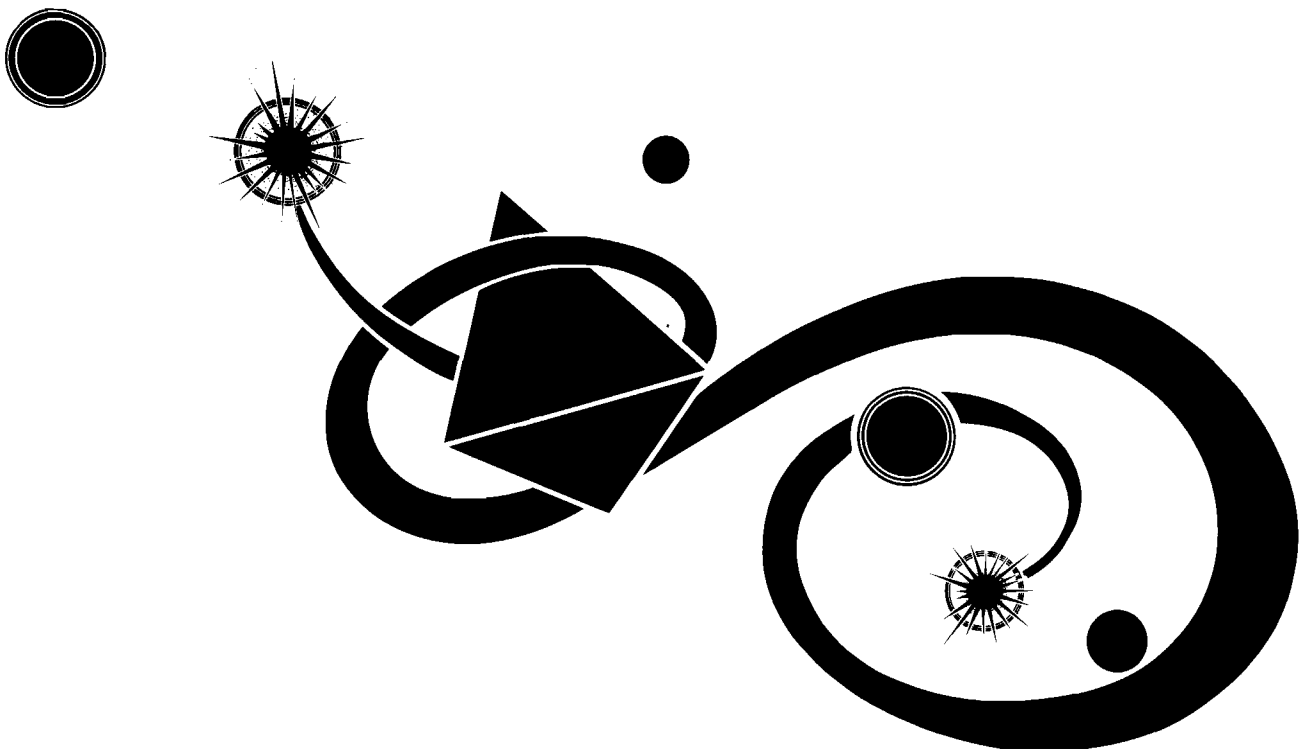
CO-221-01
1st printing

# Supplement to


## Operation, Maintenance, and Service Manual (TM-221, 1st printing) and Schematic Package (SP-221, 1st printing)



The attached sheets replace the following sections of TM-221:

| | |
|---|---|
| Chapter 1 | E. Setting the Option Switches<br>Table 1-1 Switch Settings for Price Options |
| Chapter 2 | B. Performing the Self-Test |
| Chapter 4 | Figure 4-11 EMI Shield PCB Assembly and Parts List<br>EMI Shield PCB Schematic (supplements SP-221) |

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# E. Setting the Option Switches

Settings of the game price options are explained in Table 1-1. Options preset at the factory are shown by the ◄ symbols. However, you may change the settings according to your individual needs.

To verify option switch settings, set the self-test switch to the *on* position. Compare the information on the screen to the option switch settings listed in Table 1-1. Then set the self-test switch to the *off* position.

Table 1-1 describes the switch settings for options relating to game price, coin mechanism multipliers, and bonus play. These switches are on the game PCB at location 4C/D.

The *multipliers* (switches 4–6) determine the value of the coin mechanisms to the game's logic. A *coin mechanism* is a device on the inside of the coin door that inspects the coin to determine if the correct coin has been inserted. After this inspection, the mechanism either accepts or rejects the coin. The coin door has two coin mechanisms.

The basic unit of measurement is a coin worth $.25 or 1 DM, which equals a multiplier of x1. For example, if you have a 2 DM/1 DM coin door, you may want to set the left multiplier at x2 and the right multiplier at x1.

You may offer *bonus play* for certain combinations of coins inserted. For example, with the game set at $.25 per play, players who deposit four successive $.25 coins before pressing the start switch can receive a bonus play. The bonus feature encourages players to insert more money than the minimum $.25 required for one game.

Table 1-1 lists switch settings for price options. The switches are on the game PCB at location 4C/D. Refer to *Figure 3-7* to remove the game PCB.

## Table 1-1 Switch Settings for Price Options

| Settings of 8-Toggle Switch on Quantum PCB *(at 4C/D)* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **Option** |
| Off | On | | | | | | | Free play |
| On | On | | | | | | | 1 coin for 2 credits |
| Off | Off | | | | | | | 1 coin for 1 credit ◄ |
| On | Off | | | | | | | 2 coins for 1 credit |
| | | Off | Off | | | | | Right coin mechanism x 1 ◄ |
| | | On | Off | | | | | Right coin mechanism x 4 |
| | | Off | On | | | | | Right coin mechanism x 5 |
| | | On | On | | | | | Right coin mechanism x 6 |
| | | | | Off | | | | Left coin mechanism x 1 ◄ |
| | | | | On | | | | Right coin mechanism x 2 |
| | | | | | Off | Off | Off | No bonus coins ◄ |
| | | | | | Off | On | Off | For every 4 coins inserted, logic adds 1 more coin |
| | | | | | On | On | Off | For every 4 coins inserted, logic adds 2 more coins |
| | | | | | Off | Off | On | For every 5 coins inserted, logic adds 1 more coin |
| | | | | | On | Off | On | For every 3 coins inserted, logic adds 1 more coin |
| | | | | | Off | On | On | No bonus coins |
| | | | | | On | On | On | No bonus coins |

◄*Manufacturer's recommended settings*

# A. Comments on Troubleshooting

When troubleshooting, first determine the symptom(s) of the failure. After determining the symptom, look over the wiring diagram and determine what assemblies could cause the failure. Could it be caused by the power supply, Regulator/Audio II printed-circuit board (PCB), or the video display?

The next step is to check all harness wires and connectors to the suspected assembly. If you do not find a harness or connector problem, substitute an assembly known to be good for the suspected failing assembly. If the game functions properly, you have successfully isolated the failure. If it doesn't, repeat the procedure with another assembly.

When you have isolated the failing assembly, you must troubleshoot that assembly and make the necessary repairs. If the video display fails, we suggest that a qualified video-display technician handle the troubleshooting and repair.

Be sure to refer to *The Book—A Guide to Electronic Game Operation and Servicing*, published by Atari, Inc., whenever you need help with the techniques, tools, and terminology associated with coin-operated electronic games.

To effectively troubleshoot a game PCB, learn as much as you can about the PCB. The diagrams in the *Schematic Package* (included with the game) show the functions of the circuitry. Again, while troubleshooting a PCB, first determine the symptom of the failure, then locate the suspected area on the schematic diagram.

# B. Performing the Self-Test

### *RAM and ROM Tests:*

**RAM test** occurs when you turn the game on. The test passes if the 1-player start switch is not lighted. If there is a failed RAM at location 2N, 2M, 3N, or 3M, the 1-player start switch will remain on. If there is a failed RAM at location 5D, 5E, 6D, or 6E, the 1-player start switch will flash on and off.

If the vector RAM and program ROM tests pass, the message *RAM OK* appears in the upper left corner of the screen.

**ROM test** occurs when you turn the game on, after the RAM test passes. The ROM test passes if the 2-player start switch is not lighted. If there is a failed ROM, the 2-player start switch will remain on. Table 2-1 lists the failed ROM and its location on the game PCB.

**Table 2-1 Locations of Failed ROM**

| Failed ROM Number | Location on Game PCB |
|---|---|
| 0,2 | 2E |
| 1,3 | 3E |
| 4,6 | 2F |
| 5,7 | 3F |
| 8,10 | 2H/J |
| 9,11 | 3H/J |
| 12,14 | 2K |
| 13,15 | 3K |
| 16,18 | 2L |
| 17,19 | 3L |

### *Select Function:*

Wait at least 10 seconds after playing a game before entering the Self-Test Mode. Set the self-test switch to *on* to start the Self-Test. See *Figure 1-2* for the location of the self-test switch. (To exit the Self-Test Mode, set the self-test switch to *off*.)

When Self-Test is started, the Self-Test Menu shown in Figure 2-1 appears. Each time you press the 1-player start switch, a different function is highlighted. Press the 2-player start switch to select a highlighted function.


**Figure 2-1 Self-Test Menu**

### *Statistics:*

Press the 2-player start switch when *STATISTICS* is highlighted and the Game Statistics screen shown in Figure 2-2 appears.

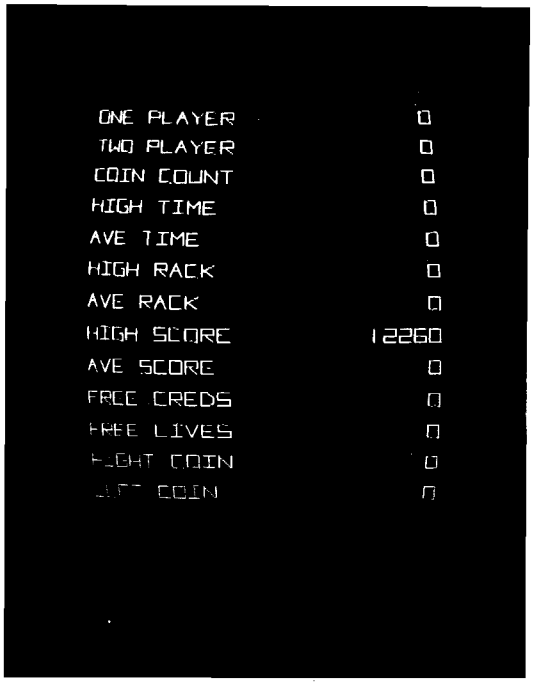



**Figure 2-2 Game Statistics**

To erase all statistics except the high-score table, return to the Self-Test Menu by pressing the 1- or 2-player start switch. Select *OPERATOR OPTIONS*. Set the *STATISTICS* option to *RESET*.

To erase the high-score table, set *HIGH SCORES* to *RESET*. Resetting the high score table does not clear credits. To clear credits, turn the game *off* and then *on*. To return to the Self-Test Menu, set the self-test switch *off* and then *on*.

### *Grids and Control Checks:*

To see the Diagonal Grid screen *(Figure 2-3)*, return to the Self-Test Menu and select *GRIDS AND CONTROL CHECKS*. The game displays the first of four possible screens for this test.

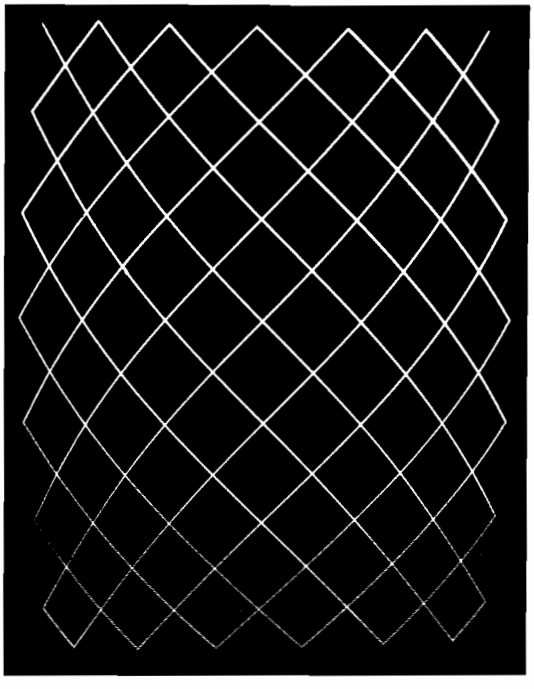


**Figure 2-3 Diagonal Grid**

This pattern is adjusted, set, and sealed at the factory, and not operator-adjustable.

To see the Horizontal/Vertical Grid screen *(Figure 2-4)*, press the 1- or 2-player start switch. To return to the Self-Test Menu, set the self-test switch *off* and then *on*.

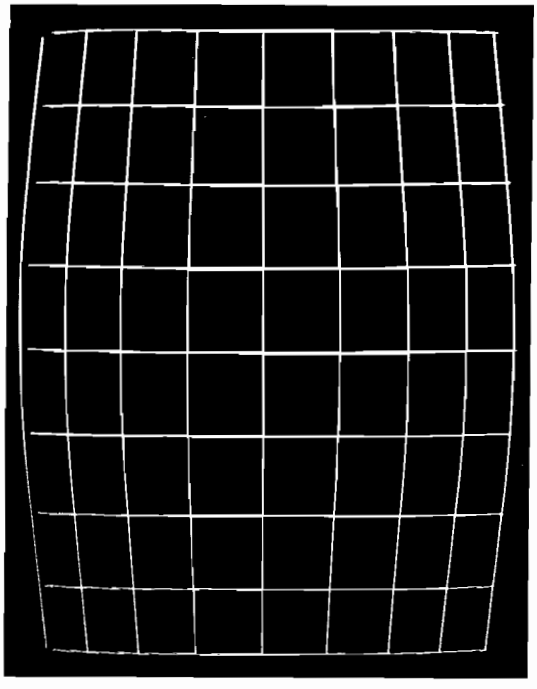


**Figure 2-4 Horizontal/Vertical Grid**

The outside grid lines should touch the sides and corners of the video display. Roll the Midi Trak-Ball™ to change colors. Use this pattern for setting the purity and convergence adjustments as described in the color X-Y display manual.

To see the Color Bar Pattern screen *(Figure 2-5)*, press the 1- or 2-player start switch. To return to the Self-Test Menu, set the self-test switch *off* and then *on*.

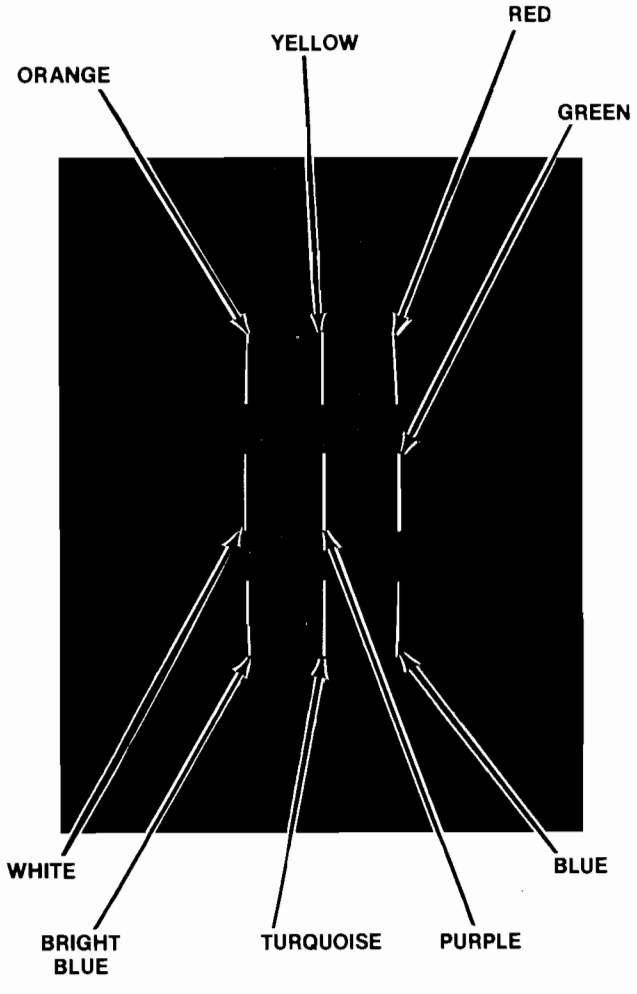



**Figure 2-5 Color Bar Pattern**

This screen tests orange, yellow, red, white, purple, green, bright blue, turquoise, and blue for color and intensity. Each group of vertical lines has the brightest color on the left and the dimmest on the right. Use this pattern for setting the tracking adjustments as described in the color X-Y video display manual.

To see the Game Switches screen *(Figure 2-6)*, press the 1- or 2-player start switch. To return to the Self-Test Menu, set the self-test switch *off* and then *on*.

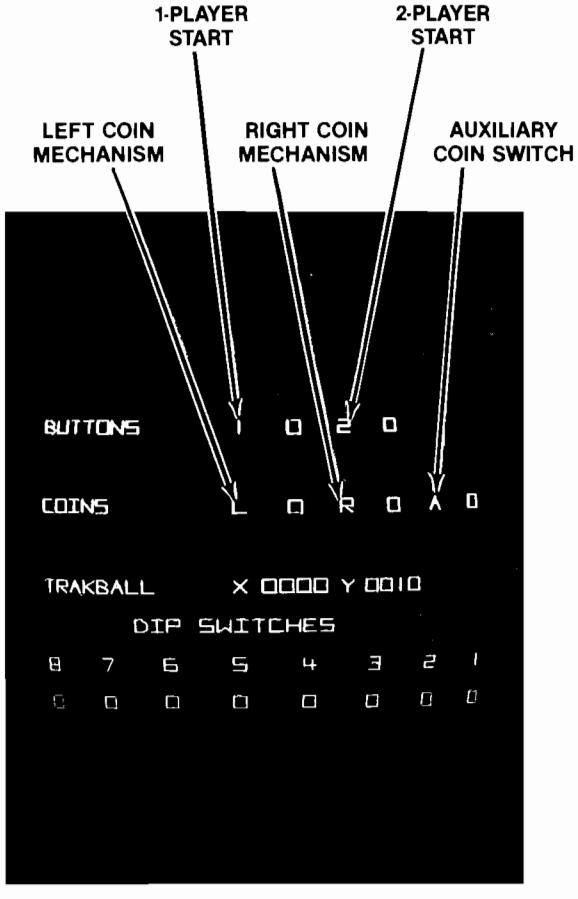



**Figure 2-6 Game Switches**

This screen tests game switches. Push and release the 1- and 2-player start switches and the auxiliary coin switch. Activate the left and right coin mechanisms, and roll the Midi Trak-Ball™. The corresponding *0* will change to *1* when the switches are closed.

Option switch settings are shown at the bottom of the screen. A *0* means the switch is *off*. A *1* means the switch is *on*. Refer to Table 1-1 for an explanation of option switches.

### *Operator Options*

To see the **SELECT OPTIONS** screen *(Figure 2-7)*, return to the Self-Test Menu and select *OPERATOR OPTIONS*. To move to the next option, press the 1-player start switch. To select a new value, roll the Midi Trak-Ball™. Press the 2-player start switch to replace the old value with the new value. Table 2-2 lists game options, their possible settings, and manufacturer's recommended settings.

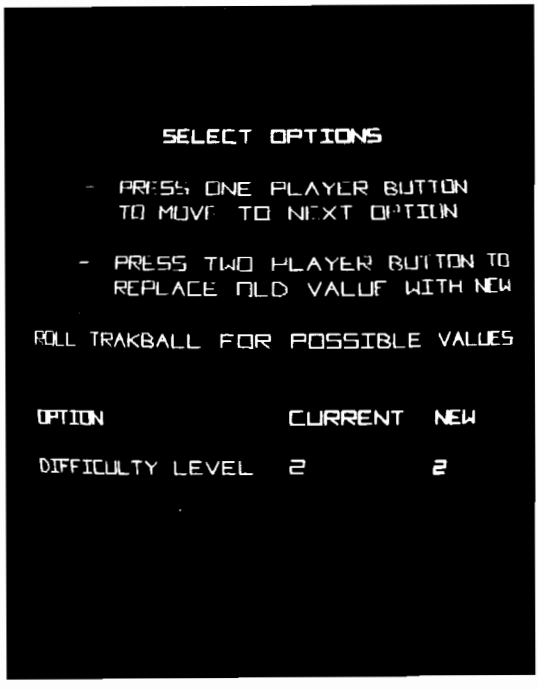



**Figure 2-7 Select Options**

## Table 2-2 Game Options

| Option | Possible Settings | Manufacturer's Recommended Setting |
|---|---|---|
| Difficulty Level | 1, 2, 3, 4, 5 | 2 |
| Language | English, French, German, Spanish | English |
| Lives per Game | 2, 3, 4, 5 | 3 |
| Signature | On, off, reset | On |
| High Scores | Keep, reset | Keep |
| Bonus 1 | First bonus at 0, 10,000, 15,000, 20,000, 25,000, 30,000, 50,000 | 25,000 |
| Bonus 2 | Additional bonus every 0, 10,000, 15,000, 20,000, 25,000, 30,000 | 50,000 |
| Statistics | Keep, reset | Keep |
| Cocktail Mode | No, yes | No |
| Coin Counters | 1, 2 | 1 |

The *SIGNATURE* option allows the player with the highest score to sign his name using the Midi Trak-Ball™. His name and score are transferred into the high-score table.

The entire high-score table is erased with the reset option. However, you may erase all except the three highest scores by turning the game *off*.

To end the Self-Test, set the self-test switch to *off*.

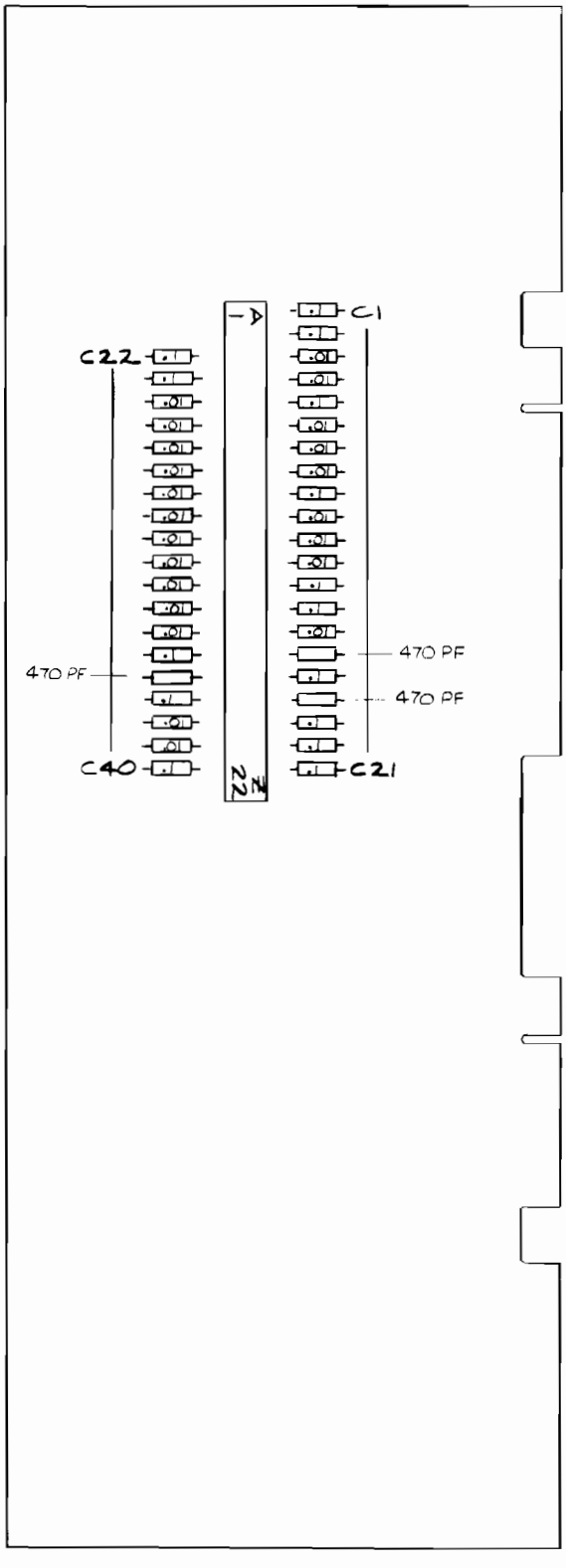
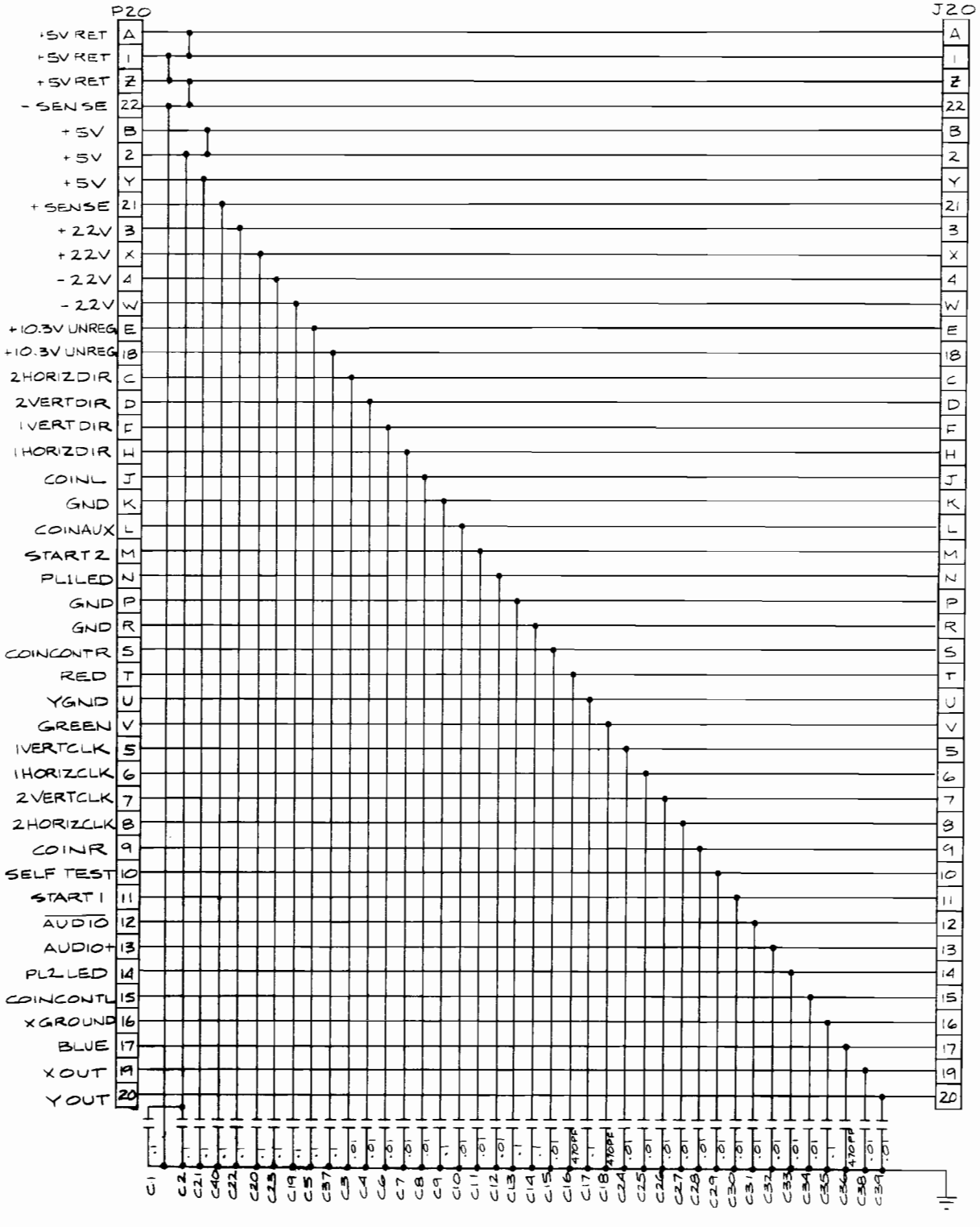



**Figure 4-11 EMI Shield PCB Assembly A037430-03 A**

# EMI Shield PCB Assembly
# Parts List

| *Designator* | *Description* | *Part No.* |
|---|---|---|
| | ***Capacitors*** | |
| C1, C2 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C3, C4 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C5 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C6-C8 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C9 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C10-C12 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C13, C14 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C15 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C16 | 470 pF, +80, -20%, 100 V Ceramic-Disk Radial-Lead Capacitor *Acceptable substitute is part no. 122013-471* | 122016-041 |
| C17 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C18 | 470 pF, +80, -20%, 100 V Ceramic-Disk Radial-Lead Capacitor *Acceptable substitute is part no. 122013-471* | 122016-471 |
| C19-C23 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C24-C34 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C35 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C36 | 470 pF, +80, -20%, 100 V Ceramic-Disk Radial-Lead Capacitor *Acceptable substitute is part no. 122013-471* | 122016-471 |
| C37 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| C38, C39 | 0.01 μF, +80, -20%, 25 V Ceramic-Disk Radial-Lead Capacitor | 122005-103 |
| C40 | 0.1 μF, +80, -20%, 50 V Ceramic-Disk Radial-Lead Capacitor | 122002-104 |
| | ***Connector*** | |
| P20 | 44-Pin Card-Edge Connector *Acceptable substitute is part no. 179046-044* | 179073-044 |




**EMI Shield PCB Schematic**
**(Supplements SP-221, 1st printing)**