

*Williams*<sup>®</sup>

16-3007-101  
August, 1982

# *Moon Patrol*

**PRELIMINARY**

FOR SERVICE...  
NOTE NEW TOLL-FREE  
TELEPHONE NUMBERS:

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IN ILLINOIS CALL:  
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*Williams*<sup>®</sup>  
**ELECTRONICS, INC.**

3401 N. California Ave., Chicago, IL 60618

## DIP SWITCH SETTINGS

### DIP SWITCH NO. 1

| ADJUSTMENT            | OPTIONS  | SWITCH NUMBER          |                        |                        |                        |                  |                  |                        |                        |
|-----------------------|--|------------------------|------------------------|------------------------|------------------------|------------------|------------------|------------------------|------------------------|
|                       |  | 1                      | 2                      | 3                      | 4                      | 5                | 6                | 7                      | 8                      |
| *RECOMMENDED SETTINGS |  | ON                     | OFF                    | OFF                    | OFF                    | OFF              | OFF              | OFF                    | OFF                    |
| †COIN MODE 1          | 2 PLAYS/1 COIN<br>3 PLAYS/1 COIN<br>4 PLAYS/1 COIN                               |                        |                        |                        |                        | OFF<br>ON<br>OFF | OFF<br>OFF<br>ON | OFF<br>OFF<br>OFF      | ON<br>ON<br>ON         |
|                       | 5 PLAYS/1 COIN<br>6 PLAYS/1 COIN<br>*1 PLAY/1 COIN                               |                        |                        |                        |                        | ON<br>OFF<br>OFF | ON<br>OFF<br>OFF | OFF<br>ON<br>OFF       | ON<br>ON<br>OFF        |
|                       | 1 PLAY/2 COINS<br>1 PLAY/3 COINS<br>1 PLAY/4 COINS                               |                        |                        |                        |                        | ON<br>OFF<br>ON  | OFF<br>ON<br>ON  | OFF<br>OFF<br>OFF      | OFF<br>OFF<br>OFF      |
|                       | 1 PLAY/5 COINS<br>1 PLAY/6 COINS<br>FREE PLAY                                    |                        |                        |                        |                        | OFF<br>ON<br>ON  | OFF<br>OFF<br>ON | ON<br>ON<br>ON         | OFF<br>OFF<br>ON       |
| †COIN MODE 2          | 1 PLAY/1 COIN<br>1 PLAY/2 COINS<br>1 PLAY/3 COINS                                |                        |                        |                        |                        | OFF<br>ON<br>OFF | OFF<br>OFF<br>ON |                        |                        |
|                       | FREE PLAY  |                        |                        |                        |                        | ON               | ON               |                        |                        |
|                       | 2 PLAYS/1 COIN<br>3 PLAYS/1 COIN<br>5 PLAYS/1 COIN<br>6 PLAYS/1 COIN             |                        |                        |                        |                        |                  |                  | OFF<br>ON<br>OFF<br>ON | OFF<br>OFF<br>ON<br>ON |
| # PATROL CARS         | 5 PATROL CARS<br>*4 PATROL CARS<br>3 PATROL CARS<br>2 PATROL CARS                | OFF<br>ON<br>OFF<br>ON | OFF<br>OFF<br>ON<br>ON |                        |                        |                  |                  |                        |                        |
| ADDITIONAL CAR AT:    | *10,000/30,000/50,000<br>20,000/40,000/60,000<br>10,000 ONLY<br>NO EXTENDED PLAY |                        |                        | OFF<br>ON<br>OFF<br>ON | OFF<br>OFF<br>ON<br>ON |                  |                  |                        |                        |

### DIP SWITCH NO. 2

| ADJUSTMENT                          | OPTIONS                    | SWITCH NUMBER |           |           |     |           |           |           |           |
|-------------------------------------|----------------------------|---------------|-----------|-----------|-----|-----------|-----------|-----------|-----------|
|                                     |                            | 1             | 2         | 3         | 4   | 5         | 6         | 7         | 8         |
| *RECOMMENDED SETTINGS               |                            | OFF           | ON        | †         | OFF | OFF       | OFF       | OFF       | OFF       |
| FLIP PICTURE                        | NO<br>YES                  | OFF<br>ON     |           |           |     |           |           |           |           |
| **CABINET TYPE                      | TABLE<br>UPRIGHT           |               | OFF<br>ON |           |     |           |           |           |           |
| COIN MODE SETTINGS FOR DIP SWITCH 1 | COIN MODE 1<br>COIN MODE 2 |               |           | OFF<br>ON |     |           |           |           |           |
| FREEZE SCREEN                       | *NO<br>YES                 |               |           |           |     | OFF<br>ON |           |           |           |
| SECTOR-SELECTION FEATURE            | *NO<br>YES                 |               |           |           |     |           | OFF<br>ON |           |           |
| DEMO MODE                           | *NO<br>YES                 |               |           |           |     |           |           | OFF<br>ON |           |
| TEST MODE                           | *NO<br>YES                 |               |           |           |     |           |           |           | OFF<br>ON |
| SWITCH 4 (not used)                 |                            |               |           |           | OFF |           |           |           |           |

\*recommended settings

\*\*For upright games, select ON for switch 2. Table games require OFF for switch 2.

†For games with a single coin selector or 2 selectors of the same value, S3 must be turned off. For games with selectors for 2 different coin values, S3 must be turned on.

## MOON PATROL DIAGNOSTICS

Turn switch #8 of DIP switch #2 to the ON position and turn power ON. The MOON PATROL diagnostic program consists of 8 independent tests, 2 of which are automatic at turning power ON in diagnostic mode: RAM Test and ROM Test. After these two tests have been properly completed, pressing the 2 Player button brings an index of the other tests to the CRT display:

- 01 DIP SWITCH
- 02 I-O PORT\*
- 03 SOUNDS
- 04 CHARACTER
- 05 COLOR
- 06 CROSS HATCH PATTERN

\* Control Panel and Coin Door switches test.

As any test other than 02 is completed, pressing the 2-Player button returns the test index to the monitor display. When test 02 is completed, the joystick lever must be moved left while pressing the 2 Player button to return the test index. If no further testing is desired, turn power OFF and return switch #8 of DIP switch #2 to the OFF position.

### RAM Test

If checked to be OK, "RAM OK" appears on monitor. If not OK, "RAM NG XXXX YY ZZ" appears on monitor (without ROM test results).

↑                    ↑                    ↑  
Faulty RAM address    RAM Input Data    RAM Output Data

If RAM is shown to be NG at address E000 - E7FF failure can have occurred in either 3B RAM or 2K decoder. If RAM is shown to be NG at address 8000 - 87FF failure can have occurred at RAM chip 3C or circuitry directly associated with the RAM chip--Chips 7J, 7K, 6A, 5D, 6D, 4A, 4B, 4C, and 4D of the Scrolling Video board or chip 5M of the CPU board. A faulty chip must be replaced to continue diagnostics.

### ROM Test

If checked to be OK, the display below appears on the monitor.

```
"RAM    OK"  
"ROM 0  OK  FF"  
"ROM 1  OK  FF"  
"ROM 2  OK  FF"  
"ROM 3  OK  FF"
```

If any are not OK, for example ROM 1; this appears on monitor.

```
"RAM    NG"  
"ROM 0  OK  FF"  
"ROM 1  NG  FF"  
"ROM 2  OK  FF"  
"ROM 3  OK  FF"
```

A faulty ROM must be replaced to continue diagnostics.

## 01 DIP SWITCH Test

Shows state of all switches contained in DIP switches #1 & #2 and the resulting game adjustments; as in Example 1-1.

Example 1-1: DIP Switch Recommended Settings  
0 = OFF, 1 = ON

|        |   |   |   |   |   |   |   |   |
|--------|---|---|---|---|---|---|---|---|
| DIP SW | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| SW1    | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SW2    | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |

PATROL CARS 4  
ADDITIONAL CARS  
POINTS 10, 30, 50 THOUSAND

DIP SW Test Example 1-1 (Cont.)  
COIN MODE 1 COIN 2 PLAYS  
BODY TYPE UPRIGHT

If any switch(es) of a DIP switch set is (are) not represented correctly, the respective DIP switch set or any of chips 1E, 1F, 1H, or 2J could be malfunctioning.

Switch #8 of DIP switch #2 is shown as "1" only because that is the position required for game diagnostics.

## 02 I-O PORT (Control Panel/Coin Door Switch) Test

Shows if all controls and coin mechanisms are functioning properly by displaying a matrix composed of the states of switches on the Control Panel and Coin Door as shown in Example 1-2.

Example 1-2: 0 = OFF 1 = ON

|       |   |   |   |   |   |   |   |   |
|-------|---|---|---|---|---|---|---|---|
|       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| KEY 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KEY 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KEY 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TIMING 0000

The TIMING number starts at 0000 and adds one count approximately every second.

If any Control Panel or Coin Door switch is closed a "1" will appear in the above matrix as follows:

|                         |        |
|-------------------------|--------|
| 1 Player Start Button   | KEY0-1 |
| 2 Player Start Button   | KEY0-2 |
| Coin Switch A           | KEY0-4 |
| Joystick Right (Faster) | KEY1-1 |
| Joystick Left (Slower)  | KEY1-2 |
| Jump                    | KEY1-6 |
| FIRE                    | KEY1-8 |
| Coin Switch B           | KEY2-5 |

Coin Switch B is present only in games with coin doors that accept coins of two different values.

To end this test and return to test index: move joystick lever left while pressing the 2 Player Start Button.

### 03 SOUNDS Test

A list of sounds normally produced by the game appears as shown below on the monitor. Move joystick lever as necessary to light the number of the sound desired to test and press the 1 Player start button for repetition of the sound.

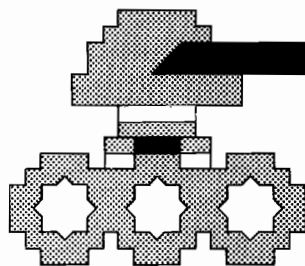
Example 1-3:

- 01 EXPLOSION (ROCK)
- 02 PASSING ONE POINT
- 03 UFO EXPLOSION
- 04 MISSILE FROM CAR
- 05 COIN
- 06 CAR JUMP
- 07 SPACE PLANT
- 08 UFO FLYING
- 09 BACK GROUND MUSIC
- 10 ENDING MUSIC
- 11 OPENING MUSIC
- 12 REACHING GOAL
- 13 CONGRATULATION
- 14 CAR EXPLOSION


### 04 CHARACTER Test

A display composed of 8 tanks vertically and horizontally flipped as shown below appears on monitor.

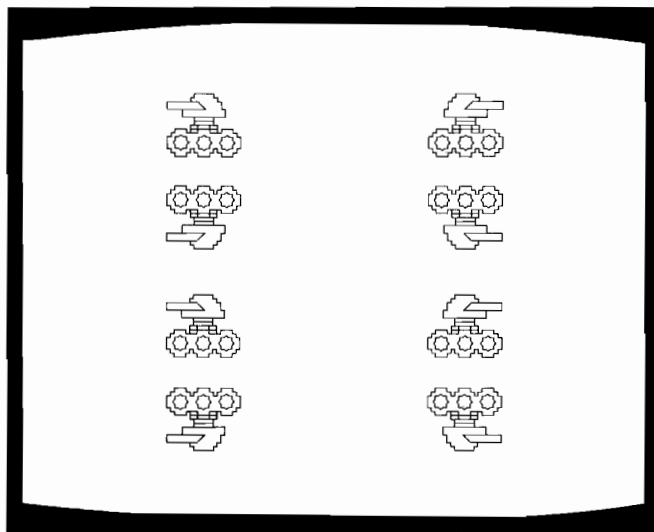
TANK = GRN  
TREADS = GRN  
TREAD WHEELS = VIOLET  
GUN = RED



 = GREEN

 = RED

 = VIOLET



05 COLOR Test

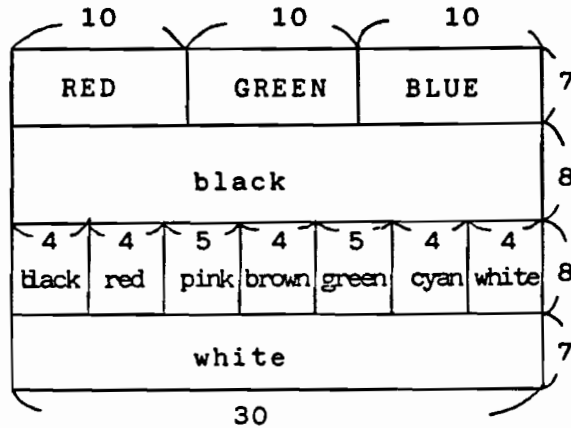
This test consists of 5 independent steps as follows:

1. An alphanumeric display is shown as below over a row of numbers 0 thru 9, letters blue and numbers white.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

0123456789

2. A color pattern is displayed as shown:



\*Numbers are the ratio of size used for each color.

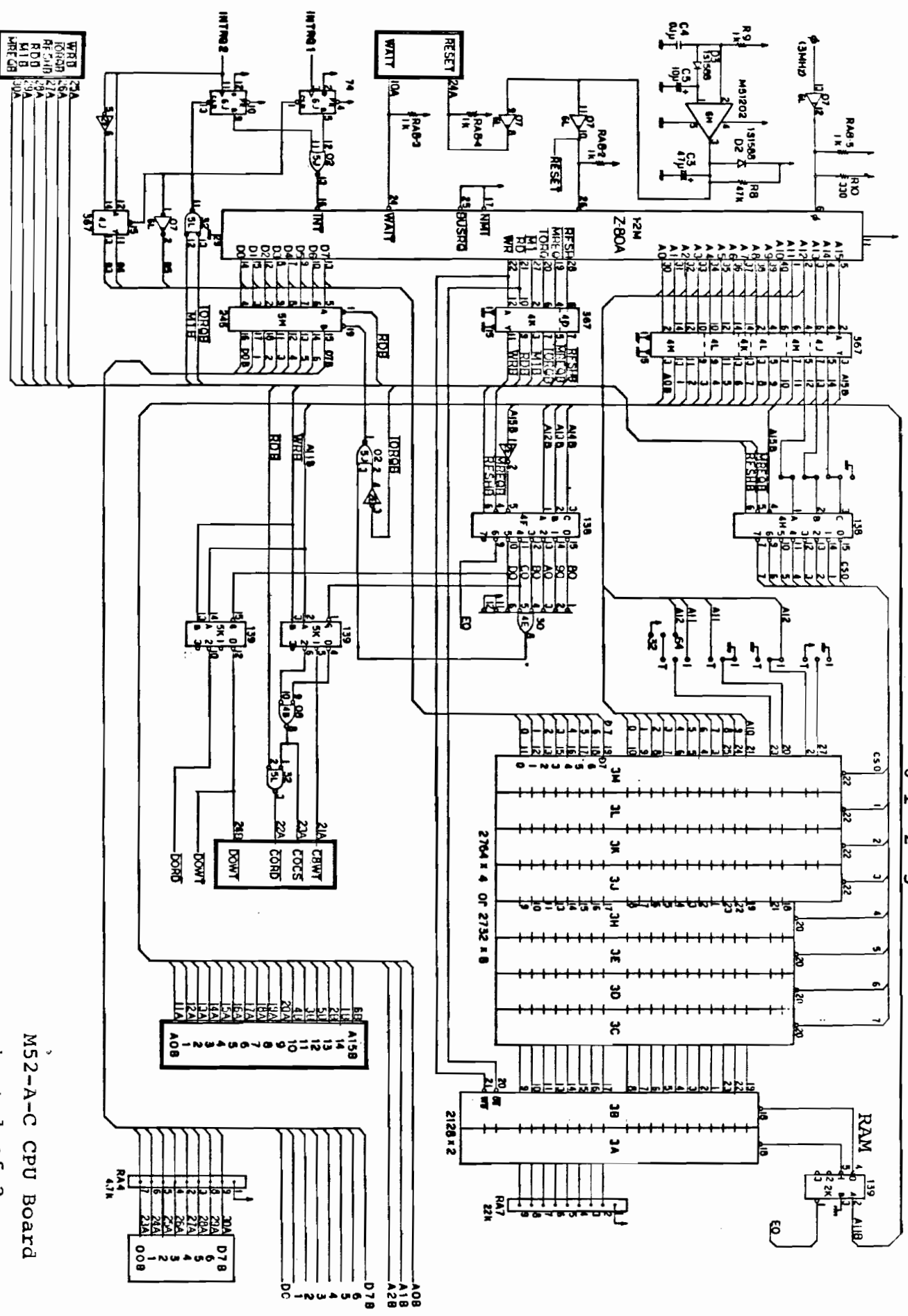
3. A field of red is displayed.
4. A field of green is displayed.
5. A field of blue is displayed.

Each independent step of this COLOR test can be advanced through by pressing the 1 Player start button.

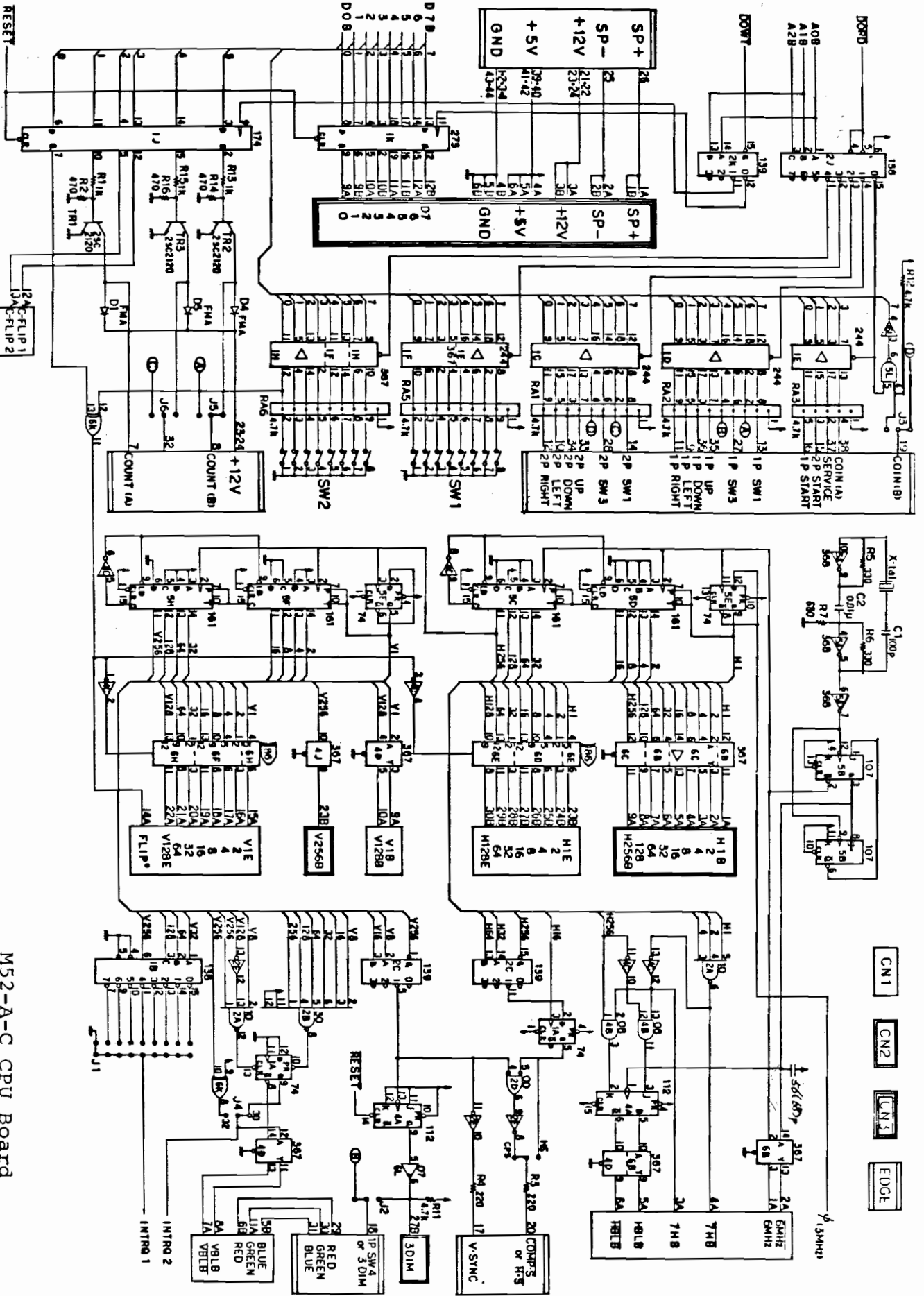
06 CROSS HATCH PATTERN Test

A white line matrix 16 lines vertical x 16 lines horizontal is displayed.

ROM ROM ROM ROM  
0 1 2 3

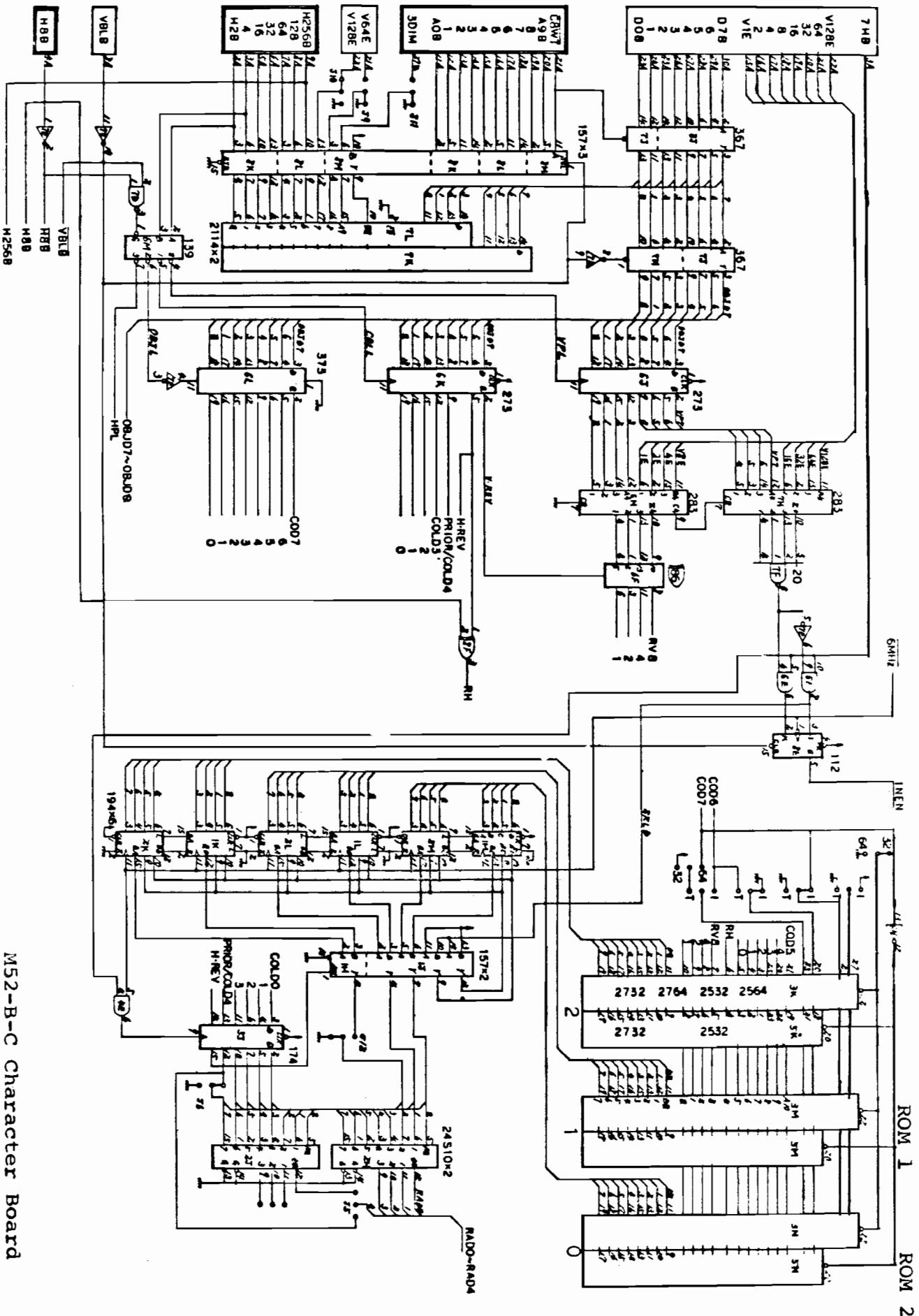


M52-A-C CPU Board  
sheet 1 of 2

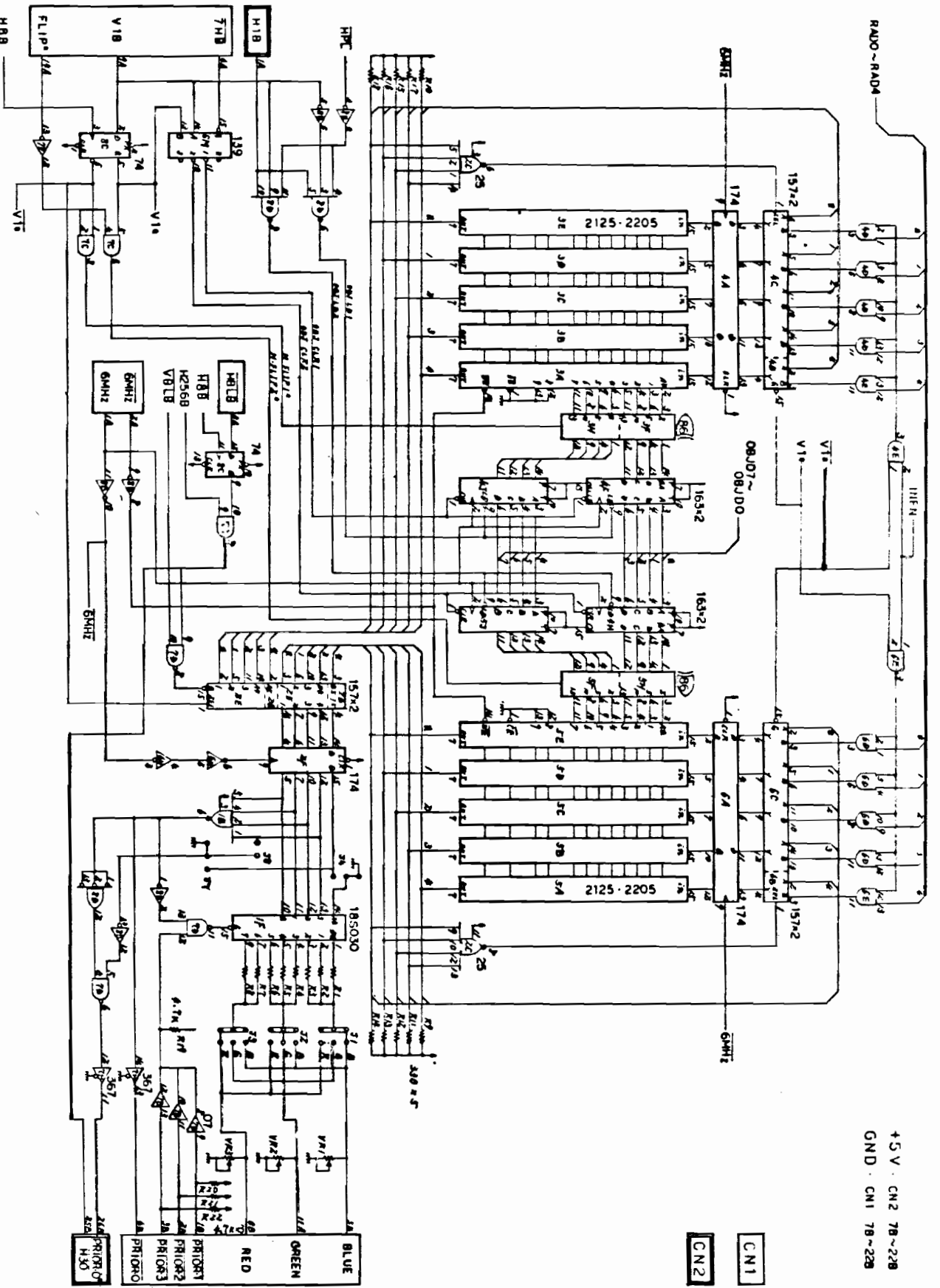


M52-A-C CPU Board





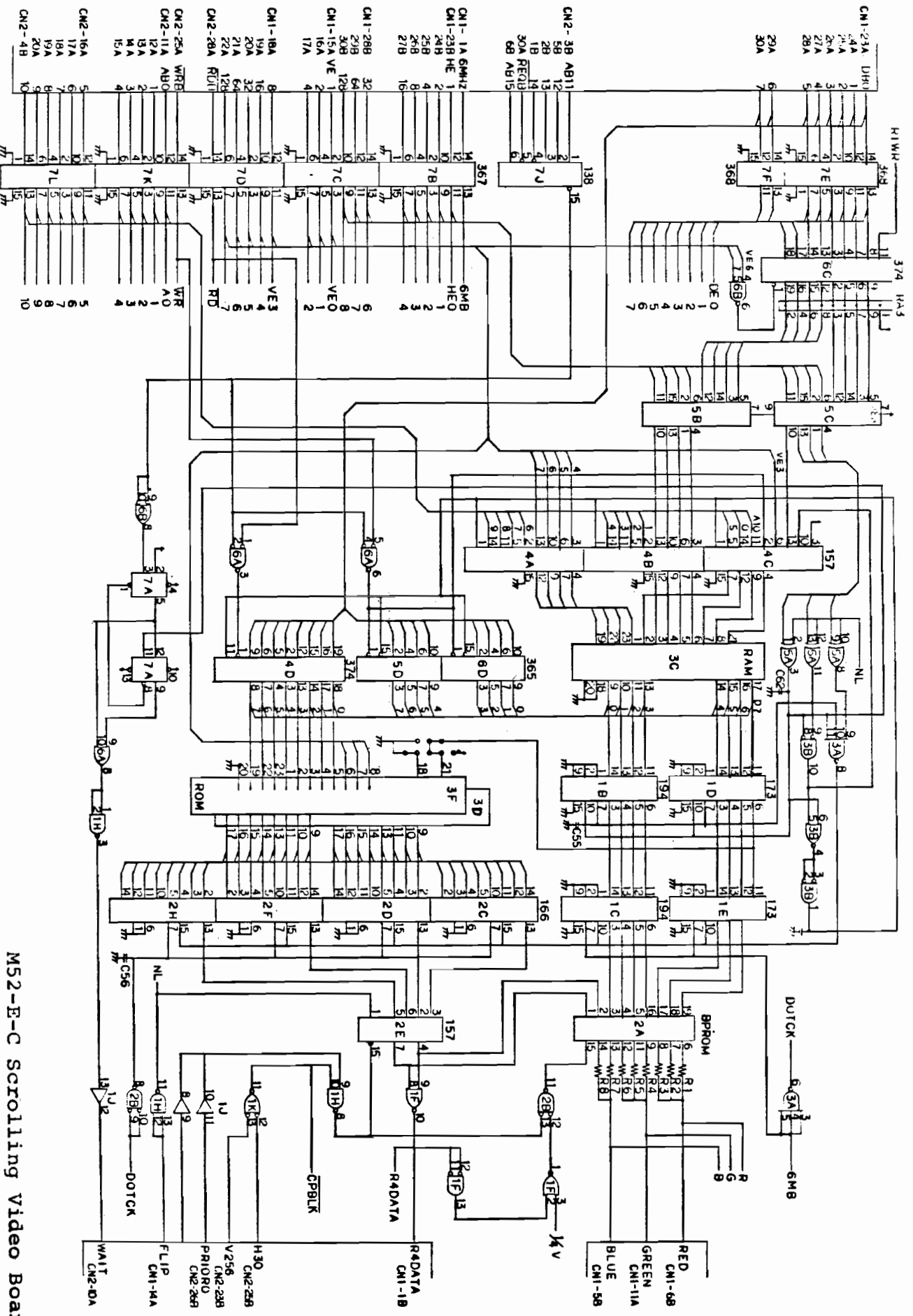
M52-B-C Character Board  
sheet 1 of 2



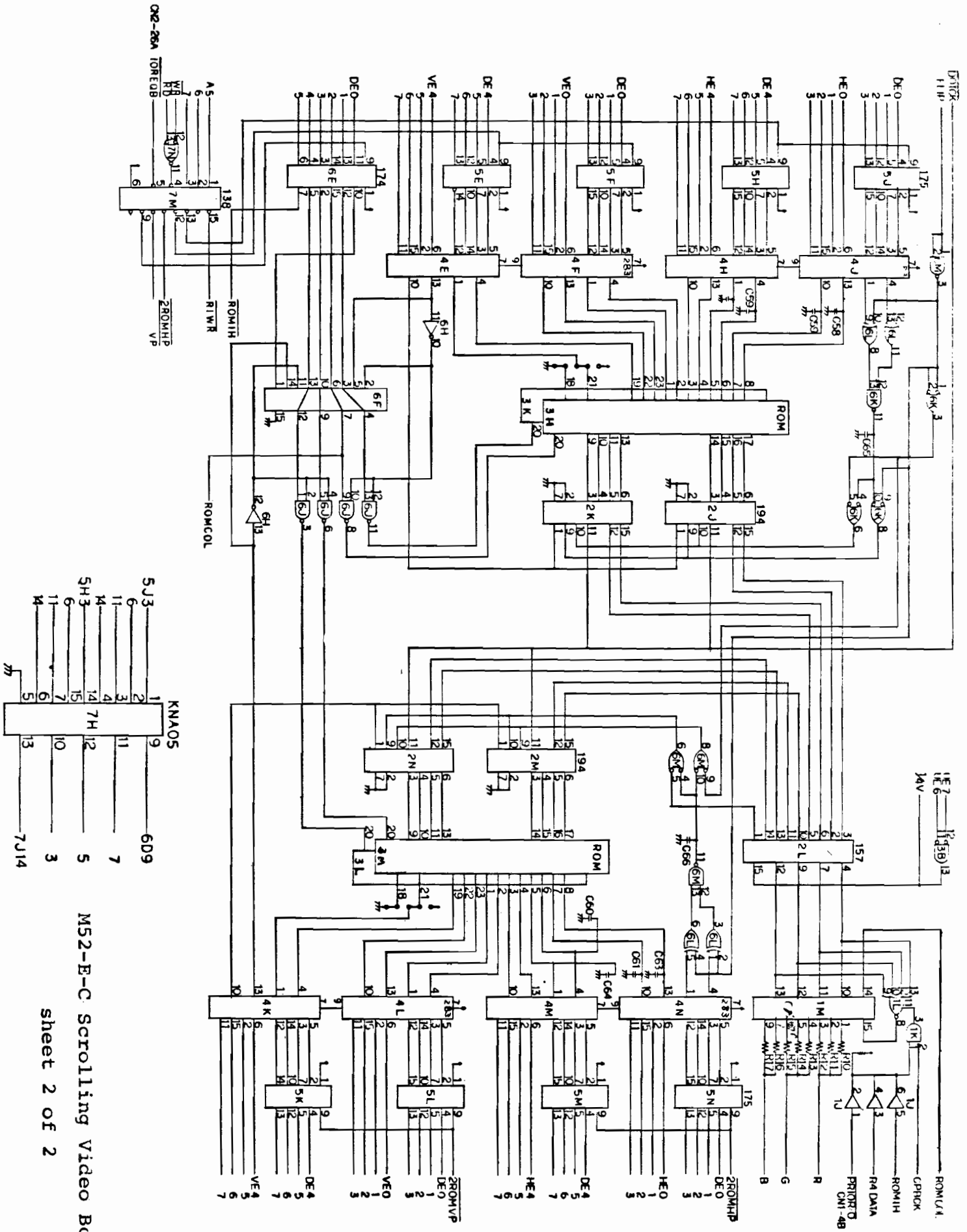
+5V · CN2 78~228  
 GND · CN1 78~228

CN1  
 CN2

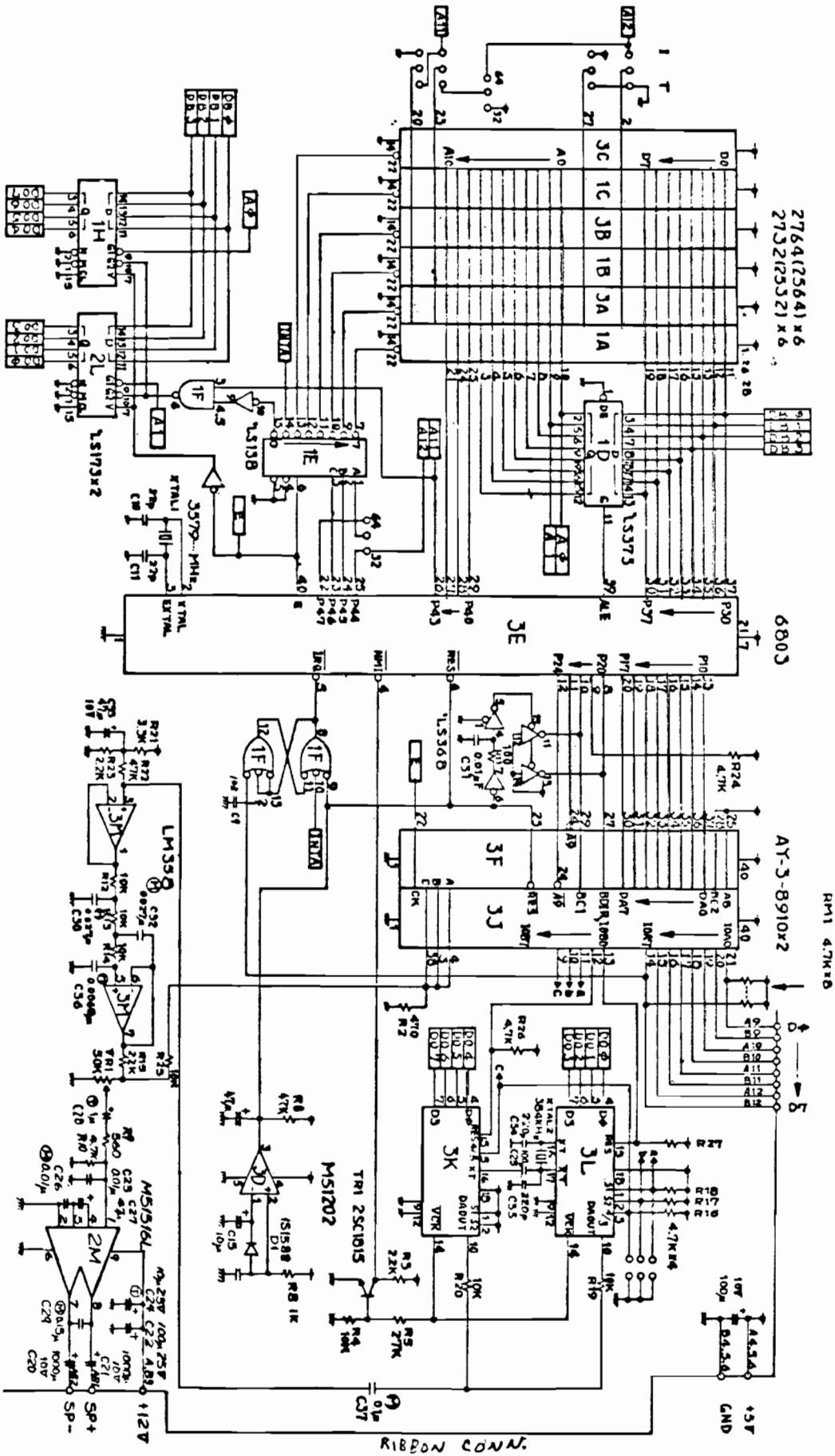
BLUE  
 GREEN  
 RED  
 PRIORITY  
 PRIORITY  
 PRIORITY  
 PRIORITY  
 PRIORITY  
 H30



M52-E-C Scrolling Video Board

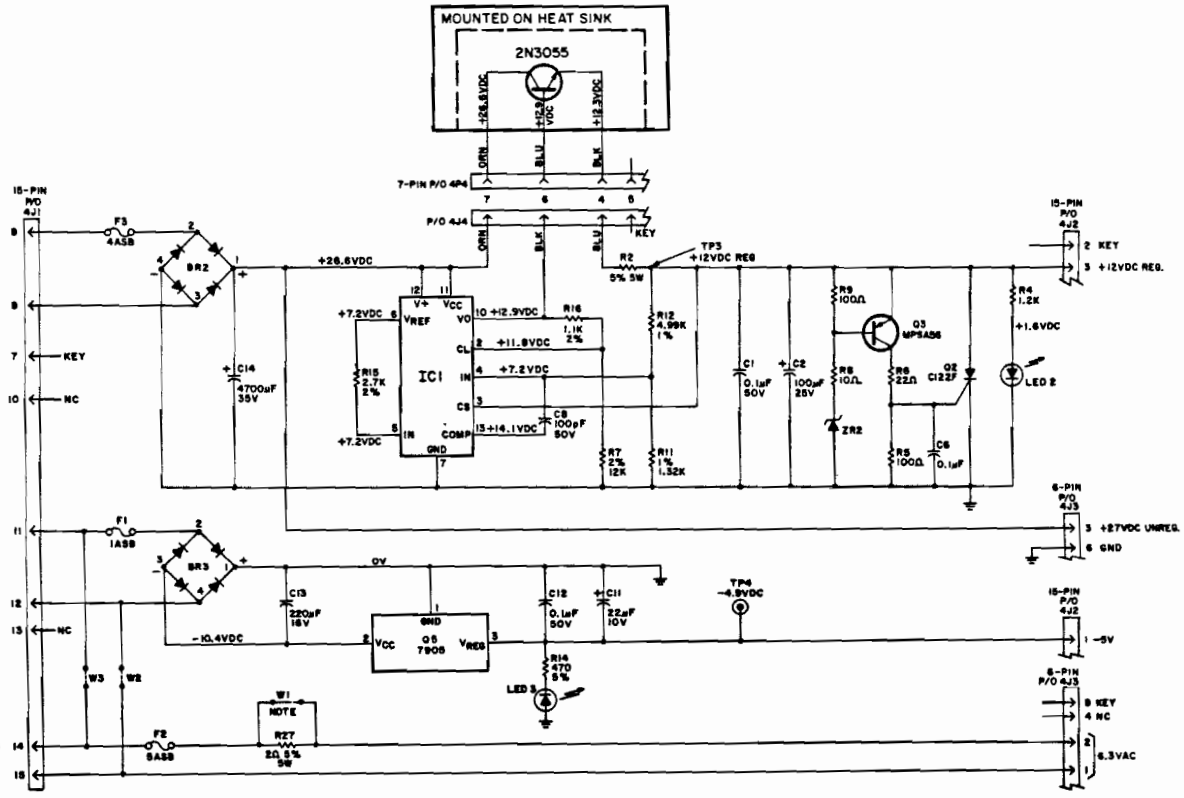
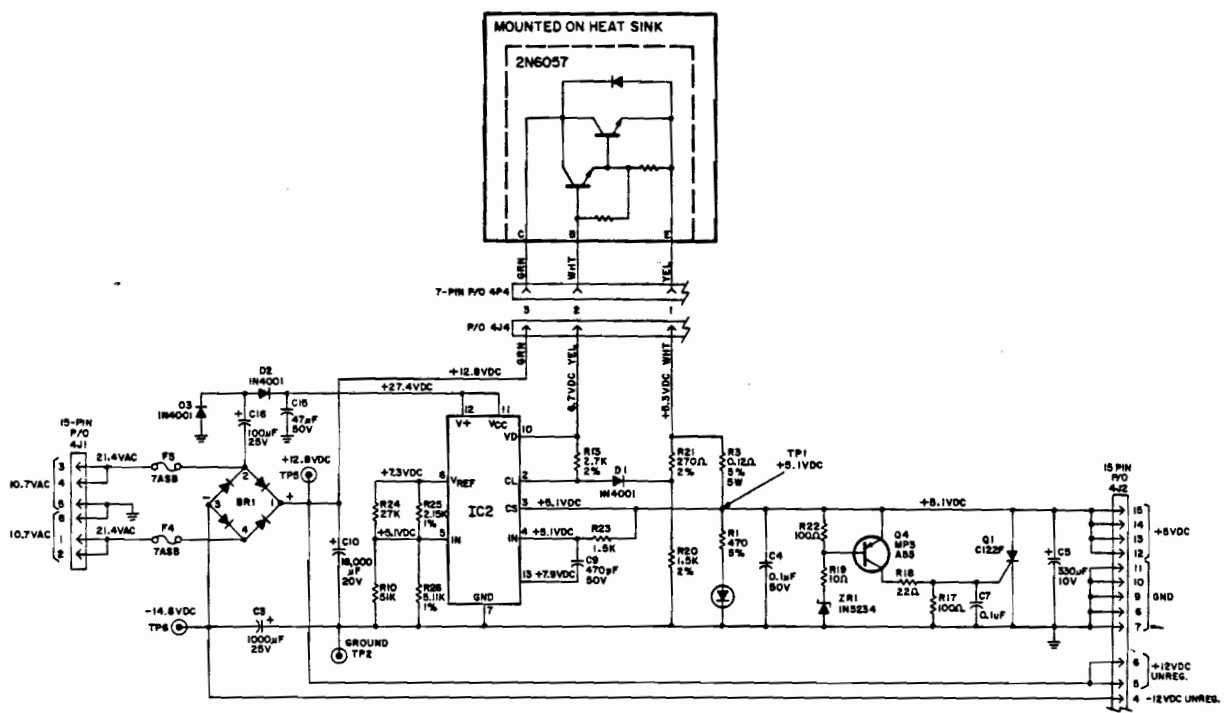


M52-E-C Scrolling Video Board  
sheet 2 of 2



MS2 SOUND-C Sound Board

**MOON PATROL**  
Power Supply Board Schematic Diagram



MOON PATROL UPRIGHT

PRELIMINARY PARTS LIST

| DESCRIPTION              | PART NO.       | DESCRIPTION                | PART NO.      |
|--------------------------|----------------|----------------------------|---------------|
| Cabinet Assembly         | AB-11-689      | Coin Door                  | C-8989        |
| Leg Adjuster Nut         | 08-7025        |                            |               |
| Leg Adjuster             | 08-7391        | Cash Box Door              | C-8832        |
| Cabinet                  | 11-689         |                            |               |
|                          |                | Cash Box Lock Bracket      | 01-7176       |
| Marquee                  | 31-1069-3007-U | Cash Box Cover             | 01-7720       |
| Marquee Molding Top      | 20-9322        | Deep Cash Box              | 03-7625       |
| Marquee Molding Bottom   | 20-9306        | Cash Box Handle            | 12-6589       |
|                          |                |                            |               |
| Speaker Panel            | D-9157         | Locks                      | 20-8995       |
| Speaker                  | 5555-09382-01  |                            |               |
| Speaker Mounting Bracket | 01-7466        | Upper Rear Door            | C-9462        |
| Speaker Panel            | 11-685-4       | Door Lock                  | 20-6542-TB    |
| Speaker Panel Cover      | 03-7712        | Lock Cam                   | 01-6583       |
| Speaker Shield           | 03-7748        | Lower Rear Door            | C-9436        |
|                          |                |                            |               |
| CRT Cover                | 31-1068-3007-U |                            |               |
| Instruction Card         | 16-3007-17     | Monitor/Shelf Assembly     | B-9368-2      |
| CRT Bezel                | 03-7749        | Monitor Shelf              | 11-685-2      |
|                          |                | Monitor                    | 5675-09979-00 |
| Control Panel            | R-9430         |                            |               |
| Red Button Assembly      | C-9214-4       | Moon Patrol Circuit Boards | A-9436        |
| White Button Assembly    | C-9214-5       |                            |               |
| Yellow Button Assembly   | C-9214-6       | Power Supply Assembly      | C-9437        |
| Joy Stick                | 20-9254        | Heat Sink                  | C-8809        |
| Trunk Latch Bracket      | 01-6994        | PCB Plate                  | C-9265        |
| Trunk Latch              | 20-9266        | P.S. PCB Assembly          | D-8784-3007-U |
| Control Panel Hinge      | 20-9447        |                            |               |
| Control Panel Overlay    | 31-1067-3007-U | Power Pack                 | D-9187-3007   |
|                          |                | Transformer                | C-8529        |
|                          |                |                            |               |
|                          |                | Line Voltage Cable         | H-9084        |
|                          |                |                            |               |
|                          |                | Vent Hole Cover            | 03-7602       |

MOON PATROL - COCKTAIL

PRELIMINARY PARTS LIST

| DESCRIPTION                         | PART NO.       |
|-------------------------------------|----------------|
| Cash Box Assembly                   | D-8603         |
| Glide with Screw                    | 20-9261        |
| Monitor/Supports Assembly           | B-9237-1       |
| Cocktail CRT Support - L            | 11-679-3-L     |
| Cocktail CRT Support - R            | 11-679-3-R     |
| 19" Monitor 19K4903                 | 5675-09979-00  |
| Line Voltage Cable Assembly         | D-8613         |
| Power Pack System 3 "T"             | D-9188-3007    |
| Heat Sink Assembly                  | C-8809         |
| P.S. PCB Assembly                   | D-8784-3007-T  |
| Power Pack-T Sub Assembly           | D-9275         |
| Transformer Assembly                | C-8609         |
| PCB Plate Sub Assembly              | C-9265         |
| Power Supply Mounting Board         |                |
| Clamp & Gasket Assembly - Table Top | B-8692         |
| Cocktail Brace Assembly             | B-9276         |
| Stud-Shoulder Hinge                 | 02-4122        |
| Cocktail Top Brace                  | 20-9262        |
| Mask w/Instruction Cards            | D-9240-3007    |
| Cabinet Top Hinge Cocktail          | 01-7105        |
| Top Lock Catch Bracket              | 01-7190        |
| Top Lock Catch                      | 02-4039        |
| CRT Bezel *                         | 03-7731        |
| CRT Filter                          | 03-7732        |
| Cocktail Glass Blank                | 08-7384        |
| Cocktail Top                        | 11-679-4       |
| Control Panel                       | D-9432         |
| Red Button Assembly                 | C-9214-4       |
| Yellow Button Assembly              | C-9214-5       |
| Joy Stick                           | 20-9254        |
| Control Panel Cover                 | 31-1070-3007-T |



MOON PATROL - COCKTAIL

PRELIMINARY PARTS LIST (Continued)

| DESCRIPTION               | PART NO.       |
|---------------------------|----------------|
| Component Door            | D-9451         |
| PCB's Assembly            | A-9436         |
| Lock Bracket - Cocktail   | 01-7102        |
| Door Kick Plate           | 01-7115        |
| Speaker Grill-T           | 03-7622        |
| PCB Mounting Block        | 11-689-2       |
| PCB Mounting/Stop Block   | 11-689-3       |
| Component Door            | 11-690-2       |
| Speaker                   | 5555-09626-00  |
| <br>                      |                |
| Coin Door Assembly        | D-9452         |
| Light Socket Assembly     | A-8639         |
| Lock Link & Stud Assembly | A-8650         |
| Red Button Assembly       | A-8654         |
| Terminal Strip & Diode    | A-9103         |
| Lock Link/Stud Assembly   | B-8651         |
| Coin Door Lock Guide      | 01-7099        |
| Coin Door Hinge           | 01-7103        |
| Coin Door Kick Plate      | 01-7117        |
| Guide Bracket             | 01-7131        |
| Guide Strip               | 01-7133        |
| Lock Link / Lower         | 01-7134        |
| Lock Mech Guide           | 02-4029        |
| Coin Mech - Quarter       | 09-11000       |
| Cocktail Coin Door        | 11-679-5       |
| Cam Lock - Coin Door      | 20-6542-TB     |
| Cocktail Coin Door Cover  | 31-1057-3005-T |

**Warning:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."