF. DESIGNATIONS INFORMATION PER MIL-STD-130.
6. PART NO. TO BE AS IN E/M
5. COAT BOTH SIDES OF MICA WASHER WITH DOW CORNING SILICON GREASE #5, AMPEX PART NO. (387-321).
4. FOR WIRE LIST SEE 3113079. ISSUE C
3. FOR SCHEMATIC SEE 3113078. ISSUE D
2. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
1. ASSEMBLY PER PRODUCTION PRACTICES MANUAL.

NOTES:

REFERENCE

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

DECIMALS XX ± .03, XXX ± .010, ANGLES ± 1°

BREAK ALL SHARP EDGES APPROX .010 CHAMFER AND SPOTFACE CORNERS

FINISH ROUGHNESS OF ALL MACHINED SURFACES PER MIL STD 10

MATERIAL

FINISH

3113095	
3113076	TM7
NEXT ASSY	1ST USED ON
APPLICATION	

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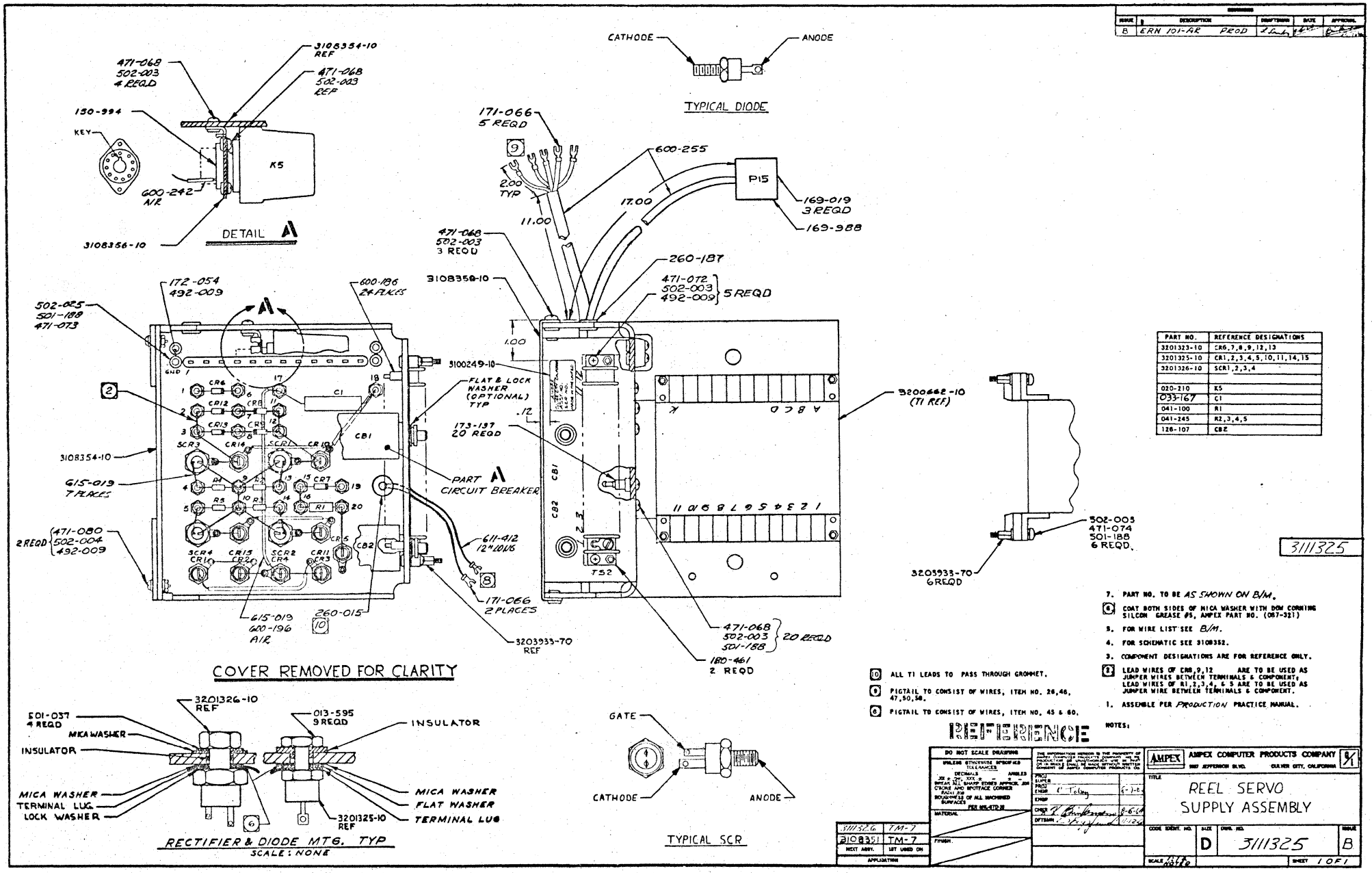
DRAWN SUPER
TRACED
ENGR
CHKR
DESIGN

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: REEL SERVO SUPPLY ASSY

CAGE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3115106	D

SCALE 1:1 SHEET 1 OF 1



PART NO.	REFERENCE DESIGNATIONS
3201323-10	CR6,7,8,9,12,13
3201325-10	CR1,2,3,4,5,10,11,14,15
3201326-10	SCR1,2,3,4
020-210	K5
033-167	C1
041-100	R1
041-245	R2,3,4,5
126-107	CB2

3111325

7. PART NO. TO BE AS SHOWN ON B/M.
6. COAT BOTH SIDES OF MICA WASHER WITH DOW CORNING SILICON GREASE #5, AMPEX PART NO. (087-321)
5. FOR WIRE LIST SEE B/M.
4. FOR SCHEMATIC SEE 3108352.
3. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
2. LEAD WIRES OF CR8,9,12 ARE TO BE USED AS JUMPER WIRES BETWEEN TERMINALS & COMPONENT; LEAD WIRES OF R1,2,3,4, & 5 ARE TO BE USED AS JUMPER WIRE BETWEEN TERMINALS & COMPONENT.
1. ASSEMBLE PER PRODUCTION PRACTICE MANUAL.

NOTES:

10 ALL TI LEADS TO PASS THROUGH GROMMET.
9 PIGTAIL TO CONSIST OF WIRES, ITEM NO. 26,46, 47,50,58.
8 PIGTAIL TO CONSIST OF WIRES, ITEM NO. 45 & 60.

REFERENCE

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
B	ERN 101-AR PROD			

DO NOT SCALE DRAWING

AMPEX COMPUTER PRODUCTS COMPANY 9/1
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: REEL SERVO SUPPLY ASSEMBLY

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111325	B

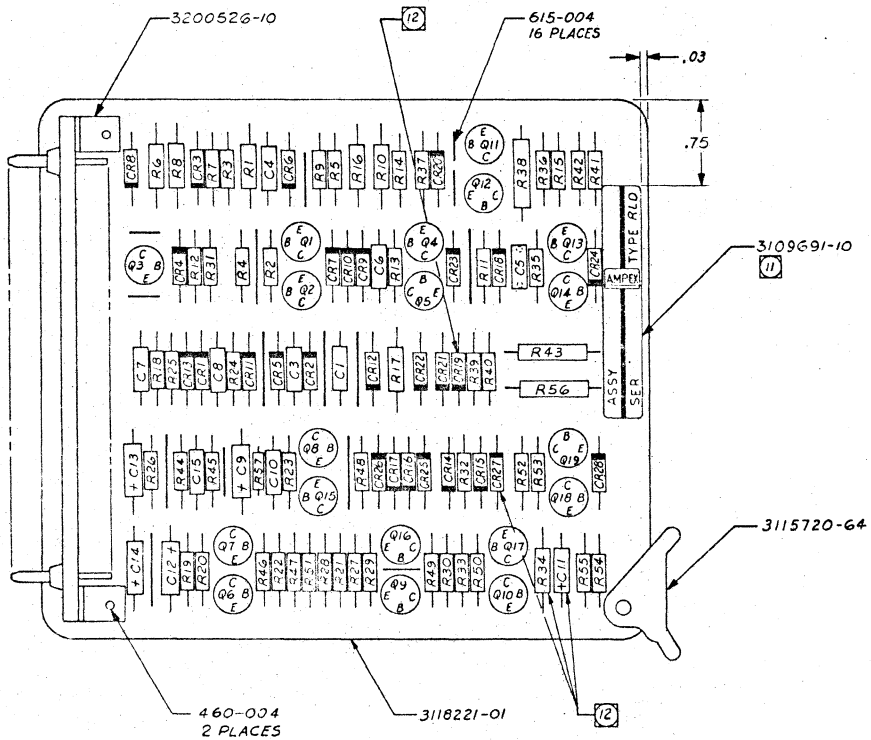
SCALE: NONE SHEET 1 OF 1

3111326	TM-7
3108351	TM-7
NEXT ASSY.	USED ON
APPLICATION	

TABLE I

ASSEMBLY	COMPONENTS			
	PART A	PART C	PART D	PART E
3118222-01	037-217	3263024-10	3263024-10	041-317
3118226-01	NOT USED	NOT USED	NOT USED	041-256
3119502-01	NOT USED	NOT USED	3263024-10	041-256

ISSUE	DESCRIPTION		DRAFTSMAN	DATE	APPROVAL
A	ERN 106-FF PROD	7/46	[illegible]	[illegible]	[illegible]
B	ECN 7011	9/1/66	[illegible]	9/11/66	[illegible]
C	ECN 7081	11/11/66	Reed	11/11/66	[illegible]
D	ECN 7218	12/20/66	[illegible]	[illegible]	[illegible]
E	ECN 7285	1/27/67	SK	1/27	[illegible]
F	ECN 7546	3/15/67	HC	3/23/67	[illegible]
G	ECN 7869	8-1-67	[illegible]	[illegible]	Garrett
H	ECN 7881	8-30-67	Reed	[illegible]	[illegible]/Garrett



TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION
3201100-10	Q1, Q2, Q3, Q4, Q5, Q9, Q10, Q11, Q12, Q13, Q14, Q16, Q18, Q19
3212053-10	Q6, Q7
3212098-10	Q8, Q15, Q17
3263024-10	CR1 THRU CR5, CR7 THRU CR10, CR12, CR14 THRU CR18, CR20 THRU CR26, CR28
3263028-10	CR6, CR11, CR13
034-212	C8
034-678	C4, C15
037-028	C9
034-519	C7, C10
034-529	C1, C5, C6
037-990	C12, C13, C14
041-278	R6, R10
041-407	R26, R32, R35, R45, R53
041-408	R29, R48, R49, R21
041-409	R9, R18, R24
PART A	C11
030-051	C3
041-317	R1, R16
041-507	R4

PART NO.	REFERENCE DESIGNATION
041-411	R19
041-436	R33, R36, R41, R54
041-482	R27, R46
041-483	R3, R5, R7, R14, R15
041-507	R28, R47
041-414	R57
041-520	R23, R25, R44
041-549	R52
041-550	R37, R40, R42, R55
041-560	R20, R22
041-569	R39
041-571	R30, R50, R51
041-584	R2, R11, R12, R13, R31
041-007	R8
041-014	R17
047-302	R38, R43, R56
PART C	CR19 (12)
PART D	CR27 (12)
PART E	R34 (12)

12 INSTALL PARTS A, C, D, E PER TABLE I.

11 MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130.

10. PART NO. TO BE AS SHOWN ON TABLE I

9. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMISEAL TYPE 1B15 COLUMBIA TECH. CORP. OR EQUIV.

~~8. MARK POT REF. NO's. 12 HIGH CHARACTERS, COLOR WHITE. PER MIL-STD-130. DO NOT IMPRESSION STAMP.~~

~~7. TRIMPOTS NOT TO BE SUBMERGED IN WATER.~~

6. COMPONENT DESIGNATIONS ARE FOR REF. ONLY.

5. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.

4 HEAVY LINE ON DIODES INDICATES CATHODE.

3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

2. FOR ASSEMBLY SPECIFICATION SEE 3118225.

1. FOR SCHEMATIC SEE 3118224, ISSUE F

NOTES:

REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS XX ± .05 XXX ± .010 TOLERANCES ANGLES ± 1/2°
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH
SEE TABLE | TM-7
NEXT ASSY | 1ST USED ON
APPLICATION

DWG NO 3118223

THE INFORMATION HEREON IS THE PROPERTY OF AMPEX CORPORATION PRODUCTS DIVISION AND REPRODUCTION OR UNAUTHORIZED USE IN PART OR IN WHOLE SHALL BE MADE WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS INC.

PROJ	[illegible]	
SUPV	[illegible]	5/16/66
PROJ	[illegible]	
ENGR	[illegible]	
CHKR		
DRTSMN	[illegible]	5/10/66

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 388, CULVER CITY, CALIF.

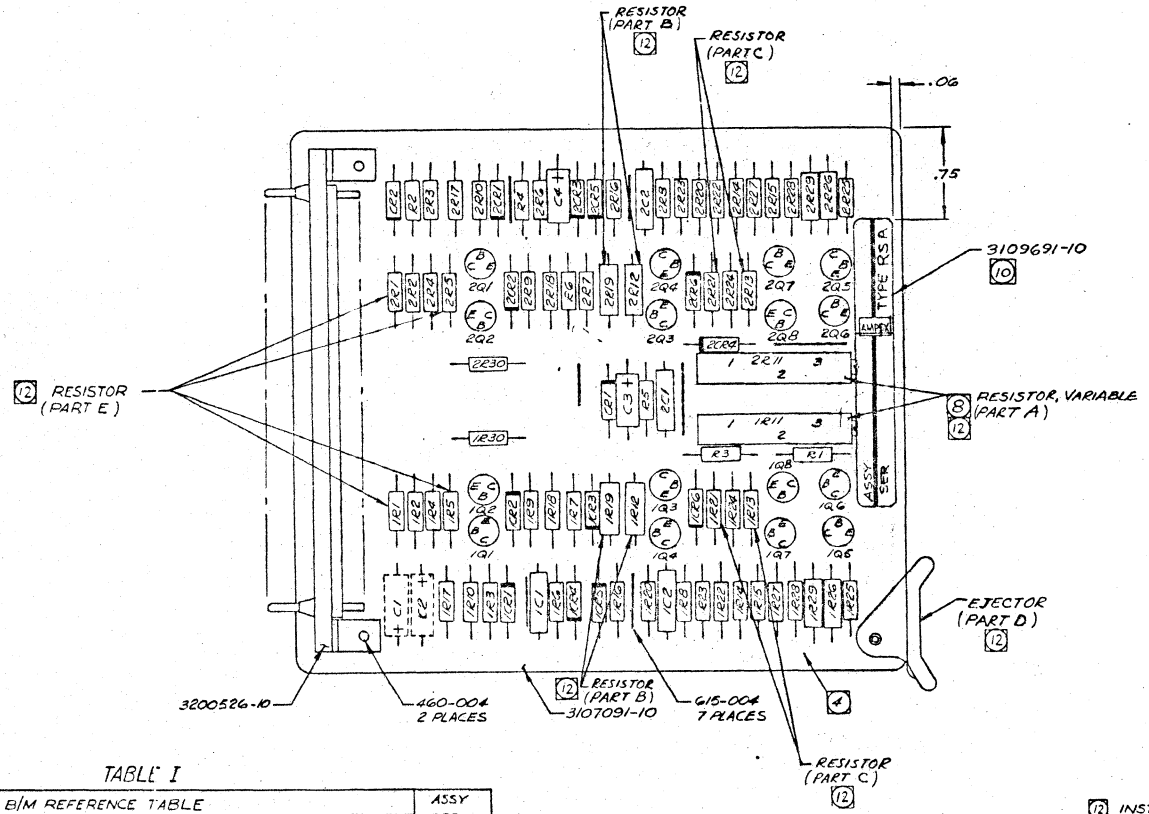
TITLE
CIRCUIT BOARD ASSY—
REWIND LOGIC -D

SIZE D | CODE IDENT NO 09150 | DWG. NO. 3118223

SCALE 2:1 | SHEET 1 OF 1

RLD

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
C	[illegible]	[illegible]	[illegible]	[illegible]
D	ECN 4712	[illegible]	6/15	[illegible]
E	ECN 4914	[illegible]	10/6	[illegible]
F	EC 8004	[illegible]	7/1/66	[illegible]
G	ECN 7539	A. Flores		[illegible]

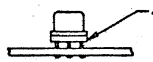


PART NO.	REFERENCE DESIGNATIONS
3201104-10	1Q3,1Q4,1Q5, 1Q7, 2Q3,2Q4,2Q5,2Q7
3212054-10	1Q1,1Q2,1Q6,1Q8,2Q1,2Q2,2Q6,2Q8
3263025-10	1CR1,1CR2,1CR4,1CR6,2CR1,2CR2,2CR4,2CR6
034-678	1C1,2C1,1C2,2C2
037-274	C3,4
PART F	C1,2
041-379	1R26,2R26,1R29,2R29
041-394	1R15,2R15,1R23,2R23
041-406	R1,2
041-408	1R2,1R4, R3,4
041-409	2R2,2R4
PART E	1R1,2R1,1R5,2R5
041-412	R5,6
041-413	1R25,2R25,1R27,2R27
041-415	1R28,2R28
041-429	1R30,2R30
041-430	1R3,2R3,1R6,2R6
041-431	1R14,2R14
048-681	1R22,2R22
048-679	1R24,2R24
042-491	1R9,2R9 1R17,2R17
042-803	1R8,2R8,1R10,2R10,1R18,2R18
PART A	1R11,2R11
PART B	1R12,2R12,1R19,2R19
048-182	1R20,2R20
048-183	1R7,2R7,1R16,2R16
PART C	1R13,2R13,1R21,2R21
3263041-10	1CR3,2CR3,1CR5,2CR5
3201573-10	CR1,CR2

3112169

TABLE I

B/M REFERENCE TABLE							ASSY SPEC
ASSEMBLY	PART A	PART B	PART C	PART D	PART E	PART F	
3107092-10	044-365	042-880	042-891	3107129-40	041-410	037-990	3107094
3112167-10	044-365	042-430	042-804	3107129-40	041-410	NOT USED	
3112175-10	044-197	042-884	042-891	3111391-15	JUMPER	037-990	
3111996-10	044-365	042-430	042-820	3107129-40	041-410	037-990	
3112168-10	044-365	048-181	042-820	3111391-15	041-410	037-990	
3112387-10	044-365	048-765	042-883	3107129-40	041-410	037-990	3113155
3113111-10	044-365	057-160	048-181	3107129-40	041-410	037-990	3107094
3113132-10	044-365	042-880	042-891	3107129-40	041-507	037-990	
3119421-01	044-197	042-883	042-883	3107129-40	041-410	037-990	3107094



TYPICAL TRANSISTOR INSTALLATION

12 INSTALL PARTS A,B,C,D,E,F PER TABLE I

11. SEAL PRINTED CIRCUIT SIDE WITH HUMI-SEAL TYPE 1B15 COLUMBIA TECH. CORP, OR EQUIV.

10 MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130. ISSUE LETTER TO BE MARKED IN UPPER RIGHT CORNER OF NAMEPLATE.

9. PART NO. 10 BE AS SHOWN ON B/M.
8. TRIMPOTS NOT TO BE SUBMERGED IN WATER.
7. HEAVY LINE ON DIODE INDICATES CATHODE.
6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
5. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
4. CIRCUITRY ON FAR SIDE.
3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.
2. FOR ASSEMBLY SPECIFICATION SEE TABLE
1. FOR SCHEMATIC SEE 3107093

NOTES:

REFERENCE

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM
		LIST OF MATERIAL			

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES:
DECIMALS ANGLES
XX ± .03 XXX ± .005
BREAK ALL SHARP EDGES APPROX. .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
✓ PER MIL-STD-10

PROJ
SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
CIRCUIT BOARD ASSY-
REEL SERVO CONTROL

3108306	TM-7
NEXT ASSY	1ST USED ON
APPLICATION	

MATERIAL
FINISH

CODE IDENT. NO | SIZE D | DWG. NO. 3112169 | REV G
SCALE 2/1

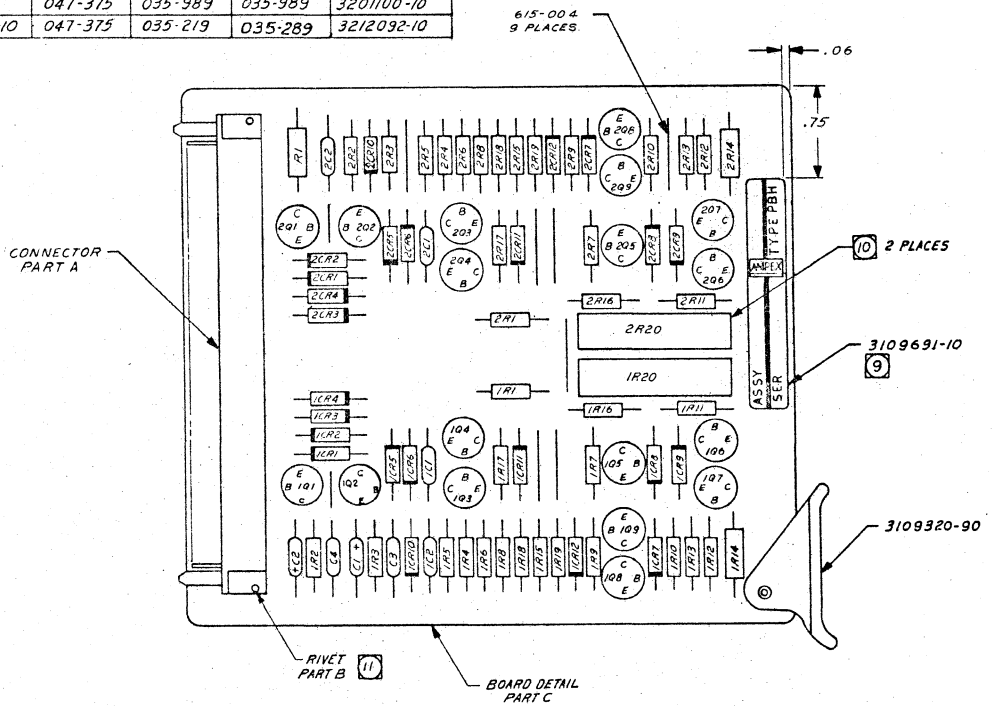
RCA

TABLE I

B/M REFERENCE TABLE

ASSEMBLY	PART D	PART E	PART F	PART G	PART H
3107072-10	3263024-10	047-375	035-989	035-989	3201100-10
3107262-10	3263024-10	047-375	035-989	035-989	3201100-10
3115249-10	3263024-10	047-741	035-989	035-989	3201100-10
3115388-10	OPEN	047-375	035-989	035-989	3201100-10
3118636-10	3263024-10	047-375	035-219	035-289	3212092-10

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911 21 DEV PRO			
B	ECN 911-AB PROD			
C	ECN 4446		7/29/65	
D	ECN 4902		9/12/66	
E	ECN 7113		4-1-67	
F	ECN 7441		8/23/67	
G	ECN 7563		12-13-67	
H	ECN 7741			
J	ECN 7887		23 SEP 1967	



PART NO.	REF DESIG.
3201100-10	1Q3, 1Q5, 2Q3, 2Q5
3212092-10	1Q8, 1Q9, 2Q8, 2Q9
3263024-10	1CR1, 1CR3, 1CR4, 1CR7-1CR12 2CR1, 2CR3, 2CR4-2CR9, 2CR12-2CR18
3263028-10	1CR5, 1CR6, 2CR5, 2CR6.
035-989	C3, C4.
037-390	C1, C2
041-394	1R2, 2R2
041-406	1R12, 2R12
041-407	1R10, 2R10
041-570	1R16, 2R16
041-430	1R19, 2R19
041-434	1R6, 2R6
041-437	1R8, 2R8, 1R9, 2R9
041-482	1R5, 2R5, 1R7, 2R7
041-507	1R3, 2R3
041-511	1R11, 2R11, 1R15, 2R15
041-408	1R1, 2R1
041-560	1R13, 2R13
041-414	1R17, 2R17
041-409	1R18, 2R18
047-302	1R14, 2R14
041-495	1R4, 2R4
044-279	1R20, 2R20
3201104-10	1Q1, 1Q2, 2Q1, 2Q2
PART H	1Q6, 1Q7, 2Q6, 2Q7
PART D	1CR2, 2CR2
PART E	R1
PART F	1C1, 2C1
PART G	1C2, 2C2

13 INSTALL PART D THRU H PER TABLE I.

12. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B15, COLUMBIA TECH CORP OR EQUIV.

11 RIVET PART 'B' USED ONLY WITH 3200526-10

10 TRIMPOTS NOT TO BE SUBMERGED IN WATER.

9 MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130

8. PART NO. TO BE AS SHOWN ON B/M.

7. HEAVY LINE ON DIODE INDICATES CATHODE.

6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.

5. COMPONENT DESIGNATIONS ARE FOR REF. ONLY.

4. ~~CIRCUITRY ON FOILSIDE.~~

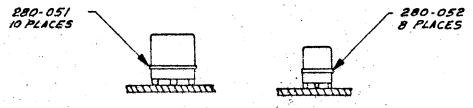
3. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.

2. FOR ASSEMBLY SPECIFICATION SEE 3107074.

1. FOR SCHEMATIC SEE 3107073.

NOTES: UNLESS OTHERWISE SPECIFIED

REFERENCE



TYPICAL TRANSISTOR INSTALLATION

3118636	TM-7
3115388	TM-7
3107272	TM-7
3107072	TM-5
3107262	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES: DECIMALS XX ± .03 YXX ± .010 ANGLES ± 1° BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII .010 ROUGHNESS OF ALL MACHINED SURFACES √ PER MIL STD 10

MATERIAL

FINISH

APPLICATION

REQD	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

DRAFTING SUPER		
PROJ ENGR		
ENGR		
CHKR		
DFTSMN	K. Kuratomi	9/6/67

AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

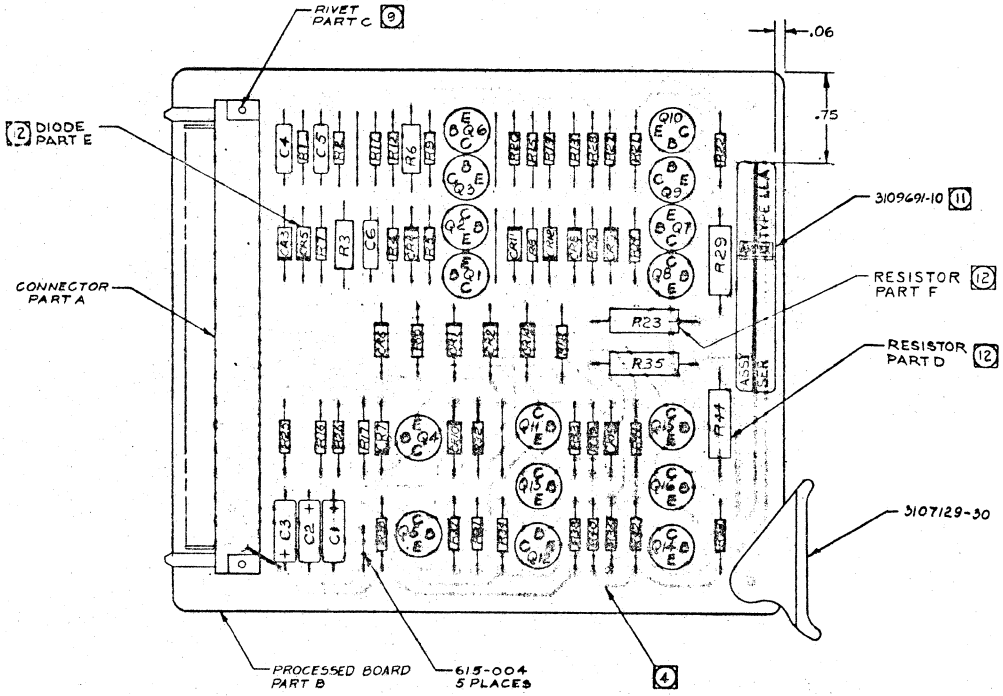
TITLE: CIRCUIT BOARD ASSEMBLY PHOTO AMPLIFIER

CODE IDENT. NO. | SIZE D | DWG. NO. 3107257

SCALE 2/1

PHB

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-33 DEV PRO		4-63	
B	ECN 911-Y PROD.		4/3/64	
C	ECN 3959			
D	ECN 4555		10/17/65	
E	ECN 5955		3/1/66	
F	ECN 7004		9/19/66	



TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION
3201100-10	Q1,2,3,6,8,10,12,13,14,16
3212053-10	Q7,9,15
3212098-10	Q4,5,11
3263024-10	CR1,2,3,4; CR6 THRU CR14
037-990	C1,2,3
034-678	C4,5,6
041-407	R8,17,32,33,39
041-408	R14,22,24,27,41,43
041-409	R9,30,21
041-412	R19
041-438	R15,33,40
041-483	R11,12
041-526	R3
041-538	R26
041-549	R13,20
041-550	R34
041-573	R21,27,42
041-584	R4,5,10,18
041-744	R36
047-302	R23,35,
041-920	R16
041-410	R1,2,7,28
041-006	R6
PART D	R44
PART E	CR5
PART F	R23
PART G	R37

(12) INSTALL PARTS A THRU G PER TABLE I.

(11) MARK PART NO. AND SERIAL NO. PER MIL-STD-130. 3107260

10. PART NO. TO BE AS SHOWN ON BILL OF MATERIAL.

(9) RIVET PART C USED ONLY ON 3200526 CONNECTOR.

8. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B15, COLUMBIA VEDH. CORP., OR EQUIVALENT.

7. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.

6. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY

5. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.

(4) CIRCUITRY ON FAR SIDE.

3. HEAVY LINE ON DIODE INDICATES CATHODE.

2. FOR ASSEMBLY SPECIFICATION SEE 3107104

1. FOR SCHEMATIC SEE 3107103

NOTES:

TABLE I

B/M REFERENCE TABLE

ASSEMBLY	PART A	PART B	PART C	PART D	PART E	PART F	PART G
3107102-10	3200526-10	3107101-10	460-004	047-302	3263024-10	047-302	041-520
3109557-10	3200504-10	3107101-10	NOT USED	047-302	3263024-10	047-302	041-520
3115628-10	3200526-10	3107101-20	460-004	NOT USED	NOT USED	047-302	041-520
3118709-10	3200526-10	3107101-10	460-004	047-302	3263024-10	NOT USED	041-520
3119408-01	3200526-10	3107101-20	460-004	047-302	3263024-10	047-302	041-503

REFERENCE

SEE TABLE	TM-11, 12
	TM-7

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

DECIMALS ANGLES

XX ± ±

BREAK ALL SHARP EDGES APPROX. .015 CHAMF AND SPOTFACE CORNER

RADII .06

ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

AMPEX COMPUTER PRODUCTS COMPANY

9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE

CIRCUIT BOARD ASSY— LOCAL / REMOTE LOGIC

CODE IDENT. NO. | SIZE D | DWG. NO. 3107260 | REV F

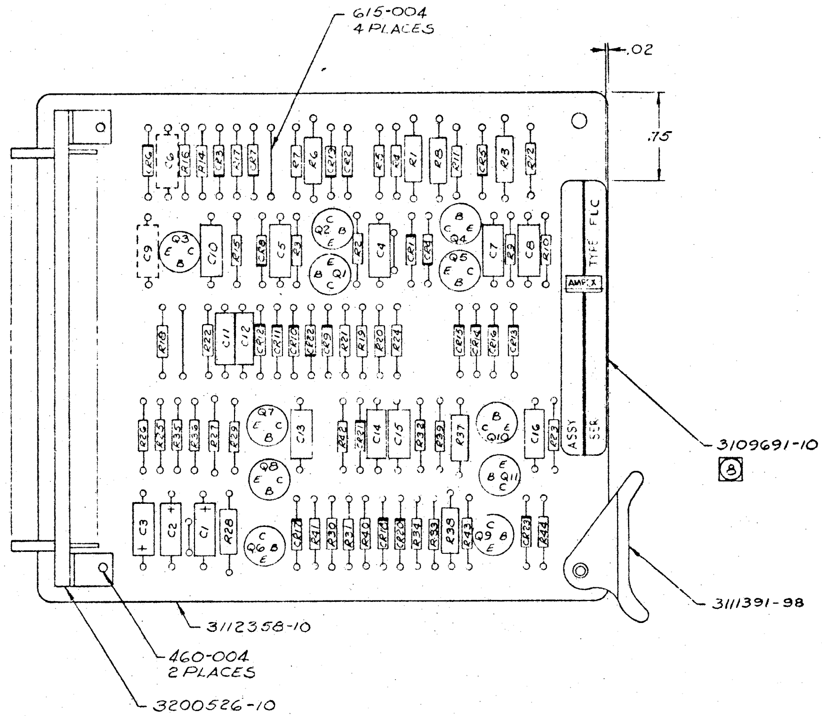
SCALE 2:1 | SHEET 1 OF 1

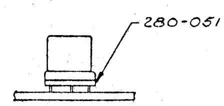
LLA

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 506C PROD. REL	[illegible]	[illegible]	[illegible]
B	ECN 5074	[illegible]	[illegible]	[illegible]
C	ECN 7341	[illegible]	[illegible]	[illegible]
D	[illegible]	[illegible]	[illegible]	[illegible]

TABLE I

B/M REFERENCE TABLE								
ASSEMBLY	USED ON	PART A	PART B	PART C	PART D	PART E	PART F	PART G
3112360-10	TM-7	034-678	326302410	041-409	041-409	041-409	037-990	034-675
3118157-01	TM 12213	034-519	OPEN	041-560	041-560	041-434	037-990	034-678
3119529-01	TM-9212	034-678	326302410	041-560	041-560	041-409	NOT USED	NOT USED





TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION	PART NO.	REFERENCE DESIGNATION
041-407	R26, R36	3201100 10	Q1 THRU Q5, Q7, Q8, Q10, Q11
041-409	R17 THRU R20, R22, R23, R30, R40	3212098 10	Q6, Q9
041-410	R7, R14	326302410	CR1 THRU CR7, CR17, CR19 THRU CR22
041-436	R33, R43	326302810	CR8 THRU CR16
041-442	R31, R41	034-519	C11, C12
041-483	R4, R5, R11, R12	031-529	C4, C5, C7, C8
041-520	R25, R35	034-678	C10, C13, C15
041-549	R16	037-990	C2
041-550	R15, R32, R42	041-008	R28, R38
041-560	R27	041-010	R37
041-584	R2, R3, R9, R10, R29, R39	041-278	R6, R8
PART A	C14, C16		
PART B	CR18, CR23	PART D	R24
C41-404	R1, R13	PART E	R34, R44
PART C	R21	PART F	C1, C3
PART G	C6, C9		

9. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B15, COLUMBIA TECH. CORP., OR EQUIV.

8. MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130. ISSUE LETTER TO BE MARKED IN UPPER RIGHT CORNER OF NAMEPLATE.

7. PART NO. TO BE AS SHOWN ON TABLE I.

6. HEAVY LINE ON DIODE INDICATES CATHODE.

5. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.

4. COMPONENT DESIGNATIONS ARE FOR REFERENCES ONLY.

3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

2. FOR ASSEMBLY SPEC SEE 3112362.

REFERENCE

10. INSTALL PART A THRU G PER TABLE I.

1. FOR SCHEMATIC SEE 3112361

NOTES:

FWA: [illegible]	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .03 .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

PROJ SUPER
PROJ ENGR
ENGR
CHKR S. [illegible] 1/7/66
DFTSMN [illegible] 12/[illegible]/65

AMPEX — AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: CIRCUIT BOARD ASSY- FWD/REV LOGIC-C

CODE IDENT. NO. | SIZE D | DWG. NO. 3118158 | ISSUE D

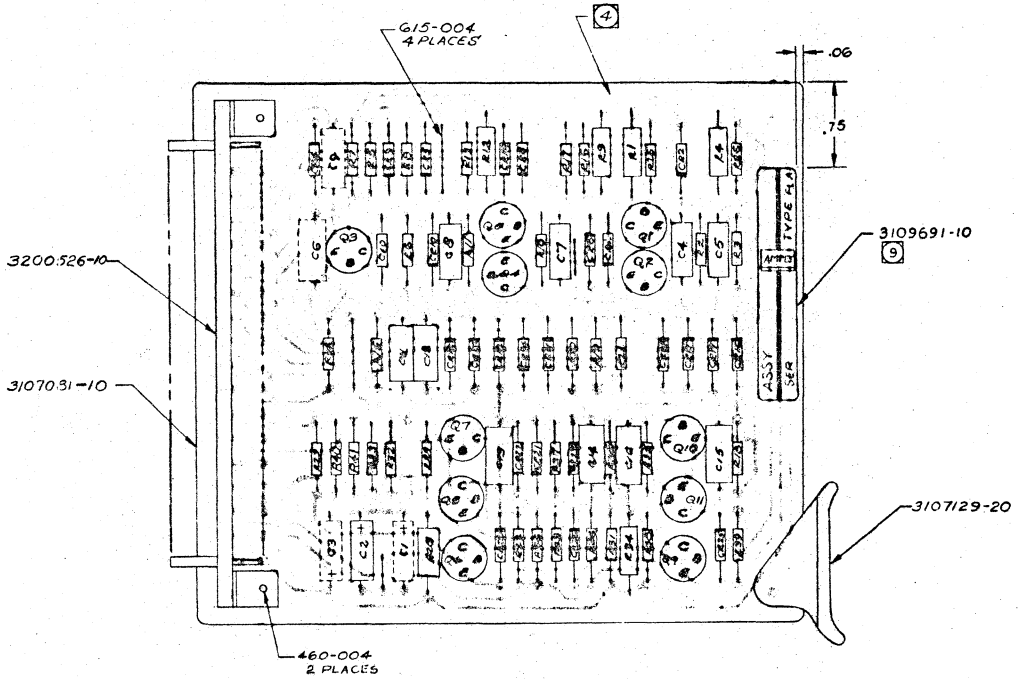
SCALE 2/1 | SHEET 1 OF 1

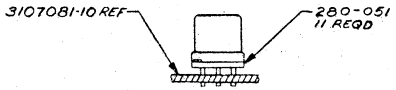
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 7815 PROD REL	[redacted]	6/16/67	

TABLE I

B/M REFERENCE TABLE

ASSEMBLY	PART A	PART B	PART C
3107082-10	037-990	034-678	041-409
3119598-01	NOT USED	NOT USED	041-560





TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION
3212098-10	Q6,9
3201100-10	Q1 THRU 5, Q7,8,10,11
3263024-10	CR1,2,4,6,8,9, CR20 THRU 26, CR18 CR5
3263028-10	CR10 THRU 17, 19
034-417	C16
034-529	C4,5,7,8
034-678	C10, 13, 14, 15
034-519	C11,12
037-990	C2
041-278	R1,12
041-404.1	R4,9
041-008	R28, R34
041-409	R8, R18, R20, 22, 14, 15, 24, 39
041-436	R31, 38
041-442	R23, 36
041-483	R16, 17, 25, 26
041-508	R35,
041-549	R7
041-550	R6, 30, 37
041-560	R32
041-594	P2, 3, 10, 11, 29
041-407	R27, 33
041-410	R3, R5
041-420	R40, 41
PART A	C1, C3
PART B	C6, C9
PART C	R19, R21

REFERENCE

(11) INSTALL PARTS A, B & C PER TABLE I. 3119599

(10) SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B1S, COLUMBIA TECH. CORP., OR EQUIV.

(9) MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD 130.

8. PART NO. TO BE AS SHOWN ON B/M.
7. HEAVY LINE ON DIODE INDICATES CATHODE.
6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
5. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
(4) CIRCUITRY ON FAR SIDE.
3. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.
2. FOR ASSEMBLY SPECIFICATION SEE 3107084.
1. FOR SCHEMATIC SEE 3107083.

NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
.XX ± .XXX ± ±
BREAK ALL SHARP EDGES APPROX. .015
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

3107082	TM-11
3119598	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

PROJ SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN L. KURATANI 6/16/67

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

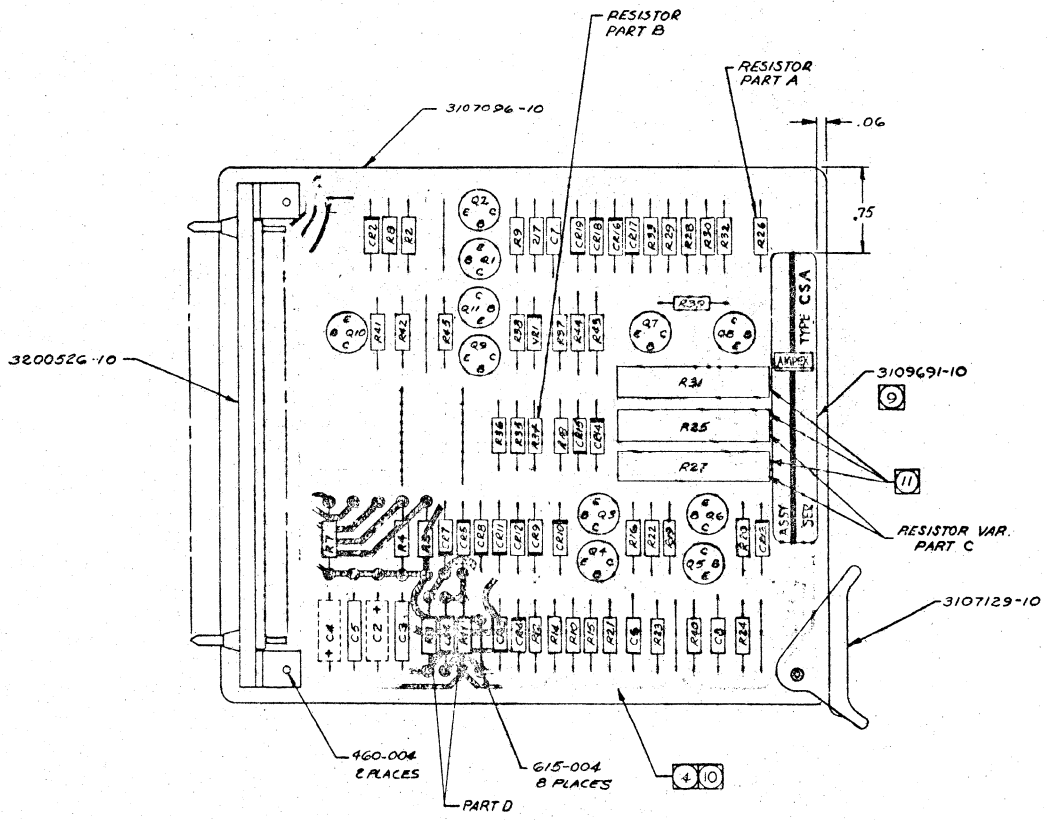
TITLE
CIRCUIT BOARD ASSY-
FWD/REV LOGIC

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3119599	A

SCALE 2:1 SHEET 1 OF 1

FLA

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
D	ECN 5004 PROD REL	[illegible]	9/6/66	[illegible]
E	ECN 7214	[illegible]	12-29	[illegible]
F	ECN 7539	A. PIANO	3-16-67	[illegible]



PART NO.	QTY	REFERENCE DESIGNATION
048-673	1	R7
041-778	2	R14, R28
042-424	1	R36
PART C	2	R25, R27
PART B	1	R34
PART A	1	R26
PART D	2	R11, R13
CV3-141	1	VR1
041-308	1	R31
042-417	2	R3, 4
042-816	2	R10, 12
3201104-20	4	Q3, 4, 7, 8
030-214	1	C8

PART NO.	QTY	REFERENCE DESIGNATION
3201100-10	6	Q1, Q2, Q5, Q6, Q9, Q11
3212091-10	1	Q10
3263024-10	2	CR11, 12
3263041-10	13	CR2 THRU CR10, CR16 THRU CR18
035-989	2	C3, C5
035-568	1	C7, C6
PART E	2	C2, C4
3263025-10	2	CR14, CR15
041-239	2	R43, R44
041-406	1	R18
041-434	1	R8
041-412	6	R19, R15, R24, R30, R39, R42
041-414	1	R2
041-415	1	R9
041-419	1	R40
041-425	4	R21, R45, R16, R22
041-428	1	R41
041-432	1	R20
041-440	1	R37
041-507	1	R17
041-482	3	R23, R32, R38
041-518	1	R35
041-766	2	R29, R33
3263028-10	1	CR13

REFERENCE

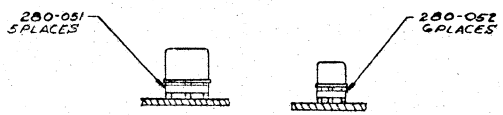
(11) TRIMPOTS NOT TO BE SUBMERGED IN WATER.

(10) SEAL PRINTED CIRCUIT SIDE WITH HUMI-SEAL TYPE 1815 COLUMBIA TECH. CORP. OR EQUIVALENT.

(9) MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130. ISSUE LETTER TO BE MARKED IN UPPER RIGHT CORNER OF NAMEPLATE.

8. PART NO. TO BE AS SHOWN ON B/M.
7. HEAVY LINE ON DIODE INDICATES CATHODE.
6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
5. COMPONENT DESIGNATIONS ARE FOR REF. ONLY.
(4) CIRCUITRY ON FARSIDE.
3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.
2. FOR ASSEMBLY SPECIFICATION SEE 3107095.
1. FOR SCHEMATIC SEE 3107098.

NOTES: UNLESS OTHERWISE SPECIFIED



TYPICAL TRANSISTOR INSTALLATION

3112369	TM-7
3112375	TM-7
3112170	TM-7
3107097	TM 7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .X ± .03, .XX ± .010, .XXX ± .005
ANGLES ±
BREAK ALL SHARP EDGES APPROX. .010 CHAMF. AND SPOTFACE CORNER
RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

PROJ
SUPER
PROJ ENGR [illegible] 3-16-67
ENGR
CHKR
DFTSMN [illegible] 3/4/65

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

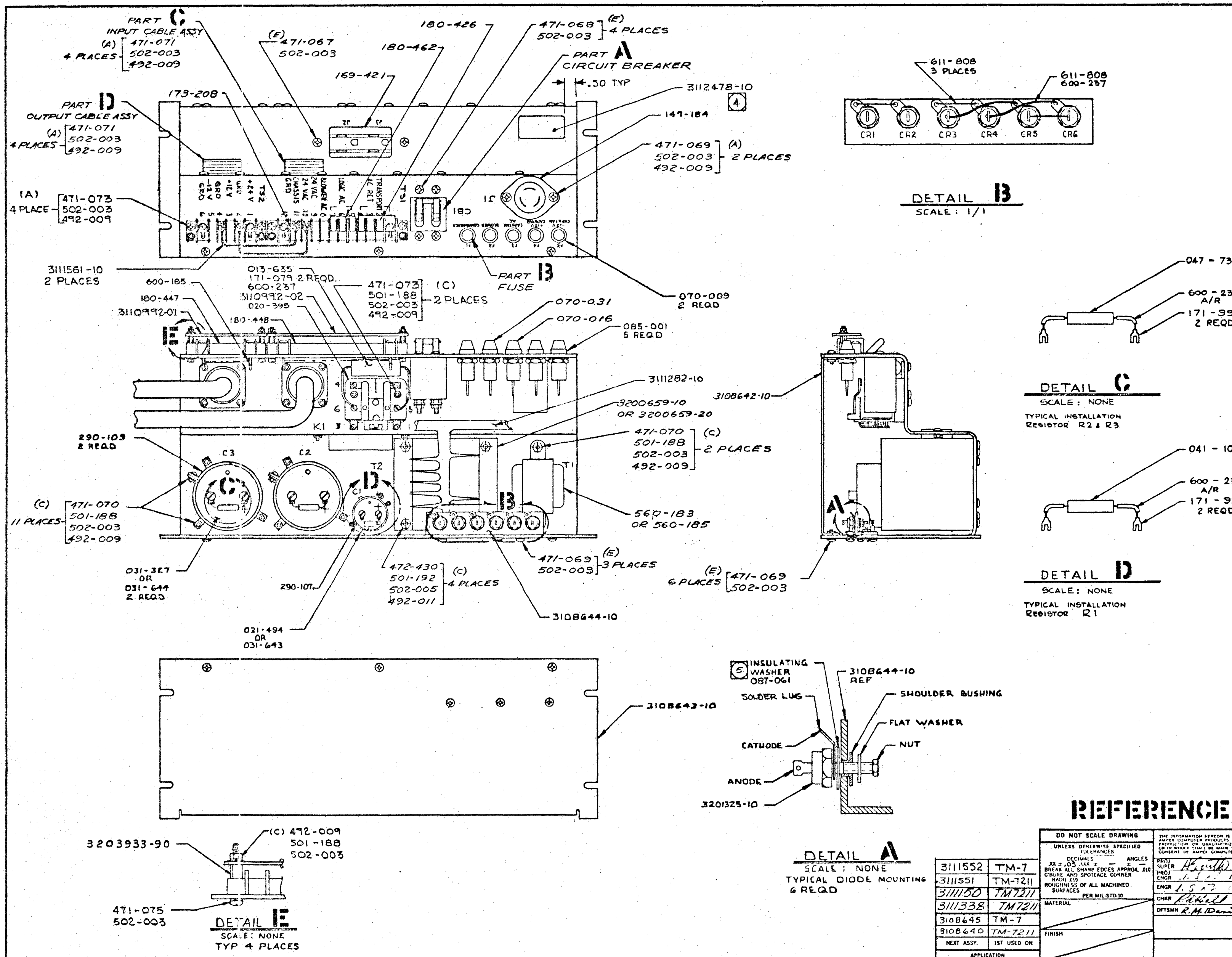
TITLE
CIRCUIT BOARD ASSY-
CAPSTAN SERVO CONTROL

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3112172	F

SCALE 2/1 SHEET 1 OF 1

CSA

ISSUE	DESCRIPTION		DRAFTSMAN	DATE	APPROVAL
A	ECN 911-97	DEV PRO	R.M.D.	[illegible]	[illegible]
B	ECN 911-BF	PROD.	K.M.	[illegible]	[illegible]
C	ECN 3536		L.S.	[illegible]	[illegible]
D	ECN 3599		[illegible]	[illegible]	[illegible]
E	ECN 4252		[illegible]	4-29-65	[illegible]



3108648

5. APPLY SILICON GREASE 087-061 TO BOTH SIDES OF MICA WASHER ON ASSY.
4. MARK IDENTIFICATION PLATE PER MIL-STD-130.
3. PART NO TO BE AS SHOWN ON B/M.
2. FOR SCHEMATIC SEE 3108647.
1. FOR WIRE LIST SEE B/M.

NOTES:

REFERENCE

NEXT ASSY.	1ST USED ON
3111552	TM-7
3111551	TM-7211
3111150	TM7211
3111338	TM7211
3108645	TM-7
3108640	TM-7211

APPLICATION

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .03 .XXX ± — ANGLES ± —
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

PROJ SUPER [illegible]
PROJ ENGR [illegible] 2-25-64
ENGR [illegible] 2-26-64
CHKR [illegible] 2-28-64
DFTSMN R.M. Davis [illegible]

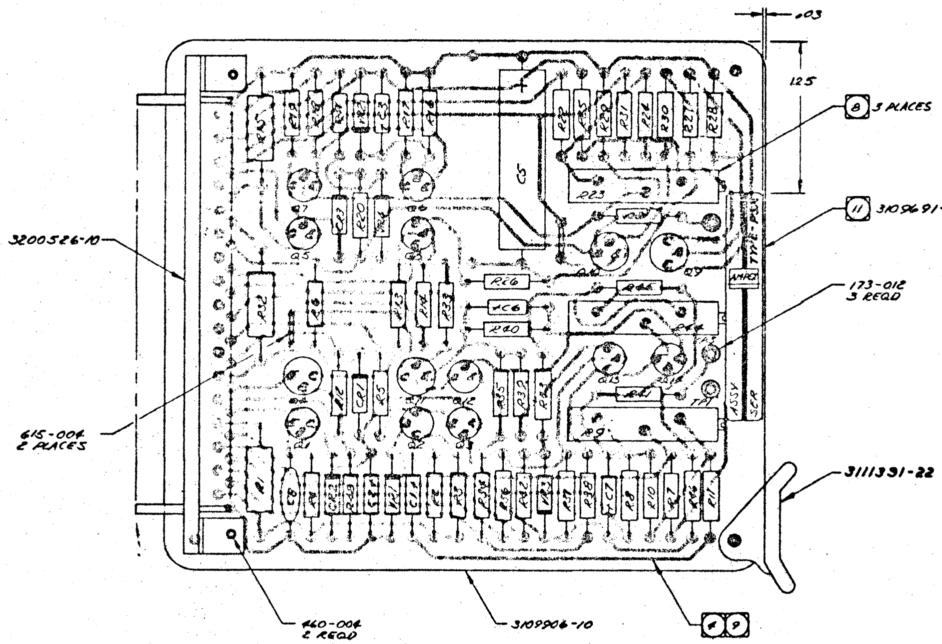
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

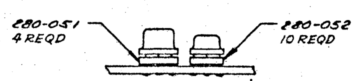
TITLE: TRANSPORT POWER SUPPLY ASSY

CODE IDENT. NO. | SIZE D | DWG. NO. 3108648 | ISSUE E

SCALE 1/2 & NOTED | SHEET 1 of 1

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
B	ERN 101-8L PROD			
C	ECN 3898			
D	ECN 3985			
E	ECN 4206			





TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION
042-533	R47
013-332	VR4

PART NO.	REFERENCE DESIGNATION
3201126-10	Q4,Q9,Q11
3212091-10	Q1,2,3,5,6,7,8,12,13,14
3263028-10	CR1,2,3
013-202	VR1,VR2,VR3
031-220	C5
034-678	C8
037-994	C1,C2,C3,C6,C7
041-003	R35,41,45
041-013	R39,40
041-014	R20
041-329	R10, R24
041-245	R5,R29,R27,R28
042-538	R26,R13
041-273	R17
041-303	R38,R6
041-322	R14
041-331	R19
041-336	R18,R48, ,30
041-343	R2,R16,R33
041-344	R3,R4,R7,R21
041-379	R34
041-461	R31,R42
042-543	R12
044-769	R9,R23,R44
047-703	R43
047-704	R36
047-705	R46
047-427	R8,R22
047-707	R11,R25
047-708	R37
047-739	R32
047-740	R1,R15
3212081-10	Q10

11. MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130. ISSUE LETTER TO BE MARKED IN UPPER RIGHT CORNER OF NAMEPLATE.
10. PART NO. TO BE 3109907-10.
9. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B15, COLUMBIA TECH. CORP. OR EQUIVALENT.
8. TRIMPOT NOT TO BE SUBMERGED IN WATER.
7. HEAVY LINE ON DIODE INDICATES CATHODE.
6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
5. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
4. CIRCUITRY ON FAR SIDE.
3. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL.
2. FOR ASSEMBLY SPEC. SEE 3109908, ISSUE "C"
1. FOR SCHEMATIC SEE 3111899, ISSUE "C"

NOTES:

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .03 .XXX ± .010 ANGLES ± 1/2°
BREAK ALL SHARP EDGES APPROX. .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
√ PER MIL-STD-10

MATERIAL

FINISH

3108396	TM-7
NEXT ASSY	1ST USED ON
APPLICATION	

FORM 3000-187 REV. 9-61

PROJ SUPER / PROJ ENGR / ENGR / CHKR / DFTSMN

CHKR date: 4 MAY 1964

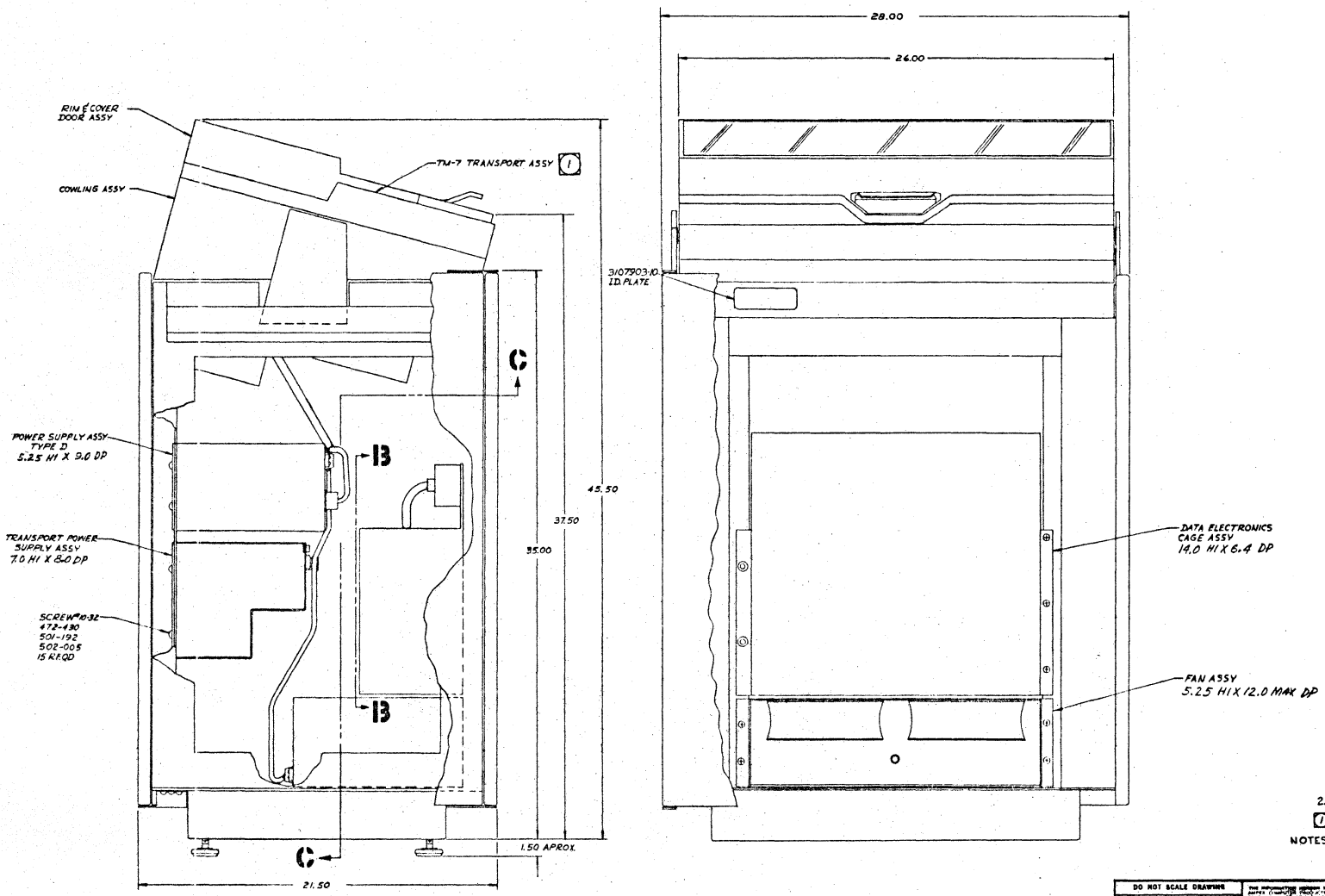
AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: CIRCUIT BOARD ASSY- REGULATOR PWR PACK

CODE IDENT. NO. | SIZE D | DWG. NO. 3109907 | ISSUE E

SCALE 2/1

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
C	ERN 101-BG			
D	ECN 4396			



3108580

2. SEE DWG NO. 3107263 FOR CABLE CONNECTIONS.

1 SEE DWG NO. 3108303 FOR INSTALLATION

NOTES:

REFERENCE

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
XX ± .03 XXX ± .010 ±
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER DEPTH
ROUGHNESS OF ALL MACHINED SURFACES PER MIL STD 10

MATERIAL

FINISH

APPLICATION

FINAL R/M	TM-7211
NEXT ASSY	INT USED ON

PROJ
SUPT
PROJ
ENGR
ENGR
CHKR
DFTSMN Eugene Kenney 8-4-71

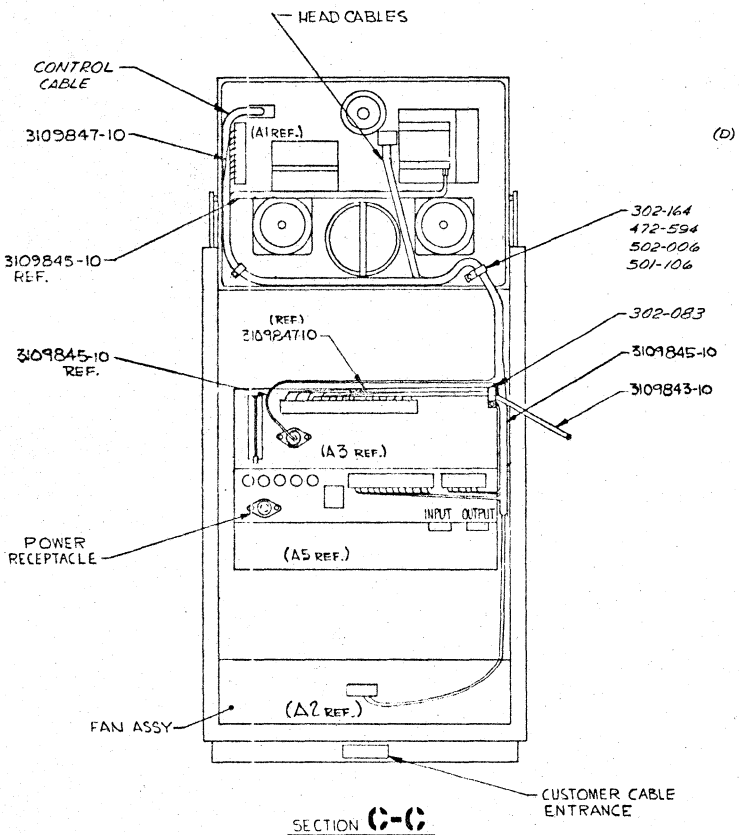
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
TM-7211
OUTLINE & INSTALLATION

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3108580	D

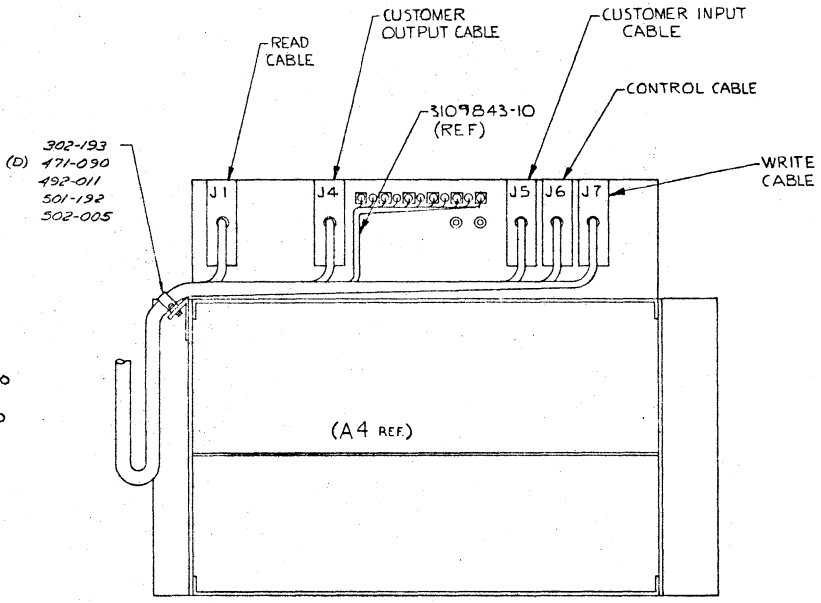
SCALE NONE SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHT 1			



SECTION C-C

TAPE TRANSPORT ROTATED 90°



SECTION B-B

~~NOTES: UNLESS OTHERWISE SPECIFIED~~

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
XX ± .01 XXX ± .010 ± 1°-2°
BREAK ALL SHARP EDGES APPROX. .010
CERAMIC AND SPOTFACE CORNER
RMS 010
ROUGHNESS OF ALL MACHINED SURFACES
√ PER MIL STD 10

MATERIAL
FINISH
FINAL RM TM 7211
NEXT ASSY. 1ST USED ON
APPLICATION

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

LIST OF MATERIAL

THE INFORMATION HEREIN IS THE PROPERTY OF AMPEX COMPUTER PRODUCTS COMPANY AND IS NOT TO BE REPRODUCED OR USED WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.

AMPEX

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

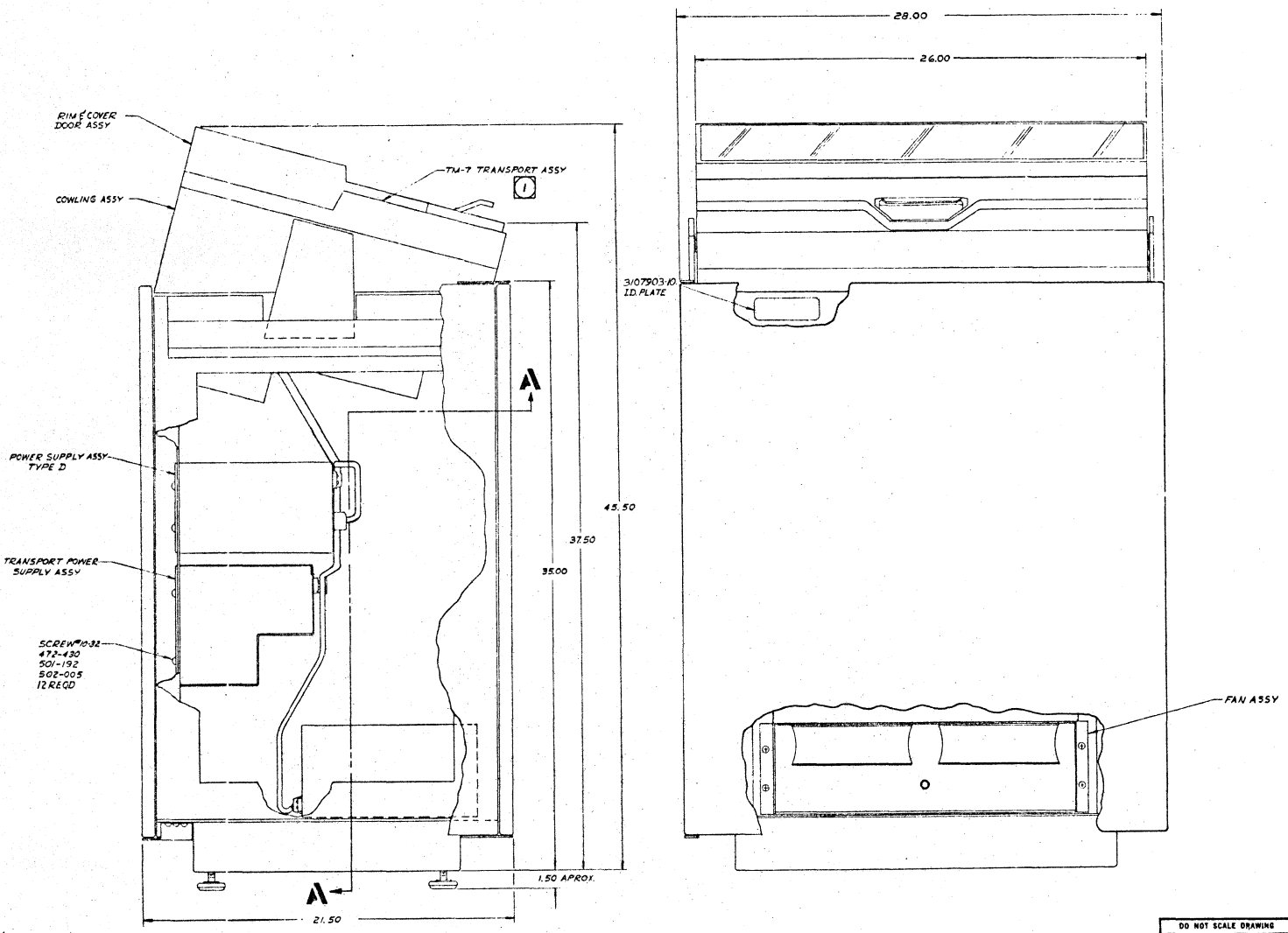
PROJ SUPER		
PROJ ENGR	SEE SHT 1	
ENGR		
CHKR		
DFTSMN	Eugene Schwarz	9-1-64

TITLE
TM-7211
OUTLINE & INSTALLATION

CODE IDENT. NO | SIZE D | DWG. NO. 3108580 | ISSUE D

SCALE NONE

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
C	LTR 101-BG			



2. SEE DWG NO. 3111604 FOR CABLE CONNECTIONS

1 SEE DWG NO. 5108303 FOR INSTALLATION

NOTES:

REFERENCE

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
XX ± .XXX ± °
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

FINAL B/M	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

PROJ SUPER
PROJ ENGR
ENGR
CHKR
DRAWN

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

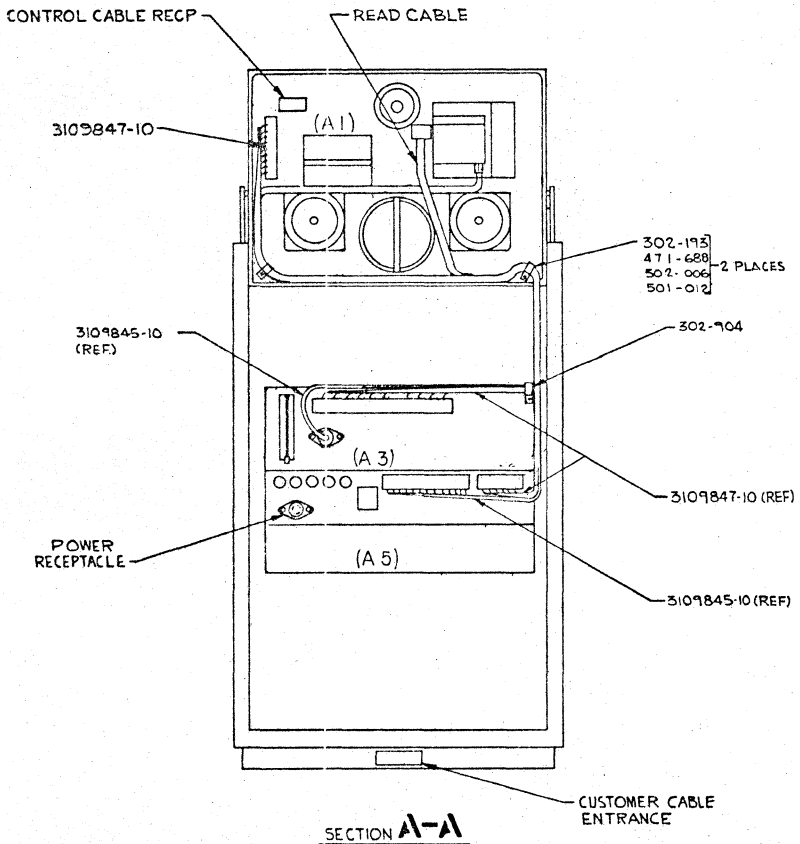
TITLE

TM-7
OUTLINE & INSTALLATION

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111625	

SCALE NONE SHEET 1 OF 2

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHT 1			



SECTION A-A

TAPE TRANSPORT
ROTATED 90°

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM

Form 3068-127 REV. 9-61 — LIST OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .03 .XXX ± .010
ANGLES ± 1/2°
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
✓ PER MIL STD 10

MATERIAL

FINISH

PROJ
SUPLR
PROJ ENGR
ENGR — SEE SH 1
CHKR
DFTSMN — Eugene E Savage 8-1-64

THE INFORMATION HEREON IS THE PROPERTY OF AMPEX COMPUTER PRODUCTS COMPANY AND BE REPRODUCED OR UNAUTHORIZED USE IN PART OR IN WHOLE SHALL BE MADE WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO

AMPEX 0/1 AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

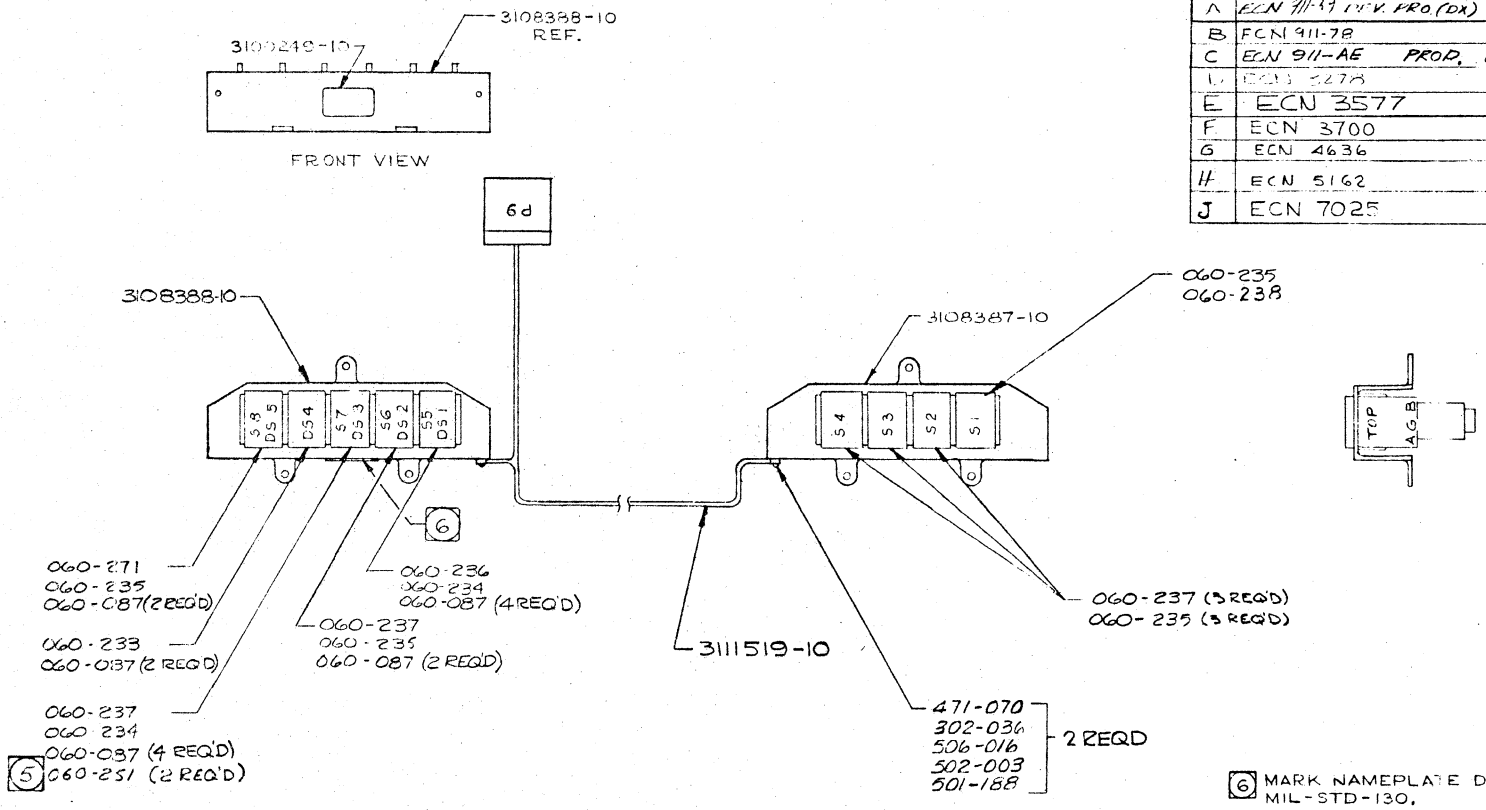
TITLE
TM-7
OUTLINE & INSTALLATION

FINAL E&M	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

CODE IDENT. NO. | SIZE D | DWG. NO. 3111625 | ISSUE C

SCALE NONE

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-37 INIT. PRO. (DX)			
B	ECN 911-78			
C	ECN 911-AE PROD.			
D	ECN 5278			
E	ECN 3577	JANSSEN		
F	ECN 3700			
G	ECN 4636			
H	ECN 5162		6-13-66	
J	ECN 7025			



3108321

6 MARK NAMEPLATE DESIGNATIONS PER MIL-STD-130.

5 INSTALL RED BOOT AMPEX P/N 060-251 OVER LAMPS ASSOCIATED WITH PINS B & D.

4. PART NO. TO BE 3108381-10

3. FOR WIRE LIST SEE 3108395, ISSUE K

2. FOR SCHEMATIC SEE 3108394, ISSUE H

1. ASSEMBLE PER MANUFACTURING PRACTICE MANUAL

NOTES:

~~NOTES: UNLESS OTHERWISE SPECIFIED~~

3108321	TM7
3108321	TM7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
XX ± ___ XXX ± ___ ± ___
BREAK ALL SHARP EDGES APPROX. .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

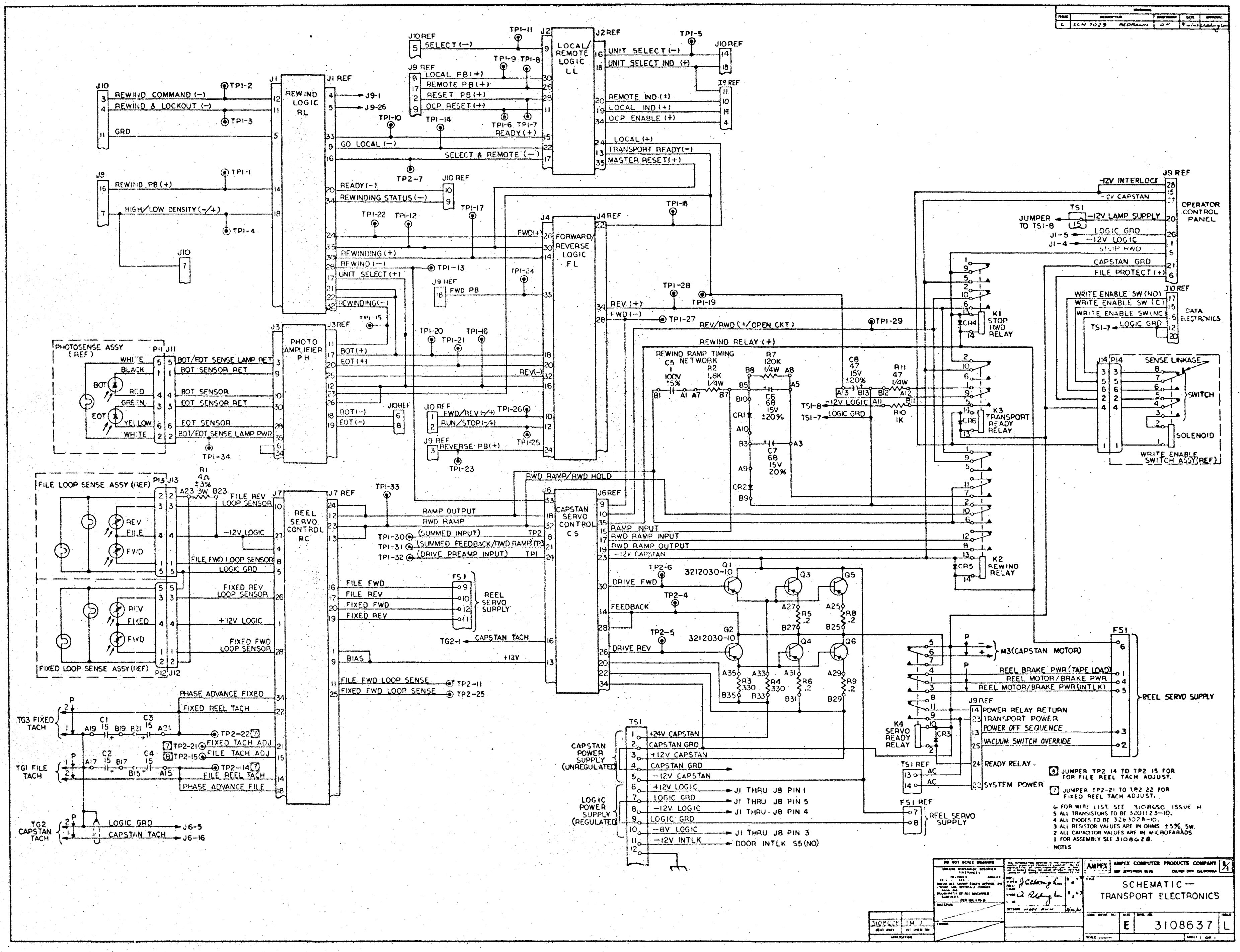
PROJ		
SUPER		
PROJ ENGR		12-16-63
ENGR		10-3-63
CHKR		12-16-63
DFTSMN		9-30-63

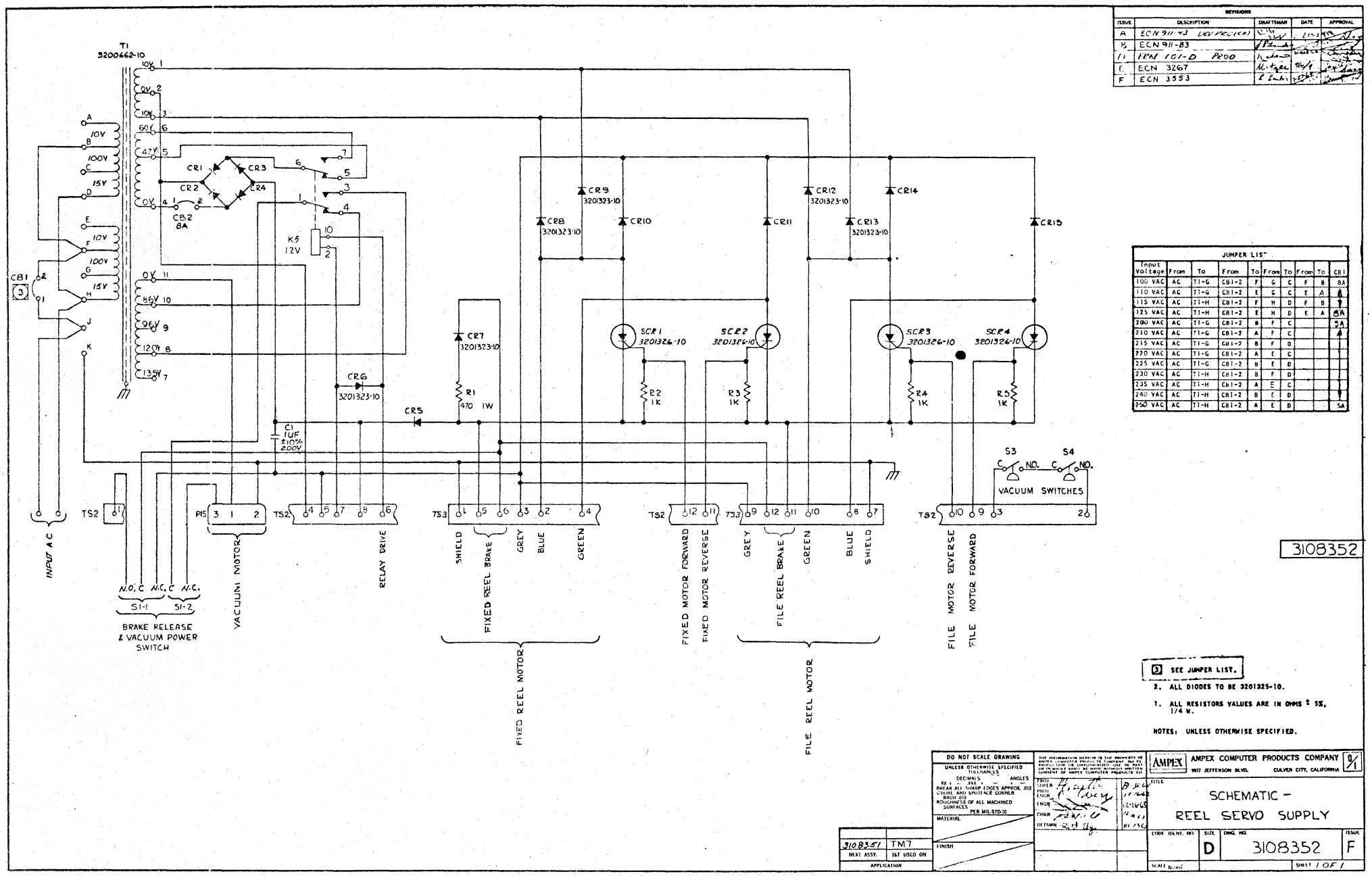
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
OPERATOR CONTROL PANEL SUB-ASSY

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	C	3108321	J

SCALE 1/2 SHEET


REWIND LOGIC RL
LOCAL/ REMOTE LOGIC LL
PHOTO AMPLIFIER PH
FORWARD/ REVERSE LOGIC FL
REEL SERVO CONTROL RC
CAPSTAN SERVO CONTROL CS
REWIND COMMAND (−)
REWIND & LOCKOUT (−)
GRD
REWIND PB (+)
HIGH/LOW DENSITY (−/+)
SELECT (−)
LOCAL PB (+)
REMOTE PB (+)
RESET PB (+)
OCP RESET (+)
UNIT SELECT (−)
UNIT SELECT IND (+)
REMOTE IND (+)
LOCAL IND (+)
OCP ENABLE (+)
GO LOCAL (−)
SELECT & REMOTE (−)
LOCAL (+)
TRANSPORT READY (−)
MASTER RESET (+)
READY (−)
REWINDING STATUS (−)
REWINDING (+)
REWIND (−)
UNIT SELECT (+)
FWD PB
PHOTOSENSE ASSY (REF)
BOT/EOT SENSE LAMP RET
BOT SENSOR RET
BOT SENSOR
EOT SENSOR RET
EOT SENSOR
BOT/EOT SENSE LAMP PWR
FWD/REV (+/−)
RUN/STOP (−/+)
REVERSE PB (+)
REV (+)
FWD (−)
REV/RWD (+/OPEN CKT)
REWIND RELAY (+)
REWIND RAMP TIMING NETWORK
RWD RAMP/RWD HOLD
RAMP OUTPUT
RWD RAMP
RAMP INPUT
RWD RAMP INPUT
RWD RAMP OUTPUT
−12V CAPSTAN
(SUMMED INPUT)
(SUMMED FEEDBACK/RWD RAMP)
(DRIVE PREAMP INPUT)
FILE LOOP SENSE ASSY (REF)
FILE REV LOOP SENSOR
FILE FWD LOOP SENSOR
LOGIC GRD
FIXED REV LOOP SENSOR
FIXED FWD LOOP SENSOR
FIXED LOOP SENSE ASSY (REF)
FILE FWD
FILE REV
FIXED FWD
FIXED REV
REEL SERVO SUPPLY
CAPSTAN TACH
BIAS
FILE FWD LOOP SENSE
FIXED FWD LOOP SENSE
PHASE ADVANCE FIXED
FIXED REEL TACH
FIXED TACH ADJ
FILE TACH ADJ
FILE REEL TACH
PHASE ADVANCE FILE
TG3 FIXED TACH
TG1 FILE TACH
TG2 CAPSTAN TACH
DRIVE FWD
FEEDBACK
DRIVE REV
CAPSTAN POWER SUPPLY (UNREGULATED)
LOGIC POWER SUPPLY (REGULATED)
+24V CAPSTAN
CAPSTAN GRD
+12V CAPSTAN
−12V CAPSTAN
+12V LOGIC
−12V LOGIC
−6V LOGIC
−12V INTLK
J1 THRU J8 PIN 1
J1 THRU J8 PIN 5
J1 THRU J8 PIN 4
J1 THRU J8 PIN 3
DOOR INTLK S5 (NO)
−12V INTERLOCK
−12V LAMP SUPPLY
JUMPER TO TS1-8
STOP RWD
FILE PROTECT (+)
OPERATOR CONTROL PANEL
WRITE ENABLE SW (NO)
WRITE ENABLE SW (C)
WRITE ENABLE SW (NC)
DATA ELECTRONICS
K1 STOP RWD RELAY
K3 TRANSPORT READY RELAY
K2 REWIND RELAY
K4 SERVO READY RELAY
SENSE LINKAGE
SWITCH
SOLENOID
WRITE ENABLE SWITCH ASSY (REF)
M3 (CAPSTAN MOTOR)
REEL BRAKE PWR (TAPE LOAD)
REEL MOTOR/BRAKE PWR
REEL MOTOR/BRAKE PWR (INTLK)
POWER RELAY RETURN
TRANSPORT POWER
POWER OFF SEQUENCE
VACUUM SWITCH OVERRIDE
READY RELAY
SYSTEM POWER
8 JUMPER TP2 14 TO TP2 15 FOR FOR FILE REEL TACH ADJUST.
7 JUMPER TP2-21 TO TP2-22 FOR FIXED REEL TACH ADJUST.
6 FOR WIRE LIST, SEE 3108650 ISSUE H
5 ALL TRANSISTORS TO BE 3201123-10.
4 ALL DIODES TO BE 3263028-10.
3 ALL RESISTOR VALUES ARE IN OHMS ±5% 5W.
2 ALL CAPACITOR VALUES ARE IN MICROFARADS
1 FOR ASSEMBLY SEE 3108628.
NOTES
AMPEX COMPUTER PRODUCTS COMPANY
SCHEMATIC — TRANSPORT ELECTRONICS
E
3108637
L



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-43 LEV REC(CN)			
B	ECN 911-83			
D	ECN 1671-D PROD			
E	ECN 3267			
F	ECN 3353			

JUMPER LIST									
Input Voltage	From	To	From	To	From	To	From	To	CB1
100 VAC	AC	T1-G	CB1-2	F	G	C	F	B	8A
110 VAC	AC	T1-G	CB1-2	E	G	C	E	A	
115 VAC	AC	T1-H	CB1-2	F	H	D	F	B	
125 VAC	AC	T1-H	CB1-2	E	H	D	E	A	6A
200 VAC	AC	T1-G	CB1-2	B	F	C			5A
210 VAC	AC	T1-G	CB1-2	A	F	C			
215 VAC	AC	T1-G	CB1-2	B	F	D			
220 VAC	AC	T1-G	CB1-2	A	E	C			
225 VAC	AC	T1-G	CB1-2	B	E	D			
230 VAC	AC	T1-H	CB1-2	B	F	D			
235 VAC	AC	T1-H	CB1-2	A	E	C			
240 VAC	AC	T1-H	CB1-2	B	E	D			
250 VAC	AC	T1-H	CB1-2	A	E	D			5A

3108352

3 SEE JUMPER LIST.

2. ALL DIODES TO BE 3201325-10.

1. ALL RESISTORS VALUES ARE IN OHMS ± 5%, 1/4 W.

NOTES: UNLESS OTHERWISE SPECIFIED.

3108351	TM7
NEXT ASSY.	I&T USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
BREAK ALL SHARP EDGES APPROX. .010
BURR AND SPLINTER CORNER
RADII .010
ROUGHNESS OF ALL MACHINED SURFACES
PER MIL-STD-10
MATERIAL
FINISH

DRAWN		
SUPER		
PROJ		
ENGR		
ENGR		
CHKR		
DFTSMN		

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC -
REEL SERVO SUPPLY

CODE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3108352	F

SCALE NONE
SHEET 1 OF 1

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 101- EK	[illegible]	[illegible]	[illegible]
B	ECN 4801	[illegible]	12-15-65	[illegible]
C	ECN 4979	[illegible]	[illegible]	[illegible]
D	ECN 7647	[illegible]	[illegible]	[illegible]

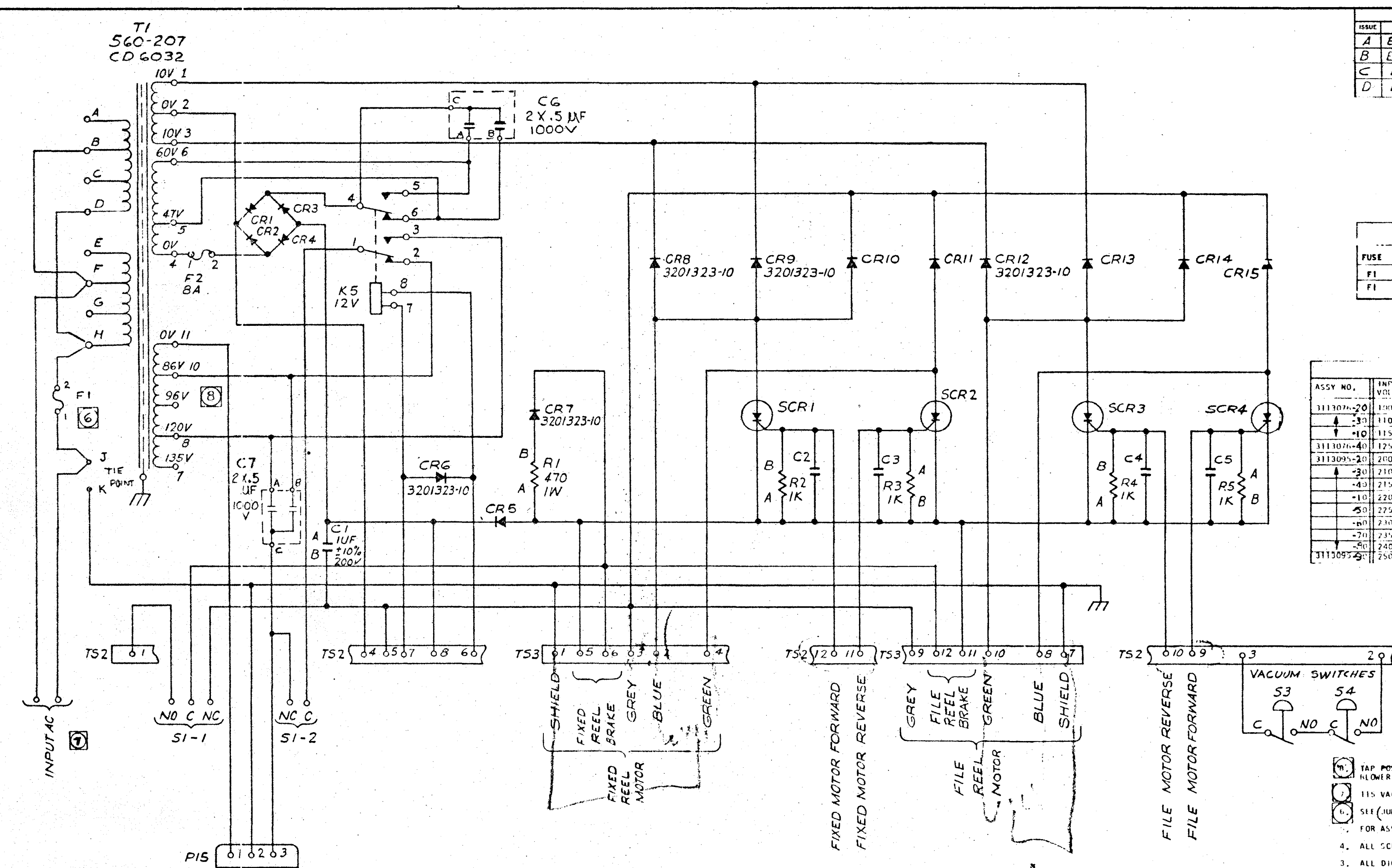


TABLE II

FUSE VALUES		
FUSE	LINE VOLTAGE	DESCRIPTION
F1	100 TO 125	MEDIUM BLOW 8A
F1	200 TO 250	MED BLOW 5A

TABLE I

JUMPER LIST

ASSY NO.	INPUT VOLTAGE	FROM	TO	FROM	TO	FROM	TO	FROM	TO	F1
3113076-20	100 VAC	F12	T1-G	AC	F	G	C	F	B	8A
↑ -30	110 ↑	↑	T1-G	↑	F	G	C	E	A	↑
↓ -10	115 ↓		T1-H		F	H	D	F	B	↓
3113076-40	125 VAC		T1-H		E	H	D	E	A	8A
3113095-20	200 VAC		T1-G		F	F	C			5A
↑ -30	210 ↑		T1-G		A	F	C			↑
-40	215		T1-G		B	F	D			
-10	220		T1-G		A	E	C			
-50	225		T1-G		B	E	D			
-60	230		T1-H		B	F	D			
-70	235		T1-H		A	F	C			
↓ -80	240 ↓	↓	T1-H	↓	B	E	D			↓
3113095-90	250 VAC	F12	T1-H	AC	A	E	D			5A

3113078

8. TAP POSITION OF 86V OR 96V DEPENDENT ON VACUUM BLOWER OUTPUT & VACUUM LIMITS.

7. 115 VAC CONNECTION SHOWN.

6. SEE (JUMPER LIST) TABLE I & II

5. FOR ASSEMBLY SEE 3113076 (115 VAC) OR 3113095 (220 VAC).

4. ALL SCR'S TO BE 3201326-10.

3. ALL DIODES TO BE 580-053.

2. ALL CAPACITORS TO BE 1 MFD 25 VDC.

1. ALL RESISTOR VALUES ARE IN OHMS ± 5%, 1/4 WATT.

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .XXX ± ANGLES
BREAK ALL SHARP EDGES APPROX. .010
CHAMF. AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL STD 10

MATERIAL

FINISH

3113076	TM7
NEXT ASSY.	1ST USED ON

APPLICATION

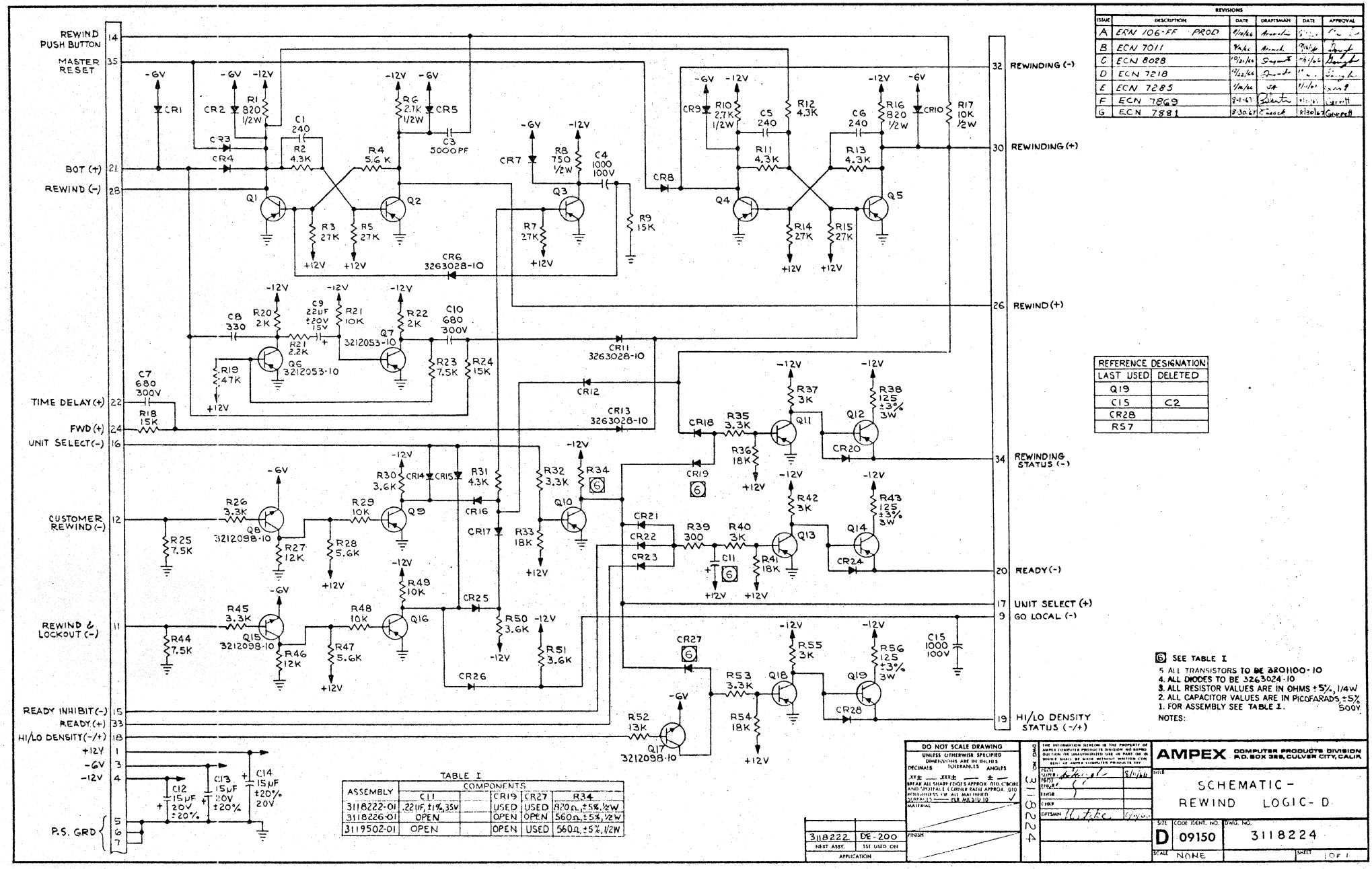
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE

SCHEMATIC REEL SERVO SUPPLY

CODE IDENT. NO | SIZE D | DWG. NO. 3113078 | ISSUE D

SCALE — | SHEET 1 OF 1



REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	ERN 106-FF PROD	6/16/66			
B	ECN 7011	9/6/66		9/16/66	
C	ECN 8028	10/21/66		11/1/66	
D	ECN 7218	11/22/66		"	
E	ECN 7285	1/24/67		1/31/67	
F	ECN 7869	8-1-67		8/2/67	
G	ECN 7881	8-30-67		9/26/67	

REFERENCE DESIGNATION	
LAST USED	DELETED
Q19	
C15	C2
CR28	
R57	

TABLE I

ASSEMBLY	COMPONENTS					
	C11		CR19	CR27	R34	
3118222-01	.22UF, ±1%, 35V		USED	USED	820Ω, ±5%, ½W	
3118226-01	OPEN		OPEN	OPEN	560Ω, ±5%, ½W	
3119502-01	OPEN		OPEN	USED	560Ω, ±5%, 1/2W	

⑥ SEE TABLE I

5 ALL TRANSISTORS TO BE 3201100-10
4. ALL DIODES TO BE 3263024-10
3. ALL RESISTOR VALUES ARE IN OHMS ±5%, 1/4W
2. ALL CAPACITOR VALUES ARE IN PICOFARADS ±5%
1. FOR ASSEMBLY SEE TABLE I.
NOTES:

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
.XX ± .XXX ± ±
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX .010
FINISH PER MIL-STD-10
MATERIAL

3118222	DE-200
NEXT ASSY.	1ST USED ON
APPLICATION	

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DRAWN	8/1/67
SUPER.	
DEPT.	
ENGR.	
CHKD	
DFTSMAN	

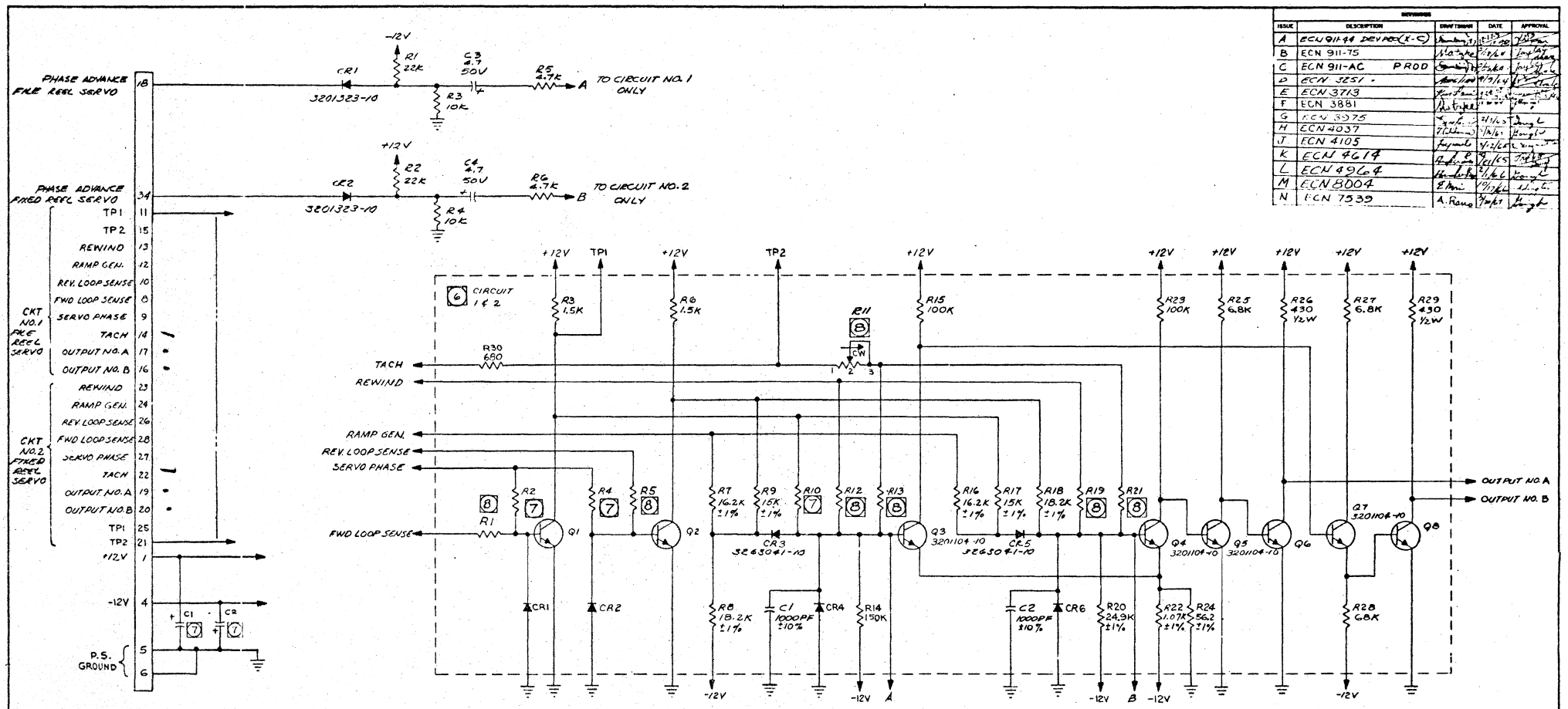
3118224

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 388, CULVER CITY, CALIF.

TITLE
SCHEMATIC - REWIND LOGIC - D

SIZE	CODE IDENT. NO.	DWG. NO.
D	09150	3118224
SCALE NONE		SHEET 1 OF 1

RLD



ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-44 DEV REV (K-C)			
B	ECN 911-75			
C	ECN 911-AC PROD			
D	ECN 3251 -			
E	ECN 3713			
F	ECN 3881			
G	ECN 3975			
H	ECN 4037			
J	ECN 4105			
K	ECN 4614			
L	ECN 4964			
M	ECN 8004			
N	ECN 7539			

TABLE I

CIRCUIT	R2	R4	R10
1	10K, 1/4W, ±5%	10K, 1/4W, ±5%	18.2K ±1%, 1/4W
2	15K, 1/9W, ±5%	15K, 1/4W, ±5%	18.2K ±1%, 1/4W

TABLE II

FUNCTION	COMPONENTS CIRCUITS 1 & 2 R11	R12 & R19	R13 & R21	R15 & R5	C1, C2	ASSY NO.
36 IPS	2.5K	5.90K	10K	1K	15MF, 20V ±20%	3107092-10
45 IPS	2.5K	7.5K	13.3K	1K	OPEN	3112167-10
54-571 IPS	10K	7.15K	10K	JUMPER	15MF, 20V ±20%	3112175-10
1-45 IPS	2.5K	7.5K	4.99K	1K	↑	3111906-10
12/16 IPS	2.5K	5.36K	4.99K	1K		3112168-10
105/52.5 IPS	2.5K	4.75K	6.81K	1K		3112387-10
87.5 IPS 200 IPS PWD 90 IPS (VAC SENSE)	2.5K	4.12K	5.36K	1K		3113111-10
	2.5K	5.90K	10K	5.6K	↓	3113132-10
75 ips	10K	6.81K	6.81K	1K	15MF, 20V ±20%	3119421-01

9. FOR REF ASSY SEE 3112169.
8. SEE TABLE II.
7. SEE TABLE I.
6. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX THE DESIGNATING NUMBER WITH THE CIRCUIT NUMBER FOR COMPLETE DESIGNATION.
5. ALL DIODES TO BE 32630#5-10.
4. ALL TRANSISTORS TO BE 32/12054-10.
3. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, ±20%, 100V.
1. FOR ASSEMBLY SEE TABLE II.

NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS .XX ± .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX .010
CORNE AND SPOTFACE CORNER
MAIN 010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

PROJ
SUPER
PROJ ENGR
LYNGR
CHKR
DFTSMN R. Jacobsen 1/9/75

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC-
REEL SERVO CONTROL

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3107093	1/1

SCALE NONE SHEET 1 OF 1

SEE TABLE II | TAN-7
NEXT ASSY. | 1ST USED ON
APPLICATION

RCA

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-4 DEV PROD(REL)	[illegible]	[illegible]	[illegible]
B	ECN 911-501	[illegible]	[illegible]	[illegible]
C	ECN 911-503	[illegible]	[illegible]	[illegible]
D	ECN 911-21	[illegible]	[illegible]	[illegible]
E	ECN 911-AB PROD.	[illegible]	[illegible]	[illegible]
F	ECN 4446	[illegible]	[illegible]	[illegible]
G	ECN 4592	[illegible]	[illegible]	[illegible]
H	ECN 4902	[illegible]	[illegible]	[illegible]
J	ECN 7441	[illegible]	[illegible]	[illegible]
K	ECN 7887	[illegible]	[illegible]	[illegible]

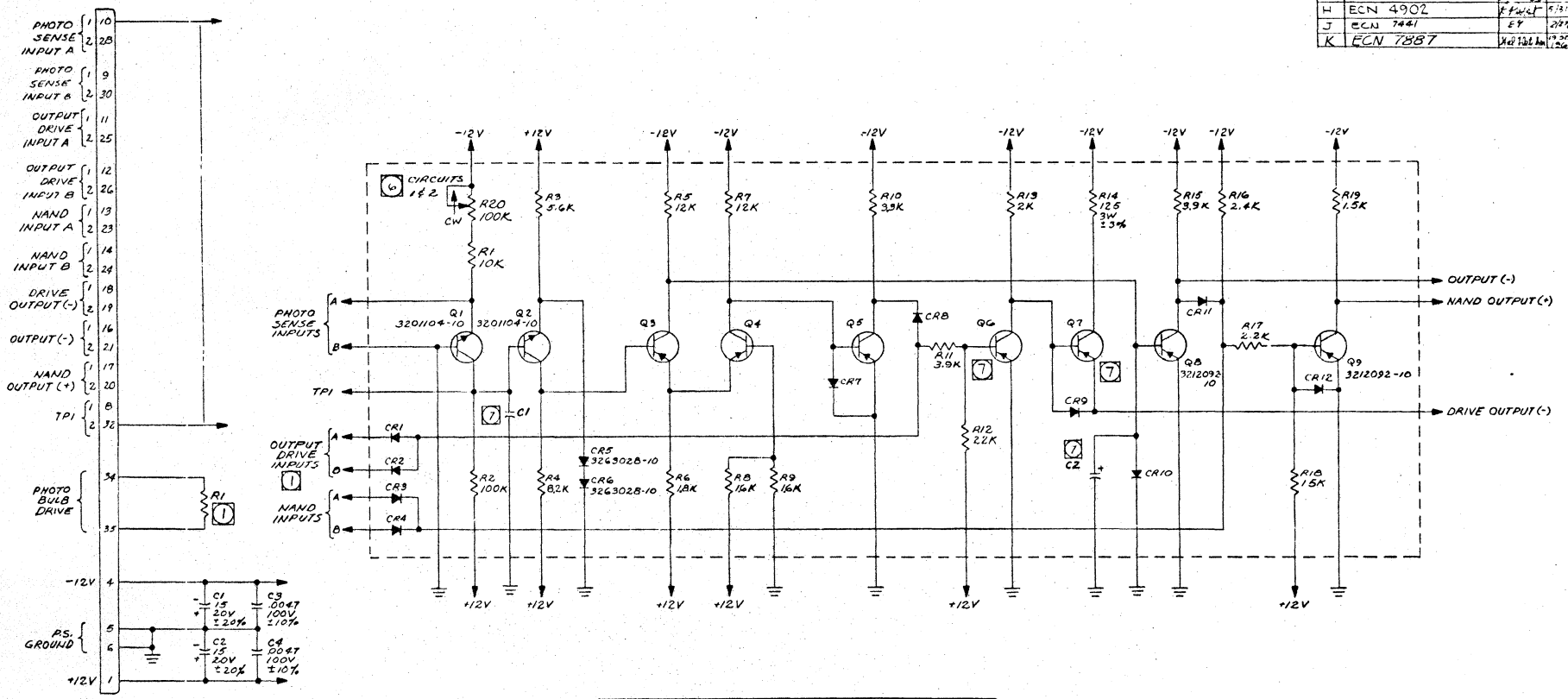


TABLE 1					
B/M NO	R1	CR2	Q6,Q7	C1	C2
3115388	3W,9Ω ±1%	NOT USED	3201100-10	.0047 100V	.0047 100V
3115249	3W,5Ω ± 5%	USED	3201100-10	.0047 100V	.0047 100V
3107072	3W,9Ω ±1%	USED	3201100-10	.0047 100V	.0047 100V
3107262	3W,9Ω ±1%	USED	3201100-10	.0047 100V	.0047 100V
3118636	3W,9Ω ±1%	USED	3212092-10	.01 100V	.01 100V

7. SEE TABLE 1.
6. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX THE REFERENCE DESIGNATION WITH THE CIRCUIT NUMBER FOR COMPLETE DESIGNATION.
5. ALL DIODES TO BE 32G3028-10.
4. ALL TRANSISTORS TO BE 3201100-10.
3. ALL RESISTOR VALUES ARE IN OHMS ± 5%, 1/4 W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS ± 10%
1. SEE NOTE 1.

NOTES: UNLESS OTHERWISE SPECIFIED

3115388	TM-7
3115249	TM-7
3107072	TM-5
3107262	TM-7
NEXT ASSY	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS XX ± XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX. .010 CHAMF. AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

PROJ [illegible]
SUPER [illegible] 2-19-6
PROJ [illegible]
ENGR [illegible] 9/11/
ENGR [illegible]
CHKR [illegible] 3-20-6
DFTSMN [illegible] 9/11/6

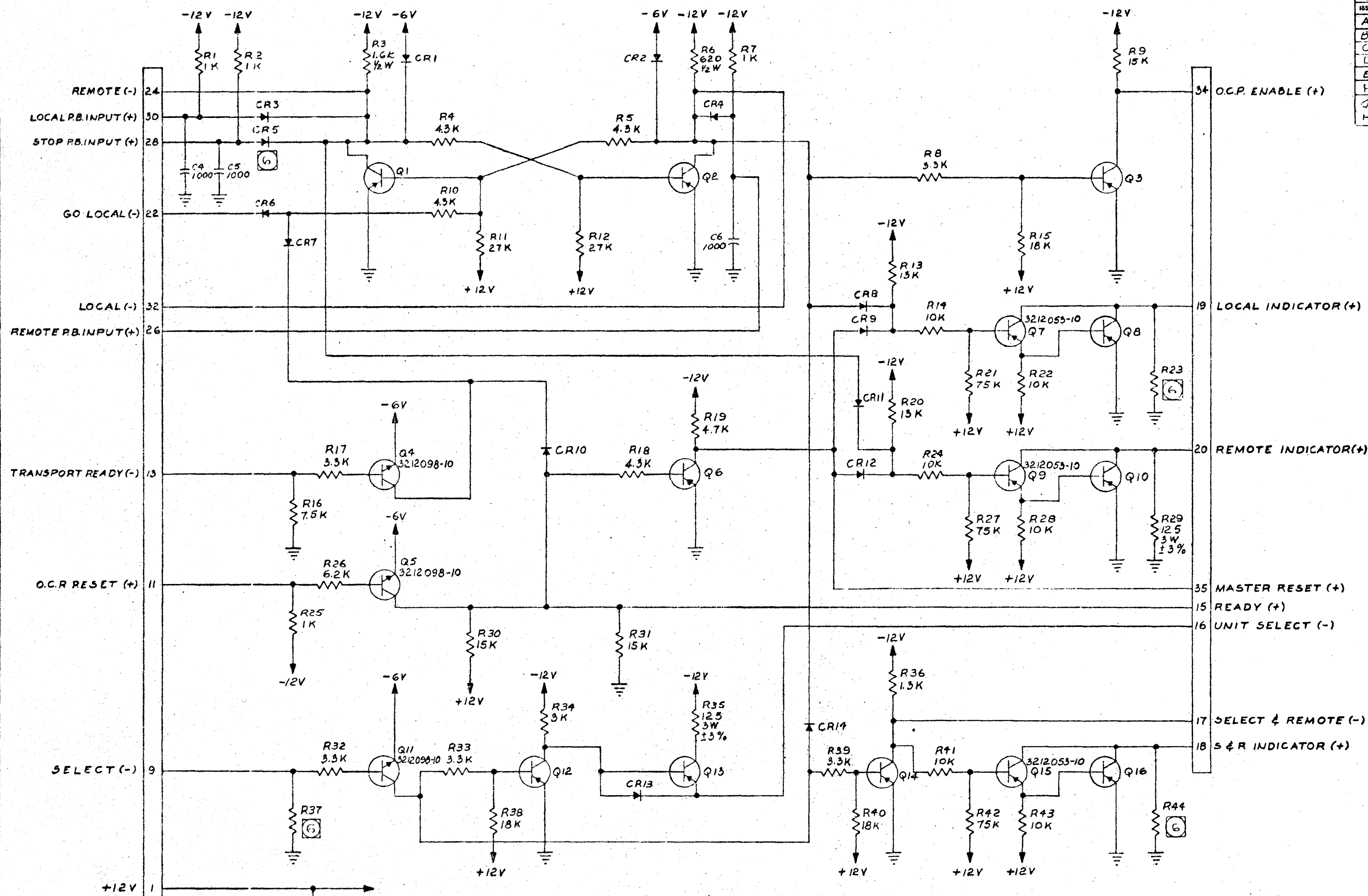
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC-
PHOTO AMPLIFIER

CODE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3107073	K

SCALE none SHEET 1 OF 1

PHB



(G) SEE TABLE I

NOTES: UNLESS OTHERWISE SPECIFIED.

1. FOR ASSEMBLY SEE TABLE
2. ALL CAPACITOR VALUES ARE IN PICOFARADS, 10%, 100V.
3. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
4. ALL TRANSISTORS TO BE 3201100-10.
5. ALL DIODES TO BE 3263024-10.

REVISIONS

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-19			
B	ECN 911-509			
C	ECN 911-53			
D	ECN 911-Y PROD			
E	ECN 3959			
F	ECN 4555			
G	ECN 5955			
H	ECN 7004			

TABLE I

ASSEMBLY	FUNCTION	USED ON	CR5	R44	R23	R37
3107102-10	36 IPS	TM-7	3263024-10	125Ω,±3%,3W	125Ω,±3%,3W	7.5K
3109557-10	36 IPS	TM-7/TM-4	3263024-10	125Ω,±3%,3W	125Ω,±3%,3W	7.5K
3115628-10	BTL (I.D)	TM-7	NOT USED	NOT USED	125Ω,±3%,3W	7.5K
3118709-10	BOEING	TM-12	3263024-10	125Ω,±3%,3W	NOT USED	7.5K
3119408-01	EAI	TM-7/9	3263024-10	125Ω,±3%,3W	125Ω,±3%,3W	270Ω

NEXT ASSY.	1ST USED ON
3118709	BOEING
3107102	TM-11,12
3109557	TM 4
3109557	TM-7
3107102	TM-7

APPLICATION

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED

MATERIAL

FINISH

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

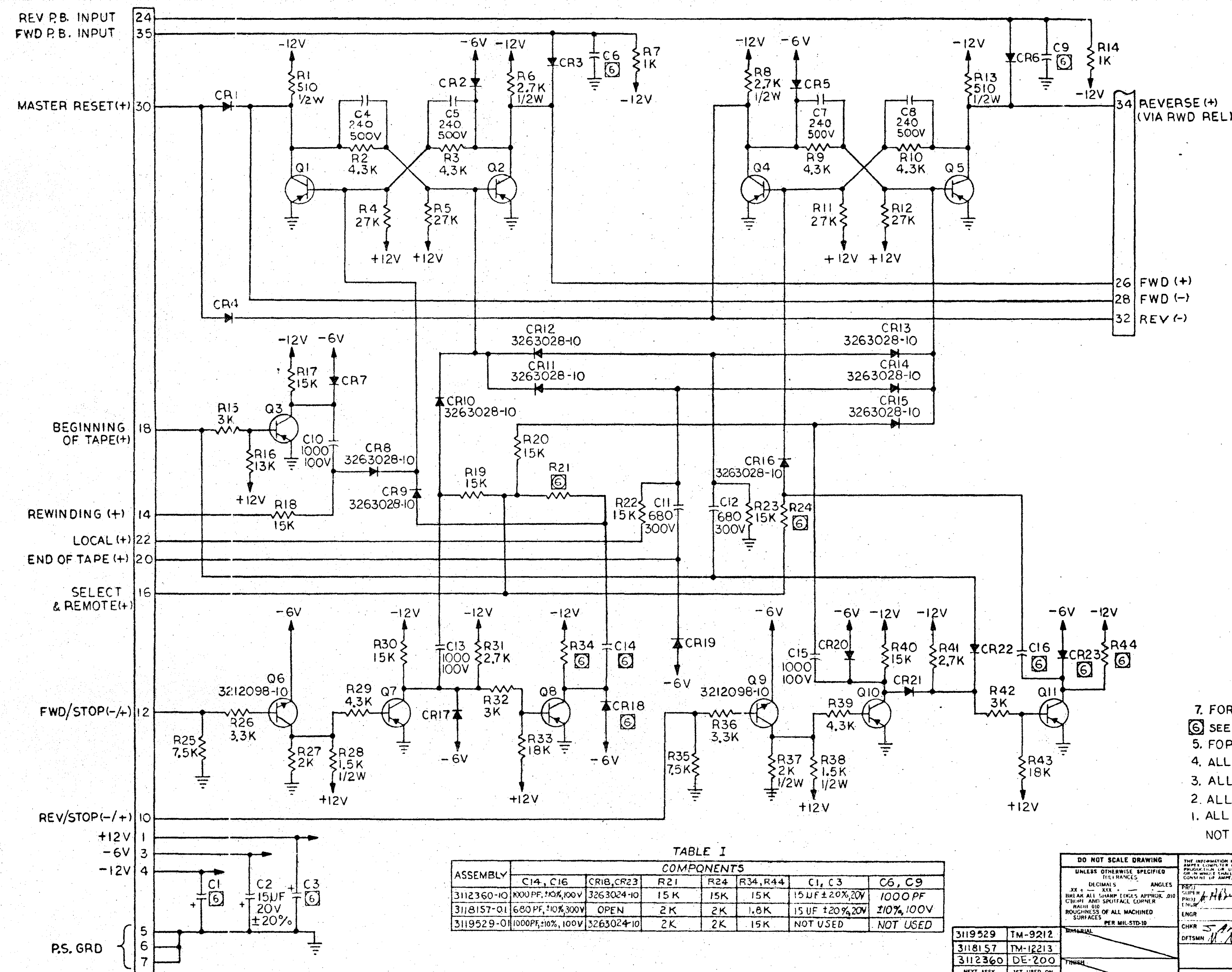
TITLE: SCHEMATIC— LOCAL / REMOTE LOGIC

SIZE: D DWG. NO. 3107103 ISSUE: H

SCALE NONE SHEET 1 OF 1

3107103

LLA



REVISIONS

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 106-CO PROD REL	[illegible]	1/7/66	[illegible]
B	ECN 5060	[illegible]	[illegible]	[illegible]
C	ECN 5074	[illegible]	[illegible]	[illegible]
D	ECN 7341	[illegible]	[illegible]	[illegible]

REFERENCE DESIGNATION	
LAST USED	DELETED
R44	
C16	
CR23	
Q11	

3112361

7. FOR REF ASSY SEE 3118158.
6 SEE TABLE I.
5. FOR ASSEMBLY SEE 3112360.
4. ALL DIODES TO BE 3263024-10.
3. ALL TRANSISTORS TO BE 3201100-10.
2. ALL RESISTOR VALUES ARE IN OHMS ±5%, 1/4W.
1. ALL CAPACITOR VALUES ARE IN PICOFARADS ± 10%.
NOTES: UNLESS OTHERWISE SPECIFIED.

TABLE I

ASSEMBLY	COMPONENTS						
	C14, C16	CR18, CR23	R21	R24	R34, R44	C1, C3	C6, C9
3112360-10	1000 PF, ±10%, 100V	3263024-10	15K	15K	15K	15 UF ±20%, 20V	1000 PF ±10%, 100V
3118157-01	680 PF, ±10%, 300V	OPEN	2K	2K	1.8K	15 UF ±20%, 20V	
3119529-01	1000 PF, ±10%, 100V	3263024-10	2K	2K	15K	NOT USED	NOT USED

NEXT ASSY.	1ST USED ON
3119529	TM-9212
3118157	TM-12213
3112360	DE-200

APPLICATION

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES

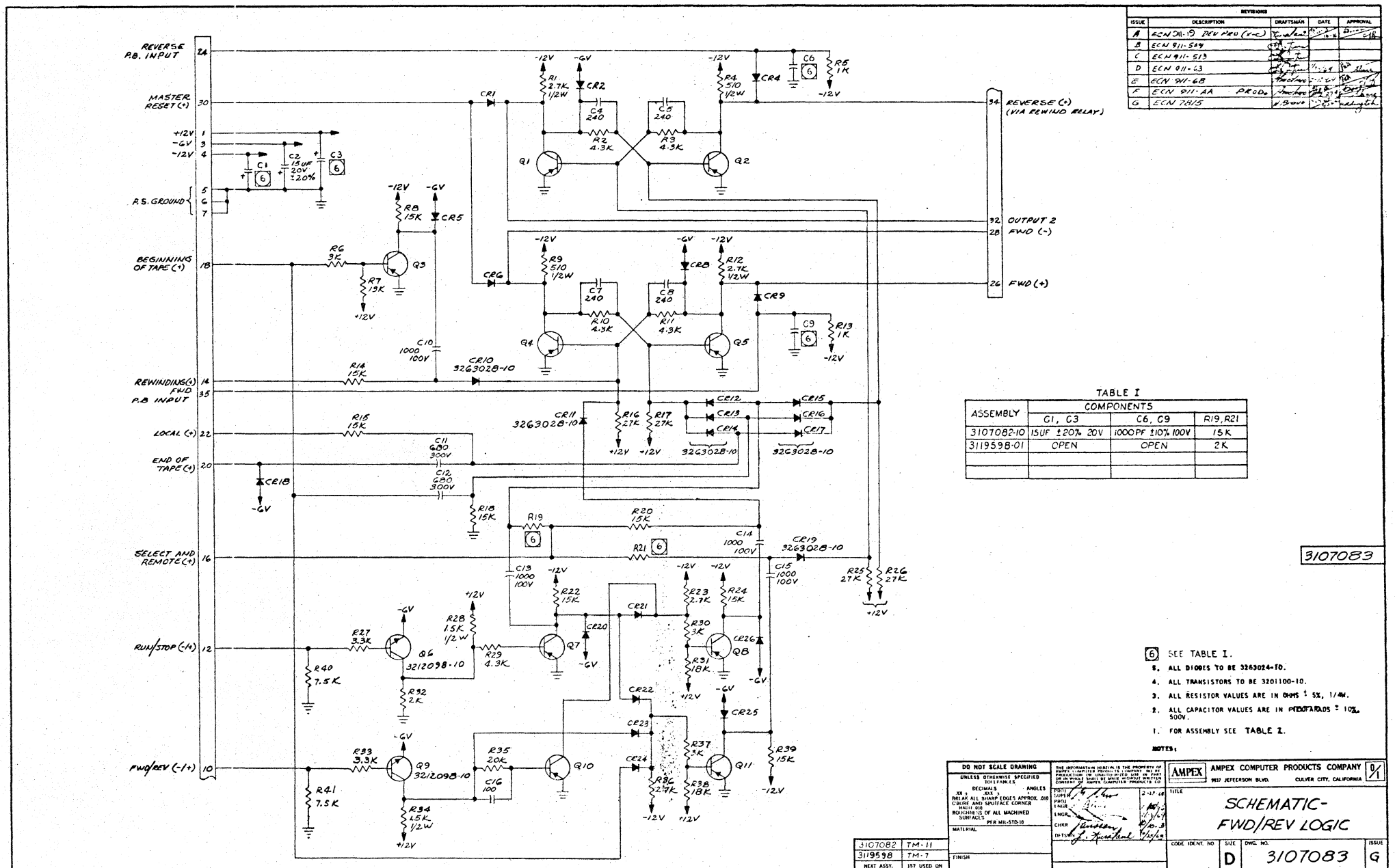
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE SCHEMATIC–FWD/REV LOGIC-C

SIZE D DWG. NO. 3112361 ISSUE D

SCALE NONE SHEET 1 OF 1

FLC



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-19 DEV REV (V-C)			
B	ECN 911-509			
C	ECN 911-513			
D	ECN 911-63			
E	ECN 911-68			
F	ECN 911-AA PROD.			
G	ECN 7815			

TABLE I

ASSEMBLY	COMPONENTS		
	C1, C3	C6, C9	R19, R21
3107082-10	15UF ±20% 20V	1000PF ±10% 100V	15K
3119598-01	OPEN	OPEN	2K

6 SEE TABLE I.

5. ALL DIODES TO BE 3263024-10.
4. ALL TRANSISTORS TO BE 3201100-10.
3. ALL RESISTOR VALUES ARE IN OHMS ± 5%, 1/4W.
2. ALL CAPACITOR VALUES ARE IN PICOFARADS ± 10%, 500V.
1. FOR ASSEMBLY SEE TABLE I.

NOTES:

3107083

3107082	TM-11
3119598	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS XX ± .03 XXX ± .010
ANGLES
BREAK ALL SHARP EDGES APPROX. .010
C'BORE AND SPOTFACE CORNER HAVE 90°
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

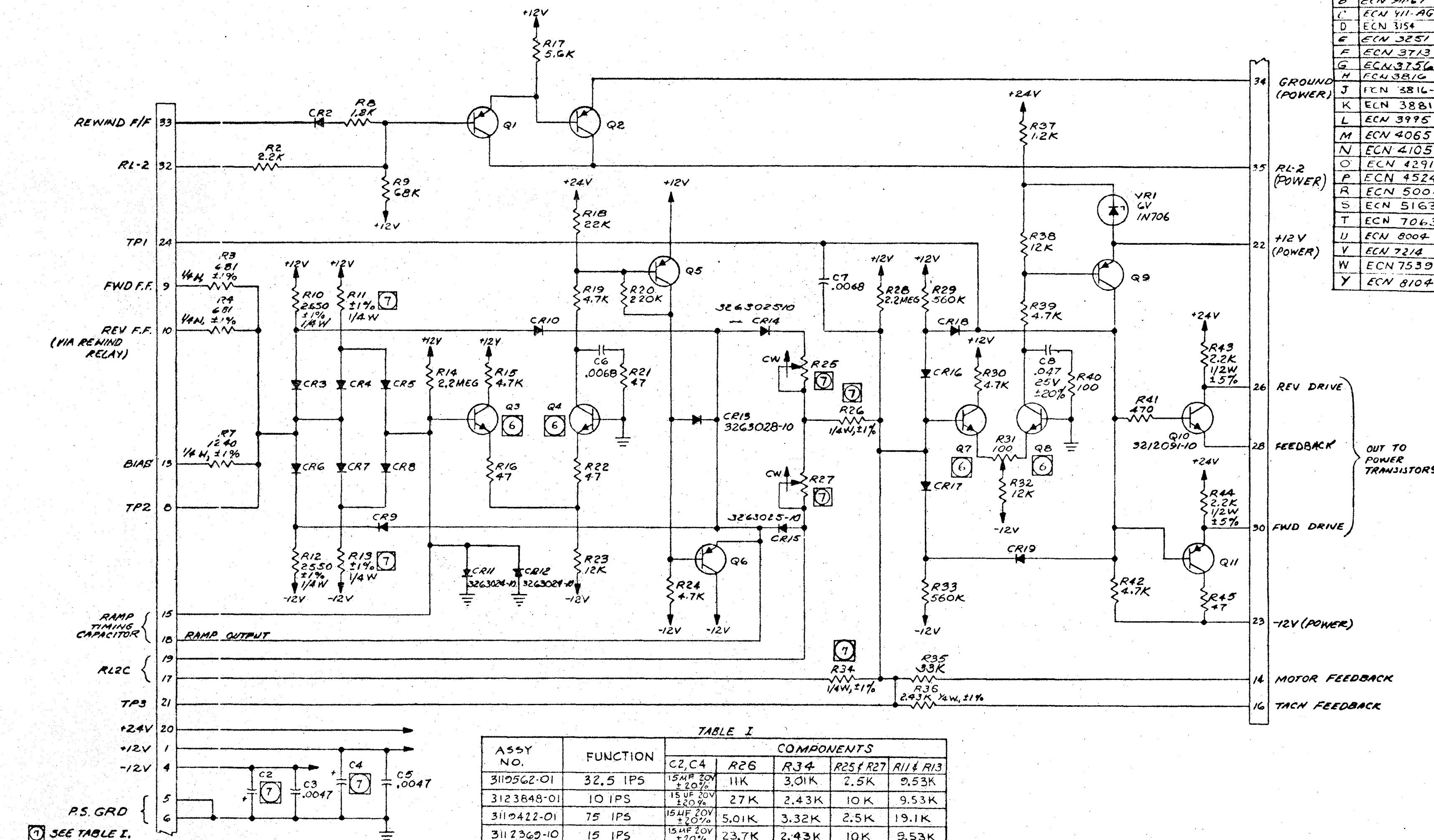
PROJ. ENGR. CHKR. DFTSMN.

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: SCHEMATIC- FWD/REV LOGIC

CODE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3107083	G
SCALE NONE		SHEET 1 OF 1	

FLA



ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-26 DEV. PRO. (X-C)	[illegible]	[illegible]	[illegible]
B	ECN 911-67	[illegible]	[illegible]	[illegible]
C	ECN 911-AG PROD.	[illegible]	[illegible]	[illegible]
D	ECN 3154	[illegible]	[illegible]	[illegible]
E	ECN 3251	[illegible]	[illegible]	[illegible]
F	ECN 3713	[illegible]	[illegible]	[illegible]
G	ECN 3756	[illegible]	[illegible]	[illegible]
H	ECN 3816	[illegible]	[illegible]	[illegible]
J	ECN 3816-A	[illegible]	[illegible]	[illegible]
K	ECN 3881	[illegible]	[illegible]	[illegible]
L	ECN 3995	[illegible]	[illegible]	[illegible]
M	ECN 4065	ARAMAKI	2/24/65	[illegible]
N	ECN 4105	[illegible]	[illegible]	[illegible]
O	ECN 4291	[illegible]	8/5/65	[illegible]
P	ECN 4524	CHR	9/2/65	[illegible]
R	ECN 5004	[illegible]	[illegible]	[illegible]
S	ECN 5163	[illegible]	[illegible]	[illegible]
T	ECN 7063	[illegible]	10/3/66	[illegible]
U	ECN 8004	[illegible]	[illegible]	[illegible]
V	ECN 7214	[illegible]	[illegible]	[illegible]
W	ECN 7539	A. Rauo	[illegible]	[illegible]
Y	ECN 8104	[illegible]	7/1/67	Addington

TABLE I

ASSY NO.	FUNCTION	COMPONENTS				
		C2, C4	R26	R34	R25 & R27	R11 & R13
3119562-01	32.5 IPS	15MF 20V ±20%	11K	3.01K	2.5K	9.53K
3123848-01	10 IPS	15 UF 20V ±20%	27K	2.43K	10K	9.53K
3119422-01	75 IPS	15MF 20V ±20%	5.01K	3.32K	2.5K	19.1K
3112369-10	15 IPS	15MF 20V ±20%	23.7K	2.43K	10K	9.53K
3112171-10	20 IPS	15MF 20V ±20%	18.2K	2.43K	2.5K	9.53K
3118199-01	25 IPS	15MF 20V ±20%	15K	2.43K	2.5K	9.53K
3113133-10	30 IPS	15MF 20V ±20%	12.1K	2.74K	2.5K	9.53K
3107097-10	36 IPS	15MF 20V ±20%	10K	2.74K	2.5K	9.53K
3113110-10	37.5 IPS, 200 IPS RWD	15MF 20V ±20%	10K	2.15K	2.5K	9.53K
3118209-01	40 IPS	15MF 20V ±20%	8.87K	2.81K	2.5K	9.53K
3112170-10	45 IPS	OPEN	7.50K	2.81K	2.5K	8.06K
3112575-10	54-56 IPS	15MF 20V ±20%	6.04K	3.01K	2.5K	9.53K

7. SEE TABLE I.
6. Q3,4 AND Q7,8 TO BE 3201104-20.
5. ALL DIODES TO BE 3263041-10.
4. ALL TRANSISTORS TO BE 3201100-10.
3. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, 100V, ±10%.
1. FOR ASSEMBLY SEE TABLE I.

NOTES: UNLESS OTHERWISE SPECIFIED

NEXT ASSY	1ST USED ON
TABLE I	TM-7

APPLICATION

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

PROJ SUPER [illegible]
PROJ ENGR [illegible]
ENGR [illegible]
CHKR C. Anderson 11/20/63
DFTSMN Kurahani 9/3/63

AMPEX — AMPEX COMPUTER PRODUCTS COMPANY, 9937 JEFFERSON BLVD., CULVER CITY, CALIFORNIA

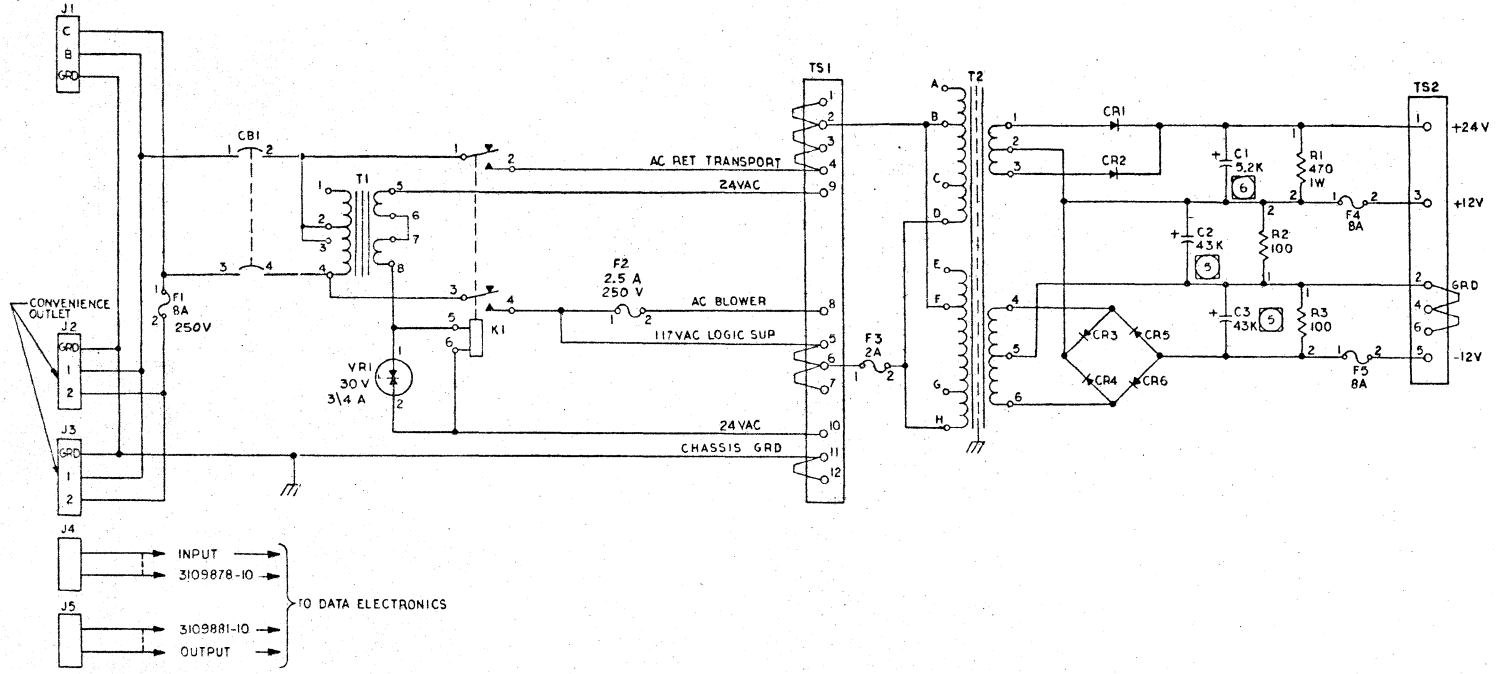
TITLE: SCHEMATIC- CAPSTAN SERVO CONTROL

CODE IDENT. NO. | SIZE: D | DWG. NO. 3107098 | ISSUE: Y

SCALE: NONE | SHEET 1 OF 1

CSA

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-99 DEV PRO			
B	ECN 911-BF PROD			
C	ECN 3543			
D	ECN 4252			
E	ECN 8036			



3108647

FOR INPUTS OTHER THAN 115VAC CONNECT AS FOLLOWS:

INPUT	JUMPER		T2	T1	CB1	F1
100VAC	TS1-2 TO T2-B	F3-2 TO T2-C	B TO F, C TO G	CB 1-2 TO T1-2	10A	8A
110VAC	TS1-2 TO T2-A	F3-2 TO T2-C	A TO E, C TO G			
125VAC	TS1-2 TO T2-A	F3-2 TO T2-D	A TO E, D TO H			
200VAC	TS1-2 TO T2-B	F3-2 TO T2-G	C TO F	CB 1-2 TO T1-1	7A	4A
210VAC	TS1-2 TO T2-A	F3-2 TO T2-G	C TO F			
215VAC	TS1-2 TO T2-B	F3-2 TO T2-G	D TO F			
220VAC	TS1-2 TO T2-A	F3-2 TO T2-G	C TO E			
225VAC	TS1-2 TO T2-B	F3-2 TO T2-G	D TO E			
230VAC	TS1-2 TO T2-B	F3-2 TO T2-H	D TO F			
235VAC	TS1-2 TO T2-A	F3-2 TO T2-G	D TO E			
240 VAC	TS1-2 TO T2-A	F3-2 TO T2-H	D TO F			
250VAC	TS1-2 TO T2-A	F3-2 TO T2-H	D TO E			

6. 6,500 UF CAN ALSO BE USED.
5. 50,000 UF CAN ALSO BE USED.
4. FOR ASSY NO, SEE FINAL B/M.
3. ALL DIODE TO BE 3201325-10.
2. ALL RESISTOR VALUES ARE IN OHMS ±5%, 5W.
1. ALL CAPACITOR VALUES ARE IN MICROFARADS, 25 V. TOLERANCE WITHIN -10 % TO +150 %.

NOTES: UNLESS OTHERWISE SPECIFIED.

3111652	TM7
3111551	TM7211
3111338	TM7211
3111150	TM7211
3108645	TM7
3108640	TM7211
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DECIMALS ANGLES
.XX ± .XXX ±
BREAK ALL SHARP EDGES APPROX. .010
CBORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES 63
PER MIL-STD-10
MATERIAL
FINISH

PROJ
SUPER
PROJ
ENGR
ENGR
CHKR
DFTSMN

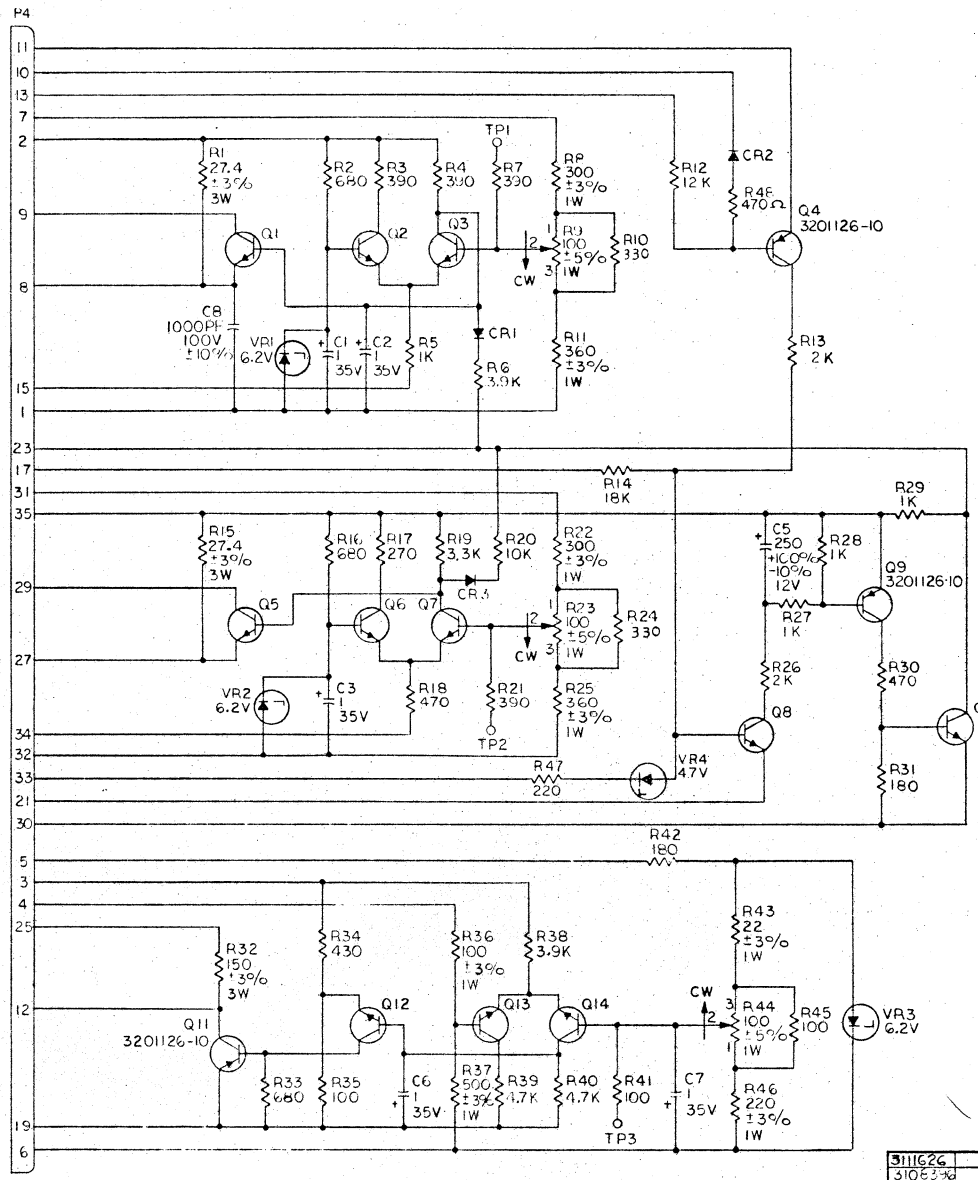
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC —
TRANSPORT POWER SUPPLY

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3108647	E

SCALE NONE SHEET 1 OF 1

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 1015			
B	ECN 3585			
C	ECN 4206			



3111899

5. ALL DIODES TO BE 3263028-10.
4. ALL TRANSISTORS TO BE 3212091-10.
3. ALL RESISTOR VALUES ARE IN OHMS ±5%, 1/2W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS ±20%, 25V.
1. FOR ASSEMBLY SEE 3109907

NOTES:

NOTE: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS XX ± XXX ± ANGLES ± BREAK ALL SHARP EDGES APPROX. .010 CHAMFER AND SPOTFACE CORNER MAXIM .010 ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

DRAFTSMAN	
SUPER	
ENGR	
ENGR	
CHKR	
DFTSMN	

3111626
3106340
NEXT ASSY. | 1ST USED ON
APPLICATION

MATERIAL
FINISH

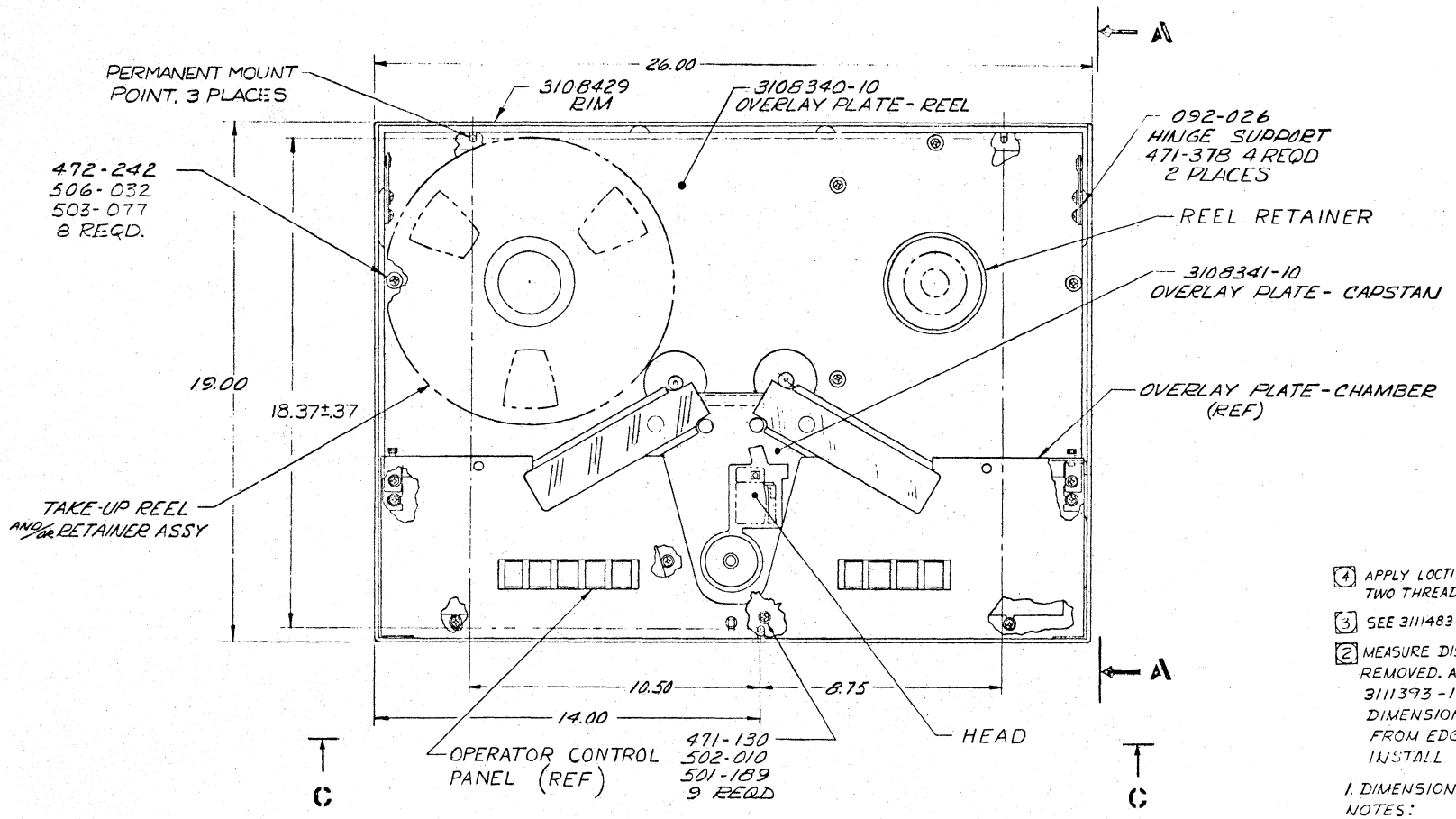
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC - REGULATOR, POWER PACK

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3111899	C

SCALE | SHEET 1 OF 1

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
B	ECN 101-83			



COVER DOOR REMOVED FOR CLARITY

4. APPLY LOCTITE "C" (018-030) TO THE LAST TWO THREADS OF HINGE PIN (3111492-10).

3. SEE 3111483 FOR ASSY & INSTALLATION.

2. MEASURE DISTANCE BETWEEN PIN WITH TRANSPORT REMOVED. ADJUST ARM-PIVOTS (3110568-10 & 3111393-10) TO WITHIN .02 OF MEASURED DIMENSION KEEPING ARM-PIVOTS EQUALLY SPACED FROM EDGE OF TRANSPORT. MOUNT TRANSPORT & INSTALL CAP-SCREWS 470-184 THRU SUPPORT ARM.

1. DIMENSIONS ARE FOR REF ONLY.

NOTES:

3108303

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

DECIMALS: XX ± .03, XXX ± .010; ANGLES ± ; BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII .010; ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

FINAL ASSY. TM-7

NEXT ASSY. | 1ST USED ON

APPLICATION

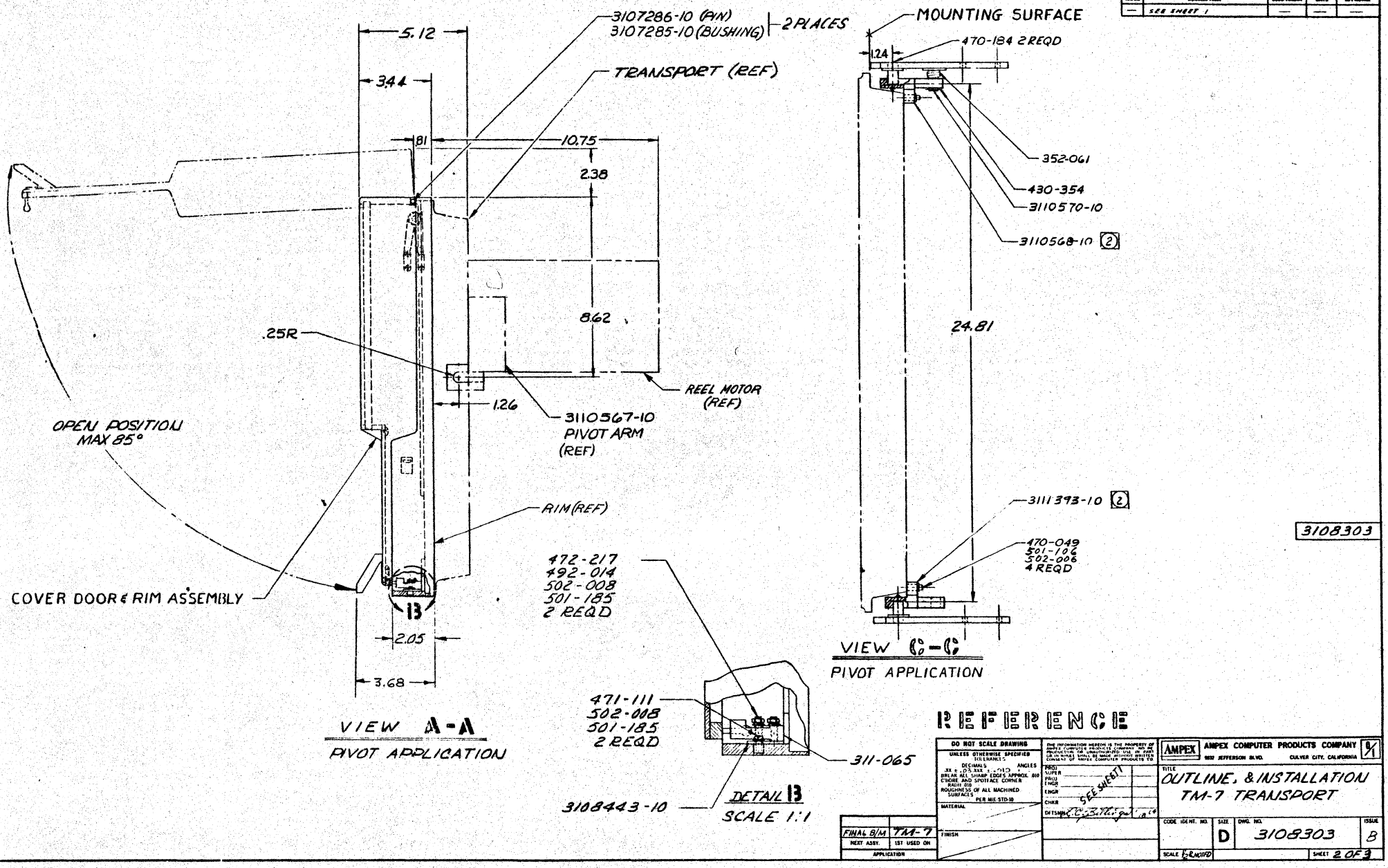
PROJ
SUPER.
PROJ
ENGR
ENGR
CHKR 2-25-69
DFTSMN 2-26-69

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: OUTLINE & INSTALLATION TM-7 TRANSPORT

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3108303	B

SCALE 1/32 | SHEET 1 OF 3



3108303

REFERENCE

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
—	SEE SHEET 1	—	—	—

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
TOLERANCES
DECIMALS ANGLES
BREAK ALL SHARP EDGES APPROX. .010 RADIUS
CHAMFER AND SPOTFACE CORNER
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH

THE INFORMATION HEREON IS THE PROPERTY OF AMPEX CORPORATION AND IS LOANED SUBJECT TO AGREEMENT NOT TO REPRODUCE OR DISCLOSE IT WITHOUT THE WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.

PROJ SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

SEE SHEET 1

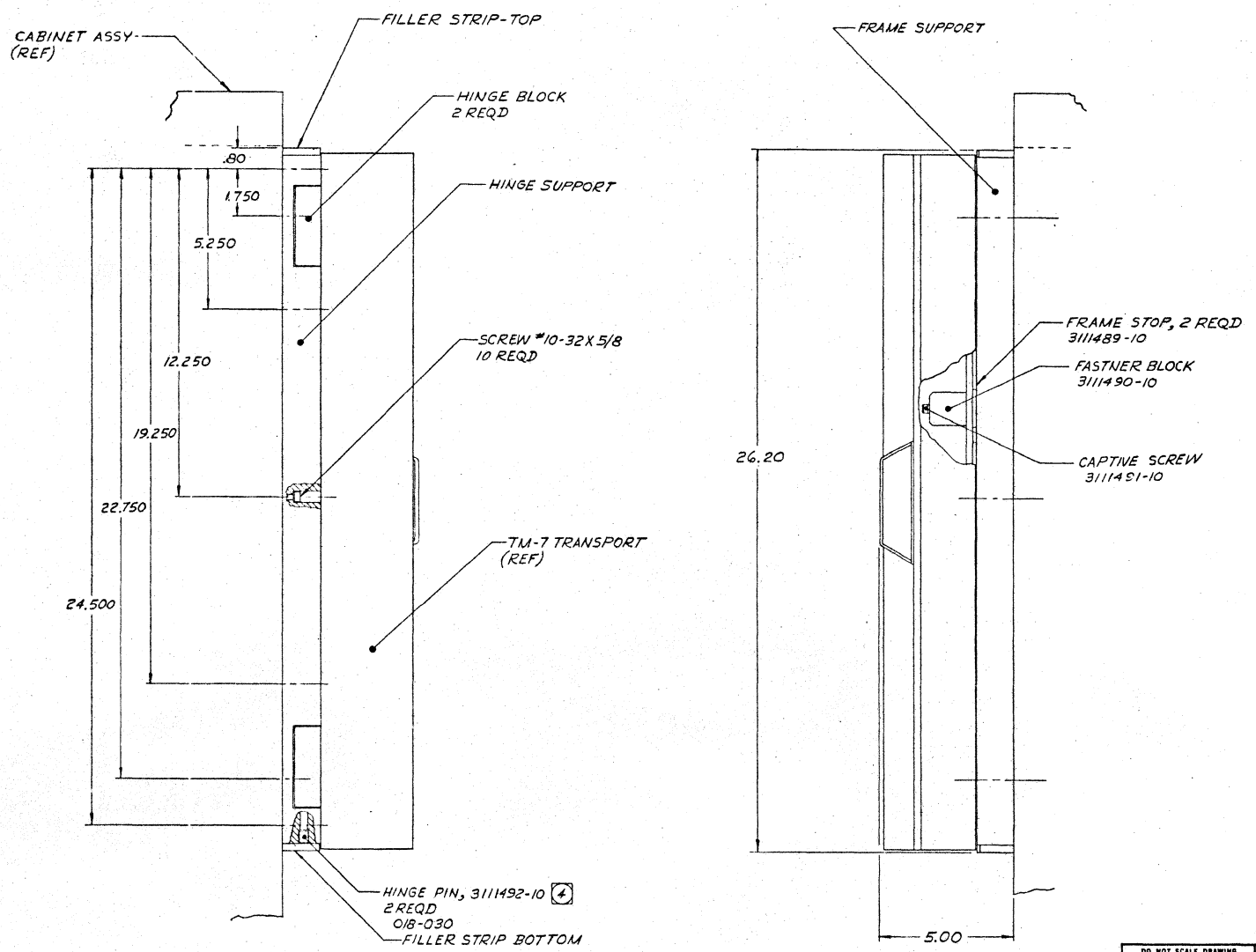
FINAL B/M TM-7
NEXT ASSY. 1ST USED ON
APPLICATION

AMPEX COMPUTER PRODUCTS COMPANY
9201 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
OUTLINE & INSTALLATION
TM-7 TRANSPORT

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3108303	B

SCALE 1/2 UNIFD SHEET 2 OF 3



HINGED APPLICATION (3)

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	SEE SHEET 1			

3108303

FINAL B/M	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
XX ± .03 XX ± .010 °
BREAK ALL SHARP EDGES APPROX. .010
CHAMFER AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD 10
MATERIAL
FINISH

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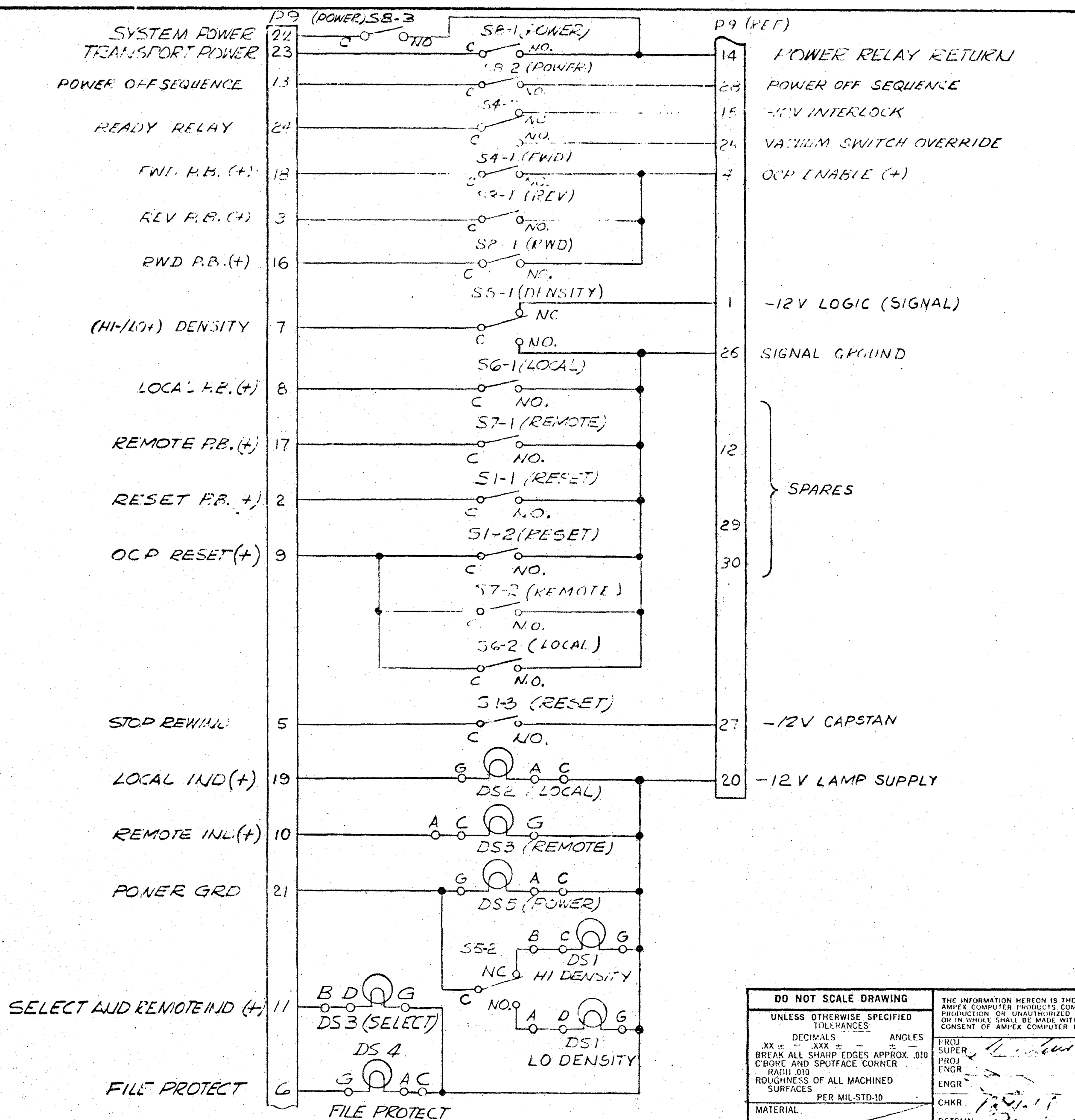
PROJ SUPER
PROJ ENGR
ENGR
CHKR
DFTSM

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
OUTLINE & INSTALLATION
TM-7 TRANSPORT

CODE IDENT. NO	SIZE	DWG. NO.	ISSUE
	D	3108303	B

SCALE 1/2 FULL SHEET 3 OF 3



REVISIONS

ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-3 ...	[illegible]		
B	ECN 911-518	[illegible]	[illegible]	[illegible]
C	ECN 911-71	[illegible]		
D	ECN 911-AE PROD.			
E	ECN 03134			
F	ECN 3577	JANSSEN		
G	ECN 5162			
H	ECN 5986			

3108394

~~NOTES: UNLESS OTHERWISE SPECIFIED~~

NEXT ASSY.	1ST USED ON
3108331	TM-7

APPLICATION

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX. .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

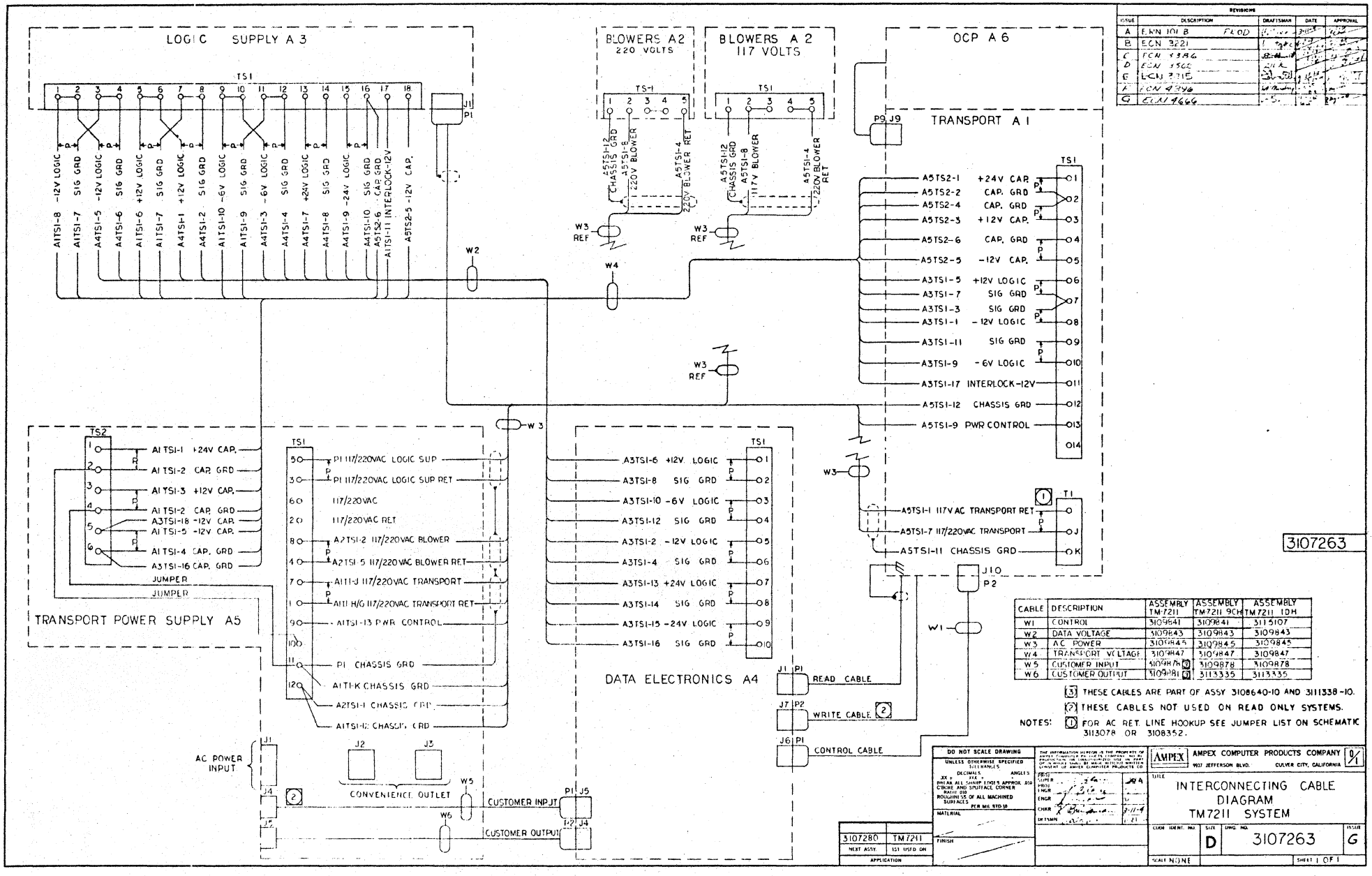
PROJ SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

AMPEX — AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: SCHEMATIC — OPERATOR CONTROL PANEL

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	C	3108394	H

SCALE NONE — SHEET 1 OF 1



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	E.N. 1018 FLOD			
B	ECN 3221			
C	ECN 3386			
D	ECN 3505			
E	ECN 3715			
F	ECN 4246			
G	ECN 4666			

CABLE	DESCRIPTION	ASSEMBLY TM7211	ASSEMBLY TM7211 9CH	ASSEMBLY TM7211 1DH
W1	CONTROL	3109841	3109841	3115107
W2	DATA VOLTAGE	3109843	3109843	3109843
W3	A.C. POWER	3109845	3109845	3109845
W4	TRANSPORT VOLTAGE	3109847	3109847	3109847
W5	CUSTOMER INPUT	3109878 [2]	3109878	3109878
W6	CUSTOMER OUTPUT	3109881 [2]	3113335	3113335

[3] THESE CABLES ARE PART OF ASSY 3108640-10 AND 3111338-10.

[2] THESE CABLES NOT USED ON READ ONLY SYSTEMS.

NOTES: [1] FOR AC RET. LINE HOOKUP SEE JUMPER LIST ON SCHEMATIC 3113078 OR 3108352.

3107280	TM7211
NEXT ASSY.	USED ON
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES

MATERIAL

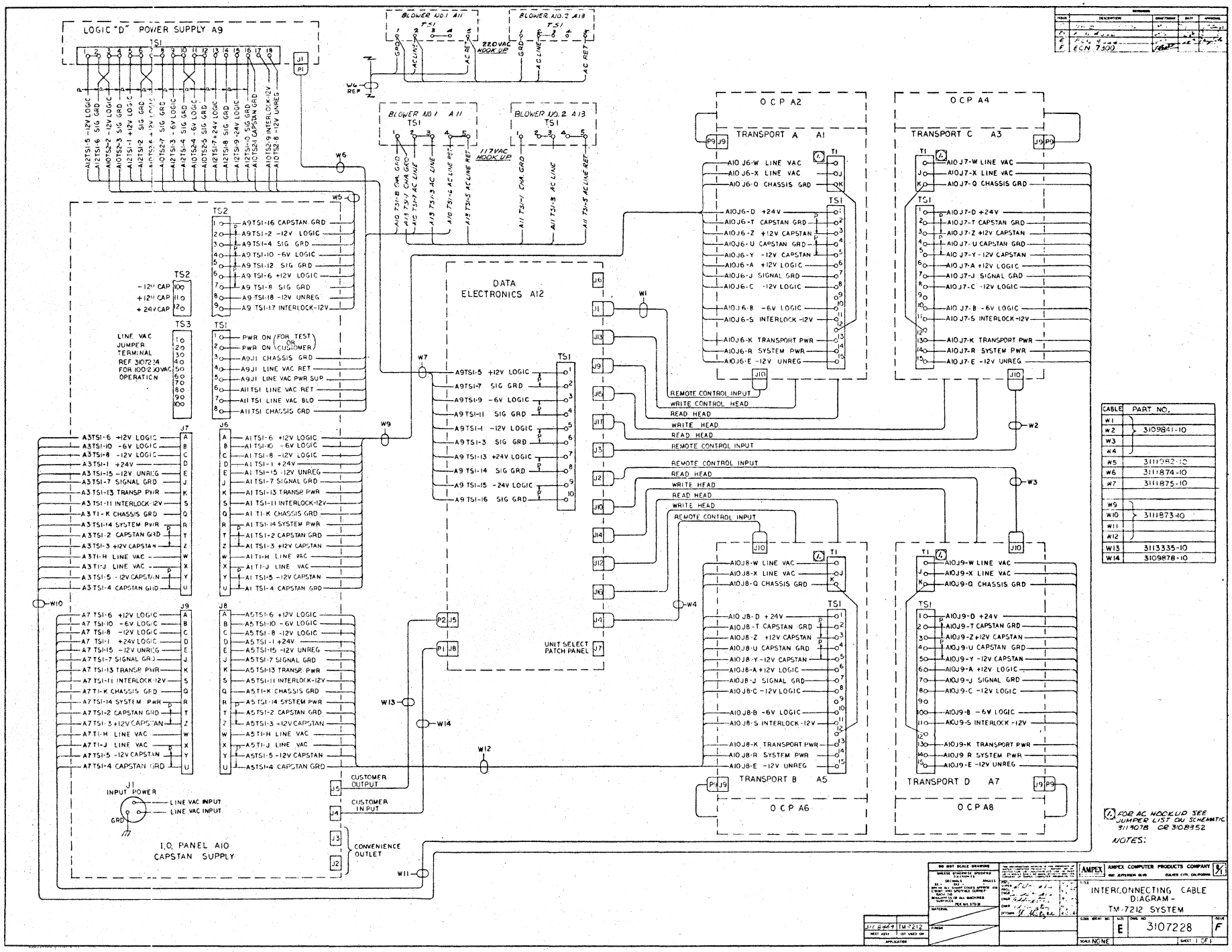
FINISH

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
INTERCONNECTING CABLE DIAGRAM
TM7211 SYSTEM

CUST. IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3107263	G

SCALE NONE SHEET 1 OF 1



CABLE	PART NO.
W1	
W2	3109841-10
W3	
W4	
W5	3111982-10
W6	3111874-10
W7	3111875-10
W9	
W10	3111873-10
W11	
W12	
W13	3113335-10
W14	3109878-10

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
D				
E	P.C.N. 7300			
F	ECN 7300			

⚠ FOR AC HOOKUP SEE JUMPER LIST ON SCHEMATIC 3119078 OR 3108352

NOTES:

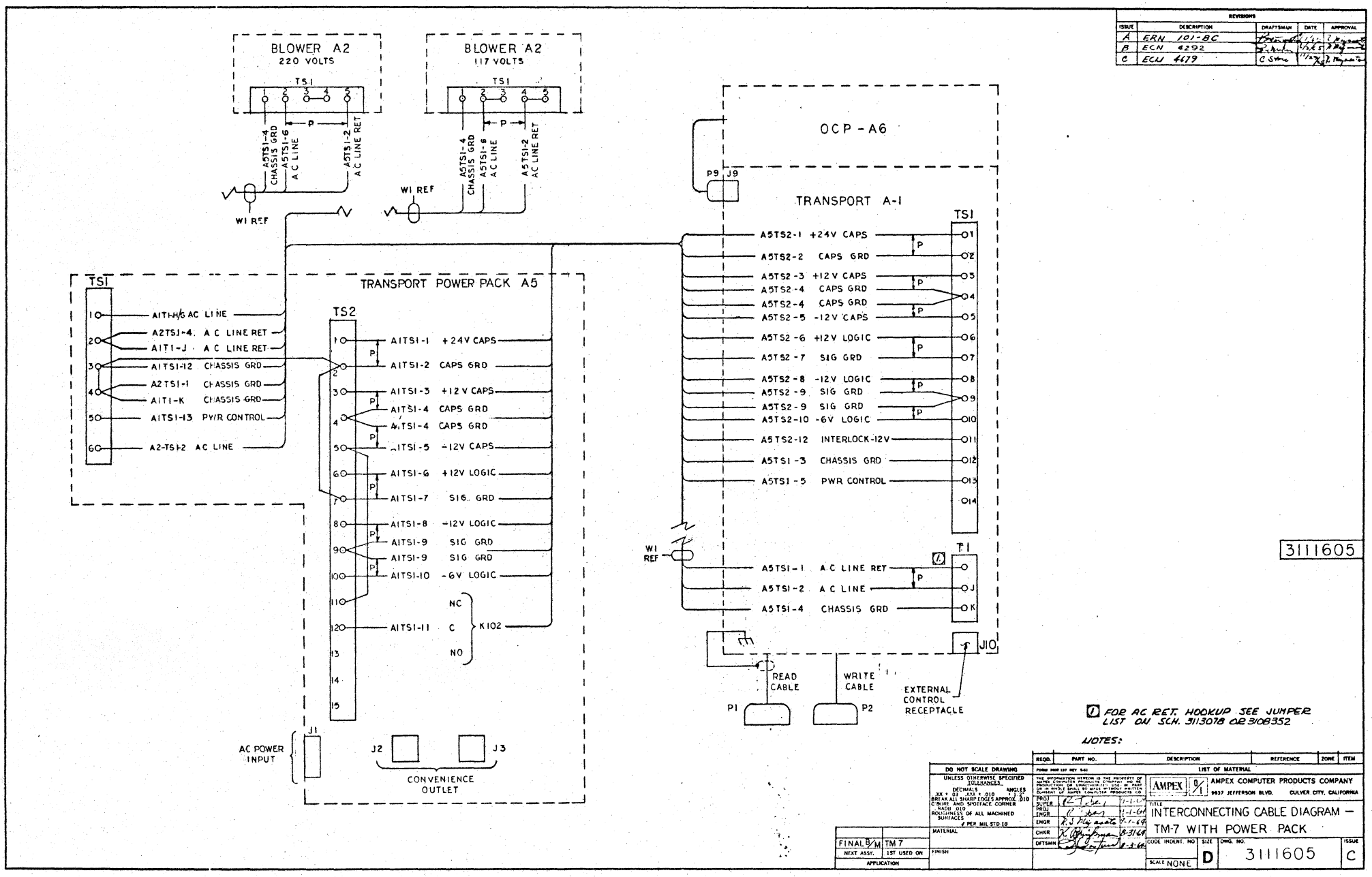
3116449	TM-7212		
NEXT ASSY		1ST USED ON	
APPLICATION			

AMPEX COMPUTER PRODUCTS COMPANY
401 JEFFERSON BLVD CULVER CITY, CALIFORNIA

TITLE: INTERCONNECTING CABLE DIAGRAM - TM-7212 SYSTEM

CODE IDENT NO.	SIZE	DWG NO.	ISSUE
	E	3107228	F

SCALE NONE SHEET 1 OF 1



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 101-BC			
B	ECN 4292			
C	ECN 4479			

3111605

[1] FOR AC RET. HOOKUP SEE JUMPER LIST ON SCH. 3113078 OR 3108352

NOTES:

REQD.	PART NO.	DESCRIPTION	REFERENCE	ZONE	ITEM
		LIST OF MATERIAL			

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS: XX ± .03, XXX ± .010
ANGLES: ±1°
BREAK ALL SHARP EDGES APPROX. .010 C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES: ✓ PER MIL STD 10

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PROJ		
SUPER.		
PROJ ENGR		1-1-66
ENGR		1-1-66
CHKR		8-3-66
DFTSMN		8-3-66

MATERIAL

FINISH

FINAL B/M: TM 7
NEXT ASSY.: 1ST USED ON
APPLICATION

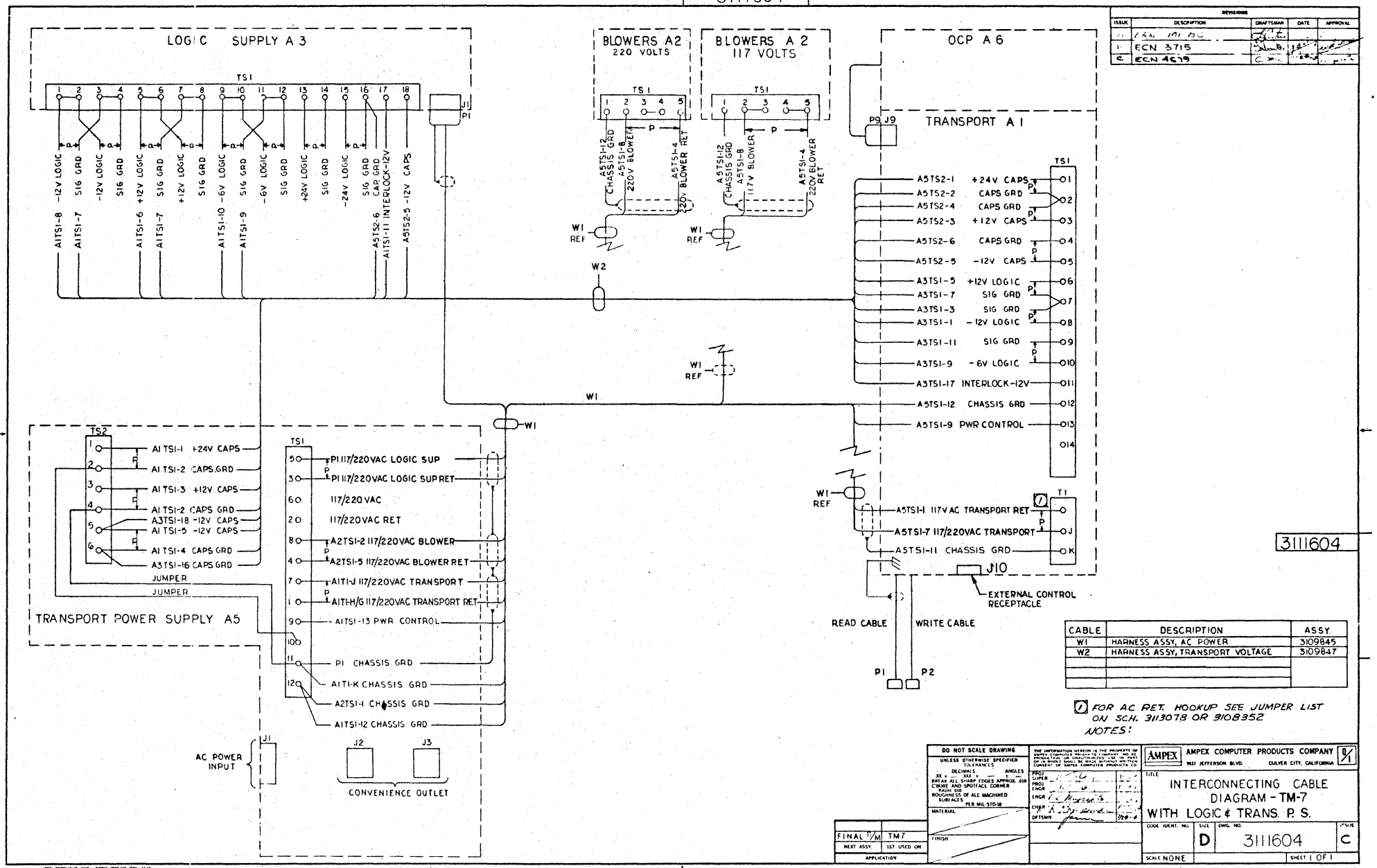
AMPEX

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: INTERCONNECTING CABLE DIAGRAM — TM-7 WITH POWER PACK

CODE IDENT. NO	SIZE	DWG. NO	ISSUE
	D	3111605	C

SCALE NONE



ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
	CAN 171 DC			
B	ECN 3715			
C	ECN 4679			

CABLE	DESCRIPTION	ASSY.
W1	HARNESS ASSY, AC POWER	3109845
W2	HARNESS ASSY, TRANSPORT VOLTAGE	3109847

1. FOR AC RET. HOOKUP SEE JUMPER LIST ON SCH. 3113078 OR 3108352

NOTES:

3111604

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS XX ± .02 XXX ± .010
BREAK ALL SHARP EDGES APPROX. .010 CHAMF. AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH
APPLICATION
FINAL ☐/M TM7
NEXT ASSY 1ST USED ON

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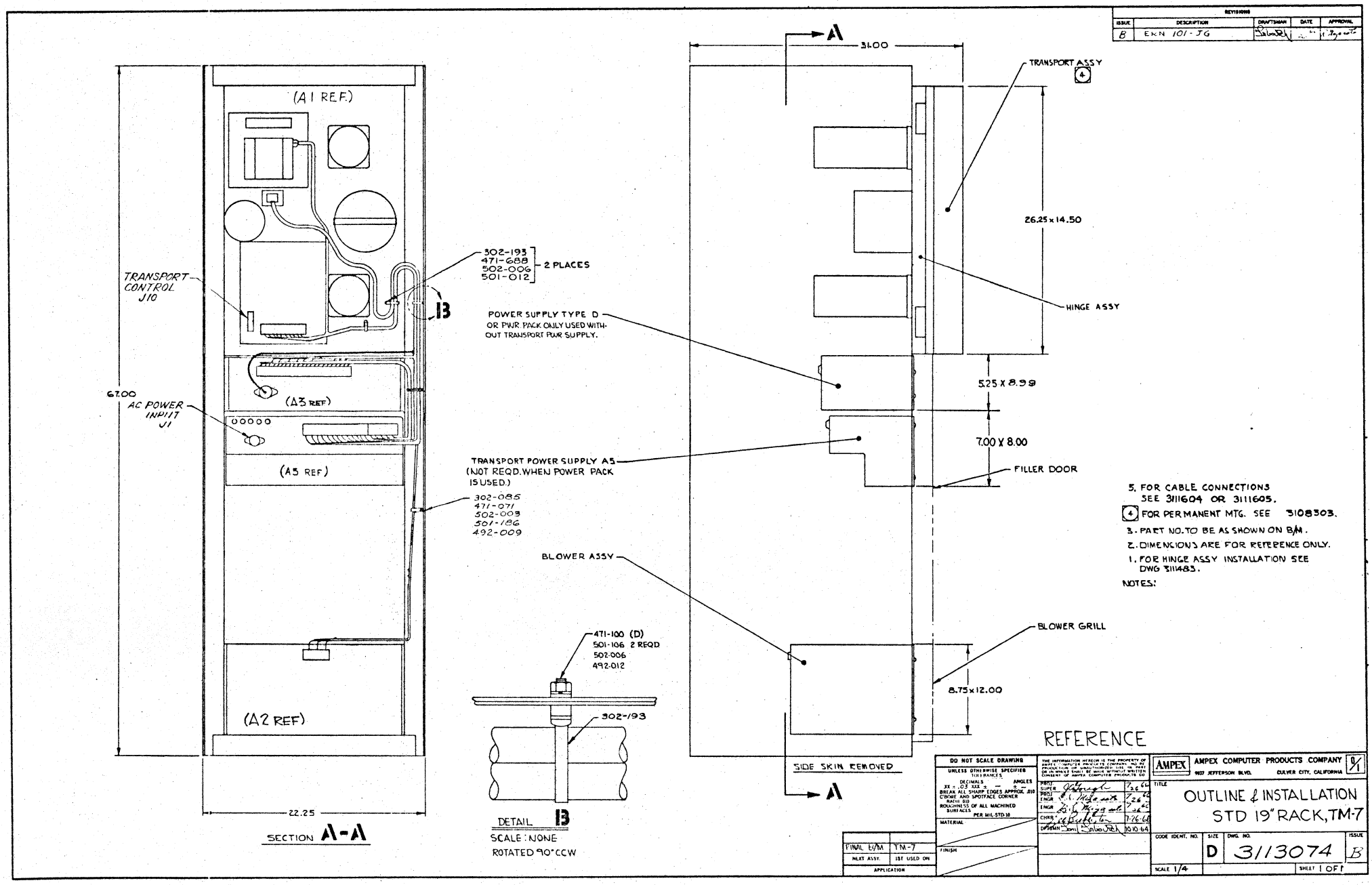
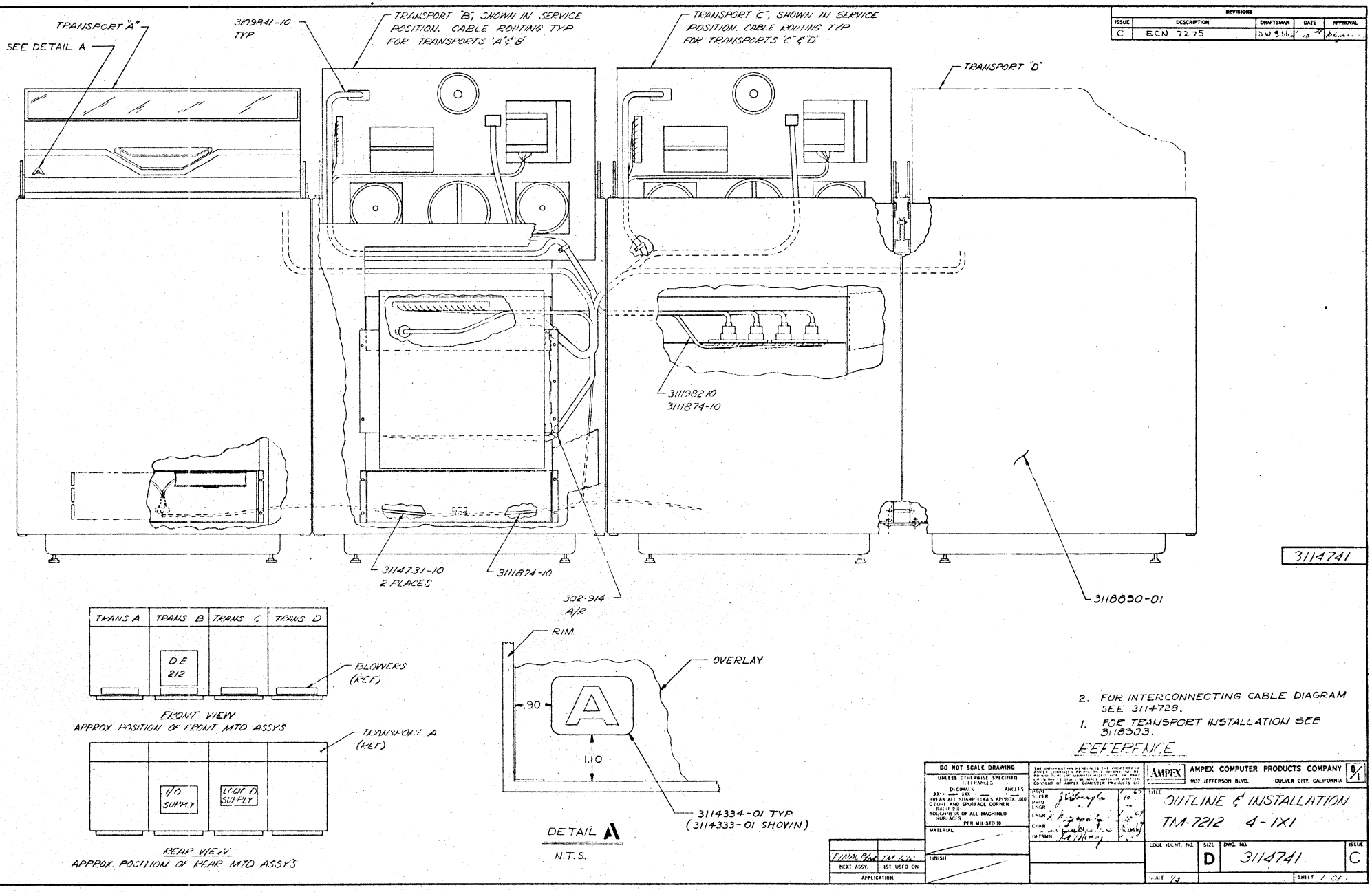
PROJ
SUPER
PROJ ENGR
ENGR
CHKR
DFTSMN

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
INTERCONNECTING CABLE DIAGRAM - TM-7 WITH LOGIC & TRANS. P. S.

CODE IDENT. NO. | SIZE D | DWG. NO. 3111604 | REV C
SCALE NONE | SHEET 1 OF 1


(A1 REF.)
(A3 REF)
(A5 REF)
(A2 REF)
TRANSPORT CONTROL J10
AC POWER INPUT J1
67.00
22.25
302-193
471-688
502-006
501-012
2 PLACES
13
POWER SUPPLY TYPE D
OR PWR PACK ONLY USED WITH-
OUT TRANSPORT PWR SUPPLY.
TRANSPORT POWER SUPPLY A5
(NOT REQD. WHEN POWER PACK
IS USED.)
302-085
471-071
502-008
501-186
492-009
BLOWER ASSY
471-100 (D)
501-106 2 REQD
502-006
492-012
302-193
DETAIL 13
SCALE: NONE
ROTATED 90° CCW
SECTION A-A
A
31.00
TRANSPORT ASSY
4
26.25 x 14.50
HINGE ASSY
5.25 X 8.99
7.00 X 8.00
FILLER DOOR
BLOWER GRILL
8.75 x 12.00
SIDE SKIN REMOVED
5. FOR CABLE CONNECTIONS SEE 3111604 OR 3111605.
4. FOR PERMANENT MTG. SEE 3108303.
3. PART NO. TO BE AS SHOWN ON B/M.
2. DIMENSIONS ARE FOR REFERENCE ONLY.
1. FOR HINGE ASSY INSTALLATION SEE DWG 3111483.
NOTES:
REFERENCE
REVISIONS
ISSUE | DESCRIPTION | DRAFTSMAN | DATE | APPROVAL
B | EKN 101-JG
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS XX ± .03 XXX ± ANGLES ±
BREAK ALL SHARP EDGES APPROX. .010
CHROME AND SPOTFACE CORNER
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
MATERIAL
FINISH
THE INFORMATION HEREON IS THE PROPERTY OF AMPEX COMPUTER PRODUCTS CO. AND IS NOT TO BE PUBLISHED OR UNLAWFULLY USED. IN PART OR IN WHOLE SHALL BE MADE WITHOUT WRITTEN CONSENT OF AMPEX COMPUTER PRODUCTS CO.
PROJ SUPER
PROJ ENGR
ENGR
CHKR
DRAFTSMAN
7-26-64
7-26-64
7-26-64
7-26-64
10-10-64
FINAL E/M TM-7
NEXT ASSY. | 1ST USED ON
APPLICATION
AMPEX
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA
TITLE
OUTLINE & INSTALLATION
STD 19" RACK, TM-7
CODE IDENT. NO.
SIZE D
DWG. NO. 3113074
ISSUE B
SCALE 1/4
SHEET 1 OF 1



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
C	ECN 7275	DWG # 566-2	10	

2. FOR INTERCONNECTING CABLE DIAGRAM SEE 3114728.
1. FOR TRANSPORT INSTALLATION SEE 3118303.

REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS: XX ± .03, XXX ± .010
BREAK ALL SHARP EDGES, APPROX .010 CHAMFER AND SPOTFACE CORNER
FINISH 125 ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10
ANGLES ± 1°
MATERIAL
FINISH
NEXT ASSY.
1ST USED ON
APPLICATION

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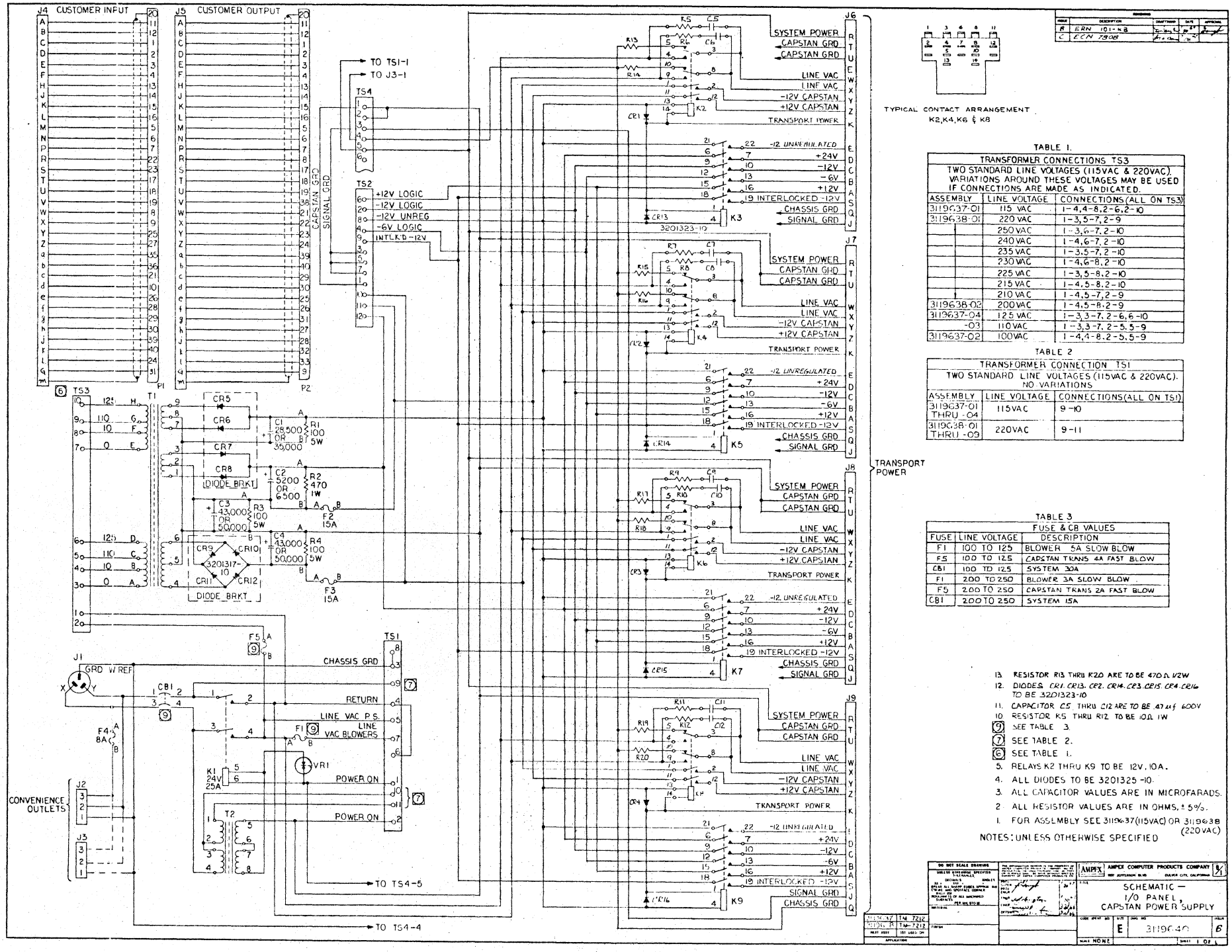
DRAFT
SUPER
PROJ
ENGR
ENGR
CHKR
DFTSMN

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: OUTLINE & INSTALLATION
TM-7212 4-1X1

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3114741	C

SCALE 1/4 SHEET 1 OF 1



TYPICAL CONTACT ARRANGEMENT
K2,K4,K6 & K8

TABLE 1.

TRANSFORMER CONNECTIONS TS3 TWO STANDARD LINE VOLTAGES (115VAC & 220VAC). VARIATIONS AROUND THESE VOLTAGES MAY BE USED IF CONNECTIONS ARE MADE AS INDICATED.		
ASSEMBLY	LINE VOLTAGE	CONNECTIONS (ALL ON TS3)
3119637-01	115 VAC	1-4,4-8,2-6,2-10
3119638-01	220 VAC	1-3,5-7,2-9
	250 VAC	1-3,6-7,2-10
	240 VAC	1-4,6-7,2-10
	235 VAC	1-3,5-7,2-10
	230 VAC	1-4,6-8,2-10
	225 VAC	1-3,5-8,2-10
	215 VAC	1-4,5-8,2-10
	210 VAC	1-4,5-7,2-9
3119638-02	200 VAC	1-4,5-8,2-9
3119637-04	125 VAC	1-3,3-7,2-6,6-10
-03	110 VAC	1-3,3-7,2-5,5-9
3119637-02	100 VAC	1-4,4-8,2-5,5-9

TABLE 2

TRANSFORMER CONNECTION TS1 TWO STANDARD LINE VOLTAGES (115VAC & 220VAC). NO VARIATIONS		
ASSEMBLY	LINE VOLTAGE	CONNECTIONS (ALL ON TS1)
3119637-01 THRU -04	115VAC	9-10
3119638-01 THRU -09	220VAC	9-11

TABLE 3

FUSE & CB VALUES		
FUSE	LINE VOLTAGE	DESCRIPTION
F1	100 TO 125	BLOWER 5A SLOW BLOW
F5	100 TO 125	CAPSTAN TRANS 4A FAST BLOW
CB1	100 TO 125	SYSTEM 30A
F1	200 TO 250	BLOWER 3A SLOW BLOW
F5	200 TO 250	CAPSTAN TRANS 2A FAST BLOW
CB1	200 TO 250	SYSTEM 15A

13. RESISTOR R13 THRU R20 ARE TO BE 470Ω 1/2W
12. DIODES CR1, CR13, CR2, CR14, CR3, CR15, CR4, CR16 TO BE 3201323-10
11. CAPACITOR C5 THRU C12 ARE TO BE .47 µf 600V
10. RESISTOR R5 THRU R12 TO BE 10Ω 1W
9. SEE TABLE 3.
7. SEE TABLE 2.
6. SEE TABLE 1.
5. RELAYS K2 THRU K9 TO BE 12V, 10A.
4. ALL DIODES TO BE 3201325-10.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
2. ALL RESISTOR VALUES ARE IN OHMS, ± 5%.
1. FOR ASSEMBLY SEE 3119637 (115VAC) OR 3119638 (220VAC)

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVED
B	ERN 101-48			
C	ECN 7908			

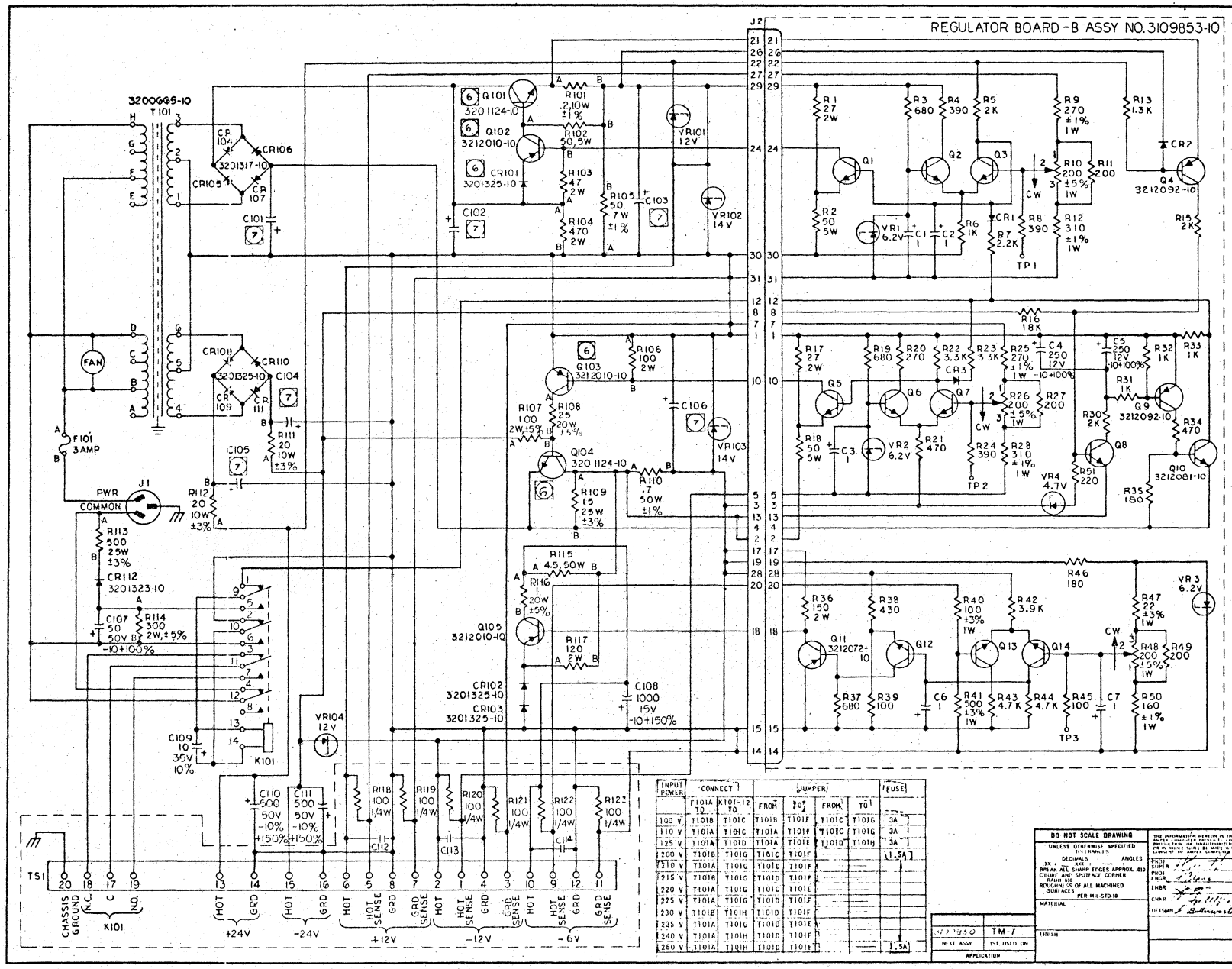
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

SCHEMATIC —
I/O PANEL,
CAPSTAN POWER SUPPLY

CODE IDENT NO.	SIZE	DWG NO.	REV
	E	3119640	6

SCALE NONE SHEET 1 OF 1



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 101 106 DEL. [illegible]	[illegible]	[illegible]	[illegible]
E	ERN 101-N PROD.	[illegible]	[illegible]	[illegible]
F	ERN 1544 CHANGES	[illegible]	[illegible]	[illegible]
G	ECN 3597	[illegible]	[illegible]	[illegible]
H	ECN 4326	[illegible]	6-3-65	[illegible]
J	ECN 4326-A	[illegible]	-30-66	[illegible]
K	ECN 5056	[illegible]	4-12-66	/

VALUE CHART	
REFERENCE DESIGNATION	VALUE
C101	28,500 µF, -10%, +150%, 25V OR 35,000 µF, -10%, +100%, 25V
C102	11,500 µF, -10%, +150%, 25V OR 14,000 µF, -10%, +100%, 25V
C103	5,200 µF, -10%, +150%, 25V OR 6,500 µF, -10%, +100%, 25V
C106	
C104	3,300 µF, -10%, +150%, 35V OR 4,500 µF, -10%, +100%, 35V
C105	

FOR FIELD SERVICE ONLY

3109852

8. C112, C113, & C114 TO BE 2.2 MFD 25 V ± 20%

7 SEE VALUE CHART

6 TO BE MOUNTED ON HEAT SINK.

5. ALL DIODES TO BE 3268028-10.

4. ALL TRANSISTORS TO BE 3212091-10.

3. ALL RESISTOR VALUES ARE IN OHMS ± 5%, 1/2 W

2. ALL CAPACITOR VALUES ARE IN MICROFARADS ±20%, 35 V.

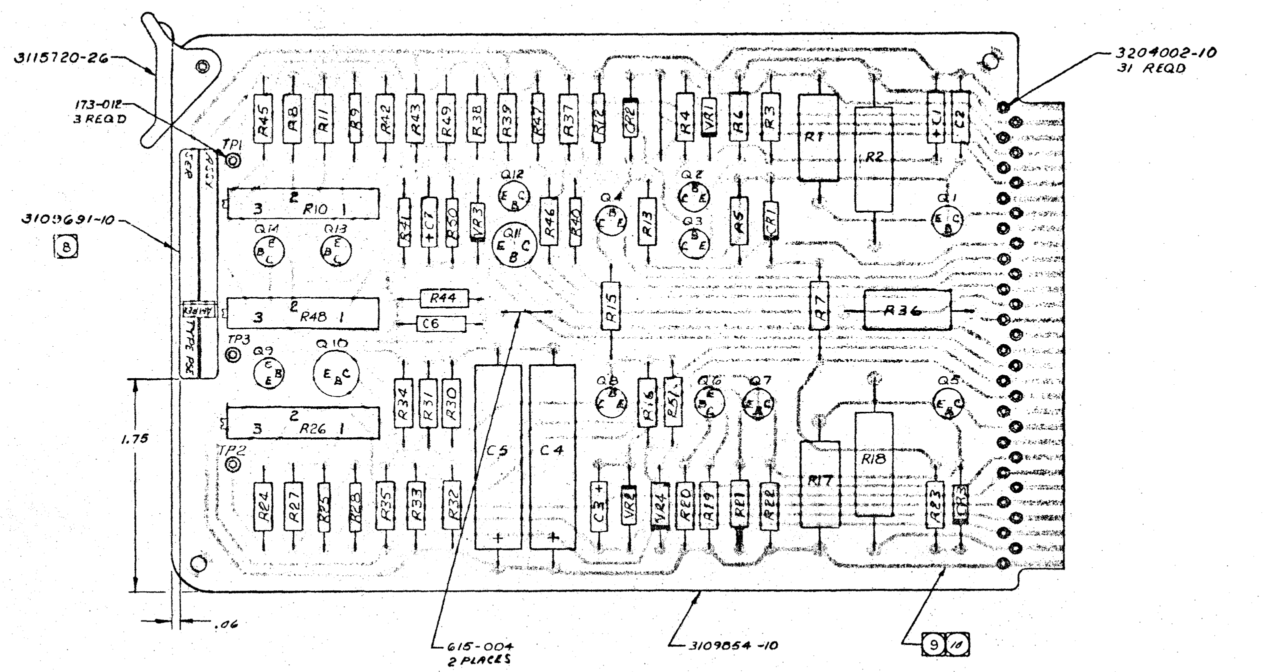
1. FOR ASSEMBLY SEE 3109850 & 3111340.

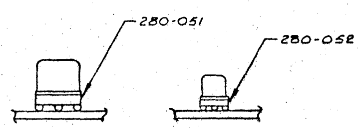
NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-93 DEV PRO	Butterworth		
B	ECN 911-105			
C	ERN 101-L PROD.		4-16-64	
D	ECN 3385			
E	ECN 3544			
F	ECN 4961			
G	ECN 5056			
H	ECN 5983		9/1/66	
J	ECN 7189	REISS		
K	ECN 7259	Bravo	2/6/67	

PART NO.	REFERENCE DESIGNATION
3201126-10	Q11
3212091-10	Q1,2,3,5,6,7,8, 12,13,14
3212092-10	Q9
3263028-10	CR1,2,3
013-202	VR1,2,3
031-220	C4,5
037-994	C1, C3, C7
041-003	R45, 39
041-010	R5, 15, 30
041-013	R44
041-239	R7
041-245	R6,33,31,32
014-364	Q4
041-273	R20
055-232	C2
041-303	R42
041-009	R16
041-331	R22,23,43
041-336	R21,34
041-343	R3,19,37
041-344	R4,8,24,38
041-424	R36
041-461	R35,46
041-462	R13
041-670	R1,17
044-827	R10,26,48
047-703	R47
047-704	R40
047-800	R50
047-802	R12,28
047-801	R9,25
047-708	R41
047-709	R2,18
3212081-10	Q10
013-587	VR4
041-004	R51
041-334	R11,27,49
055-122	C6

3109853





TYPICAL TRANSISTOR INSTALLATION

VERSION TABLE		
PART NO.	USE	USED ON
3109853-10	FIELD SERVICE BUILT TO ISSUE 'F'	3109850 3111340
3109853-20	PRODUCTION	3117240 3117245

NOTES:

1. FOR SCHEMATIC SEE 3117242
2. FOR ASSEMBLY SPECIFICATION SEE 3117246
3. ASSEMBLE PER MANUFACTURING PRACTICES MANUAL.
4. HEAVY LINE ON DIODE INDICATES CATHODE.
5. COMPONENT DESIGNATIONS ARE FOR REFERENCE ONLY.
6. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
7. PART NO. TO BE AS SHOWN IN VERSION TABLE

8. MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130.

9. CIRCUITRY ON DIP SIDE.

10. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMI-SEAL TYPE 1B15, COLUMBIA TECH. OR EQUIVALENT.

NEXT ASSY.	3109850
1ST USED ON	TM-7
APPLICATION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± — .XXX ± — ANGLES ± —
BREAK ALL SHARP EDGES APPROX .010
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

PROJ SUPER / PROJ ENGR / ENGR / CHKR / DFTSMN Butterworth 2-17-64

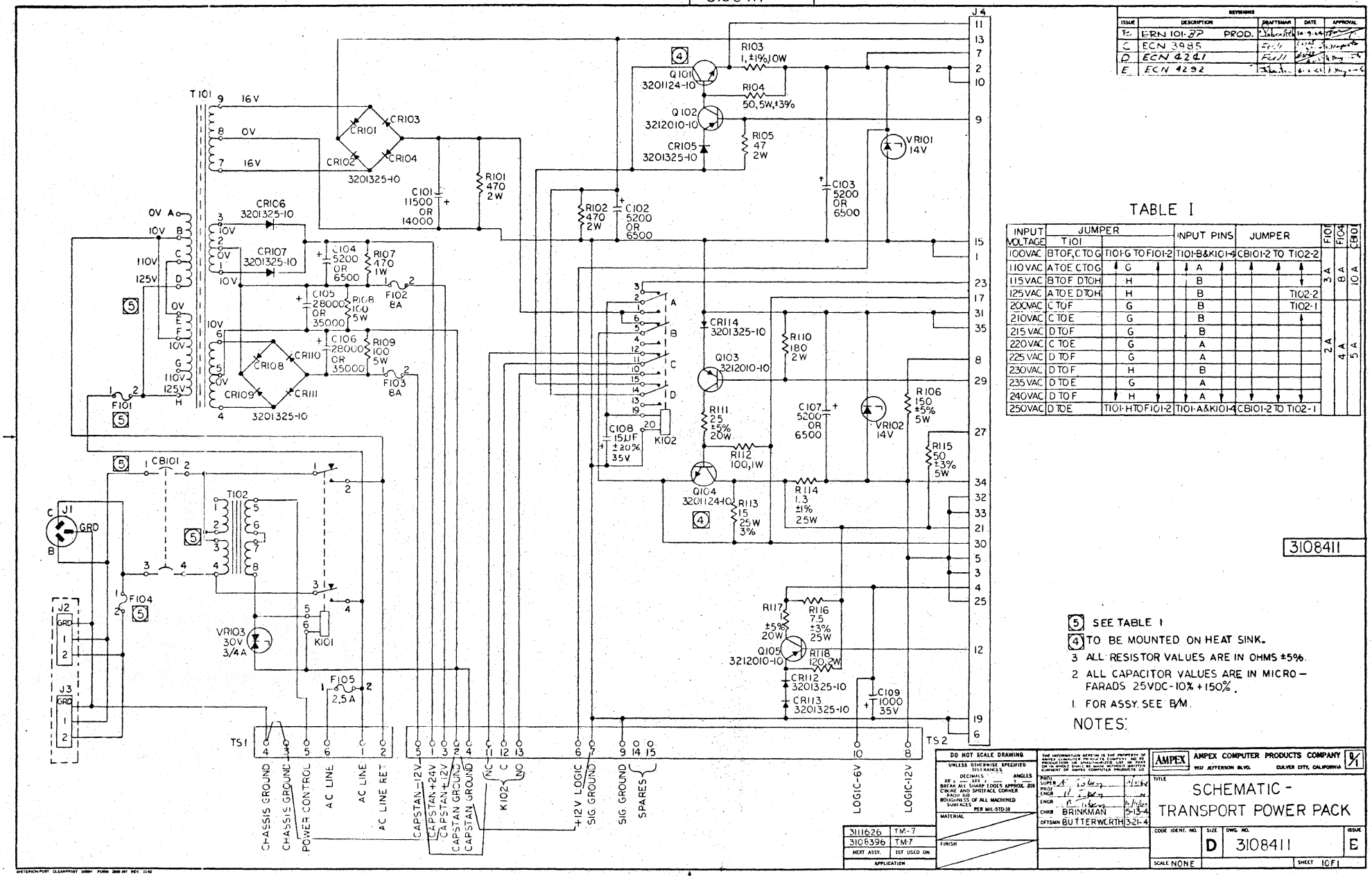
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE: CIRCUIT BOARD ASSY- REGULATOR BOARD-B

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3109853	K

SCALE 2/1 SHEET 1 OF 1

3108411



REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
B	ERN 101-BP PROD.	[illegible]	10-9-64	[illegible]
C	ECN 3985	Full	[illegible]	[illegible]
D	ECN 4261	Full	[illegible]	[illegible]
E	ECN 4292	[illegible]	6-3-65	[illegible]

TABLE I

INPUT VOLTAGE	JUMPER T101		INPUT PINS	JUMPER	FIO1	FIO4	CB01
100VAC	B TO F, C TO G	T101-G TO F101-2	T101-B & K101-4	CB101-2 TO T102-2	3A	8A	10A
110VAC	A TO E C TO G	G	A				
115VAC	B TO F D TO H	H	B				
125VAC	A TO E D TO H	H	B	T102-2			
200VAC	C TO F	G	B	T102-1			
210VAC	C TO E	G	B				
215VAC	D TO F	G	B		2A	4A	5A
220VAC	C TO E	G	A				
225VAC	D TO F	G	A				
230VAC	D TO F	H	B				
235VAC	D TO E	G	A				
240VAC	D TO F	H	A				
250VAC	D TO E	T101-H TO F101-2	T101-A & K101-4	CB101-2 TO T102-1			

3108411

(5) SEE TABLE I

(4) TO BE MOUNTED ON HEAT SINK.

3 ALL RESISTOR VALUES ARE IN OHMS ±5%.

2 ALL CAPACITOR VALUES ARE IN MICRO-FARADS 25VDC -10% +150%.

1 FOR ASSY. SEE B/M.

NOTES:

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ±.03, .XXX ±.010
ANGLES ±1°
BREAK ALL SHARP EDGES APPROX. .016
C'BORE AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL-STD-10

MATERIAL

FINISH

3111626	TM-7
3108396	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

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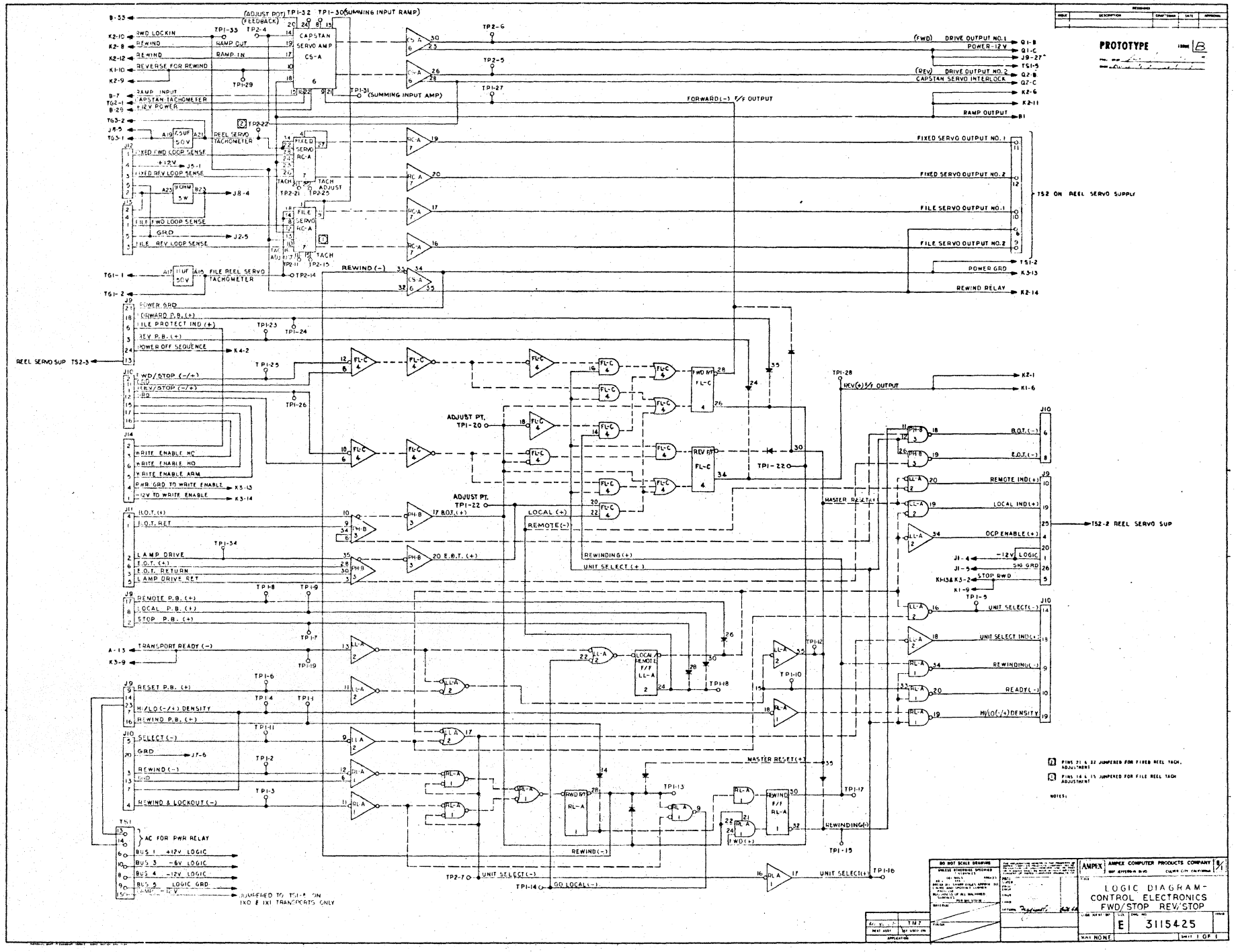
DRFT	[illegible]	[illegible]
SUPER	[illegible]	[illegible]
PROJ	[illegible]	[illegible]
ENGR	[illegible]	[illegible]
ENGR	[illegible]	[illegible]
CHKR	BRINKMAN	5-13-65
DFTSMN	BUTTERWORTH	3-21-65

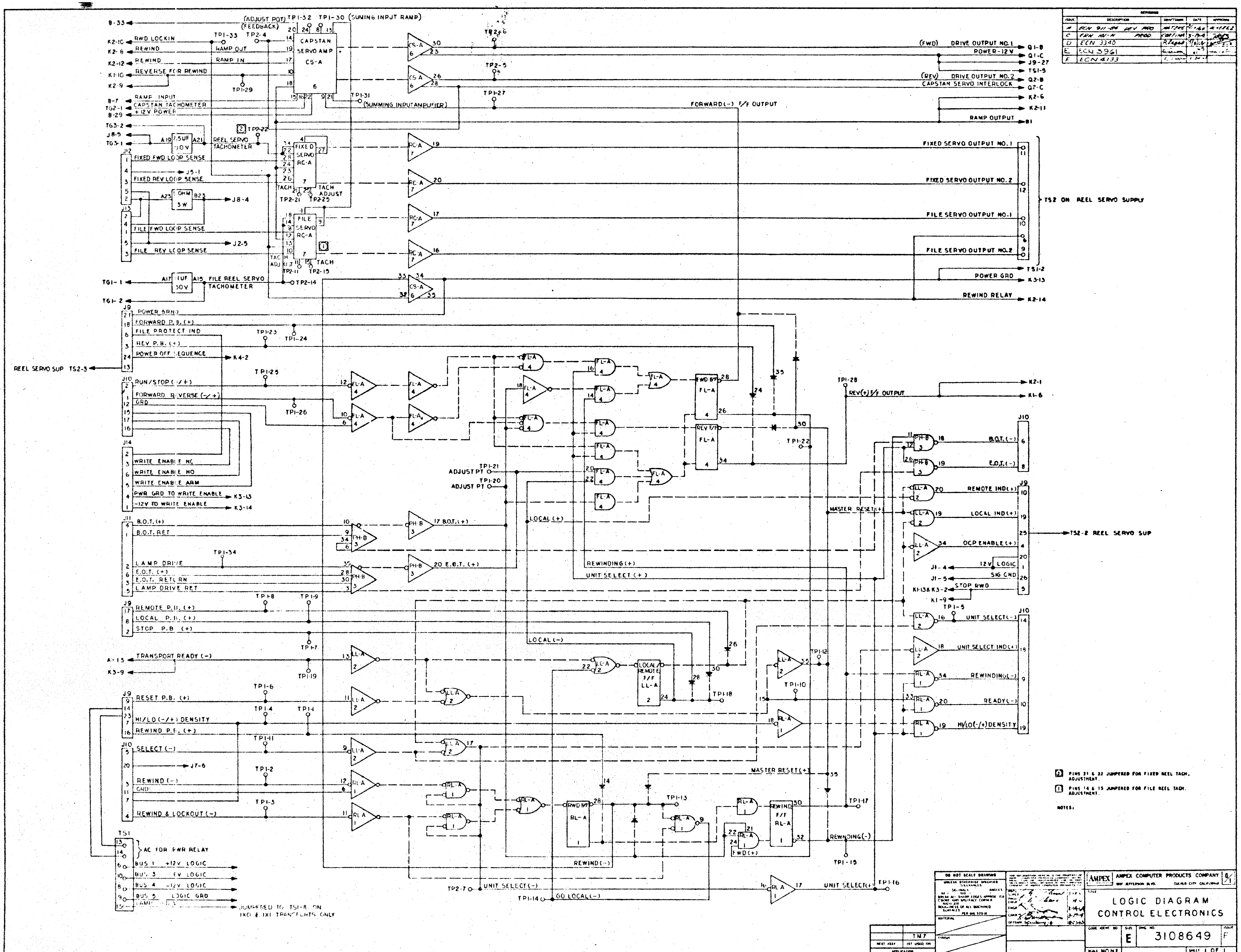
AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC - TRANSPORT POWER PACK

CODE IDENT. NO.	SIZE	DWG. NO.	ISSUE
	D	3108411	E

SCALE NONE SHEET 1 OF 1

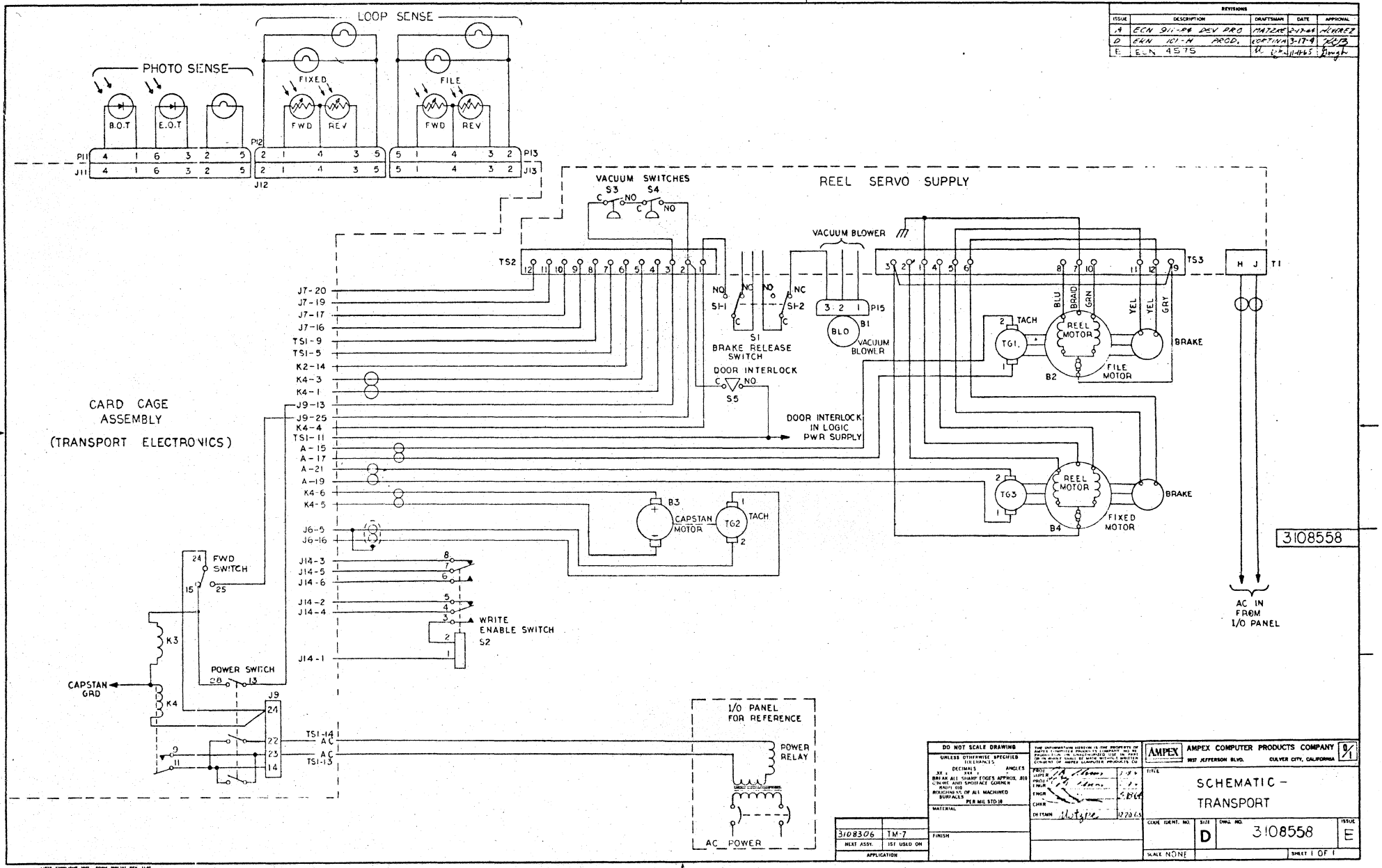

PROTOTYPE
LOGIC DIAGRAM-
CONTROL ELECTRONICS
FWD/STOP REV/STOP
AMPEX COMPUTER PRODUCTS COMPANY
3115425
SIZE E
SCALE NONE
SHEET 1 OF 1
CAPSTAN SERVO AMP CS-A
FIXED SERVO RC-A
FILE SERVO RC-A
FWD F/F FL-C
REV F/F FL-C
FWD F/F RL-A
REWIND F/F RL-A
LOCAL REMOTE F/F LL-A
FORWARD(-) F/F OUTPUT
REV(+) F/F OUTPUT
DRIVE OUTPUT NO. 1
DRIVE OUTPUT NO. 2
CAPSTAN SERVO INTERLOCK
RAMP OUTPUT
FIXED SERVO OUTPUT NO. 1
FIXED SERVO OUTPUT NO. 2
FILE SERVO OUTPUT NO. 1
FILE SERVO OUTPUT NO. 2
REWIND RELAY
MASTER RESET(+)
REMOTE IND(+)
LOCAL IND(+)
OCP ENABLE(+)
UNIT SELECT(-)
UNIT SELECT IND(+)
REWINDING(-)
READY(-)
HI/LO(-/+) DENSITY
B.O.T.(-)
E.O.T.(-)
REMOTE(-)
LOCAL(+)
REWINDING(+)
UNIT SELECT(+)
GO LOCAL(-)
REWIND(-)
TRANSPORT READY(-)
AC FOR PWR RELAY
BUS 1 +12V LOGIC
BUS 3 -6V LOGIC
BUS 4 -12V LOGIC
BUS 5 LOGIC GRD
BUS 6 -12V
JUMPERED TO TS1-A ON IXD & IXI TRANSPORTS ONLY
TS2 ON REEL SERVO SUPPLY
TS2-2 REEL SERVO SUP
REEL SERVO SUP TS2-3
NOTES:
1. PINS 21 & 22 JUMPERED FOR FIXED REEL TACH. ADJUSTMENT
2. PINS 14 & 15 JUMPERED FOR FILE REEL TACH ADJUSTMENT



ECN 911-06 DEV PRO
ECN 1114 PROD
ECN 3340
ECN 3961
ECN 4133
CAPSTAN SERVO AMP CS-A
FIXED SERVO RC-A
FILE SERVO RC-A
DRIVE OUTPUT NO. 1
POWER -12 V
DRIVE OUTPUT NO. 2
CAPSTAN SERVO INTERLOCK
FORWARD (-) F/F OUTPUT
RAMP OUTPUT
FIXED SERVO OUTPUT NO. 1
FIXED SERVO OUTPUT NO. 2
FILE SERVO OUTPUT NO. 1
FILE SERVO OUTPUT NO. 2
TS2 ON REEL SERVO SUPPLY
POWER GRD
REWIND RELAY
REV(+) F/F OUTPUT
B.O.T. (-)
E.O.T. (-)
REMOTE IND (+)
LOCAL IND (+)
OCP ENABLE (+)
TS2-2 REEL SERVO SUP
UNIT SELECT (-)
UNIT SELECT IND (+)
REWINDING (-)
READY (-)
HI/LO (-/+) DENSITY
MASTER RESET (+)
REWIND F/F RL-A
LOCAL/REMOTE F/F LL-A
AC FOR PWR RELAY
BUS 1 +12V LOGIC
BUS 3 -6V LOGIC
BUS 4 -12V LOGIC
BUS 5 LOGIC GRD
JUMPERED TO TS1-8 ON 1X0 & 1X1 TRANSPORTS ONLY
PINS 31 & 32 JUMPERED FOR FIXED REEL TACH. ADJUSTMENT.
PINS 14 & 15 JUMPERED FOR FILE REEL TACH. ADJUSTMENT.
NOTES:
DO NOT SCALE DRAWING
TM-7
NEXT ASSY
USED ON
APPLICATION
AMPEX COMPUTER PRODUCTS COMPANY
CULVER CITY, CALIFORNIA
LOGIC DIAGRAM
CONTROL ELECTRONICS
E
3108649
F
SCALE NONE
SHEET 1 OF 1

3108558

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ECN 911-98 DEV PRO	MATZKE	2-17-68	ALVAREZ
D	ECN 101-N PROD.	KOETTING	3-17-9	[illegible]
E	E-N 4575	[illegible]	[illegible]	[illegible]



3108306	TM-7
NEXT ASSY.	1ST USED ON
APPLICATION	

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS .XX ± .010 .XXX ± .005
ANGLES ± 1°
BREAK ALL SHARP EDGES APPROX. .010 CHAMF. AND SPOTFACE CORNER RADII .010
ROUGHNESS OF ALL MACHINED SURFACES PER MIL STD 10
MATERIAL
FINISH

PROJ. [illegible]
PROJ. ENGR. [illegible]
ENGR [illegible]
CHKR [illegible]
DFTSMN [illegible] 12-20-68

AMPEX COMPUTER PRODUCTS COMPANY
9937 JEFFERSON BLVD. CULVER CITY, CALIFORNIA

TITLE
SCHEMATIC - TRANSPORT

CODE IDENT. NO.	SIZE	DWG NO.	ISSUE
	D	3108558	E

SCALE NONE SHEET 1 OF 1

ADDENDUM 3119302-01
LINK SPECIAL FEATURES

SCOPE.

This addendum documents special features not included in the standard technical manual. Special input signal and output signal lists and a cross-reference list of printed circuit boards are provided. Printed circuit board (PCB) assembly drawings and schematics not included in the technical manual are supplied. A special data electronics logic diagram is located at the end of this addendum.

GENERAL DESCRIPTION.

TM-7 TAPE TRANSPORT.

The tape transport is designed to operate at 45 ips. The list of PCB's in the TM-7 manual is for 36 ips operation only. The PCB's supplied with this TM-7 Tape Transport appear on the PCB cross-reference list.

The standard TM-7 responds to Forward/Reverse and Run/Stop commands. This transport is modified to accept Forward/Stop and Reverse/Stop commands.

DATA ELECTRONICS.

The data electronics card cage is wired as shown on Logic Diagram 3118334. The PCB's supplied with this DE-211 Data Electronics appear on the PCB cross-reference list. The input and output signal lists provide connector pin designations for both the input/output panel and the data electronics card cage.

The parity bit is generally supplied by external equipment. In this system, the parity bit is generated by the Exclusive OR circuits on PCB B17 and B18 and is handled as Write Data 7. Parity is checked by the Exclusive OR circuits on PCB B9 and B10.

Holding register circuits are provided by flip-flop circuits on PCB A11 and A12.

Bidirectional read deskew is accomplished by the read deskew circuits on PCB's A2 through A8. The forward command automatically selects the forward deskew circuits. The absence of the forward command selects reverse deskew. Deskew adjustment in the local mode can be performed by removing the Select Logic (SLB) circuit board and by applying -12 volts to B7-31 to select forward read deskew circuits or B7-29 to select reverse read deskew circuits.

I/O PANEL J4	DE CARD CAGE J5	INPUT SIGNALS
C	1	Write Track 1 (-)
D	2	Write Track 2 (-)
E	3	Write Track 3 (-)
F	4	Write Track 4 (-)
M	5	Write Track 5 (-)
N	6	Write Track 6 (-)
P	7	*Write Track 7 (-)
W	8	Write Strobe (-)
X	9	Write Reset (-)
d	10	Read Permit (-)
A	11	Ground
B	12	Ground
H	13	Ground
J	14	Ground
K	15	Ground
L	16	Ground
T	17	Ground
U	18	Ground
V	19	Ground
m	20	Shield Ground
c	21	Write Permit (-)
R	22	Holding Register DC Reset (-)
S	23	*Write Track 9 (-)
l	24	Odd/Even Parity (-/+)
Y	25	Forward/Stop (-/+)
e	26	Reverse/Stop (-/+)
Z	27	Rewind & Lockout (-)
f	28	Rewind (-)
g	29	Ground
h	30	Ground
G	31	Spare
a	35	Ground
b	36	Ground
j	39	Spare
k	40	*Write Track 8 (-)

*Not used in this system

SON 9719 FAL 3114790
DE-211 Logic Diagram 3118334

Link TM-7211
45 IPS 556/200 CPI

I/O PANEL J5	DE CARD CAGE J4	OUTPUT SIGNALS
C	1	Read Track 1 (-)
D	2	Read Track 2 (-)
E	3	Read Track 3 (-)
F	4	Read Track 4 (-)
M	5	Read Track 5 (-)
N	6	Read Track 6 (-)
P	7	Read Track 7 (-)
R	8	Clock (-)
G	9	Read Data 8 (-)
d	10	*Read Data 9 (-)
A	11	Ground
B	12	Ground
H	13	Ground
J	14	Ground
K	15	Ground
L	16	Ground
S	17	Ground
T	18	Ground
U	19	Ground
m	20	Shield Ground
W	21	BOT (+)
X	22	EOT (+)
Y	23	Rewinding (-)
Z	24	Ready (-)
e	25	High/Low Density Status (-/+)
f	26	Spare
h	27	Vertical Parity Error (-)
j	28	Spare
c	29	*Write Check Error
g	31	Ground
k	32	Unit Select (-)
l	33	Select Indicator (+)
V	38	Write Enable (C)
a	39	Write Enable (NO)
b	40	Write Enable (NC)

*Not used in this system.

SON 9719 FAL 3117490
DE-211 Logic Diagram 3118334

Link TM-7211
45 IPS 556/200 CPI

PRINTED CIRCUIT BOARD CROSS-REFERENCE LIST

TM-7 CONTROL ELECTRONICS

CODE	PART NO.	DESCRIPTION	LOCATION	SCHEMATIC	ASSY DWG
CSA	3112170-10	Capstan Servo Control	J6	3107098	3112172
FLC	3112360-10	Forward/Reverse Logic -C	J4	3112361	3118158
LLA	3107102-10	Local/Remote Logic	J2	3107103	3107260
PHB	3107262-10	Photo Amplifier	J3	3107073	3107257
RCA	3112167-10	Reel Servo Control	J7	3107093	3112169
RLA	3107087-10	Rewind Logic	J1	3107088	3107261

DE-211 DATA ELECTRONICS

CODE	PART NO.	DESCRIPTION	LOCATION	SCHEMATIC	ASSY DWG
EOA	3107274-10	Exclusive OR	B9, B10, B17, B18	3104452	3107274
FFE	3118267-01	Flip-Flop -E	A11, A12	3118269*	3118268*
IBA	3107258-10	Input Buffer	B15, B16	3107038	3107251
ODA	3107259-10	Output Driver	B13, B14	3107043	3107255
ODM	3118163-01	Output Driver	B19	3118166*	3118165*
RAB	3107266-10	Read Amplifier	B2-B5	3107118	3107270
RDC	3109932-10	Read Deskew (Bi-directional)	A2-A8	3109930	3109933
SGA	3119379-01	Strobe Generator	B8	3107058	3107276
SLB	3111157-10	Select Logic -B	B7	3111158	3111157
WAB	3112363-10	Write Amplifier	A14-A20	3112345	3112347
WPD	3107268-10	Write Power Gate	A24	3107128	3107272

*Drawings provided with this addendum.

FAL 3117490, SON 9719
DE Logic Diagram 3118334*

Link TM-7211
45 IPS 556/200 CPI

REVISIONS				
ISSUE	DESCRIPTION	DRAFTSMAN	DATE	APPROVAL
A	ERN 136-FD PROD			

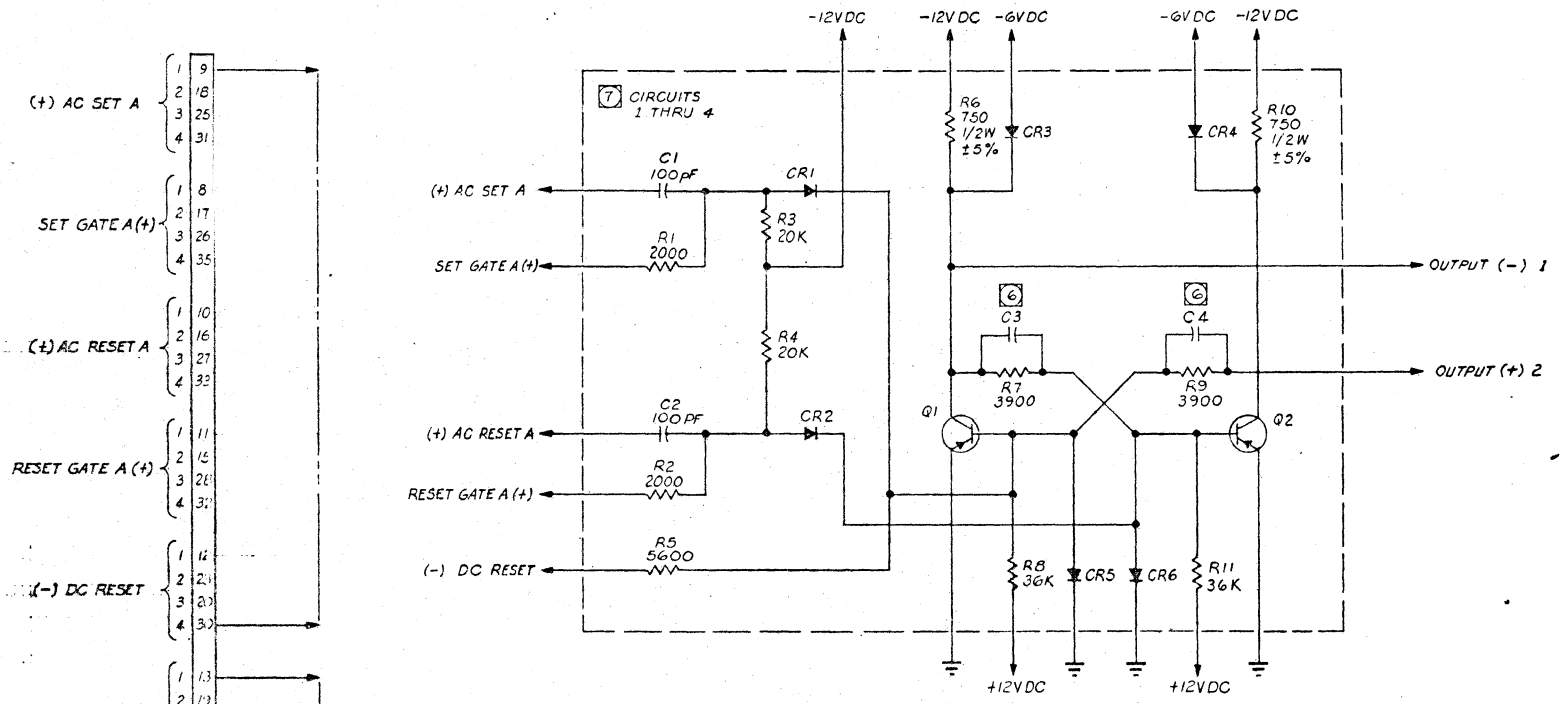


TABLE 1

ASSEMBLY	COMPONENT
3118267-01	C3 & C4
	OPEN

7 SEE TABLE 1.
6 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX THE REFERENCE DESIGNATION WITH THE CIRCUIT NUMBER FOR COMPLETE DESIGNATION.
5. ALL TRANSISTORS TO BE 321209Z-10.
4. ALL DIODES TO BE 326302A-10.
3. ALL RESISTOR VALUES ARE IN OHMS, ±5%, 1/4W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, ± 5% 500V.
1. FOR ASSEMBLY SEE TABLE 1.
NOTES:

3118269

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED TOLERANCES
DECIMALS ANGLES
MATERIAL
FINISH
NEXT ASSY | USED ON
APPLICATION

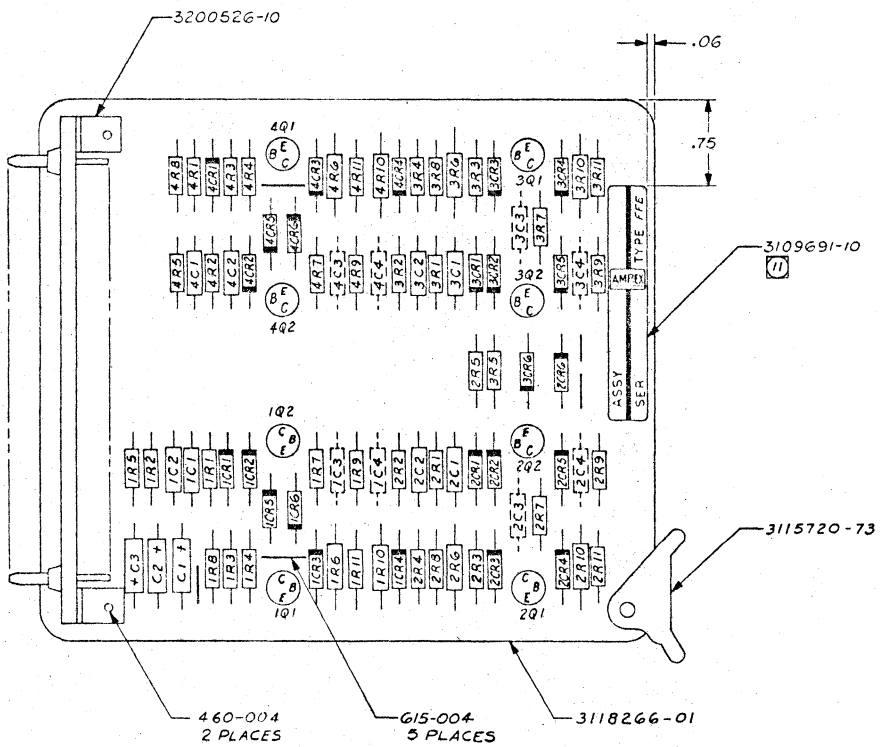
AMPEX COMPUTER PRODUCTS COMPANY
TITLE
SCHEMATIC — FLIP-FLOP -E
SIZE D | DWG. NO. 3118269 | REV A
SCALE | SHEET

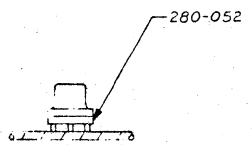
3118268

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
A	ERN 106-FD PROD	7/4/66			

TABLE I

B/M REFERENCE TABLE	
ASSEMBLY	PART 'A'
3118267-01	NOT USED





TYPICAL TRANSISTOR INSTALLATION

PART NO.	REFERENCE DESIGNATION
3212092-10	1Q1 THRU 4Q1, 1Q2 THRU 4Q2
3263024-10	1CR1 THRU 4CR1, 1CR2 THRU 4CR2, 1CR3 THRU 4CR3, 1CR4 THRU 4CR4, 1CR5 THRU 4CR5, 1CR6 THRU 4CR6
037-990	C1, C2, C3
034-177	1C1 THRU 4C1, 1C2 THRU 4C2
041-560	1R1 THRU 4R1, 1R2 THRU 4R2
041-508	1R3 THRU 4R3, 1R4 THRU 4R4
041-511	1R7 THRU 4R7, 1R9 THRU 4R9
041-751	1R8 THRU 4R8, 1R11 THRU 4R11
041-507	1R5 THRU 4R5
041-007	1R6 THRU 4R6, 1R10 THRU 4R10
(12) PART 'A'	1C3 THRU 4C3, 1C4 THRU 4C4

(12) FOR COMPONENT INSTALLATIONS, SEE TABLE I.

(11) MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130

10. PART NO. TO BE AS SHOWN ON TABLE I.
9. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMISEAL TYPE 1B15 COLUMBIA TECH CORP OR EQUIV.
~~8. MARK POT REF. NO's. .12 HIGH CHARACTERS, COLOR WHITE, PER MIL-STD-130. DO NOT IMPRESSION STAMP.~~
~~7. TRIMPOTS NOT TO BE SUBMERGED IN WATER~~
6. COMPONENT DESIGNATIONS ARE FOR REF. ONLY.
5. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.
4. HEAVY LINE ON DIODES INDICATES CATHODE
3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.
2. FOR ASSEMBLY SPECIFICATION SEE 3118270.
1. FOR SCHEMATIC SEE 3118269.

NOTES

REFERENCE

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
.XX ± .05 .XXX ± .010 ± 1/2°
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE COPNER RADII APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES 125 PER MIL STD 10
MATERIAL
FINISH

SEE TABLE	DE-200
NEXT ASSY	ISE USED ON
APPLICATION	

3118268 CN DWG

PROT
SCRIBE
PROT
ENGR
CHKR
DFTSMAN

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 988, CULVER CITY, CALIF.

TITLE
CIRCUIT BOARD ASSEMBLY-
FLIP/FLOP -E

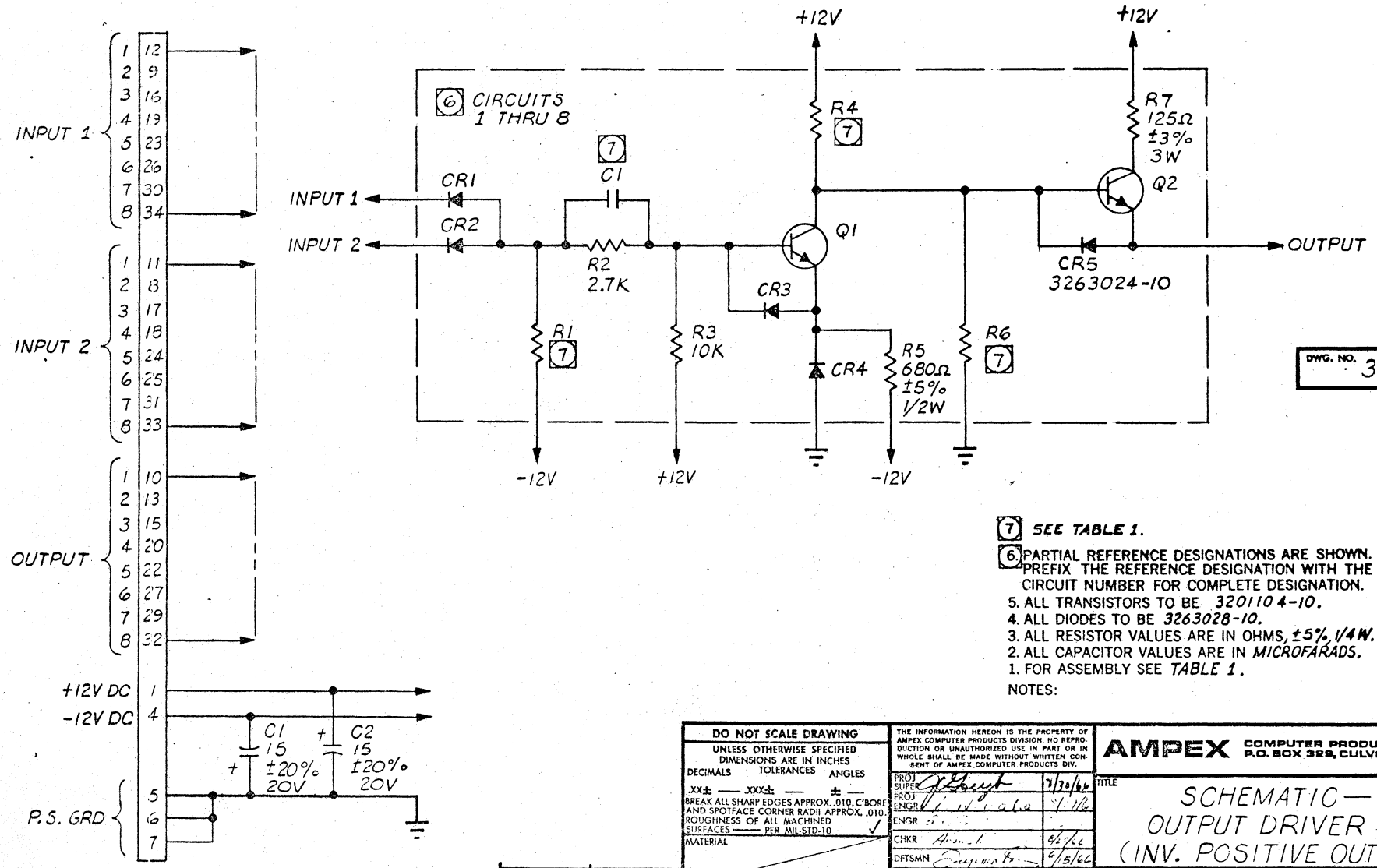
SIZE	CODE IDENT NO	DWG NO
D	09150	3118268
SCALE 2:1		SHEET 1 OF 1

3118166

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
B	ECN 5942 PROD REL	5/24/66	Guiness	8/30/66	Gough
C	ECN 7200	12/16/66	REISS	12/20/67	Gough

TABLE I

ASSY NO.	OUTPUT LEVEL	COMPONENTS			
		C1	R1	R4	R6
3118161-01	0/+3V	OPEN	OPEN	6.19K, ±1%	2.74K, ±1%
3118162-01	0/+6V	OPEN	OPEN	2.21K, ±1%	2.74K, ±1%
3118163-01	0/+9V	OPEN	OPEN	1.82K, ±1%	7.5K, ±1%
3118164-01	0/+12V	OPEN	OPEN	2K	OPEN
3118293-01	0/+4V	OPEN	OPEN	4.22K, ±1%	2.74K, ±1%
3119497-01	0/+8V	OPEN	OPEN	3.01K, ±1%	7.5K, ±1%



DWG. NO. 3118166

7 SEE TABLE 1.

6 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX THE REFERENCE DESIGNATION WITH THE CIRCUIT NUMBER FOR COMPLETE DESIGNATION.

5. ALL TRANSISTORS TO BE 3201104-10.
4. ALL DIODES TO BE 3263028-10.
3. ALL RESISTOR VALUES ARE IN OHMS, ±5%, 1/4W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
1. FOR ASSEMBLY SEE TABLE 1.

NOTES:

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS .XX± —— .XXX± —— TOLERANCES ± —— ANGLES
BREAK ALL SHARP EDGES APPROX. .010. C'BORE AND SPOTFACE CORNER RADII APPROX. .010.
ROUGHNESS OF ALL MACHINED SURFACES —— PER MIL-STD-10 ✓
MATERIAL
FINISH

PROJ SUPER	G. Gough	7/20/66
PROJ ENGR	[illegible]	7/1/66
ENGR		
CHKR	[illegible]	6/27/66
DFTSMN	Guiness	6/5/66

SEE TABLE	DE-200
NEXT ASSY.	1ST USED ON
APPLICATION	

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 329, CULVER CITY, CALIF.

TITLE
SCHEMATIC — OUTPUT DRIVER — M (INV. POSITIVE OUTPUT)

SIZE	CODE IDENT. NO.	DWG. NO.
C	09150	3118166

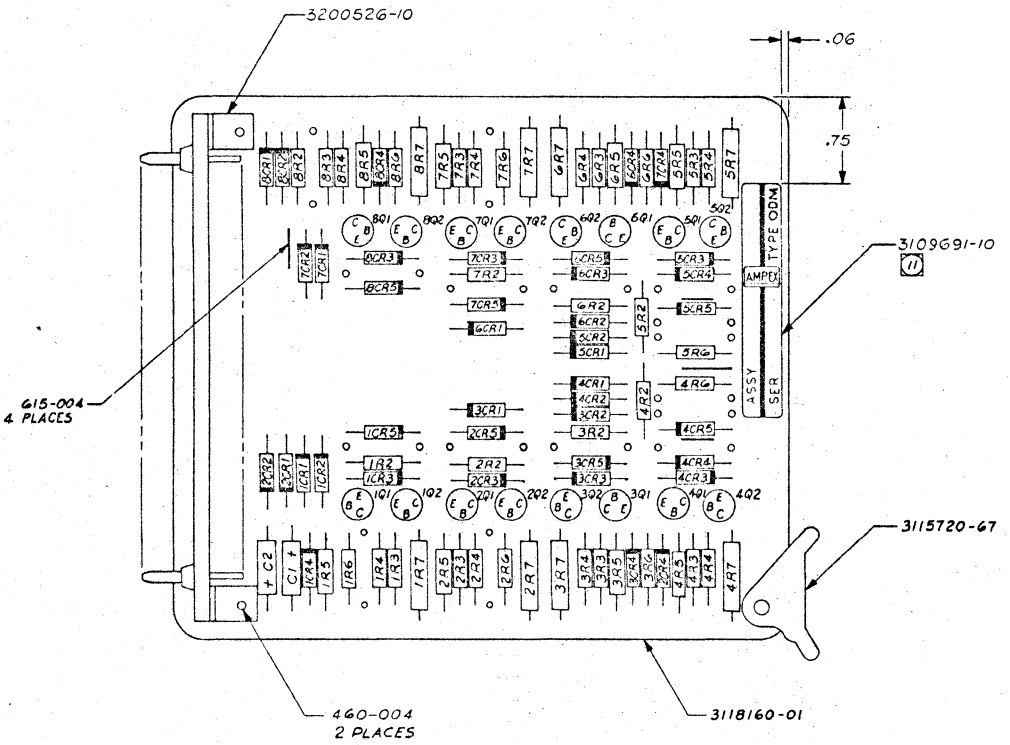
SCALE NONE SHEET 1 OF 1

3118165

REVISIONS					
ISSUE	DESCRIPTION	DATE	DRAFTSMAN	DATE	APPROVAL
B	ECN 5942 PROD REL	9/26/66	[illegible]		

TABLE I

ASSEMBLY NO.	OUTPUT LEVEL	COMPONENTS			
		PART A	PART B	PART C	PART D
3118161-01	0/+3V	NOT USED	NOT USED	042-881	048-186
3118162-01	0/+6V	↑	↑	042-423	048-186
3118163-01	0/+9V	↓	↓	042-460	042-430
3118164-01	0/+12V	NOT USED	NOT USED	041-560	NOT USED
3118293-01	0/+4V	NOT USED	NOT USED	042-873	048-186
3119497-01	0/+8V	NOT USED	NOT USED	042-866	042-430



PART NO.	REFERENCE DESIGNATION
3201104-10	1Q1 THRU 8Q1, 1Q2 THRU 8Q2
32G3024-10	1CR5 THRU 8CR5
32G3028-10	1CR1 THRU 8CR1, 1CR2 THRU 8CR2 1CR3 THRU 8CR3, 1CR4 THRU 8CR4
037-068	C1, C2
041-408	1R3 THRU 8R3
041-442	1R2 THRU 8R2
(12) PART C	1R4 THRU 8R4
(12) PART D	1R6 THRU 8R6
041-343	1R5 THRU 8R5
047-302	1R7 THRU 8R7
(12) PART A	1C1 THRU 8C1
(12) PART B	1R1 THRU 8R1

TYPICAL TRANSISTOR INSTALLATION

REFERENCE

(12) INSTALL PARTS 'A THRU D' PER TABLE I.

(11) MARK PART NO. AND NAMEPLATE INFORMATION PER MIL-STD-130.

10. PART NO. TO BE AS SHOWN ON TABLE I.

9. SEAL PRINTED CIRCUIT SIDE ONLY WITH HUMISEAL TYPE 1B15 COLUMBIA TECH CORP OR EQUIV

~~8. MARK POT. REF. NOS. 12 HIGH CHARACTERS, COLOR WHITE, PER MIL-STD-130. DO NOT IMPRESSION STAMP.~~

~~7. TRIMPOTS NOT TO BE SUBMERGED IN WATER~~

6. COMPONENT DESIGNATIONS ARE FOR REF. ONLY.

5. PLUS SIGN ON CAPACITOR INDICATES POSITIVE.

4. HEAVY LINE ON DIODES INDICATES CATHODE

3. ASSEMBLE PER PRODUCTION PRACTICES MANUAL.

2. FOR ASSEMBLY SPECIFICATION SEE 3118167

1. FOR SCHEMATIC SEE 3118166.

NOTES:

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMALS TOLERANCES ANGLES
XX ± .05 XXX ± .010 ± 1/2°
BREAK ALL SHARP EDGES APPROX .010 C'BORE AND SPOTFACE CORNER RADII APPROX .010
ROUGHNESS OF ALL MACHINED SURFACES — PER MIL STD 10
MATERIAL

FINISH

SEE TABLE	DE-200
NEXT ASSY.	1ST USED ON
APPLICATION	

DWG NO 3118165

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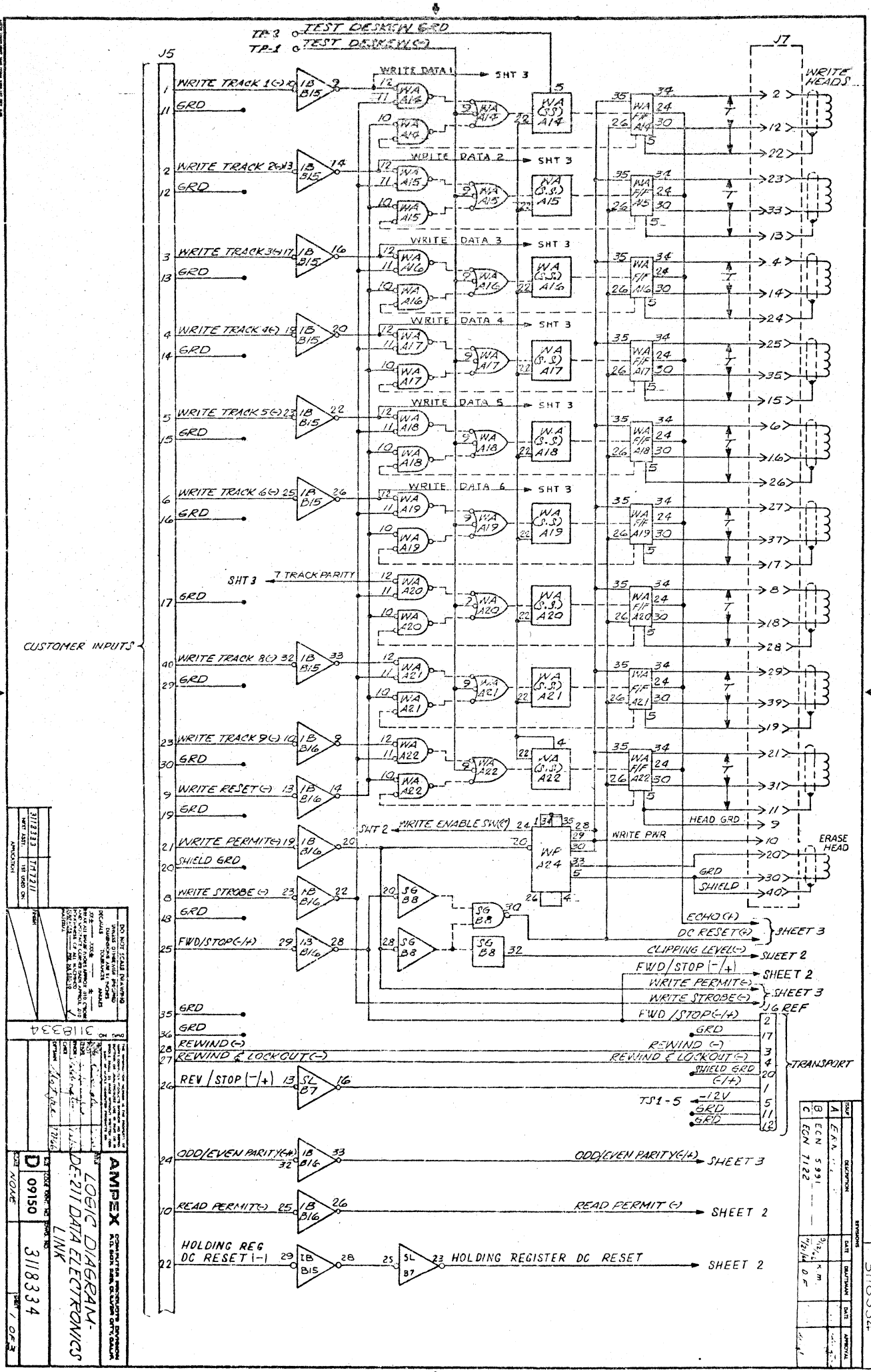
PROJ		
ENGR		
CHKR		
DFTSMN	[illegible]	9/26/66

AMPEX COMPUTER PRODUCTS DIVISION
P.O. BOX 2865, CULVER CITY, CALIF.

TITLE
CIRCUIT BOARD ASSY—
OUTPUT DRIVER -M
(INV. POSITIVE OUTPUT)

SIZE	CODE IDENT NO	DWG NO
D	09150	3118165

SCALE 2:1 SHEET 1 OF 1



REV	DESCRIPTION	DATE	APPROVAL
A	E.C.N.		
B	E.C.N. 5991		
C	E.C.N. 7122	3/24/74	K.M.

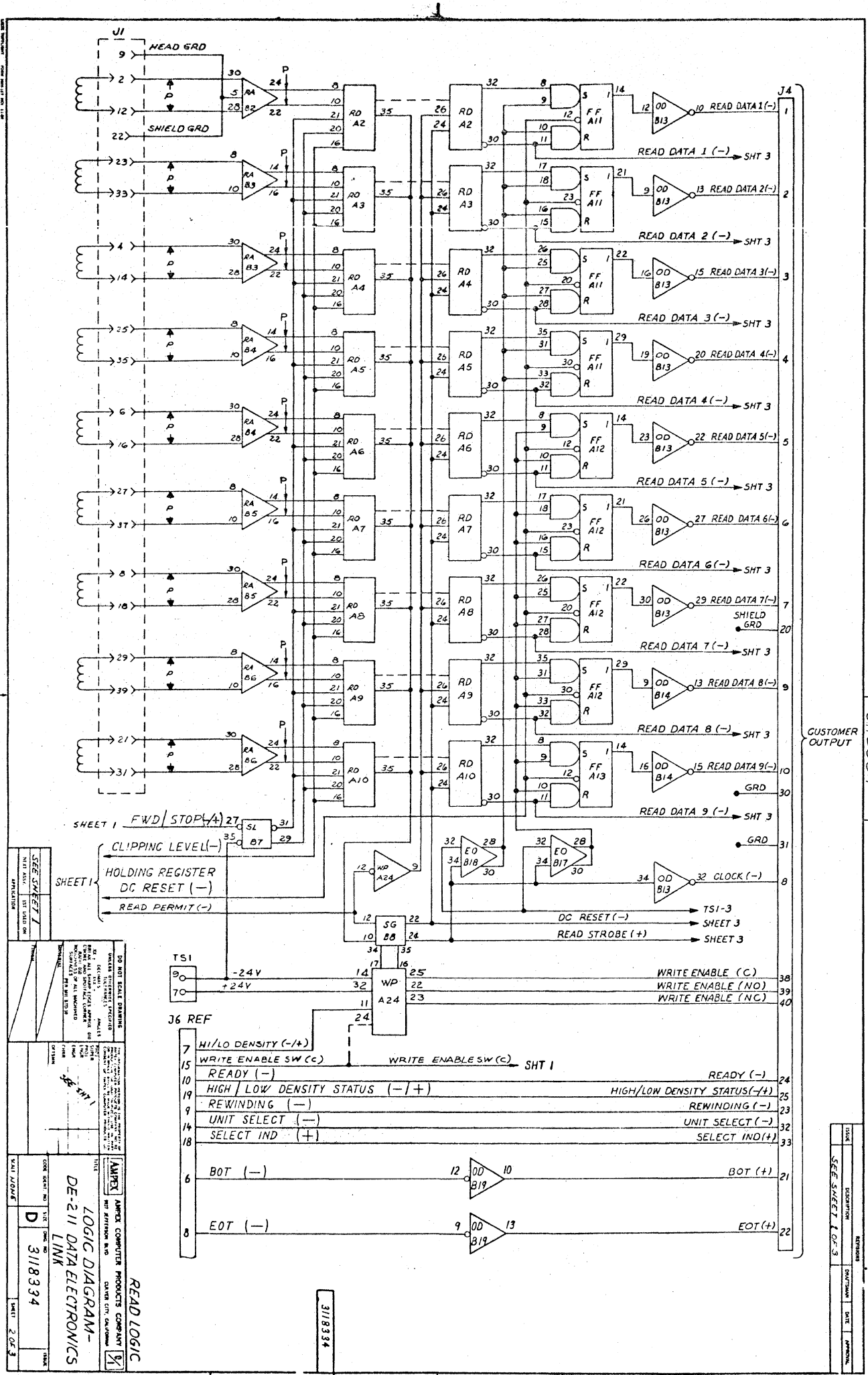
AMPEX
REDWOOD CITY, CALIFORNIA

LOGIC DIAGRAM-
DF-211 DATA ELECTRONICS
LINK

D 09150 3118334

SCALE NONE SHEET 1 OF 3

3118334



3118334

SEE SHEET 1

DO NOT SCALE DRAWING

AMPEX COMPUTER PRODUCTS COMPANY
DAVIS CITY, CALIFORNIA

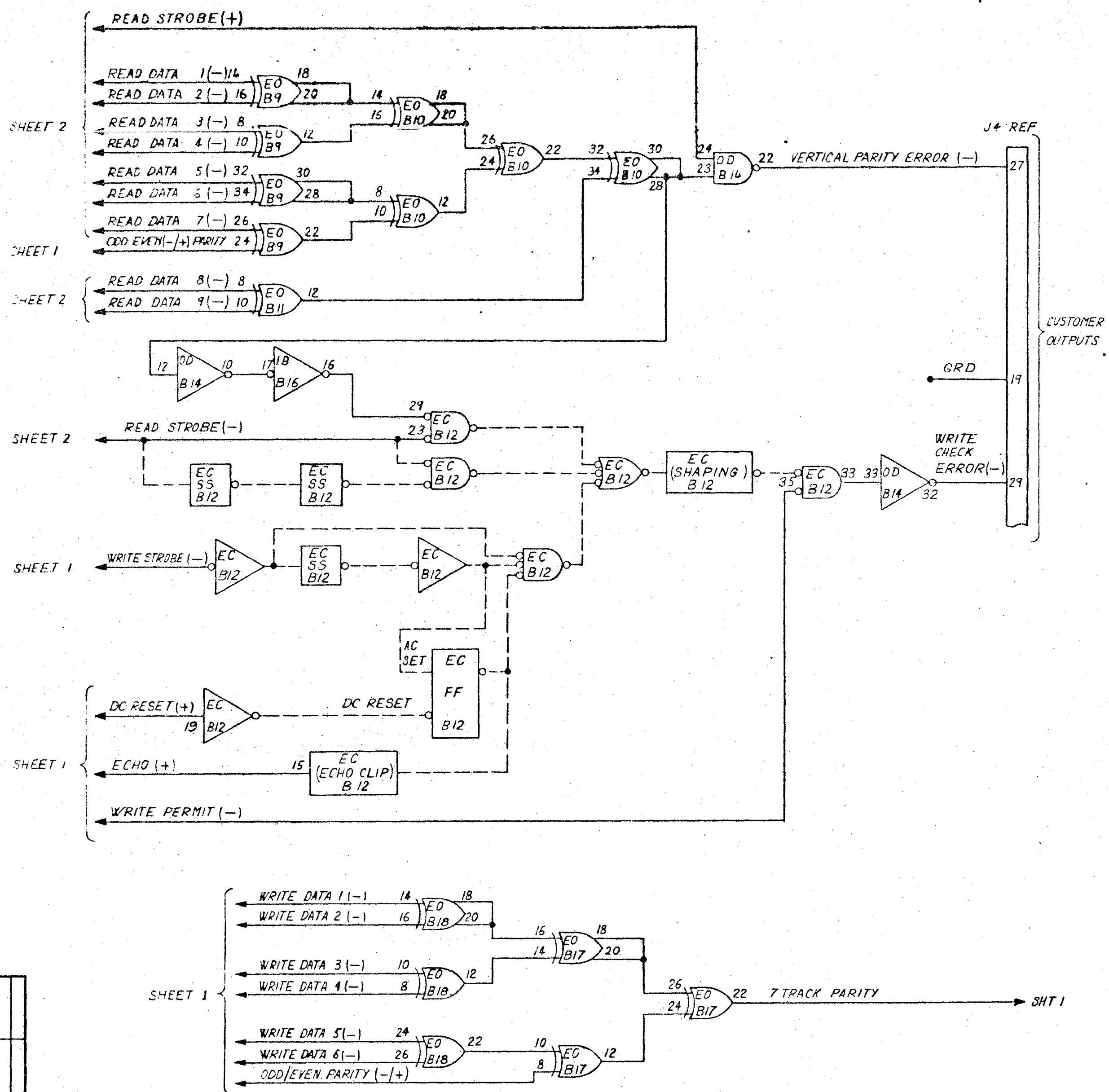
TITLE
LOGIC DIAGRAM-
DE-211 DATA ELECTRONICS
LINK

READ LOGIC

SIZE D
DWG NO 3118334
SHEET 2 OF 3

SEE SHEET 1 OF 3

3118334



3118334

AMPEX COMPUTER PRODUCTS COMPANY

CULVER CITY, CALIFORNIA

TITLE: LOGIC DIAGRAM DE-211 DATA ELECTRONICS LINK

SIZE: D

DWG. NO. 3118334

SHEET 3 OF 3

SEE SHEET 1 OF 3

3118334