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# INDY 800

## Service Information



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## 1. GENERAL MAINTENANCE INFORMATION

### 1-1. INTRODUCTION

The Atari Indy 800 game consists of a cabinet, TV monitor, printed circuit boards (PCBs), interconnecting wiring, and various cabinet-mounted circuit components. Except for a schematic, no information about the TV monitor is presented in this manual. The TV monitor is a GE 25" color unit. TV circuit malfunctions can be solved using standard TV troubleshooting techniques. However, the PCB computer requires troubleshooting techniques that may be unfamiliar to the average technician. Therefore, the troubleshooting information in this manual is dedicated to the PCBs and their associated cabinet circuitry.

### 1-2. WARRANTY

This game has been designed with solid-state circuitry to be as maintenance-free as possible. However, as with all mechanical or electrical devices, there may be minor problems. If the PCB fails within the 90-day\* warranty period, contact the distributor from whom the game was originally purchased for replacement or repair instructions. All such warranty returns must be accompanied by completed warranty return forms. Any PCB repairs attempted by anyone other than authorized Atari Service Center personnel will void the warranty. If the PCB fails after the warranty period has expired, it will be repaired for a nominal parts and labor charge.

Atari, Inc. warrants the TV monitor for a period of 30 days commencing the day of shipment from the Atari factory. If the monitor fails within that period, immediately contact the distributor from whom the game was originally purchased for repair or replacement instructions. Any TV repairs (other than replacement of fuses or adjustments) attempted during the warranty period by anyone other than authorized Atari Service Center personnel will void the warranty.

\*from date of shipment from the factory

If the TV monitor fails after the warranty period has expired, it may be returned to the distributor where it will be repaired for a nominal parts and labor charge, or it may be taken to any competent TV repair shop.

#### 1-3. NEW MACHINE SET-UP PROCEDURE

Before turning this machine on, inspect it carefully for any damage which may have occurred during shipment. Inspect both interior and exterior of the machine for any obvious damage to the cabinet or internal components. Check for cracked or broken cabinet parts, assemblies pulling loose, broken or disconnected wires, or foreign objects shorting electrical connections. After the machine has been plugged in and turned on, perform the checkout procedure.

#### 1-4. NEW MACHINE CHECKOUT

As each new machine leaves the factory, every component and subassembly is carefully checked for proper operation. However, since parts may have been damaged or adjustments changed during shipping, the following checkout procedure must be repeated prior to placing the machine on location:

1. Inspect both the exterior and interior of the machine for obvious shipping damage such as cracked or broken cabinet parts, subassemblies broken loose, etc.
2. Carefully inspect the interior of the machine to see that all solder joints, slip-on connectors, and plug-in type connectors are firmly seated. Pay particular attention to the PCB edge connector and the fuses. Also check the connections to the coin switch, the TV monitor, the interlock switches, and all other Molex-type connectors.
3. Plug the machine in, and pull out the white actuator shafts of the interlock switches if the rear door is open. Inspect the cathode ray tube image for a steady and sharp picture that exhibits the proper levels of brightness and contrast.
4. Insert several old and new coins into the coin acceptor. No genuine coin should be rejected, and each coin insertion should step the coin counter one digit. Depress the coin rejector button to make sure that the linkage is operating smoothly.

5. Coin insertion should start the game. Check for proper game sequence, making sure that all aspects of the game are functioning correctly.
6. The interlock switch must turn off the entire machine when the rear door is opened.

1-5. Q-530 COIN ACCEPTOR: OPERATION, ADJUSTMENT & MAINTENANCE

All coin acceptors leave the factory adjusted for maximum performance. If, however, more critical adjustments are desired, or if the unit has been completely disassembled for service, the following adjustment procedure is suggested. If the coin acceptor has been removed from the machine, place it in a vertical position on a level surface. If the acceptor is still mounted on the coin door, place the coin door in a vertical position on a level surface.

1. Kicker and Separator

- a. Set the acceptor with the back of the unit facing you in the test position.
- b. Loosen the screws holding the kicker (1) and the separator (3) and move both the kicker (2) and the separator (4) as far to the right as they will go. Tighten the screws.
- c. Insert several test coins (both old and new) and note that some are returned by striking the separator.
- d. Loosen the separator screw and move the separator a slight amount to the left. Tighten the screw.
- e. Insert the test coins again and, if some of them are still returned, repeat Step 4 until all the coins are accepted.
- f. Loosen the kicker screw and move the locker as far to the left as it will go. Tighten the screw.
- g. Insert the test coins and note that some are returned.
- h. Loosen the kicker screw and move the kicker a slight amount to the right. Tighten the screw.
- i. Insert the coins again and, if some are still returned, repeat Step 8 until all the coins are accepted.
- j. Be sure that both screws are tight after the adjustments have been made.

## 2. The Magnet Gate

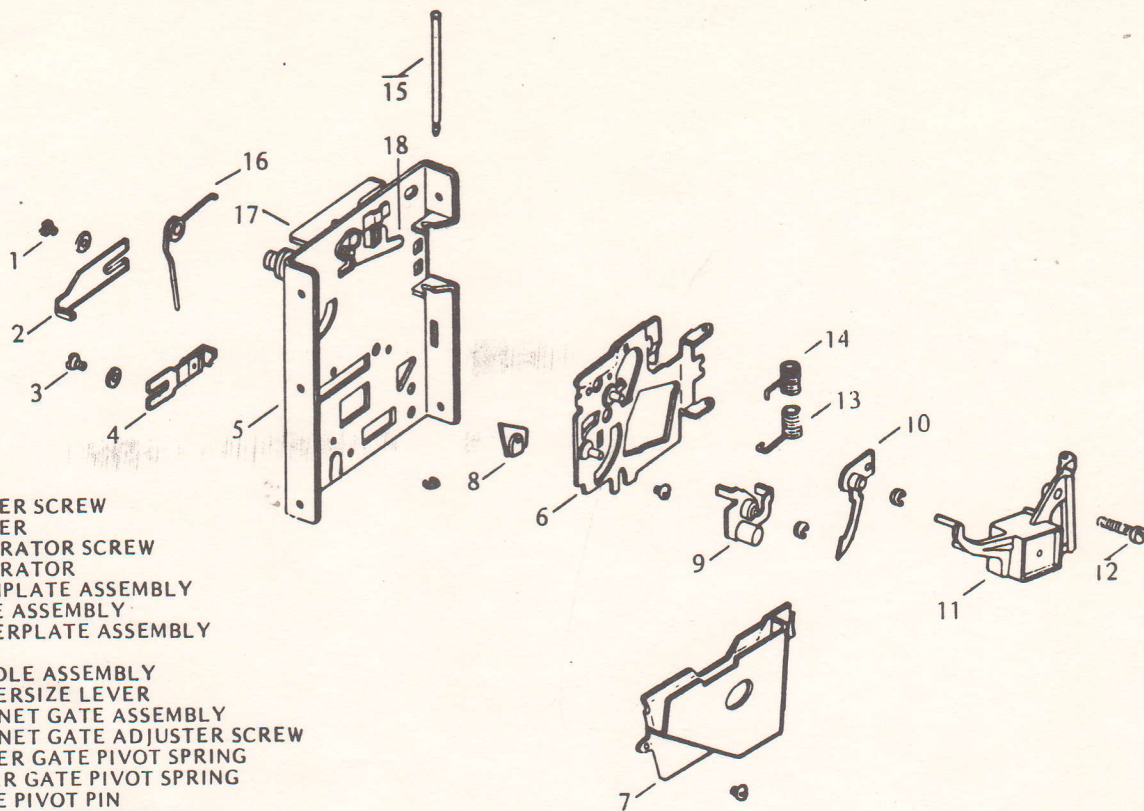
- a. Set the acceptor with the front of the unit facing you in the test position.
- b. Turn the magnet gate adjusting screw (2) out or counterclockwise until none of the coins will fit through.
- c. With a coin resting in the acceptor, turn the adjuster in or clockwise until the coin barely passes through the magnet gate.
- d. Test this adjustment using several other coins, both old and new, and if any of them fail to pass the magnet gate, repeat Step c until all the coins are accepted.
- e. Fix the magnet gate in this position with a drop of glue or Loctite<sup>TM</sup>, if necessary.

## 3. Acceptor Maintenance

Depending on the environment in which the acceptor is used, periodic preventive maintenance should be performed. The mainplate (5) may be cleaned with any household cleaner. Thorough rinsing and drying are necessary to remove deposits and/or film. Remove all metal particles from the magnet by guiding the point of a screwdriver or similar tool along the edges of the magnet. You will notice that the particles will cling to the point of the tool. Remove the transfer cradle (9) and the undersize lever (10) and clean the bushings and the pivot pins. A pipe cleaner is an effective cleaning tool. Apply powdered graphite or pencil lead to the pivot pins and bushings and reassemble. Spray the entire unit lightly with WD-40<sup>TM</sup>, a silicone lubricant.

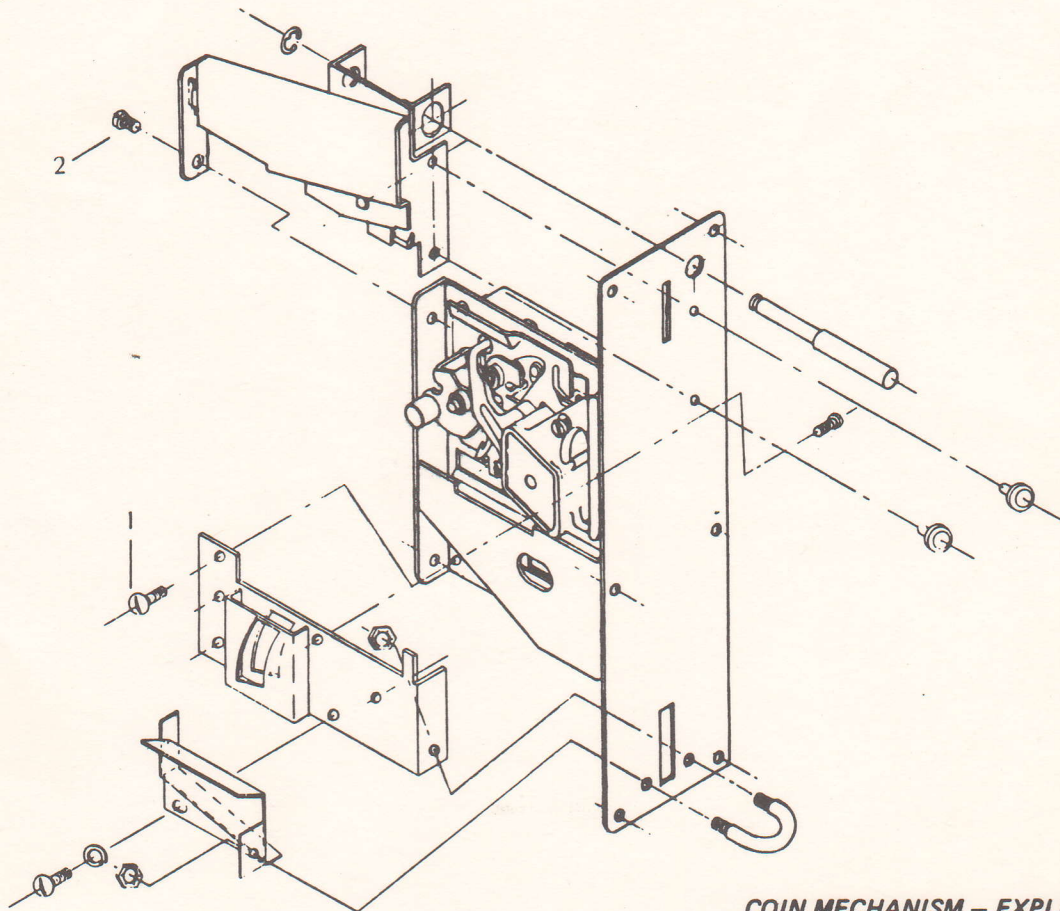
## 1-6. GENERAL MACHINE MAINTENANCE

Due to its solid-state circuitry, your machine will require very little maintenance other than periodic cleaning, lubrication and TV monitor adjustment. The cabinet and plexiglass screen may be cleaned with any non-abrasive household cleaner. The coin acceptor and the rejector linkage should be sprayed lightly once every three months with WD-40<sup>TM</sup> or similar silicone lubricant. The potentiometer shafts must never be lubricated in any way. The TV monitor is adjusted only when the CRT picture is distorted, or if the contrast or brightness appear to be out of adjustment.



- 1 KICKER SCREW
- 2 KICKER
- 3 SEPARATOR SCREW
- 4 SEPARATOR
- 5 MAINPLATE ASSEMBLY
- 6 GATE ASSEMBLY
- 7 COVERPLATE ASSEMBLY
- 8 RAIL
- 9 CRADLE ASSEMBLY
- 10 UNDERSIZE LEVER
- 11 MAGNET GATE ASSEMBLY
- 12 MAGNET GATE ADJUSTER SCREW
- 13 LOWER GATE PIVOT SPRING
- 14 UPPER GATE PIVOT SPRING
- 15 GATE PIVOT PIN
- 16 WIPER LEVER SPRING
- 17 WIPER LEVER
- 18 WIPER

**COIN ACCEPTOR - EXPLODED**



**COIN MECHANISM - EXPLODED**

## 2. CIRCUIT DESCRIPTION

### 2-1. GENERAL SYSTEM DESCRIPTION

1. The Indy 800 electronics system consists of the following components:

<u>Part/Assy No.</u>	<u>Qty.</u>	<u>Description</u>	<u>Section</u>	<u>Page</u>
A003182	1	Sync PCB	2-2	2-5
A003170	1	Score PCB	2-3	2-8
A003184	1	Coin control PCB	2-4	2-10
A003000	8	Car PCB	2-5	2-13
A003199	1	Backplane PCB	2-1	2-4
A003191	1	Power Supply PCB	2-6	2-19
A000607	8	Steering PCB	2-1	2-4
A003193	1	Remote panel PCB	2-4	2-11
92-013	1	25" color TV monitor	---	---
---	-	Harness & controls	---	---

The sync, score, coin control, and eight individual car boards are housed in a card rack within the game. These PCBs are interconnected by the backplane circuit board which is located at the rear of the card rack. The backplane board also provides edge connectors for interfacing with the other system components through the harness. Figure I-A shows the locations of the various boards and connectors within the card rack. The car numbers, colors, and steering wheel locations as well as locations of the card rack and power supply are shown in Figure I-B.

2. Basic functional description of each PCB

- a. Sync PCB

This includes the system clock, the video sync counters, and timing function generators, the race track video, the score checkpoints, score video windows, and the ORing circuitry for detection of collisions with other cards. The master audio volume control is also located on this board.

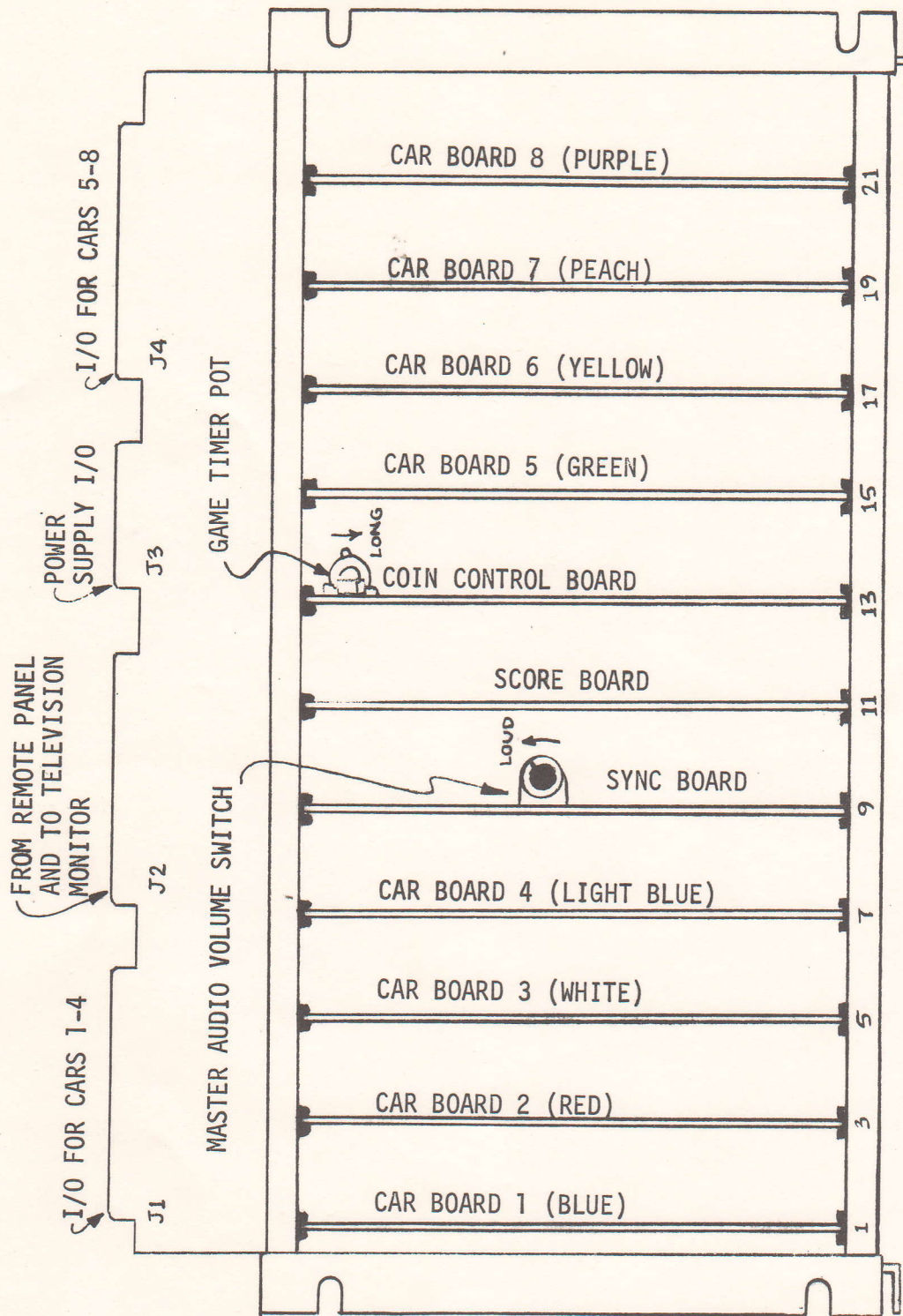


FIGURE I-A INDY 800 CARD RACK LAYOUT (FRONT VIEW)

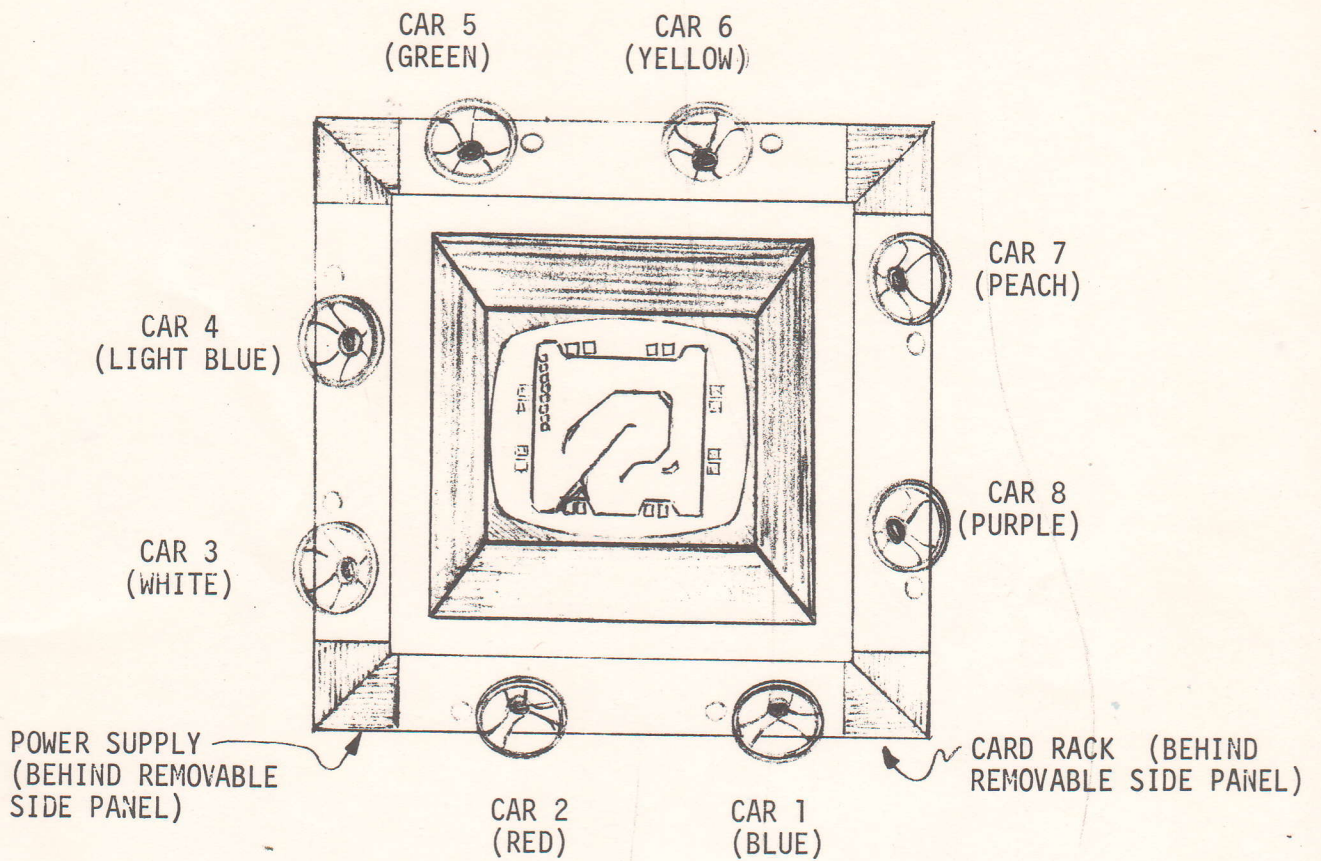


FIGURE I-B INDY 800 CABINET: LOCATION OF CAR CONTROLS AND ELECTRONICS

b. Score PCB

This includes all the circuitry necessary for detecting, counting, and displaying the score for each car. It also senses which car has the highest score and causes that score to blink. Finally, it contains the video outputs to the TV (except sync) and the TV calibration function circuit.

c. Coin control PCB

This monitors all coin inputs. It generates the reset and enable for each car in both the attended (with remote panel) and unattended (coin input, automatic) modes. The game timer and game turn-off circuitry are also included on this board.

d. 8 identical car PCBs

These control each of the individual cars. Each board contains all the circuitry necessary to rotate, move, and produce the video and audio for one car when enabled. The skid, collision, and crash detectors are also on this board.

e. Backplane board

This has no electronic components and serves only as an interface between the various components of the entire system.

f. Power supply PCB

This is the source of the unregulated power supplies for the digital and analog circuitry of the other boards. The relays and drivers for the coin mechanism lockout coils are also located on this board.

g. Steering PCBs

These are mounted on the backside of the steering wheel assemblies. The boards use optical sensing to produce two signals in quadrature, which may be decoded into rate and direction of rotation.

h. Remote panel

This is simply a switch board which is used to control the game in the attended mode of operation. Individual car enables, a master enable, and a start button are provided. When the remote panel is disconnected, the game automatically reverts to the unattended or automatic mode.

## 2-2. THE SYNC PRINTED CIRCUIT BOARD

The sync PCB has circuitry to produce the following functions:

1. System CLOCK and video countdown chain.
2. COMP SYNC signal to TV monitor.
3. Race track video.
4. Score CHECKPOINTS.
5. SCORE WINDOW.
6. OTHER CARS signal for each car.
7. +5 volts power for steering boards.
8. Miscellaneous timing signals to other logic.
9. MASTER VOLUME CONTROL signals.

The system CLOCK runs at 14.3 MHz. The horizontal countdown chain A4, B4, C4 (9316s) divides this basic frequency by 908 for each video line (15.76 KHz). The vertical countdown chain D4, D4 (7493), E3 (74107) divides the line rate by an additional 263 for a video frame (60 Hz).

The horizontal counter starts at 116 (binary 0001110100) and counts to 1024 (1111111111). The horizontal sync pulse (HSYNC) begins at count 256 and is 64 clock pulses wide (4.47  $\mu$ sec). This is done at C3-9 (7474) where the rising edge of 256H clocks a low through to Q, which is set back to a high 64H later by B3-11 (7400).

The vertical counter counts from zero (binary 00000000) to 262 (100000110), at which time D3-12 (7410) goes low. At the next rising edge of 512H, this low is clocked through to C3-5 (7474). VRESET then resets the vertical counters to zero and the cycle begins again after VRESET is cleared again one line later. The vertical sync pulse (VSYNC) comes from an R/S flip flop, D3-1 (7202). It begins with VRESET and is  $4\frac{1}{2}$  lines long (290  $\mu$ sec).

The race track signal (RT) is generated by feeding sync counter signals into a 1K ROM, F4 (003189). The 4-bit output is multiplexed to a single line by F3 (74153) and is gated by 512H and by a signal to produce "dots" from A3-8 (7420).

Similarly, the score CHECKPOINTS come from a 256-bit ROM, E5 (003188) which is addressed with functions from the sync counters. The three lowest-order data outputs of this ROM are used to generate the score windows in which the score video will be shown. This generation is

accomplished in some random logic including A1 (7400), B1 (7486), and finally out of C1-8 (7420).

COMP RESET CLOCK is a signal which drives the car reset circuitry on the coin control board. It is a signal that occurs at horizontal count 544 through 1024 on one line out of every 12. D1 (74107) is hooked up as a divide-by-3 counter to produce a 4-line signal every 12 lines. B2 (7400) is hooked up as an R/S flip flip to produce the proper horizontal timing. These are ANDed together along with 1V and 2V signals to produce the required signal at C1-6 (7420).

BOUNDS is a signal that represents a horizontal boundary. It goes to the car reset circuitry on the coin control board. Any car found coincident with this signal is out of bounds and will be reset back to the starting line.

FLASH is a 4-bit (250  $\mu$ sec) square wave used to make the score of the leader blink.

16V  $\oplus$  32H is a timing signal used in the generation of the score video. It is a digit select signal that multiplexes the high- and low-order digits of the score.

The OTHER CARS signals are a three-level ORing of every car except the one to which the signal is sent. They are used on the car boards to detect collisions between cars.

VCLOCK is a two-pulse signal during horizontal sync on each line (except those lines from 256V until the end of VSYNC). It is used to clock the vertical-motion counters on the car boards.

MASTER VOLUME signals choose one of four possible volume levels for all cars.

See Figure II-A for a diagram of the sync functions, race track, etc., as oriented on the TV screen.

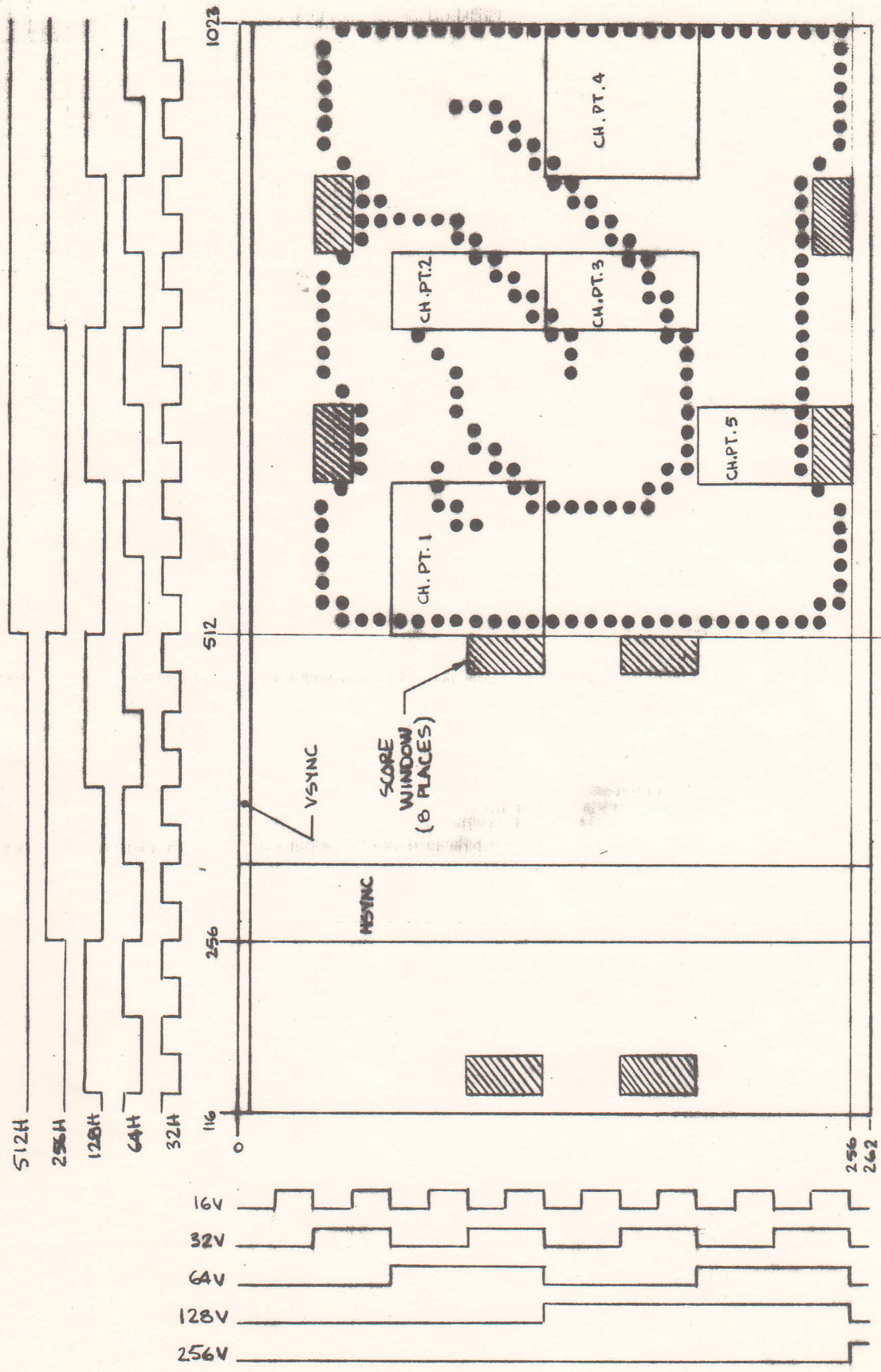


FIGURE II-A: SYNC PCB FUNCTIONS

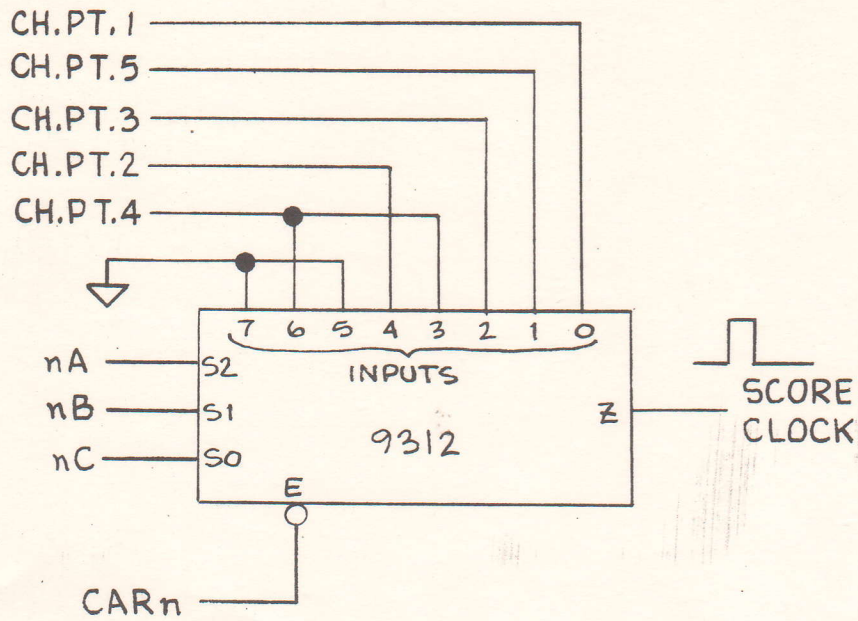
## 2-3. THE SCORE PRINTED CIRCUIT BOARD

The score circuit board includes several subcircuits that detect, count, and display the score as well as detect the leader. Each car has 6 bits of score arranged in two digits of 3 bits each. The three least significant bits ( $nC$ ,  $nB$ ,  $nA$ , where  $n$  = car number) represent an even decimal digit from zero to 8 and are the signals from the divide-by-5 outputs of a 7490 decade counter. The three most significant bits ( $nF$ ,  $nE$ ,  $nD$ ) are the outputs of a divide-by-8 counter configuration and they represent a decimal digit from zero to 7. Thus, the score for each car runs from 00 to 78, counting by twos.

Score is detected by sensing that the car crosses a series of "checkpoints" in a certain sequence. These checkpoints are generated on the sync board and are located at appropriate places along the race course (see sync board, Section 2). The detection of coincidence between car and checkpoints in the proper sequence is provided by a 9312 IC, an eight-input multiplexer. The circuit is shown in Figure III-A. Depending on the least significant digit (3 bits) of score, the next checkpoint to be crossed is selected.

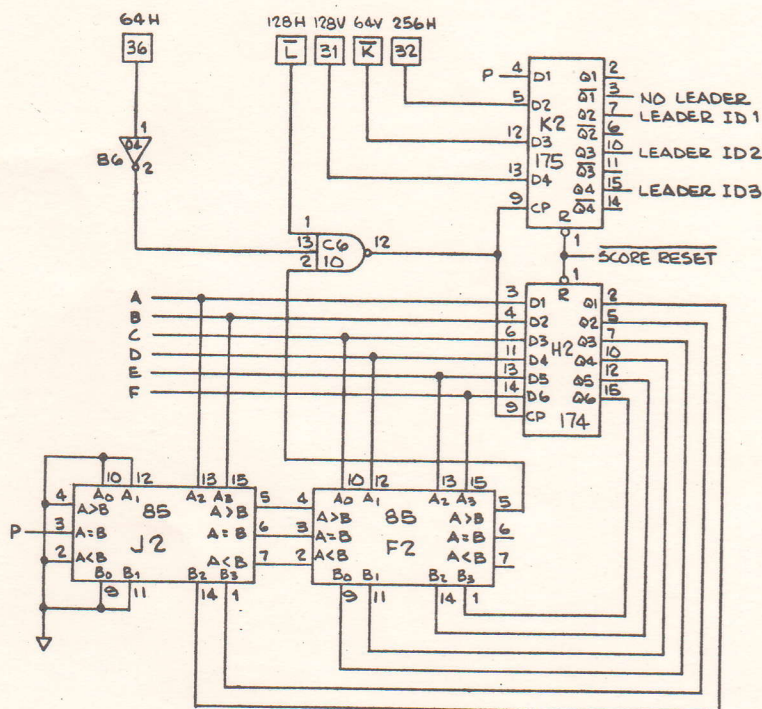
From the score counters, the score bits are time-multiplexed in another stage of six 9312s so that each score is present at the output of the multiplexers when it is to be displayed on the screen. This time-multiplexed score information is then fed into two circuits -- the leader detector circuit and the seven-segment decoder.

The leader detector circuit operates as follows (see Figure III-B). At the start of a game, all of the score counters and the latches K2 (74175) and H2 (74174) are reset. H2 contains the high score bits and K2 contains a code telling which car first achieved that score. At each video frame all the scores are compared to the highest score by comparing the multiplexed score bits (A through F) with the outputs of H2. This comparison is made in the digital comparators J2 and F2 (7485). When the incoming score exceeds the previous high score, an output of the comparator is gated with some sync signals in C6 (7410) to avoid race conditions. The resulting signal clocks H2 and K2 to store the new highest score and new-leader code.



LEAST SIGNIFICANT SCORE BITS			SELECTED CHECKPOINT
nC	nB	nA	
0	0	0	CH. PT. 1
0	0	1	2
0	1	0	3
0	1	1	4
1	0	0	CH. PT. 5

FIGURE III-A: SCORE DETECTION CIRCUIT



LEADER ID SIGNALS			NO LEADER SIGNAL	CAR IN LEAD
3	2	1		
X	X	X	1*	NONE
0	0	0	0	1
0	0	1	0	2
0	1	0	0	3
0	1	1	0	8
1	0	0	0	4
1	0	1	0	7
1	1	0	0	6
1	1	1	0	5

\* NO LEADER CONDITION IS PRESENT ONLY AT START OF GAME.

FIGURE III-B: LEADER DETECTOR CIRCUIT

The time-multiplexed score is further multiplexed into two digits in H1 (9322) and this information is fed into a seven-segment decoder, F1 (7448). A digital comparator, L2 (7485), is used to make the score of the leader blink by exciting the blanking input of F1 when the LEADER I.D. code matches the time-multiplexed sync signals (256H, 64V, 128V).

Four 74153s (A1, B1, D1, E1) and three 9312s (A2, B2, C2) are the function generators that translate the multiplexed seven-segment data into score video information. E1 and B1 form the seven-segment characters for scores 1, 2, 5, and 6. E1 (74153) forms the vertical segments b, c, e, and f. B1 (74153), together with a blanking signal from B2 (9312), forms the horizontal segments a, d, and g. These are ORed in C1 (7432): C1-11 has the video for scores 1 and 2; C1-8 has the video for scores 5 and 6. Similarly, D1 (74153) forms the vertical segments for scores 3, 4, 7, and 8, and A1 (74153) and A2 (9312) produce the horizontal segments. These are again ORed in C1 (7432): C1-6 has the video for scores 3 and 4; C1-3 has the video for scores 7 and 8. These separate video signals are remultiplexed in C2 (9312), where the score window from the sync board is used to gate the information through at the proper time.

This composite score video signal is then demultiplexed in D6 (9301) into eight separate score video signals. These signals are then ORed with the car signals in E6 and F6 (7408), ANDed with the video function SIGNAL, and sent out to the television as video information. There is some slight additional circuitry that creates video test and alignment functions on the white video output line (car 3). These functions are: normal operation, all-white screen, all-black screen (no video), and a dot pattern for convergence adjustment. They may be selected by attaching the appropriate jumper as shown on the schematic.

#### 2-4. COIN CONTROL PRINTED CIRCUIT BOARD

The coin control circuit board contains the circuitry for the following functions:

1. Coin detection and credit latches.
2. Game control, game timer.
3. Car reset circuitry.

The heart of the coin detection and credit latch circuitry is the LM339 quad analog comparator. This device is used to sense a proper coin input and to latch and register credit for that coin until the end of the game. Normally open and normally closed coin inputs are brought into an inverter latch where the coin signal is debounced.

When the coin switch is closed, the 0.1  $\mu$ f capacitor on the non-inverting (+) terminal of the LM339 is discharged through a 68K resistor. If the switch is closed for more than 12 msec, the voltage at the non-inverting terminal of the LM339 will go negative with respect to the inverting (-) terminal voltage (ref. Voltage). When this occurs, the output of the LM339 changes state. Through positive feedback, this state is latched into the comparator. If the coin switch is closed for less than 6 msec, the capacitor will not discharge sufficiently to allow the output of the LM339 to change state. Between 6 and 12 msec, the latching may or may not take place, depending on device tolerances. The typical duration of coin pulse needed to toggle the latch is 10 msec. At the end of the game, or in case of a power or static interrupt, the REF voltage at the inverting (-) comparator input is pulled low. The output again goes high, and the 0.1  $\mu$ f capacitor is quickly recharged through a diode.

The game control circuitry determines which cars are enabled in all modes of operation. There are three basic modes of operation:

1. Unattended (automatic).
2. Attended with coin inputs, remote start.
3. Attended-with remote enable and start.

In the attended mode, the remote panel is not used. In the first attended mode the start button on the remote panel is used, but the enable switches are not (they should all be turned to the "off" position). The second attended mode assumes manual collection of money by the attendant. The lockout coil switch on the power supply board should be turned to "off" so that no money can be put into the machine. The attendant then enables any or all of the cars by turning the appropriate switches on the remote panel and pushing the start button.

The coin board determines whether it is in the attended or unattended mode by seeing if the remote panel is connected to it. If the remote panel is connected, then the  $\overline{\text{REMOTE}}$  signal will be low (provided by a grounded jumper in the remote connector). Otherwise  $\overline{\text{REMOTE}}$  will be high or pulled up. This signal goes to a 9322 quad two-input multiplexer (D2) that selects the proper control functions for required mode of operation.

In the unattended or automatic mode of operation, if any coin has been put into the machine, CREDIT is high (from CREDIT 1, IC C5, 7430). When CREDIT goes high, the game counters K1, J1 (7493s) start counting. After eight pulses from the 1 SEC oscillator, L1 (555), the PLAY 1 latch H1-10 and K1-13 (7402) changes state and the game starts.

If the game is in the play mode and car n has credit (Qn is high), then ATTRACT n will go low (ICs H4 and F4, 7400). This enables the controls on car n so that it may be driven. During the eight-second waiting period, the  $\overline{\text{SCORE RESET}}$  signal is driven low by C2-8 (7410). At the end of the game, after 128 pulses from the one-second clock, the END GAME latch H1-4 (7402) produces a pulse to reset the credit latches.

In the attended mode, the START signal clocks the CREDIT 2 flip flop at C3-11 (7474). If any coin latches are set or remote enable switches are in the "on" position, CREDIT and PLAY will go high. The score will be reset by the START signal. At the end of the game, the END GAME latch (H1) will reset the CREDIT 2 flip flop (C3) through C2-4 (7410).

The car reset circuitry resets each car at the start of the game and if it travels out of bounds. COMP RESET CLOCK shifts a series of high signals through the 8-bit parallel out-shift register, C4 (74164). As the high signal ripples through the shift register on consecutive pulses from COMP RESET CLOCK, the individual car reset clocks (CRC 1 through CRC 8) are produced. These are used to clock the car reset flip flops A3, A4, B3, B4 (7474s). If coin switch n is closed or if car n is out of bounds, the set input of car reset flip flop n will be pulsed low, and CAR RESET n will go high. If the game has credit but car n does not, then the D-input to the reset flip flop will be held high and CAR RESET n will be continuously clocked high by CRC n. As long as the CAR RESET signal is high, car n will disappear. Then credit for car n is established, CAR RESET n will be clocked low, and the car will reappear at the starting line.

## 2-5. CAR PRINTED CIRCUIT BOARD

The car board contains the following circuits:

1. Car steering processor.
2. Car acceleration processor.
3. Car motion counters.
4. Car video processor.
5. Crash and collision detection.
6. Sound synthesis and power amp.

The steering processor is a two-stage up/down counter (E2 and F2, 74193s) with decoding circuitry in front (E3, 7474, and E1, 7300) and the skid detector (C1, 7400) and latch (D1, 7475) after. When the circuit is enabled (attract goes low), the decoder circuitry translates a quadrature signal from the steering board into direction and rate of turn information -- see Figure V-A).  $\overline{VTC}$  on E3-13 (7474) serves as a maximum turning rate signal.

When there is a collision between cars, E1-6 (7400) forces the car to turn for the duration of the COLLISION signal at the maximum turning rate. The red LEDs on the outputs of H4-10, 12 (7414) serve only as visual indicators of the operation of the quadrature signal from the steering board. E2 and F2 (74193s) divide the rotation pulses of the decoder circuit by 128. The last five bits of this division become the rotation code R4-R0\* that represents a specific car orientation. Binary 00000 is straight up; the count continues clockwise through 32 consecutive positions up to binary 11111, which is just left of straight up. The skid latch D1 (7475) contains the direction code\* of the car or D4-D1 (the lowest-order direction bit is R0).

\*The rotation code R4-R0 tells in which direction the car is pointed; the direction code D4-D1, R0 tells the direction of motion.

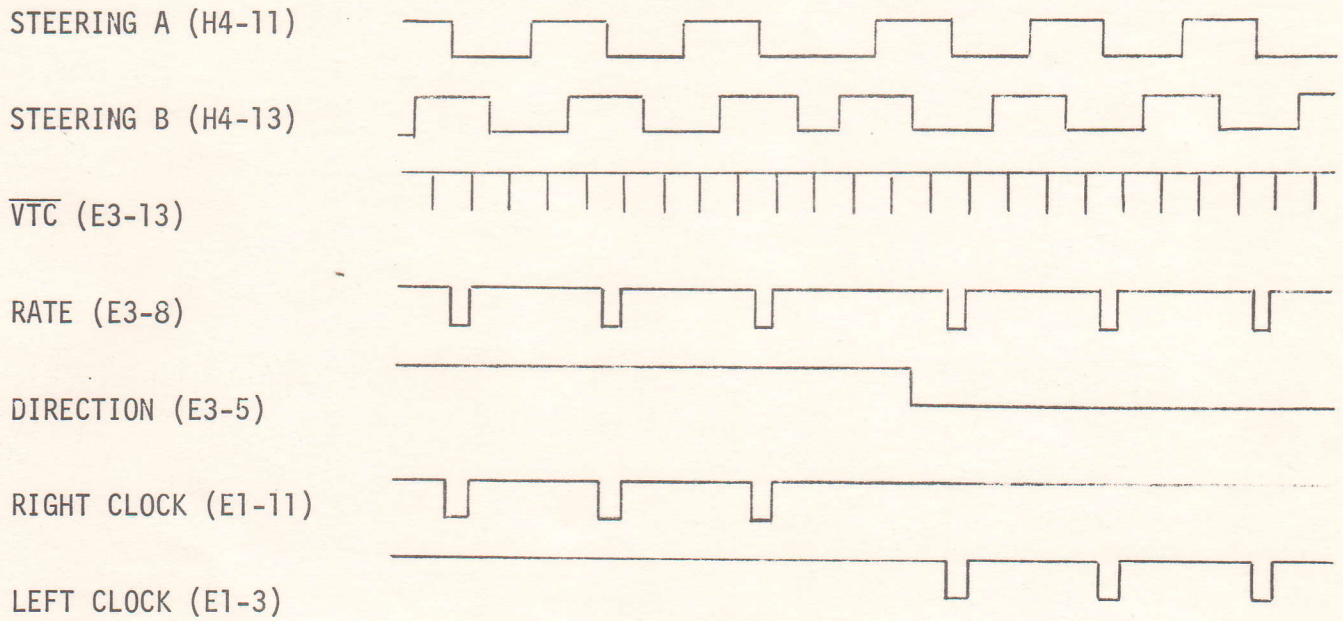
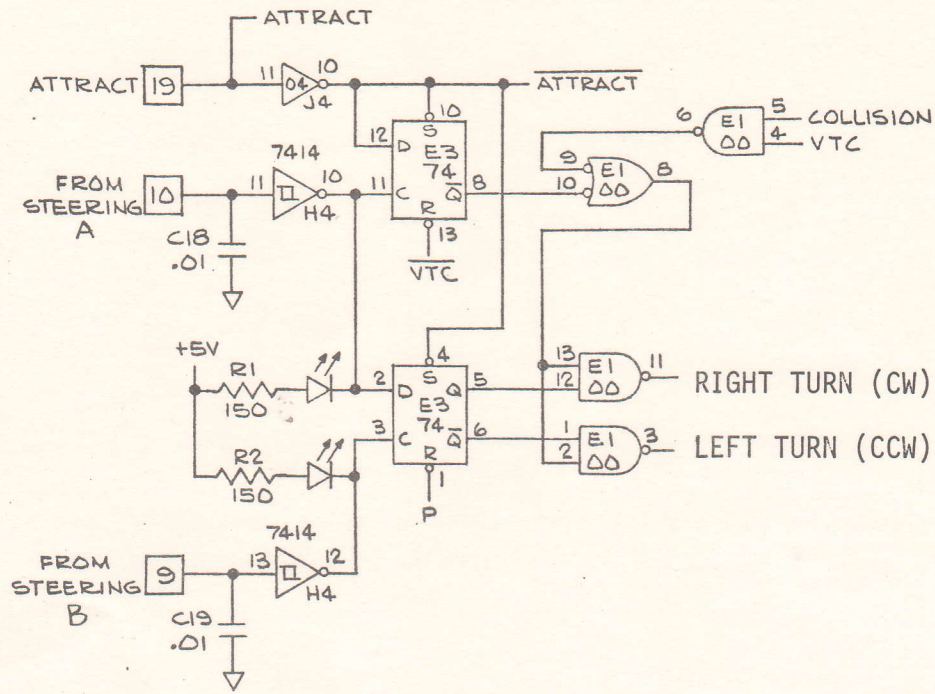


FIGURE V-A STEERING DECODER CIRCUIT WITH SAMPLE WAVEFORMS

This code differs from the rotation code only when the car is in a skid. The skid condition is determined by C1 (7400). If the car is at quarter-speed or greater when the brake is depressed, or if the car collides with another car, a skid condition exists, and  $\overline{\text{SKID}}$  goes low to latch the last rotation into D1.

The acceleration processor consists of some preprocessing circuitry (D3, 74153) to create acceleration and deceleration pulses, an up/down counter (C2, 74193) to count these pulses and keep track of the speed, and a circuit (D2, 7485) that translates this speed information into speed pulses in the G0 signal.

With only the gas pedal depressed, the car will accelerate at the rate of one unit per 16 frames (signal from C3-6, 7420 gated with 8F at D3-4). With no pedal depressed or with only the brake depressed, the car will decelerate at the rate of one unit per eight frames. With both gas and brake pedals depressed, the car will decelerate one unit per 16 frames. The up/down counter, C2 (94193) with a fifth stage A1-5 (7407), counts these acceleration units. At speed 14 (binary 11110), C3-8 (7420) gates out any further acceleration pulses and maximum speed is attained. At speed zero, in the attract mode, or after a crash into the pylons, the STOP signal resets the counter outputs to zero. The digital comparator D2 (7485) compares the speed code (SPEED 5-SPEED 1) against frame bits (1F-16F) from B1 (7493) and A1-3 (74107). The result is shown in Figure V-B.

The motion circuit operates on the principle of the Atari patented "slipping counter" method of moving objects on a raster scan display (patent no. 3793483). The motion counters count in parallel with the sync counters on the sync board. In order to move vertically, the vertical motion counter K3 (9316), L3 (9316), and J1-5 (74107) is forced to count short (up) or long (down) with respect to the sync vertical counter. Similarly, the horizontal motion counter H3, J2, H2 (9316s) causes horizontal motion by counting short (left) or long (right) with respect to the sync horizontal counter.

Each frame in which the G0 signal is high causes the motion counters to make a unit move in the direction specified by the direction code (D4-D1, R0). To move faster, G0 is high more often. A table of approximate sine/

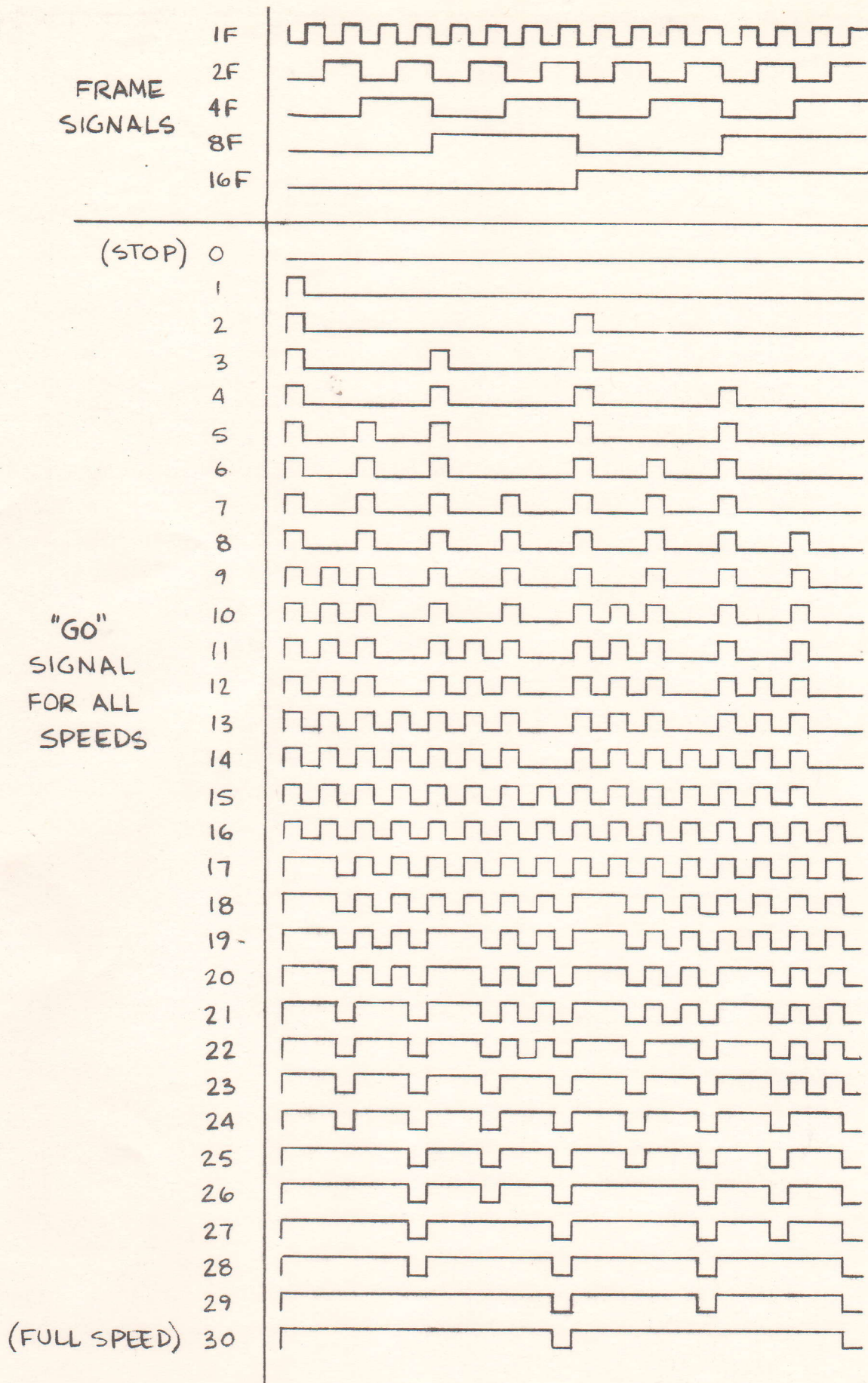


FIGURE V-B: "GO" SIGNAL (SPEED PULSES)

cosine values for the 32 different directions is contained in a PROM (K4, 003187). This motion code goes to the motion counters when GO enables the PROM. The horizontal motion code is gated with  $\overline{\text{VRESET}}$  in F3 (7402). This limits the long or short count to one line of the frame. A table of the horizontal and vertical motion codes for all 32 directions, as seen at the load inputs of H3 and K3 (9316s), is given in Table V-C. The horizontal counter is clocked at the system clock rate of 14.318 MHz. In order to maintain the same amount of motion resolution vertically as well as horizontally, the vertical motion counter is clocked by VCLOCK. This signal is two pulses per line and is gated out during vertical sync so that the vertical motion counter requires one less stage. Using the terminal count outputs of the counters, a car window is formed of 16 clock pulses by 8 lines.

The video processor uses line, column, and rotation information to address video information in a 4K ROM, K2 (003186). Further column information from the horizontal motion counter is used to multiplex the ROM outputs to a single line from L2 (9312). This video is then clocked into J1-3 (74107) to remove edge effects and race problems. The result is the car video information.

When the car collides with another car, L1 (555) produces a half-second pulse during which the car will skid and spin. If the car crashes into the pylons, a low pulse is made at  $\overline{\text{CRASH}}$  (H1-8), 7400). This signal stops the car and triggers the crunch sound.  $\overline{\text{CRASH SEQ}}$  remains low and prevents further crashes until the car is no longer in contact with the pylons.

The sounds that are synthesized are the MOTOR SOUND, HORN, CRUNCH (crash), and SCREECH (skid). The MOTOR SOUND is produced by performing a D/A conversion on the speed code (SPEED 5-SPEED 1), and using the result to drive a current source that controls the oscillation frequency of B3 (555). This frequency is divided by both 6 and 4 and various divisions are mixed. The HORN is a 760-Hz signal gated by the horn button input. CRUNCH is made by gating noise from a noise source (D5-1, LM324) with a discrete one-shot, triggered by  $\overline{\text{CRASH}}$ . The SCREECH sound is formed by an op amp (D5-14, LM324) configured as a free-running multivibrator. This oscillator is also perturbed by the noise source to give it a

DIRECTION CODE D4-D1, R0	HORIZONTAL INPUTS (H3) D C B A	VERTICAL INPUTS (K3) D C B A
0 0 0 0 0	0 1 0 0	1 1 0 0
0 0 0 0 1	0 0 1 1	1 1 0 0
0 0 0 1 0	0 0 1 1	1 0 1 1
0 0 0 1 1	0 0 1 0	1 0 1 1
0 0 1 0 0	0 0 0 1	1 0 1 1
0 0 1 0 1	0 0 0 1	1 0 1 0
0 0 1 1 0	0 0 0 1	1 0 0 1
0 0 1 1 1	0 0 0 0	1 0 0 1
0 1 0 0 0	0 0 0 0	1 0 0 0
0 1 0 0 1	0 0 0 0	0 1 1 1
0 1 0 1 0	0 0 0 1	0 1 1 1
0 1 0 1 1	0 0 0 1	0 1 1 0
0 1 1 0 0	0 0 0 1	0 1 0 1
0 1 1 0 1	0 0 1 0	0 1 0 1
0 1 1 1 0	0 0 1 1	0 1 0 1
0 1 1 1 1	0 0 1 1	0 1 0 0
1 0 0 0 0	0 1 0 0	0 1 0 0
1 0 0 0 1	0 1 0 1	0 1 0 0
1 0 0 1 0	0 1 0 1	0 1 0 1
1 0 0 1 1	0 1 1 0	0 1 0 1
1 0 1 0 0	0 1 1 1	0 1 0 1
1 0 1 0 1	0 1 1 1	0 1 1 0
1 0 1 1 0	0 1 1 1	0 1 1 1
1 0 1 1 1	1 0 0 0	0 1 1 1
1 1 0 0 0	1 0 0 0	1 0 0 0
1 1 0 0 1	1 0 0 0	1 0 0 1
1 1 0 1 0	0 1 1 1	1 0 0 1
1 1 0 1 1	0 1 1 1	1 0 1 0
1 1 1 0 0	0 1 1 1	1 0 1 1
1 1 1 0 1	0 1 1 0	1 0 1 1
1 1 1 1 0	0 1 0 1	1 0 1 1
1 1 1 1 1	0 1 0 1	1 1 0 0
STOP CODE	0 1 0 0	1 0 0 0

TABLE V-C: UNIT MOTION CODES INTO MOTION COUNTERS

"gritty" quality, and it is turned on and off by the SKID signal F4-8 (7406); the sounds are then mixed, buffered, and fed into a digitally controlled four-position master attenuator. The audio volume trimpot should be adjusted so that with the horn turned on, the signal at D5-8 (LM324) is 0.75 volt peak to peak. Finally, the audio signal is amplified by the LM380 power amp.

## 2-6. POWER SUPPLY PRINTED CIRCUIT BOARD

The power supply board has the circuitry for the unregulated supplies and for driving the coin mechanism lockout coils.

The unregulated supplies are both full-wave center-tap rectified configurations. The +9V supply may vary from 7.5V to nearly 11V, depending on line voltage at the transformer primary and the load current. It supplies the power for the +5V regulators on the logic PCBs. The +20V supply may vary from 8V to 22V, again depending on line and load conditions. It supplies power for the audio electronics on the car boards and for the lockout coil drivers.

The lockout coil driver should be active when the  $\overline{LOn}$  signal is high, i.e., when car n has credit. This turns transistor Qn on, powers the coil of relay Kn, and applies 20V to the lockout coil on coin mechanism n (activating the coil disengages the lockout function). The diode across the relay coil shorts inductive spikes of turn-off. The diode from the emitter of the transistor to ground increases noise immunity by raising the turn-on voltage of the transistor. The 100-ohm resistor from the relay coil to +20V is a current limit resistor to limit the dissipation in the relay and the transistor.

## 2-7. OPERATOR ADJUSTMENTS AND OPERATING INSTRUCTIONS

### 1. Adjustments

There are several adjustments available to the operator. These are:

- a. Master volume switch (sync PCB).
- b. Game time adjustment (coin control PCB).
- c. Lockout coil power switch (power supply PCB).

The master volume switch adjusts the overall audio volume level to one of four possible levels. It is located on the sync PCB as shown in Figure I-A. Clockwise adjustment decreases volume; counterclockwise

adjustment increases the sound level. All of the car PCBs have their own separate volume controls. These are preset at the factory for balanced output levels and should be changed only by service personnel making repairs or adjustments to the car PCBs.

The game timer potentiometer is located on the coin control PCB in the upper corner near the front of the card rack. It adjusts the length of the game from approximately 75 seconds to nearly three minutes. Game time is increased by turning the pot downward or clockwise as seen from the front of the card rack.

The lockout coin power switch is located near the edge connector of the power supply PCB. If switched to the "off" position, all of the coils will go into the coin lockout mode, and the machine will not accept coins. This feature is useful in applications where an attendant collects payments manually and uses the remote panel to control the game. In order to use the coin mechanisms in the machine, this switch must be in the "on" position and power must be on.

## 2. Operating instructions

The unattended or automatic mode: after insuring that the machine is properly assembled and secure, apply power by inserting the power plug into a 105-125 VAC, 60-cycle, three-pronged or grounded receptacle rated for at least 5 amperes (600 watts). It will take a few minutes for the TV monitor to warm up. The game should come on in the attract mode (no sound or car motion). A coin in any slot will increment that coin counter, cause the lockout coil to engage, and reset that car to the starting line. After approximately eight seconds, the game will start (sound will come on and the cars may be driven). All cars that have not received credit will disappear from the TV screen. The eight-second delay allows all players to deposit their money before the game starts. Any player depositing money after the game starts will also get his car reset to the starting line and may play for the remainder of the game. The lockout coil power switch must be on, and the remote panel must be disconnected for this mode of operation.

The attended mode or using the remote panel; with power off (power cord disconnected), remove the side access panel. Guide the remote panel cable through the power cord outlet hole and into the machine. Connect the cable to the mating connector coming from the main harness just left of the card rack. If the coin mechanisms are to be used, the lockout coil power switch should be in the "on" position; it should be off if money will be collected manually. Put the access panel back into place. After insuring that the game is properly assembled and secure and that all toggle switches on the remote panel are in the "off" or downward position, apply power of 105-125 VAC, 60 cycles, 5 amperes, third terminal grounded.

If the coin mechanisms are used for money collection, the game will perform as in the automatic mode, except that to start the game the start button on the remote panel is used. All toggle switches on the remote panel should be in the "off" position at all times in this mode.

If money is collected manually, the cars for which payment has been received are enabled by toggling the appropriate switches on. Optionally, if all cars are to be enabled, the master switch in the center of the remote panel may be switched on. The game may be stopped at any time by disabling all the cars -- if a restart is desired or if a contest for a certain number of laps is desired. To start a game after setting the switches to their proper positions, push the "start" button.

## 2-8. SERVICE AND TROUBLESHOOTING

Indy 800 is sold with spare circuit boards for all boards in the card rack and one spare steering PCB. When inserting circuit boards into the card rack, take the following steps to insure that the game will not be damaged:

1. Be certain that the board is the proper type for that position and that it is not reversed. See Figure I-A for location of board types. Heatsinks should always be at the top of the board and to the right.
2. Be certain that the board is inserted straight into position in the card guides.

3. Pushing gently, wobble the board slightly until it begins to seat into the connector. If it does not begin to seat, recheck steps 1 and 2 and check for warpage of the board. Correct any problem.
4. Applying firm, constant pressure, push the board into place until it is seating fully. The front edge of the board should be flush with adjacent circuit boards. DO NOT use fast, jerky motions, as this could damage the backplane board or the edge connector.

When removing boards, always use the card ejector tool provided with the game. Hook the bolt of the tool into the hole in the uppermost corner of the circuit board. Using the frame of the card rack as a pivot, pull gently up to disengage the card from the backplane (see Figure VIII-A). Remove the ejector tool and pull the card out by hand.

When troubleshooting, the short description of each board in Section 1 should be a great help in quickly locating a problem. Replacing the suspect circuit board with a replacement gives quick verification of the source of the problem. To fix a circuit board, refer to the schematic and technical description provided in this manual. Repair of circuit boards should be attempted only by qualified technical personnel with proper equipment. As an additional aid to maintenance, the system has been designed so that all eight car PCBs are interchangeable. Also, removing one car board will only disable that car, without affecting any others.

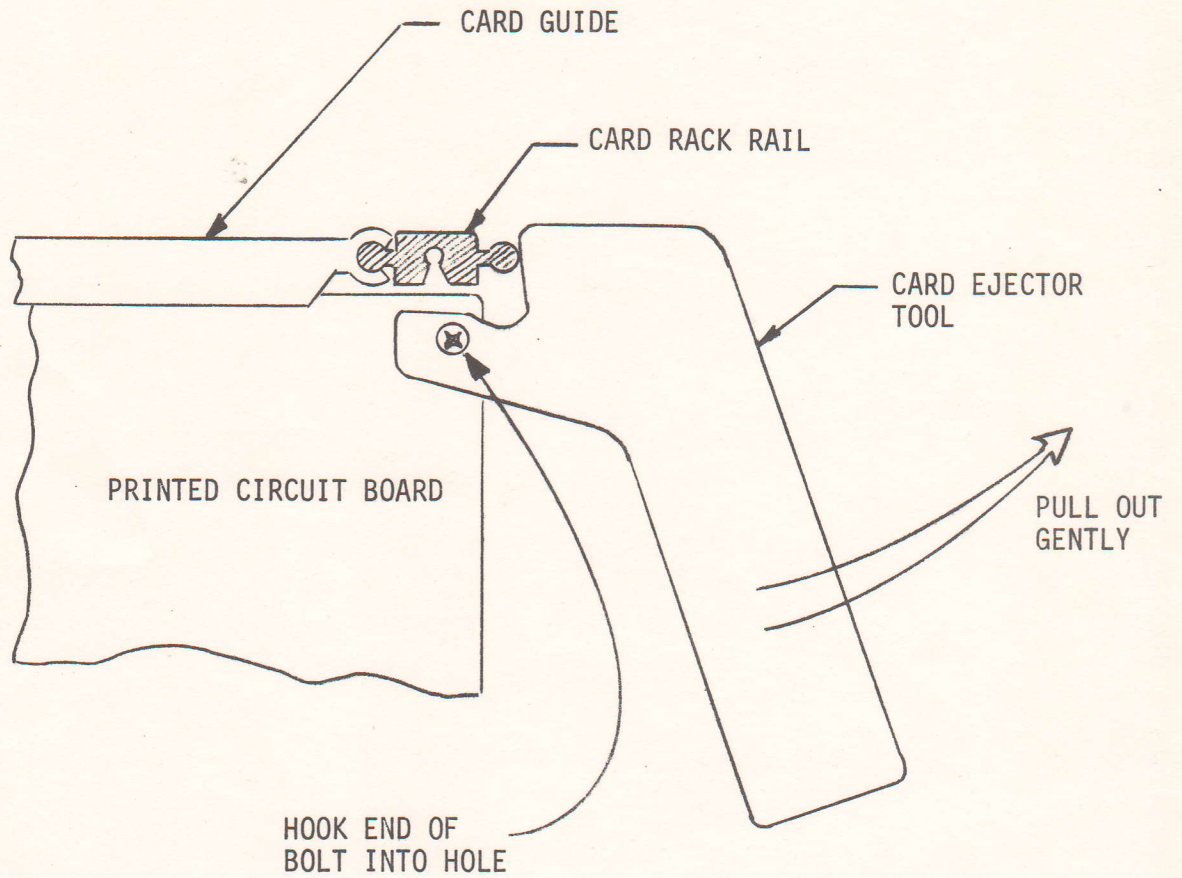


FIGURE VIII-A USE OF THE CARD EJECTOR TOOL

### 3. CUSTOMER SERVICE INFORMATION

#### 3-1. TEST EQUIPMENT

In order to test any Atari PCB, some items such as the logic probe are absolutely essential. Others are desirable and will make the test procedure easier but are not absolutely essential. Some of these instruments are available from the Atari Customer Service Department and these are: the Kurz-Kasch 520 Logic Probe, the Atari Video Probe and the Hewlett-Packard 10529A Logic Comparator. Other instruments that are very useful are the HP 10526T Logic Pulser and the Tektronix 465 Oscilloscope. These items are available through your local electronics supply house.

#### 3-2. REQUIRED MINIMUM EQUIPMENT

The following items are absolutely essential to perform the test procedures presented in this manual:

1. Logic Probe: The logic probe is an instrument designed for checking the outputs of integrated circuits. The Kurz-Kasch Logic Probe, Model No. LP-520, which is available through the Atari Customer Service Department or most large electronics supply houses, is recommended. This logic probe indicates if a signal is logic high, logic low, or changing from one state to another. Consult the operating instructions included with the probe for further details about its operation.
2. Video Probe: The video probe is a very simple but extremely useful device and consists of two test clips, a length of rubber-coated, test lead wire, and a 4.7K,  $\frac{1}{4}$ -watt carbon resistor. Video probes may be obtained from the Atari Customer Service Department or, if necessary, they can be assembled from standard components available at all electronics supply houses.

### 3-3. OPTIONAL EQUIPMENT

It is possible to find 90% of the possible PCB computer malfunctions without the following items. However, if a complete set of troubleshooting equipment is desired, Atari recommends:

1. Hewlett-Packard 10529A Logic Comparator

The Hewlett-Packard 10529A Logic Comparator is used to verify correct IC operation. This device simply clips onto in-circuit ICs and instantly displays any logic state difference between the in-circuit test IC and the reference IC in the comparator. Logic differences for each pin of a 14 or 16 dual in-line package are indicated by a lamp on the comparator. If the logic comparator is purchased from the Atari Customer Service Department, it is shipped with 20 preprogrammed reference PCBs. If the device is purchased elsewhere, these PCBs must be specially programmed.

2. Hewlett-Packard 10526T Logic Pulser

The Hewlett-Packard 10526T Logic Pulser is used to stimulate in-circuit ICs so that they are driven to their opposite states. This device is available from the Atari Customer Service Department or can be obtained from most large electronics supply houses.

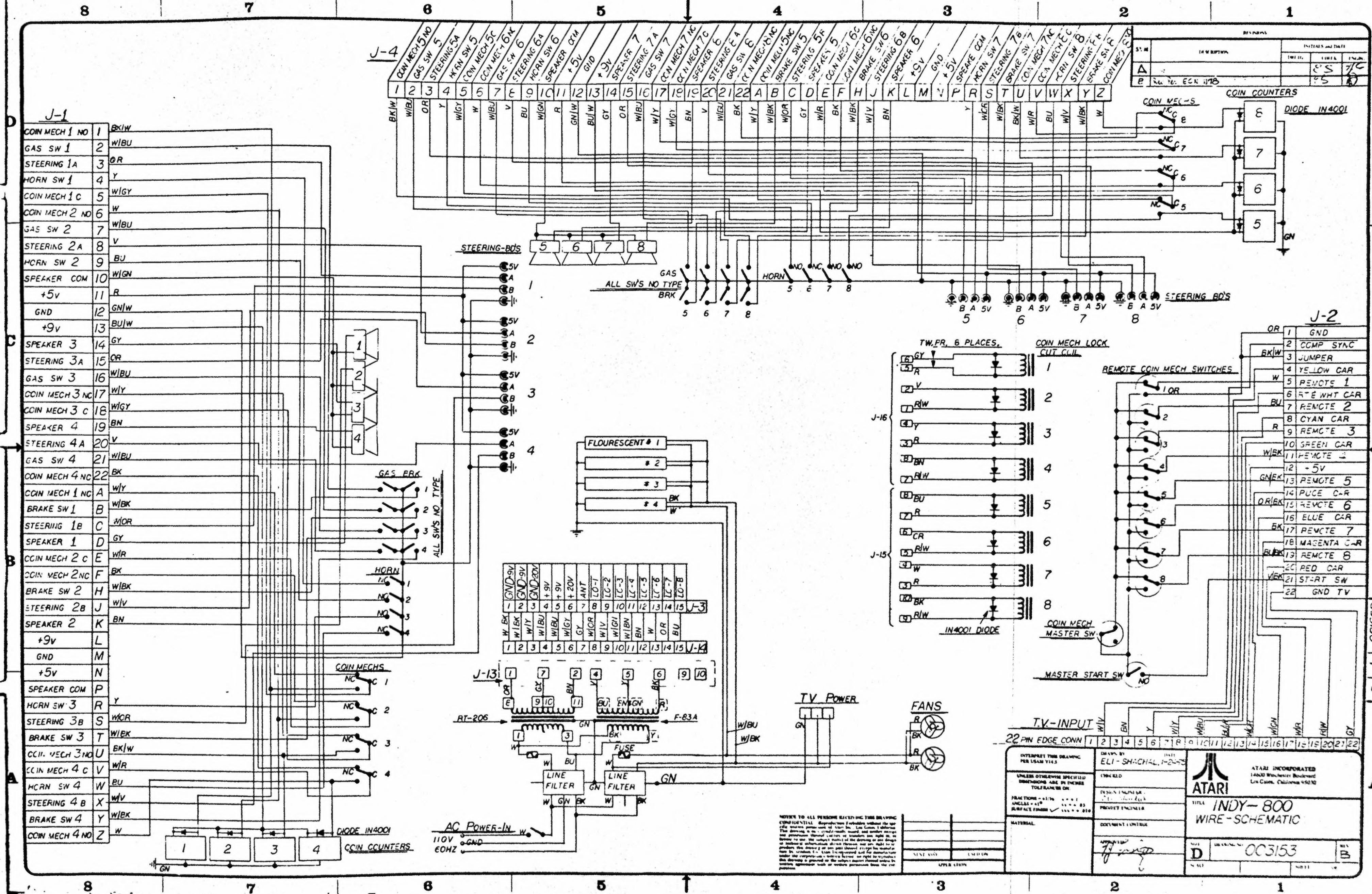
3. Tektronix 465 Oscilloscope

The Tektronix 465 Oscilloscope is used for viewing various wave forms and should be ordered from Tektronix. Consult the manufacturer's operating instructions for details on oscilloscope operation.

## LOGIC TYPE & FUNCTION

<u>TYPE</u>	<u>FUNCTION</u>
7400	QUAD 2-INPUT NAND GATE
7402	QUAD 2-INPUT NOR GATE
7404	HEX INVERTER
74S04	HEX INVERTER
7408	QUAD 2-INPUT AND GATE
7410	TRIPLE 3-INPUT NAND GATE
7413	DUAL NAND SCHMITT TRIGGER
7420	DUAL 4-INPUT NAND GATE
7425	DUAL 4-INPUT NOR WITH STROBE
7427	TRIPLE 3-INPUT NOR GATE
7430	SINGLE 8-INPUT NAND GATE
7448	BCD TO 7-SEGMENT DECODER
7450	DUAL AND/OR GATE (INVERTER/EXPANDER)
7474	DUAL D FLIP FLOP
7483	4-BIT FULL ADDER
7486	QUAD EXCLUSIVE OR GATE
7490	DECADE COUNTER
7492	DIVIDE-BY-2/6/12 COUNTER
7493	4-BIT BINARY COUNTER
74107	DUAL JK M/S FLIP FLOP
74153	DUAL 4-BIT MULTIPLEXER
74157	QUAD 2-INPUT DATA SELECTOR/MULTIPLEXER
74165	PARALLEL-LOAD 8-BIT SHIFT REGISTER
74192	SYNCHRONOUS DECADE UP/DOWN COUNTER

74193	SYNCHRONOUS BINARY UP/DOWN COUNTER
LM380	AMPLIFIER
NE555	TIMER
NE566	FUNCTION GENERATOR
747	DUAL OPERATIONAL AMPLIFIER
RC4136D	QUAD OPERATIONAL AMPLIFIER
MFC6040	VOLTAGE-CONTROLLED OPERATIONAL AMPLIFIER
8098	HYBRID
8103	HYBRID
8099	HYBRID
9311	ONE-OF-SIXTEEN DECODER/DEMULTIPLEXER
9312	8-INPUT MULTIPLEXER
9314	QUAD LATCH
9316	4-BIT BINARY COUNTER
9321	DUAL ONE-OF-FOUR DECODER
9602	DUAL MONOSTABLE MULTIVIBRATOR
74186	ROM



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FRACTIONS - 1/16" +0.001	DESIGN ENGINEER	TITLE
DECIMALS - 0.015" +0.0005	PROJECT ENGINEER	INDY-800 WIRE-SCHEMATIC
SURFACE FINISH - 0.0005" +0.0001	DOCUMENT ENGINEER	003153
MATERIAL	APPROVED	REV B

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Manufacturing



ASSEMBLY TITLE / INDY 800 CABINET TOP - TOP ASSY P/L A002970

PARTS LIST SPECIFICATION

Page 1 of 1

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Mech. Eng. *[Signature]*

Proj. Eng. *Wayne Dauter*

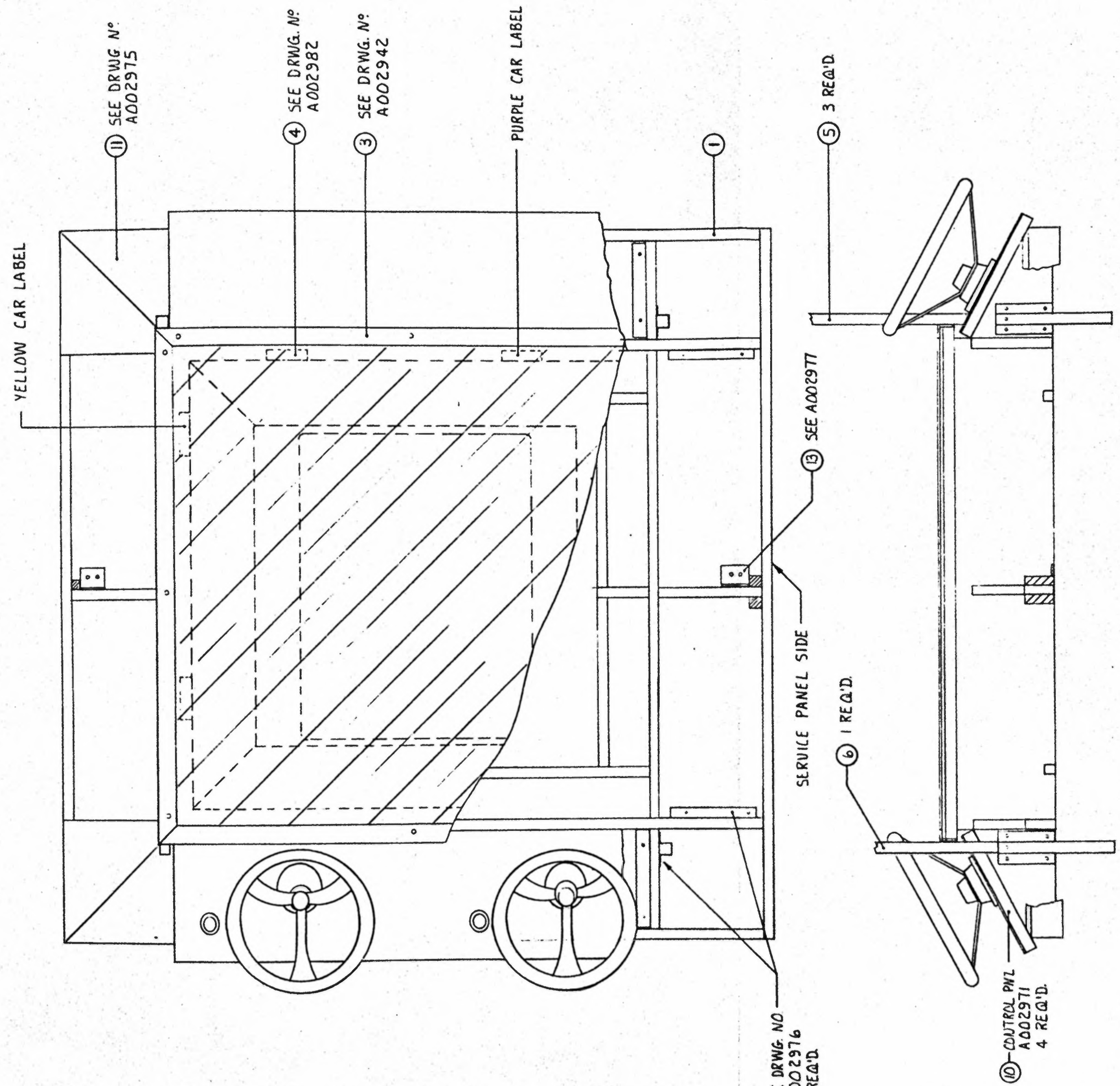
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REV.  
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Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	Production Release	2-3-75	<i>[Signature]</i>				
B	Rev per ECN 1112	2-7-75	<i>[Signature]</i>				
C	Rev per ECN 1121	2/11/75	<i>[Signature]</i>				
D	" " " 1130	2/14/75	<i>[Signature]</i>				
E	" " " 1152	2/26/75	<i>[Signature]</i>				
F	" " " 1226	3/17/75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	A002892	REF.	Cabinet Top Frame Assy
2			
3	A002942	1	Plexiglass cover - Retainer Assy
4	A003337	1	Car Label & Instruction Card Assy
5	002921-01	3	Long Steel Leg
6	002921-02	1	Long Steel Leg with Detail
7			
8			
9			
10	A002971	4	Control Panel Assy
11	A002975	1	ABS Corner Cap Assy
12	A002976	1	Corner Brkt & Leg Brkt & Control Panel Brkt Assy
13	A002977	2	Top - Tie Down Brkt Assy

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E		NS 3-4-75	
F	ECN 1226	WS 3-17-75	B. J.

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	CHECKED INCHES ENGINEER PROJECT ENGINEER <i>Richard Smith</i> DRAWING CENTER	TITLE <b>INDY 800          CABINET TOP-TOP ASSY</b>	
MATERIAL UPPER CABIN	PART ASSY <b>INDY 800</b>	DRAWING NO. <b>D A002970</b>	REV. <b>F</b>

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Manufacturing



ASSEMBLY TITLE / **INDY 800 TOP DISPLAY TOP ASSY** **P/L** A002969

PARTS LIST SPECIFICATION Page 1 of 1

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 Proj. Eng. *Wayne [Signature]* Elec. Eng. *[Signature]* REV. F

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C	Rev per ECN 1121	2/11/75	<i>[Signature]</i>				
D	REV PER ECN 1125	2/17/75	<i>[Signature]</i>				
E	Rev per ECN 1242	3/18/75	<i>[Signature]</i>				
F	Rev per ECN 1271	3/25/75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	A002929	REF	Display Top - Cabinet Assy
2	A002978-01	2	Top Plex Retainer Assy-Small
3	A002978-02	2	Top Plex Retainer Assv- Large
4	A002981	4	Fluorescent Light Assy
5	A003389-01	2	Bottom Plex Retainer Assy-Small
6	A002979	1	Mirror Plex & ABS Retainer Assy
7		1	
8	A002982	1	Alum. Corner Cap & Shorting Leg Assy
9	A003389-02	2	Bottom Plex Tetainer Assy-Large
10	002939	Ref	Display Top - Cover
11	A002930	4	Plexiglas S/S Layout



Manufacturing



ASSEMBLY TITLE / INDY 800 - BASE CABINET TOP ASSY P/L 002967

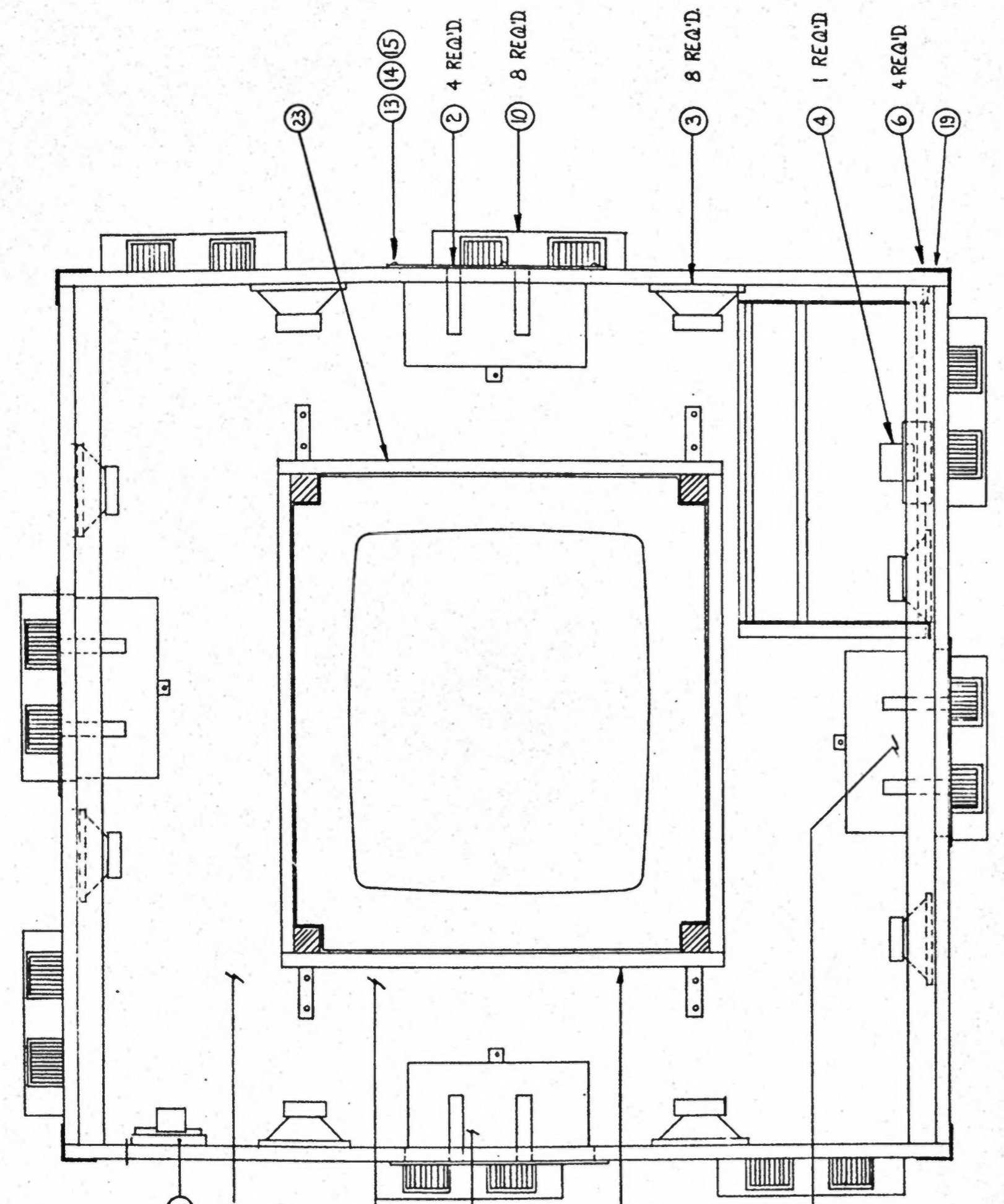
PARTS LIST SPECIFICATION Page 1 of 1

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 Proj. Eng. *Wayne [Signature]* Elec. Eng. *[Signature]* REV. G

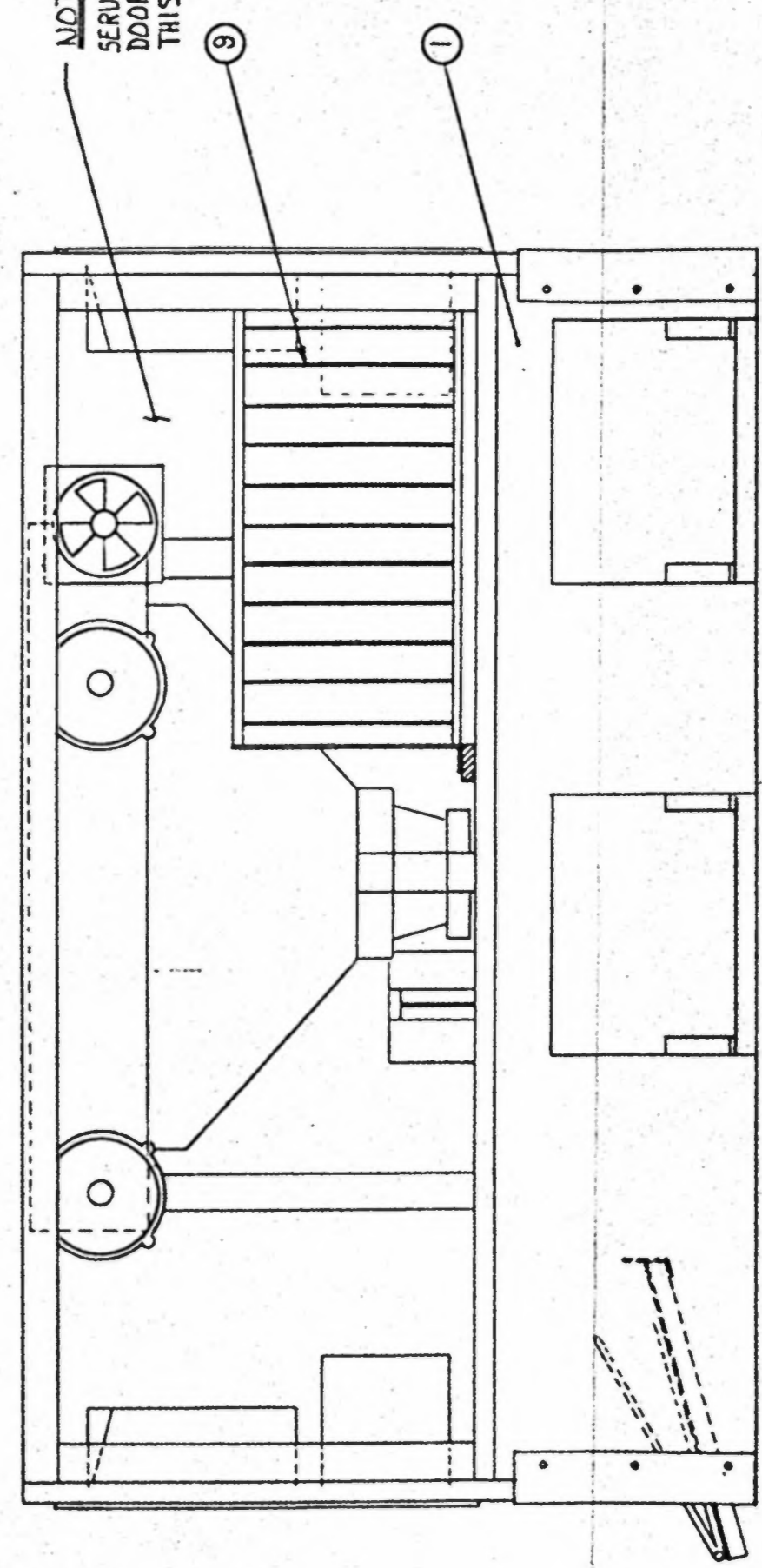
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C	Rev per ECN 1121	2/11/75	<i>[Signature]</i>				
D	" " " 1134	2-14-75	<i>[Signature]</i>				
E	" " " 1153	2/26/75	<i>[Signature]</i>				
F	" " " 1218	3/17/75	<i>[Signature]</i>				
G	" " " 1260	3/24/75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	A002913	REF.	Base Cabinet Assy
2	A003332	4	Coin Door Assy
3	A002960	8	Speaker Assy
4	A003427	2	Cooling Fan Assy
5			
6	002958	4	Corner Protective Brackets
7	A002990	1	Main Harness, Installation Assy
8			
9	A002955	1	PCB Rack Assy
10	A002947	8	Foot Pedal Mounting Assy
11			
12			
13	75-5120N	24	#10-24 x 1 1/4 Carriage Bolts
14	75-014C	24	#10 Flat Washers
15	75-911S	24	#10 Hex Nuts
16	A002985-01	1	Coin Housing, Speaker, Harness, Installation
17		1	
18	A002985-02	3	Coin Housing Harness Installation
19	73-77003	24	3/16 Dia. Alum. Pop-Rivets (Protective Brkts)
20	75-5120N	12	#10-24 x 1 1/4 Carriage Bolts (Foot Pedal Assy)
21	75-010S	12	#10-Flat Washers
22	75-911S	12	#10-24 Hex Nuts
23	A002968	1	T.V. Stand Assy
24	A002991	1	Remote Control Box Assy

8 7 6 5 4 3 2 1



TOP VIEW



SERVICE PANEL SIDE VIEW

NOTE  
SERVICE PANEL  
DOOR - NOT SHOWN  
THIS VIEW

SYM	DESCRIPTION	REVISIONS		
		NO.	DATE	BY
E	ECN 1218	WS	3-4-75	✓
F	ECN 1218	WS	3-17-75	✓
G	ECN 1260	WS	3-24-75	✓

- ⑦ MAIN HARNESS INSTALL. SEE DRWG. NO. A002990 SHEET 1 OF 3
- ⑦ POWER SUPPLY HARNESS INSTALLATION DRWG. NO. A002990 SHT. 2 OF 3
- ⑧ COIN HOUSING HARNESS INSTALLATION - 3 REQ'D. SEE DRWG. NO. A002985-02
- ⑦ LOCK-OUT COIL MAIN HARNESS INSTALLATION DRWG. NO. A002990 SHEET 3 OF 3
- ⑩ COIN HOUSING, SPEAKER HARNESS INSTALLATION SEE DRWG. A002985-01

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FINAL ASSY	DUPLICATE
REV. ASSY	ASSEMBLY
OPERATION	

INTERPRET THIS DRAWING PER ISAS VIEWS	DRAWN BY WS	DATE 3-4-75	<p>ATARI INCORPORATED 1400 Wilshire Boulevard Los Angeles, California 90020</p>
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS: .0176 .0003 ANGLES: .05 .0001 SURFACE FINISH: .0005 .010	CHECKED	DESIGN ENGINEER	
MATERIAL	PROJECT ENGINEER <i>Richard Sinton</i>		<p>TITLE INDY 800 BASE CABINET-TOP ASSY</p>
	APPROVED <i>Richard Sinton</i>	DESIGNMENT SYSTEMS	<p>SHEET D DRAWING NO. A002967 REV. G</p>
	NAME <i>Voite</i>		SHEET 1 OF 1

D  
C  
B  
A

D  
C  
B  
A



ASSEMBLY TITLE

INDY 800 CARD RACK ASSY

P/L 002955

PARTS LIST SPECIFICATION

Page 1 of 1

Drawn

Checked *M.J. 2/20/75*

Mech. Eng. *R. Kallman*

Proj. Eng. *Wayne Suter*

Elec. Eng

REV.  
A

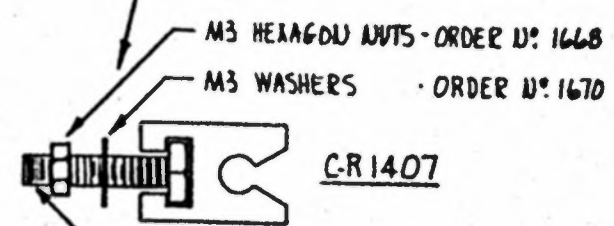
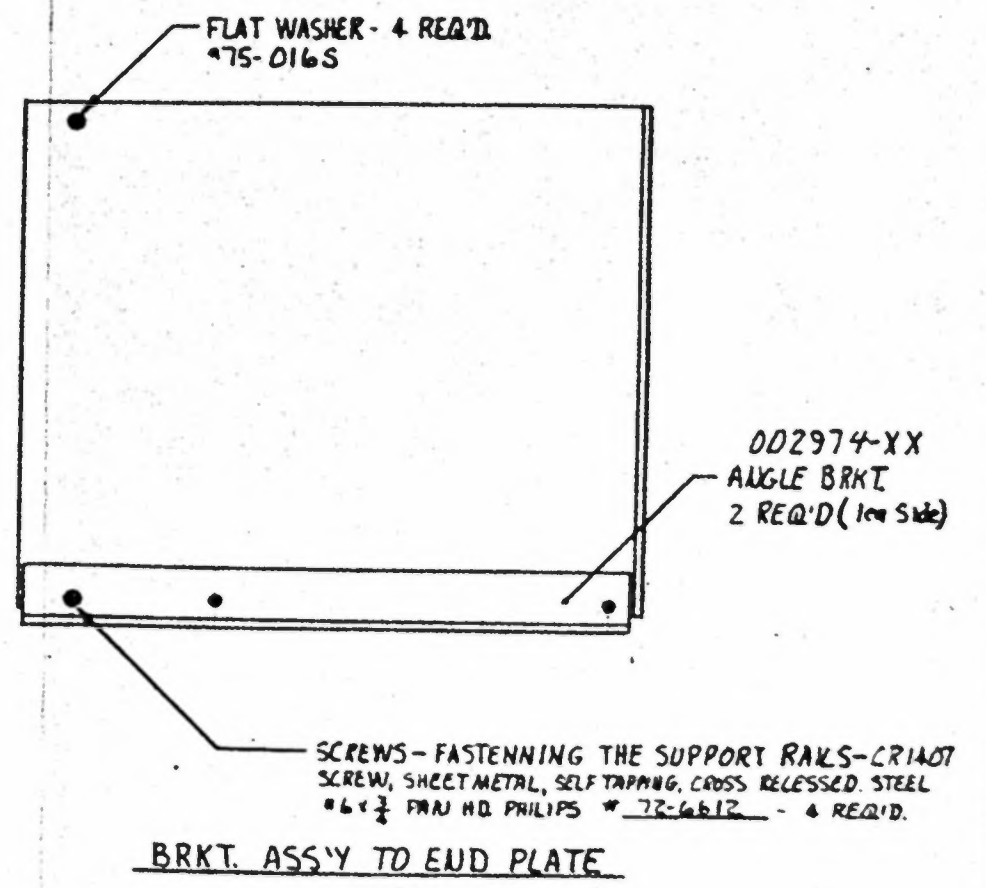
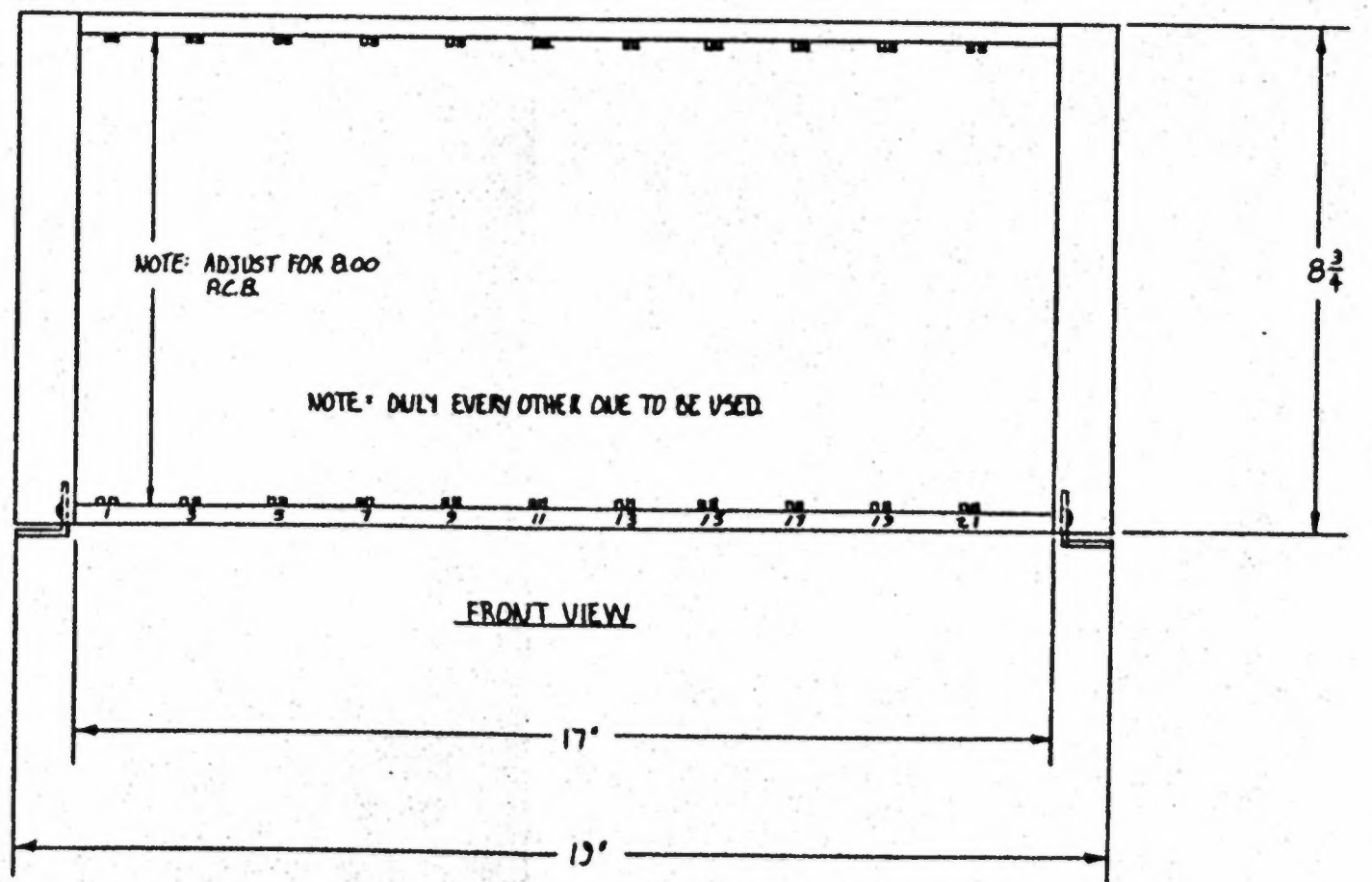
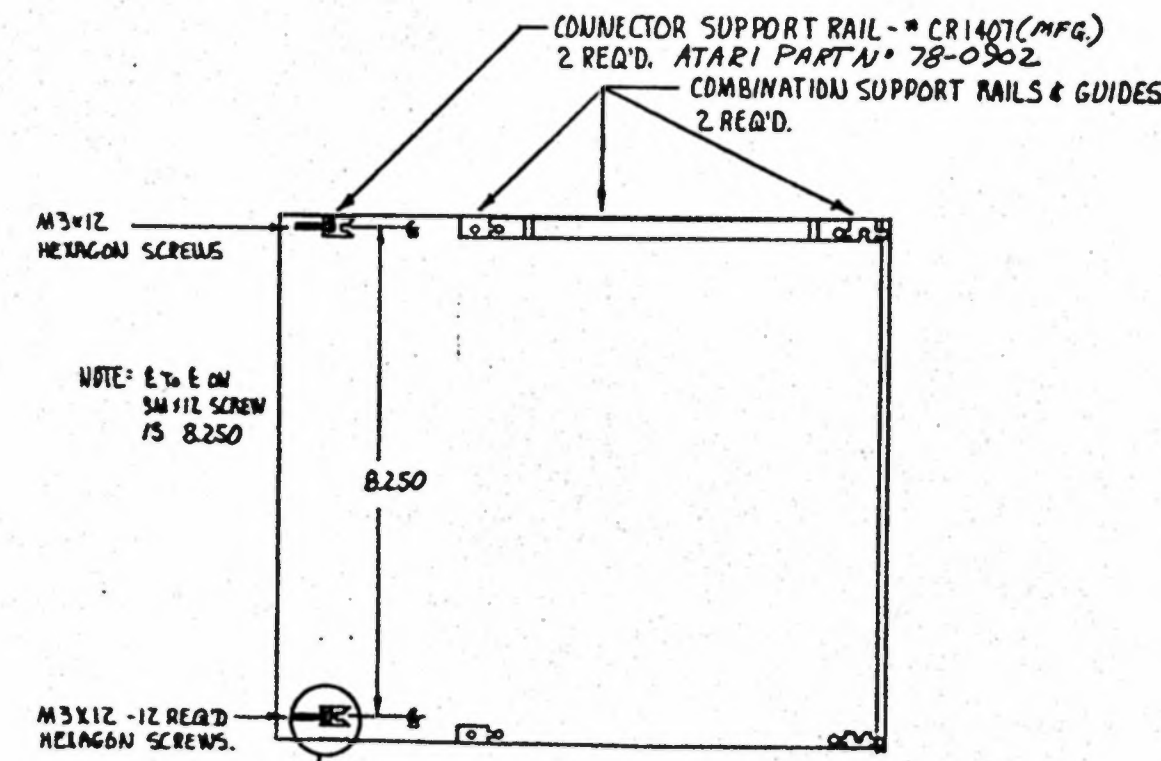
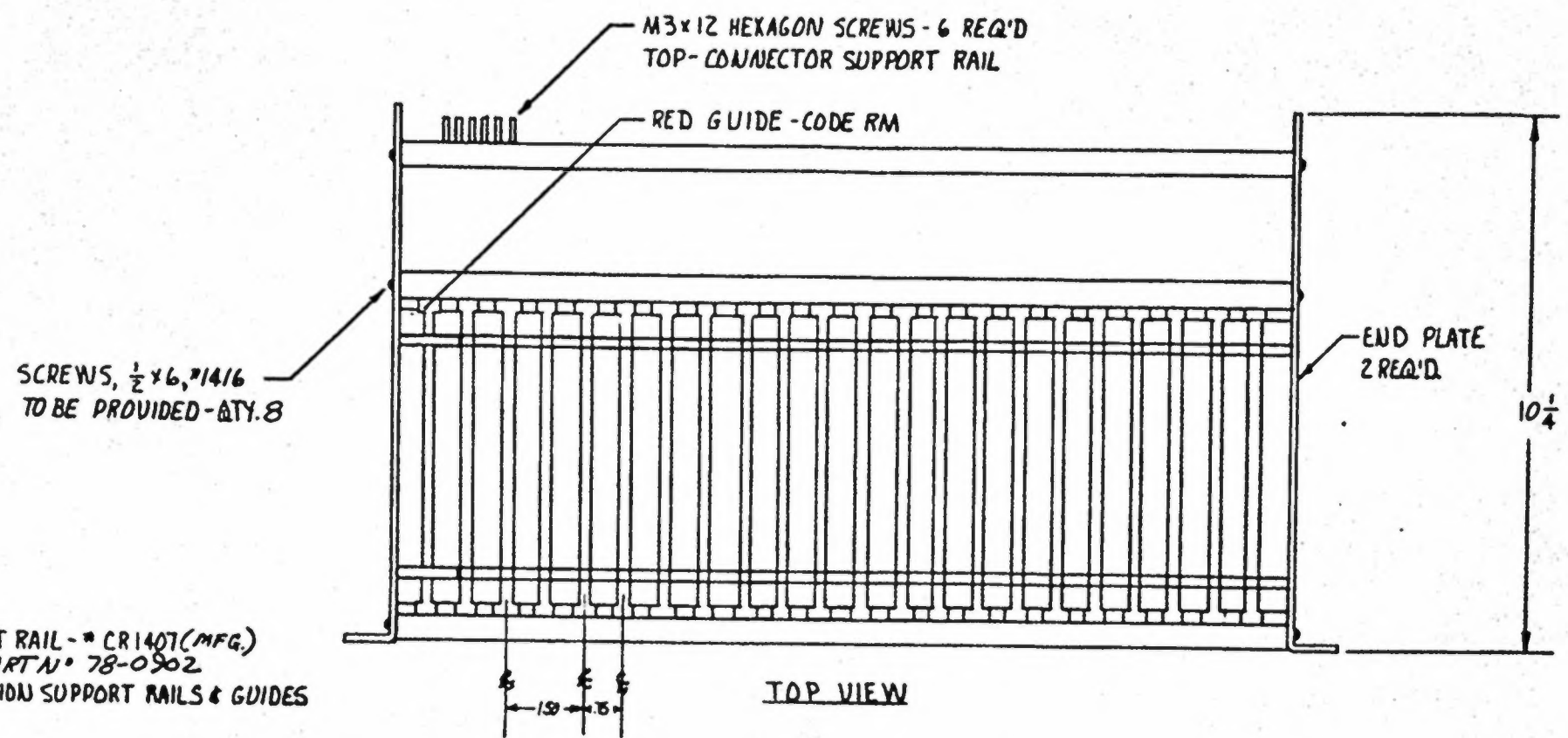
Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	2/18/75	<i>PKK</i>				

Item	Part Number	Qty.	DESCRIPTION
1	78-0901	1	Card Rack Kit CR 2966
2	78-0902	2	Connector Support Rail CR 1407
3	72-6612	4	Self-Tapping Screws, #6 x 3/4 Pan Head Sht. Mtl.
4	002974-01	1	Angle Brkt.
5	002974-02	1	Angle Brkt.

8 7 6 5 4 3 2 1

MFR. PART N°	DESCRIPTION	QTY.
CR2966	CARD RACK KIT:	
	INCLUDES:	
	1. COMBO SUPPORT RAILS & GUIDES	2
	2. END PLATES	2
	3. 6 x 1/2 SCREWS	8
	4. M3 SCREWS, HEX	N/R
	5. M3 NUTS	N/R
	6. M3 WASHERS	N/R
CR1407	CONNECTOR SLOPE RAIL	2

SYM	REV. DESCRIPTION	INITIALS AND DATE		
		DATE	DATE	DATE
A	PROD. REL	WS	2-10-75	



M3x12 HEXAGON SCREWS - ORDER N° 1666

NOTE: NUTS & WASHERS TO BE PROVIDED WITH M3x12 HEX. SCR.

NOTE: PARTS DESCRIBED BELONG TO E.E.C.O.

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INTERPRET THIS DRAWING PER LEAD 7161	DRAWN BY WS. DATE 2-7-75	<p>ATARI INCORPORATED 1400 W. Webster Boulevard Los Altos, California 94024</p>
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	DESIGN ENGINEER	
FRACTIONS - 1/16 1/32 1/64	PROJECT ENGINEER	TITLE
DECIMALS - 0.0005 0.001 0.002 0.005 0.010 0.015 0.030 0.060 0.125 0.250 0.500 1.000	EXHIBIT CONTROL	INDY 800
MATERIAL	APPROVAL	P.C. BD RACK ASSY
		DRAWING N° A002955
		SCALE 1:2

8 7 6 5 4 3 2 1



Job Title RACETRAK STEERING PCB ASSY

Dwg. P/L 000607

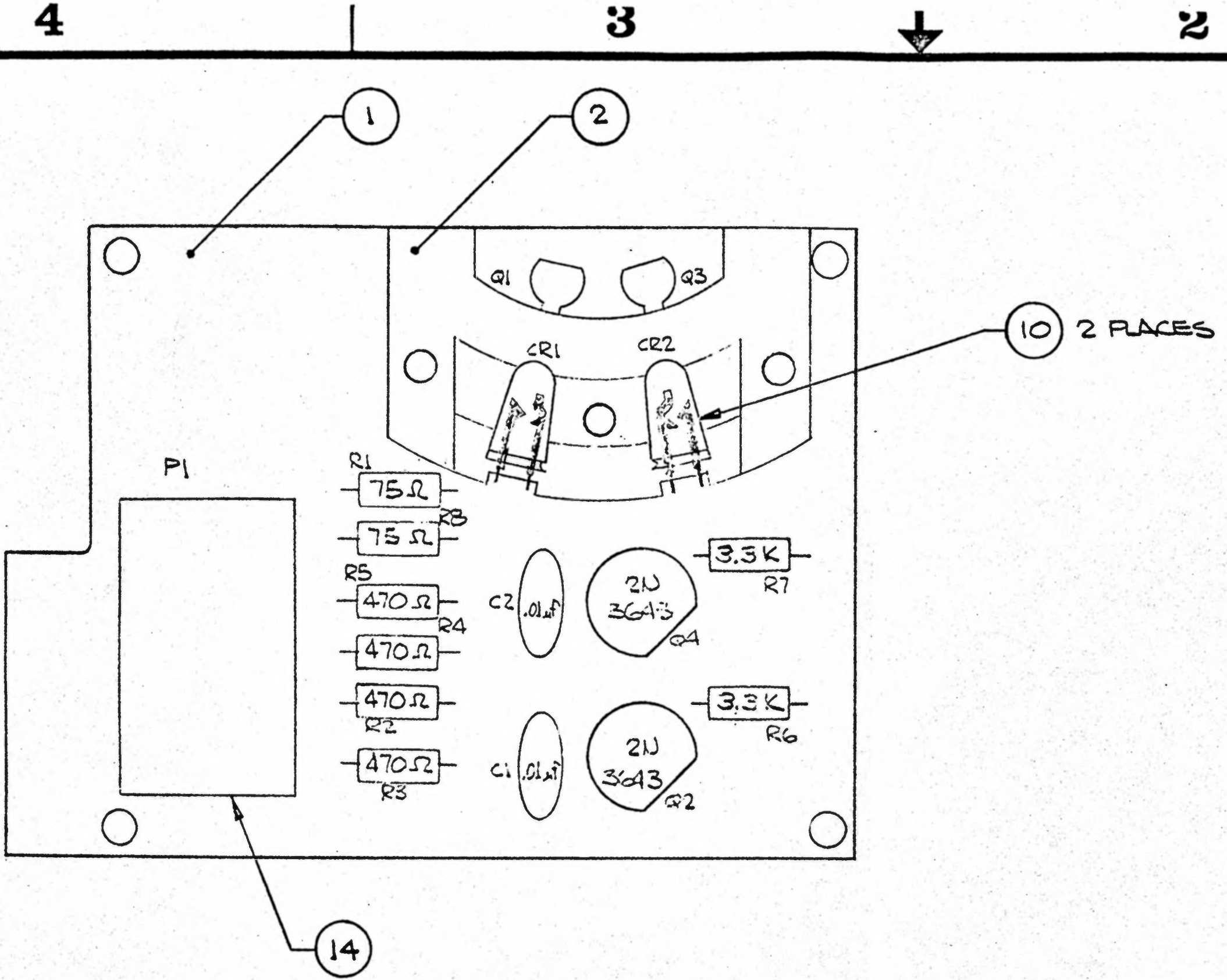
Parts List Specification sheet 1 of 1

Drawn		
Checked	M. J. 5/21/75	Mech. Eng.
Proj. Eng.	J. Donaldson	Elec. Eng. J. Long
		Rev. L

Rev.	Description	Apprv.	Rev.	Description	Apprv.
H	Redesigned	5-8-74			
J	Rev per ECN 397	5/28/74			
K	Rev per ECN 457	6/3/74			
L	Rev per ECN 601	7/15/74			

Item	Part. No.	Qty.	Description
1	000614	1	Printed Circuit Board (E)
2	001092	1	Light Mount
3	001151	Ref	Schematic Diagram
4	11750/10-5750	2	Resistor, Comp., 75 ohm, 1/2 watt, 5%
5	11471/10-5471	4	Resistor, Comp, 470 ohm, 1/2 watt, 5%
6	11332/10-5332	2	Resistor, Comp, 3.3Kohm, 1/2 watt, 5%
7	34104 /27-101103	2	Capacitor, Ceramic, .01uf
8	70006/38-2N5777	2	Transistor, 2N 5777 (Photo Darlington)
9	70000/34-2N3643	2	Transistor, 2N 3643
10	71008/38-ME7124	2	Light Emitting Diode, I.R. ME 7124
11			
12			
13			
14	80089 /79-58005	1	Connector, 10 pin, PC Mount, Amp #1-380991

Handwritten notes: 5, KUSA



REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
H	REDESIGNED	5-3-74		
J	REV. PER ECN 397	5-28-74		
K	REV. PER ECN 457	6-3-74		
L	REV PER ECN 601	7-16-74		

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APPROVED	APPROVED
DATE	DATE
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5	DRAWN BY DC	DATE 5-6-74	 ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	DESIGN ENGINEER	
FRACTIONS = ±1/16 .x = .1 ANGLES = ±1° .xx = .03 SURFACE FINISH ✓ .xxx = .010	PROJECT ENGINEER	DOCUMENT CONTROL	TITLE ASSEMBLY STEERING BOARD
MATERIAL: SEE PL 000607	APPROVED 5/21/74	SCALE 2:1	DRAWING NO. A000607
		SHEET 1 OF 1	REV L



ASSEMBLY TITLE **INDY 800 STEERING WHEEL ASSY** P/L 000598-02

PARTS LIST SPECIFICATION

Page 1 of 1

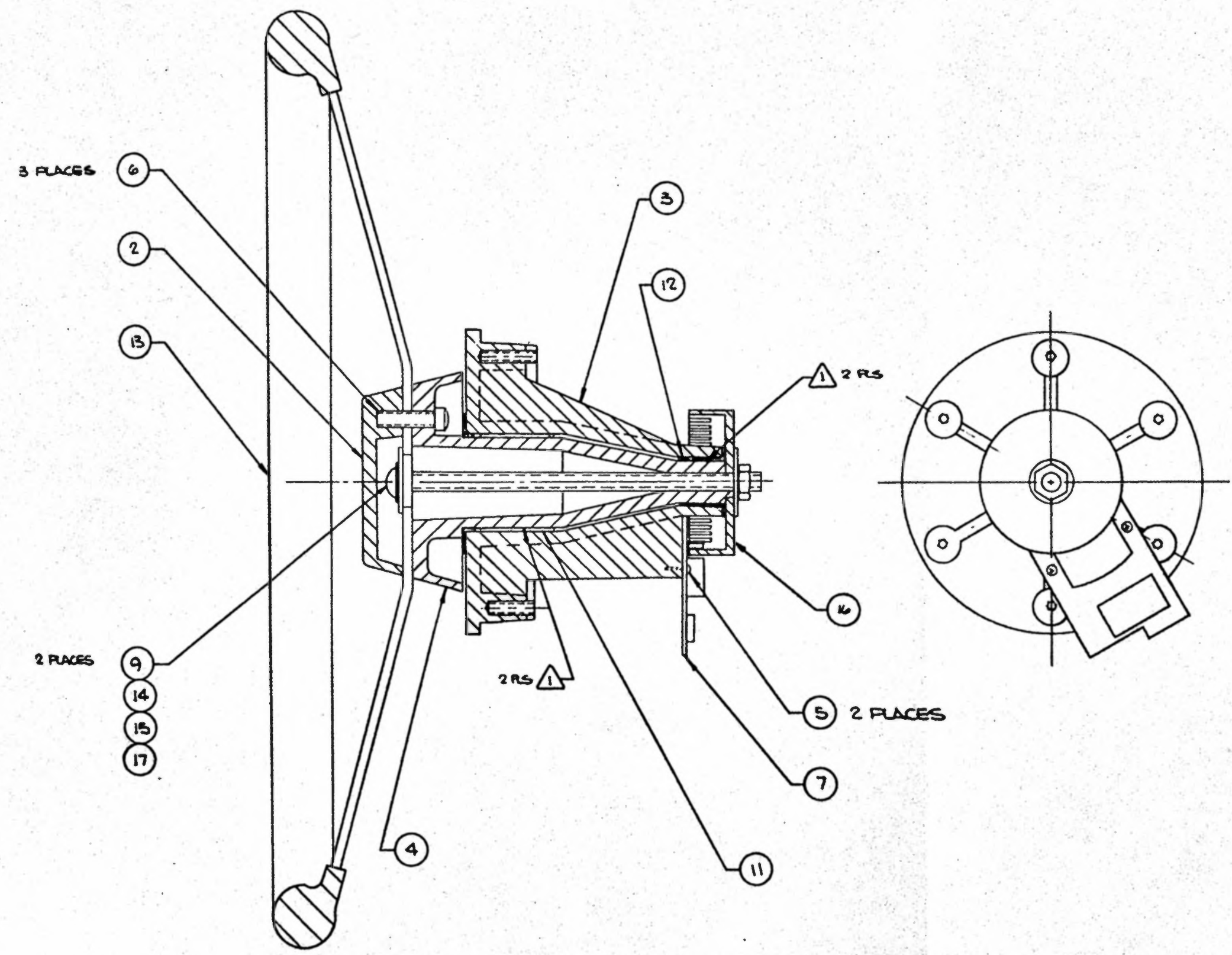
Drawn			
Checked	<i>M. J. 5/21/75</i>	Mech. Eng.	<i>[Signature]</i>
Proj. Eng.		Elec. Eng.	<i>[Signature]</i>
			RFV. <b>G</b>

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REF	2/6/75	<i>[Signature]</i>				
G	ECN 1131	2/14/75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	000598	Ref	Steering Wheel Assy (3201-3803)
2	002133	1	Cover, Kee Games Insigna
3	000605	1	Housing (3201-3545)
4	000606	1	Shaft (3201-3544)
6	72-7512	3	Screw, Mach, Fil. Hd, Phil #4-20 x 3/4 Lg.
7	A000607	1	Printed Circuit Assy
8			
9	75-07002	2	Washer, Fender, 1/4"
10			
11	76-042020	1	Bearing, Thompson (20L20-F)
12	76-041010	1	Bearing, Thompson (10L10-F)
13	78-40102	1	Steering, Wheel 10"
14	75-945N	1	Nut, #4-20, Nylon Lock
15	72-9580	1	Screw, Mach, Truss Hd, Slotted #4-20 x 5 Lg.
16	000616	1	Hub Light
17	75-055	1	Washer, 1/4" Int. Tooth, Starlock
18	78-16002	A/R	Silicone Grease, Compound #5
19.	73-1208	2	MACH. SCR. 256 x 1/2 PAN HD. PH.

8 7 6 5 4 3 2 1

SYM	DESCRIPTION	INITIALS AND DATE		
		DATE	INITIALS	INITIALS
A	RELEASED FOR PROD	2-20-74		
B	REVISED PER ECN	3-21-74		
C	REVISED PER ECN 230	4-4-74		
D	REVISED PER ECN 270	4-6-74		
E	REVISED PER ECN 379	5-17-74		
F	REVISED PER ECN 526	6-19-74		
G	ECN 1131	2-14-75		



NOTES:  
 1 APPLY LIGHT FILM OF SILICONE GREASE #5 COMPOUND (OR EQUIV.) ON AREAS INDICATED. (ITEM 18)  
 2 VENDOR PART NO. 3201-3803

NOTE:  
 000598-01 - AS SHOWN  
 000598-02 - OMIT PART # 78-401DI ADD 78-401DZ  
 OMIT " " 000599 ADD 002133

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000597	INDY 800
000598	000599
000599	000600

INTERPRET THIS DRAWING PER LS-101143	DESIGNED BY L.C.	DATE 11-19-73	ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED Dale	DATE 4-10-74				
FRACTIONS 1/16 1/8 1/4 3/8 1/2 5/8 3/4 7/8	DESIGN ENGINEER Dale	PROJECT ENGINEER 11/14	TITLE ASSEMBLY, STEERING WHEEL			
MATERIAL SEE P. 000598	DOCUMENT CONTROL J.P.	APPROVED G.W. 11/11	<table border="1"> <tr> <td>REV D</td> <td>DESCRIPTION 000598-XX</td> <td>REV G</td> </tr> </table>	REV D	DESCRIPTION 000598-XX	REV G
REV D	DESCRIPTION 000598-XX	REV G				

8 7 6 5 4 3 2 1

DRAWING NO. 000598-01

A



Job Title FOOT PEDAL ASSY Dwg. P/L 000589

*Parts List Specification* sheet 1 of 1

Drawn	Patty		
Checked	M. 2. 5/20/75	Mech. Eng.	Rev. G
Proj. Eng	(10) 3/20/74	Elec. Eng.	

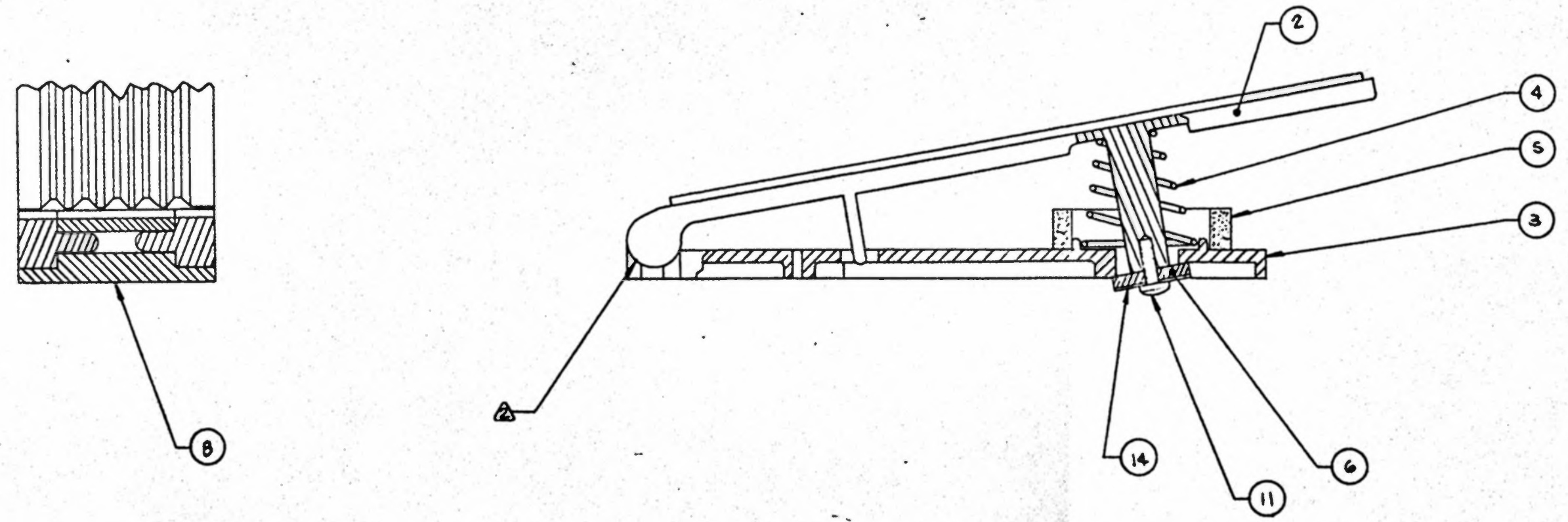
Rev.	Description	Apprv.	Rev.	Description	Apprv.
A	Release for Production	(M) 3/20/74			
B	Revise per ECN 194	(M) 8-21-74	G	REV. PER ECN 969	12-3-74
C	Rev per ECN 229	4-4-74			
D	Rev per ECN 382	5-20-74			
E	Rev per ECN 442	5/28/74			
F	Rev per ECN 460	6-6-74			

Item	Part. No.	Qty.	Description
1	A000589	Ref	Foot Pedal Assy (3201-3555)
2	000590	1	Foot Pedal (3201-3533)
3	000591	1	Pedal Foot (3201-3534)
4	000592	1	Spring (3201-3550)
5	000593	1	Bumper (3201-3551)
6	000594	1	Stop Washer (3201-3552)
7			
8	000597	1	Bearing Block (3201-3549)
9			
10			
11	75199/72-1508S	1	Screw, mach., Pan Hd, Phil #1/4-20 x 1/2 18
12			
13			
14	75-7002/75409	1	Washer, Fender 1/4
15			
16			
17	83268	A/R	Silicone Grease Compound #5
18	84012	A/R	Contact Cement

GT 10

8 7 6 5 4 3 2 1

REVISIONS				
SYM	DESCRIPTION	INITIALS AND DATE		
		DATE	INITIALS	DATE
A	RELEASED FOR PROD	3-20-74		
B	PER ECN 194			
C	REVISED PER ECN 229	4-5-74	DLK	ADAR
D	REVISED PER ECN 382	5-20-74	DLK	ADAR
E	REVISED PER ECN 442	5-28-74	DLK	ADAR
F	REVISED PER ECN 460	6-6-74	DLK	ADAR
G	REVISED PER ECN 969	1-23-74	DLK	ADAR



- NOTES:
- TACK ITEM 5 TO ITEM 3 WITH 3M1357 CONTACT ADHESIVE.
  - APPLY LIGHT SHEAR SILICONE GREASE #5 COMPOUND (OR EQUIV.) ON AREAS INDICATED. (ITEM 14)

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 FRACTIONS - 1/16 1/8 3/16 1/2 3/4 1  
 ANGLES - 45° 90° 135°  
 SURF. FINISH - SEE DIMENSIONS

AC02971	INDY 800
A001022	A700519
REV 1/11/74	1/11/74

INTERPRET THIS DRAWING PER SEAB VIALS	DRAWN BY J.S.	DATE 11-19-73	 ATARI INCORPORATED 14000 Woodside Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED DLK	DESIGNED BY J. S. JONES	
FRACTIONS - 1/16 1/8 3/16 1/2 3/4 1	PROJECT ENGINEER J. S. JONES	DATE 3/26/74	TITLE ASSEMBLY FOOT PEDAL
ANGLES - 45° 90° 135°	APPROVED BY J. S. JONES	DATE 4/10/74	DRAWING NO. D A000589
SURF. FINISH - SEE DIMENSIONS	MATERIAL SEE P/1000589	APPROVED BY J. S. JONES	REV G

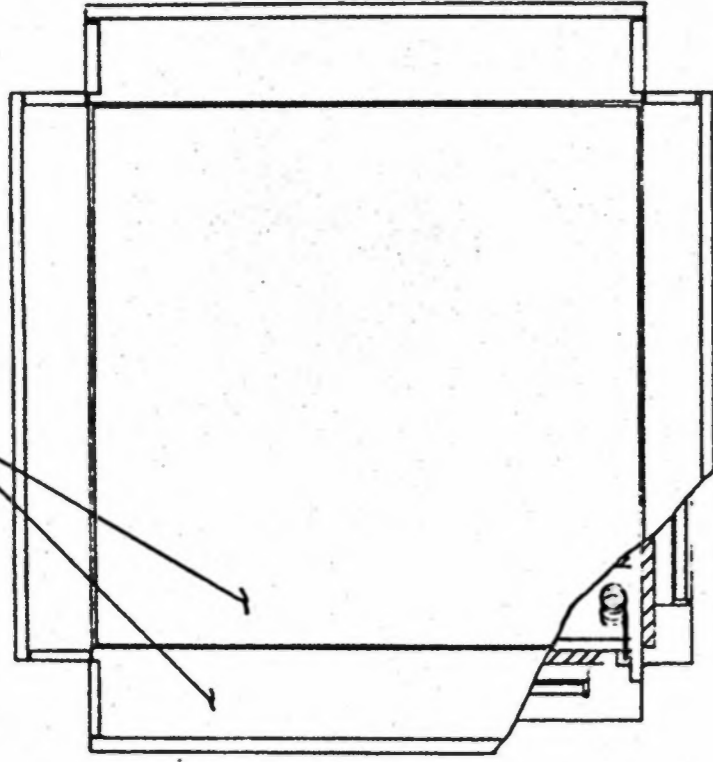
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16850000  
 1  
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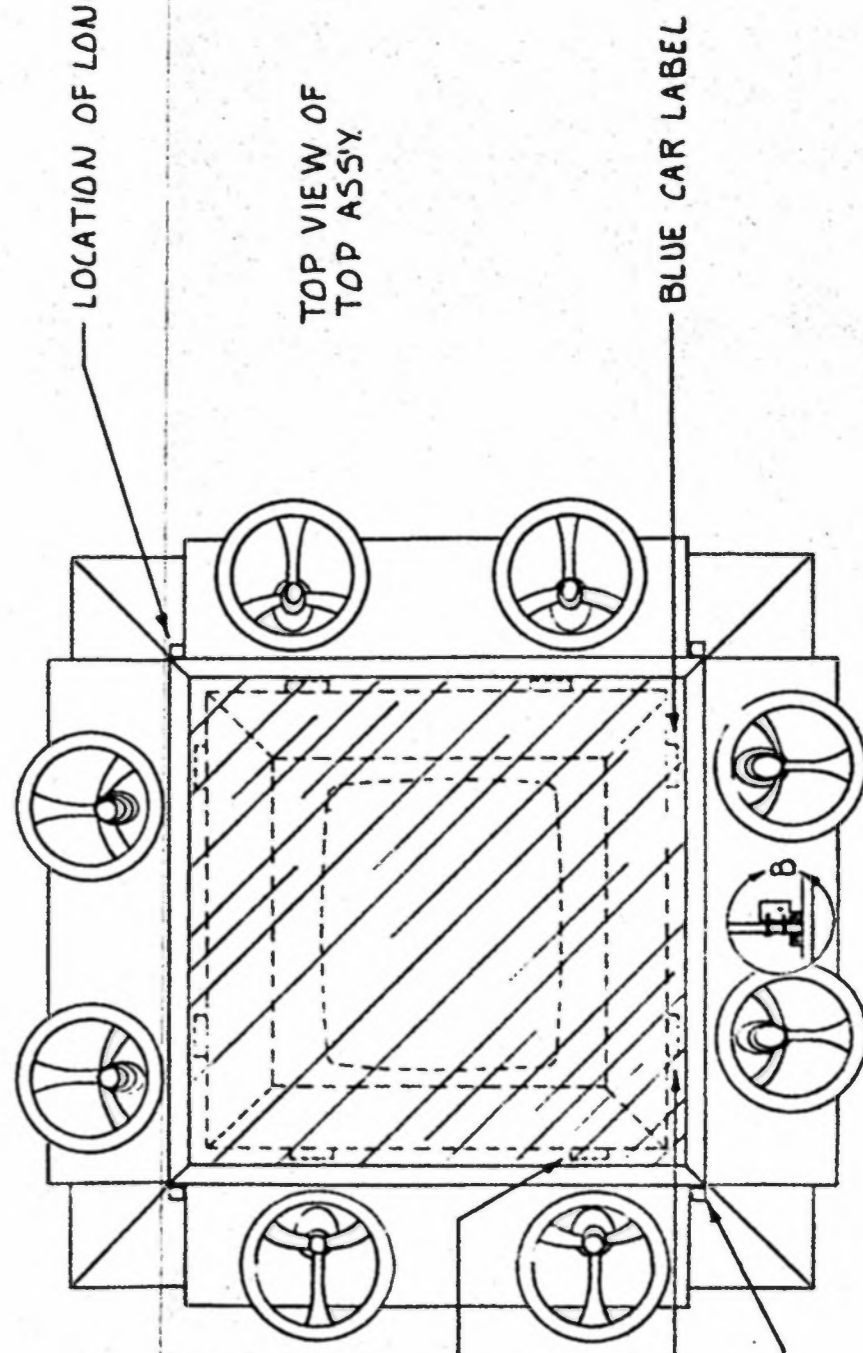
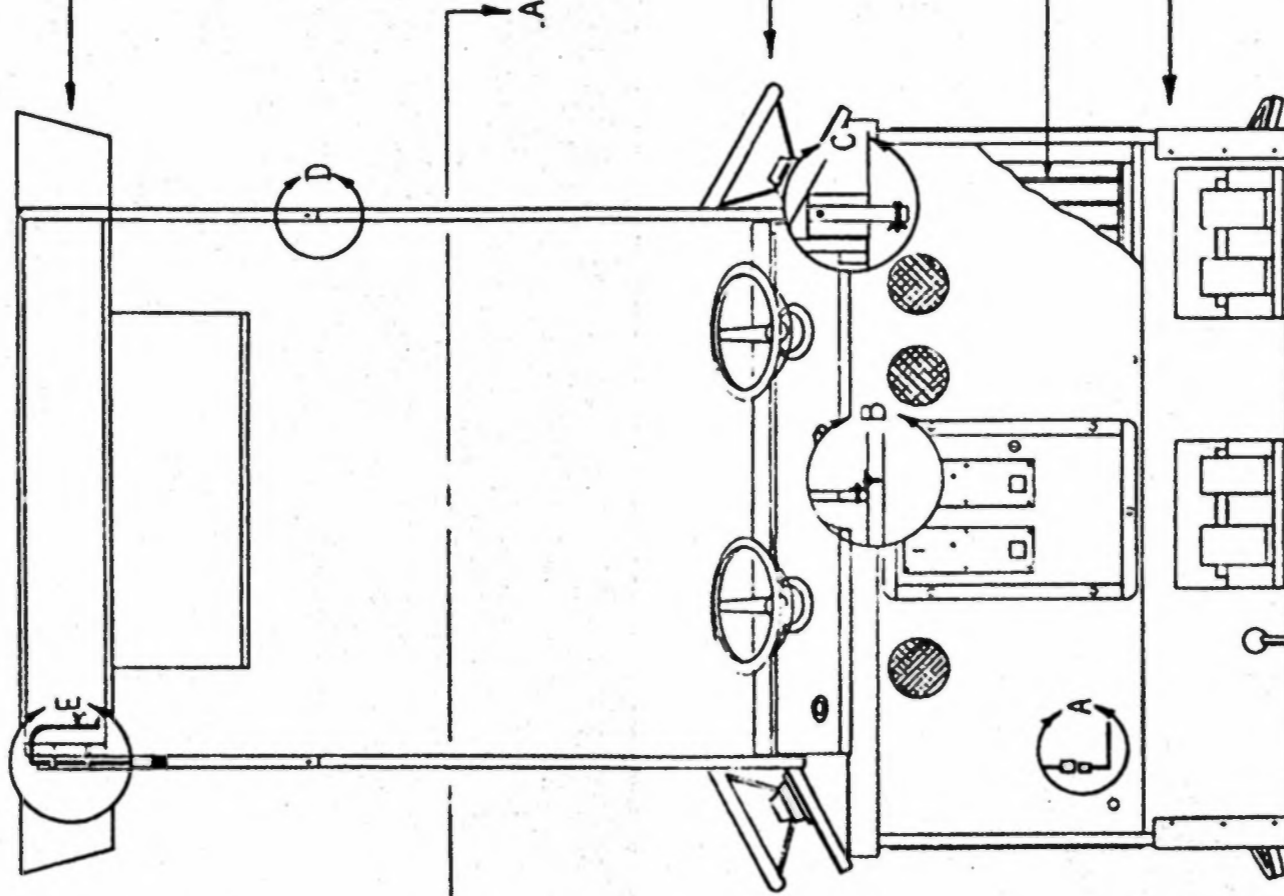
**ASSEMBLY INSTRUCTIONS**

- STEP 1** MOUNT CABINET TOP A002970 TO CABINET BASE A002967
- NOTE:** BLUE CAR LABEL ON CABINET TOP ASSY MUST BE PLACED OVER PC BOARD RACK AREA IN BASE CABINET ASSY
- NOTE:** SEE DETAIL 'B' SHEET 2, FOR MOUNTING ASSY OF CABINET TOP TO BASE.
- STEP 2** INSERT FOUR STEEL LEGS INTO BRACKETS ATTACHED TO TOP
- NOTE:** EACH STEEL LEG HAS DETAIL HOLES THAT MATCH HOLES IN BRACKETS ON CABINET TOP. SEE DETAIL 'C'.
- STEP 3** PLACE DISPLAY TOP ONTO STEEL LEGS MATCHING HOLES ON THE 'SHORT LEGS' WITH THOSE ON THE LONG STEEL LEGS.
- NOTE:** SHORT STEEL LEG, IDENTIFIED WITH A PIECE OF TAPE MUST BE PLACED ON LONG STEEL LEG DIRECTLY ABOVE POWER SUPPLY BOARD IN CABINET BASE.
- STEP 4.** REMOVE COVER AND GIVE ABS TOP PANEL FROM DISPLAY TOP ASSY, TO LOCATED DISPLAY TOP HARNESS THAT PASSES THROUGH MARKED STEEL LEG TO CONNECTION IN THE BASE. SEE DETAIL 'A'. REPLACE COVERS AFTER HARNESS IS CONNECTED.
- STEP 5.** CAREFULLY LOCATE MOUNTING HARDWARE THROUGH DETAIL HOLES IN LEGS. SEE DETAIL 'C' AND 'D'.
- NOTE:** MOUNTING HARDWARE, DETAIL 'C'. REMOVE CONTROL PANEL ASSY FOR EASY ACCESS.
- STEP 6** CONNECT ALL HARNESS BY OPENING COIN DOORS FOR EASY ACCESS.
- NOTE:** SEE SHEET 2, FOR DETAIL ON ASSY OF STEP 2, 4 AND 5.

NOTE: REMOVE THESE PANELS IN ASSEMBLY STEP 4.



DISPLAY-TOP ASSY  
A002969



THIS STEEL LEG CORRESPONDS WITH SHORT LEG, MARKED WITH TAPE, ATTACHED TO DISPLAY TOP

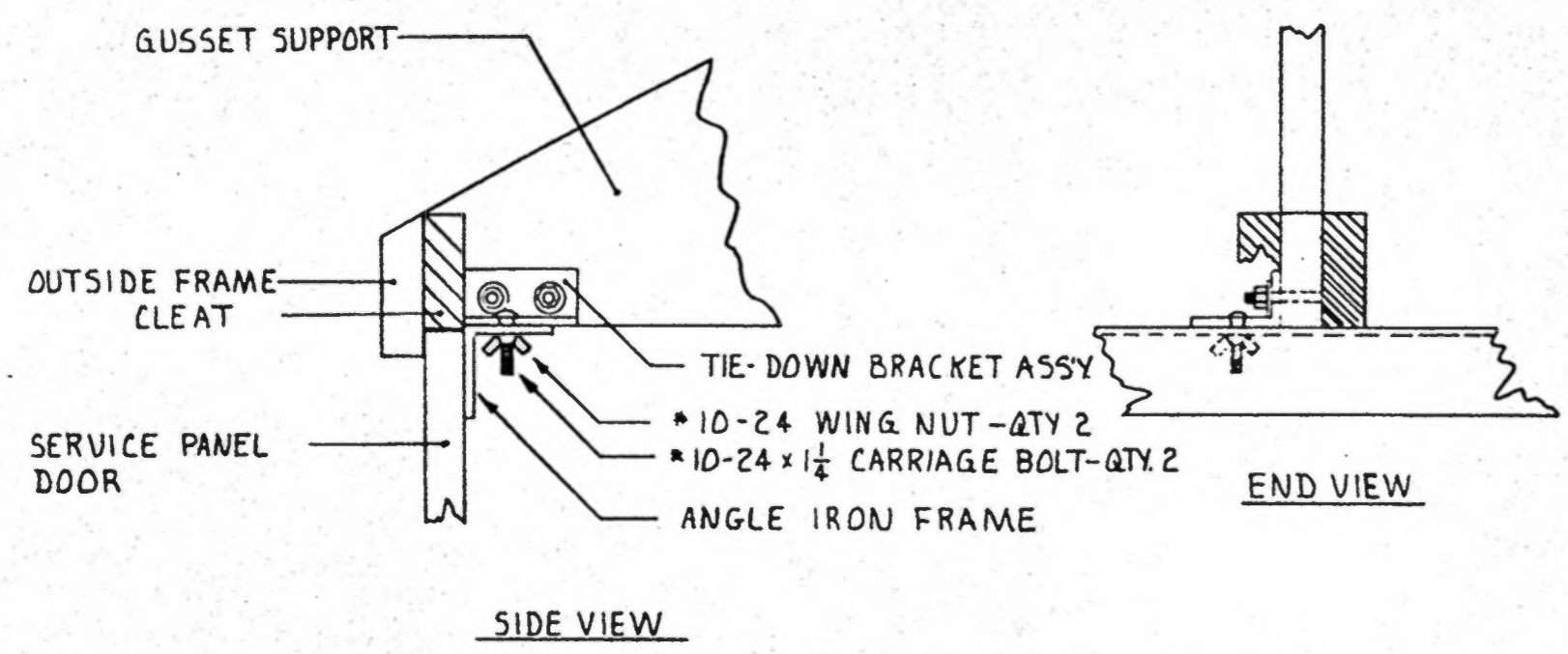
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DATE	INDY 800
REV	1
APP'D	INDY 800
DATE	3-5-75

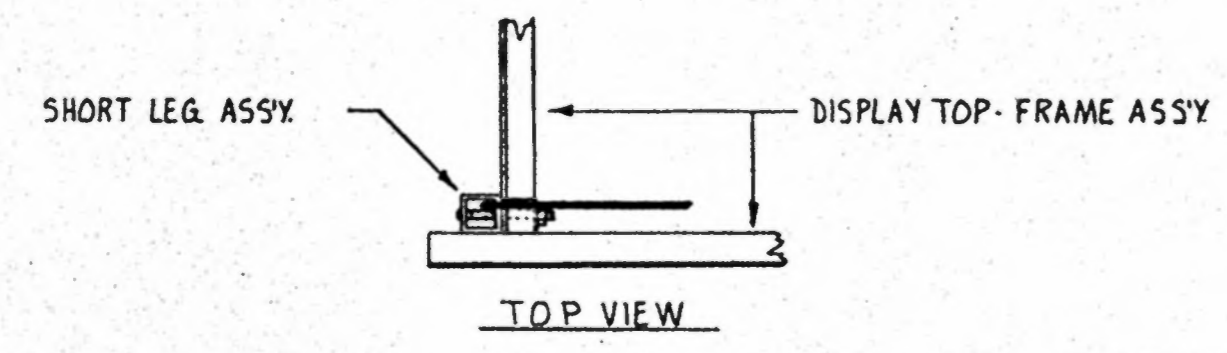
INTERPRET THIS DRAWING PER USAS VHS	DESIGN BY WS	DATE 3-5-75	<p>ATARI INCORPORATED 14600 W. SANDERS BLVD LOS GATOS, CALIFORNIA 95030</p>
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	DESIGN ENGINEER	PROJECT ENGINEER K. Wayne Hunter	
FRACTIONS - 1/16 & 1/8	DATE	REV	INDY 800
DECIMALS - 0.01 & 0.001	DATE	REV	ASSEMBLY INSTRUCTIONS
SURFACE FINISH - AS - 0.015	DATE	REV	D 003347 A
MATERIAL	DATE	REV	NONE

SYM	DESCRIPTION	NOTES - 2 DASH		
		REV	DATE	BY
A	PROD. REL.	WS	3-5-75	

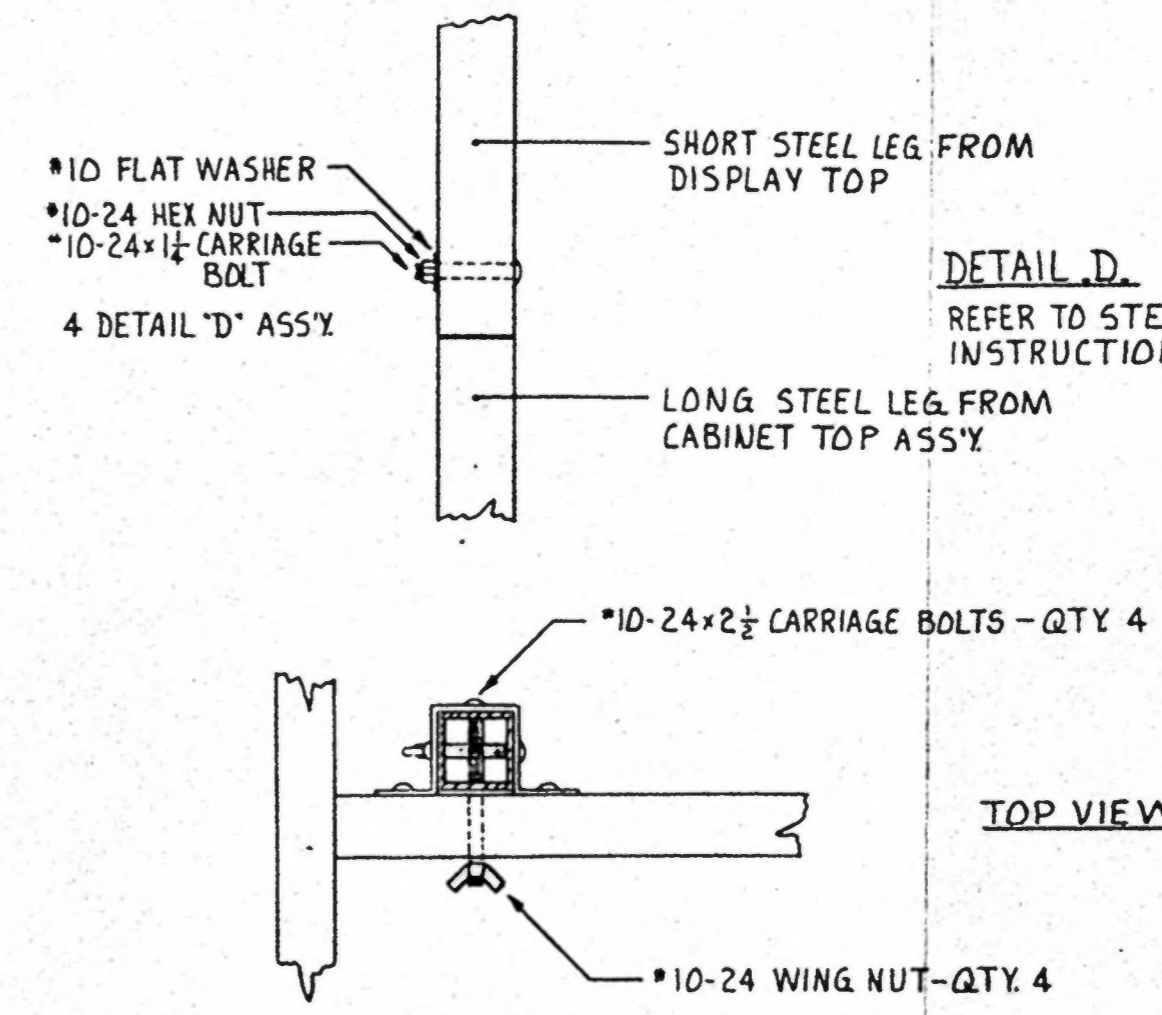
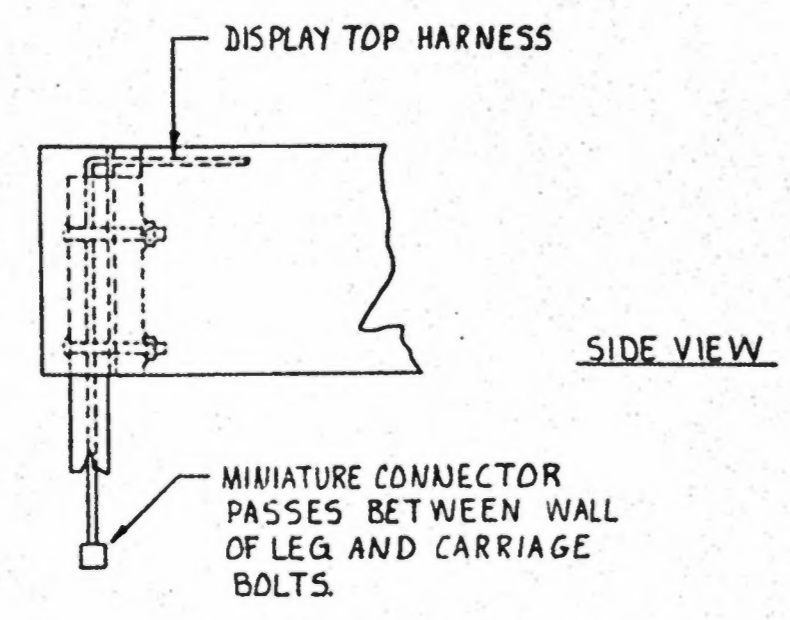
REVISIONS			INITIALS AND DATE		
SYM	DESCRIPTION	DATE	INITIALS	DATE	INITIALS
A	PROD. REL	WS 3-5-75	WS	3-5-75	D



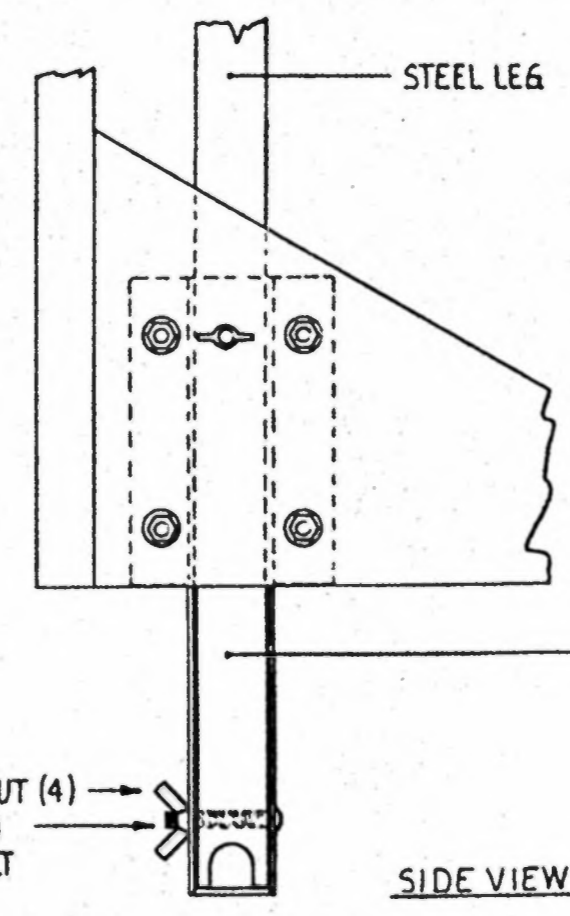
**DETAIL B.**  
REFER TO STEP 1 OF ASSY INSTRUCTIONS - SHEET 1 of 2



**DETAIL E.**  
REFER TO STEP 4 OF ASSY INSTRUCTIONS - SHEET 1 of 2



**DETAIL D.**  
REFER TO STEP 5 OF ASSY INSTRUCTIONS - SHEET 1 of 2



**DETAIL C.**  
REFER TO STEP 5 OF ASSY INSTRUCTIONS - SHEET 1 of 2

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INTERPRET THIS DRAWING: FELLSAM VLS	DRAWN BY WS 3-5-75	 ATARI INCORPORATED 14000 Wilshire Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE AS SHOWN	CHECKED	
FRUITONS - 4876 4-4-83 ANGLES - 4876 4-4-83 SERIES NUMBER - 4876 4-4-83	DESIGN ENGINEER	TITLE INDY 800 ASSEMBLY INSTRUCTIONS
NATIONAL	PROJECT ENGINEER K. Wajet Sauter	NO. DRAWING NO. 003347 REV. A
	APPROVED	DATE None
		SHEET 2 of 2



ASSEMBLY TITLE **RT8 BACKPLANE BOARD** P/L 003199

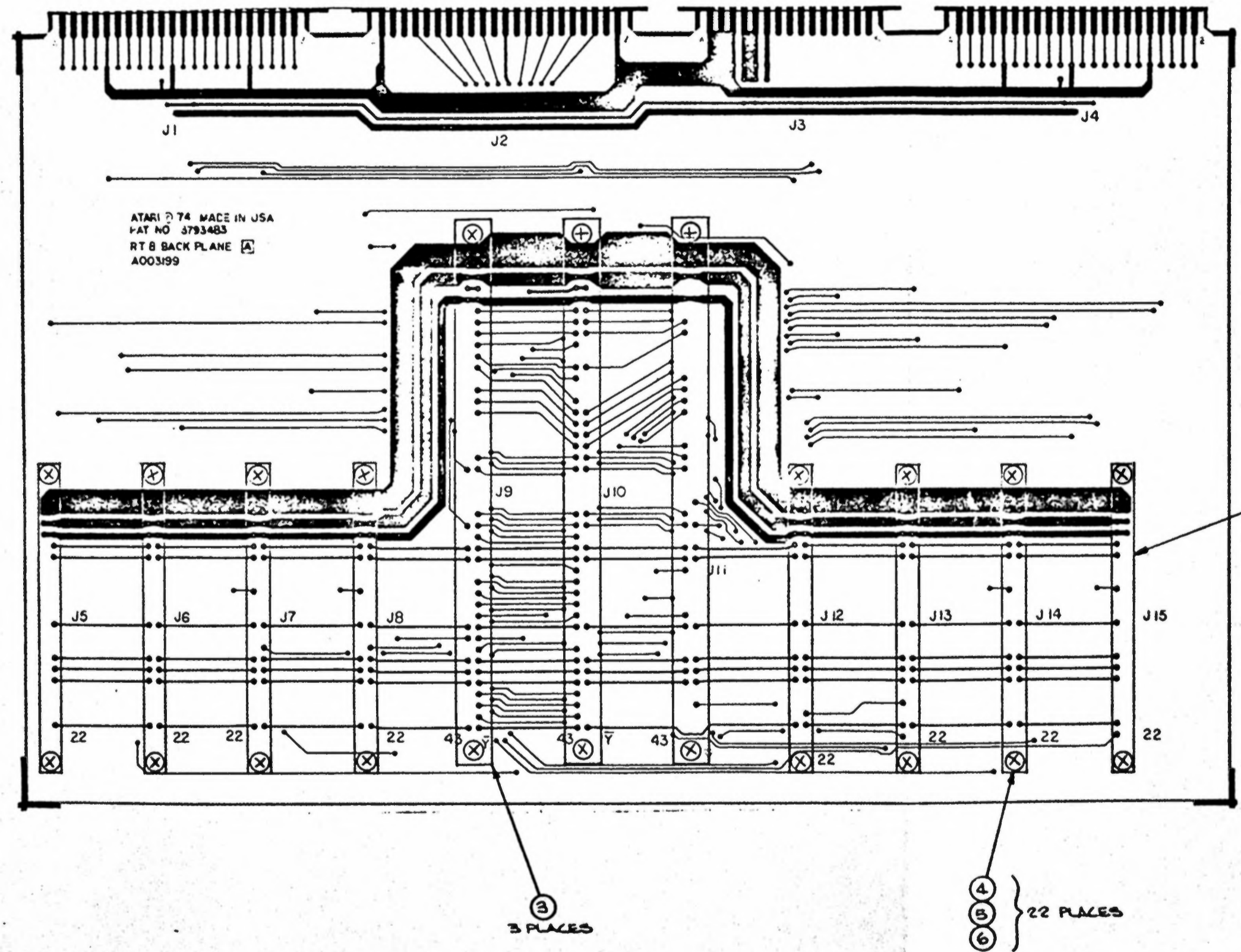
PARTS LIST SPECIFICATION Page 1 of 1

Drawn \_\_\_\_\_  
 Checked *M.J. 5/20/75* Mech. Eng.  
 Proj. Eng.: *V. K. 3 FEB 75* Elec. Eng.: *V. K. 3 FEB 75* REV. A  
*AWB 2/3/75*

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REI	2-3-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003200	1	Printed Circuit Board (Backplane)
2	79-514222	8	44 Pin Edge Connector, .156, Dip Solder
3	79-514243	3	86 Pin Edge Connector, .156, Dip Solder
4	75-1408	22	Screw, Mach., Pan Hd., Phil., 4-40 x 1/2"
5	75-9149	22	Nut, Machine, Hex, 4-40
6	75-054	22	Lock Washer, Internal Star, #4

REVISIONS		INITIALS AND DATE		
SYM	DESCRIPTION	DATE	INITIALS	DATE
A	PRODUCTION RELEASE	2/21/75	GR	JK

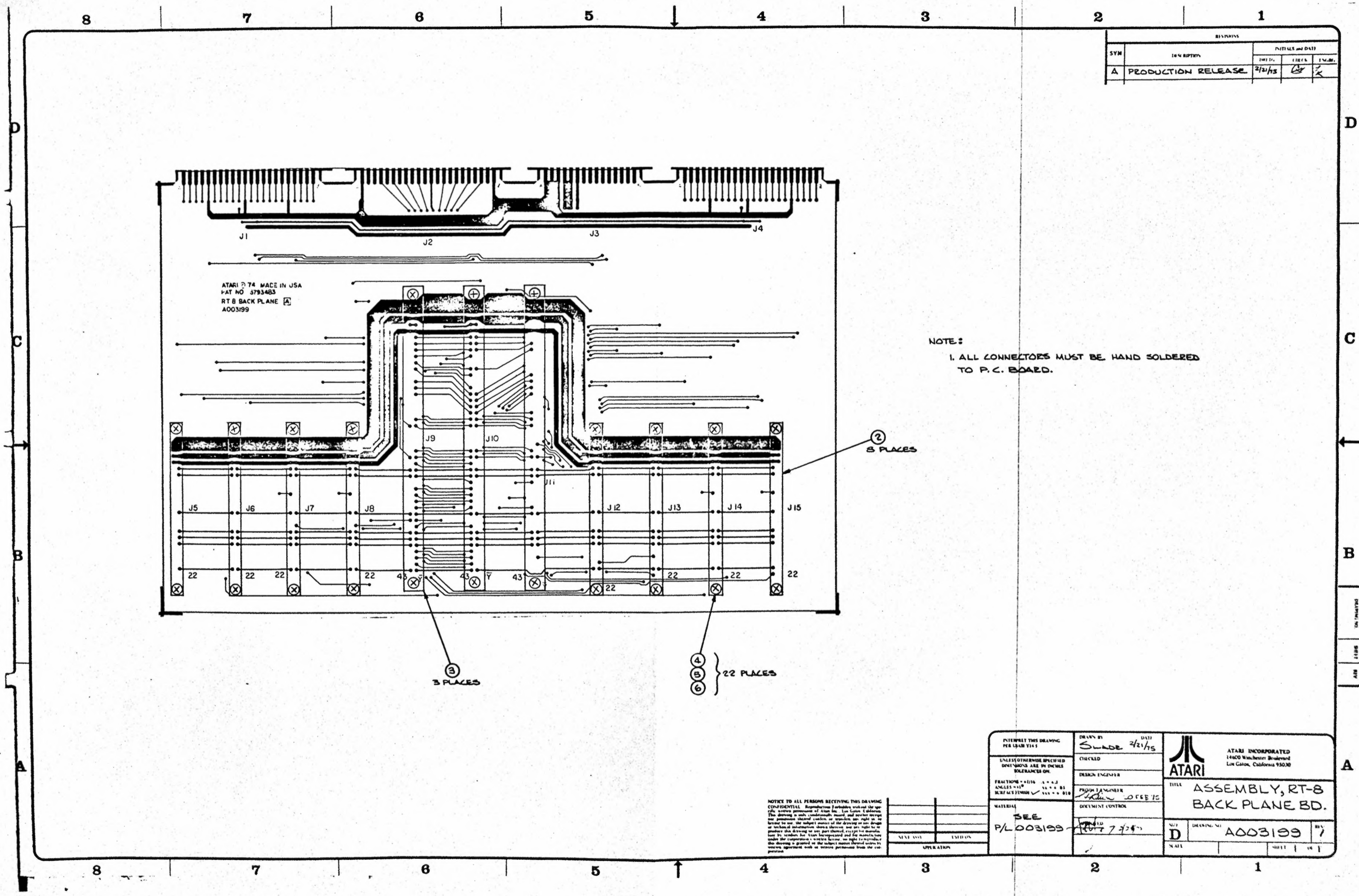


ATARI 74 MADE IN USA  
 PAT NO 3793483  
 RT 8 BACK PLANE A  
 A003199

NOTE:  
 1. ALL CONNECTORS MUST BE HAND SOLDERED  
 TO P.C. BOARD.

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INTERPRET THIS DRAWING PER 1548 VHS	DRAWN BY SLADE 2/21/75	DATE 2/21/75	 ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE BY DIMENSION BOLDFACE ON	CHECKED	DESIGN ENGINEER	
FRANCHISE 001/16 1-0-02 ANGLES 90° 10° SURFACE FINISH ✓ ALL 0.010	PROJECT ENGINEER Klein 2/22/75	DATE 2/22/75	TITLE ASSEMBLY, RT-8 BACK PLANE BD.
MATERIAL SEE P/L003199	DEPARTMENT CONTROL	DATE 2/22/75	SHEET NO. D
OPERATION			DRAWING NO. A003199





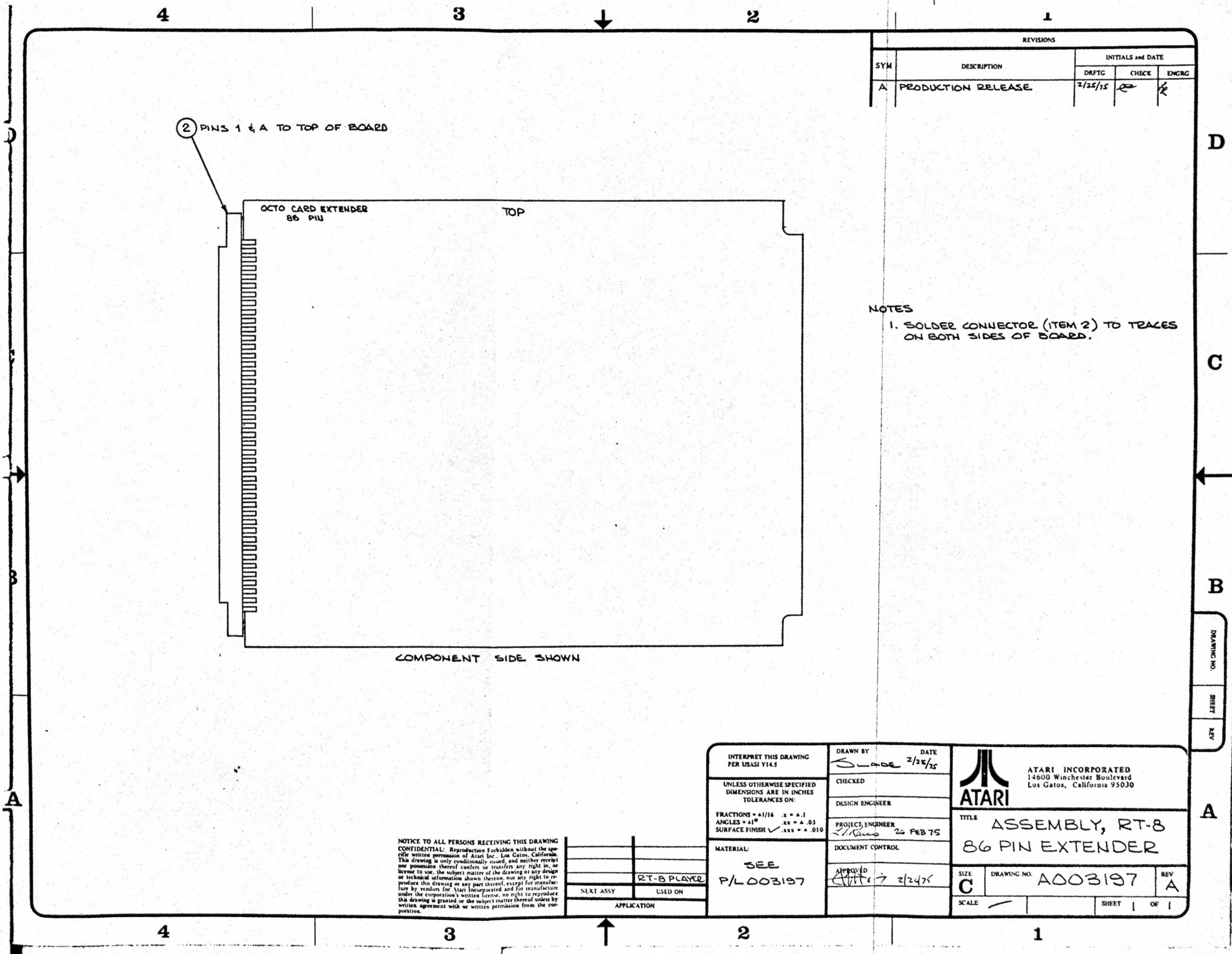
ASSEMBLY TITLE / RT8 EXTENDER BOARD, 86 PIN P/L 003197

PARTS LIST SPECIFICATION Page 1 of 1

Drawn \_\_\_\_\_  
 Checked *M-2. 5/20/75* Mech. Eng.  
 Proj. Eng. *J. Raw. 5/15/75* Elec. Eng. *J. Raw. 5/15/75* REV. A  
*Atta - 2/3/75*

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	2-3-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003198	1	Printed Circuit Board (86 Pin Ext.)
2	79-514243	1	86 Pin Edge Connector, .156, Dip Solder



REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE	2/25/75	[Signature]	[Signature]

NOTES  
 1. SOLDER CONNECTOR (ITEM 2) TO TRACES ON BOTH SIDES OF BOARD.

COMPONENT SIDE SHOWN

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APPLICATION	USED ON
	RT-8 PLAYER
NEXT ASSY	

INTERPRET THIS DRAWING PER USASI Y14.5	DRAWN BY SLADE	DATE 2/25/75	ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	DESIGN ENGINEER	
FRACTIONS = 1/16 .1 = .1	PROJECT ENGINEER L. Rando	DATE 26 FEB 75	TITLE ASSEMBLY, RT-8 86 PIN EXTENDER
ANGLES = 45° .25 = .03	DOCUMENT CONTROL		SIZE C
SURFACE FINISH ✓ .xxx = .010	MATERIAL: SEE P/L003197	APPROVED [Signature] 2/24/75	DRAWING NO. A003197
			REV A
			SCALE —
			SHEET 1 OF 1

DRAWING NO.  
SHEET  
REV

A



ASSEMBLY TITLE / RT8 EXTENDER BOARD, 44 PIN P/L 003195

PARTS LIST SPECIFICATION Page 1 of 1

Drawn  
 Checked *M.J.* Mech. Eng.  
 Proj. Eng. *J. Kim* Elec. Eng. *J. Kim* 31 E 275  
 REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD R/L	2-3-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003196	1	Printed Circuit Board (44 Pin Ext.)
2	79-515222	1	44 Pin Edge Connector, .156, Extender Type

4

3

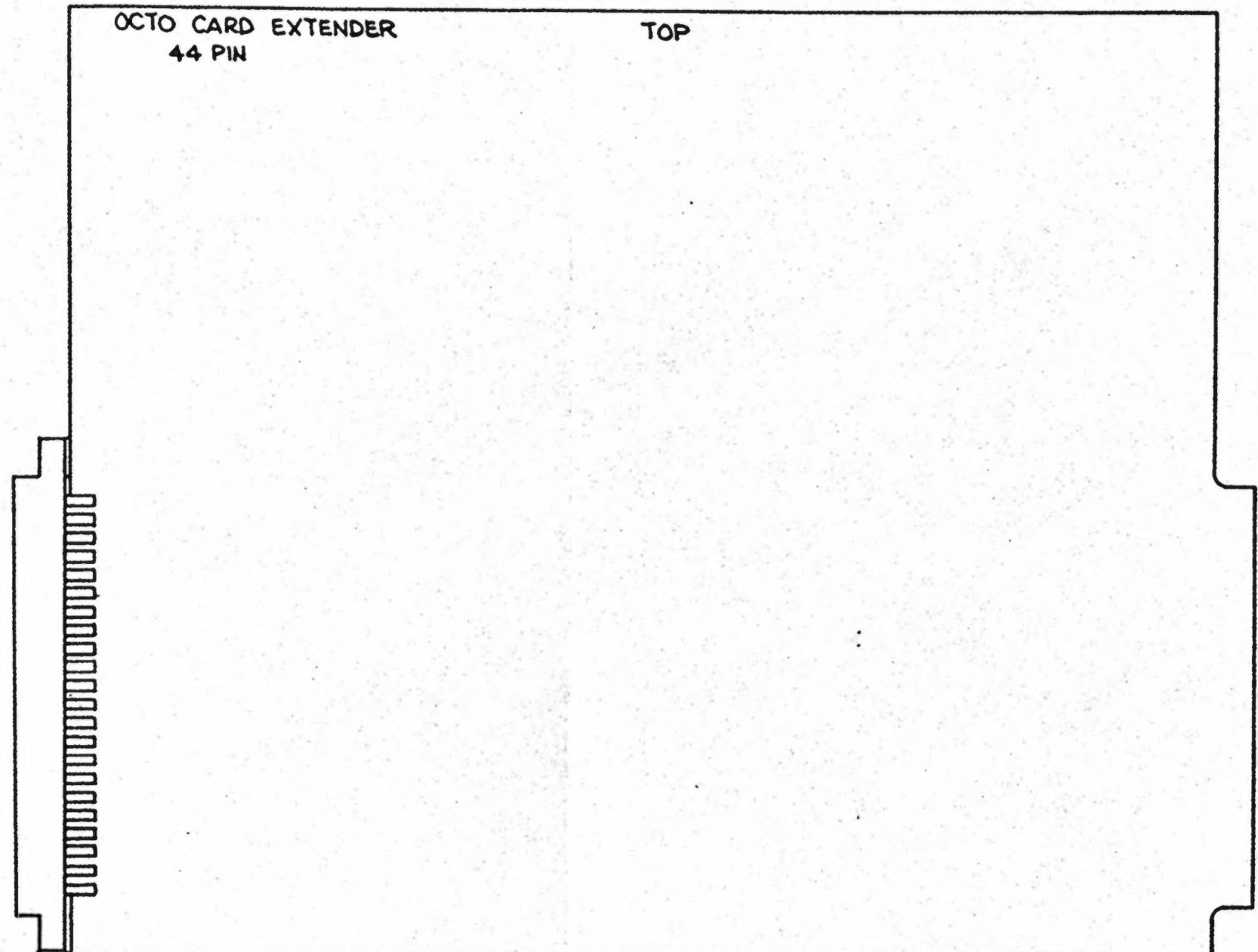
2

1

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRAFTG	CHECK	ENGRG
A	PRODUCTION RELEASE	2/25/75	[Signature]	[Signature]

OCTO CARD EXTENDER  
44 PIN

TOP



COMPONENT SIDE SHOWN

2 PINS 1 & A TO TOP OF BOARD

NOTES:  
1. SOLDER CONNECTOR (ITEM 2) TO TRACES ON BOTH SIDES OF BOARD.

D

C

B

DRAWING INCH  
SHEET  
REV

A

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RT-8 PLAYER	
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USAS1 V14.5	DRAWN BY [Signature]	DATE 2/25/75	<p>ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030</p>
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	DESIGN ENGINEER	
FRACTIONS = 1/16 .5 = .1 ANGLES = 45° .25 = .03 SURFACE FINISH ✓ .001 = .010	PROJECT ENGINEER [Signature]	26 FEB 75	TITLE ASSEMBLY, RT-8 44 PIN EXTENDER
MATERIAL: SEE P/L 003195	DOCUMENT CONTROL	APPROVED [Signature]	SIZE C
			DRAWING NO. A003195
			REV A
			SCALE —
			SHEET 1 OF 1

4

3

2

1



ASSEMBLY TITLE / REMOTE CONTROL BOARD

P/L 003193

PARTS LIST SPECIFICATION

Page 1 of 1

Drawn

Checked *M.Z.*

Mech. Eng.

Proj. Eng. *J. Raw* FEB 75

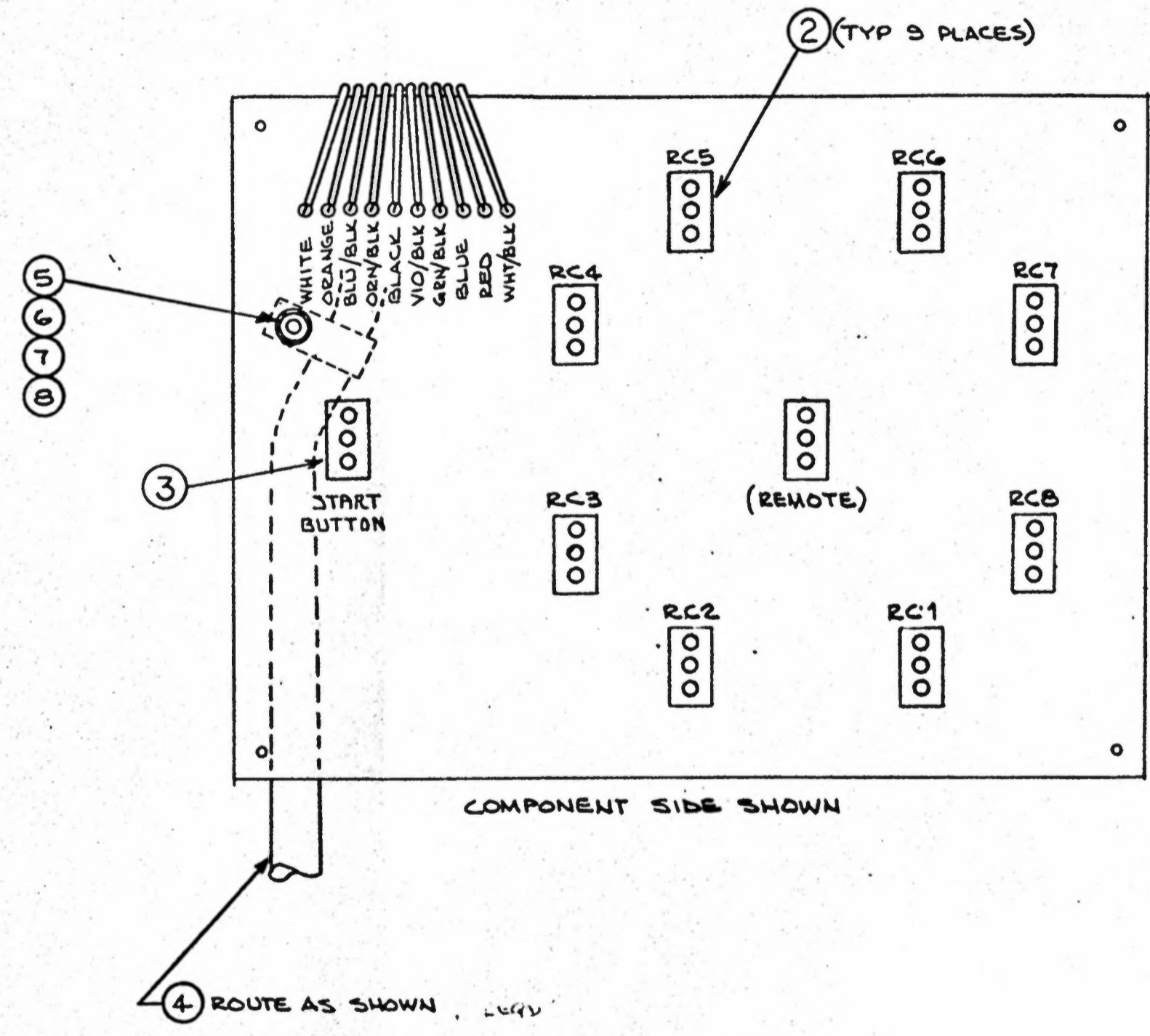
Elec. Eng. *J. Raw* FEB 75

REV.  
B

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REI	2-3-75	<i>[Signature]</i>				
B	Rev per ECN 1148	2-26-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003194	1	Circuit Board (Remote Control)
2	61-011C	9	SPDT Toggle Switch, PC Mount, w/Panel Dress Nut (C&K #7107 P3 D C B E A7807)
3	62-007	1	SPDT Momentary Pushbutton Switch, PC Mount, w/Cap & Bezel (C&K #8121C 8018-2 w/8025)
4	A003159-01	1	Remote Control Cable
5	78-25001	1	Cable Tie, Screw Down
6	75-247S	1	Screw, Machine, Rd. Hd., Cross Rec #4-40
7	75-054	1	Washer, Lock, Int. Tooth, Steel #4
8	75-914S	1	Nut, Machine, Hex #4-40

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRAFTG	CHECK	ENGRG
B	PRODUCTION RELEASE	2/25/75	[Signature]	[Signature]



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RT-8 PLAYER	
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USAS4 Y14.5  
 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:  
 FRACTIONS =  $\pm 1/16$   $\pm .001$   
 ANGLES =  $\pm 1^\circ$   $\pm .03$   
 SURFACE FINISH  $\sqrt{\text{SEE A.010}}$   
 MATERIAL:  
 SEE P/L 003193

DRAWN BY P. BRISTOW DATE 2-14-75  
 CHECKED  
 DESIGN ENGINEER  
 PROJECT ENGINEER [Signature] 25 FEB 75  
 DOCUMENT CONTROL  
 APPROVED [Signature] 7/25/75

**ATARI** ATARI INCORPORATED  
 14600 Winchester Boulevard  
 Los Gatos, California 95030

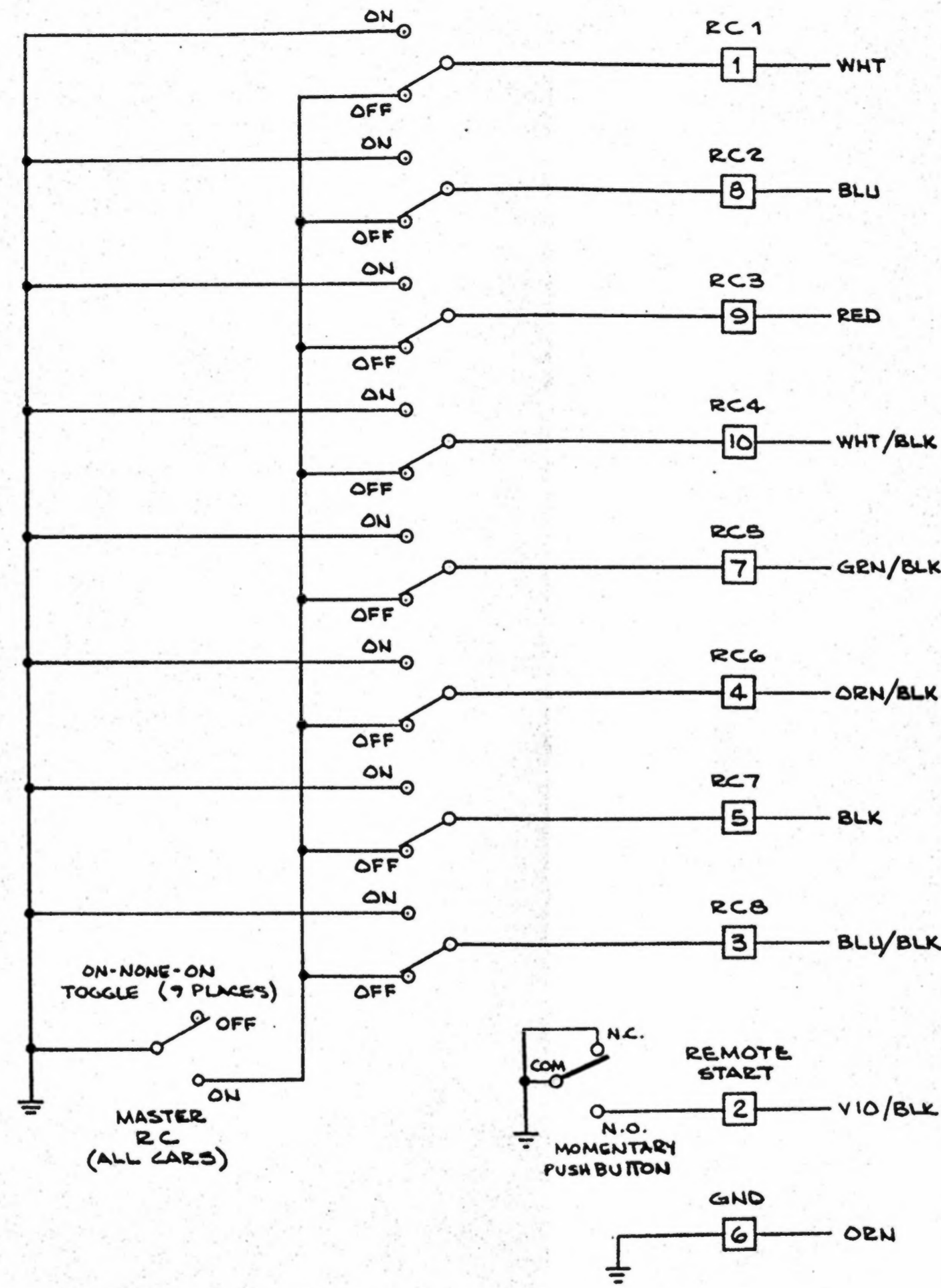
TITLE ASSEMBLY, RT-8  
 REMOTE CONTROL BD

SIZE C DRAWING NO. A003193 REV B  
 SCALE 1:1 SHEET 1 OF 1

DRAWING NO. A003193  
 SHEET 1/1  
 REV B

4 3 2 1

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRAFTG	CHECK	ENGRG
B	PRODUCTION RELEASE	2/25/75	[Signature]	[Signature]
C	REVISED PER ECM 1282	4/2/75	[Signature]	[Signature]



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003193	RT-8 PLAYER
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5	DRAWN BY S. [Signature] DATE 2/25/75	ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	
FRACTIONS = 1/16 x = .1	DESIGN ENGINEER	TITLE SCHEMATIC, RT-8 REMOTE CONTROL BD.
ANGLES = 45° .xx = .03	PROJECT ENGINEER X. [Signature] 25 FEB 75	SIZE C
SURFACE FINISH ✓ .xxx = .010	DOCUMENT CONTROL	DRAWING NO. 003193
MATERIAL:	APPROVAL [Signature] 2/25/75	REV C
		SCALE
		SHEET 1 OF 1

D  
C  
B  
A

4 3 2 1



ASSEMBLY TITLE / RT8 POWER SUPPLY BOARD

P/L 003191

PARTS LIST SPECIFICATION

Page 1 of 1

Drawn

Checked

Mech. Eng.

Proj. Eng. *L. K...* 3/10/75

Elec. Eng. *V. K...* 3 FEB 75

REV.

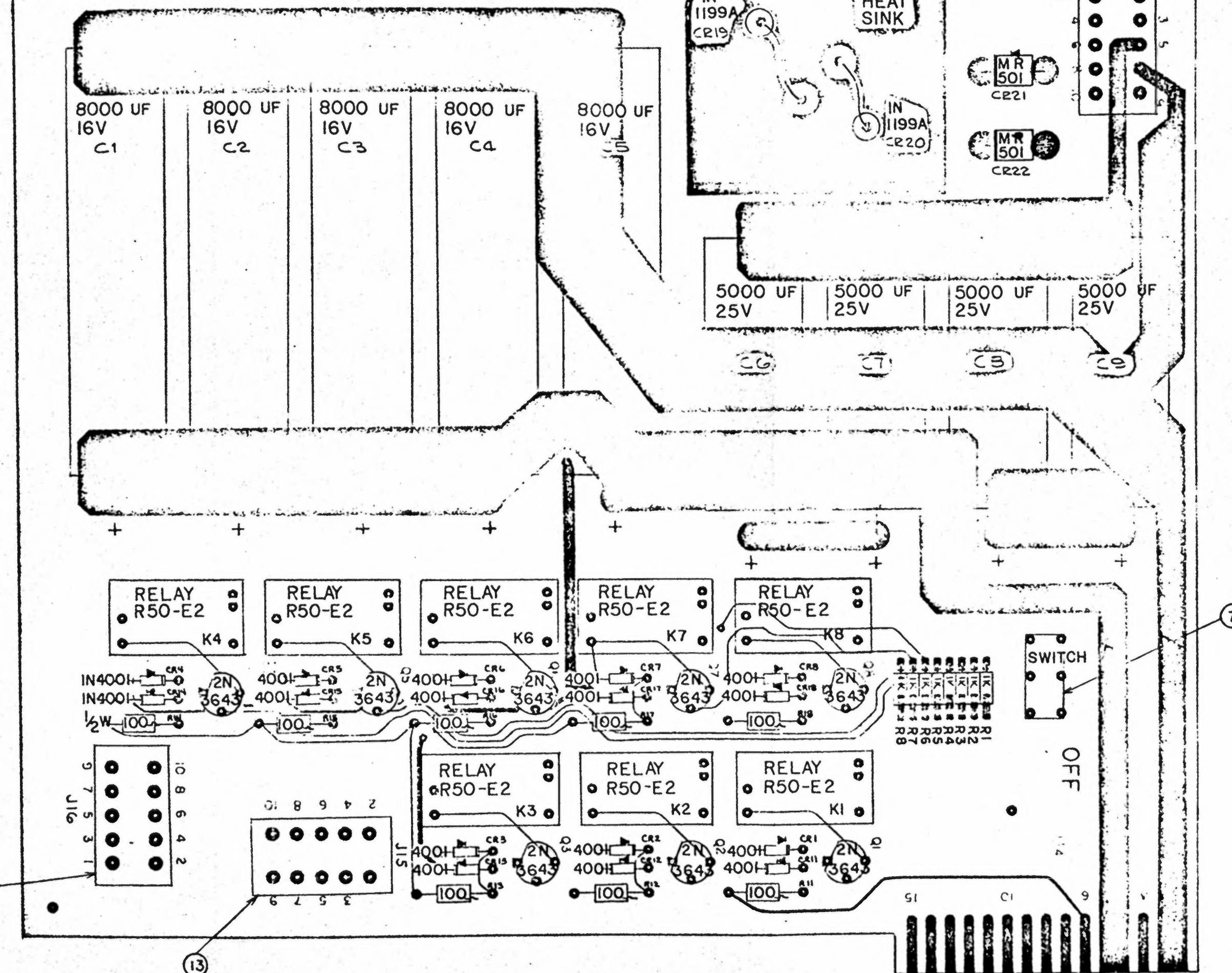
B

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD RFL	2-3-75	<i>[Signature]</i>				
B	REV PER ECN 1185	3-5-75	<i>[Signature]</i>				

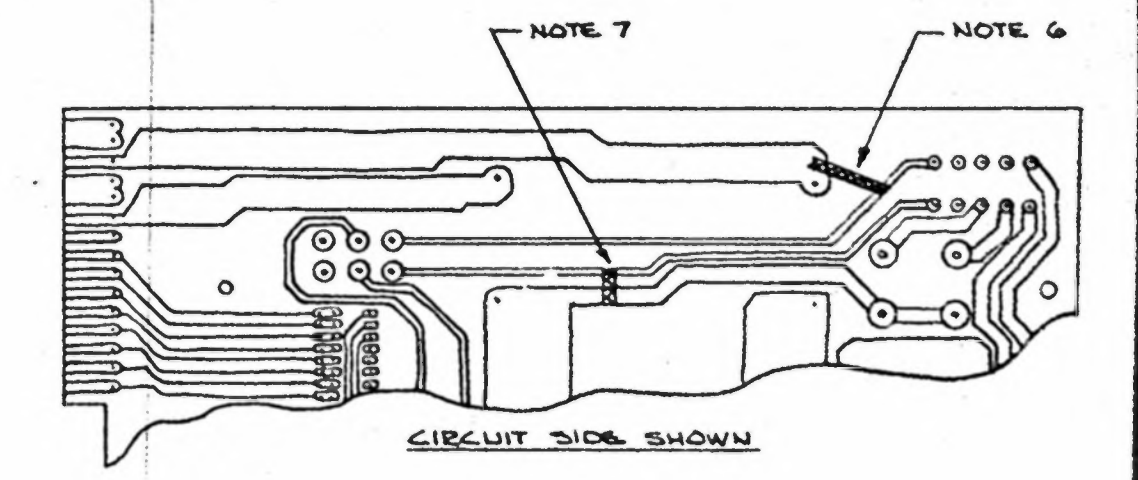
Item	Part Number	Qty.	DESCRIPTION
1	003192	1	Printed Circuit Bd, RT8 Pwr Supply Board
2	23-160808	5	Capacitor, Electrolytic, 8000uf, 16V
3	23-250508	4	Capacitor, Electrolytic, 5000uf, 25V
4	31-MR501	2	Diode, Type MR501, 3A
5	31-1N1199A	2	Diode, Type 1N1199A, 12A, 50V
6	78-06006	1	Heat Sink, Wakefield 680-1.25
7	69-001	1	DPDT Slide Switch
8	10-5102	8	Resistor, Carbon, 5%, 1/4W, 1K ohm
9	11-5101	8	Resistor, Carbon, 5%, 1/2W, 100 ohm
10	34-2N3643	8	NPN Transistors, Type 2N3643
11	31-1N4001	16	Diode, Type 1N4001, 1A
12	43-8001	8	Relay, Minature P.C., Amf R50-E2-Y1-12VDC (Potter/Brumfield)
13	79-58005	3	Connector, 10pin, PC Mount, Amp#1-380991

REV	DATE	BY	CHK
A	PRODUCTION RELEASE	3/15/75	[initials]
B	REVISED PER ECN 1185	3/15/75	[initials]

RT8 PWR SUPPLY BD A003191  
 ATARI ©75 MADE IN USA PAT NO. 3793483



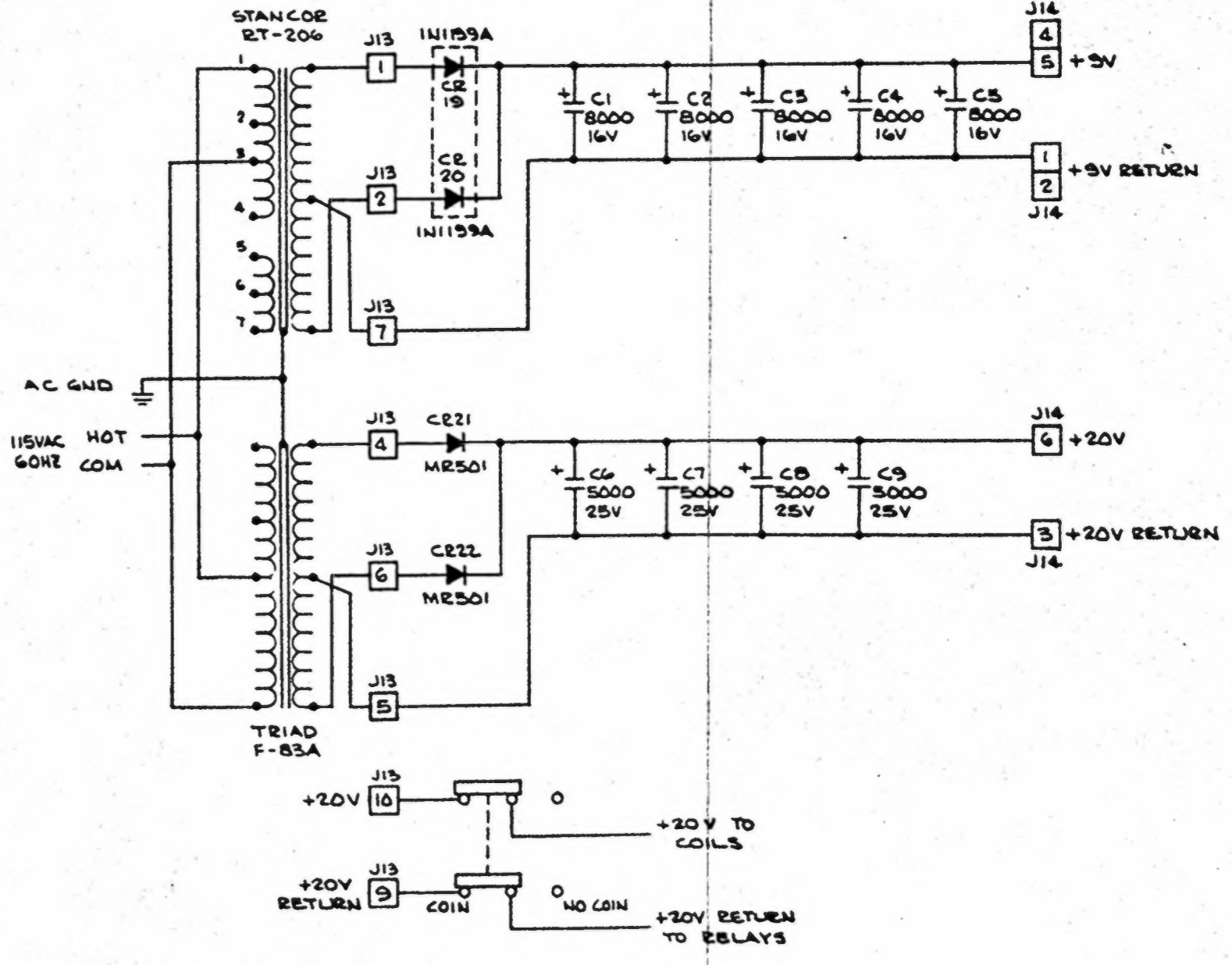
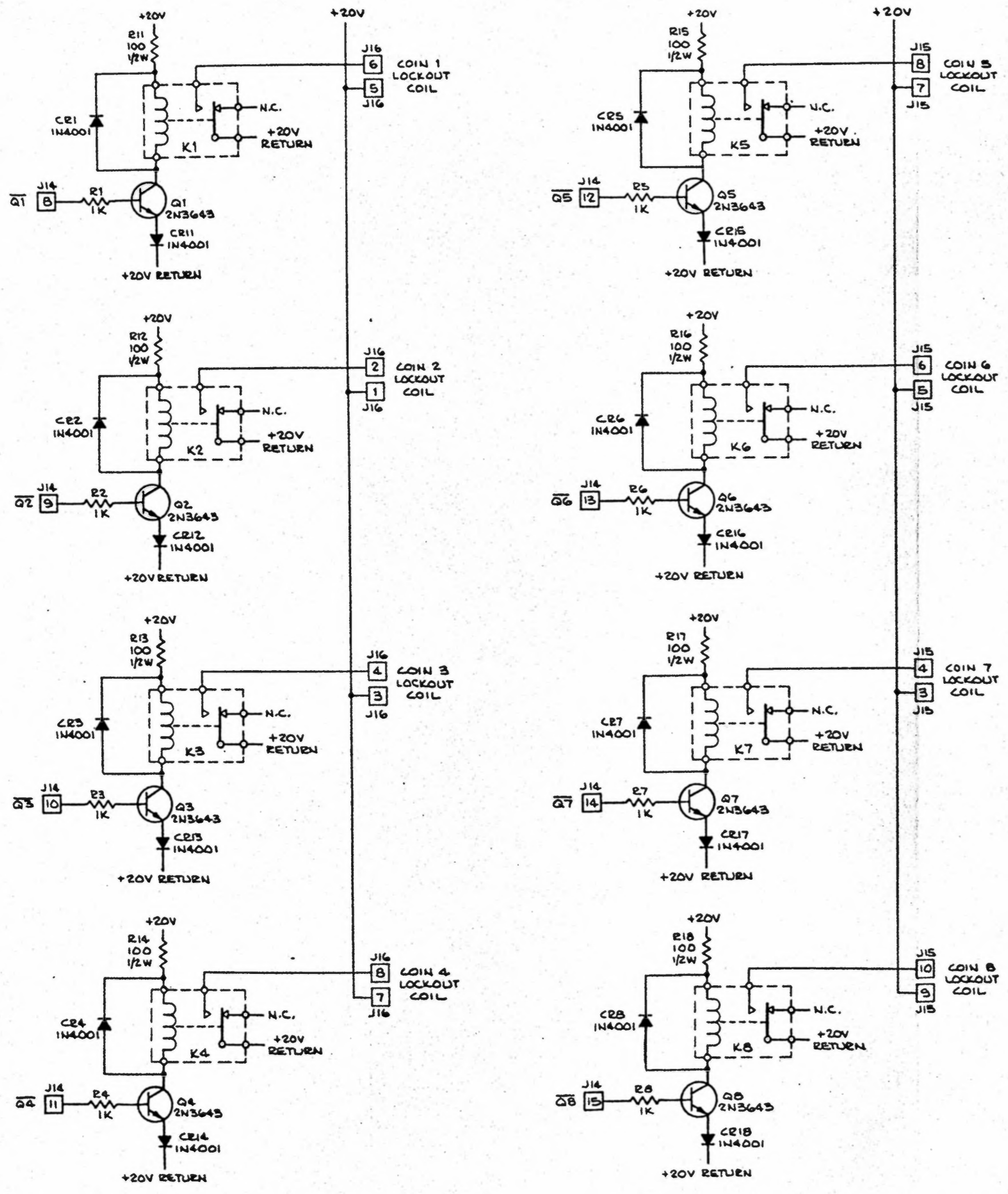
- NOTES:
1. REMOVE PINS 3 AND 8 FROM J13 BEFORE MOUNTING.
  2. REMOVE PINS 1 AND 2 FROM J15 BEFORE MOUNTING.
  3. REMOVE PINS 9 AND 10 FROM J16 BEFORE MOUNTING.
  4. THE FOLLOWING COMPONENTS SHALL BE HAND SOLDERED:
    - A. CR19 AND CR20 (IN1199A).
    - B. ON/OFF SWITCH (ITEM 7).
    - C. R1 THRU R8 (RELAYS).
  5. CR21 AND CR22 SHALL BE MOUNTED VERTICALLY TO BOARD
  6. ADD AWG 20 JUMPER ON CIRCUIT SIDE AS SHOWN
  7. ADD AWG 20 JUMPER ON CIRCUIT SIDE AS SHOWN



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DESIGNED BY P. BRISTOW 2-13-75	ATARI INCORPORATED 1400 Wilson Avenue Fremont, CA 94538
CHECKED BY [blank]	TITLE ASSEMBLY, RT-8 POWER SUPPLY
DRAWN BY [blank]	PART NO. A003191
DATE 3/15/75	REV B

REVISIONS			
SYM	DESCRIPTION	INITIALS AND DATE	
A	PRODUCTION RELEASE	2/15/75	1/1/75
B	REVISED PER ECN 1185	4/2/75	2/1/75



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003191	RT-8 PLAYER
DATE	END IN
APPROVED	

INTERPRET THIS DRAWING PER CHAPTER 1145	DRAWN BY SLADE 2/15/75	DATE	ATARI INCORPORATED 14000 Redwood Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	CHECKED	PROJECT NUMBER RT-8 FEB 75	TITLE SCHEMATIC, RT-8 POWER SUPPLY
FRACTIONS: 1/16 1/8 1/4 3/8 1/2 3/4 1 1 1/2 2 3 4 5 6 8 10 12 16 20 24 32 40 48 60 72 96 120 144 180 240 360 480 600 720 960 1200 1440 1800 2400 3600 4800 6000 7200 9600 12000 14400 18000 24000 36000 48000 60000 72000 96000 120000 144000 180000 240000 360000 480000 600000 720000 960000 1200000 1440000 1800000 2400000 3600000 4800000 6000000 7200000 9600000 12000000 14400000 18000000 24000000 36000000 48000000 60000000 72000000 96000000 120000000 144000000 180000000 240000000 360000000 480000000 600000000 720000000 960000000 1200000000 1440000000 1800000000 2400000000 3600000000 4800000000 6000000000 7200000000 9600000000 12000000000 14400000000 18000000000 24000000000 36000000000 48000000000 60000000000 72000000000 96000000000 120000000000 144000000000 180000000000 240000000000 360000000000 480000000000 600000000000 720000000000 960000000000 1200000000000 1440000000000 1800000000000 2400000000000 3600000000000 4800000000000 6000000000000 7200000000000 9600000000000 12000000000000 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ASSEMBLY TITLE RT8 COIN CONTROL BOARD P/L 003184

PARTS LIST SPECIFICATION

Page 1 of 1

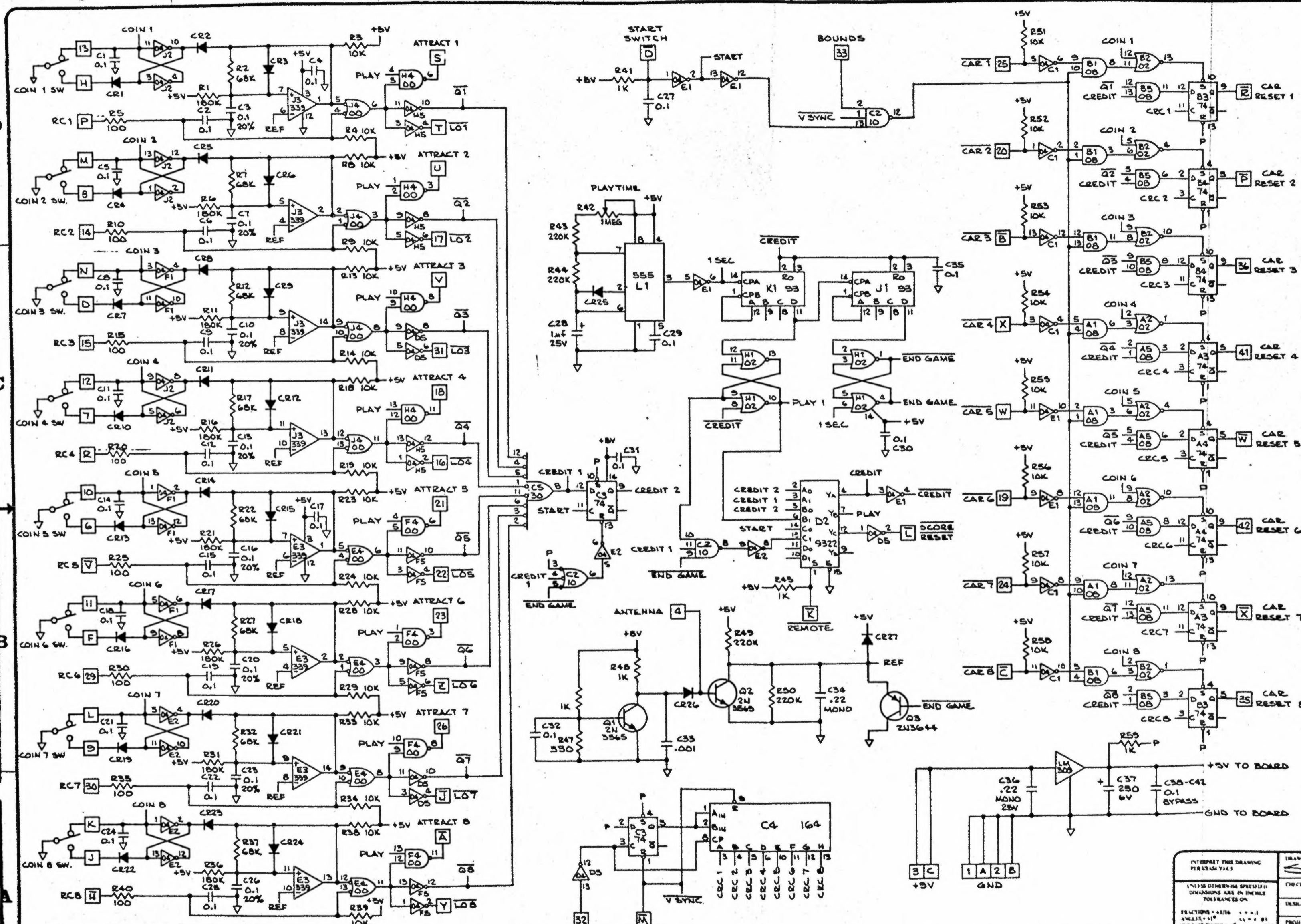
Drawn	
Checked	Mech. Eng.
Proj. Eng. <i>L. R. Allen</i>	Elec. Eng. <i>V. K. ... 4 FEB 75</i>
	<i>AKA 7 2/4/75</i>
	REV. B

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD 1161	2-4-75	<i>[Signature]</i>				
B	Rev per ECN 1161	2-26-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003185	1	Printed Circuit Board
2	37-LM309	1	LM309K Positive 5-Volt Regulator
3	78-06004	1	Heatsink, WakeField 680-.75A
4	72-1412S	2	Screw, Machine, Pan Hd., Phil., 6-32 x 5/8"
5	75-916S	2	Nut, Machine, Hex, 6-32
6	75-016	2	Flat Washer, Regular, #6
7	75-056	2	Lock Washer, Internal Star, #6
8	37-7400	4	7400 I.C.
9	37-7402	3	7402 "
10	37-7404	8	7404 "
11	37-7408	4	7408 "
12	37-7410	1	7410 "
13	37-7430	1	7430 "
14	37-7474	5	7474 "
15	37-7493	2	7493 "
16	37-74164	1	74164 "
17	37-9322	1	9322 "
18	37-555	1	555 Timer I.C.
19	37-LM339	2	LM339 Quad Comparator
20	34-2N3565	2	Transistor, NPN, Type 2N3565
21	31-1N914	27	Diode, Type 1N914
22			
23	10-5101	8	Resistor, Carbon, 5%, 1/4W, 100 ohm
24	10-5102	5	" " " " 1K "
25	10-5103	24	" " " " 10K "
26			
27	10-5683	8	" " " " 68K "
28	10-5224	4	" " " " 220K "
29	10-5331	1	" " " " 330 "
30	10-5184	8	" " " " 180K "
31	19-311105	1	Trimpot, 1M ohm, P.C. Vert. Mount
32	27-101102	1	Capacitor, Ceramic, .001 uf, 100V
33	27-101104	29	" " 0.1 uf, 100V
34	29-011	2	Capacitor, Monolythic, .22 uf, 12V, Rad.
35	24-250105	1	Capacitor Electrolytic, 1 uf, 25V
36	24-060257	1	" " 250 uf, 6V
37	27-120104	8	Capacitor, Ceramic, 0.1 uf, 12V, 20%
38	33-2N3644	1	Transistor, PNP, 2N3644



REVISIONS		INITIALS AND DATE		
SYM	DESCRIPTION	DATE	INITIALS	DATE
B	PRODUCTION RELEASE	2/26/75	JK	JK



LAST REF. DESIGNATIONS  
 R59  
 C42  
 CR20  
 Q2

NOTE: 1. ALL DIODES ARE 1N514.

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INTERPRET THIS DRAWING PER IEC 7145	DATE 1/7/75	 ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED DESIGN ENGINEER PROJECT ENGINEER DATE 27 FEB 75	
FRACTIONS - 1/16" = .0625" ANGLES - 45° SURFACE FINISH - AS SHOWN	TITLE SCHEMATIC, COIN CONTROL BOARD PART NUMBER 003184 REV B	MATERIAL 003184 STAP 1/22 DATE 1/27/75



ASSEMBLY TITLE / RT8 SYNC BOARD

P/L003182

PARTS LIST SPECIFICATION

Page 1 of 1

Drawn

Checked *MJ.* 2-19-75

Mech. Eng.

Proj. Eng. *L. J. R...* 4 FEB 75

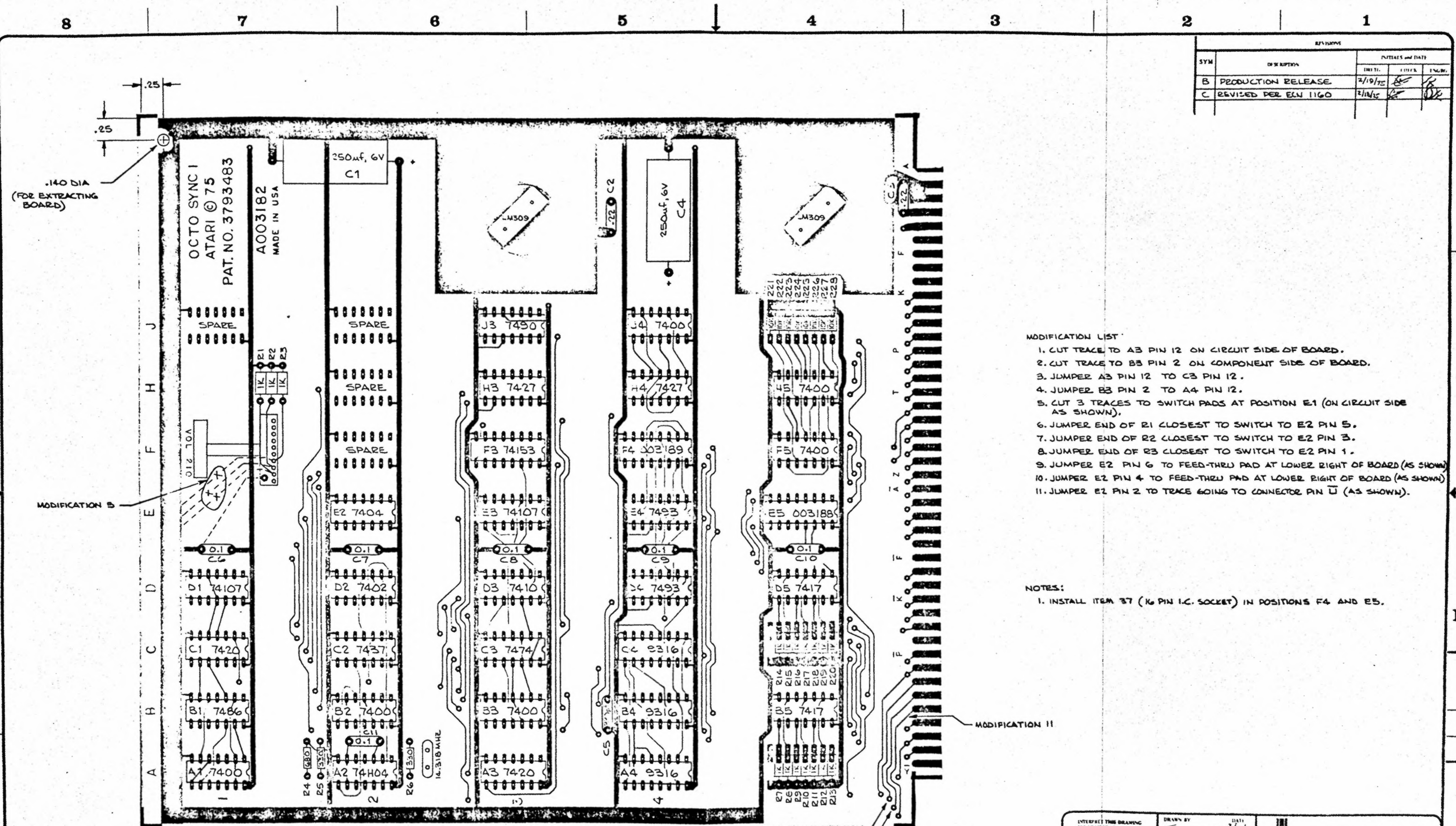
Elec. Eng. *V. R...* 4 FEB 75

REV.  
C

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	2-4-75	<i>[Signature]</i>				
B	REV PER ECN 1143	2-19-75	<i>[Signature]</i>				
C	REV PER ECN 1160	2/28/75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003183	1	Printed Circuit Board
2	37-LM309	2	LM309K Positive 5-Volt Regulator
3	78-06004	2	Heatsink, Wakefield 680-.75A
4	72-1610S	4	Screw, Mach, , Pn Hd, Phil, 6-32 x 5/8"
5	75-916S	4	Nut, Machine, Hex, 6-32
6	75-016	4	Flatwasher, Regular, #6
7	75-056	4	Lock Washer, Internal Star, #6
8	66-071P4T	1	Rotary Switch, P.C. Mount, 1P-4T, Grayhill #71AF36-01-1-04-N
9	73-802	1	Switch Knob (Raytheon #50-5-1)
10	37-7400	6	7400 Integrated Circuit
11	37-7402	1	7402 " "
12	37-74H04	1	74H04 " "
13	37-7410	1	7410 " "
14	37-7417	2	7417 " "
15	37-7420	2	7420 " "
16	37-7427	2	7427 " "
17	37-7437	1	7437 " "
18	37-7474	1	7474 " "
19	37-7486	1	7486 " "
20	37-7490	1	7490 " "
21	37-7493	2	7493 " "
22	37-74107	2	74107 " "
23	37-74153	1	74153 " "
24	37-9316	3	9316 " "
25	003188	1	P-ROM, RT8 Check Points, 32 x 8, 256 Bit
26	003189	1	P-ROM, RT8 Racetrack, 256 x 4, 1024 Bit
27	90-101	1	14.318MHZ Crystal
28	10-5331	2	Resistor, Carbon, 5%, 1/4W, 330 ohm
29	10-5681	1	Resistor, Carbon, 5%, 1/4W, 680 ohm
30	10-5102	17	Resistor, Carbon, 5%, 1/4W, 1K ohm
31	10-5103	8	Resistor, Carbon, 5%, 1/4W, 10K ohm
32	28-101331	1	Capacitor, Mica, 330pf, 100V
33	27-101104	6	Capacitor, Ceramic, 0.1uf, 100V
34	29-011	2	Capacitor, Monolythic, .22uf, 12V
35	24-060257	2	Capacitor, Electrolytic, 250uf, 6V
36	37-7404	1	7404 INTEGRATED CIRCUIT
37	79-42116	2	SOCKET, I.C., 16 PIN

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DATE	DESIGN	ENGR.
B	PRODUCTION RELEASE	2/19/75		
C	REVISED PER ECN 1160	2/11/75		



MODIFICATION LIST

1. CUT TRACE TO A3 PIN 12 ON CIRCUIT SIDE OF BOARD.
2. CUT TRACE TO B3 PIN 2 ON COMPONENT SIDE OF BOARD.
3. JUMPER A3 PIN 12 TO C3 PIN 12.
4. JUMPER B3 PIN 2 TO A4 PIN 12.
5. CUT 3 TRACES TO SWITCH PADS AT POSITION E1 (ON CIRCUIT SIDE AS SHOWN).
6. JUMPER END OF R1 CLOSEST TO SWITCH TO E2 PIN 5.
7. JUMPER END OF R2 CLOSEST TO SWITCH TO E2 PIN 3.
8. JUMPER END OF R3 CLOSEST TO SWITCH TO E2 PIN 1.
9. JUMPER E2 PIN 6 TO FEED-THRU PAD AT LOWER RIGHT OF BOARD (AS SHOWN).
10. JUMPER E2 PIN 4 TO FEED-THRU PAD AT LOWER RIGHT OF BOARD (AS SHOWN).
11. JUMPER E2 PIN 2 TO TRACE GOING TO CONNECTOR PIN U (AS SHOWN).

NOTES:

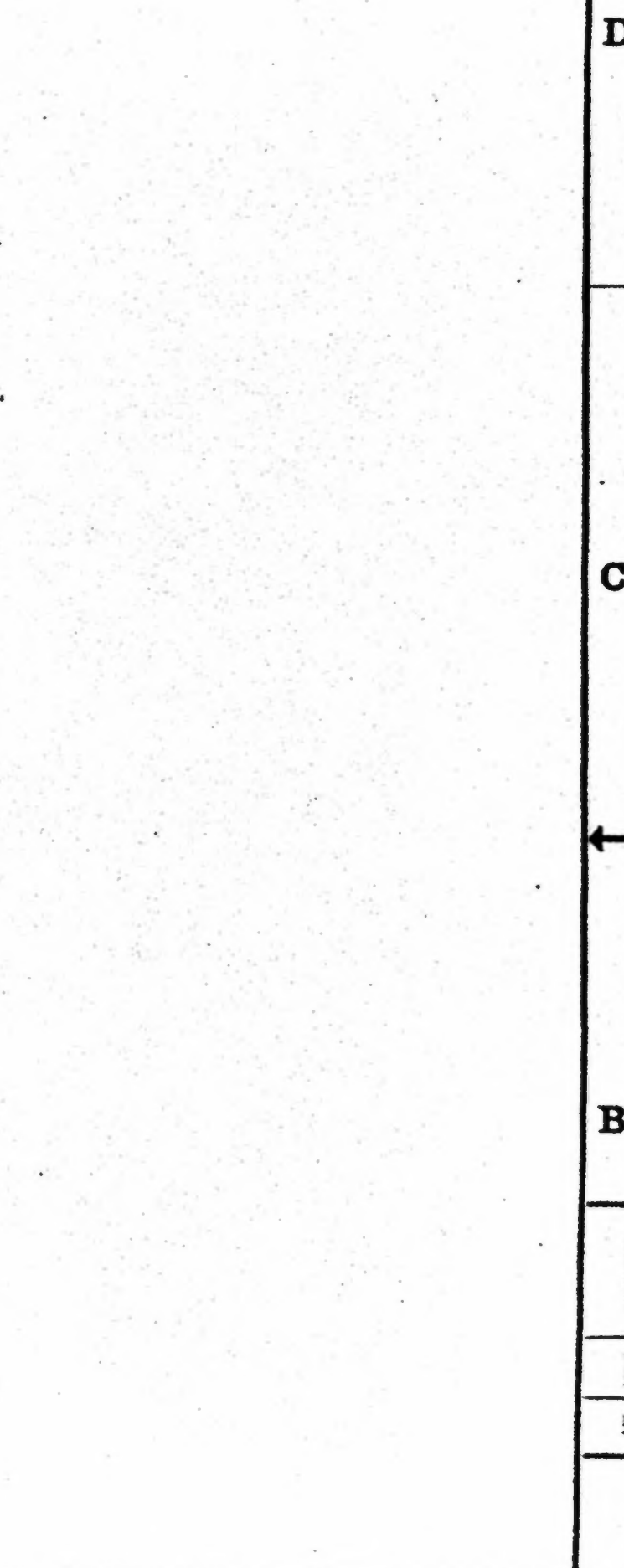
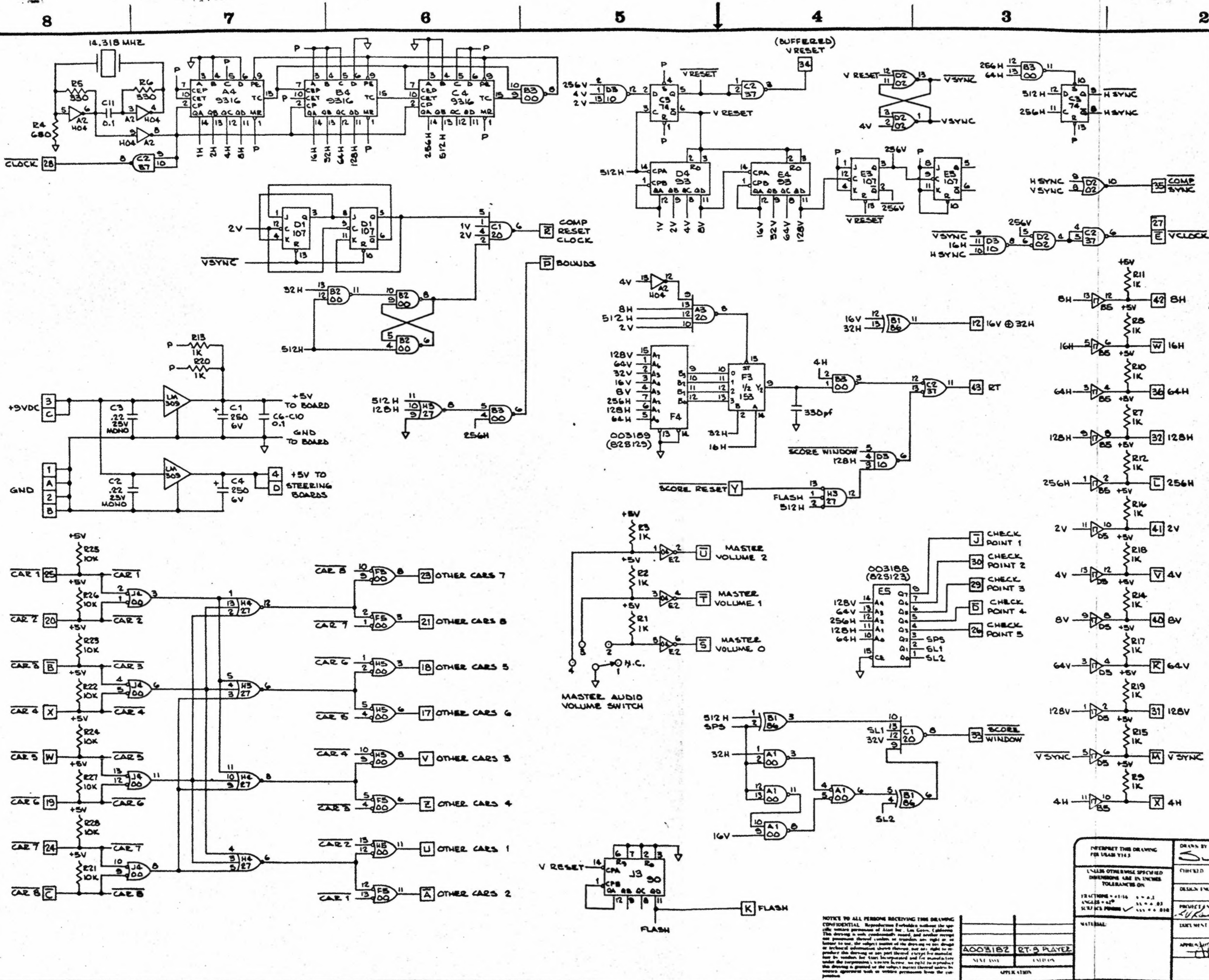
1. INSTALL ITEM 37 (16 PIN I.C. SOCKET) IN POSITIONS F4 AND E5.

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INTERPRET THIS DRAWING PER ISAS 1743	DRAWN BY SLADE 2/11/75	ATARI INCORPORATED 1400 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS - ±0.005 ANGLES - ±1° SURFACE FINISH - 125 ± 0.010	CHECKED	
MATERIAL SEE P/L 003182	DESIGN ENGINEER	DATE 2/11/75
	PROJECT ENGINEER	DRAWING NO. A003182
	DOCUMENT CONTROL	REV. C

OPERATION	DATE	INITIALS

SYM	DESCRIPTION	INITIALS AND DATE		
		DESIGN	CHKD	DATE
B	PRODUCTION RELEASE			2/19/75
C	REVISED PER ECN 1160			1/28/75
D	REVISED PER ECN 1252			2/26/75



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INTERPRET THE DRAWING FOR U.S.A. 1143 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	DRAWN BY: <i>Slade</i> DATE: <i>2/17/75</i>	ATARI INCORPORATED 1400 Webster Boulevard Los Gatos, California 95030
	FINISHED: _____ DESIGN ENGINEER: _____ PROJECT NUMBER: <i>19 FEB 75</i> DATE SENT CONTROL: _____ APPROVAL: _____	
MATERIAL: _____ APPLICATION: _____	MAX. WAVELENGTH: _____ MIN. WAVELENGTH: _____	DATE: _____ REV: _____



ASSEMBLY TITLE / RT8 SCORE BOARD

P/L003170

PARTS LIST SPECIFICATION

Page 1 of 1

Drawn

Checked

Mech. Eng.

Proj. Eng. *L. Rain* 3 FEB 75

Elec. Eng. *L. Rain* 3 FEB 75

REV.

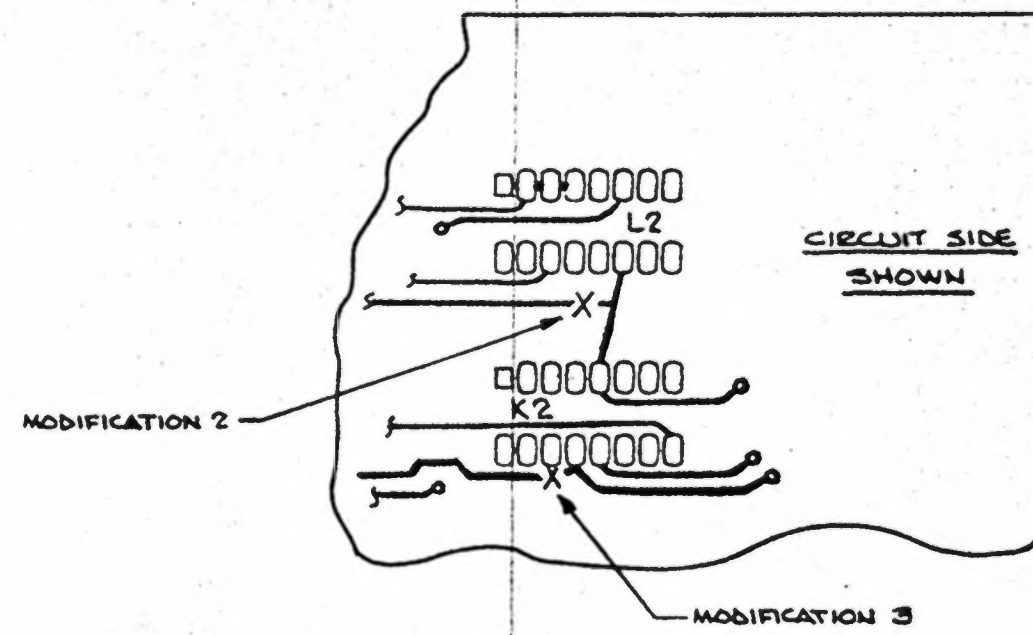
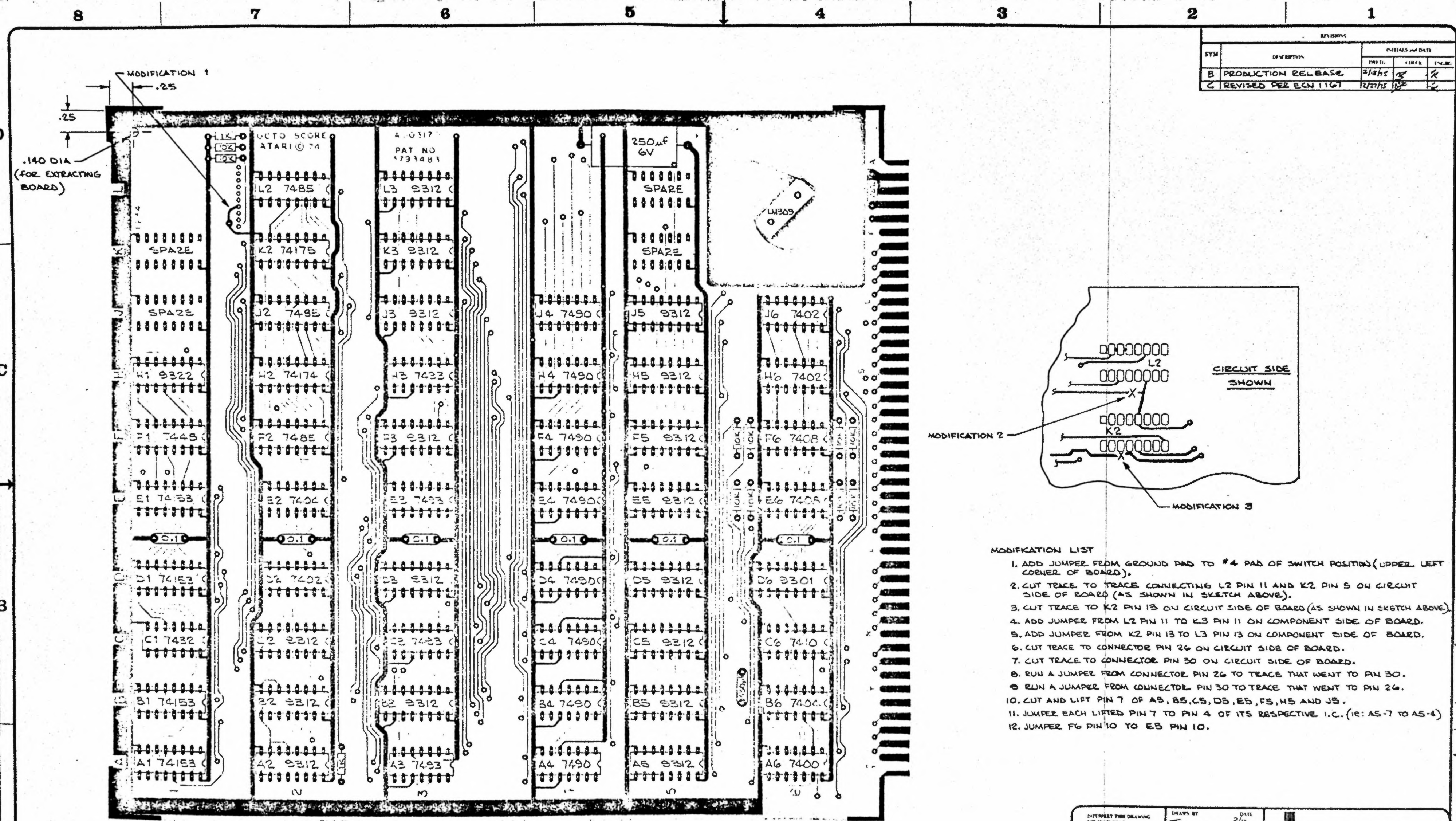
*AW* 2/3/75

C

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROP REF	2-3-75	<i>[Signature]</i>				
B	Rev per ECN 1142	2-18-75	<i>[Signature]</i>				
C	REV PER ECN 1167	2-27-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	003171	1	Printed Circuit Board
2	37-LM309	1	LM309K Positive 5-Volt Regulator
3	78-06005	1	Heatsink, Wakefield 680-1.0A
4	72-1412S	2	Screw, Mach., Sheetmetal, Pan Hd, Phil, 6-32 x 5/8"
5	75-916S	2	Nut, Machine, Hex, 6-32
6	75-016	2	Flat Washer, Regular, #6
7	75-056	2	Lock Washer, Internal Star, #6
8			
9			
10	37-7400	1	7400 Integrated Circuit
11	37-7402	3	7402 " "
12	37-7404	2	7404 " "
13	37-7408	2	7408 " "
14	37-7410	1	7410 " "
15	37-7432	1	7432 " "
16	37-7448	1	7448 " "
17	37-7485	3	7485 " "
18	37-7490	8	7490 " "
19	37-7493	4	7493 " "
20	37-74153	4	74153 " "
21	37-74174	1	74174 " "
22	37-74175	1	74175 " "
23	37-9301	1	9301 " "
24	37-9312	17	9312 " "
25	37-9322	1	9322 " "
26	10-5102	2	Resistor, Carbon, 5%, 1/4W, 1K ohm
27	10-5103	10	Resistor, Carbon, 5%, 1/4W, 10K ohm
29	28-101331	1	Capacitor, Mica, 330pf, 100V
30	27-101104	6	Capacitor, Ceramic, 0.1uf, 100V
31	29-011	1	Capacitor, Monolythic, .22uf, 12V
32	24-060257	1	Capacitor, Electrolytic, 250uf, 6V

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DESIGN	ENGR	CHKD
B	PRODUCTION RELEASE	2/18/75	AS	AS
C	REVISED PER ECN 1167	2/17/75	AS	AS

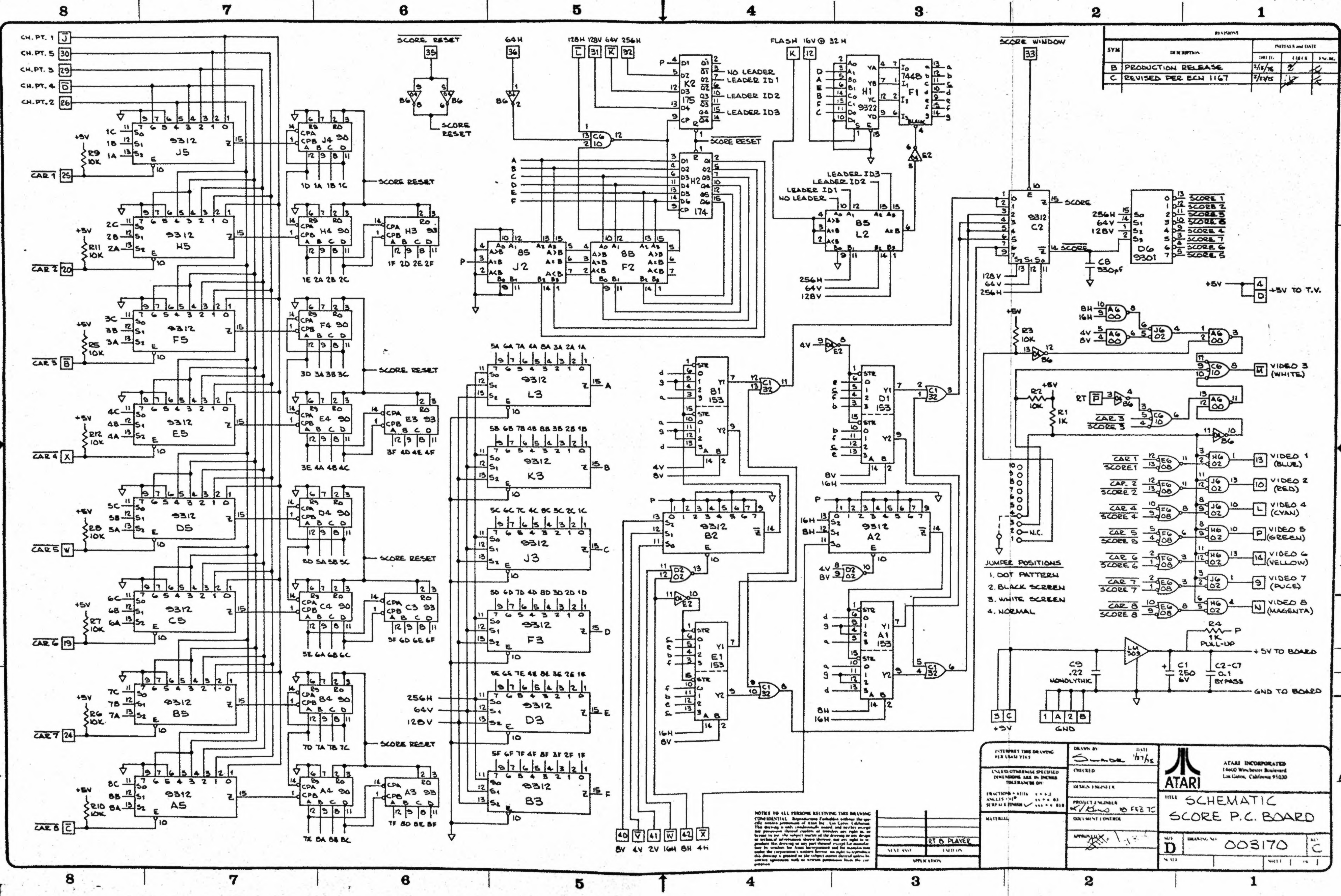


- MODIFICATION LIST**
1. ADD JUMPER FROM GROUND PAD TO #4 PAD OF SWITCH POSITION (UPPER LEFT CORNER OF BOARD).
  2. CUT TRACE TO TRACE CONNECTING L2 PIN 11 AND K2 PIN 5 ON CIRCUIT SIDE OF BOARD (AS SHOWN IN SKETCH ABOVE).
  3. CUT TRACE TO K2 PIN 13 ON CIRCUIT SIDE OF BOARD (AS SHOWN IN SKETCH ABOVE).
  4. ADD JUMPER FROM L2 PIN 11 TO K3 PIN 11 ON COMPONENT SIDE OF BOARD.
  5. ADD JUMPER FROM K2 PIN 13 TO L3 PIN 13 ON COMPONENT SIDE OF BOARD.
  6. CUT TRACE TO CONNECTOR PIN 26 ON CIRCUIT SIDE OF BOARD.
  7. CUT TRACE TO CONNECTOR PIN 30 ON CIRCUIT SIDE OF BOARD.
  8. RUN A JUMPER FROM CONNECTOR PIN 26 TO TRACE THAT WENT TO PIN 30.
  9. RUN A JUMPER FROM CONNECTOR PIN 30 TO TRACE THAT WENT TO PIN 26.
  10. CUT AND LIFT PIN 7 OF A5, B5, C5, D5, E5, F5, H5 AND J5.
  11. JUMPER EACH LIFTED PIN 7 TO PIN 4 OF ITS RESPECTIVE I.C. (I.E. A5-7 TO A5-4)
  12. JUMPER F6 PIN 10 TO E5 PIN 10.

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INTEREST THIS DRAWING FOR UNASS VHS	DRAWN BY SLADE 2/13	DATE 2/13	 ATARI INCORPORATED 1400 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	DESIGN ENGINEER	
FRACTIONS - 1/16 1/8 1/4 3/8 1/2 3/4 1 1 1/2 2 3 4	PROJECT MANAGER SLADE 12 FEB 75	QUALITY CONTROL	TITLE ASSEMBLY, RT-8 SCORE BOARD
MATERIAL SEE P/L 003170	APPROVED SLADE 7 31 75	DATE 7 31 75	DWG. NO. A003170
DATE NEXT REV. REVISION	RT-8 PLAYER	SCALE 1:1	REV. C

REV	DESCRIPTION	DATE	BY	CHK
B	PRODUCTION RELEASE	2/18/76	J	J
C	REVISED PER ECN 1167	2/24/76	J	J



INTERNET THIS DRAWING FOR 154M 1141	DRAWN BY: <i>Shane</i> 1/11/76	 ATARI INCORPORATED 14400 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	CHECKED:	
FRACTIONS - 1/16" ... 1/8" ... 1/4" ... 1/2" ... 3/4" ... 1"	DESIGN NUMBER:	TITLE: SCHEMATIC SCORE P.C. BOARD
DECIMALS - 0.015" ... 0.030" ... 0.060" ... 0.120" ... 0.250" ... 0.500" ... 1.000"	PROJECT NUMBER: <i>1/15/76</i>	
MATERIAL:	DESIGN CENTER:	APPR'D BY: <i>[Signature]</i> DATE: <i>2/18/76</i>
APPLICATION: RT 0 PLAYER		MFR: <i>D</i> DRAWING NO: 003170    ALT: <i>C</i>

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ASSEMBLY TITLE / RT8 CAR BOARD P/L 003000

PARTS LIST SPECIFICATION Page 1 of 2

Drawn	
Checked	Mech. Eng.
Proj. Eng. <i>J. C. ... 2/3/75</i>	Elec. Eng. <i>J. C. ... 2/3/75</i>
	<i>APR 7 2/3/75</i>
	REV. B

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REF	2-3-75	<i>[Signature]</i>				
B	REV PER ECN 1166	2-27-75	<i>[Signature]</i>				

Item	Part Number	Qty.	DESCRIPTION
1	002999	1	Printed Circuit Board
2	78-06004	1	Heatsink, Wakefield #680-.75A
3	37-LM309	1	LM309K Positive 5-Volt Regulator
4	37-LM340T-15	1	LM340T-15 Positive 15-Volt Regulator
5	37-7400	4	7400 Integrated Circuit
6	37-7402	2	7402 " "
7	37-7404	3	7404 " "
8	37-7406	1	7406 " "
9	37-7410	1	7410 " "
10	37-7414	1	7414 " "
11	37-7420	1	7420 " "
12	37-7474	2	7474 " "
13	37-7475	1	7475 " "
14	37-7485	1	7485 " "
15	37-7490	1	7490 " "
16	37-7492	1	7492 " "
17	37-7493	1	7493 " "
18	37-74107	2	74107 " "
19	37-74153	1	74153 " "
20	37-74193	3	74193 " "
21	003186	1	ROM, RT8 Car Video, 512 x 8, 4096 Bit
22	003187	1	P-ROM, RT8 Motion Code, 32 x 8, 256 Bit
23	37-9312	1	9312 Integrated Circuit
24	37-9316	5	9316 " "
25	37-555	2	555 Timer Integrated Circuit
26	37-LM324	1	LM324 Quad Op Amp
27	37-LM380	1	LM380 Audio Power Amp
28	34-2N3565	1	Transistor, NPN, Type 2N3565
29	34-2N3643	1	Transistor, NPN, Type 2N3643
30	35-2N3644	1	Transistor, PNP, Type 2N3644
31	31-1N914	8	Diode, Type 1N914
32	38-MV 5013	2	Light Emitting Diode, Visible, Red
33	79-42424	1	24 pin Solder Socket
34	79-42116	1	16 pin Solder Socket
35	19-311103	1	10K ohm Trimpot
36	10-5151	2	Resistor, Carbon, 5%, 1/4W, 150 ohm
37	10-5102	7	" " " " 1K ohm
38	10-5152	1	" " " " 1.5K ohm
39	10-5332	1	" " " " 3.3K ohm
40	10-5472	8	" " " " 4.7K ohm

## PARTS LIST SPECIFICATION

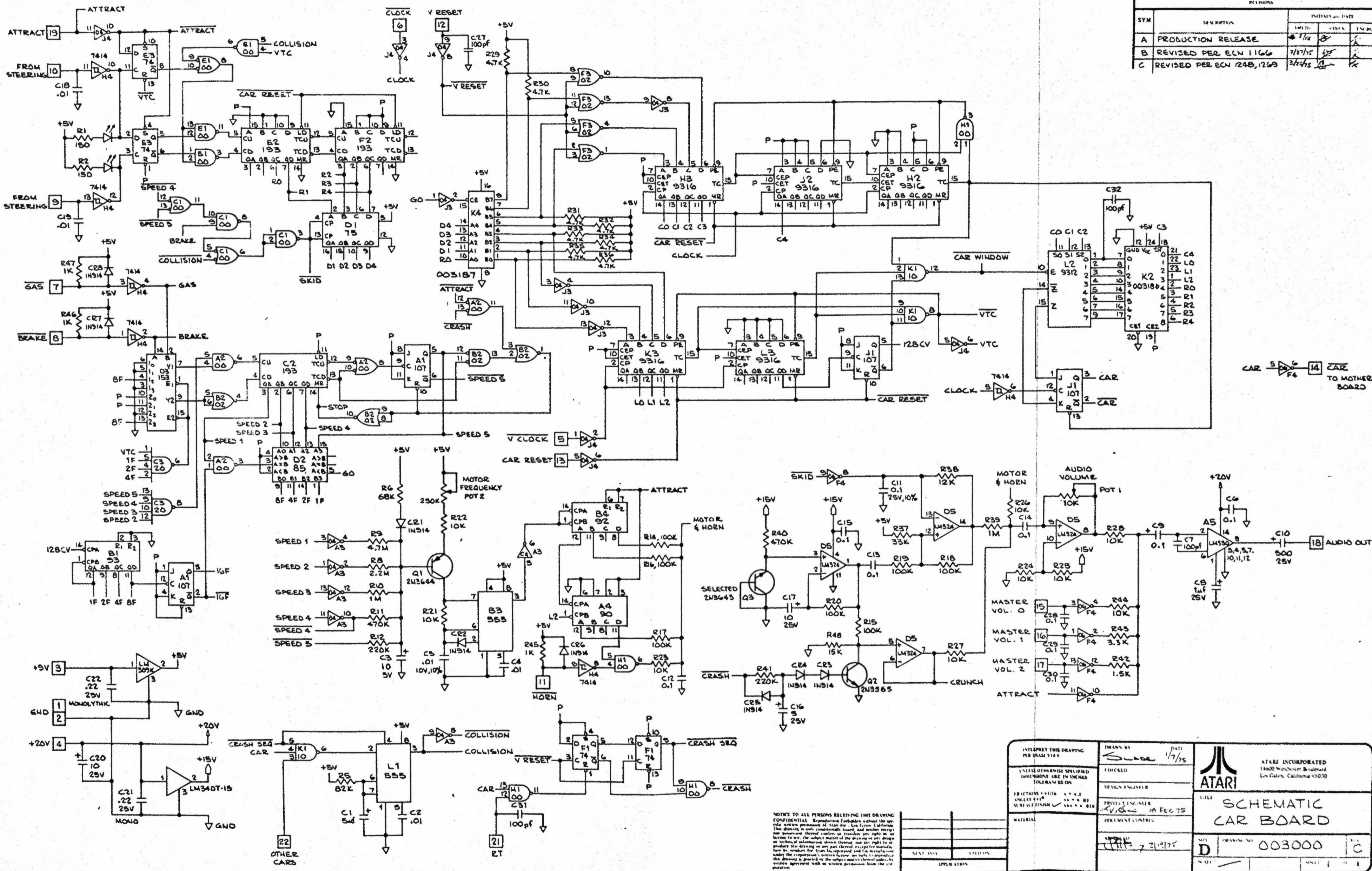
REV E

Page 2 of 2

Item	Part Number	Qty.	DESCRIPTION
41	10-5103	9	Resistor, Carbon, 5%, 1/4W, 10K ohm
42	10-5123	1	" " " " 12K ohm
43	10-5153	1	" " " " 15K ohm
44	10-5333	1	" " " " 33K ohm
45	10-5683	1	" " " " 68K ohm
46	10-5823	1	" " " " 82K ohm
47	10-5104	7	" " " " 100K ohm
48	10-5224	2	" " " " 220K ohm
49	10-5474	2	" " " " 470K ohm
50	10-5105	2	" " " " 1M ohm
51	10-5225	1	" " " " 2.2M ohm
52	10-5475	1	" " " " 4.7M ohm
53	19-311254	1	250K ohm Trimpot
54	28-101101	3	Capacitor, Mica, 100pf, 100V
55	27-101103	4	" Ceramic, .01uf, 100V
56	21-250103	1	" Film (Mylar), .01uf, 25V
57	27-101104	13	" Ceramic, 0.1uf, 100V
58	21-250104	1	" Film (Mylar), 0.1uf, 25V
59	29-011	2	" Monolythic, 0.22uf, 12V
60	24-250105	1	" Electrolytic, 1uf, 25V
61	24-250505	2	" Electrolytic, 5uf, 25V
62	24-250106	3	" Electrolytic, 10uf, 25V
63	24-250507	1	" Electrolytic, 500uf, 25V
64	72-1412S	2	Screw, Mach, Sht Mtl, Pn Hd, Phil, 6-32 x 5/8"
65	75-916S	2	Nut, Machine, Hex, 6-32
66	75-016	2	Flat Washer, #6
67	75-056	2	Lock Washer, Internal Sta., #6



SYM	DESCRIPTION	INITIALS - DATE		
		DESIGN	CHECK	DATE
A	PRODUCTION RELEASE			
B	REVISED PER ECN 1166			2/17/75
C	REVISED PER ECN 1248, 1269			2/17/75



INTERPRET THIS DRAWING PER USAS 7115	DRAWN BY: <i>S. Suda</i> DATE: 1/7/75	 ATARI INCORPORATED 1400 Woodhurst Boulevard Los Altos, California 95020
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED:	
FRACTIONS - 1/16 3/32 1/8 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 10 1/2 11 11 1/2 12 12 1/2 13 13 1/2 14 14 1/2 15 15 1/2 16 16 1/2 17 17 1/2 18 18 1/2 19 19 1/2 20 20 1/2 21 21 1/2 22 22 1/2 23 23 1/2 24 24 1/2 25 25 1/2 26 26 1/2 27 27 1/2 28 28 1/2 29 29 1/2 30 30 1/2 31 31 1/2 32 32 1/2 33 33 1/2 34 34 1/2 35 35 1/2 36 36 1/2 37 37 1/2 38 38 1/2 39 39 1/2 40 40 1/2 41 41 1/2 42 42 1/2 43 43 1/2 44 44 1/2 45 45 1/2 46 46 1/2 47 47 1/2 48 48 1/2 49 49 1/2 50 50 1/2 51 51 1/2 52 52 1/2 53 53 1/2 54 54 1/2 55 55 1/2 56 56 1/2 57 57 1/2 58 58 1/2 59 59 1/2 60 60 1/2 61 61 1/2 62 62 1/2 63 63 1/2 64 64 1/2 65 65 1/2 66 66 1/2 67 67 1/2 68 68 1/2 69 69 1/2 70 70 1/2 71 71 1/2 72 72 1/2 73 73 1/2 74 74 1/2 75 75 1/2 76 76 1/2 77 77 1/2 78 78 1/2 79 79 1/2 80 80 1/2 81 81 1/2 82 82 1/2 83 83 1/2 84 84 1/2 85 85 1/2 86 86 1/2 87 87 1/2 88 88 1/2 89 89 1/2 90 90 1/2 91 91 1/2 92 92 1/2 93 93 1/2 94 94 1/2 95 95 1/2 96 96 1/2 97 97 1/2 98 98 1/2 99 99 1/2 100 100 1/2 101 101 1/2 102 102 1/2 103 103 1/2 104 104 1/2 105 105 1/2 106 106 1/2 107 107 1/2 108 108 1/2 109 109 1/2 110 110 1/2 111 111 1/2 112 112 1/2 113 113 1/2 114 114 1/2 115 115 1/2 116 116 1/2 117 117 1/2 118 118 1/2 119 119 1/2 120 120 1/2 121 121 1/2 122 122 1/2 123 123 1/2 124 124 1/2 125 125 1/2 126 126 1/2 127 127 1/2 128 128 1/2 129 129 1/2 130 130 1/2 131 131 1/2 132 132 1/2 133 133 1/2 134 134 1/2 135 135 1/2 136 136 1/2 137 137 1/2 138 138 1/2 139 139 1/2 140 140 1/2 141 141 1/2 142 142 1/2 143 143 1/2 144 144 1/2 145 145 1/2 146 146 1/2 147 147 1/2 148 148 1/2 149 149 1/2 150 150 1/2 151 151 1/2 152 152 1/2 153 153 1/2 154 154 1/2 155 155 1/2 156 156 1/2 157 157 1/2 158 158 1/2 159 159 1/2 160 160 1/2 161 161 1/2 162 162 1/2 163 163 1/2 164 164 1/2 165 165 1/2 166 166 1/2 167 167 1/2 168 168 1/2 169 169 1/2 170 170 1/2 171 171 1/2 172 172 1/2 173 173 1/2 174 174 1/2 175 175 1/2 176 176 1/2 177 177 1/2 178 178 1/2 179 179 1/2 180 180 1/2 181 181 1/2 182 182 1/2 183 183 1/2 184 184 1/2 185 185 1/2 186 186 1/2 187 187 1/2 188 188 1/2 189 189 1/2 190 190 1/2 191 191 1/2 192 192 1/2 193 193 1/2 194 194 1/2 195 195 1/2 196 196 1/2 197 197 1/2 198 198 1/2 199 199 1/2 200 200 1/2 201 201 1/2 202 202 1/2 203 203 1/2 204 204 1/2 205 205 1/2 206 206 1/2 207 207 1/2 208 208 1/2 209 209 1/2 210 210 1/2 211 211 1/2 212 212 1/2 213 213 1/2 214 214 1/2 215 215 1/2 216 216 1/2 217 217 1/2 218 218 1/2 219 219 1/2 220 220 1/2 221 221 1/2 222 222 1/2 223 223 1/2 224 224 1/2 225 225 1/2 226 226 1/2 227 227 1/2 228 228 1/2 229 229 1/2 230 230 1/2 231 231 1/2 232 232 1/2 233 233 1/2 234 234 1/2 235 235 1/2 236 236 1/2 237 237 1/2 238 238 1/2 239 239 1/2 240 240 1/2 241 241 1/2 242 242 1/2 243 243 1/2 244 244 1/2 245 245 1/2 246 246 1/2 247 247 1/2 248 248 1/2 249 249 1/2 250 250 1/2 251 251 1/2 252 252 1/2 253 253 1/2 254 254 1/2 255 255 1/2 256 256 1/2 257 257 1/2 258 258 1/2 259 259 1/2 260 260 1/2 261 261 1/2 262 262 1/2 263 263 1/2 264 264 1/2 265 265 1/2 266 266 1/2 267 267 1/2 268 268 1/2 269 269 1/2 270 270 1/2 271 271 1/2 272 272 1/2 273 273 1/2 274 274 1/2 275 275 1/2 276 276 1/2 277 277 1/2 278 278 1/2 279 279 1/2 280 280 1/2 281 281 1/2 282 282 1/2 283 283 1/2 284 284 1/2 285 285 1/2 286 286 1/2 287 287 1/2 288 288 1/2 289 289 1/2 290 290 1/2 291 291 1/2 292 292 1/2 293 293 1/2 294 294 1/2 295 295 1/2 296 296 1/2 297 297 1/2 298 298 1/2 299 299 1/2 300 300 1/2 301 301 1/2 302 302 1/2 303 303 1/2 304 304 1/2 305 305 1/2 306 306 1/2 307 307 1/2 308 308 1/2 309 309 1/2 310 310 1/2 311 311 1/2 312 312 1/2 313 313 1/2 314 314 1/2 315 315 1/2 316 316 1/2 317 317 1/2 318 318 1/2 319 319 1/2 320 320 1/2 321 321 1/2 322 322 1/2 323 323 1/2 324 324 1/2 325 325 1/2 326 326 1/2 327 327 1/2 328 328 1/2 329 329 1/2 330 330 1/2 331 331 1/2 332 332 1/2 333 333 1/2 334 334 1/2 335 335 1/2 336 336 1/2 337 337 1/2 338 338 1/2 339 339 1/2 340 340 1/2 341 341 1/2 342 342 1/2 343 343 1/2 344 344 1/2 345 345 1/2 346 346 1/2 347 347 1/2 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