TM-055

Operation • Maintenance • Service Manual

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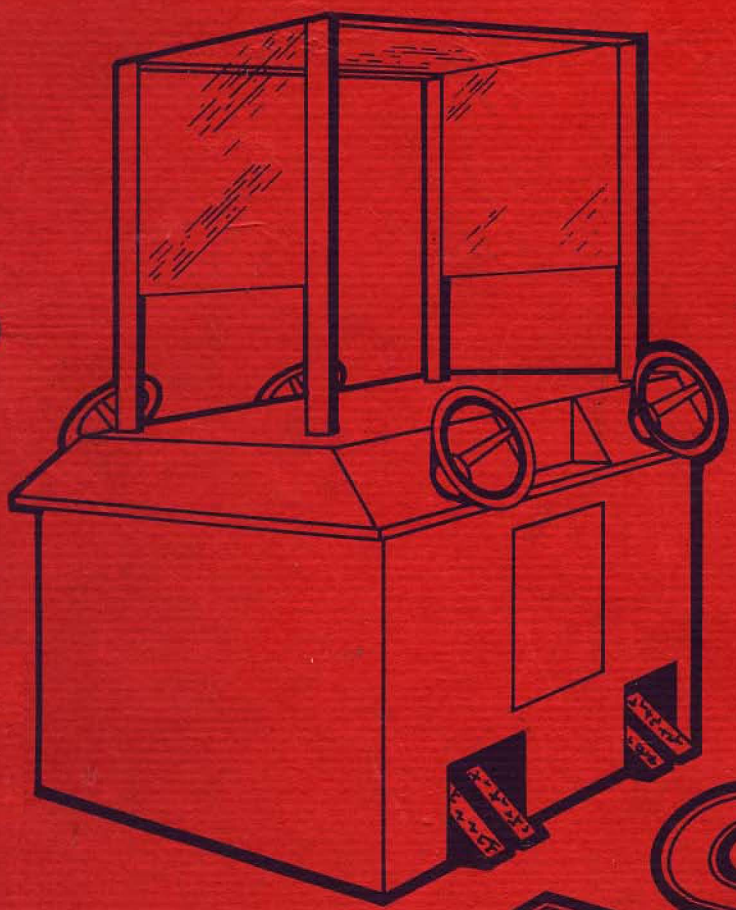

Indy 4

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WARRANTY

Seller warrants that its printed circuit boards and parts thereon are free from defects in material and workmanship under normal use and service for a period of ninety (90) days from date of shipment. Seller warrants that its television monitors are free from defects in material and workmanship under normal use and service for a period of thirty (30) days from date of shipment. None of the Seller's other products or parts thereof are warranted.

If the products described in this manual fail to conform to this warranty, Seller's sole liability shall be, at its option, to repair, replace, or credit Buyer's account for such products which are returned to Seller during said warranty period, provided:

(a) Seller is promptly notified in writing upon discovery by Buyer that said products are defective;

(b) Such products are returned prepaid to Seller's plant; and

(c) Seller's examination of said products discloses to Seller's satisfaction that such alleged defects existed and were not caused by accident, misuse, neglect, alteration, improper repair, installation or improper testing.

In no event shall Seller be liable for loss of profits, loss of use, incidental or consequential damages.

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I. GENERAL MAINTENANCE INFORMATION

1.1 INTRODUCTION

The Atari Indy 4 game consists of a cabinet, TV monitor, printed circuit boards (PCBs), interconnecting wiring, and various cabinet-mounted circuit components. The TV monitor, a GE 25-inch color unit, is not discussed in this manual, nor is a schematic of its PCB reproduced here. Rather, an in-depth manual has been prepared on this monitor, and it is available from Atari. Ask for TM-053, G.E. #25MB Color Monitor Troubleshooting Manual (for Indy 800 and similar games) from Atari, Inc., Customer Service Dept., 2175 Martin Avenue, Santa Clara, CA 95050.

TV circuit malfunctions can be solved using standard television 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 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 disconnected wires, or foreign objects shorting electrical connections. After the machine has been plugged in and turned on, perform the checkout procedure.

1.3 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:

1.3.1 GENERAL INSPECTION: Inspect both the exterior and interior of the machine for obvious shipping damage such as cracked or broken cabinet parts, subassemblies broken loose, etc.

1.3.2 INTERIOR INSPECTION: 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.

1.3.3 APPLYING POWER: 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.

1.3.4 COIN & BILL ACCEPTORS: Insert several old and new quarters and $1.00 bills into the acceptors. No genuine money should be rejected, and each insertion should step the counter one digit when using coins (no counter advancing occurs when inserting a bill). Depress the coin

rejector button to make sure that the linkage is operating smoothly.

1.3.5 START GAME: Coin or $1.00 bill insertion should start the game. Check for proper game sequence, making sure that all aspects of the game are functioning correctly.

1.3.6 INTERLOCK SWITCH: The interlock switch must turn off the entire machine when the lower cabinet doors are opened.

1.4 COIN MECH, INC.'S Q-530 COIN ACCEPTOR -- OPERATION, ADJUSTMENT AND 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 (see Figure 1-1). 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.

1.4.1 KICKER AND SEPARATOR:

a. Set the acceptor with the back of the unit facing you in the test position. 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.

b. Insert several test coins, both old and new, and note that some are returned by striking the separator. Loosen the separator screw and move the separator a slight amount to the left. Tighten the screw.

c. Insert the test coins again, and if some of them are still returned, repeat Step "b" until all the coins are accepted.

d. Loosen the kicker screw and move the locker as far to the left as it will go. Tighten the screw. Insert the test coins and note that some are returned. Now loosen the kicker screw and move the kicker slightly to the right. Tighten the screw.

e. Insert the coins again, and if some are still returned, repeat Step "d" until all the coins are accepted. Be sure that both screws are tight after the adjustments have been made.

1.4.2 MAGNET GATE: Set the acceptor with the front of the unit facing you in the test position. Turn the magnet gate adjusting screw (2) out or counterclockwise until none of the coins will fit through.

With a coin resting in the acceptor, turn the adjuster in or clockwise until the coin barely passes through the magnet gate. Test this adjustment using several other coins, both old and new, and if any of them fail to pass the magnet gate, repeat the above adjustment until all the coins are accepted.

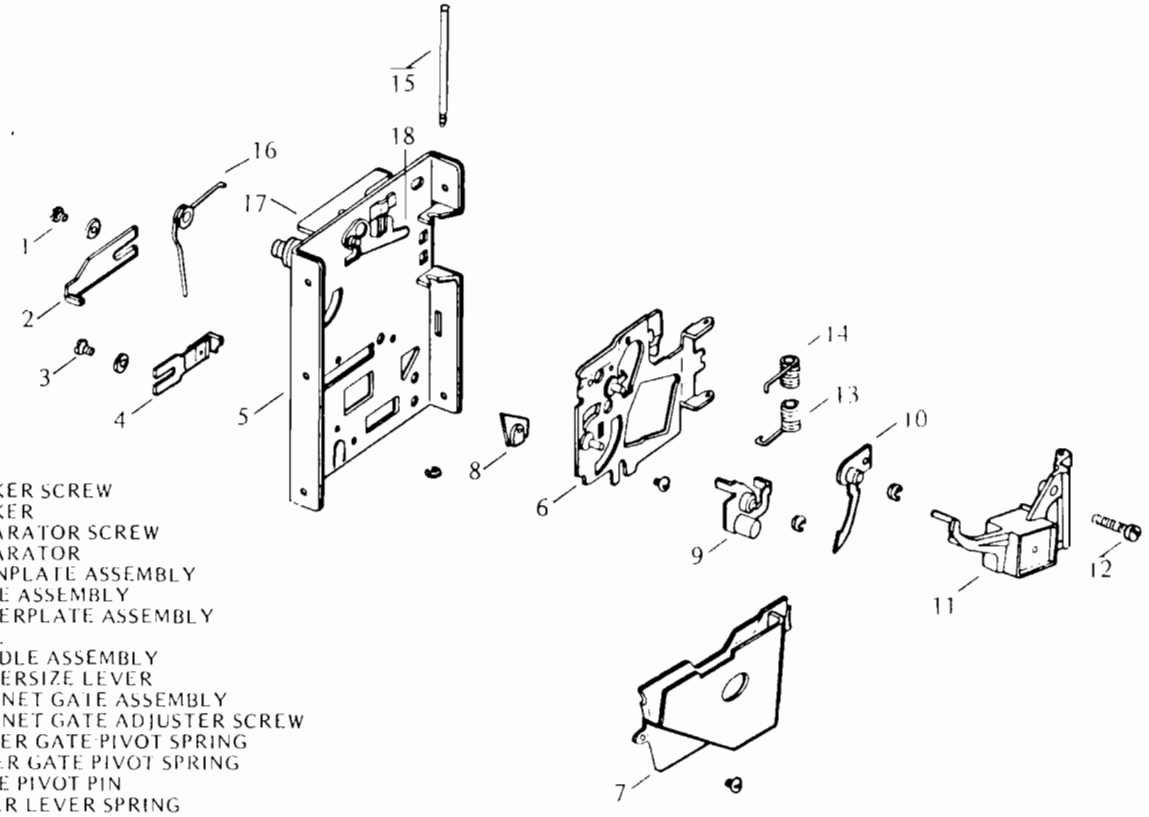
Fix the magnet gate in this position with a drop of glue or Loctite™, if necessary.

1.4.3 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®, a lubricant.

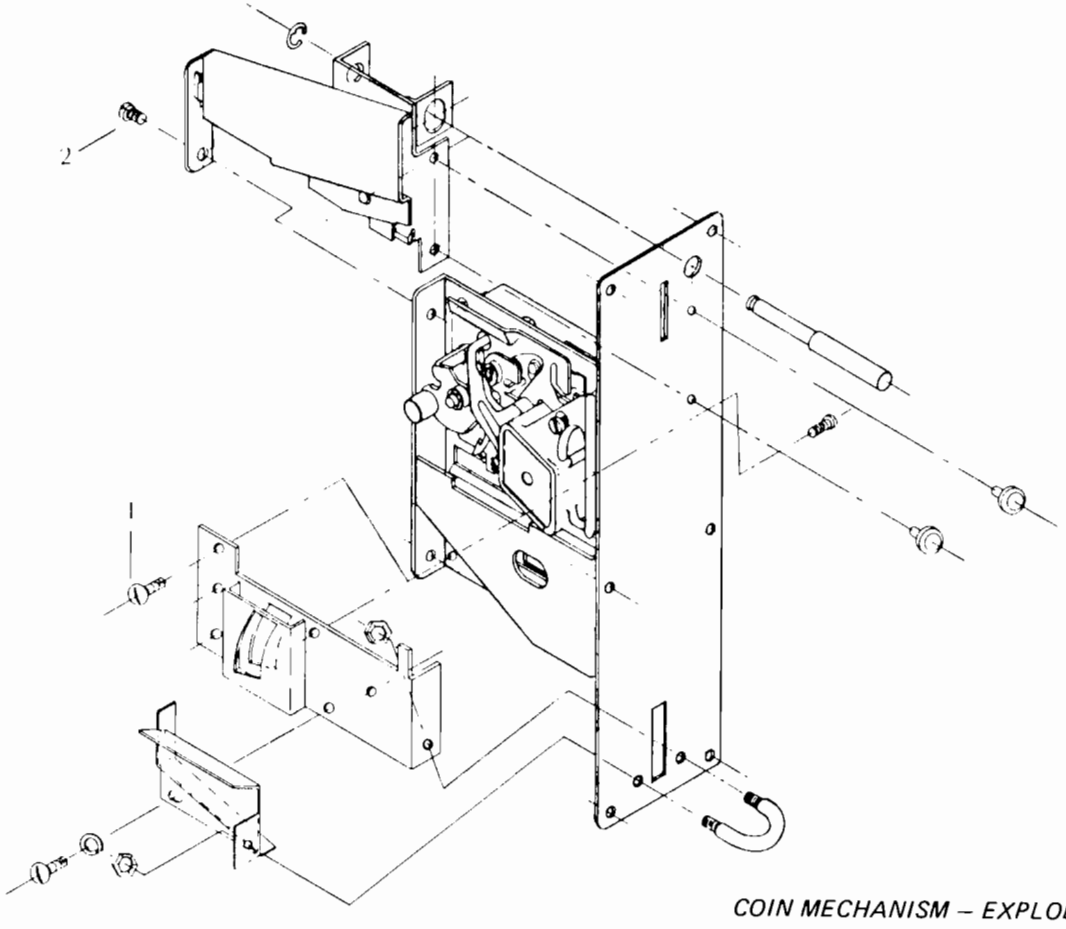
1.5 GENERAL MACHINE MAINTENANCE

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® or a 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

Figure 1-1 Coin Acceptor and Mechanism

II. INDY 4 CIRCUITS

2.1 GENERAL SYSTEM DESCRIPTION

2.1.1 Parts of the Indy 4 electronics system include:

4	Steering PCB*
4	Car PCB*
1	Coin Control PCB*
1	Score PCB*
1	Sync PCB*
1	Backplane PCB
1	Power Supply PCB
1	25" color TV monitor
-	Harness and controls

The sync, score, coin control, and four 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 2-1 shows the locations of the various boards and connectors within the card rack. The car colors and steering wheel locations, as well as locations of the card rack and power supply, are shown in Figure 2-2.

2.1.2 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 cars. The master audio volume control is also located on this board.

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. The game time and game turn-off circuitry are also included on this board.

d. Four 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 PCB. 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 drivers for the coin mechanism lockout coils are also located on this board.

*All of these come with one additional spare printed circuit board.

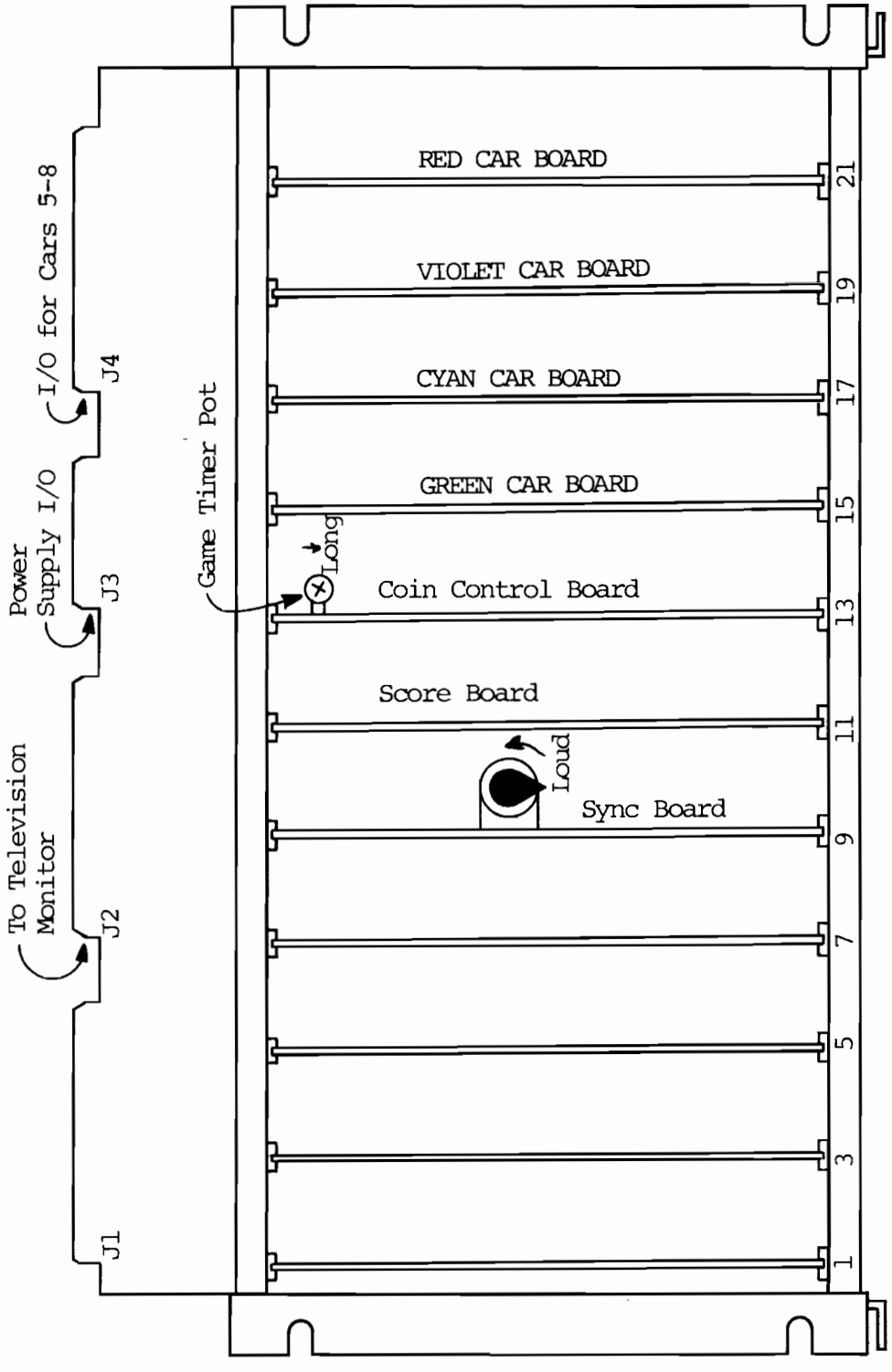


Figure 2-1 Indy 400 Card Rack Layout (Front View)

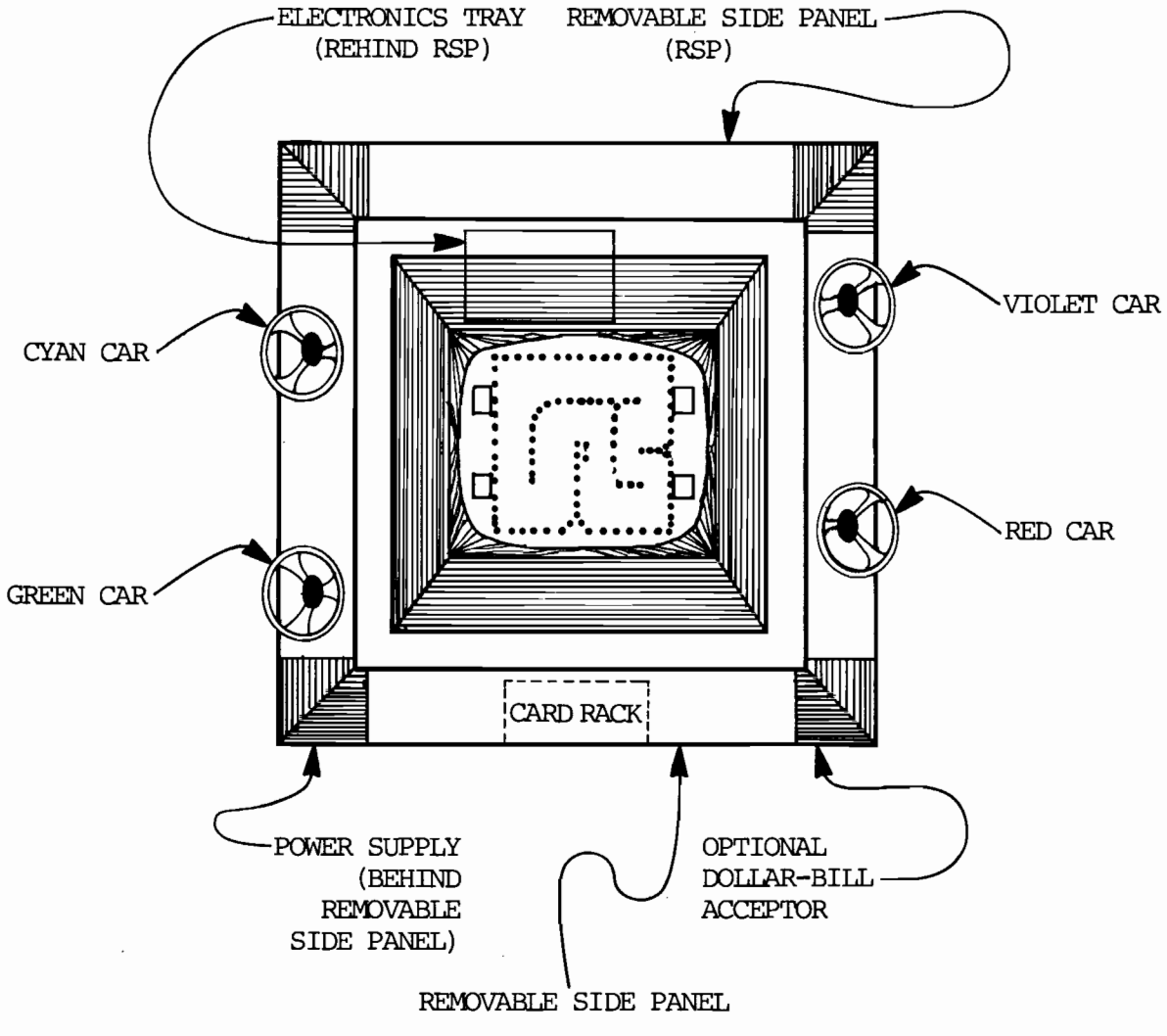


Figure 2-2 Indy 4 Cabinet:
Location of Car Controls and Electronics

g. Steering PCB. 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.

2.2 SYNC PRINTED CIRCUIT BOARD

The sync PCB has circuitry to produce the following functions:

- System clock and video countdown chain
- COMP SYNC signal to TV monitor
- Race track video
- Score checkpoints
- SCORE WINDOW signal
- OTHER CARS signal for each car
- +5 volts power for steering boards
- Miscellaneous timing signals to other logic
- 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 μsec). 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 000000000) 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 4½ lines long (290 μsec).

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 that 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-flop 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 μsec) square wave used to make the score of the leader blink.

16V ⊕ 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.

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

See Figure 2-3 for a diagram of the sync functions, race track, etc., as oriented on the Indy 4 television screen.

2.3 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 (cC, 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 Section 2.2). The detection of coincidence between car and checkpoints in the proper sequence is provided by a 9312 IC, and eight-input multiplexer. The circuit is shown in Figure 2-4. 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

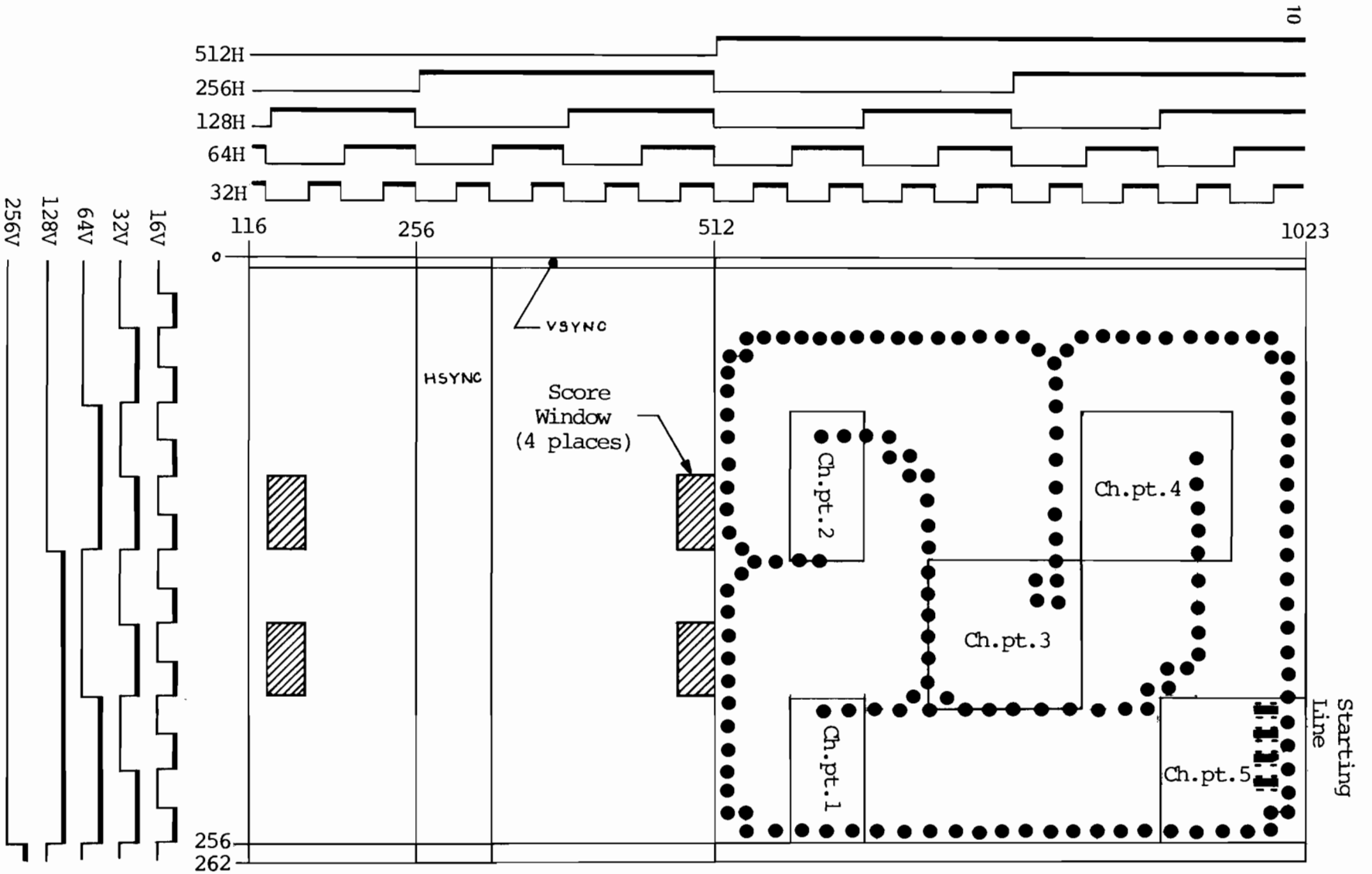


Figure 2-3: Sync PCB Functions

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 2-5). 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.

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 ID code matches the time-multiplexed sync signals (256H, 64V, 128V).

Two 74153s (A1, D1) and two 9312s (A2, C2) are the function generators that translate the multiplexed seven-segment data into score video information. A1 and D1 form the seven-segment character. D1 (74153) forms the vertical segments b, c, e, and f. A1 (74153), together with a blanking signal from A2 (9312), forms the horizontal segments a, d, and g. These are ORed in C1 (7432): C1-3 has the video for red and violet scores; C1-6 has the video for green and cyan scores. 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.

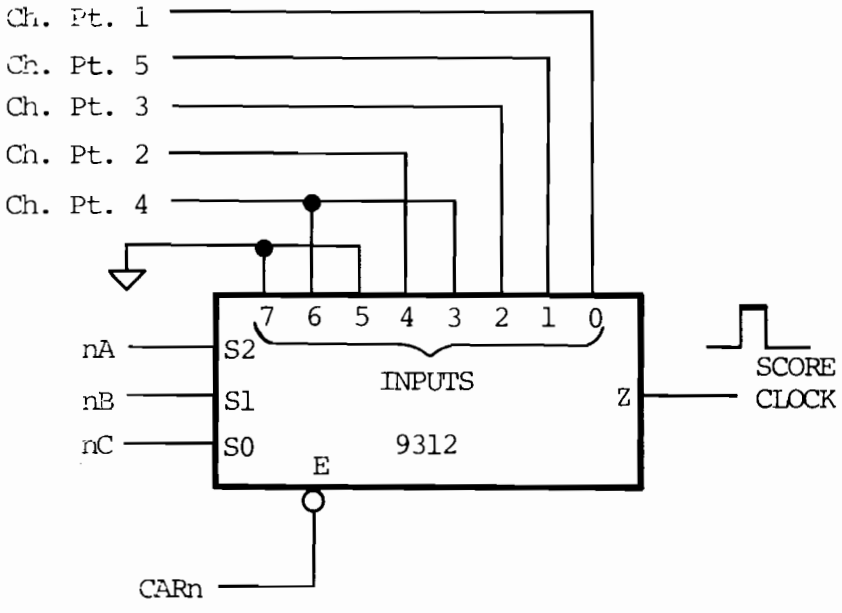
This composite score video signal is then demultiplexed in D6 (9301) into four separate score video signals. These signals are then ORed with the car signals, ANDed with the video function signal, and sent out to the television as video information. There is some slight additional circuitry that creates video test and alignment functions on the white video output line. 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 score board schematic (see region B-2).

2.4 COIN CONTROL PRINTED CIRCUIT BOARD

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

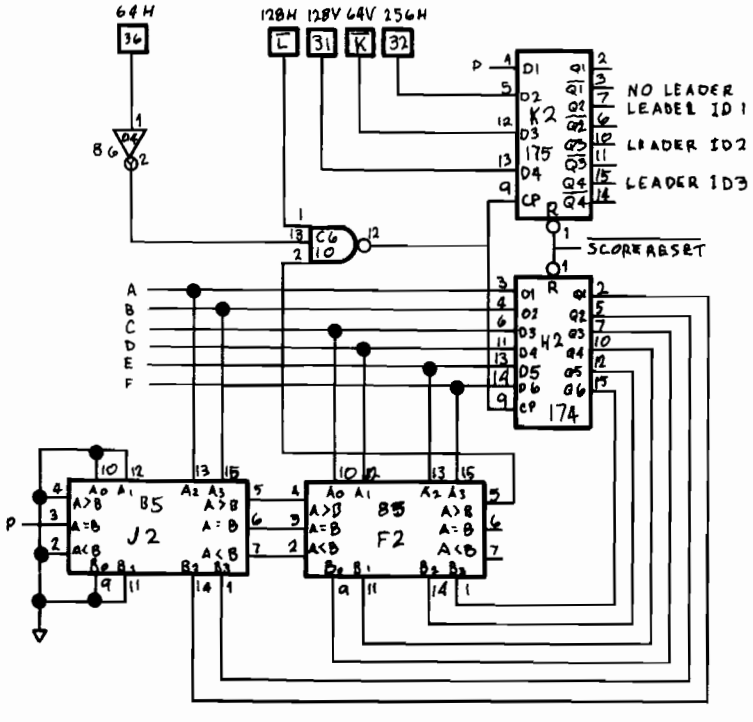
- Coin detection and credit latches
- Game control, game timer
- Car reset circuitry

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



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 2-4 Score Detection Circuit



Leader ID Signals			No-Leader Signal	Car in Lead
3	2	1		
X	X	X	1*	None
0	1	0	0	3
0	1	1	0	8
1	0	0	0	4
1	0	1	0	7

*No-leader condition is present only at start of game.

Figure 2-5 Leader Detector Circuit

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 µf 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 LM330 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 µf capacitor is quickly recharged through a diode.

The game control circuitry determines which cars are to be enabled.

If a coin is put into the machine, CREDIT goes high. When this happens, 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 (IC F4, 7400). This enables the controls on car n, so that it may be driven. During the eight-second waiting period, the 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.

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 (CRCn) are produced. These are used to clock the car reset flip-flops A3, A4, B3 (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:

- Car steering processor
- Car acceleration processor
- Car motion counters
- Car video processor

- Crash and collision detection
- 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 2-6. $\overline{\text{VTC}}$ 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 or 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).

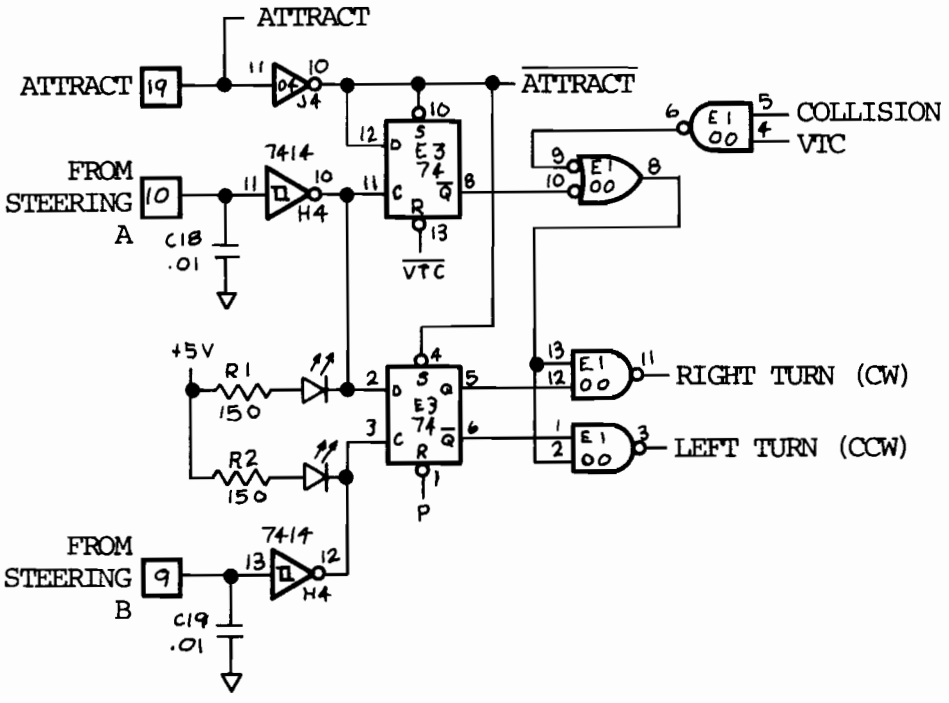
This code differs from the rotation code only when the car is in a skid. The skid condition is determined by C1 (7400). If the car is at quarter-speed or greater when the brake is depressed, or if the car collides with another car, a skid condition exists, and $\overline{\text{SKID}}$ goes low to latch 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 GO 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 gates 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 2-7.

The motion circuit operates on the principle of the Atari patented "slipping counter" method of moving objects on a raster scan display (Patent No.

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



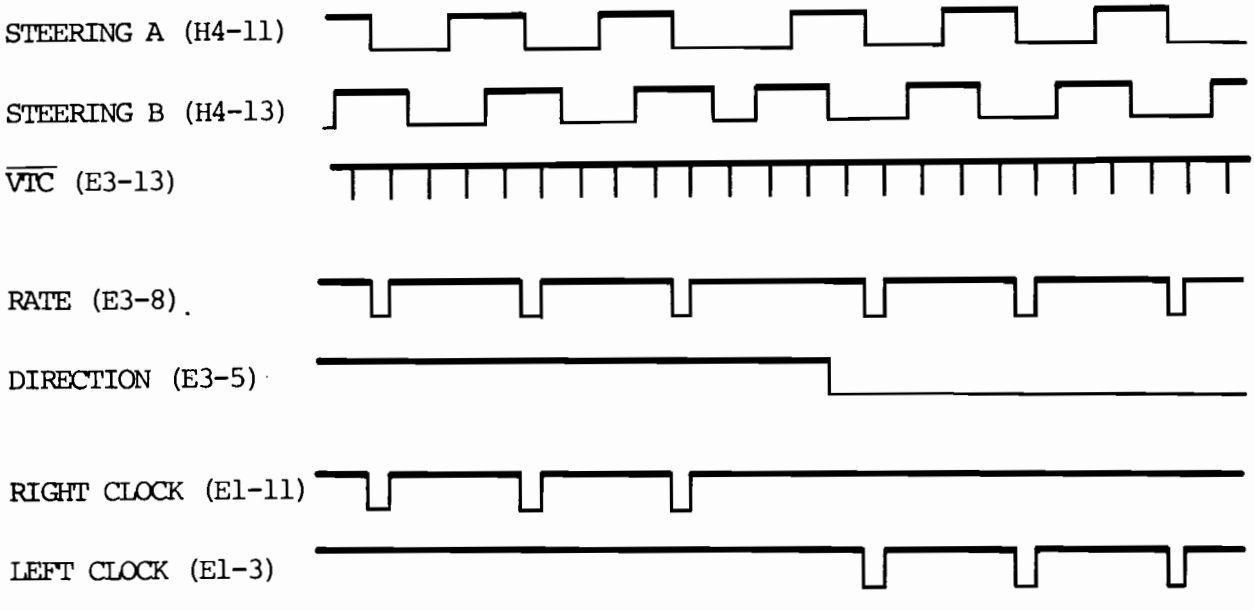


Figure 2-6 Steering Decoder Circuit with Sample Waveforms

3,793,483). 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 GO 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, GO is high more often. A table of approximate sine/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 2-1. 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. 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 "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.

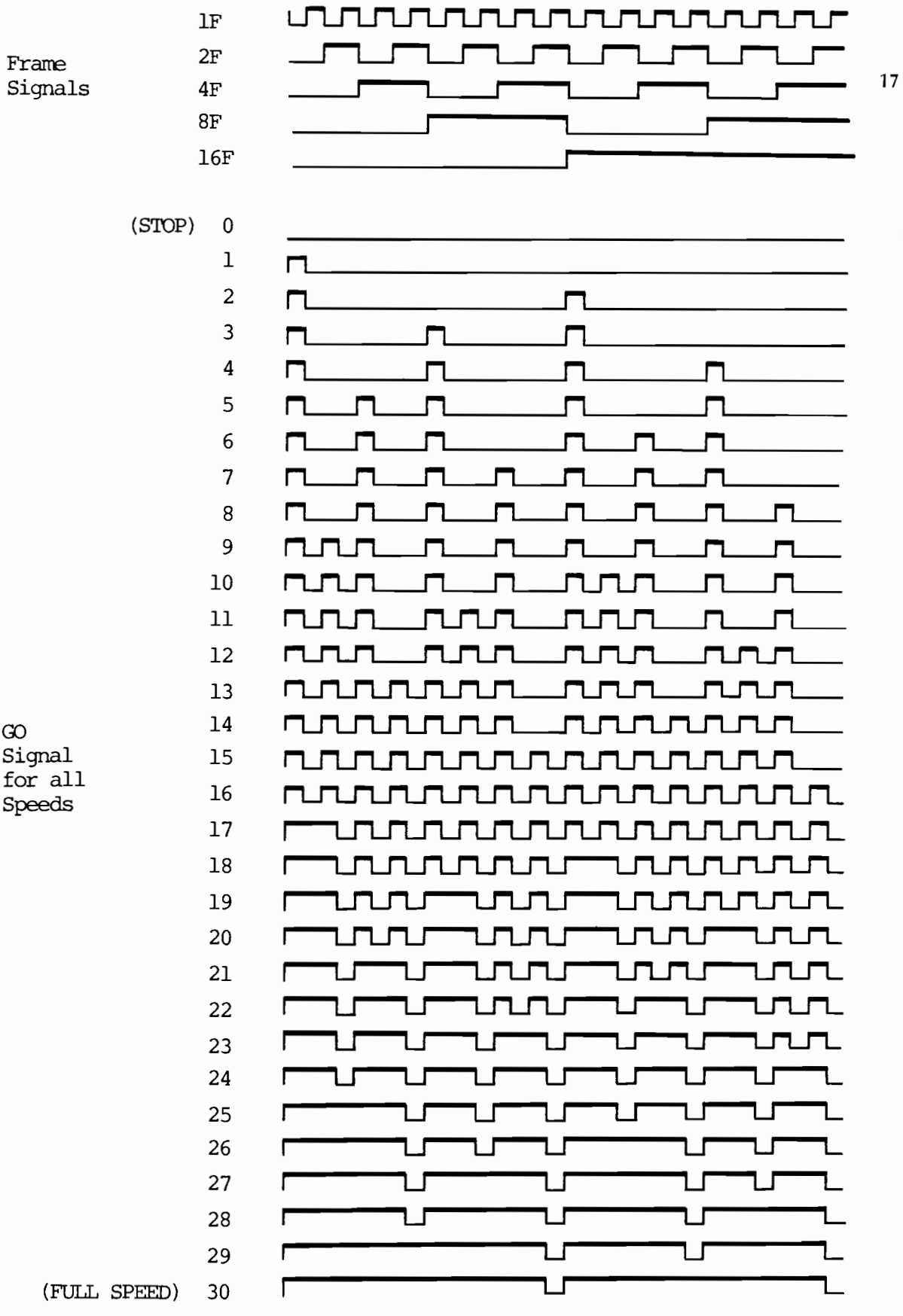


Figure 2-7 GO Signal (Speed Pulses)

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 does not yet have credit. This causes switching transistor 2N3643 to turn on power transistor 2N5190, allowing current to flow through the lockout coil. This enables a coin to be entered. The entry of a coin for car n causes $\overline{LOn}$ to go low. This signal going low turns off the 2N3643, and the latter device then turns off the 2N5190. The lockout coil is released by the 2N5190, and further coins are locked out until the end of the present game, i.e., when $\overline{LOn}$ goes back high.

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 2-1: Unit Motion Codes for All 32 Directions

III. ADJUSTMENTS AND SERVICING

3.1 OPERATOR ADJUSTMENTS AND OPERATING INSTRUCTIONS

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

- Master volume switch (on sync PCB)
- Game time adjustment (on coin control PCB)
- Lockout coil power switch (on 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 2-1. 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 coil 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. In order to use the coin mechanisms in the machine, this switch must be in the "on" position and power must be on.

3.1.2 OPERATING INSTRUCTIONS (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.

3.2 SERVICE AND TROUBLESHOOTING

Indy 4 is sold with one spare PCB for each kind of circuit board 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:

3.2.1 Be certain that the board is the proper type for that position and that it is not reversed. See Figure 2-1 for location of board types. Heatsinks should always be at the top of the board and to the right.

3.2.2 Be certain that the board is inserted straight into position in the card guides.

3.2.3 Pushing gently, wobble the board slightly until it begins to seat into the connector. If it does not begin to seat, recheck the above two steps, and check for warpage of the board. Correct any problem.

3.2.4 Applying firm, constant pressure, push the board into place until it is seated 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 2-8). Remove the ejector tool, and pull the card out by hand.

When troubleshooting, the short description of each board in Section II of this manual should help in quickly locating a problem. Replacing a 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 four car PCBs are interchangeable. Also, removing one car board will only disable that car, without affecting any others.

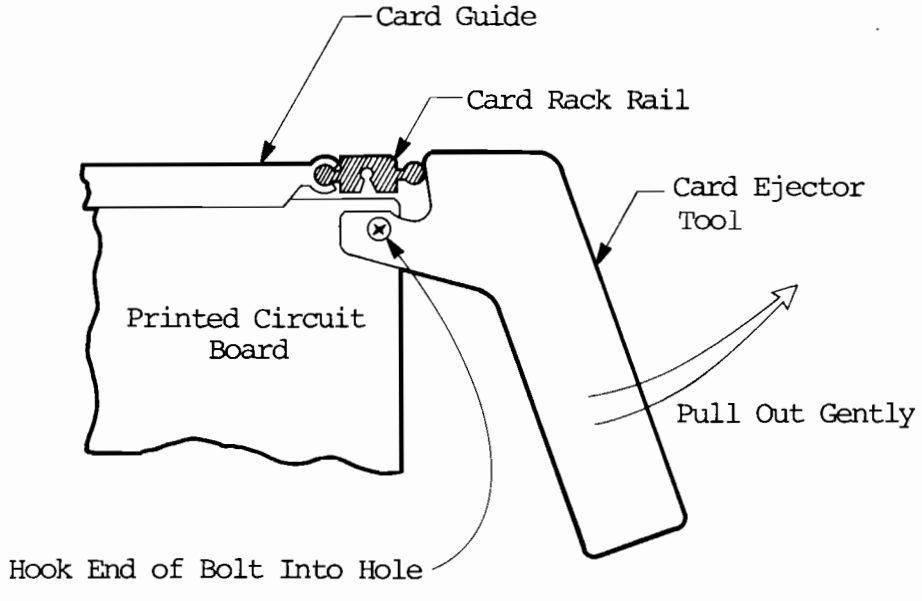


Figure 3-1 Use of Card Ejector Tool

3.3 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 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 two items are available through your local electronics supply house. You may write to the Customer Service Dept. at Atari, Inc., 2175 Martin Avenue, Santa Clara, CA 95050 or call at (408) 984-1900.

3.4 REQUIRED EQUIPMENT

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

3.4.1 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 is indicated 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.

3.4.2 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, ¼-watt carbon resistor. Video probes may be obtained from the Atari Customer Service Dept. or, if necessary, they can be assembled from standard components available at all electronics supply houses.

3.5 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:

3.5.1 HEWLETT-PACKARD 10529A LOGIC COMPARATOR: This device 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 (DIP) are indicated by a lamp on the comparator. If the logic comparator is purchased form the Atari Customer Service Dept., it is shipped with 20 preprogrammed reference PCBs. If the device is purchased elsewhere, these PCBs must be specially programmed.

3.5.2 HEWLETT-PACKARD 10526T LOGIC PULSER: This device 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 Dept. or can be obtained from most large electronics supply houses.

3.5.3 TEKTRONIX 465 OSCILLOSCOPE: This scope is used for viewing various wave forms, and should be ordered from Tektronix. Consult the manufacturer's operating instructions for details on oscilloscope operation.

3.6 LOGIC TYPES AND FUNCTIONS

Type	Function
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-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

Type	Function
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	Read-only memory (ROM)

Number	Title
A004793	Parts List and Drawing Cabinet Top Assembly
A004792	Parts List and Drawing Cabinet Lower Assembly
A005082	Parts List and Drawing Dashboard Assembly
A004797	Parts List and Drawing Double Foot Pedal Assembly
005488	Drawing Harness Installation
005480	Schematic (Wiring Diagram) Harness
A005486	Parts List and Drawing Electronics Tray Assembly
001151 A000607	Schematic, Steering PCB Parts List and Drawing, Steering PCB
A003000	Schematic, Parts List and Drawing Car PCB
A003184-02	Schematic, Parts List and Drawing Coin Control PCB
A003170-02	Schematic, Parts List and Drawing Score PCB
A003182-02	Schematic, Parts List and Drawing Sync PCB
A003199	Parts List and Drawing Backplane PCB
A003191-02	Schematic, Parts List and Drawing Power Supply PCB
(none)	Schematic G.E. Color TV, Chroma Input PCB

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE	CABINET TOP ASSEMBLY	P/L 004793

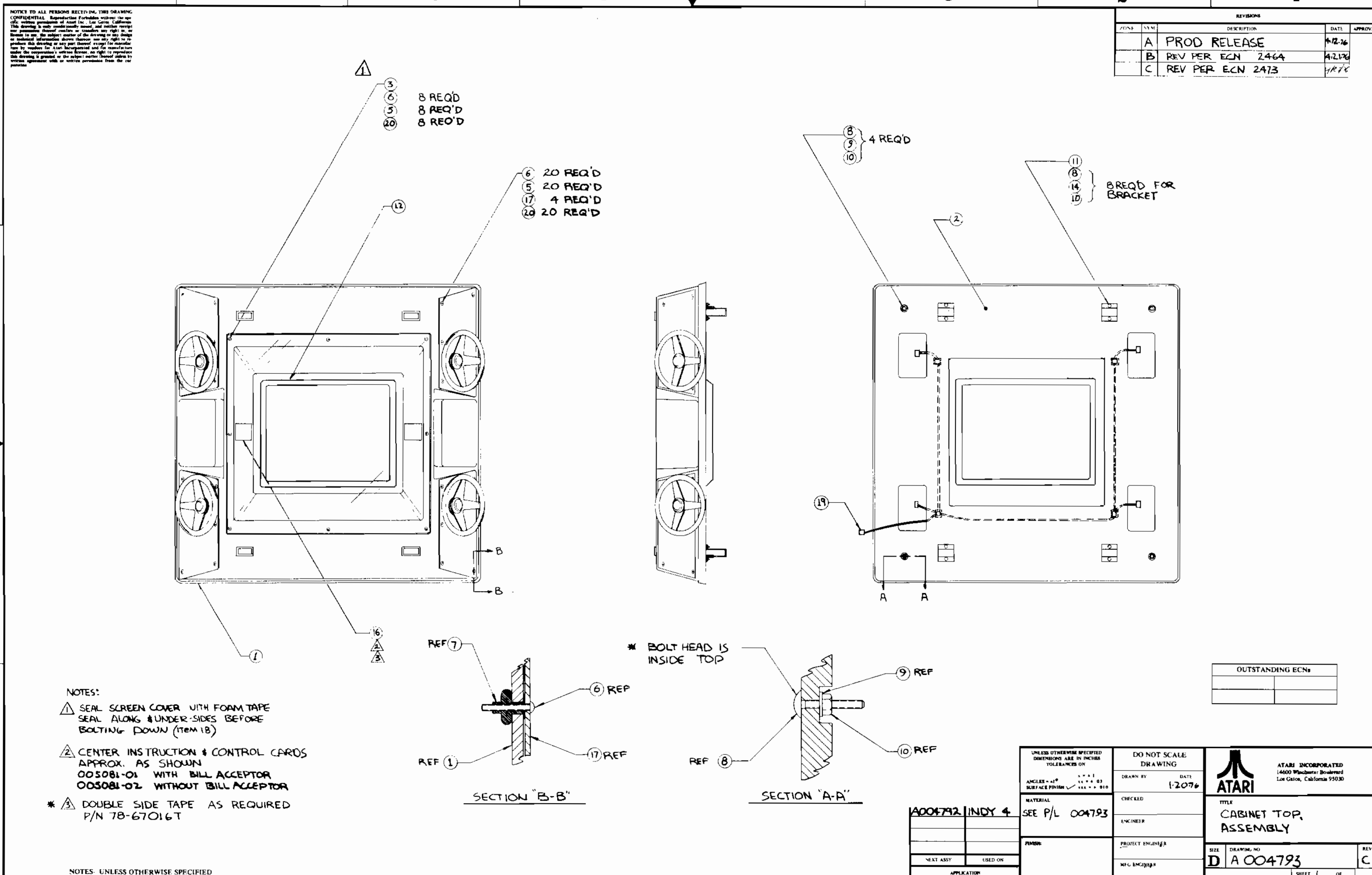
PARTS LIST SPECIFICATION — Page 1 of 1

Drawn			REV. C
Checked	4/22/76	Mech. Eng.	
Proj. Eng.		Elec. Eng	

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A		4/13/76					
B	Rev per ECN 2464	4/21/76					
C	Rev per ECN 2473	4/22/76					

Item	Part Number	Qty.	DESCRIPTION
1	004578	1	Top Cabinet
2	004579	Ref	Base
3	004580-01	1	Screen Cover
4			
5	75-99090006	28	Well-Nut, Blind Hole Fastener
6	82-8014B	28	Screw, Button Hd, Socket Cap, 10-32 x 7/8" Lg
7			
8	75-5524NX	12	Bolt, Carriage, Rd Hd, Sq. Neck, Stl, ¼-20 x 1½ Lg
9	75-015S	4	Washer, Flat, Plain Pattern, #¼
10	75-915S	12	Nut, Mach, Hex, STD Pattern, #¼-20
11	004605	4	Bracket - Canopy Pole
12	005138-01	1	Bezel, 25" Monitor
13			
14	75-045	8	Washer, Split-Lock, Cres, #¼
15			
16	005081-01 or 02	2	Instructions - , 005081-02 to be used without Dollar Bill Acceptor
17	A005082	4	Dash Board Assembly
18	78-6900401	A/R	Tape, Foam, Adhesive Approx. 15'-0"
19	A005482	1	Top - Steering Harness
20	75-07021	28	Nylon Black Washers

* Optional: Double Coated Scoth Tape P/N 78-603116



NOTICE TO ALL PERSONS RECEIVING THIS DRAWING
REVISIONS
A PROD RELEASE 4-12-76
B REV PER ECN 2464 4-21-76
C REV PER ECN 2473
3 8 REQ'D
6 8 REQ'D
5 8 REQ'D
20 8 REQ'D
6 20 REQ'D
5 20 REQ'D
17 4 REQ'D
20 20 REQ'D
12
8 9 10 4 REQ'D
11 8 14 10 8 REQ'D FOR BRACKET
2
19
16
1
B
A
REF 7
6 REF
REF 1
17 REF
SECTION "B-B"
✱ BOLT HEAD IS INSIDE TOP
9 REF
10 REF
REF 8
SECTION "A-A"
NOTES:
1. SEAL SCREEN COVER WITH FOAM TAPE SEAL ALONG & UNDER-SIDES BEFORE BOLTING DOWN (ITEM 18)
2. CENTER INSTRUCTION & CONTROL CARDS APPROX. AS SHOWN
005081-01 WITH BILL ACCEPTOR
005081-02 WITHOUT BILL ACCEPTOR
✱ 3. DOUBLE SIDE TAPE AS REQUIRED P/N 78-67016T
NOTES: UNLESS OTHERWISE SPECIFIED
OUTSTANDING ECNs
A004792 INDY 4
NEXT ASSY
USED ON
APPLICATION
MATERIAL
SEE P/L 004793
FINISH
DO NOT SCALE DRAWING
DRAWN BY
DATE 1-20-76
CHECKED
ENGINEER
PROJECT ENGINEER
MFG ENGINEER
ATARI
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030
TITLE
CABINET TOP, ASSEMBLY
SIZE D
DRAWING NO A 004793
REV C
SHEET 1 OF

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / CABINET ASSEMBLY , LOWER **P/L** A004792

PARTS LIST SPECIFICATION

Drawn			
Checked	4/22/76	Mech. Eng.	
Proj. Eng.		Elec. Eng	REV. C

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	4/13/76					
B	Rev per ECN 2463	4/22/76					
C	Rev per ECN 2502	4/26/76					

Item	Part Number	Qty.	DESCRIPTION
1	48-004	4	5" Arkay Speakers
2	004723	1	Panel, Left Side
3	A003637 -12	2	Coin Door Assembly
4	000869	4	Alum. Speaker Mesh Cover
5	73-77004	16	Rivets, 3/16 x .68 Lg
6	004724	1	Panel, Right Side
7	72-6810	16	Screw, Self-Tapping, #8 x 5/8, Phil, Pan Hd
8	75-5124B	12	Carriage Bolt, #10-24 x 1½ Lg
9	75-010S	12	#10 Flat Washer
10	75-040	28	#10 Lock Washer
11	75-911S	20	#10-24 Hex Nut
12	72-6812	32	Screw, Self Tapping, #8 x 3/4, Phil, Pan Hd
13	A004778	1	Frame Weldment
14			
15	A004797	4	Double Foot Pedal Assembly
16	72-5524	4	Scr, Mach, Hex Hd, Stl Cd Plate, #¼-20 x 1½ Lg
17			
18	A005173	4	Enclosure, Foot Pedal
19	75-5516B	8	Bolt, Carriage, #¼-20 x 1" Lg
20	75-045	14	Washer, Lock, Split, #¼
21	75-915S	10	Nut, Hex, Steel, #¼-20
22	78-3201	4	Adjustable Swivel Guide
23	68-001	2	Interlock Switches
24	72-5512	2	Screw, Mach, Hex Hd, Stl, Cad Plate, #¼-20 x 3/4" Lg
25	75-025S	2	Washer, Flat, Plain Pattern (Narrow), #¼
26	71-803	1	Assembly, Control
27	71-801U1	1	Assembly, Transport
28	71-802U1	1	Assembly, Stacker
29	72-1608	6	Scr, Mach, Pan Hd, CRES, #6-32 x ½" Lg
30	72-1610S	2	Scr, Mach, Pan Hd, Rec, #6-32 x 5/8" Lg
31	75-016S	8	Washer, Flat, #6
32	75-046	8	Washer, Split-Lock, #6
33	75-916S	8	Nut, Hex, #6-32
34	004086	1	Bar, Cross
35	72-5108	16	Scr, Mach, Hex Hd, Steel, #10-24 x 1/2" Lg
36			
37	75-010S	8	Washer, Flat, Reg Pattern, #10
38			
39	A005666	1	Assembly, Monitor Frame
40	* 003195	1	44 Pin Extender Board

ASSEMBLY TITLE CABINET ASSEMBLY, LOWER **P/L** A004792

PARTS LIST SPECIFICATION

Item	Part Number	Qty.	DESCRIPTION
41	*003197	1	86 Pin Extender Board
42	78-0901	1	Card Rack Ket CR2966
43	78-0902	2	Connector Support Rail CR1407
44	72-6612	4	Self-Tapping Screws, #6 x 3/4 Pan Hd, Sht Mtl
45	002974-01	1	Angle Bracket
46	002974-02	1	Angle Bracket
47	*A003000	5	Car Boards
48	*A003184-02	2	Coin Control Boards
49	*A003170-02	2	Score Board
50	*A003182-02	2	Sync Board
51	*A000607	1	STeering PCB Assembly
52	A003199	1	Backplane P.C. Board
53	003517	4	Backplane Board Support Bar
54	003518	4	Fish Paper, Insulator
55	A005486	1	Electronics Tray Assembly
56	A003191-02	1	Power Supply Board
57	A005238	1	Harness Assembly & Modification
58	005480	Ref	Harness Schematic
59	A005481	1	Main Harness
60	A005483	1	T.V. Video Harness
61	A005484	1	Lock Out Power Harness
62	A005485	1	Power Supply Harness
64	A005488	Ref	Harness Installation

* EXTRA BOARDS TO BE SHIPPED AS SPARED BOARDS

REVISIONS

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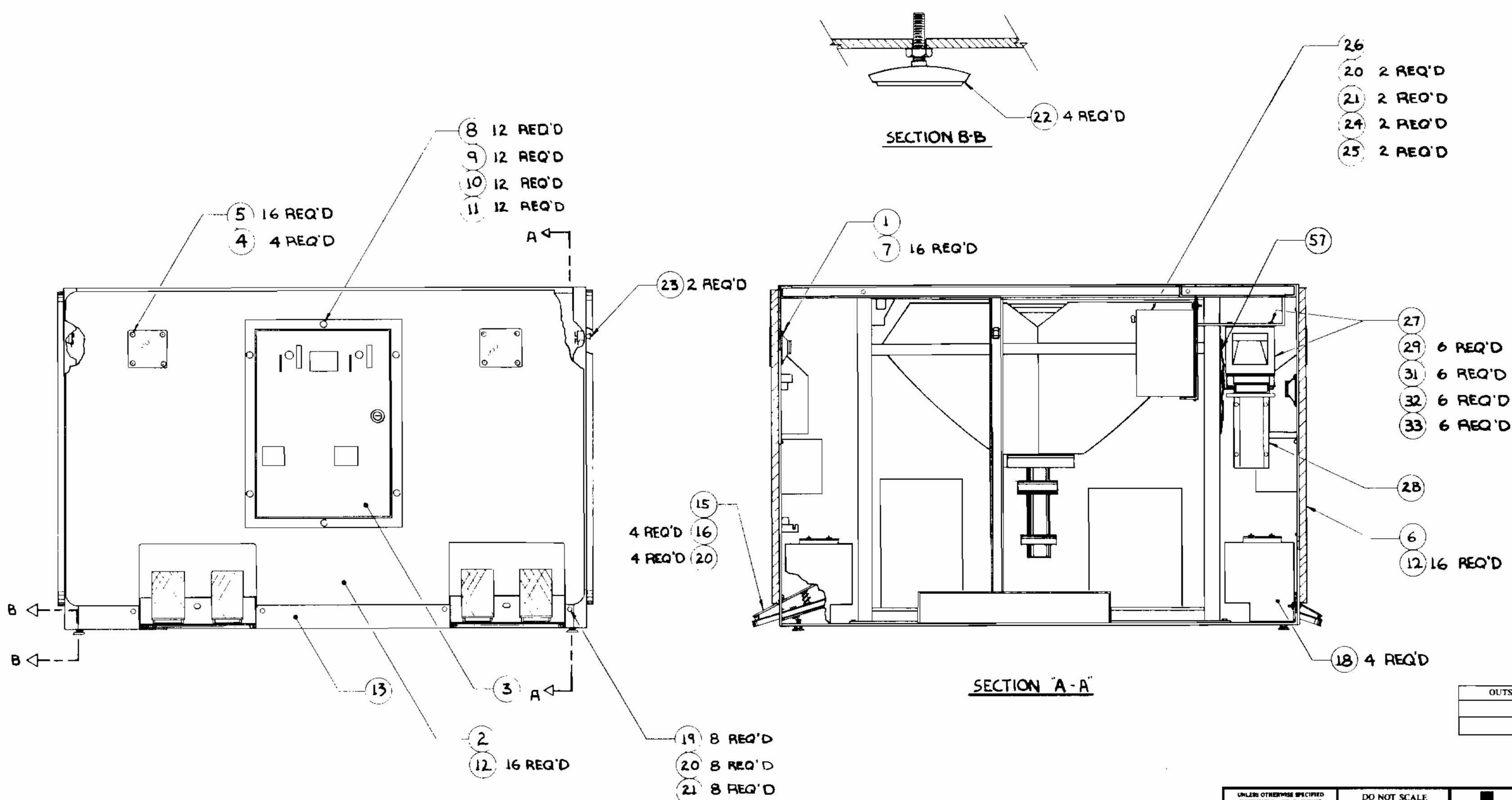
	B	REV PER ECN 2463	4-21-76	
	C	REV PER ECN 2502	4/6	



OUTSTANDING ECNs	

NOTES: UNLESS OTHERWISE SPECIFIED

NEXT ASSY	USED ON
A004791	INDY 4

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON ANGLES ± 1° SURFACE FINISH ✓

MATERIAL SEE P/L A004792

FINISH

DO NOT SCALE DRAWING

DRAWN BY — DATE 9-76
CHECKED
ENGINEER
PROJECT ENGINEER
MFG ENGINEER

ATARI

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE CABINET ASSEMBLY, LOWER

SIZE D DRAWING NO A004792-XX REV C

SHEET 1 OF 2

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED
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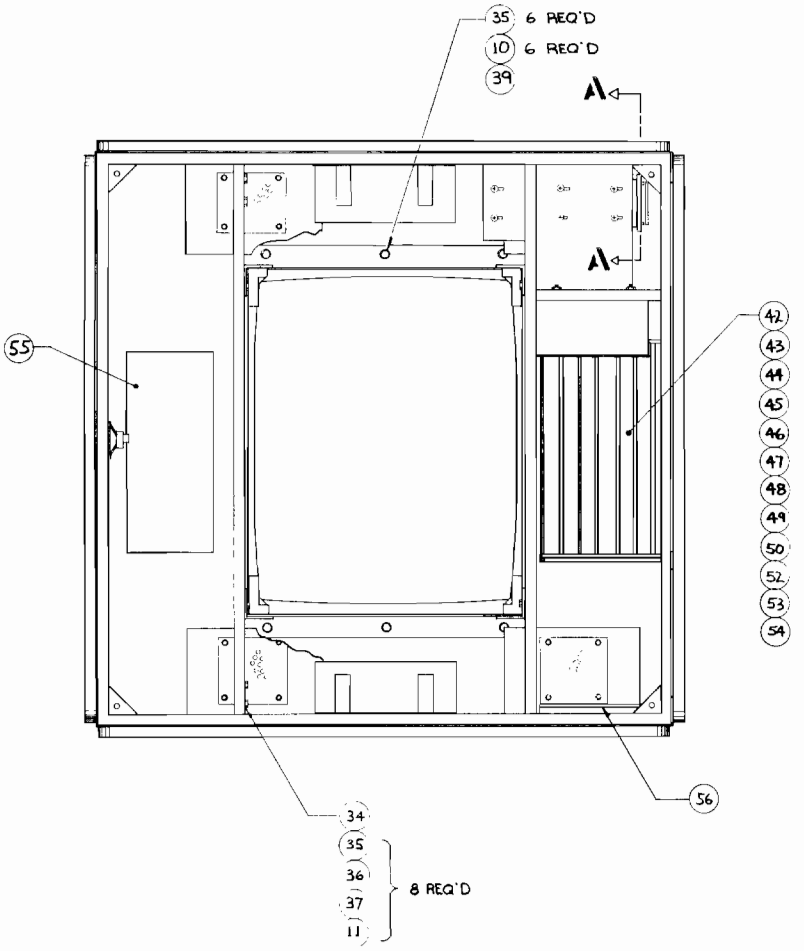
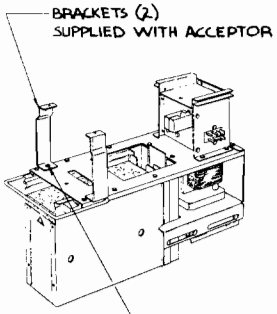
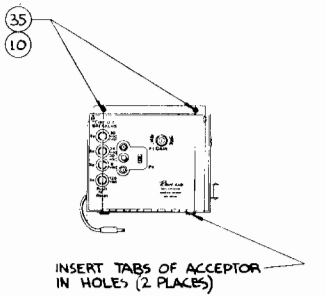
	B	REV PER ECN 2463	9/22/76	
	C	REV PER ECN 2502	1/26/77	



A004792-01 SHOWN

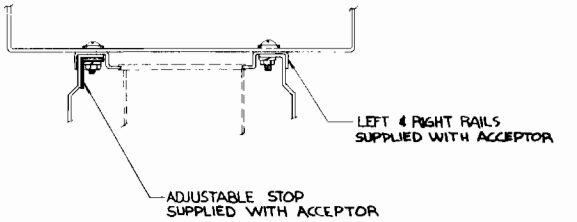




A004792-02 LOWER CAB ASSY - WITHOUT BILL ACCEPTOR.

1. A004792-01 LOWER CAB. ASS'Y WITH BILL ACCEPTOR.

NOTE:



VIEW A - A

OUTSTANDING ECNs	

A004791	INDY 4
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
ANGLES ± 1/2°
SURFACE FINISH √
X.X ± .01
X.XX ± .010

MATERIAL
SEE P/L A004792

FINISH

DO NOT SCALE DRAWING

DRAWN BY	DATE 1-30-76
CHECKED	
ENGINEER	
PROJECT ENGINEER	
MFG ENGINEER	

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE
CABINET ASSEMBLY, LOWER

SIZE	DRAWING NO.	REV
D	A 004792-XX	C

SHEET 2 OF 2

NOTES: UNLESS OTHERWISE SPECIFIED

ATARI
Innovative leisure

ASSEMBLY TITLE / DASHBOARD ASSEMBLY **P/L** 005082

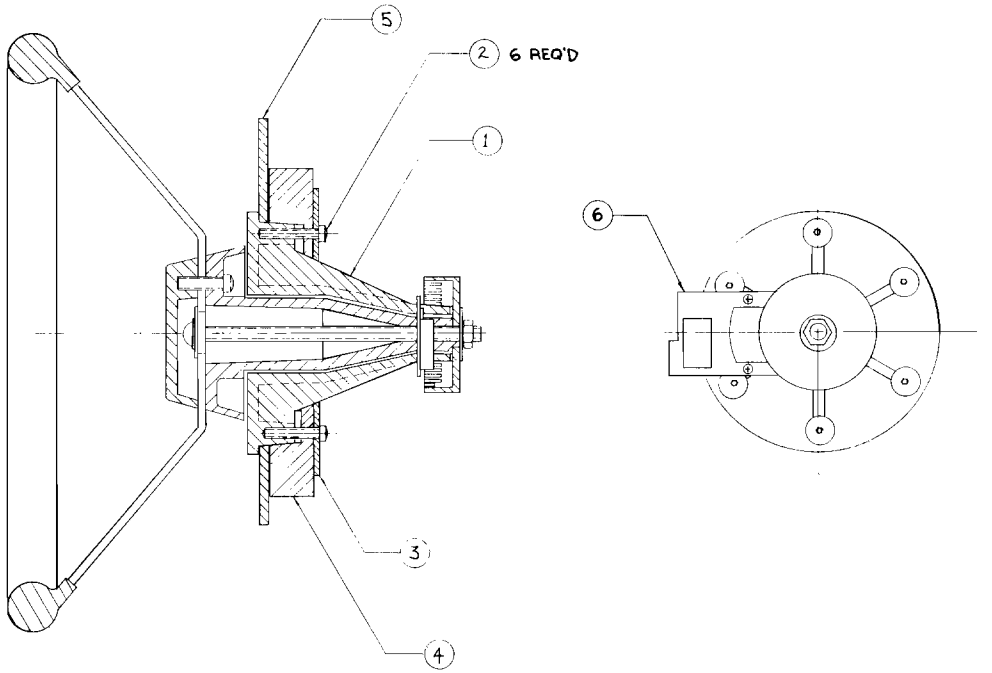
PARTS LIST SPECIFICATION

Drawn			
Checked		Mech. Eng.	
Proj. Eng.		Elec. Eng	REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	4/13/76					

Item	Part Number	Qty.	DESCRIPTION
1	000598-03	Ref	Steering Wheel Assy (10" Dia. Wheel)
2	72-1112S	6	Screw, Mach, Pan Hd, Phil, #10-24 x 3/4" Lg
3	000567	1	Bow Washer
4	004805	1	Backing Plate - Wood
5	004582-XX	1	Plate - Mounting (Alum)
6	A000607	1	Steering PCB Assembly

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED
	A	PROD. RELEASE	4.7.76	



OUTSTANDING ECNs	

A004793	INDY 4
NEXT ASSY	USED ON
APPLICATION	

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
ANGLES ± 1°
SURFACE FINISH ✓

DO NOT SCALE DRAWING

DRAWN BY
DATE 12.2.76
CHECKED
ENGINEER
PROJECT ENGINEER

MATERIAL: SEE P/L A005082
FINISH:

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE: DASHBOARD, ASSEMBLY

SIZE D | DRAWING NO A 005082 | REV A

SHEET 1 OF 1

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / DOUBLE FOOT PEDAL ASSY **P/L** 004797

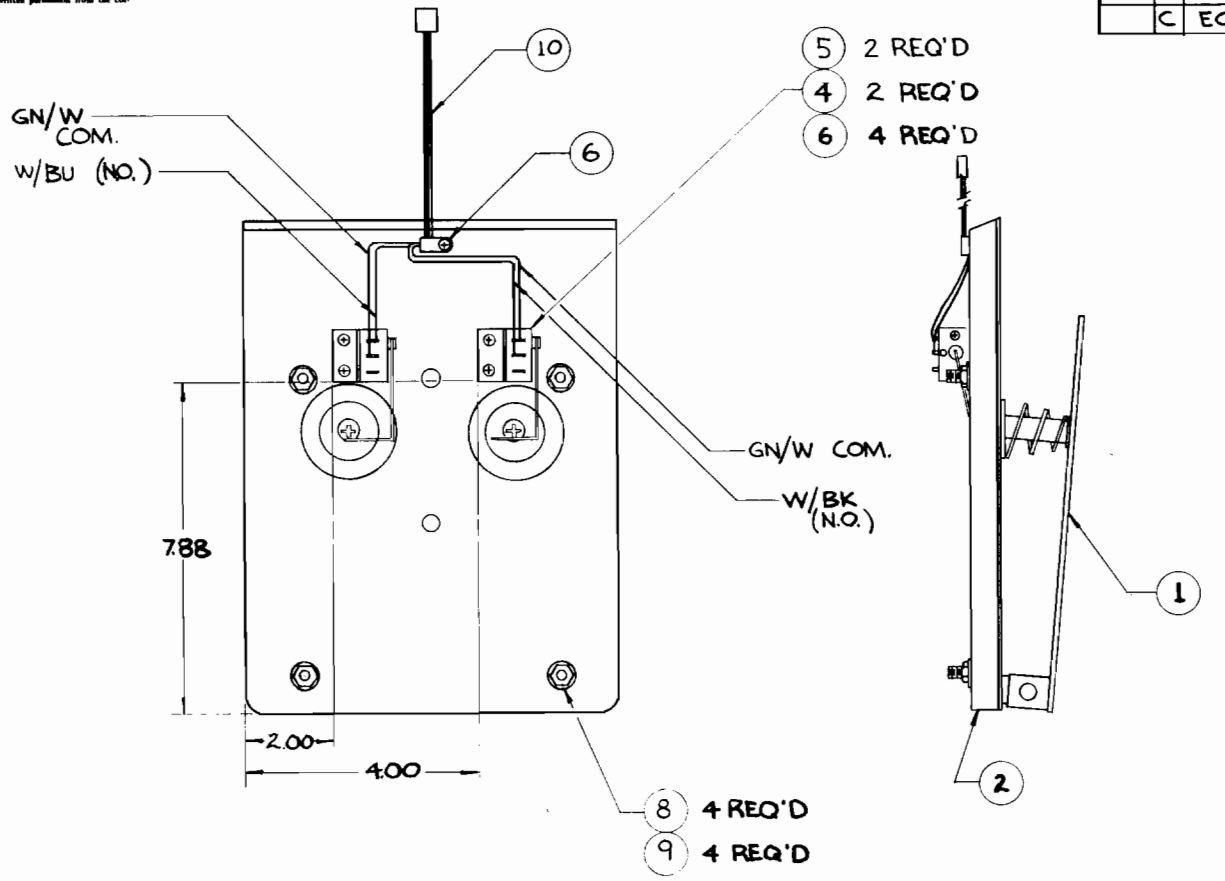
PARTS LIST SPECIFICATION

Drawn			
Checked		Mech. Eng.	
Proj. Eng.		Elec. Eng	REV. C

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A		4/12/76					
B	ECN 2427	4.14.76					
C	ECN 2449	7/20/76					

Item	Part Number	Qty.	DESCRIPTION
1	A004798	1	Double Metal Foot Pedal Assy
2	004801	1	Mount Board, Foot Pedal
4	002191	2	Foot Pedal Switch Brkt
5	65-0 1C	2	Switch, Cherry E51-60B
6	75-8810	5	Screw, Wood, Flat Head, Steel #8 x 5/8" Lg.
8	75-914S	4	Nut, Machine, Hexagon, 4-40
9	75-048	4	Washer, Split-Lock, Cres #8
10	A003157-02	1	Foot Pedal Harness

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE	4-12-76	
	B	ECN NO. 2427	4-14-76	
	C	ECN NO. 2449	4-20-76	



OUTSTANDING ECNs	

004778	INDX 4		
NEXT ASSY	USED ON		
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
ANGLES ± 1°
SURFACE FINISH ✓
x = ± .1
xx = ± .03
xxx = ± .010

MATERIAL: SEE P/L A004797

FINISH:

DO NOT SCALE DRAWING

DRAWN BY DATE 1-26-76

CHECKED

ENGINEER

PROJECT ENGINEER

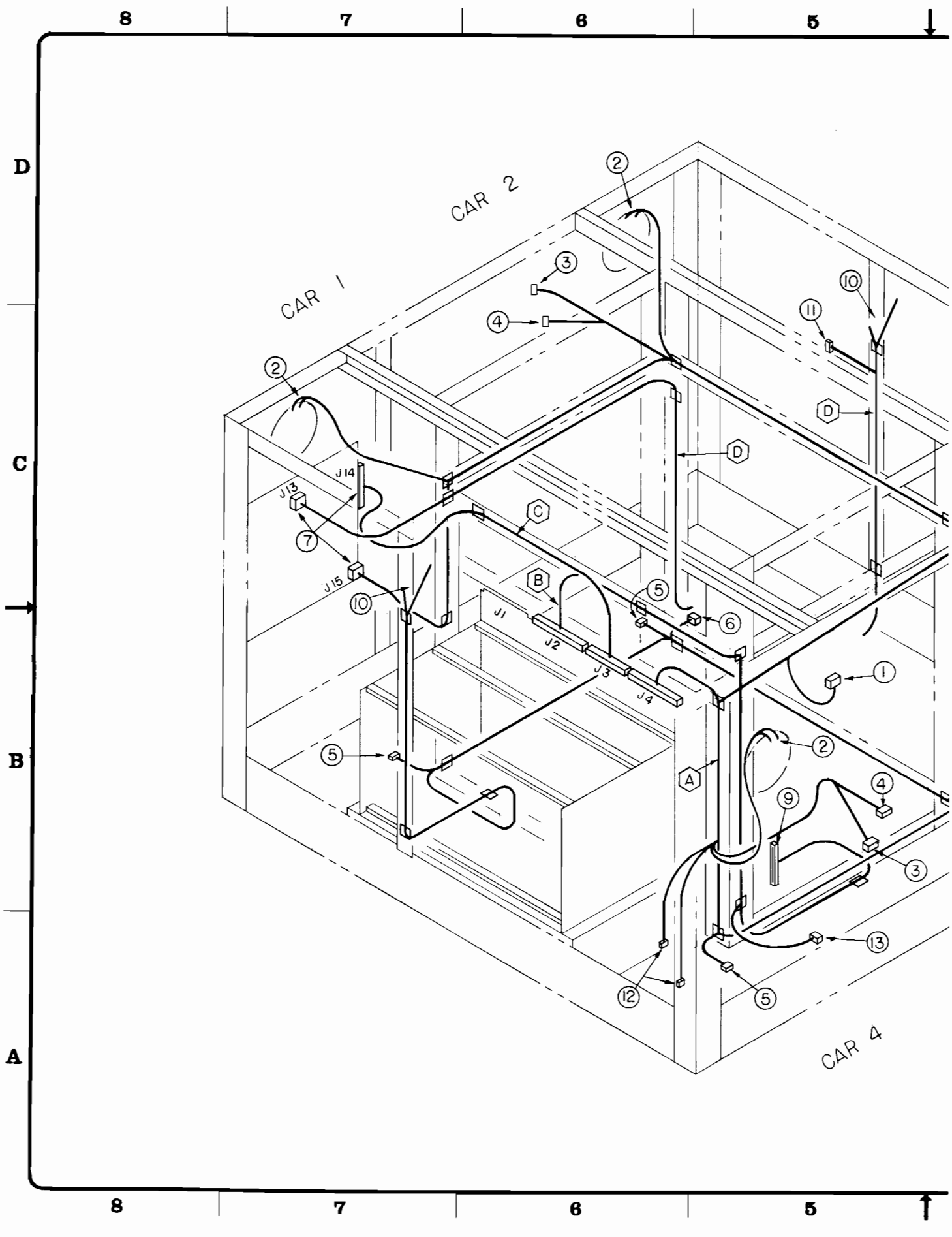
MFG ENGINEER

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

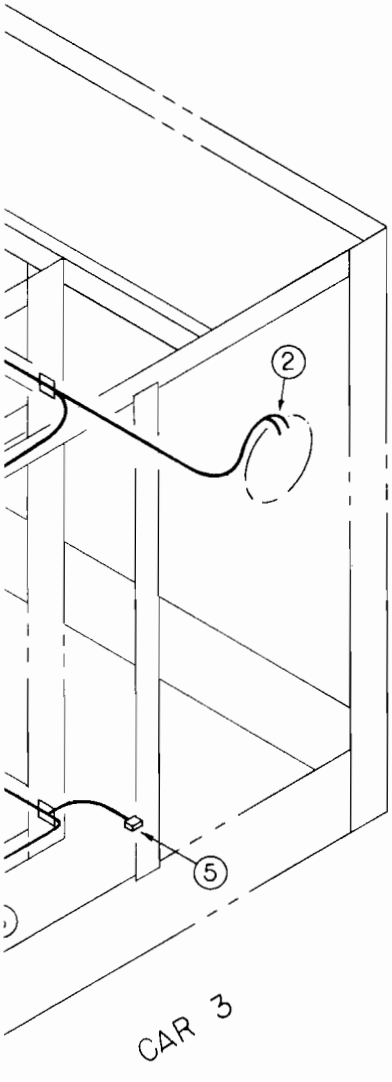
TITLE: DOUBLE FOOT PEDAL ASSEMBLY

SIZE	DRAWING NO.	REV
C	A 004797	C
SCALE	SHEET 1 OF 1	

NOTES: UNLESS OTHERWISE SPECIFIED


8
7
6
5
D
C
B
A
CAR 1
CAR 2
CAR 4
J1
J2
J3
J4
J13
J14
J15
A
B
C
D

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PROD REL	5/3/76		



HARNESSES

A MAIN A005481-01
B TV-VIDEO A005483-01
C LOCKOUT POWER A005484-01
D POWER SUPPLY A005485-01

CONNECTIONS

1 STEERING
2 SPEAKER
3 COIN MECH
4 LOCKOUT COILS
5 FOOT PEDALS
6 ELECTRONICS TRAY
7 POWER SUPPLY BOARD
8 MOTHER BOARD
9 T.V.
10 INTERLOCK SWITCH
11 A C POWER TO FAN
12 A C POWER TO BILL ACCEPTOR
13 BILL ACCEPTOR CREDIT

NEXT ASSY | USED ON
APPLICATION

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS ± 1/16 .x ± .1
ANGLES ± 1° .xx ± .03
SURFACE FINISH ✓ .xxx ± .010

MATERIAL:

	DRAWN BY	DATE
	B.R.R.	4-28-76
CHECKED		
DESIGN ENGINEER		
PROJECT ENGINEER		
DOCUMENT CONTROL		
APPROVED		

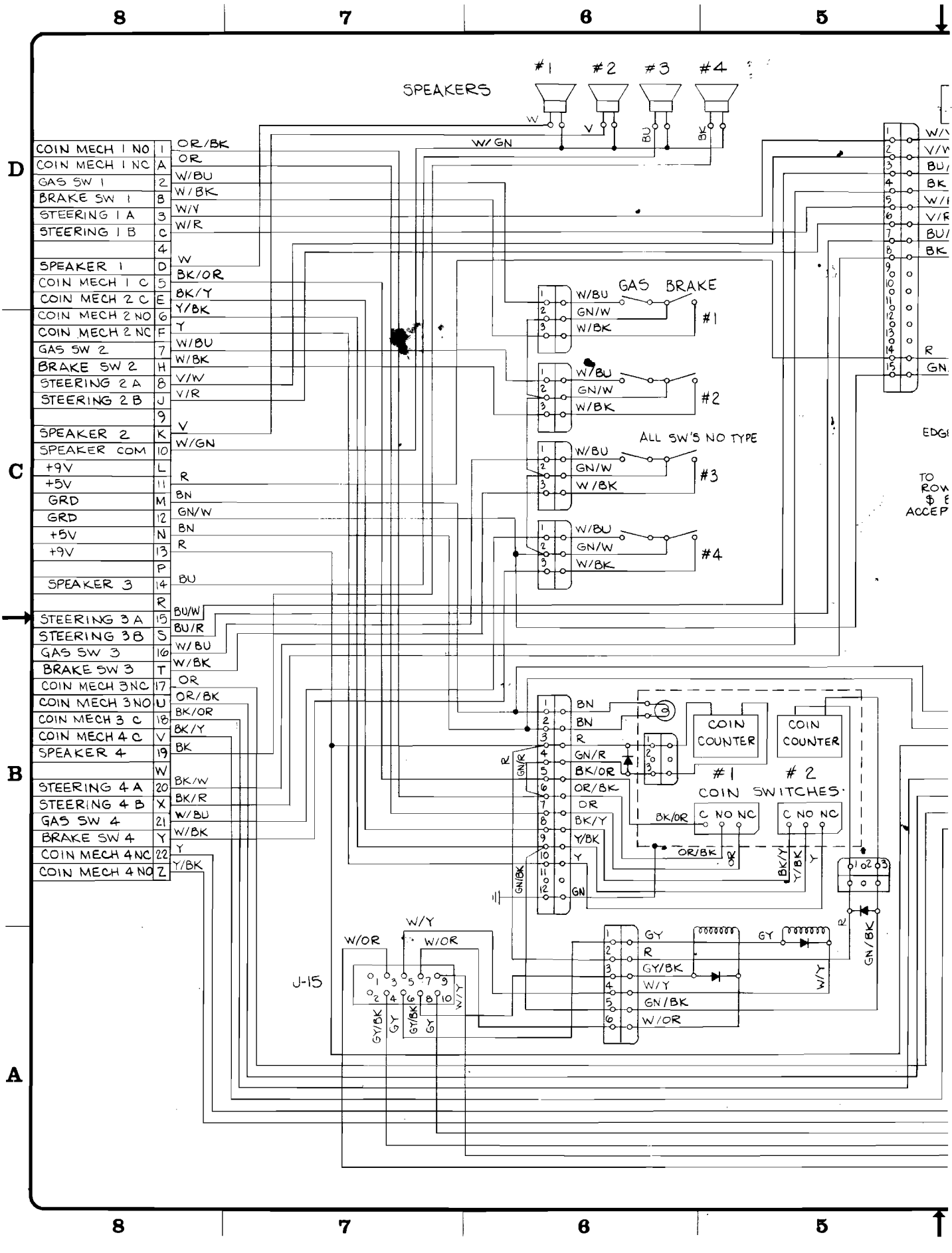
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE
INDY 4
HARNESS INSTALLATION

SIZE	DRAWING NO.	REV
D	005488	A

SCALE — | SHEET 1 OF 1

DRAWING NO. | SHEET | REV


8
7
6
5
D
C
B
A
SPEAKERS
#1
#2
#3
#4
W
V
BU
BK
W/GN
COIN MECH 1 NO 1 OR/BK
COIN MECH 1 NC A OR
GAS SW 1 2 W/BU
BRAKE SW 1 B W/BK
STEERING 1 A 3 W/V
STEERING 1 B C W/R
4
SPEAKER 1 D W
COIN MECH 1 C 5 BK/OR
COIN MECH 2 C E BK/Y
COIN MECH 2 NO 6 Y/BK
COIN MECH 2 NC F Y
GAS SW 2 7 W/BU
BRAKE SW 2 H W/BK
STEERING 2 A 8 V/W
STEERING 2 B J V/R
9
SPEAKER 2 K V
SPEAKER COM 10 W/GN
+9V L
+5V 11 R
GRD M BN
GRD 12 GN/W
+5V N BN
+9V 13 R
P
SPEAKER 3 14 BU
R
STEERING 3 A 15 BU/W
STEERING 3 B S BU/R
GAS SW 3 16 W/BU
BRAKE SW 3 T W/BK
COIN MECH 3 NC 17 OR
COIN MECH 3 NO U OR/BK
COIN MECH 3 C 18 BK/OR
COIN MECH 4 C V BK/Y
SPEAKER 4 19 BK
W
STEERING 4 A 20 BK/W
STEERING 4 B X BK/R
GAS SW 4 21 W/BU
BRAKE SW 4 Y W/BK
COIN MECH 4 NC 22 Y
COIN MECH 4 NO Z Y/BK
GAS
BRAKE
W/BU
GN/W
W/BK
#1
#2
#3
#4
ALL SW'S NO TYPE
COIN COUNTER
COIN COUNTER
#1
#2
COIN SWITCHES
C NO NC
C NO NC
BK/OR
OR/BK
BK/Y
Y/BK
Y
GN
BN
R
GN/R
OR/BK
OR
GN/BK
J-15
W/Y
W/OR
W/OR
GY/BK
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GN/BK
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ROW
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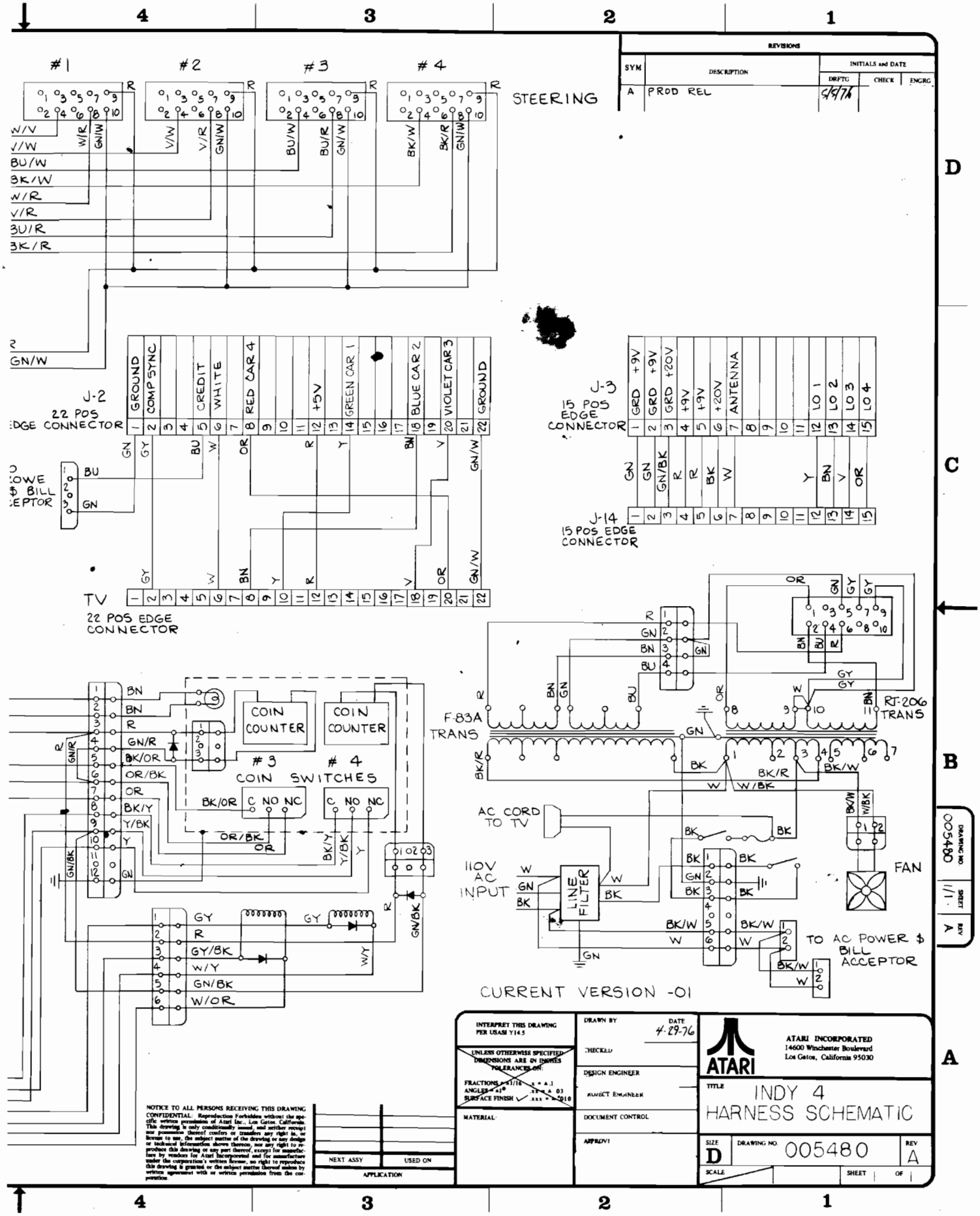
ACCEP
EDG



REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PROD REL	4/29/76		

NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS ±1/16 .x ± .1 ANGLES ±1° .xx ± .03 SURFACE FINISH √ .xxx ± .010

MATERIAL

DRAWN BY — DATE 4-29-76
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER
DOCUMENT CONTROL
APPROVE

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE: INDY 4 HARNESS SCHEMATIC

SIZE D | DRAWING NO. 005480 | REV A
SCALE | SHEET | OF

DRAWING NO 005480 | SHEET 1/1 | REV A

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / ELECTRONICS TRAY	P/L A005486-01

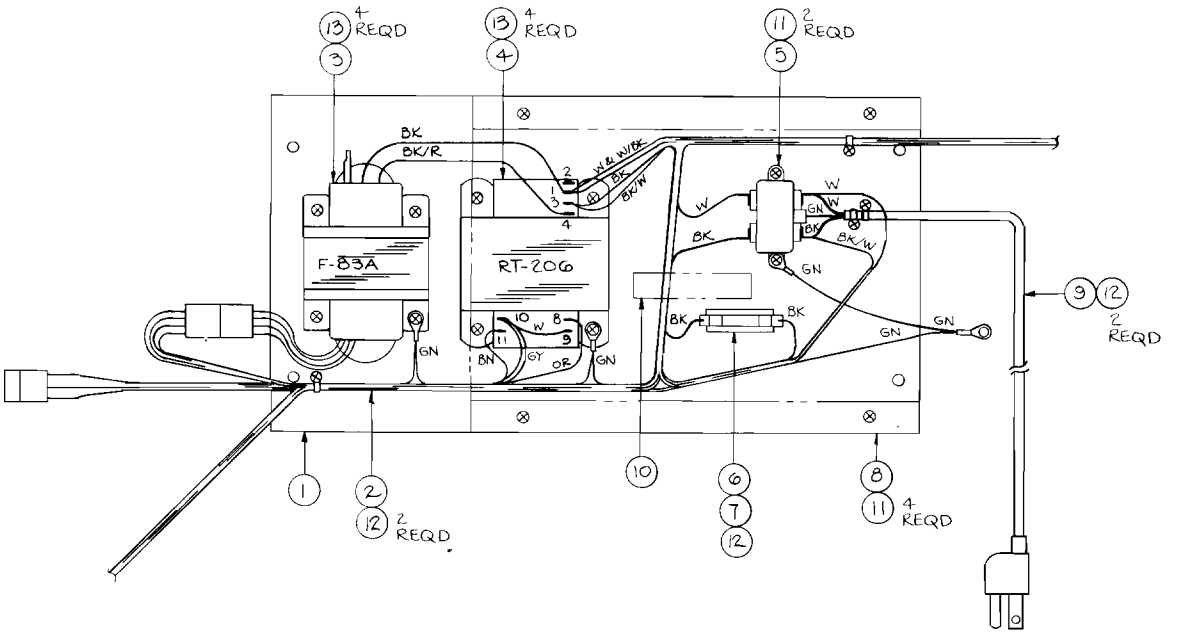
PARTS LIST SPECIFICATION — Page 1 of 1

Drawn		
Checked	Mech. Eng.	
Proj. Eng.	Elec. Eng.	REV. B

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	4/21/76					
B	Rev per ECN 2509	4/29					

Item	Part Number	Qty.	DESCRIPTION
1	005478	1	Electronics Tray
2	A005485-01	1	Power Supply Harness
3	A005164-02	1	Transformer, Triad F83A
4	42-7112	1	Transformer, Stancor RT-206
5	41-2001	1	Filter Power Line
6	46-202501	1	Fuse, 5 AMP
7	79-3201	1	Fuse Holder
8	005507-01	1	Electronics Tray Cover
9	A004381-01	1	Power Cord 8' Assy
10	000871-01	1	Label
11	72-6608	6	Screw, SM, Pan Hd, Phil #6 x ½ Lg
12	72-6612	5	" " " " " #6 x 3/4 Lg
13	72-6812	8	" " " " " #8 x 3/4 Lg

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED
	A	PROD REL		
	B	REV PER ECN 2509		



OUTSTANDING ECNs	

CURRENT VERSION A005486-01

NOTES : UNLESS OTHERWISE SPECIFIED

INDY 4	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: ANGLES ± 1° .xx ± .03 .xxx ± .010 SURFACE FINISH √

DO NOT SCALE DRAWING

DRAWN BY | DATE 4-20-76

CHECKED

ENGINEER

PROJECT ENGINEER

MFG ENGINEER

MATERIAL:

FINISH:

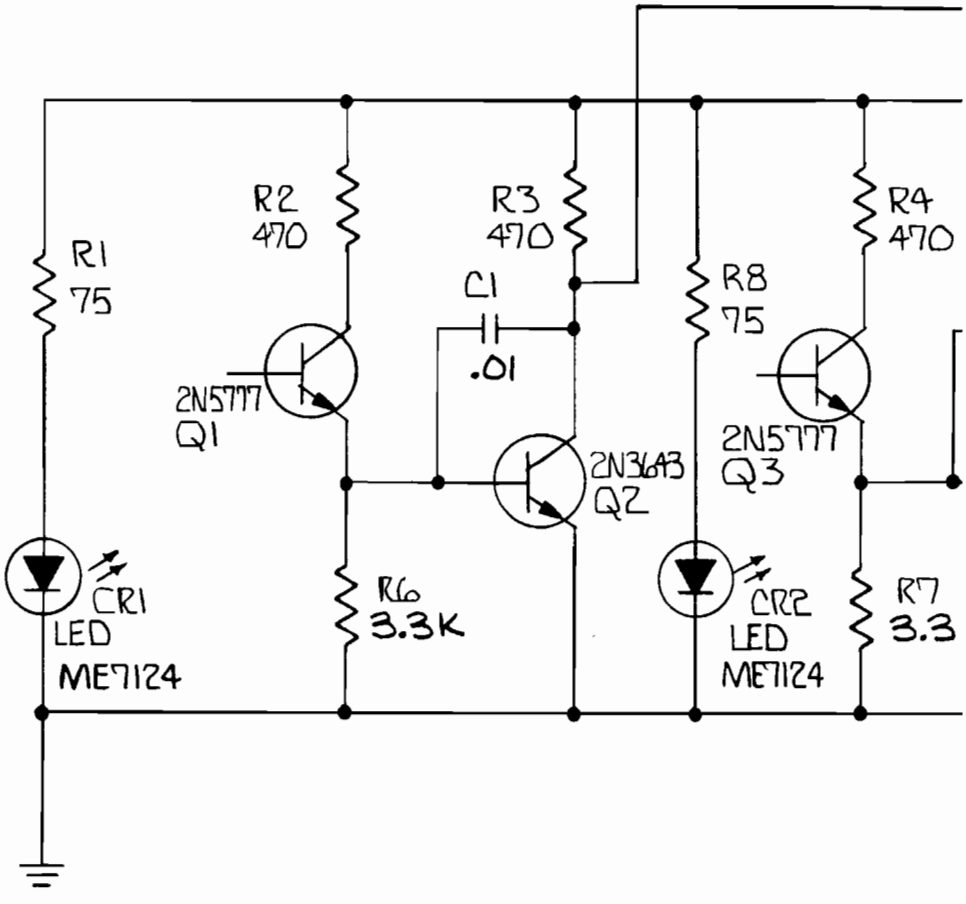
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE INDY 4 ELECTRONICS TRAY ASSEMBLY

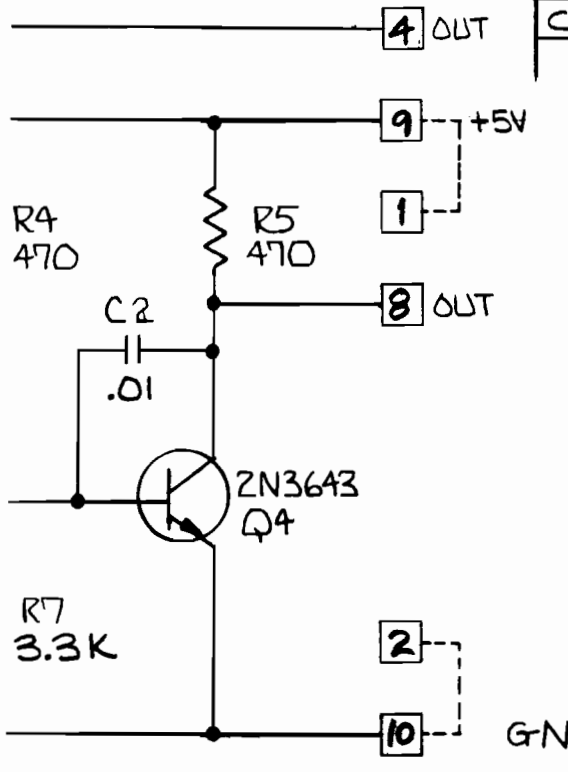
SIZE C | DRAWING NO. A005486 | REV B

SCALE HALF | SHEET 1 OF 1

DRAWING NO. A005486 | SHEET 1/1 | REV B



A000607	A0C
NEXT ASSY	U:
APPLICATION	



REVISIONS

SYM	DESCRIPTION	INITIALS and DATE DRFTG.	CHECK	ENGRG.
A	RELEASED FOR PROD	4-16		
B	REV. PER ECN 441	6-29-73		
C	REV. PER ECN 1533	7/8/75		

MICROFARADS.
2. ALL CAPACITORS IN 1/4W, 5%, CARBON.
1. ALL RESISTORS IN OHMS,
NOTES: (UNLESS OTHERWISE SPEC)

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:
FRACTIONS = ±1/16 .x = ± .1
ANGLES = ±1° .xx = ± .03
SURFACE FINISH √ .xxx = ± .010

MATERIAL:

DRAWN BY DATE 4-16-72
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER 4/19/74
DOCUMENT CONTROL
4/18/74

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE SCHEMATIC STEERING BOARD

SIZE B | DRAWING NO 001151 | REV C

SCALE NONE | SHEET 1 OF 1

7 A000519
USED ON
PLICATION

ATARI

Job Title	Dwg.
RACETRAK STEERING PCB ASSY	P/L 000607

Parts List Specification

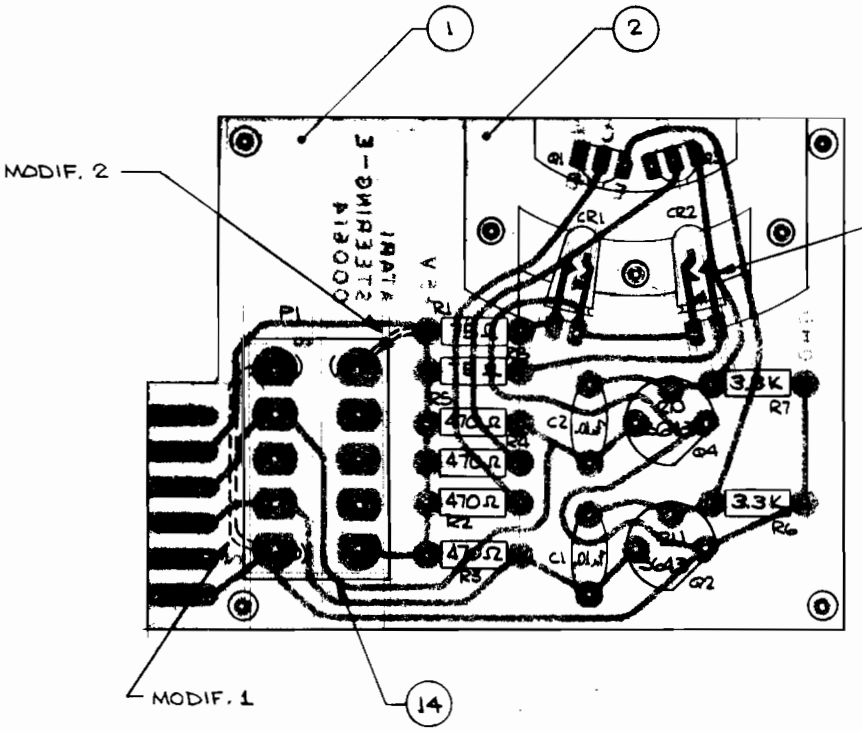
sheet 1 of 1

Drawn		
Checked	Mech. Eng.	Rev.
Proj. Eng	Elec. Eng.	M

Rev.	Description	Apprv.	Rev.	Description	Apprv.
H	Redesigned	5-6-74			
J	Rev per ECN 397 5/28/74				
K	Rev per ECN 457 6/3/74				
L	Rev per ECN 601 7/15/74				
M	Rev per ECN 1531				

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, ¼ watt, 5%
5	11471/10-5471	4	Resistor, Comp, 470 ohm, ¼ watt, 5%
6	11332/10-5332	2	Resistor, Comp, 3.3Kohm, ¼ 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
15	72-1212S	1	Screw, Machine, Pan Head Phil, #2-56 x 3/4 Lg.
16	75-042	1	Washer, Split Lock #2
17	75-912S	1	Nut, Hex, #2-56
18	003749	1	Retainer, Led Light Mount

*USA



REFER TO SCHEMATIC 001151

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		
M	REV PER ECN 1531	7/8/75		

MODIFICATIONS: FOR 000614 REV J P.C. BOARDS

1. JUMPER FROM PIN 2 TO PIN 10 OF THE 10 PIN CONNECTOR, ON CIRCUIT SIDE OF BOARD.
2. JUMPER FROM PIN 1 OF THE 10 PIN CONNECTOR TO THE PAD MARKED +5V (END OF R1) ON CIRCUIT SIDE OF BOARD.

MODIFICATIONS: FOR 000614 REV K P.C. BOARDS.

1. JUMPER FROM PIN 2 TO PIN 10 OF THE 10 PIN CONNECTOR, ON CIRCUIT SIDE OF BOARD.

NEXT ASSY	USED ON
A000598	A000519
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS = ±1/16 .x = ±.1
ANGLES = ±1° .xx = ±.03
SURFACE FINISH ✓ .xxx = ±.010

MATERIAL: SEE PL 000607

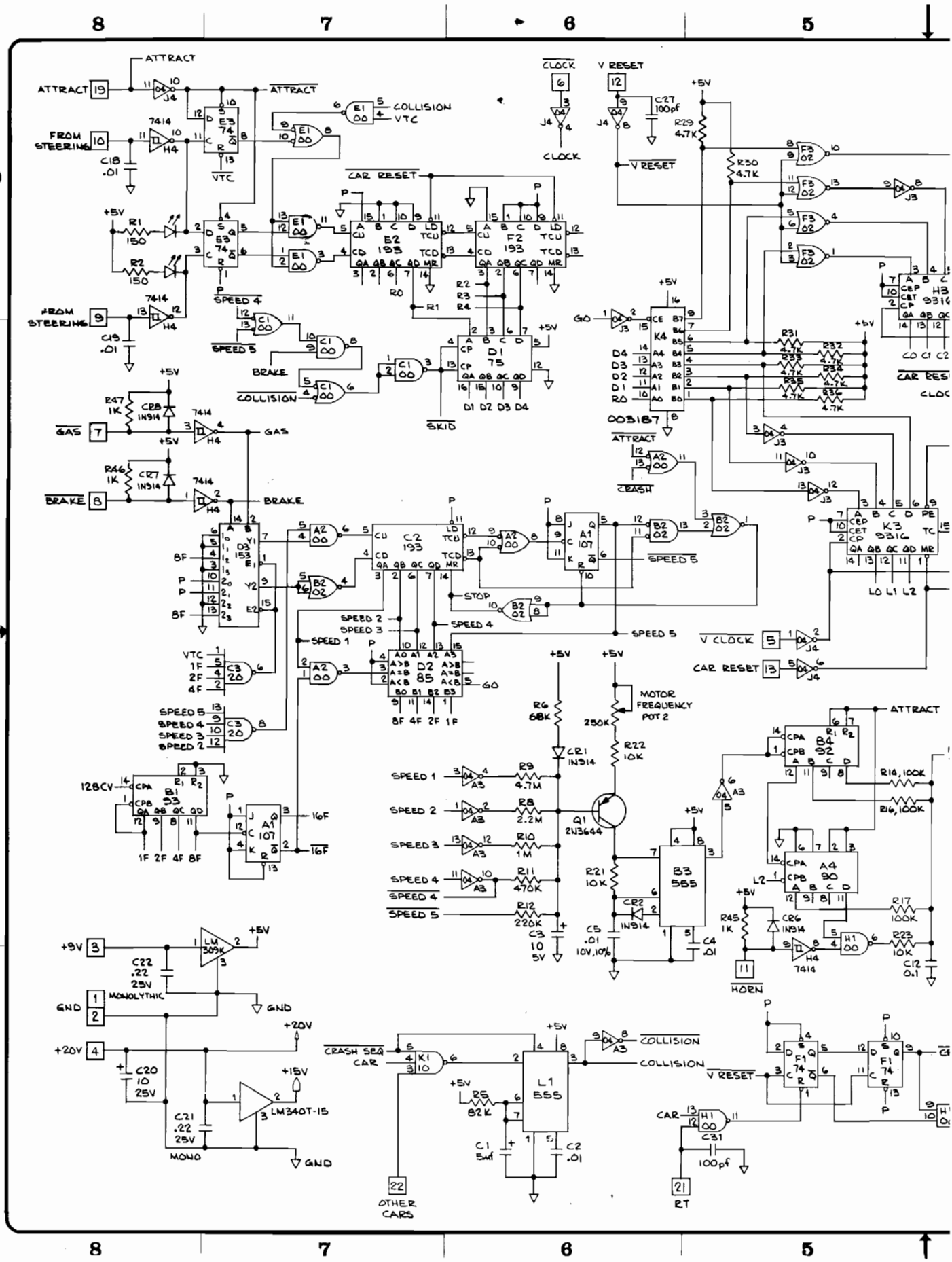
DRAWN BY DATE 5-6-74
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER
DOCUMENT CONTROL 5/21/74

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

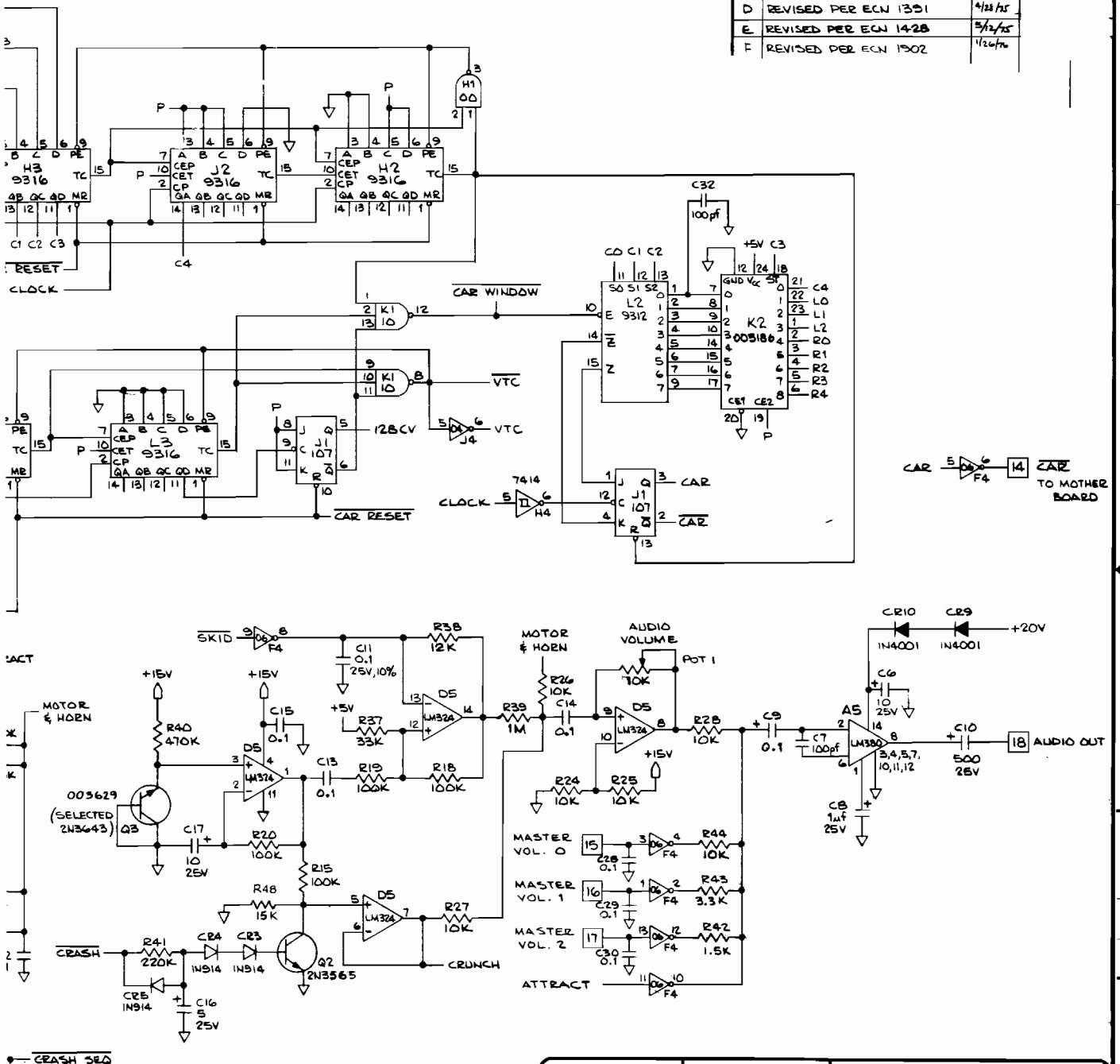
TITLE: ASSEMBLY STEERING BOARD

SIZE: B | DRAWING NO: A000607 | REV: M

SCALE: 2:1 | SHEET 1 OF 1


8
7
6
5
D
C
B
A
ATTRACT
FROM STEERING
C18 .01
7414
H4
VTC
E3 74
R1 150
R2 150
+5V
SPEED 4
SPEED 5
BRAKE
COLLISION
C19 .01
R47 1K
CR8 1N914
GAS
R46 1K
CR7 1N914
BRAKE
CAR RESET
B2 193
R0
R1
R2
R3
R4
D1 75
D1 D2 D3 D4
SKID
CLOCK
J4
V RESET
C27 100pf
R29 4.7K
R30 4.7K
F3 02
J3
K4
D4
D3
D2
D1
D0
R31
R32
R33
R34
R35
R36
4.7K
003187
CRASH
K3 9316
LO L1 L2
V CLOCK
CAR RESET
D3 153
BF
P
VTC
1F
2F
4F
C3 20
SPEED 5
SPEED 4
SPEED 3
SPEED 2
C2 193
A1 107
STOP
SPEED 1
D2 85
8F 4F 2F 1F
GO
MOTOR FREQUENCY POT 2
250K
R6 68K
CR1 1N914
R22 10K
Q1 2N3644
R9 4.7M
R8 2.2M
R10 1M
R11 470K
R12 220K
C3 10 5V
R21 10K
CR2 1N914
B3 555
C5 .01 10V,10%
C4 .01
128CV
B1 53
1F 2F 4F 8F
16F
B4 92
B4 90
R14, 100K
R16, 100K
R17 100K
R23 10K
C12 0.1
R45 1K
CR6 1N914
HORN
+9V
LM 309K
C22 .22 25V MONOLYTHIC
GND
+20V
C20 10 25V
+15V
LM340T-15
C21 .22 25V MONO
CRASH SEQ CAR
K1
L1 555
R5 82K
C1 5uf
C2 .01
COLLISION
OTHER CARS
F1 74
CAR
H1
C31 100pf
RT

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE	2/18		
B	REVISED PER ECN 1166	2/27/75		
C	REVISED PER ECN 1248, 1269	3/25/75		
D	REVISED PER ECN 1351	4/28/75		
E	REVISED PER ECN 1428	5/12/75		
F	REVISED PER ECN 1502	11/26/75		



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NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS ± .01/16 .x ± .1
ANGLES ± 1° .xx ± .03
SURFACE FINISH ✓ .xxx ± .010

MATERIAL

DRAWN BY	DATE 1/7/75	
CHECKED		
DESIGN ENGINEER		
PROJECT ENGINEER	10 FEB 75	
DOCUMENT CONTROL		
APPROVED	2/18/75	

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE
SCHEMATIC CAR BOARD

SIZE	DRAWING NO	REV
D	003000	F
SCALE		SHEET 1 OF 1

DRAWING NO. SHEET REV

INDY 800

ATARI
Innovative leisure

ASSEMBLY TITLE / RT8 CAR BOARD **P/L** A003000

PARTS LIST SPECIFICATION Page 1 of 2

Drawn			
Checked	8/25/75	Mech. Eng.	
Proj. Eng.	2/3/75	Elec. Eng. 2/3/75	REV. F
		2/3/75	

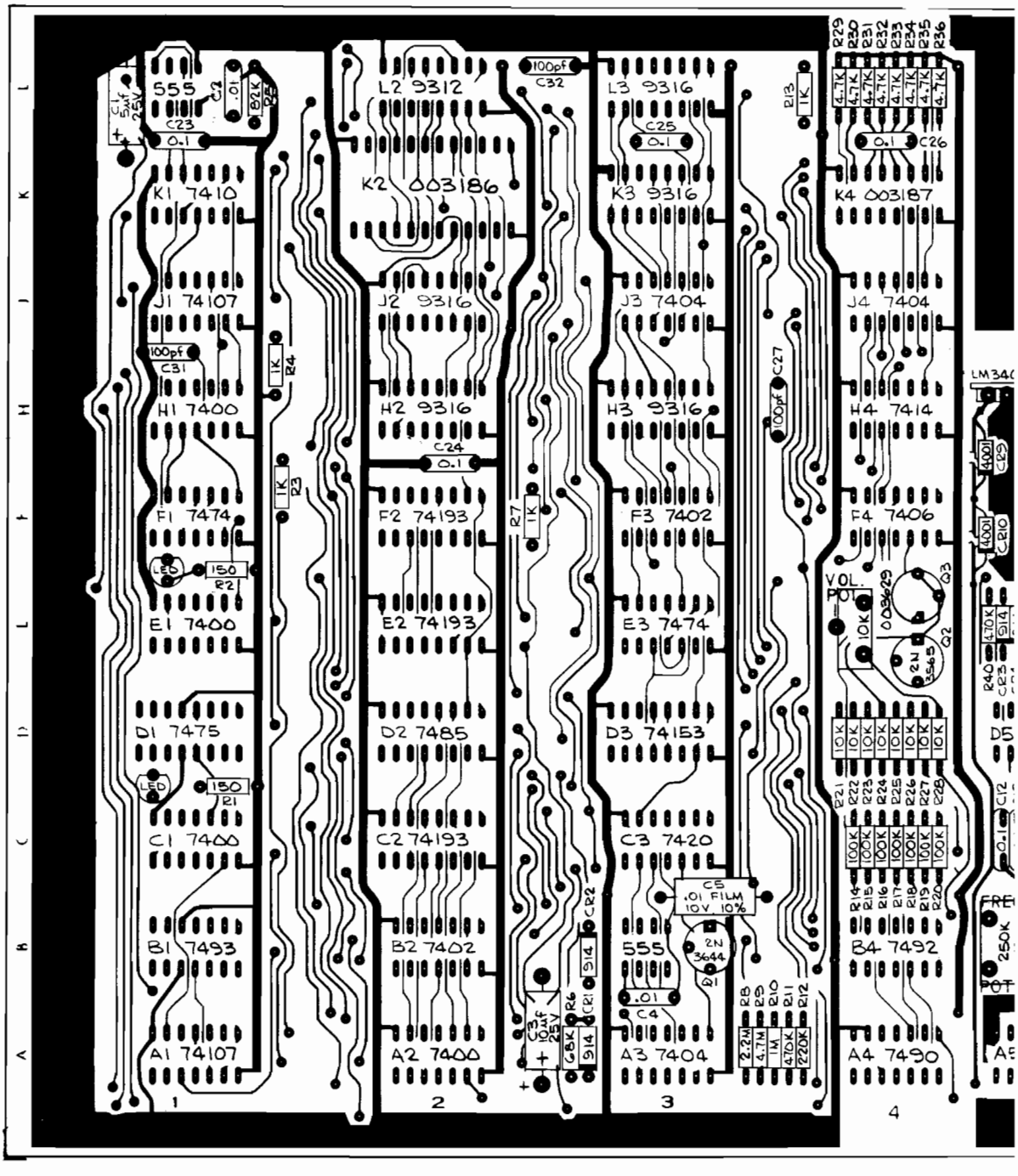
Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	2-3-75					
B	REV PER ECN 1166	2-27-75					
C	REV PER ECN 1248, 1269	3/25/75					
D	REV PER ECN 1391	4/28/75					
E	REV PER ECN 1428	5/12/75					
F	Rev. Per. ECN 1902	1/27/76					

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	003629	1	Transistor, Noise Source, 2N3643
30	35-2N3644	1	Transistor, PNP, Type 2N3644
31	31-1N914	8	Diode, Type 1N914
32	38-MV5013	2	Light Emitting Diode, Visible, Red
33			
34			
35	19-315103	1	10K ohm Trimpot
36	10-5151	2	Resistor, Carbon, 5%, ¼W, 150 ohm R1,2
37	10-5102	7	" " " " 1K ohm R3,4,7,13,45-47
38	10-5152	1	" " " " 1.5K ohm R42
39	10-5332	1	" " " " 3.3K ohm R43
40	10-5472	8	" " " " 4.7K ohm R29-36

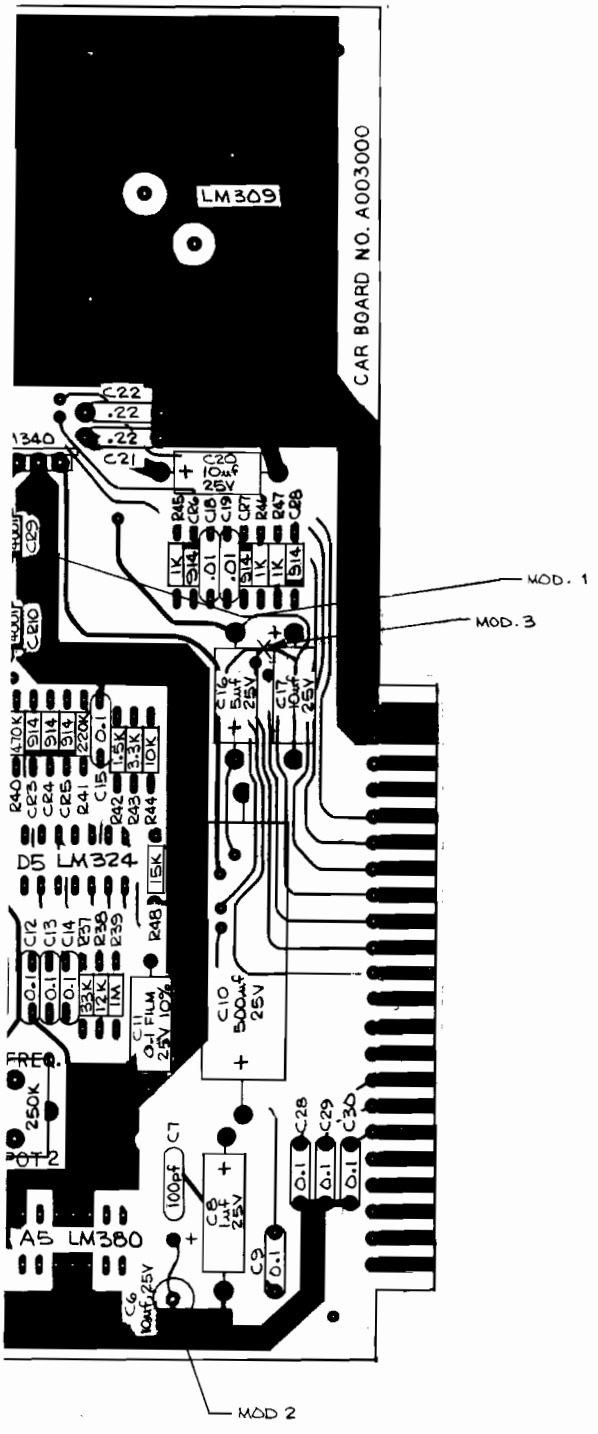
ASSEMBLY TITLE RT8 CAR BOARD **P/L** A003000

PARTS LIST SPECIFICATION REV. F

Item	Part Number	Qty.	DESCRIPTION
41	10-5103	9	Resistor, Carbon, 5%, ¼W, 10K ohm R21-28,44
42	10-5123	1	" " " " 12K ohm R38
43	10-5153	1	" " " " 15K ohm R48
44	10-5333	1	" " " " 33K ohm R37
45	10-5683	1	" " " " 68K ohm R6
46	10-5823	1	" " " " 82K ohm R5
47	10-5104	7	" " " " 100K ohm R14-20
48	10-5224	2	" " " " 220K ohm R12,41
49	10-5474	2	" " " " 470K ohm R11,40
50	10-5105	2	" " " " 1M ohm R10,39
51	10-5225	1	" " " " 2.2M ohm R8
52	10-5475	1	" " " " 4.7M ohm R9
53	19-315254	1	250K ohm Trimpot
54	28-101101	4	Capacitor, Mica, 100pf, 100V
55	27-250103	4	" Ceramic, .01uf, 25V
56	21-250103	1	" Film (Mylar), .01uf, 25V
57	27-250104	12	" Ceramic, 0.1uf, 25V
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	4	" 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			
67	75-056	2	Lock Washer, Internal Star, #6
68	31-1N4001	2	Diode, 1N4001
69	78-16005	1	Silpad


555
K1 7410
J1 74107
H1 7400
F1 7474
E1 7400
D1 7475
C1 7400
B1 7493
A1 74107
L2 9312
K2 003186
J2 9316
H2 9316
F2 74193
E2 74193
D2 7485
C2 74193
B2 7402
A2 7400
L3 9316
K3 9316
J3 7404
H3 9316
F3 7402
E3 7474
D3 74153
C3 7420
555
A3 7404
K4 003187
J4 7404
H4 7414
F4 7406
B4 7492
A4 7490
VOL. POT
003629
2N 3643
2N 3644
LM340
1
2
3
4

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
D	REVISED PER ECN 1391	4/25/75		
E	REVISED PER ECN 1428	5/22/75		
F	REVISED PER ECN 1902	1/26/76		



NOTES:

1. LED'S TO BE MOUNTED POINTING TOWARDS BACK OF BOARD AND LAYING DOWN.
2. THIS ASSEMBLY TO BE USED WITH 002999 REVISION "B" P.C. BOARD.

MODIFICATIONS : (TO REVISION "B" AND REVISION "C" 002999 BOARDS).

1. INSTALL TWO IN4001 DIODES IN SERIES AS SHOWN, CUTTING TRACE UNDERNEATH EACH DIODE.
2. INSTALL 10uf 25V CAPACITOR AS SHOWN, STANDING UP.

MODIFICATION : (TO REVISION "B" 002999 BOARDS ONLY)

3. CUT TRACE AS INDICATED. JUMPER + (POSITIVE) END OF C17 (10uf/25V) CAPACITOR TO D5 PIN 2 (LM324).

DRAWING NO. | SHEET | REV.

NEXT ASSY	USED ON
	INDY 800
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS = ±1/16 .X = ±.1
ANGLES = ±1° .XX = ±.03
SURFACE FINISH ✓ .XXX = ±.010

MATERIAL SEE P/L 003000

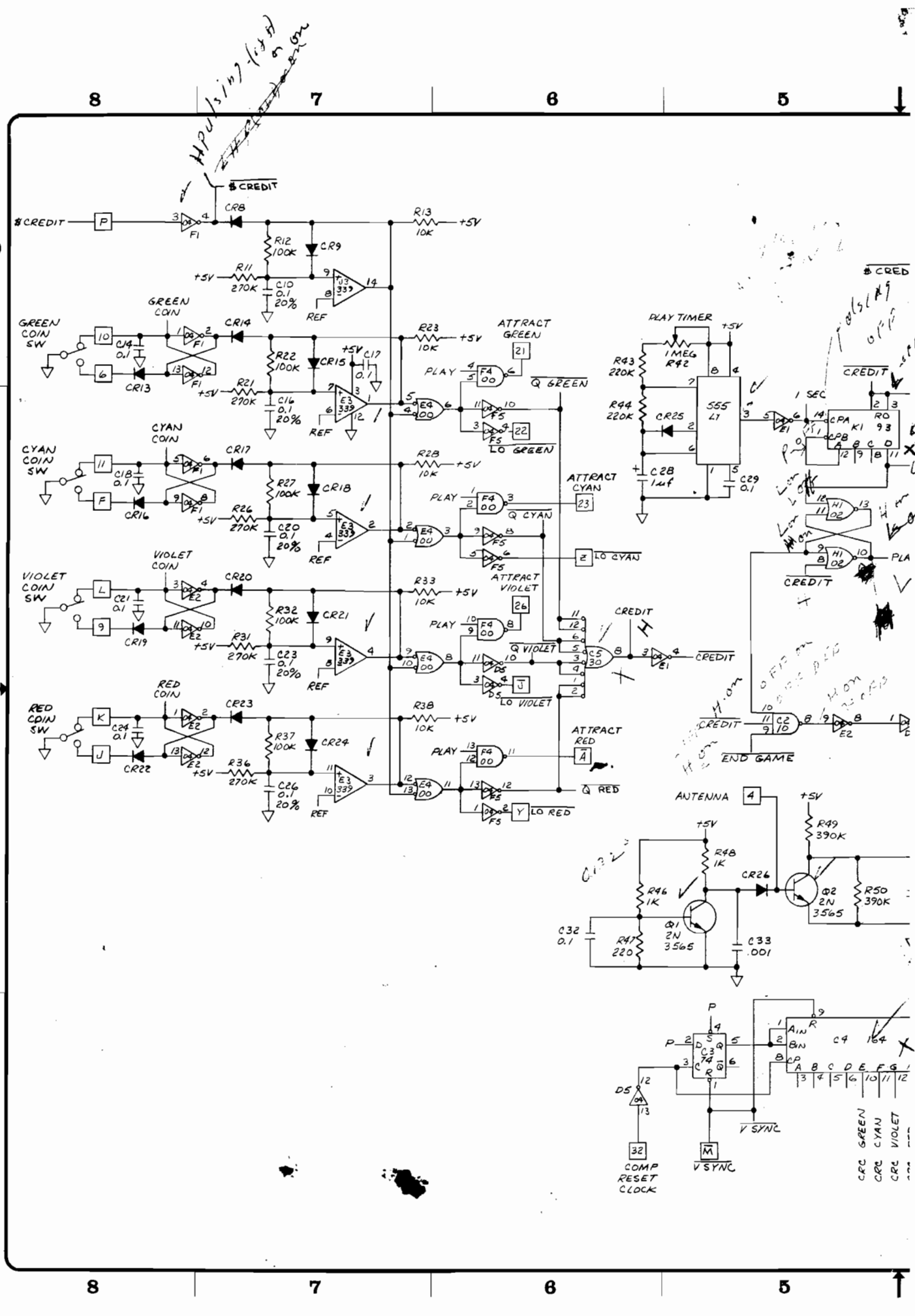
DRAWN BY DATE 4/25/75
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER 29 APR 75
DOCUMENT CONTROL

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

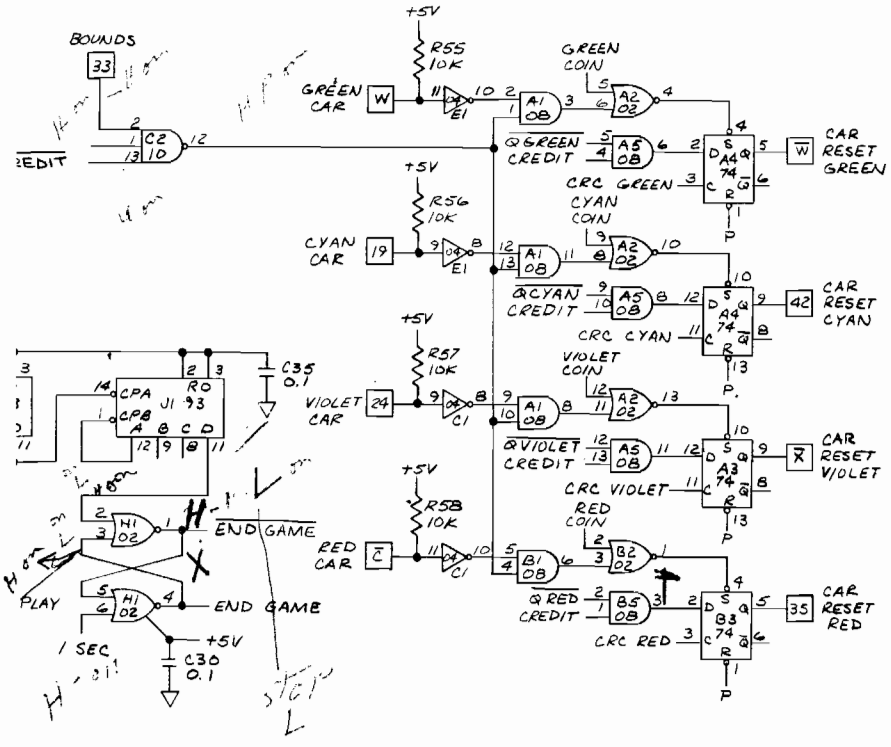
TITLE ASSEMBLY, CAR BOARD

SIZE D | DRAWING NO A003000 | REV F

SCALE 2/1 | SHEET 1 OF 1


8
7
6
5
D
C
B
A
$CREDIT
#CREDIT
CR8
R13
10K
+5V
R12
100K
CR9
R11
270K
C10
0.1
20%
REF
GREEN COIN
GREEN COIN SW
CR14
CR13
C14
0.1
R22
100K
CR15
C17
0.1
R21
270K
C16
0.1
20%
R23
10K
ATTRACT GREEN
PLAY
Q GREEN
LO GREEN
CYAN COIN
CYAN COIN SW
CR17
CR16
C18
0.1
R27
100K
CR18
R26
270K
C20
0.1
20%
R28
10K
ATTRACT CYAN
Q CYAN
LO CYAN
VIOLET COIN
VIOLET COIN SW
CR20
CR19
C21
0.1
R32
100K
CR21
R31
270K
C23
0.1
20%
R33
10K
ATTRACT VIOLET
Q VIOLET
LO VIOLET
RED COIN
RED COIN SW
CR23
CR22
C24
0.1
R37
100K
CR24
R36
270K
C26
0.1
20%
R38
10K
ATTRACT RED
Q RED
LO RED
PLAY TIMER
1MEG
R42
R43
220K
R44
220K
CR25
C28
1uf
C29
0.1
555
1 SEC
CREDIT
END GAME
ANTENNA
R49
390K
R48
1K
R46
1K
R47
220
CR26
Q2
2N
3565
Q1
2N
3565
R50
390K
C32
0.1
C33
.001
V SYNC
COMP
RESET
CLOCK
CRC GREEN
CRC CYAN
CRC VIOLET

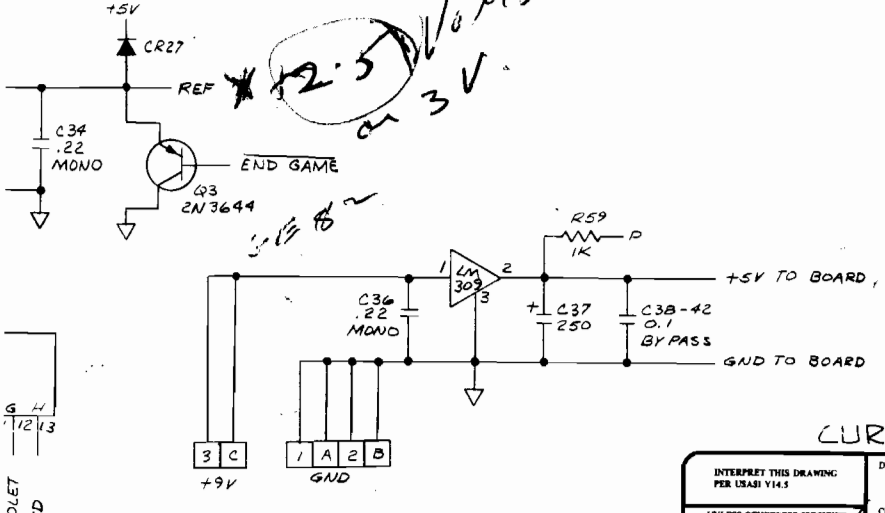
REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		ORFTG	CHECK	ENGRG
A	PRODUCTION RELEASE		4/23/76	



LAST REF DES
R59
C42
CR27
Q3

D5 L SCORE RESET

NOTES:
1. ALL DIODES ARE IN914.



CURRENT VERSION -02

A004792-01	INDY 4
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USAS1 Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS = ±1/16 x = ±.1
ANGLES = ±1° XX = ±.01
SURFACE FINISH ✓ XXX = ±.005

MATERIAL

DRAWN BY — DATE 4/9/76
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER 4/23/76
APPROVED

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE: SCHEMATIC, COIN CONTROL BOARD

SIZE D | DRAWING NO. 003184 | REV A

SCALE — | SHEET 1 OF 1

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / COIN CONTROL BOARD **P/L** A003184-02

PARTS LIST SPECIFICATION Page 1 of 2

Drawn	
Checked	Mech. Eng.
Proj. Eng.	Elec. Eng

6 REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD. REL.	4/23/76					

Item	Part Number	Qty.	DESCRIPTION	
1	003185-01	1	Printed Circuit Board	
2	37-LM309	1	LM309K Positive 5-Volt Regulator	
3	78-06004	1	Heatsink, WakeField 680-.75A	
4	72-1610C	2	Screw, Machine, Pan Hd., Phil., 6-32 x 5/8	
5	75-916C	2	Nut, Machine, Hex, 6-32	
6				
7	75-056	2	Lock Washer, Internal Star, #6	
8	37-7400	2	7400 I.C.	E4,F4
9	37-7402	3	7402 "	H1, A2, B2
10	37-7404	6	7404 "	C1, E1, F1, E2, D5, F5
11	37-7408	4	7408 "	A1, B1, A5, B5
12	37-7410	1	7410 "	C2
13	37-7430	1	7430 "	C5
14	37-7474	4	7474 "	A3,B3,C3,A4
15	37-7493	2	7493 "	J1, K1
16	37-74164	1	74164 "	C4
17				
18	37-555	1	555 Timer I.C.	L1
19	37-LM339	2	LM339 Quad Comparator	E3, J3
20	34-2N3565	2	Transistor, NPN, Type 2N3565	Q1, 2
21	31-IN914	17	Diode, Type IN914	CR8,9,13-27
22				
23				
24	10-5102	4	Resistor, Carbon, 5%, ¼W, 1K OHM	R41,46,48,59
25	10-5103	9	" " " " 10K OHM	R13,23,28,33,38 55-58

*

ASSEMBLY TITLE INDY 4 COIN CONTROL BOARD P/L A003184-02

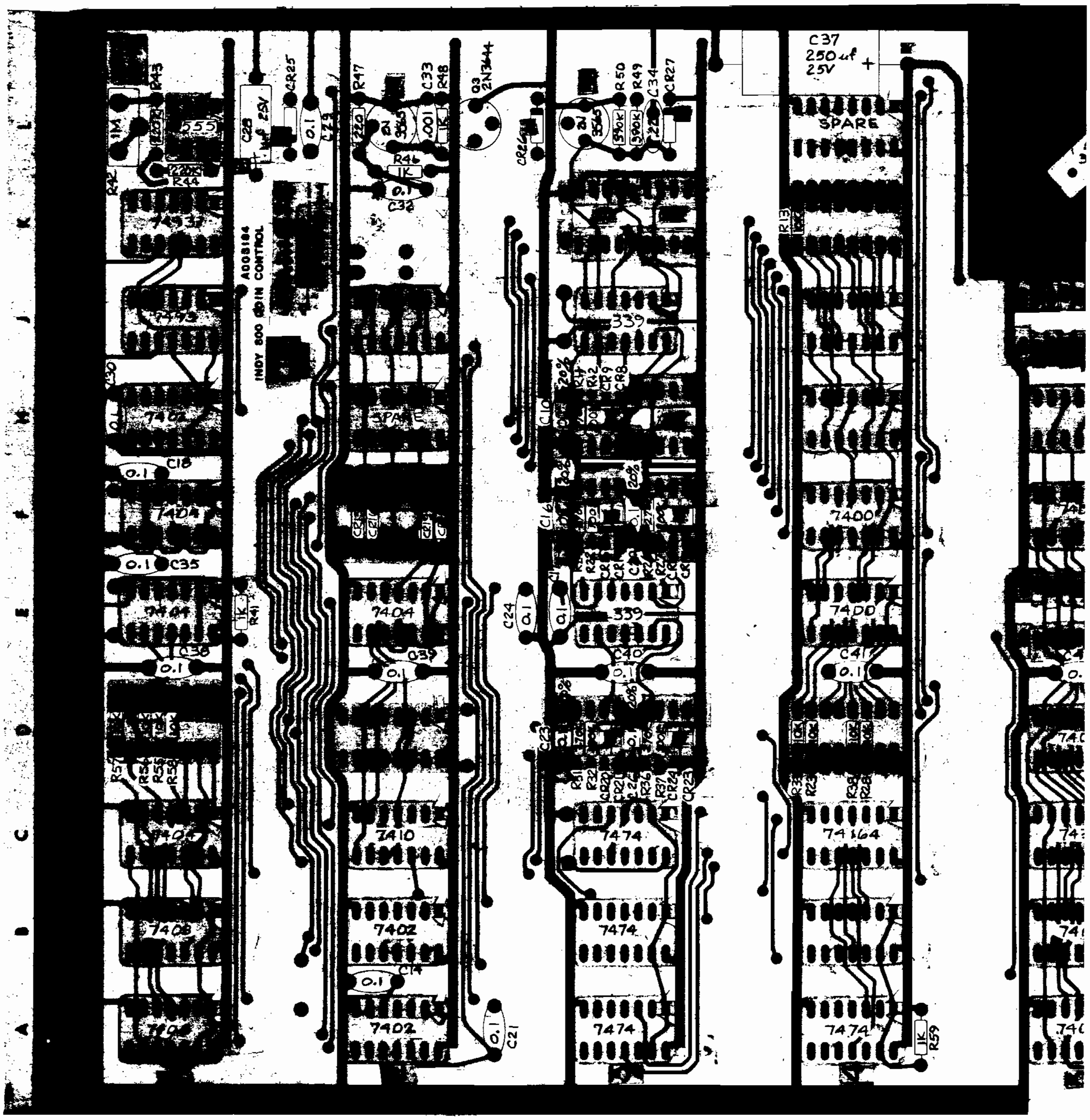
PARTS LIST SPECIFICATION REV A

Item	Part Number	Qty.	DESCRIPTION
26			
27	10-5104	5	Resistor, Carbon, 5%, ¼W, 100K OHM R12,22,27,32,37
28	10-5224	2	" " " " 220K OHM R43,44
29	10-5221	1	" " " " 220 OHM R47
30	10-5274	5	" " " " 270K OHM R11,21,26,31,36
31	10-5394	2	" " " " 390K OHM R49,50
32	19-315105	1	Trimpot, 1M OHM, P.C. Vert. Mount R42
33	24-250105	1	Capacitor Electrolytic, 1 uf, 25V C28
34	24-250227	1	" " 220 uf, 25V C37
35	29-008	5	Capacitor, Ceramic, 0.1 uf, 12v, 20%, C10,16,20,23,26
36	27-250102	1	Capacitor, Ceramic, .001uf, 25V C33
37	27-250104	14	" " 0.1uf, 25V C14,17,18, 21, 24, 29,30,32,35,38-42
38	29-011	2	Capacitor, Monolythic, .22uf, 12V, Rad. C34,36
39	33-2N3644	1	Transistor, PNP, 2N3644 Q3
40	75-016S	2	Washer, Flat, Reg. Pattern, #6 Steel
41	78-16005	1	Silpad

*

8 7 6 5

D



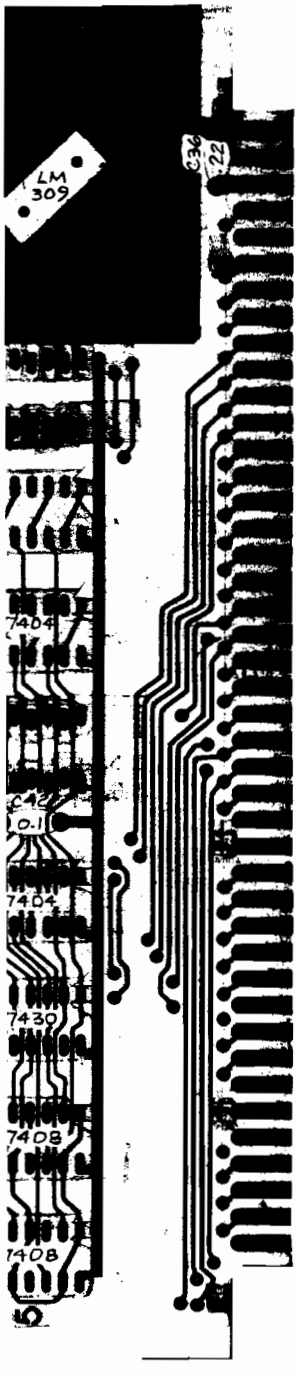
C

B

A

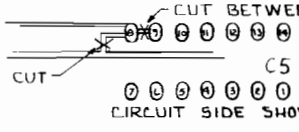
8 7 6 5

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE		4/23/76	



NOTES:
1. THIS ASSEMBLY DRAWING TO BE USED WITH 003185 REV 'B' P.C. BOARD.
2. ALL DIODES ARE IN914.

MODIFICATIONS: (TO BE DONE TO 003185 REV 'B' P.C. BOARD)
1. ON CIRCUIT SIDE, CUT TRACE BETWEEN PINS 8 AND 9 OF C5, AND CUT L-SHAPED TRACE GOING TO PIN 8 OF C5, AS SHOWN:



CIRCUIT SIDE SHOWN

2. JUMPER EDGE CONNECTOR PIN 'P' TO F1 PIN 3.
3. CUT & LIFT F1 PIN 10.
4. JUMPER J4 PIN 9 TO E4 PIN 1, 4, 10 & 13.
5. JUMPER C5: PIN 1 TO PIN 2; PIN 3 TO PIN 4; PIN 5 TO PIN 6; AND PIN 11 TO PIN 12.
6. CUT & LIFT D5 PIN 8.
7. JUMPER D2: PIN 3 TO PIN 4; PIN 6 TO PIN 7; AND PIN 13 TO PIN 12.
8. CUT AND LIFT C2 PIN 13.
9. JUMPER C2 PIN 13 TO F1 PIN 4.

CURRENT VERSION -02

NEXT ASSY	USED ON
	INDY 4
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS ± 1/16 .x ± .1
ANGLES ± 1° .xx ± .03
SURFACE FINISH ✓ .xxx ± .010

MATERIAL: SEE P/L A003184-02

	DATE
DRAWN BY	4/20/76
CHECKED	
DESIGN ENGINEER	
PROJECT ENGINEER	4/24/76
DOCUMENT CONTROL	
APPROVED	

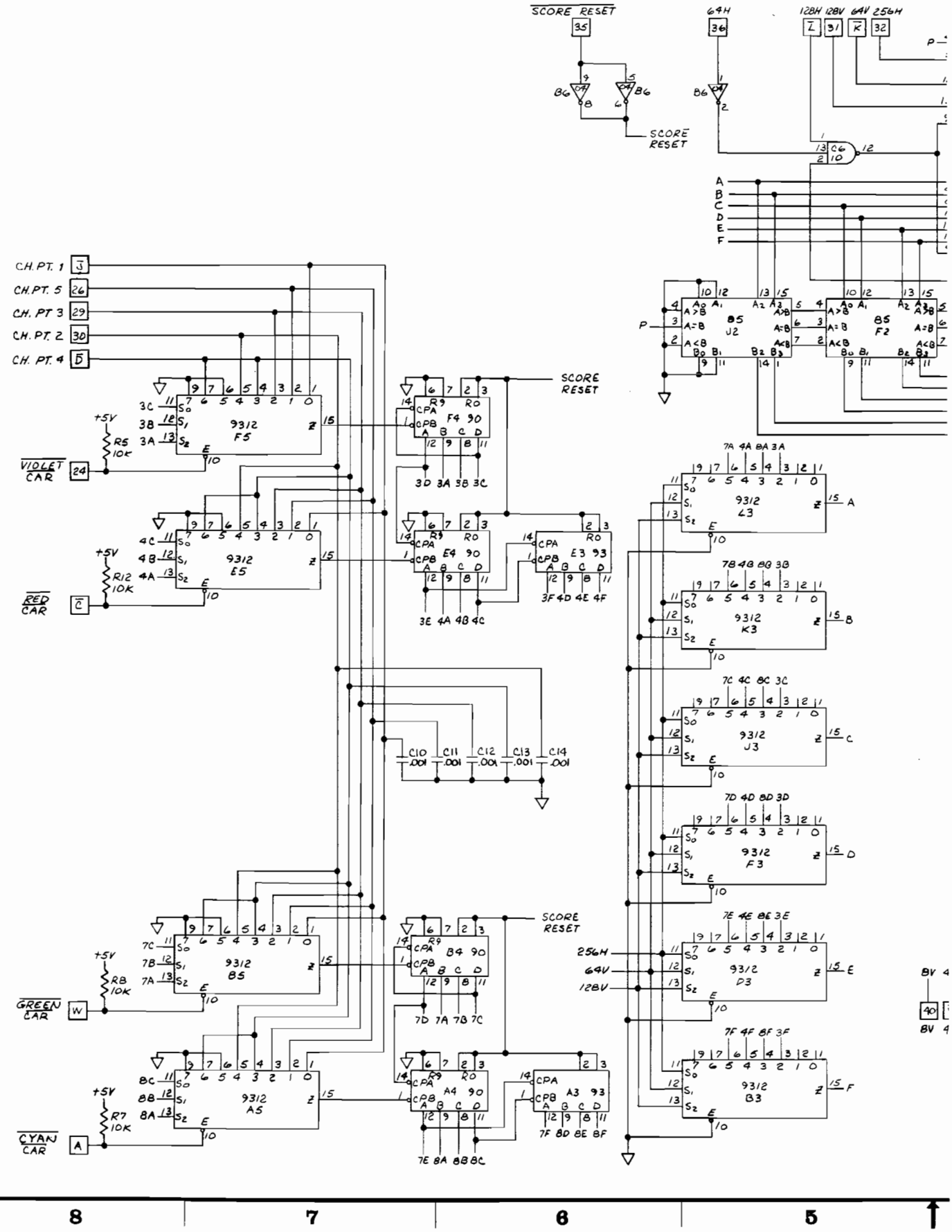
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

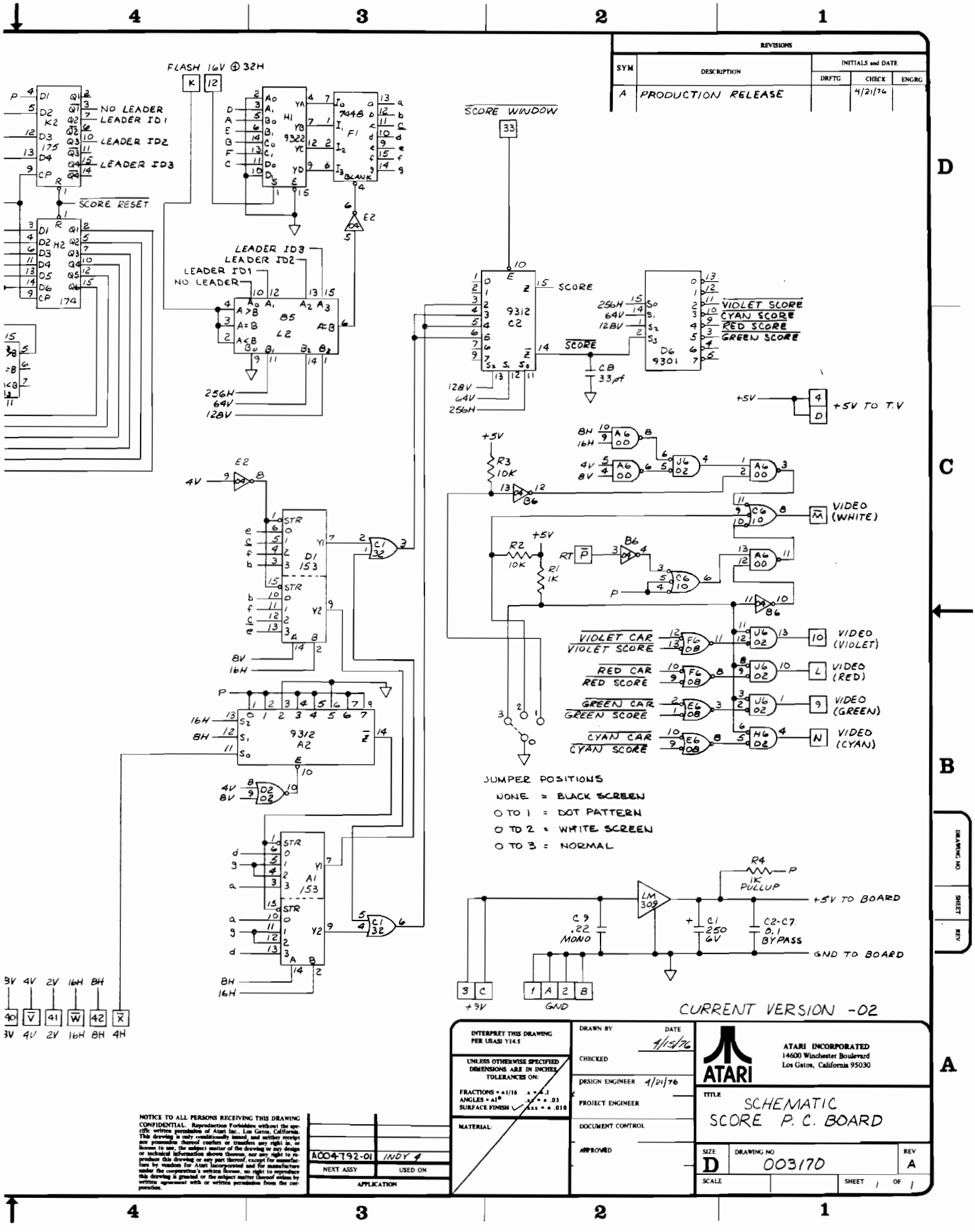
TITLE: ASSEMBLY, COIN CONTROL BOARD

SIZE	DRAWING NO.	REV
D	A003184	A

SCALE 2/1 SHEET 1 OF 1

DRAWING NO. | SHEET | REV


8
7
6
5
D
C
B
A
SCORE RESET
64H
128H 128V 64V 256H
CH. PT. 1
CH. PT. 5
CH. PT 3
CH. PT. 2
CH. PT. 4
VIOLET CAR
RED CAR
GREEN CAR
CYAN CAR
+5V
R5 10K
R12 10K
R8 10K
R7 10K
9312 F5
9312 E5
9312 B5
9312 A5
F4 90
E4 90
B4 90
A4 90
E3 93
A3 93
3D 3A 3B 3C
3E 4A 4B 4C
7D 7A 7B 7C
7E 8A 8B 8C
3F 4D 4E 4F
7F 8D 8E 8F
85 J2
85 F2
9312 L3
9312 K3
9312 J3
9312 F3
9312 D3
9312 B3
7A 4A BA 3A
7B 4B BB 3B
7C 4C BC 3C
7D 4D BD 3D
7E 4E BE 3E
7F 4F BF 3F
C10 .001
C11 .001
C12 .001
C13 .001
C14 .001
256H
64V
12BV
8V 4


REVISIONS
SYM | DESCRIPTION | INITIALS and DATE: DRFTG | CHECK | ENGRG
A | PRODUCTION RELEASE | | 4/21/76 |
FLASH 16V ⊕ 32H
NO LEADER
LEADER ID1
LEADER ID2
LEADER ID3
SCORE RESET
SCORE WINDOW
SCORE
VIOLET SCORE
CYAN SCORE
RED SCORE
GREEN SCORE
+5V TO T.V
VIDEO (WHITE)
VIDEO (VIOLET)
VIDEO (RED)
VIDEO (GREEN)
VIDEO (CYAN)
VIOLET CAR
RED CAR
GREEN CAR
CYAN CAR
JUMPER POSITIONS
NONE = BLACK SCREEN
O TO 1 = DOT PATTERN
O TO 2 = WHITE SCREEN
O TO 3 = NORMAL
+5V TO BOARD
GND TO BOARD
+9V
GND
CURRENT VERSION -02
INTERPRET THIS DRAWING PER USASI Y14.5
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS = ±1/16 .x = ±.1
ANGLES = ±1° .xx = ±.03
SURFACE FINISH √ .xxx = ±.010
MATERIAL:
DRAWN BY
DATE 4/15/76
CHECKED
DESIGN ENGINEER 4/21/76
PROJECT ENGINEER
DOCUMENT CONTROL
APPROVED
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030
TITLE
SCHEMATIC
SCORE P. C. BOARD
SIZE D
DRAWING NO 003170
REV A
SCALE
SHEET 1 OF 1
A004792-01 INDY 4
NEXT ASSY USED ON
APPLICATION
DRAWING NO
SHEET
REV
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INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE	SCORE BOARD, P.C. BOARD	P/L A003170-02

PARTS LIST SPECIFICATION — Page 1 of 2

Drawn		
Checked	Mech. Eng.	
Proj. Eng.	Elec. Eng.	REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD. REL.	4/21/76					

Item	Part Number	Qty.	DESCRIPTION
1	003171-01	1	Printed Circuit Board
2	37-LM309	1	LM309K Positive 5-Volt Regulator
3	78-06005	1	Heatsink, Wakefield 680-1.0A
4	72- 1610C	2	Screw, Mach., Pan Hd, Phil, 6-32 x 5/8
5	75-916C	2	Nut, Machine, Hex, 6-32
6	78-16005	1	Silpad
7	75-056	2	Lock Washer, Internal Star, #6
8	75-016S	2	Washer, Flat, Reg. Pattern, #6 Steel
9			
10	37-7400	1	7400 Integrated Circuit A6
11	37-7402	3	7402 " " D2, H6, J6
12	37-7404	2	7404 " " E2, B6
13	37-7408	2	7408 " " E6, F6
14	37-7410	1	7410 " " C6
15	37-7432	1	7432 " " C1
16	37-7448	1	7448 " " F1
17	37-7485	3	7485 " " F2, J2, L2
18	37-7490	4	7490 " " A4, B4, E4, F4
19	37-7493	2	7493 " " A3, E3
20	37-74153	2	74153 " " A1, D1
21	37-74174	1	74174 " " H2
22	37-74175	1	74175 " " K2
23	37-9301	1	9301 " " D6
24	37-9312	12	9312 " " A2,C2,B3,D3,F3,J3,K3,L3,A5, B5,E5,F5

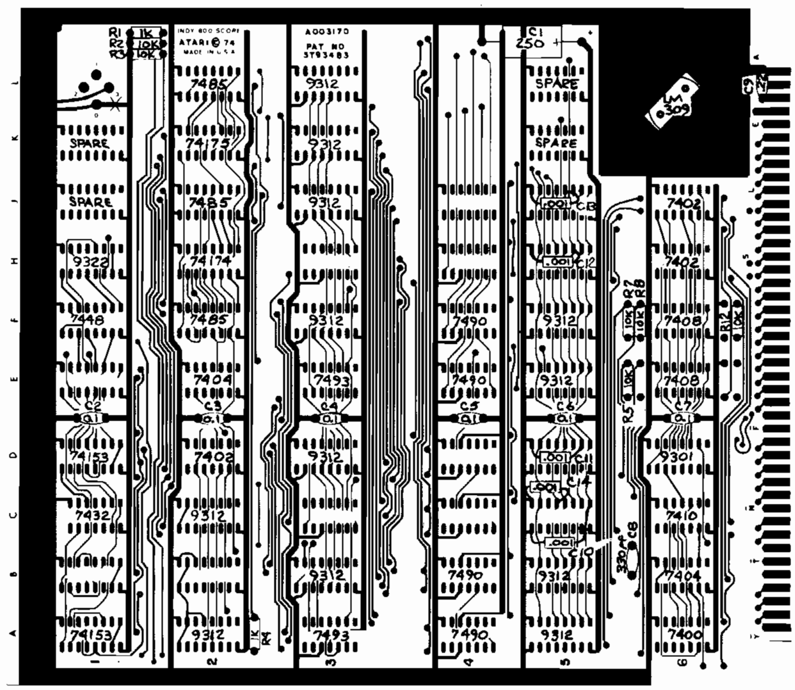
*

ASSEMBLY TITLE	SCORE BOARD, P.C.BOARD	P/L A003170-02
PARTS LIST SPECIFICATION	REV. A	Page 2 of 2

Item	Part Number	Qty.	DESCRIPTION
25	37-9322	1	9322 Integrated Circuit H1
26	10-5102	2	Resistor, Carbon, 5%, ¼W, 1K OHM R1, 4
27	10-5103	6	Resistor, Carbon, 5%, ¼W, 10K OHM R2,3,5,7,8,12
29	28-101331	1	Capacitor, Mica, 330pf, 100V C8
30	27-250104	6	Capacitor, Ceramic, 0.1uf, 25V, C2-7
31	29-011	1	Capacitor, Monolythic, .22uf, 12V C9
32	24-250257	1	Capacitor, Electrolytic, 250uf, 25V C1
33	27-250102	5	Capacitor, Ceramic, 0.001uf, 25V, C10-14

8 7 6 5

D



C

B

A

8 7 6 5

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE		4/21/76	

NOTES:

1. THIS ASSEMBLY DRAWING TO BE USED WITH 003171 REVISION 'B' P.C. BD.

MODIFICATIONS:

1. CUT TRACE THAT GOES TO '0' PAD IN UPPER LEFT CORNER OF BOARD.
2. JUMPER '0' PAD TO LARGE GROUND TRACE.
3. JUMPER '3' PAD TO LARGE GROUND TRACE.
4. CUT TRACE GOING TO EDGE CONNECTOR PIN 20.
5. CUT TRACE GOING TO EDGE CONNECTOR PIN 24.
6. CUT TRACE GOING TO EDGE CONNECTOR PIN X.
7. CUT TRACE GOING TO EDGE CONNECTOR PIN $\overline{B}$.
8. CUT TRACE GOING TO EDGE CONNECTOR PIN $\overline{C}$.
9. JUMPER EDGE CONNECTOR PIN 24 TO F5 PIN 10.
10. JUMPER EDGE CONNECTOR PIN $\overline{C}$ TO E5 PIN 10.
11. JUMPER A5 PIN 10 TO C5 PIN 10.
12. JUMPER B5 PIN 10 TO D5 PIN 10.
13. CUT & LIFT C6 PINS 4 & 5.
14. JUMPER C6 PIN 4 & 5 TO 1K PULLUP (R4).
15. CUT & LIFT D6 PIN 12.
16. JUMPER TRACE GOING TO D6 PIN 12 TO D6 PIN 11.
17. JUMPER TRACE GOING TO C6 PIN 5 TO F6 PIN 12.
18. INSERT: .001 CAP BETWEEN C5 PINS 1 & 9.
19. INSERT: .001 CAP BETWEEN C5 PINS 5 & 8.
20. INSERT: .001 CAP BETWEEN D5 PINS 2 & 8.
21. INSERT: .001 CAP BETWEEN H5 PINS 3 & 8.
22. INSERT: .001 CAP BETWEEN J5 PINS 4 & 8.

CURRENT VERSION -02

A004792-01	INDY 4
NEXT ASSY	USED ON
APPLICATION	

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS = ±1/16 x = ±.1
ANGLES = ±1° xx = ±.03
SURFACE FINISH ✓ xxx = ±.010

MATERIAL: SEE P/L A003170-02

DRAWN BY DATE 4/9/76
CHECKED
DESIGN ENGINEER 4/21/76
PROJECT ENGINEER
DOCUMENT CONTROL
APPROVED

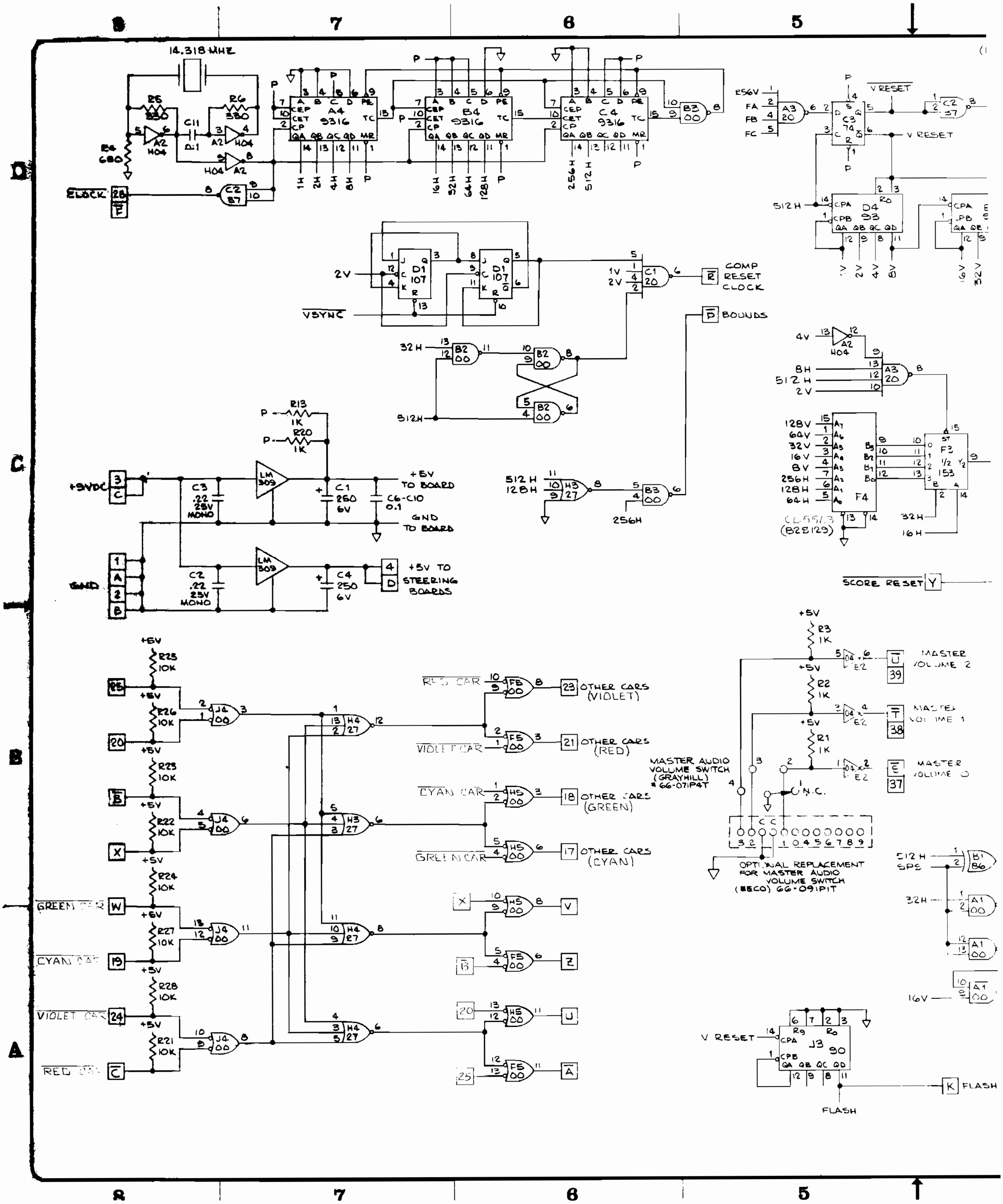
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

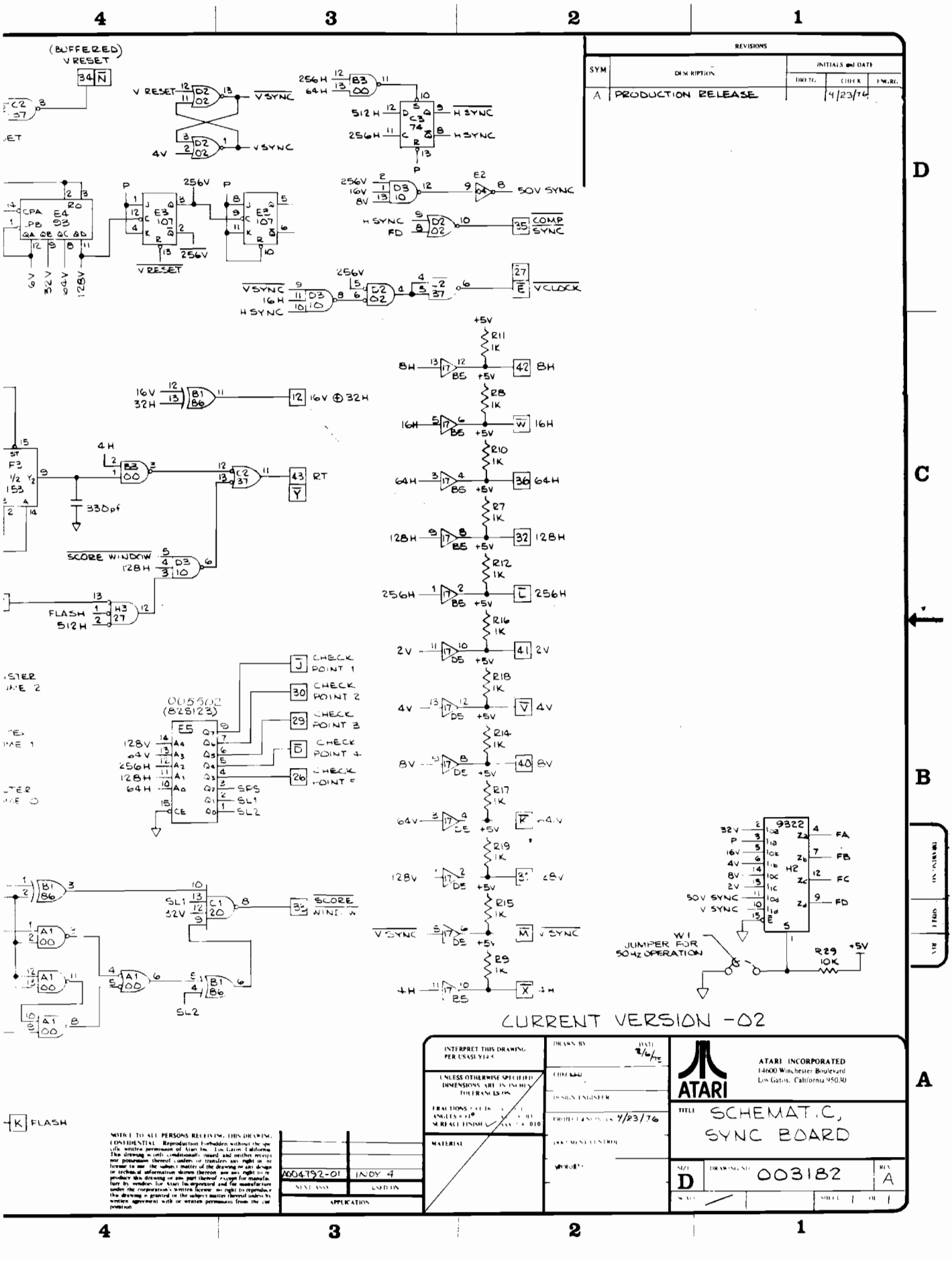
TITLE: ASSEMBLY, SCORE BOARD

SIZE	DRAWING NO.	REV
D	A003170	A

SCALE 1/1 SHEET 1 OF 1

DRAWING NO. | SHEET | REV


8
7
6
5
14.318 MHZ
R5 330
R6 330
C11 0.1
R4 680
A2 H04
CLOCK
A4 9316
B4 9316
C4 9316
B3 00
1H 2H 4H 8H
16H 32H 64H 128H
256H 512H
256V
FA
FB
FC
A3 20
C3 74
V RESET
C2 37
D4 93
512 H
1V 2V 4V 8V 16V 32V
D1 107
2V
VSYNC
C1 20
COMP RESET CLOCK
BOUNDS
32 H
B2 00
512H
4V
8H
512 H
2 V
128V
64V
32V
16V
8V
256H
128H
64H
F4
F3 153
(82S129)
32 H
16 H
R13 1K
R20 1K
+5VDC
C3 .22 25V MONO
LM 309
C1 250 6V
C6-C10 0.1
+5V TO BOARD
GND TO BOARD
GND
C2 .22 25V MONO
C4 250 6V
+5V TO STEERING BOARDS
512 H
128H
H3 27
256H
B3 00
SCORE RESET
+5V
R3 1K
R2 1K
R1 1K
MASTER VOLUME 2
MASTER VOLUME 1
MASTER VOLUME 0
MASTER AUDIO VOLUME SWITCH (GRAYHILL) # 66-071P4T
N.C.
OPTIONAL REPLACEMENT FOR MASTER AUDIO VOLUME SWITCH (BECO) 66-091P1T
R25 10K
R26 10K
R23 10K
R22 10K
R24 10K
R27 10K
R28 10K
R21 10K
J4 00
H4 27
H3 27
RED CAR
VIOLET CAR
CYAN CAR
GREEN CAR
F5 00
H5 00
OTHER CARS (VIOLET)
OTHER CARS (RED)
OTHER CARS (GREEN)
OTHER CARS (CYAN)
GREEN CAR
CYAN CAR
VIOLET CAR
RED CAR
512 H
SPS
B1 86
32H
A1 00
16V
V RESET
J3 90
FLASH


4
3
2
1
D
C
B
A
REVISIONS
SYM
DESCRIPTION
INITIALS and DATE
DRFTG
CHECK
ENG.RG.
A
PRODUCTION RELEASE
4/23/76
(BUFFERED) V RESET
V RESET
VSYNC
4V
256H
64H
512H
HSYNC
256V
16V
8V
50V SYNC
HSYNC FD
COMP SYNC
VSYNC
16H
VCLOCK
+5V
R11 1K
R8 1K
R10 1K
R7 1K
R12 1K
R16 1K
R18 1K
R14 1K
R17 1K
R19 1K
R15 1K
R9 1K
8H
16H
64H
128H
256H
2V
4V
8V
64V
128V
V SYNC
4H
42 8H
W 16H
36 64H
32 128H
L 256H
41 2V
V 4V
40 8V
K 64V
39 128V
M VSYNC
X 4H
16V 32H
16V ⊕ 32H
4H
330pf
43 RT
Y
SCORE WINDOW
128H
FLASH
512H
CHECK POINT 1
CHECK POINT 2
CHECK POINT 3
CHECK POINT 4
CHECK POINT 5
SPS
SL1
SL2
005502
(828123)
SL1
32V
SCORE
SL2
9322
32V
P
16V
4V
8V
2V
50V SYNC
V SYNC
FA
FB
FC
FD
W1 JUMPER FOR 50Hz OPERATION
R29 10K
+5V
K FLASH
CURRENT VERSION -02
INTERPRET THIS DRAWING PER USASI Y14.5
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± ANGLES ± 0° SURFACE FINISH
MATERIAL
DRAWN BY
DATE 3/16/76
CHECKED
DESIGN ENGINEER
PROJECT ENGR. 4/23/76
DOCUMENT CONTROL
APPROVED
ATARI
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030
TITLE SCHEMAT.C, SYNC BOARD
SIZE D
DRAWING NO 003182
REV A
SCALE
SHEET 1 OF 1
NOTICE TO ALL PERSONS RECEIVING THIS DRAWING. CONFIDENTIAL. Reproduction forbidden without the specific written permission of Atari Inc. Los Gatos, California. This drawing is only conditionally issued and neither receipt nor possession thereof confers or transfers any right in or license to use the subject matter of the drawing or any design or technical information shown thereon nor any right to reproduce this drawing or any part thereof except for manufacture by vendors for Atari Incorporated and for manufacture under the corporation's written license nor right to reproduce the drawing is granted or the subject matter thereof unless by written agreement with or written permission from the corporation
A004792-01
INDY 4
NEXT ASSY
USED ON
APPLICATION

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / SYNC BOARD **P/L** A003182-02

PARTS LIST SPECIFICATION

Drawn		
Checked	Mech. Eng.	
Proj. Eng.	Elec. Eng	REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD. REL.	4/23/76					

Item	Part Number	Qty.	DESCRIPTION
1	003183-01	1	Printed Circuit Board
2	37-LM309	2	LM309K Positive 5-Volt Regulator
3	78-06004	2	Heatsink, Wakefield 680-.75A
4	72- 1610C	4	Screw, Mach, Pn Hd, Phil, 6-32 x 5/8
5	75-916C	4	Nut, Machine, Hex, 6-32
6	78-16005	2	Silpad
7	75-016S	4	Washer, Flat, Reg Pattern, #6 Steel
8	75-056	4	Lock Washer, Internal Star, #6
9	66-071P4T	1	Rotary Switch, P.C. Mount, 1P-4T, Grayhill #71AF36-01-1-04-N
10	73-802	1	Switch Knob(Raytheon #50-5-1)
11	37-7400	6	7400 Integrated Circuit A1,B2,B3,J4,F5,H5
12	37-7402	1	7402 " " D2
13	37-74H04	1	74H04 " " A2
14	37-7410	1	7410 " " D3
15	37-7417	2	7417 " " B5, D5
16	37-7420	2	7420 " " C1, A3
17	37-7427	2	7427 " " H3, H4
18	37-7437	1	7437 " " C2
19	37-7474	1	7474 " " C3
20	37-7486	1	7486 " " B1
21	37-7490	1	7490 " " J3
22	37-7493	2	7493 " " D4, E4
23	37-74107	2	74107 " " D1, E3
24	37-74153	1	74153 " " F3
25	37-9316	3	9316 " " A4, B4, C4

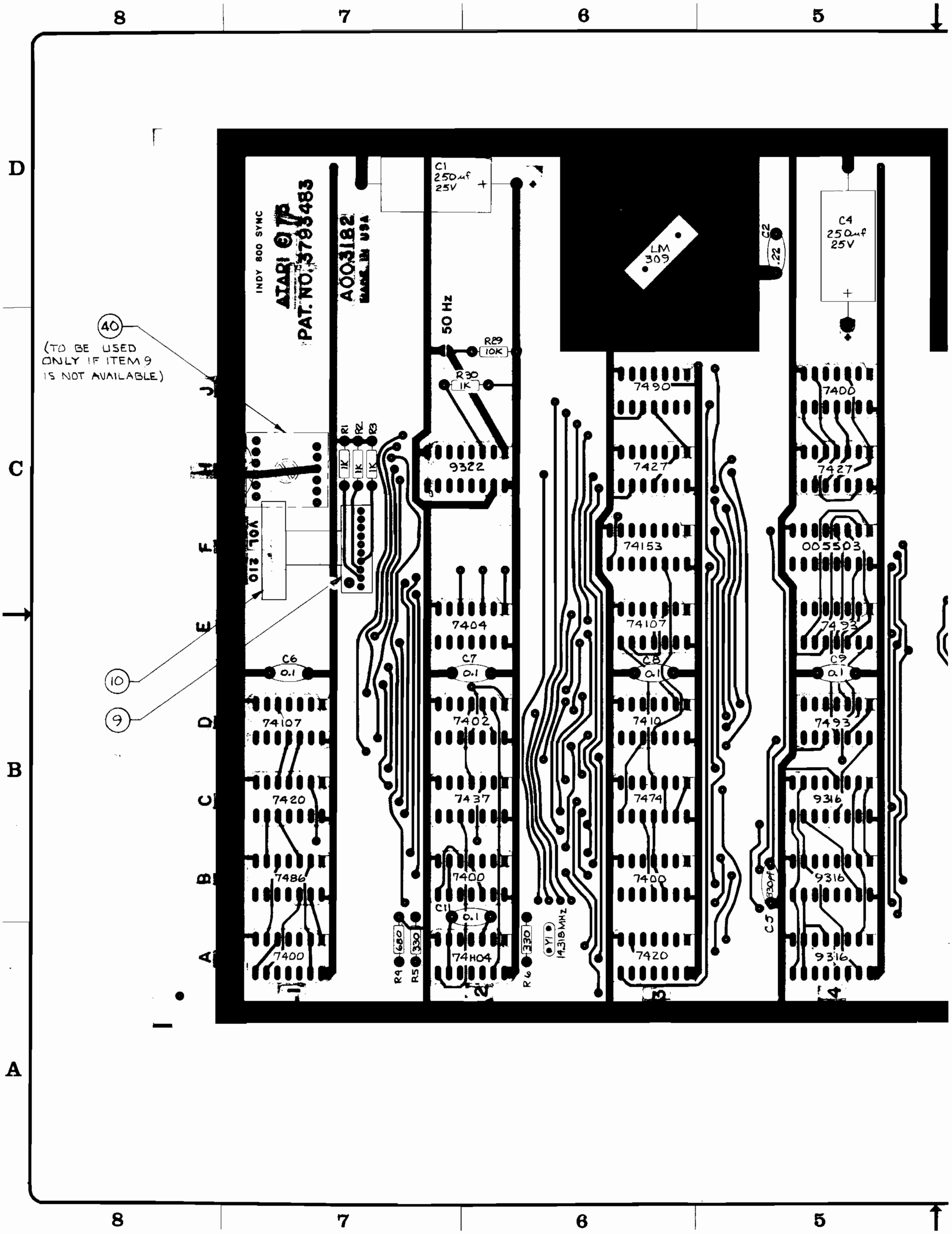
ASSEMBLY TITLE SYNC BOARD, INDY 4 **P/L** A003182-02

PARTS LIST SPECIFICATION REV A

Item	Part Number	Qty.	DESCRIPTION	
26	005502-01	1	P-ROM, RT4 Check Points, 32 x 8, 256 Bit	E5
27	005503-01	1	P-ROM, Racetrack, 256 x 4, 1024 Bit	F4
28	90-101	1	14.318MHZ Crystal	Y1
29	10-5331	2	Resistor, Carbon, 5%, ¼W, 330 OHM	R5,6
30	10-5681	1	" " " " 680 OHM	R4
31	10-5102	18	" " " " 1K OHM	R1-3,7-20,30
32	10-5103	9	" " " " 10K OHM	R21-29
33	28-101331	1	Capacitor, Mica, 330pf, 100V	C5
34	27-250104	6	Capacitor, Ceramic, 0.1uf, 25V	C6-11
35	29-011	2	Capacitor, Monolythic, .22uf, 12V	C2,3
36	24-250227	2	Capacitor, Electrolytic, 220uf, 25V	C1,4
37	37-7404	1	7404 Integrated Circuit	E2
38	79-42116	2	Socket, I.C., 16 Pin	F4,E5
39	37-9322	1	9322 Integrated Circuit	H2
*40	66-091P10T	1	Stripswitch, P.C. Mount, EECO, #1A211001G	

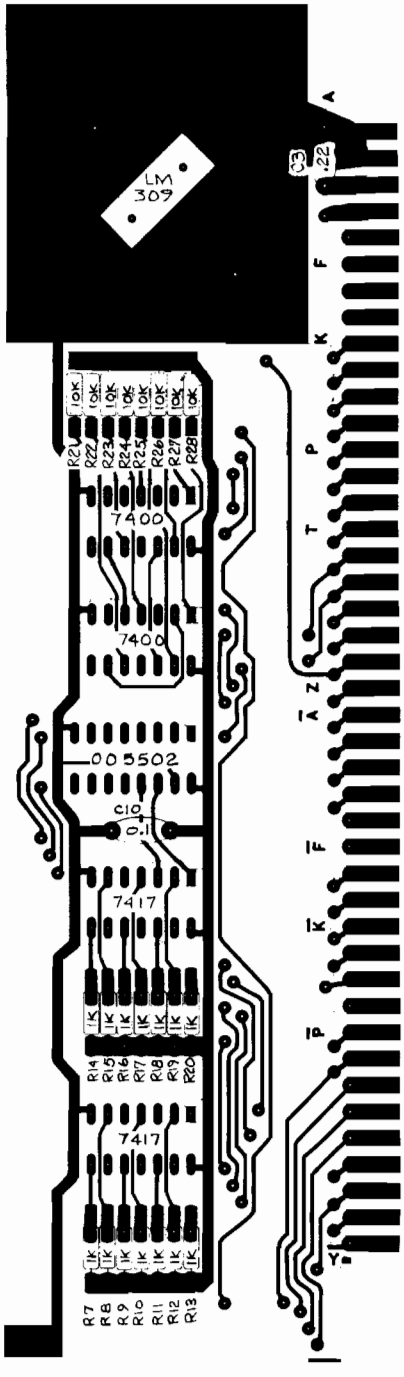
*NOTE: Item 40 is to be used only if items 9 & 10 are not available

*



(TO BE USED ONLY IF ITEM 9 IS NOT AVAILABLE)
40
10
9
INDY 800 SYNC
ATARI
PAT. NO. 3793483
A003182
MADE IN USA
C1 250uf 25V
C4 250uf 25V
LM 309
C2 .22
50 Hz
R29 10K
R30 1K
R1 R2 R3
1K 1K 1K
9322
7490
7400
7427
74153
005503
7404
74107
7493
C6 0.1
C7 0.1
C8 0.1
C9 0.1
74107
7402
7410
7493
7420
7437
7474
9316
7486
7400
7400
9316
C11 0.1
74H04
7420
9316
R9 680
R5 330
R6 330
Y1 14.318 MHz
C5 330pf

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE		4/23/76	



NOTES:

1. INSTALL ITEM 38 (16 PIN I.C. SOCKET) IN POSITION F4 AND E5.
2. THIS ASSEMBLY DRAWING TO BE USED WITH 003183 REV 'C' P.C. BOARD.

CURRENT VERSION -02

INTERPRET THIS DRAWING PER USASI Y14.5	DRAWN BY	DATE 4/20/76	ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS = ±1/16 .x = ±.1 ANGLES = ±1° .xx = ±.03 SURFACE FINISH √ .xxx = ±.010	CHECKED		
	DESIGN ENGINEER		TITLE ASSEMBLY, SYNC BOARD
	PROJECT ENGINEER 4/23/76		
MATERIAL: SEE P/L A003182-02	DOCUMENT CONTROL		SIZE D DRAWING NO A003182 REV A
	APPROVED		SCALE 2/1 SHEET 1 OF 1

A004792-01	INDY 4
NEXT ASSY	USED ON
APPLICATION	

DRAWING NO. | SHEET | REV

INDY 800

ATARI
Innovative leisure

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

PARTS LIST SPECIFICATION Page 1 of 1

Drawn			
Checked	8/25/7	Mech. Eng.	
Proj. Eng.	3 FEB 7[illegible]	Elec. Eng	3 75

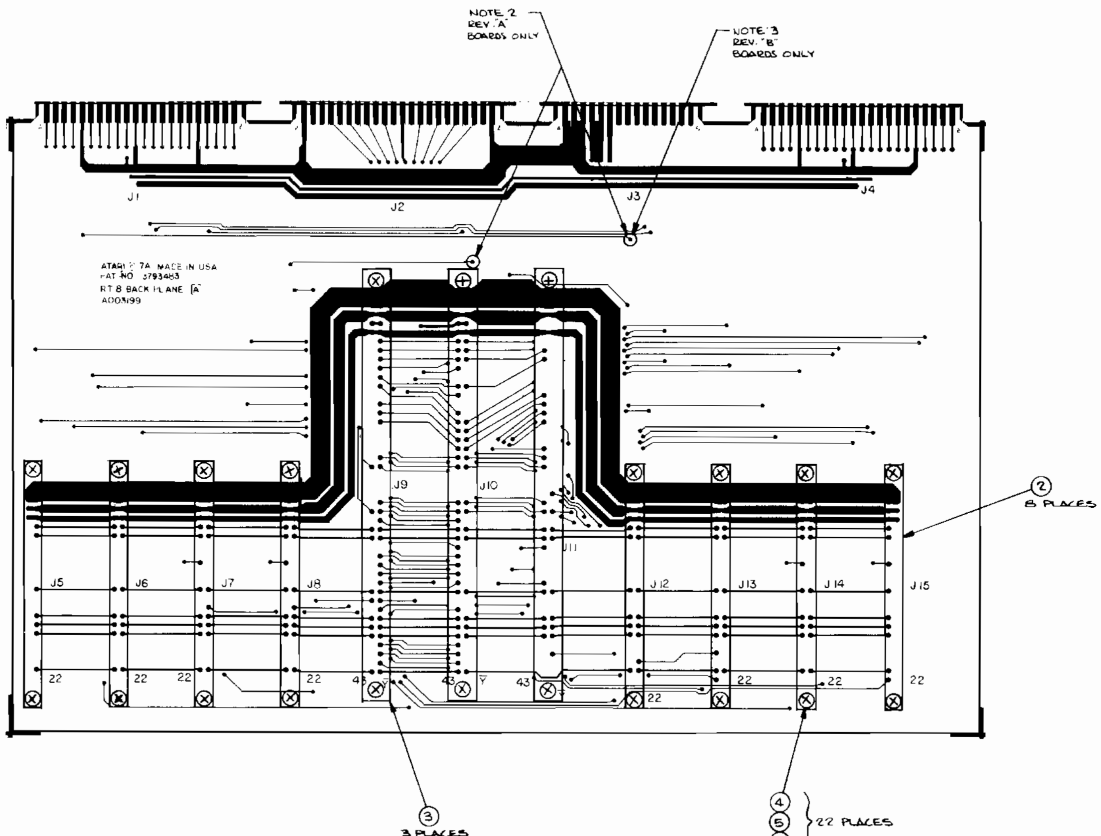
REV. D

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD REL	2-3-75					
B	REV PER ECN 1253	3/25/75					
C	REV PER ECN 1392	4/30/75					
D	REV PER ECN 1436	5/14/75					

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 ½"
5	75-914	22	Nut, Machine, Hex, 4-40
6	75-054	22	Lock Washer, Internal Star, #4
7	79-511001	3	CONNECTOR KEY

*

SYM	DESCRIPTION	INITIALS and DATE DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE	2/21/75		
B	REVISED PER ECN 1253	3/25/75		
C	REVISED PER ECN 1392	4/30/75		
D	REVISED PER ECN 1436	5/14/75		



NOTE:

1. ALL CONNECTORS MUST BE HAND SOLDERED TO P.C. BOARD.
2. APPLY DENNISON #43-146-1 SIGNAL DOTS TO THE TWO PLACES INDICATED, ON ALL REVISION "A" 003200 P.C. BOARDS (COMPONENT SIDE).
3. APPLY DENNISON #43-146-1 SIGNAL DOT TO THE ONE PLACE INDICATED, ON ALL REVISION "B" 003200 P.C. BOARDS (COMPONENT SIDE).
4. ADD A CONNECTOR KEY TO CONN. J9 (SYNC BD) BETWEEN PINS 31 & 32.
5. ADD A CONNECTOR KEY TO CONN. J10 (SCORE BD) BETWEEN PINS 29 & 30.
6. ADD A CONNECTOR KEY TO CONN. J11 (COIN BD) BETWEEN PINS 33 & 34.

MODIFICATIONS: (TO REVISION "A" 003200 P.C. BOARDS ONLY)

1. JUMPER CONNECTOR J9 PIN Y TO CONNECTOR J10 PIN 35

NEXT ASSY	USED ON
	INDY 800

APPLICATION

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/16 ANGLES ± 1° SURFACE FINISH ✓ .XX ± .03 .XXX ± .010

MATERIAL: SEE P/L 003199

DRAWN BY — DATE 2/21/75
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER
DOCUMENT CONTROL
RELEASED

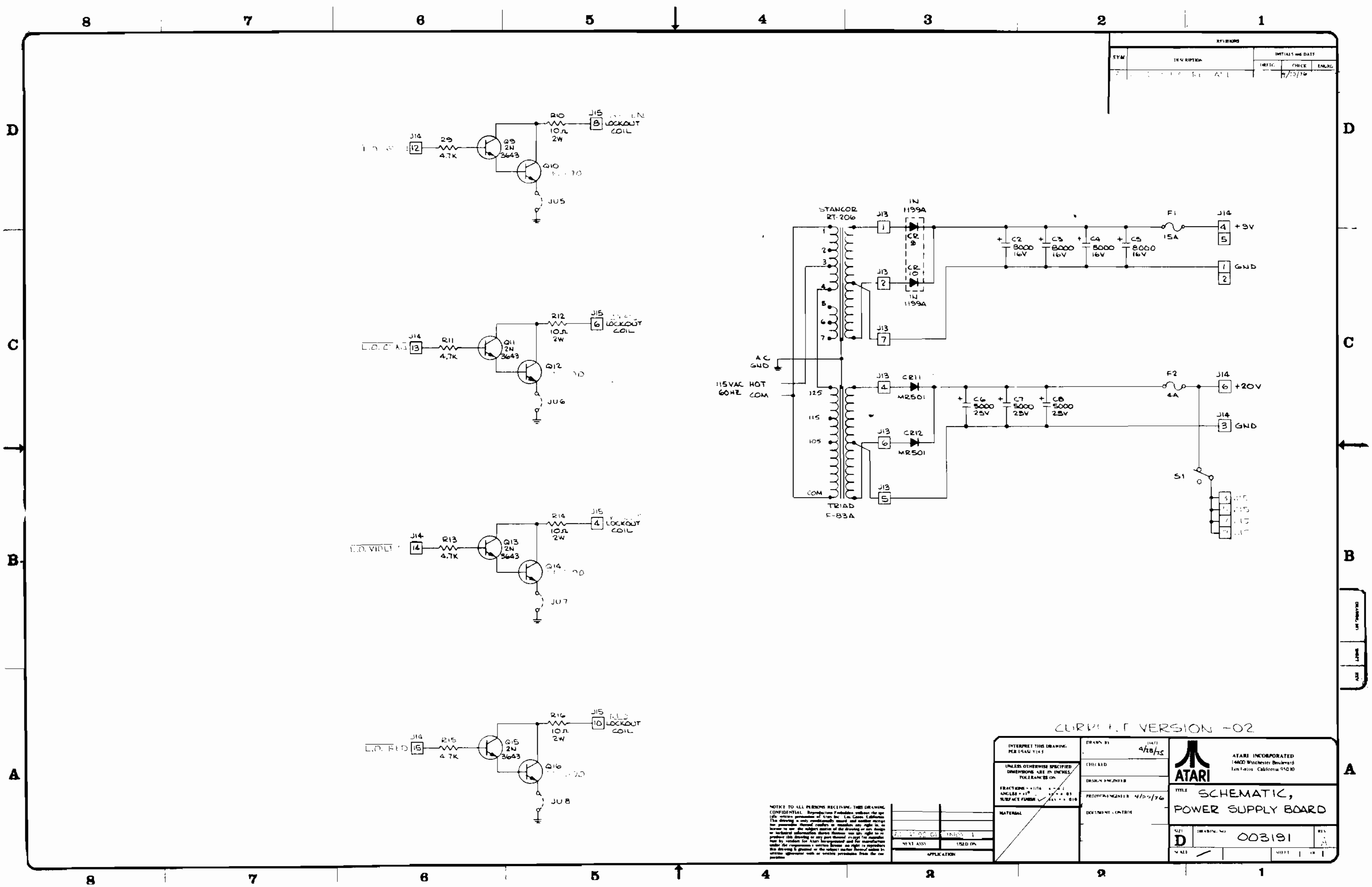
ATARI

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

TITLE: ASSEMBLY, BACK PLANE BD.

SIZE: D — DRAWING NO. A003199 — REV. D

SCALE — SHEET 1 OF 1


CURRENT VERSION -02
ATARI
ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030
SCHEMATIC,
POWER SUPPLY BOARD
D
003191
STANCOR
RT-206
TRIAD
F-83A
115VAC
60HZ
HOT
COM
AC
GND
J13
J14
J15
+5V
GND
+20V
F1
15A
F2
4A
C2
8000
16V
C3
8000
16V
C4
8000
16V
C5
8000
16V
C6
5000
25V
C7
5000
25V
C8
5000
25V
1N
1199A
CR
9
CR
10
CR11
CR12
MR501
S1
LOCKOUT
COIL
R10
10Ω
2W
R9
4.7K
Q9
2N
3643
Q10
JU5
R12
10Ω
2W
R11
4.7K
Q11
2N
3643
Q12
JU6
R14
10Ω
2W
R13
4.7K
Q13
2N
3643
Q14
JU7
R16
10Ω
2W
R15
4.7K
Q15
2N
3643
Q16
JU8
L.O. VIOLET
L.O. RED
REVISIONS
SYM
DESCRIPTION
INITIALS and DATE
DRFTG.
CHECK
ENG'RG
DRAWN BY
DATE
4/28/75
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER
4/20/76
DOCUMENT CONTROL
INTERPRET THIS DRAWING PER USASI Y14.5
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON
FRACTIONS
ANGLES
SURFACE FINISH
MATERIAL
NEXT ASSY
USED ON
APPLICATION
TITLE
SIZE
DRAWING NO.
REV
SCALE
SHEET
OF
1
A
B
C
D
1
2
3
4
5
6
7
8

INDY 4

ATARI™ Innovative leisure

ASSEMBLY TITLE / POWER SUPPLY P.C.B. **P/L** A003191-02

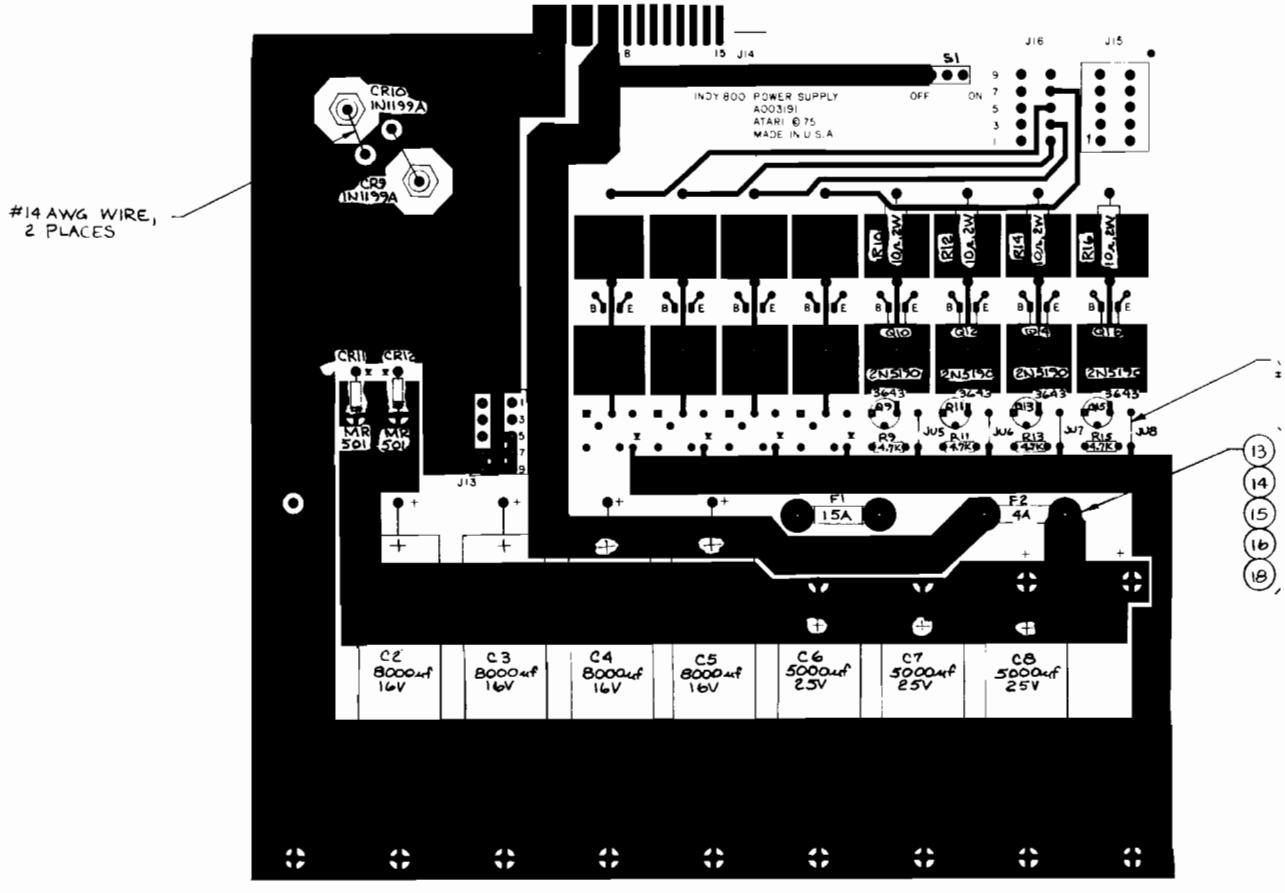
PARTS LIST SPECIFICATION Page 1 of 1

Drawn		
Checked	Mech. Eng.	
Proj. Eng.	Elec. Eng	REV. A

Rev.	Description	Date	Apprv.	Rev.	Description	Date	Apprv.
A	PROD. REL.	4/23/76					

Item	Part Number	Qty.	DESCRIPTION
1	003192-01	1	P.C.B., Indy 4 Power Supply
2	24-160808	4	Capacitor, Electrolytic, 8000uf, 16V, 85°C C2-5
3	24-250478	3	Capacitor, Electrolytic, 4700uf, 25V, 85°C C6-8
4	31-MR501	2	Diode, Type MR501 (3A) CR11, 12
5	31-1N1199A	2	Diode, Type 1N1199A (12A) CR9,10
6	78-06006	1	Heatsink, Wakefield 680-1.25
7	61-011C	1	SPDT Toggle Switch, C & K 7101, S1
8	10-5472	4	Resistor, Carbon, 5%, ¼W, 4.7K OHM R9,11,13,15
9	13-0100	4	Resistor, Carbon, 10%, 2W, 10 OHM R10,12,14,16
10	34-2N3643	4	NPN Transistor, Type 2N3643 Q9,11,13,15
11			
12	34-2N5190	4	NPN Power Transistor, Type 2N5190 Q10,12,14,16
13	72-1406C	8	Machine Screw, 4-40 x 3/8, Stainless
14	75-914C	8	Hex Nut, 4-40
15	75-054	8	Lock Washer, Internal Star, #4
16	75-014S	8	Flat Washer, #4
17	79-58005	2	Connector, 10 pin, P.C. Mount, AMP #1-380991 J13,15
18	79-3202	4	Fuse Clip, 3AG, Beryllium Copper, Silver Plate, Little Fuse #121001
19	46-2031503	1	Fuse, 3AG, 15A, 32V, Fast-Blow F1
20	46-203401	1	Fuse, 3AG, 4A, 125V, Fast-Blow F2
21	78-16007	4	Silpad

*


#14 AWG WIRE, 2 PLACES
INDY 800 POWER SUPPLY
A003191
ATARI © 75
MADE IN U.S.A
OFF
ON
S1
J14
J15
J16
CR10 IN1199A
CR9 IN1199A
CR11
CR12
MR 501
MR 501
J13
R10 10Ω 2W
R12 10Ω 2W
R14 10Ω 2W
R16 10Ω 2W
Q10 2N5160
Q12 2N5160
Q14 2N5160
Q16 2N5160
3643
R9 4.7K
R11 4.7K
R13 4.7K
R15 4.7K
JU5
JU6
JU7
JU8
F1 15A
F2 4A
C2 8000uf 16V
C3 8000uf 16V
C4 8000uf 16V
C5 8000uf 16V
C6 5000uf 25V
C7 5000uf 25V
C8 5000uf 25V
13
14
15
16
18

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	PRODUCTION RELEASE		4/23/76	

NOTES:
1. THIS ASSEMBLY DRAWING TO BE USED WITH 003192 REV'E' P.C. BOARD.
2. REMOVE PINS 3 AND 8 FROM J13 BEFORE MOUNTING.
3. REMOVE PINS 1 AND 2 FROM J15 BEFORE MOUNTING.

— JUMPER 4 PLACES
#22 AWG WIRE

3 4 5 6 8 — 4 PLACES

CURRENT VERSION -02

INTERPRET THIS DRAWING PER USASI Y14.5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:
FRACTIONS ± 1/16 .x = ± .1
ANGLES = ± 1° .xx = ± .03
SURFACE FINISH ✓ .xxx = ± .010

MATERIAL
SEE P/L A003191-02

DRAWN BY — DATE 4/21/76
CHECKED
DESIGN ENGINEER
PROJECT ENGINEER 4/23/76
DOCUMENT CONTROL
APPROVED

ATARI INCORPORATED
14600 Winchester Boulevard
Los Gatos, California 95030

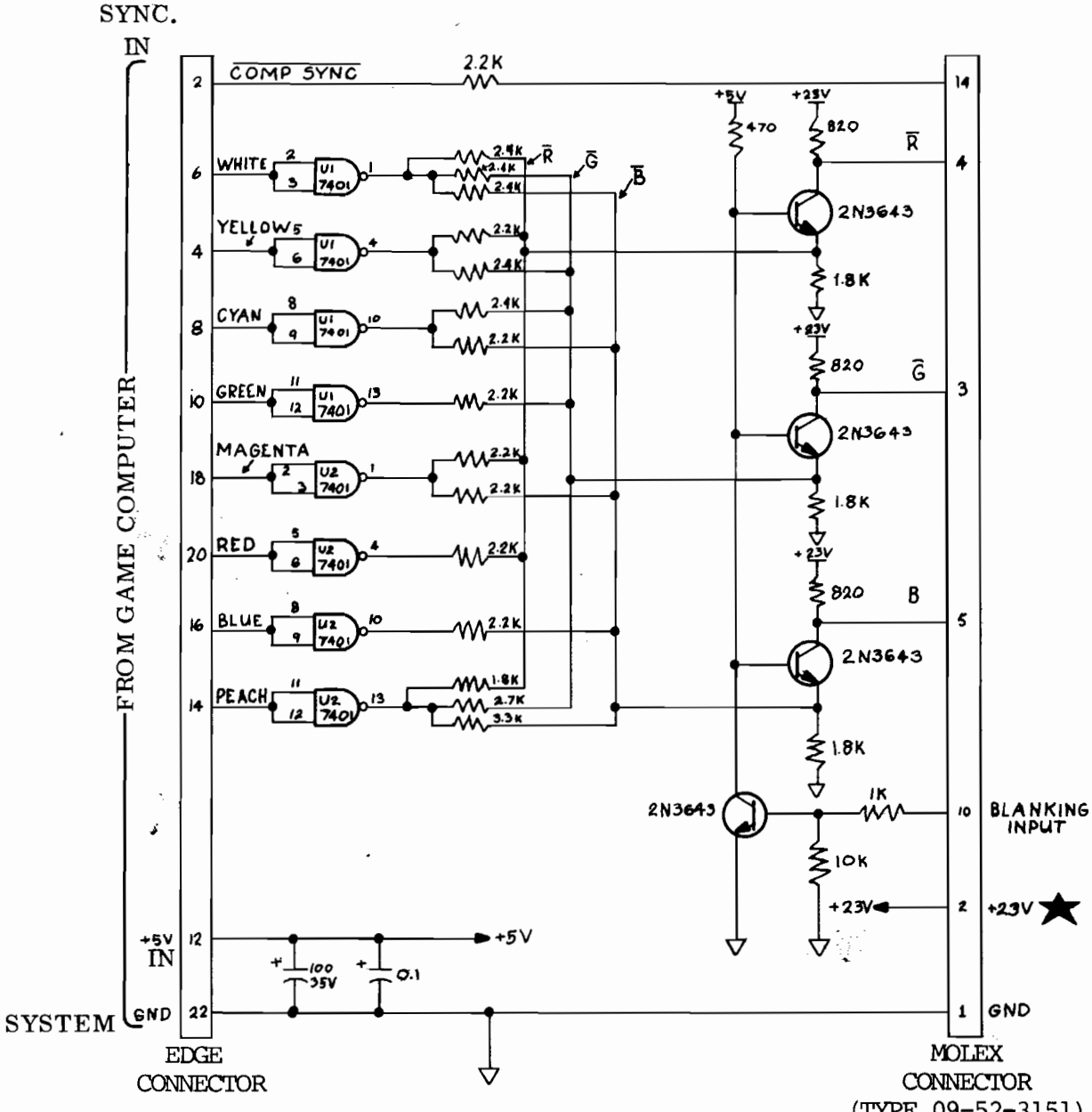
TITLE
ASSEMBLY, POWER SUPPLY BOARD

SIZE D | DRAWING NO A003191 | REV A
SCALE 1/1 | SHEET 1 OF 1

A004792-01	INDY 4
NEXT ASSY	USED ON
APPLICATION	

DRAWING NO
SHEET
REV

Schematic Diagram
Indy 4, TV Chroma Input Board
(G.E. 25" Color TV)



NOTES:

1. Color Inputs Are Positive-Going TTL
2. $\overline{\text{COMP SYNC}}$ Input Is Negative-Going TTL
3. Yellow, blue and peach colors not used in Indy 4 game.