

U10-13
U10-15
U11-15
U19-27
U19-29

If there are any problems, check U22.

STEP III:

Set up and synchronize the scope as it is in STEP II. Then connect Channel 1 to U10-15, so that two pulses are observed. Use Channel 2 to check pins 30-37 on U19, the data lines to the GI Sound Chip. Compare the signals on the scope to those illustrated in the timing chart. It is essential that these lines are in their correct states when U10-15 is low. (When U10-15 is high, the behavior of these lines is irrelevant).

If the lines are in their correct states, the GI Sound Chip is properly connected to the Data Bus.

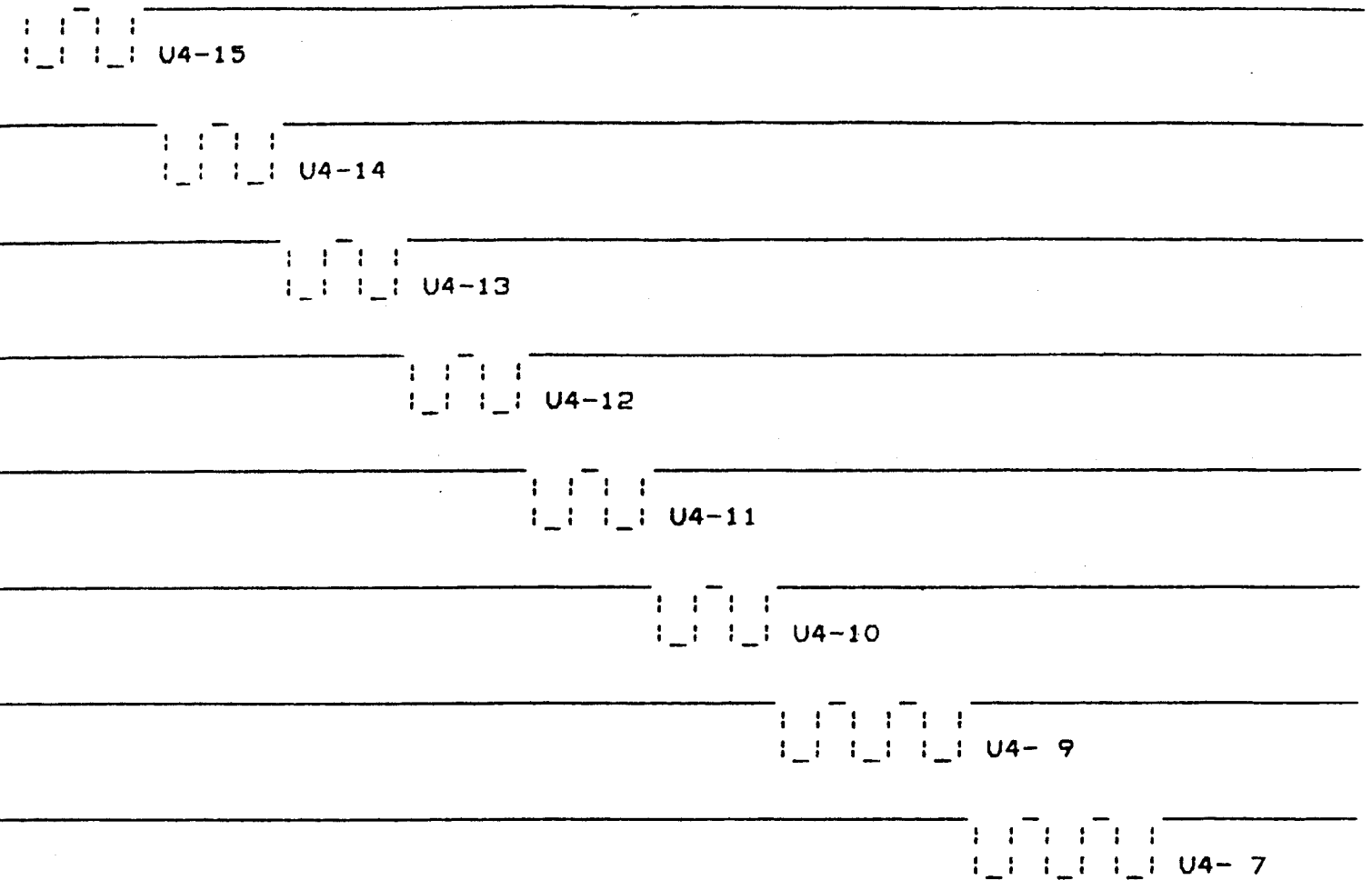
STEP IV:

Set up and synchronize the scope as it is in STEPS II and III. Then connect Channel 1 to Read Data Pulse U11-15. Use Channel 2 to compare the signals at U19, pins 30-37 to those illustrated in the timing chart. It is essential that these lines are in their correct states when U11-15 makes a low-to-high transition. The behavior of these lines is irrelevant at all other times.

If the correct data still fails to appear, an unwanted device is competing with the GI Sound Chip to drive the bus. In this case, use Channel 2 to insure that pins 7 and 9-14 on U11 do not go low simultaneously with U11-15. If this happens, either U11 is defective, or there is a short on the board. Similarly, pins 7 and 10-15 on U4 should not go low simultaneously with U11-15. If this happens, either U4 is defective, or there is a short on the board.

FIGURE 4-2

WAVEFORMS USED TO CHECK THE OUTPUTS OF U4 ON THE Z80 CONTROLLER BOARD
WHEN USING THE NO-OP JUMPER



 = A BURST OF 2048 PULSES EACH PULSE IS 350 N SEC WIDE

 = A BURST OF 2048 PULSES EACH PULSE IS 600 N SEC WIDE

SWITCH TEST

If either the Disc Interface portion or the Switch Test portion of the LAIR Test fails, troubleshoot the option and control inputs in the following manner.

First make sure that the Z80, the PROM board, and the Display Panel are functioning properly. The states of the RAM, interrupts, audio amplifiers, and the GI sound have no effect, either positive or negative, on the outcome of this test. Now connect J1 of the Z80 Controller Board to J1 of the test harness.

There are four sets of Switch inputs:

Dip Switch 1
 Dip Switch 2
 Control Panel Byte A
 Control Panel Byte B

The test program reads these inputs, then echoes them to the Display Panel.

Take the Dip Switches first. Cycle each Dip Switch individually. The inputs for Dip Switch 1 are echoed in octal notation in Display 3, DS1-DS3, the inputs for Dip Switch 2 in Display 2, DS4-DS6. When all bits on a single Dip Switch are open/high, the display for that Dip Switch should read 377 octal. The following table lists the display numbers for a Dipswitch with one pin closed/grounded:

BIT HELD LOW	OCTAL DISPLAY NUMBER
7	177
6	277
5	337
4	357
3	367
2	373
1	375
0	376

Now take the control panel inputs. The input bits at Control Panel Byte A are linked to the outputs at Miscellaneous Output Register U16. The inputs bits at Control Panel Byte B are linked to the inputs at Disc Output Register U21. The connection points for these inputs and outputs are listed below. Toggle the input bits one at a time by grounding them at the test harness. At the same time, watch the corresponding outputs with a scope. High inputs should be linked to high outputs, low inputs to low outputs. The inputs for Control Panel Byte B are monitored in octal in Display 1,

DS9-DS11, the inputs for Control Panel Byte A in Display 0, DS12-DS14.

NOTE: Coin Counter Driver Transistor Q3 acts as an inverter. The signal appearing at U16-2 is therefore the inverse of the Coin Counter Drive signal appearing at J4-33.

CONTROL PANEL INPUT BYTE A

BIT NAME	J4, PIN	U8, PIN
D0 Up	13	11
D1 Down	9	13
D2 Left	5	15 ---->
D3 Right	1	17
D4 Action	29	8
D5 Aux 1	25	6 ---->
D6 Aux 2	21	4
D7 Aux 3	17	2

MISCELLANEOUS OUTPUT

BIT NAME	J no. PIN	U16, PIN
D0 B0	Not used	-----
D1 B1	Not used	-----
D2 B2	Not used	-----
D3 B3	Not used	-----
D4 Coin Counter Drive	4 33	2
D5 Disc O.E.		5
D6 Enter	1 2	6
D7 Int/Ext	1 17	9

NOTE: ENABLE DISC OUTPUT BY GROUNDING D5 OF CONTROL PANEL A.

CONTROL PANEL INPUT BYTE B

BIT NAME	J no. PIN	U14, PIN
D0 P1	4 2	17
D1 P2	4 6	15
D2 Coin 1	4 10	13 ---->
D3 Coin 2	4 14	11
D4 Aux 4	4 26	2
D5 Aux 5	4 22	4 ---->
D6 Fan	4 18	6
D7 Ready	1 6,7	8

DISC OUTPUT

BIT	J1, PIN	U21, PIN
D0	12	2
D1	11	19
D2	10	5
D3	9	16
D4	13	6
D5	14	15
D6	15	9
D7	16	12

SIGNATURE ANALYSIS: DATA AND ADDRESS LINES
FOR THE Z80 CONTROLLER BOARD

Use the following procedure to debug boards that do not run test programs properly even after the original Z80 Microprocessor has been replaced by a Z80 that is known to be in correct working order.

STEP I: PRELIMINARY TESTS:

Positive results to each of the following tests are essential to the production of valid signatures in the Signature Analysis Tests of the Data and Address lines. Solve each problem as it arises. Do not move on until each test has been completed satisfactorily.

To begin, connect J4 of the Z80 Controller Board to the main DC wiring harness. Use a 40-pin ribbon cable to connect J2 of the Z80 Board to a PROM board that has been loaded with a game program.

A. DC VOLTAGE SUPPLY: Check the +5V DC supply at U1-11. There should always be between 4.8 and 5.2 volts.

B. CONTROL LINES: Remove the Z80, and install a modified NO-OP jumper in the Z80 socket at U1. Now use an oscilloscope to check all of the following Z80 Control lines:

- 1.) CLOCK: U1-6. The CLOCK should have a period of 250ns. The high level should be 4.4V or above, the low level 0.45V or below.
- 2.) RESET-: U1-26. Normally high, this line should drop low when the RESET button is depressed.
- 3.) BUSRQ-: U1-25. This line should be high.
- 4.) WAIT-: U1-24. This line may be either high or toggling. If it is tied low, the Wait Circuit is defective. Check U28 and associated circuitry.
- 5.) INT-: U1-16. This line should be low. If it is not low, check the signals arriving at U26, pins 11 and 13. U26-11 should be a square wave with a period of 33 milli-

seconds, and U26-13 should be high.

6.) NMI-: U1-17. This line should be high.

C. ADDRESS DECODING: Connect Channel 1 of the scope to U4-15. Sync the scope until the wave obtained is the same as that shown in Figure 1. Now use Channel 2 to compare the wave forms obtained at U4, pins 7 and 9-14 to the corresponding waves pictured in Figure 1. Note that the pulse bursts at U4, pins 7 and 9 are slightly longer than those at U4, pins 10-14. This difference is due to the action of the Wait Circuit.

If all of the correct wave forms appear, the address decoding system and address lines 13-15 are functioning properly. If some of the waves do not match their counterparts in Figure 1, check U4. If only some of U4's outputs are functioning correctly, the problem can be traced to address lines 13-15. If none of U4's outputs are working, make sure pins 8-10 on U4 are toggling.

D. U1-19 (MEMORY REQUEST) and U1-27: Make sure both lines are toggling.

DO NOT proceed until all of the above tests have been completed.

STEP II: SIGNATURE ANALYSIS

Set up the Signature Analyzer in the following manner:

START lead to U4-15: falling edge
STOP lead to U4-10: falling edge
CLOCK lead to CLOCK TEST POINT on NO-OP:
rising edge
GROUND lead to U4-8

Now power up the CPU Board, and probe for the following Data Line signatures:

TABLE 1

Location: U1 of Z80 Controller Board at base of No-OP jumper.

PIN	NAME	SIGNATURE
14	D0	4A61
15	D1	9C50
12	D2	C6P5
8	D3	U113
7	D4	0043
9	D5	2837
10	D6	CH50
13	D7	H4P8

If all of the signatures are correct, the Z80 can successfully read PROM memory. The game boards, therefore, should be able to run the LAMP CYC 2 and SW TST 1 test programs.

If all of the signatures are correct, but the boards are still incapable of running the above two test programs, there may be a problem in the I/O Address Decoding. In this case, refer to SIGNATURE ANALYSIS: I/O ADDRESS DECODING.

If any or all of the signatures are incorrect, compare the signatures for D0-D7 on U1 of the PROM card to those listed in TABLE 2 below. If all of these signatures match, then:

- a. There is an open data line.
- b. U15 is defective.
- c. U15-1 is lacking an active-low READ signal.

If any or all of the signatures are incorrect, then:

- a. There are shorted address lines.
- b. The address lines are defective.
- c. Pins 11-15, the outputs of U4, are not properly connected to pin 20 on U1 through U5 of the PROM card.

To locate the problem, compare the signatures for A0-A12 on U1 of the PROM card to the corresponding signatures in TABLE 2. If all of the signatures are correct, the address lines are functioning properly.

If all of the address lines are functioning correctly, test for continuity between pins 11-15 on U4 and pin 20 on U1 through U5 of PROM card.

If any or all signatures are incorrect, check U2, U5, U9, and U12, and check for opens and shorts.

TABLE 2

Location: U1 of the PROM card:

SIGNAL	SIGNATURE	PIN	PIN	SIGNATURE	SIGNAL
+5V	C7U8	1	28	C7U8	+5V
A12	UUU7	2	27	C7U8	+5V
A7	057F	3	26	N.C.	N.C.
A6	1506	4	25	663P	A8
A5	9A4U	5	24	4A0F	A9
A4	1F37	6	23	0PU0	A11
A3	2C9F	7	22	----	O.E.
A2	925A	8	21	FC3F	A10
A1	HC32	9	20	----	C.E.
A0	6H57	10	19	H4P8	D7
D0	4A61	11	18	CH50	D6
D1	9C50	12	17	2837	D5
D2	C6P5	13	16	0043	D4
GND	0000	14	15	U113	D3

After checking all of the above signatures, make sure that the WAIT- line is toggling. If it is not, the Wait Circuit is defective.

SIGNATURE ANALYSIS: I/O ADDRESS DECODING

Use this procedure when the Z80 Controller Board passes the Signature Analysis Tests of the Address and Data Lines, but still fails to run the LAMP CYC 2 and SW TST 1 Diagnostic Programs.

Begin by connecting J4 of the Z80 Controller Board to the main DC harness. Insert Test PROM I/O SIG into U1 of a properly functioning PROM card. Use a 40-pin ribbon cable to connect the PROM card to J2 of the Z80 Controller Board.

Now set up the Signature Analyzer:

START lead to U4-14: falling edge
 STOP lead to U4-12: falling edge
 CLOCK lead to U23-17: rising edge
 GROUND lead to U4-8

Probe pins 7 and 9-15 on U10 of the Z80 Controller Board for the following signatures:

PIN	SIGNATURE
15	829U
14	7391
13	7506
12	5549
11	5UP0
10	6836
9	8U10
7	8652

If any or all of the signatures are incorrect, check U10, U23, and WRITE line U10-5. If all of the signatures are correct, U10 is functioning correctly.

Now probe for the following signatures at pins 7 and 9-15 on U11 of the Z80 Controller Board:

PIN	SIGNATURE
15	C67H
14	3FH8
13	U415
12	C8HP
11	UCP6
10	4A23
9	0H42
7	AU06

If all of the signatures are correct, U11 is functioning properly. If any or all of the signatures are incorrect, U11 is defective.

For the final test, probe for the following signatures at U19, pins 27 and 29:

PIN	SIGNATURE
27	U799
29	F37C

If both of the signatures are correct, U22 is functioning properly. If either signature is bad, U22 is defective.

CHAPTER 5

MONITOR AND NTSC DECODER BOARD SUPPLEMENT INFORMATION

NTSC DECODER BOARD ALIGNMENT PROCEDURE

PRELIMINARY

Set all six PCB controls to mechanical center except the sub-contrast (R107) which is set to the full clockwise position.

SET UP:

1. Connect a composite video color bar signal at 1.0V pp to the PCB input at P101.
2. Adjust sub-contrast (R107) for maximum contrast with no overdrive. Overdrive appears as vertical white bars between the color bars, most noticeable between the yellow and cyan bars.
3. Adjust sub-brilliance (R130) until the black portion of the color bar pattern just turns black (raster just extinguished).
4. Critically adjust trimmer capacitor C124 to center of color lock-in range. It is a good idea to power PCB monitor off for a few seconds, then back on to ensure color lock.
5. Set chroma input level (R144) fully clockwise, then rotate slowly counterclockwise until color appears, then rotate counterclockwise another 30-40 degrees.
6. Connect scope at 10 microsec/div (AC couple) to blue output (P103-6). Adjust L101(3.58 MHz trap) for minimum of 3.58 MHz carrier riding on video signal.
7. With scope at blue output, adjust sub-brilliance (R130) and contrast pre-set (R106) for a black level of 0.5 volts and a peak white level of 4.0 volts respectively.
8. With scope at blue output, adjust sub-color (R139) so that the peak level for the grey bar and the peak level for the blue bar are equal.
9. Connect the scope to the green output (P103-5) and adjust the sub-tint so that the peak level for the cyan bar and the peak level for the green bar are equal.

10. If necessary, re-adjust the contrast pre-set (R106) for a peak white level of 4.0 volts (3.5V above black level).

NOTE: All of the information in this chapter is taken directly from ELECTROHOME ELECTRONICS' Service and Operation Manual: G07-19" R.G.B. Colour Monitor, January 1981, and from ELECTROHOME ELECTRONICS' Supplement Service Data: NTSC Decoder, July 1983.

APPENDIX A

PARTS LIST

PART NO.	DESCRIPTION
01-10505-01	LAMP, FLUORESCENT
01-11963-01	FAN, MUFFIN, 50 CFM
01-11964-01	FAN GUARD, MUFFIN, FILTER
20-10862-01	BRKT, COIN BOX TONG, SC
20-10864-01	HANDLE, COIN BOX, SC
20-10871-01	COIN BOX, SC
20-10872-03	COVER, COIN DRAWER
20-11382-01	GRILL, SPEAKER, SQ
20-11420-01	RAIL, CRT MNTG, CKTL, UNIVERSAL
20-12066-01	RETAINER, UPPER MARQUEE C.C.
20-12067-01	RETAINER, LOWER MARQUEE C.C.
21-10831-01	BEZEL, CRT, FORMED, SC
21-12138-01	PLEXI, REAR, SCORE, DRAGON'S LAIR
21-12139-01	PLEXI, MONITOR, DRAGON'S LAIR
21-12140-01	PLEXI, FILM SMOKED, 6 1/2 X 8 1/2
22-12099-01	A DECAL, SIDE, DRAGON'S LAIR
26-10588-01	FIXTURE, LAMP, FLUORESCENT
32-12100-01	A CABINET, UPRIGHT, DL
38-11701-01	ASSY, POWER PLATE, STARCOM
20-11606-01	PLATE, MNTG, P/S, TRANS
25-10551-01	BOLT, CARRIAGE, 3/16" X 1/2" BLACK O
38-11723-01	ASSY, TRANS ISOL RAVENSW
43-11704-01	TRANS, ISOL RAVENSWOOD 105P9
87-11688-01	ASSY, HARN TRANS/MON JG
87-11767-01	ASSY, HARN, TRANS GND
87-11768-01	ASSY, HARN TRANS/PS
82-10842-30	P/S, DATA POWER
38-11704-01	ASSY, COIN DOOR, STARCOM
20-10896-11	COIN DOOR W/LAMPS CKTL SC
22-10899-01	DECAL, "CINEMATRONICS"
25-10556-01	NUT, HEX 4-40
25-10570-01	WASHER, LOCK, 4 INT
87-11680-02	ASSY, HARNESS, COIN DOOR, STARCOM
38-11863-01	MONITOR, 19" COLOR, HORIZONTAL, NTS
38-12065-01	ASSY, CNTL PANEL, DRAGON'S LAIR
20-11972-01	CNTRL PANEL, DRAGON'S LAIR
22-12066-01	DECAL, LEXAN, DRAGON'S LAIR CNTL
25-10551-01	BOLT, CARRIAGE, 3/16" X 1/2" BLACK O
25-10558-01	NUT, HEX, 10-24
25-10559-01	NUT, PAL 5/8"
25-10572-01	WASHER, LOCK, 10 INT
37-11192-01	BUTTON, SHORT, WHITE, COCKTAIL
37-11192-02	BUTTON, SHORT, RED
37-11373-01	SWITCH, W/PLASTIC MNTG BRKT, SHOR
38-11396-01	ASSY, JOYSTICK, 8 POS, LEAFSWITCH
87-11679-11	ASSY, HARNESS, CNTL PANEL, STARCOM
38-12071-01	ASSY, MARQUEE, DRAGON'S LAIR
21-12069-01	PLEXI, MARQUEE
22-12098-01	DECAL, LEXAN, MARQUEE, DRAGON'S LAI
38-12080-01	ASSY, OPERATOR CONVINIENCE PANEL,

20-12078-02	BRKT, OPERATOR CONVIENCE PNL
25-10557-01	NUT, HEX, 6-32
25-10563-01	SCREW, MACHINE, 6-32X1/2" PAN. HD. P
25-10571-01	WASHER, LOCK, 6 INT
25-10582-01	TUBING, SHRINK, 3/16" ROLL STK, BL
26-10589-01	KNOB, VOLUME
29-11754-01	METER, COIN 6 VOLT (KEISU NR-06)
51-10722-01	POT, W.LK. WASHER/NUT, 10K OHM
65-10812-01	DIODE, 1N4003, ENCPL
87-12084-01	ASSY, HARNESS OP. CONV. PNL. C.C.
38-12081-01	ASSY, AC INPUT PANEL, STARCOM
20-12093-01	PLATE, AC INPUT PANEL, STARCOM
37-10893-01	SWITCH, INTERLOCK
63-12131-01	FILTER, AC LINE, GCM3N1P (GENISCO)
38-12088-01	ASSY, CIRCUIT PANEL, STARCOM
20-12092-01	PLATE, CIRCUIT MOUNTING STARCOM
25-11753-01	SPACER, NYLON 6-5/8" (SMITH 4025)
25-11753-02	NYLON SPACER, 1" 6
25-11756-01	SCREW, MACHINE 6-32-2" PN HD PH
25-11757-01	SCREW, MACHINE 6-32X1 1/4 PH HD P
81-12035-01	PCA, MAIN BOARD, STARCOM
20-10520-01	HEAT SINK, THERMALLOY 6071B
20-10521-01	HEAT SINK, THERMALLOY 6072B
20-10537-01	HEATSINK, THERMALLOY 6060
36-10621-01	SOCKET, 24 PIN, I.C., DIP SOLDERTA
36-11784-01	SOCKET, 40 PIN DIPTAIL
37-11535-01	SWITCH, PUSHBUTTON, 39-251-RED
37-12050-01	SWITCH, DIP 8 POS. GRAYHILL (8142)
41-10652-01	CONN, 16 CIR, M HEADER
41-11895-01	CONN, 40 CIR, M HEADER
41-12113-01	CONN, 36 PIN BODY MOLEX 03-06-236
41-12114-01	PINS, SOLDER, MOLEX 02-06-8103
44-10673-01	IC, 7815-C
44-10677-01	IC, 74LS00
44-10680-01	IC, 74LS08
44-10697-01	IC, 74LS393
44-10700-01	IC, 74SO4
44-11028-01	IC, 74LS74
44-11029-01	IC, 74LS138
44-11486-01	IC, 74LS244
44-11487-01	IC, 74LS245
44-11492-01	IC, 74LS374
44-11833-01	IC, Z80A (4 MHZ)
44-11890-01	IC, 4016 (200NS)
44-12053-01	IC, AY-3-8910 (GI)
44-12055-01	IC, LM383 (NS)
53-10730-01	RES, 300 OHM 1/4W 5% C.
53-10731-01	RES, 330 OHM 1/4W 5% C.
53-10734-01	RES, 1K OHM 1/4W 5% C.
53-10735-01	RES, 1.5K OHM 1/4W 5% C.
53-10743-01	RES, 4.7K OHM 1/4W 5% C.
53-10746-01	RES, 10K OHM 1/4W 5% C.
53-10771-01	RES, 360 OHM 1W 5% C.

53-10920-01 RES,5.1K OHM 1/4W 5% C.
 53-11044-01 RES,510 OHM 1/4W 5% C.
 53-11123-01 RES,0 OHM 5% C.
 53-11684-01 RES, 220 OHM 1/4 W 5% C
 53-12115-01 RES,2.2 OHM 1/4W 5% C.
 63-10781-01 CAP,005MF 50V DISC 20%
 63-10784-01 CAP,.1MF 50V DISC 20%
 63-10940-01 CAP,.001MF 50V DISC 20%
 63-10944-01 CAP, 100MF 35V ELEC RAD
 63-11042-01 CAP, 470MF 35V ELEC
 63-11127-01 CAP, 1.0MF 50V ELEC RAD
 63-11128-01 CAP, 22MF 50V ELEC RAD
 63-11370-01 CAP, 10MF 50V ELEC
 63-12129-01 CAP,330PF 50V DISC 20%
 63-12130-01 CAP,0.2MF 50V CERAMIC DISC, 20%
 65-10812-01 DIODE,1N4003,ENCPL
 65-10993-01 DIODE,1N914
 66-10816-01 TRANSISTOR,NPN 2N3904
 66-10817-01 TRANSISTOR,PNP 2N3906
 66-10823-01 TRANSISTOR,NPN 2N5878
 69-11898-01 CRYSTAL,16MHZ FUNDAMENTAL
 80-12035-01 PCB,MAIN LOGIC,STARCOM
 81-12056-01 PCA,ROM,STARCOM
 02-12091-01 EPROM,2764,250 NS,U1,DRAGON'S LA
 02-12091-02 EPROM,2764,250 NS,U2,DRAGON'S LA
 02-12091-03 EPROM,2764,250 NS,U3,DRAGON'S LA
 02-12091-04 EPROM,2764,250 NS,U4,DRAGON'S LA
 02-12091-05 EPROM,2764,250 NS,U5,DRAGON'S LA
 36-11547-01 SOCKET,DIP 28CIR
 41-11895-01 CONN,40 CIR,M HEADER
 63-10784-01 CAP,.1MF 50V DISC 20%
 63-11042-01 CAP, 470MF 35V ELEC
 80-12056-01 PCB,ROM,STARCOM
 87-12093-01 ASSY,R.CBL.40CIR 3"
 38-12128-01 A ASSY,DISC PLAYER IN DRAWER
 01-11965-01 AIR FILTER,STARCOM
 02-12092-01 VIDEO DISC, DRAGON'S LAIR
 20-10868-12 BRACKET,DRAWER,STARCOM
 20-10873-01 BRACKET,AIR FILTER
 25-12130-01 SHOCK ISOLATOR,7821-2A-T3 (BARRY
 38-12127-01 LASER DISC PLAYER,PR7820
 71-10834-01 SPEAKER,
 81-12036-01 PCA,DISPLAY,STARCOM
 36-11547-01 SOCKET,DIP 28CIR
 41-10652-01 CONN, 16 CIR, M HEADER
 44-12054-01 IC,ICM7218D (INTERSIL)
 63-10784-01 CAP,.1MF 50V DISC 20%
 63-11042-01 CAP, 470MF 35V ELEC
 65-11533-01 LED,MAN8940 (MONSANTO)
 80-12036-01 PCB,DISPLAY,STARCOM
 87-12139-01 ASSY,MAIN HARNESS,STARCOM
 87-12140-01 ASSY,PLAYER

APPENDIX B
SCHEMATICS AND ASSEMBLY DRAWINGS

ORDER OF APPEARANCE	No. of Pages
1. Z80 Controller Board Schematics	2
2. Z80 Controller Board Assembly	1
3. Magicom ROM Schematic	1
4. Magicom ROM Assembly	1
5. Magicom Display Schematic	1
6. Magicom Display Assembly	1
7. Condor Power Supply Schematic	1
8. R.G.B. Monitor Schematic	1
9. NTSC Decoder Schematic	1
10. NTSC Decoder Specifications	1

IMPORTANT

Videodisc Maintenance

Videodiscs are made of plastic and the following precautions must be taken.

The disc may be dusted with a clean, lint free, 100% cotton cloth. When necessary, the disc may be cleaned by using a mild, alcohol free, non-abrasive cleanser such as a non-aerosol window cleaner or an amonia/water solution. Before using any cleaner READ THE LABEL to determine advisibility of use on a plastic surface.

It is suggested that the videodisc be handled by its edges or between the center hole and one edge.

When not in the player, the videodiscs should lie flat in their container to lessen the possibility of their becoming warped.

Please read the important information on loading and removing discs in the player operation section of your manual.

UNLOCKING DISC PLAYER AND INSTALLING DISC

Remove the 2 bolts on either side of the game cabinet and pull out the disc player drawer.

Power on the game and make sure that the POWER button on the lower left front panel of the disc player is on (IN).

Push the REJECT/OPEN button on the upper left front panel of the player until the player hood unlocks. Then power off the game.

Raise the player hood and use a coin to remove the large locking screw at the edge of the disc cavity. Next, remove the lens cap. Put the screw and lens cap in the bag on the cabinet door.

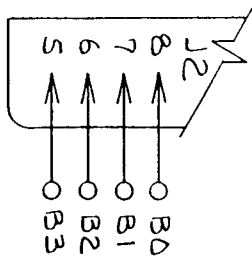
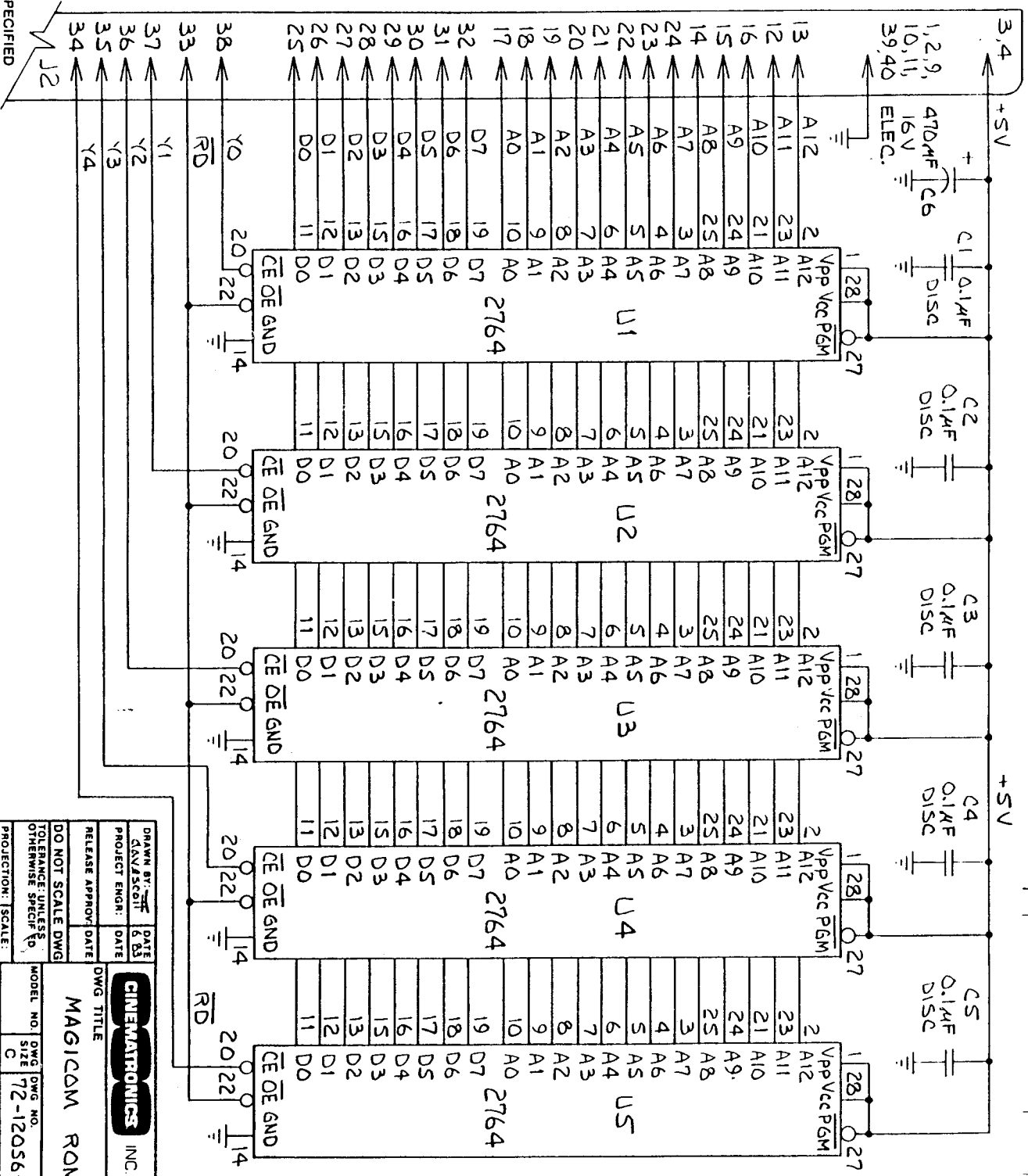
Take the disc from its protective cover and install it in the player with the metal side up. Close player cover, close player drawer, and replace drawer bolts. Then power on game.

When moving the game, remove the disc and place it in its protective cover. Reinstall locking screw and lens cap. DO NOT PUT THE DISC IN THE PLAYER WITH THE LOCKING SCREW INSTALLED!

WARNING!!!!!! DO NOT SHIP THE DISC PLAYER IN A NON-LEVEL POSITION. If the game must be shipped on its side, remove the disc player drawer from the cabinet.

PROPRIETARY
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
1			



NOTES: UNLESS OTHERWISE SPECIFIED

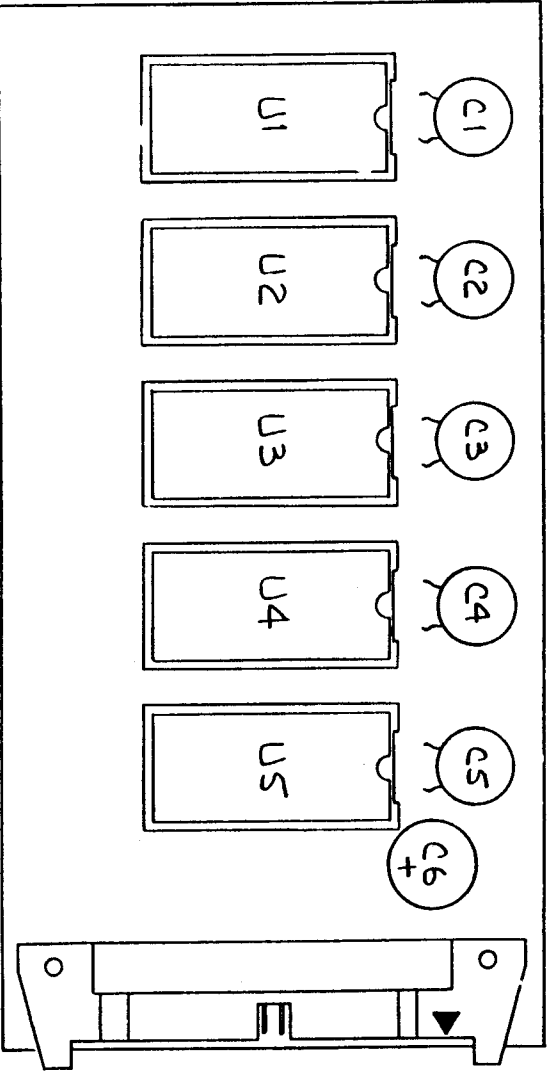
DRAWN BY: DAV/AScol PROJECT ENGR: DATE RELEASE APPROV: DATE	CINEMATRONICS INC.	DATE: 6/83 DATE: DATE DATE: DATE	E: Caion 92020
DO NOT SCALE DWG TOLERANCE: UNLESS OTHERWISE SPECIF.	DWG TITLE: MAGICOM ROM	MODEL NO: DWG NO: C 72-12056-01	REV: A
PROJECTION: SCALE:	CODE IDENT:	SHEET 1 OF 1	

4 3 2 1

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REV	DESCRIPTION	DATE



J2
 SYMBEX 32351-1-40

3. DRAGON'S LAIR (81-12056-01): U1-U5, 2764 WITH SOCKET
 2. C6; 470 MF, 16 V MINIMUM ELECTROLYTIC
 1. C1-C5; 0.1 MF, 50V, DISC
- NOTES: UNLESS OTHERWISE SPECIFIED

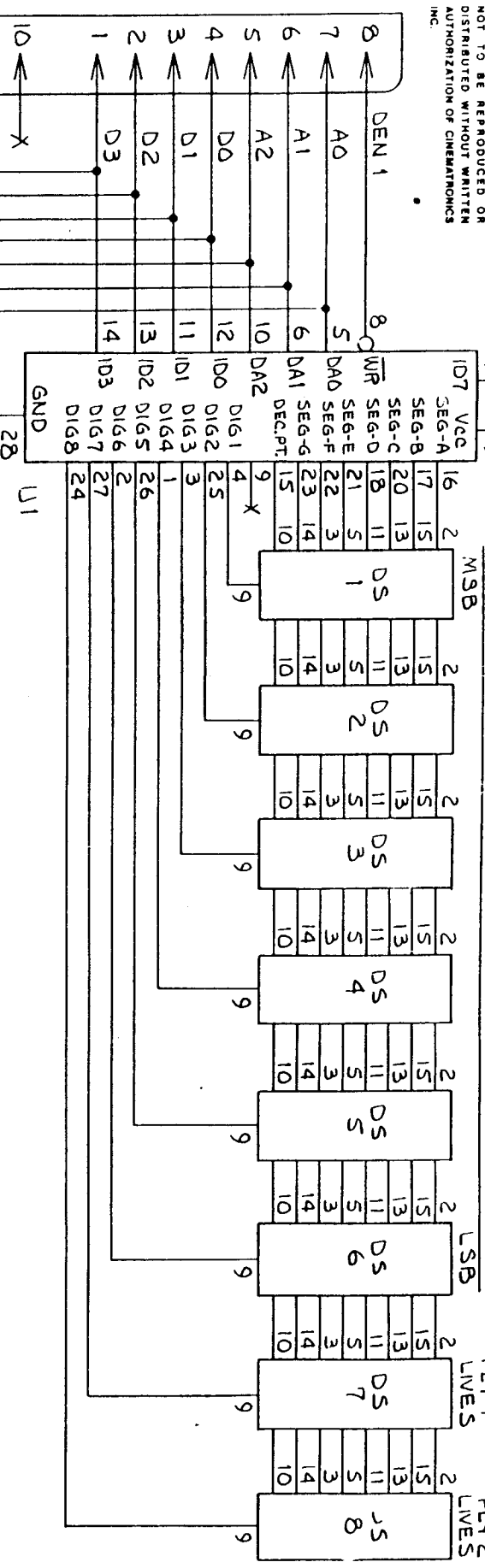
MATERIAL:		DRAWN BY: DAV SCOTT		DATE: 6-83	
FINISH:		PROJECT ENGR: DAV SCOTT		DATE: 6-83	
		RELEASE APPROV: DAV SCOTT		DATE: 6-83	
		DO NOT SCALE DWG			
		TOLERANCE: UNLESS OTHERWISE SPECIFIED			
		PROJECTION: SCALE 2:1			
		DWG TITLE: MAGICOM ROM		INC: CINEMATRONICS INC	
		MODEL NO: 81-12056-XX		REV: A	
		CODE IDENT: C		SHEET 1 OF 1	

4 3 2 1

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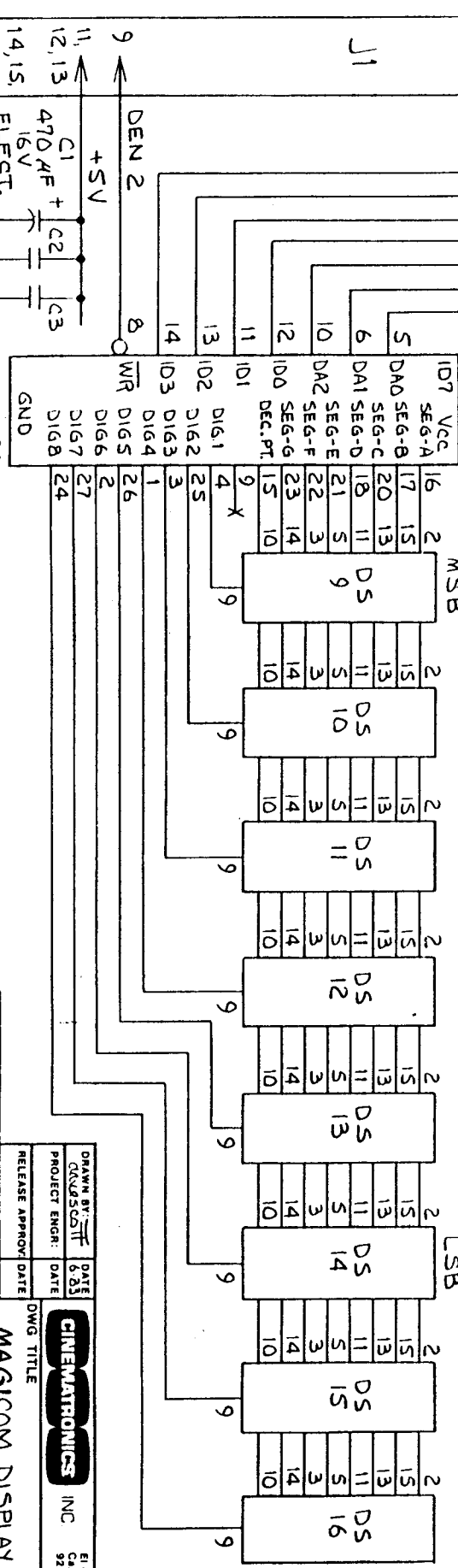
PLAYER ONE SCORE

PLY 1 LIVES
 PLY 2 LIVES



PLAYER TWO SCORE

CREDITS



NOTES: UNLESS OTHERWISE SPECIFIED

- 1. U1, U2: ICM 7218D
- 2. DS1-DS16: MAN 8940
- 3. C2, C3: 0.1µF, 50V, CERAMIC DISC

REV	DESCRIPTION	DATE	APPROVED
1			

CINEMATRONICS INC
 El Cajon 92020

MAGICOM DISPLAY

DRAWN BY: [Signature] DATE: 07/83
 PROJECT ENGR: DATE:
 RELEASE APPROV: DATE:

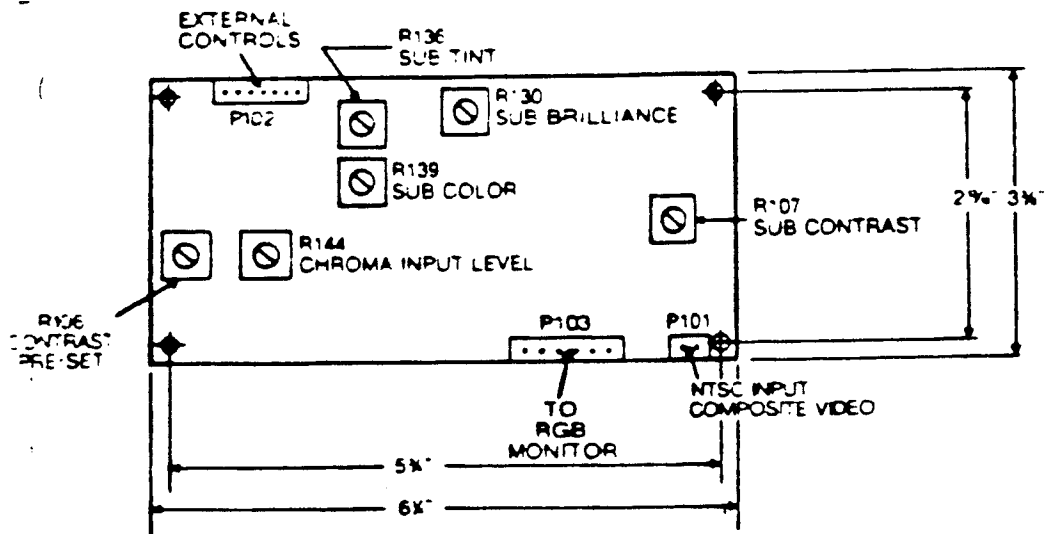
DO NOT SCALE DWG
 TOLERANCE: UNLESS OTHERWISE SPECIFIED
 PROJECTION: SCALE:

MODEL NO: [Blank] DWG NO: [Blank]
 SIZE: C 72-12036-01
 CODE IDENT: [Blank] SHEET 1 OF 1

NTSC DECODER SPECIFICATIONS

Pin Outs

- P101-1 75 ohm Input
- P101-2 Ground
- P102-1 Vs Supply (16V)
- P102-2 External Tint Wiper
- P102-3 External Color Wiper
- P102-4 Ground to Control
- P102-5 External Detail Wiper
- P102-6 Not Used
- P102-7 Vcc to Control (12V)
- P103-1 Ground
- P103-2 Blanking Output
- P103-3 Positive Composite Sync.
- P103-4 Red Output
- P103-5 Green Output
- P103-6 Blue Output



00-4211-02 NTSC DECODER SCHEMATIC

ISSUE B

RESISTORS RESISTANCE IS IN Ω (OHMS), $\text{k}\Omega$ (KILOHMS), OR $\text{M}\Omega$ (MEG OHMS) UNLESS OTHERWISE SPECIFIED

CAPACITORS CAPACITY IN p (PICOFARADS), n (NANOFARADS), OR μ (MICROFARADS), DC MV AND TOLERANCE NOTED WHERE CRITICAL.

CAUTION FOR CONTINUED SAFETY REPLACE COMPONENTS NOTED BY Δ WITH EXACT REPLACEMENT PARTS ONLY CONSULT SERVICE MANUAL PARTS LIST SECTION "SAFETY COMPONENTS"

