BIPOLAR PROM ADAPTER READ THIS SHEET FIRST!

The BIPOLAR PROM ADAPTER (#ABIP) must be used with caution. The addendum which accompanies the adapter describes the precautions which must be followed for the successful use of the system. If the precautions are not followed the programming unit, the adapter or both may be damaged. Please review the following list:

1. **NEVER** install the adapter with AC power applied to the programming unit.
2. The adapter requires power from the programming unit ACCESSORY CONNECTOR. Connect the two wires (orange) to +5 and (yellow) to +35. The wires have push-on connectors. **NEVER** attach or remove the wires with AC power applied to the programming unit.
3. The 24 pin socket on the adapter is located at the corner. When you insert a device into the socket be sure that downward pressure does not cause the adapter to tilt down and disconnect from the programming unit socket. If this occurs remove power from the programming unit and reinstall the adapter.
4. Bipolar proms smaller than 24 pins are always inserted fully left justified in the 24 pin socket. The notch on the prom faces the red dot on the socket.

ABOUT BIPOLAR PROMS

This paragraph discusses reoccuring issues which are specific to bipolar proms. Please be sure that you understand the following items:

1. Bipolar proms cannot be erased. The information is stored in an array of small fuses inside the part. An unblown (intact or unprogrammed) fuse will read as a 00. A blown (programmed) fuse will read as a 01. Once a fuse is blown that bit in the memory array of the part is permanently set.
2. There are two configurations of bipolar prom; 4 bit and 8 bit. The EPROM+ software reads and programs **ALL** bipolar proms as 8 bit parts. If you are working with a 4 bit part, such as an 82S129 or 74S287 there will be 4 bits which will always read as 01 because they **DON'T EXIST**. If you read a new, unprogrammed, 8 bit part into the buffer and examine the contents with the editor (Command 5) you will see 00, 00, 00, 00, 00, 00, 00, 00 in the first 8 locations. If you read an unprogrammed 4 bit part you will see 00, 00, 00, 00, 01, 01, 01, 01 in the first 8 locations. This is because the last four 01s represent the bits not physically in the part. If you read with no prom installed in the adapter you will see 01, 01, 01 ,01, 01, 01, 01, 01 as no bits exist because no device is in the socket. Try it and see.
3. The EPROM+ system cannot perform a blank check on a 4 bit prom because four of the bits always appear to be programmed. When you instruct the system to program a part it will respond that the device is not erased and ask if a new device is installed. Respond with "N"o. When the system prompts with OVERRIDE? respond with "Y"es and the programming process will begin.

HOW TO TELL IF YOUR 4 BIT PART IS BLANK (UNPROGRAMMED)

1. From the MAIN SCREEN select the BUFFER EDITOR (Command 5). Type the following: F0<space>7FF<space>F0<enter>. Note that <space> is the space bar and <enter> is the ENTER key. The editor screen will display all F0. Press "#" then "+". This converts the F0 bytes into bits. The editor screen will now appear exactly as a blank (unprogrammed) 4 bit bipolar prom. Press "ESC" to exit the editor.
2. Install your 4 bit bipolar prom into the adapter. Select Command 8 (compare device with buffer) and respond with "Y"es to perform the compare. If the prom is blank the system will indicate 0 errors. If there are any errors the part is defective or has already been programmed. **NOTE**: Many electronic distributors will not test their bipolar proms before shipment. If parts have been returned to the distributor as defective, they may have been programmed by the previous customer. **BE AWARE** that just because a part is in a tube or appears to be new that the only way to truely tell is via the above procedure.

USING THE CONFIGURABLE BIPOLAR PROM SOCKET ADAPTER

The BIPOLAR PROM socket adapter allows the Andromeda Research programming system to read and program various manufacturers bipolar proms such as the Signetics 82SXXX and National 74SXXX families. The prom is read and programmed in a manner somewhat different from traditional EPROM devices. Since these chips require that only one bit be programmed at a time, the programming system uses one byte in the programming system buffer for each bit in the prom. This means that eight bytes in the programming systems buffer represent one byte in the prom. See below.

Byte 0 (57 HEX) in the PROM looks like (0 1 0 1 0 1 1 1 Binary)

In the programming systems buffer the same byte is represented as:
0000-01 0001-01 0002-01 0003-00 0004-01 0005-00 0006-01 0007-00 (these are hex values)

IMPORTANT: Note that only the least significant bit of each buffer byte is used. With this arrangement, the system buffer requires 8 times the actual number bytes that the prom contains. This representation of prom data is called **BIT** format. Note that there is a command in the buffer editor (the **# COMMAND**) which allows you to convert the contents of the first 2048 bytes of the buffer from bit format to byte and from byte to bit. This command is very useful and was created specifically for use with bipolar proms. It is fully described in the system manual.

INSTALLING AND CONNECTING THE ADAPTER *- (AC POWER PACK MUST NOT BE PLUGGED IN!)*

IMPORTANT WARNING: The adapter has 28 pins and must be inserted like a 28 pin device (justified to the left as you face the programming unit). Reference the illustration on the programming unit overlay. **If you install the adapter incorrectly, the adapter or the programming unit may be damaged.**

Install the adapter into the programming unit by lifting the handle on the programming unit socket to about 45 degrees and then inserting the pins on the adapter into the open socket pins. The adapter must be flat against the socket of the programming unit. Release the handle to lock the adapter in place. Note that the red dot on the adapter socket should be facing the same direction as the red dot on the programming unit socket.

Connect the wire (marked +5) on the adapter to the ACCESSORY CONNECTOR pin marked +5.

Connect the wire (marked Vpp UNREG or +35) to the ACCESSORY CONNECTOR pin marked +35.

With the adapter installed and connected, connect the power pack to the AC outlet. Start the control program (PEP). The program should identify the programming unit and assign the I/O PORT. You may now proceed.

To read a programmed prom, install it into the 24 pin ZIF socket (left justify devices smaller than 24 pins) and use Command 3 to read it into the system.

Once this is done, remove the original chip and insert a blank prom into the ZIF socket. Select Command 2 and instruct the programming system to program the device beginning at address 0 and ending with the device maximum size. (**Note**: You can find the device size by pressing the "S" command from the main menu or type **ALL** in place of the ending address). Note that the system will inform you that the device is not erased. This is normal for this type of chip. Answer "N" to the question "New device installed?" and "Y" to the "Override?" question. The system will begin programming the chip. After the programming process is complete the system will verify that the device programmed correctly. If everything operated properly, the chip in the adapter is an exact duplicate of the chip which was read into the system.

You may save a copy of the information in the original chip by using Command A and specifying a buffer range of 0 to the device size.

To remove the adapter from the system, disconnect the power-pack from the wall outlet, then disconnect the wires from the adapter to the programming unit and then remove the adapter.

PROGRAMMING ERRORS
A bipolar prom is programmed by applying a high voltage pulse to a specific bit in the device. This pulse physically causes a microscopic fuse to "BLOW" which sets the bit to a logic 1. Occasionally there will be fuses inside the device which do not blow the first time the device is programmed. If this occurs, you will see the system make up to five attempts (passes) to properly program the device. If after five attempts the part cannot be programmed, the system assumes the part is defective.

READING AND PROGRAMMING OTHER BIPOLAR PROMS

This adapter will also read various pin compatible bipolar proms however it will only program the 82S and 74S types. (**NOTE:**The part number printed on the device must be 82SXXX or 74SXXX or the device will not program.) If you have a device that cannot be programmed using the adapter, you may read the device and then program the contents into an 82S or 74S pin compatible substitute.

NOTE: Manufacturers of bipolar proms may change their device programming requirements. If you encounter a situation where a supported device will not program correctly, try a different device from a different manufacturer.

CONFIGURING THE ADAPTER

The BIPOLAR PROM adapter is user configurable using a 48 pin JUMPER BLOCK next to the 24 pin device socket. The JUMPER BLOCK allows the device socket pins to be routed to any adapter signal pin. The different types of bipolar proms have device inputs and outputs on different pins. The JUMPER BLOCK allows the adapter to be configured to connect the current adapter programming signal to the corresponding bipolar prom pin.

To configure the adapter for a specific bipolar prom, refer to the BIPOLAR PROM JUMPER BLOCK CONFIGURA-TIONS page. This page illustrates the JUMPER BLOCK connection arrangement for all supported devices. The adapter is shipped configured for the device type specified when the adapter was ordered. If no device was specified, the adapter is configured for the 32X8 prom. If you alter the configuration of the adapter, you may do so using 22 gauge solid wires or solder wires to removable DIP headers which are inserted into the JUMPER BLOCK.

The JUMPER BLOCK configurations on the configuration sheet illustrate the necessary interconnections. The column on the left shows the adapter programming signals. The column on the right are the connection points for the 24 pin device socket. Connect the signal designator in the left column to the corresponding (matching) pin designator on the right. This is all that is required to configure the adapter. Note that for 32X8 proms the configuration designators are directly adjacent to each other. Note that not all pins are used for all devices.

ADJUSTING THE PROGRAMMING VOLTAGES (see figure below)

The adapter is initially set to program the 74S series of bipolar prom. This series of devices programs with Vbit and VccP set to 11.5 volts. Most of the 82S series of bipolar proms will also program at this voltage. Some of the older 82S family of proms required that Vbit be set to 18.0 volts and VccP be set to 8.7 volts. If you encounter an 82S device or series of 82S devices which do not program at all or only program partially, you may adjust the Vbit and VccP signal voltages. To adjust the voltages, install the adapter and apply power to the system. Connect the positive lead of a voltmeter to the tip of the 1.5K (brown, green, red, gold) resistor next to the 317 regulator which corresponds to the voltage you wish to change. Connect the negative lead to the GND pin on the ACCESSORY CONNECTOR. Turn the adjustment on the top of the corresponding 1 turn pot shown on the figure until the voltage reaches the desired level. Note that these voltage settings are not critical and can be +/- .2 volts.

CONFIGURABLE BIPOLAR PROM ADAPTER
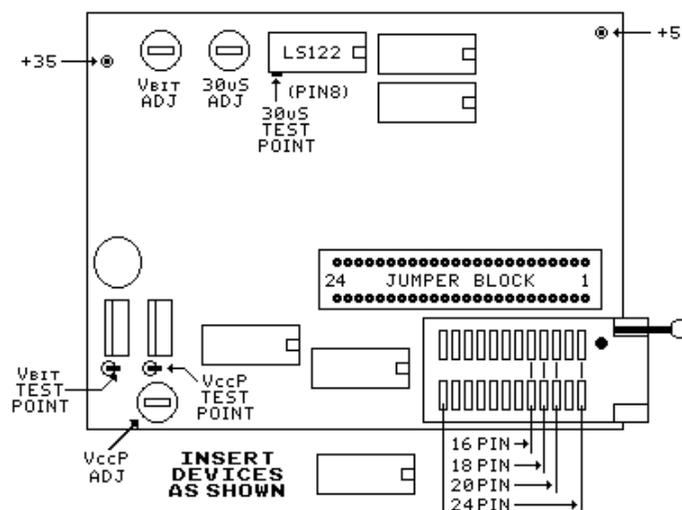
BIPOLAR PROM JUMPER BLOCK CONFIGURATIONS

(TOP VIEW WITH 24 PIN ZIF SOCKET ON RIGHT)

32X8 PROMS (16 PIN)

82S23
82S123
74S188
74S288

```
VccP - [1]    S20[1] - VccP
(+5) - [2]     S4[2] -
 B0 - [3]      S5[3] - B0
 B1 - [4]      S6[4] - B1
 B2 - [5]      S7[5] - B2
 B3 - [6]      S8[6] - B3
 B4 - [7]      S9[7] - B4
 B5 - [8]     S10[8] - B5
 B6 - [9]     S11[9] - B6
 B7 - [10]    S13[10] - B7
GND - [11]     NC [11]
GND - [12]     S3[12] -
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] -
 A4 - [18]    S18[18] - A4
 A3 - [19]    S17[19] - A3
 A2 - [20]    S16[20] - A2
 A1 - [21]    S15[21] - A1
 A0 - [22]    S14[22] - A0
A10 - [23]    S19[23] -
 CE̅ - [24]    S19[24] - CE̅
```

256X4 PROMS (16 PIN)

82S126
82S129
74S287
74S387

```
VccP - [1]    S20[1] - VccP
(+5) - [2]     S4[2] -
 B0 - [3]      S5[3] - A6
 B1 - [4]      S6[4] - A5
 B2 - [5]      S7[5] - A4
 B3 - [6]      S8[6] - A3
 B4 - [7]      S9[7] - A0
 B5 - [8]     S10[8] - A1
 B6 - [9]     S11[9] - A2
 B7 - [10]    S13[10] - B3
GND - [11]     NC [11]
GND - [12]     S3[12] -
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] -
 A4 - [18]    S18[18] - A4
 A3 - [19]    S17[19] - A3
 A2 - [20]    S16[20] - A2
 A1 - [21]    S15[21] - A1
 A0 - [22]    S14[22] - A0
A10 - [23]    S19[23] - A7
 CE̅ - [24]    S19[24] -
```

512X4 PROMS (16 PIN)

82S130
82S131
74S570
74S571

```
VccP - [1]    S20[1] - VccP
(+5) - [2]     S4[2] -
 B0 - [3]      S5[3] - A6
 B1 - [4]      S6[4] - A5
 B2 - [5]      S7[5] - A4
 B3 - [6]      S8[6] - A3
 B4 - [7]      S9[7] - A0
 B5 - [8]     S10[8] - A1
 B6 - [9]     S11[9] - A2
 B7 - [10]    S13[10] - B3
GND - [11]     NC [11]
GND - [12]     S3[12] -
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] -
 A4 - [18]    S18[18] - GND
 A3 - [19]    S17[19] - CE̅
 A2 - [20]    S16[20] - B0
 A1 - [21]    S15[21] - B1
 A0 - [22]    S14[22] - B2
A10 - [23]    S19[23] - A7
 CE̅ - [24]    S19[24] -
```

512X8 PROMS (20 PIN)

82S146
82S147
74S472
74S473

```
VccP - [1]    S20[1] - A7
(+5) - [2]     S4[2] - A1
 B0 - [3]      S5[3] - A2
 B1 - [4]      S6[4] - A3
 B2 - [5]      S7[5] - A4
 B3 - [6]      S8[6] - B0
 B4 - [7]      S9[7] - B1
 B5 - [8]     S10[8] - B2
 B6 - [9]     S11[9] - B3
 B7 - [10]    S13[10] - B4
GND - [11]     NC [11]
GND - [12]     S3[12] - A0
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] - VccP
 A7 - [17]    S21[17] - A8
 A4 - [18]    S18[18] - A5
 A3 - [19]    S17[19] - CE̅
 A2 - [20]    S16[20] - B7
 A1 - [21]    S15[21] - B6
 A0 - [22]    S14[22] - B5
A10 - [23]    S19[23] - A6
 CE̅ - [24]    S19[24] -
```

256X8 PROMS (20 PIN)

74LS471
82LS135

```
VccP - [1]    S20[1] - A6
(+5) - [2]     S4[2] - A1
 B0 - [3]      S5[3] - A2
 B1 - [4]      S6[4] - A3
 B2 - [5]      S7[5] - A4
 B3 - [6]      S8[6] - B0
 B4 - [7]      S9[7] - B1
 B5 - [8]     S10[8] - B2
 B6 - [9]     S11[9] - B3
 B7 - [10]    S13[10] - B4
GND - [11]     NC [11]
GND - [12]     S3[12] - A0
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] - VccP
 A7 - [17]    S21[17] - A7
 A4 - [18]    S18[18] - GND
 A3 - [19]    S17[19] - CE̅
 A2 - [20]    S16[20] - B7
 A1 - [21]    S15[21] - B6
 A0 - [22]    S14[22] - B5
A10 - [23]    S19[23] - A5
 CE̅ - [24]    S19[24] -
```

512X8 PROMS (24 PIN)

82S140
82S141
74S474
74S475

```
VccP - [1]    S20[1] - GND
(+5) - [2]     S4[2] - A4
 B0 - [3]      S5[3] - A3
 B1 - [4]      S6[4] - A2
 B2 - [5]      S7[5] - A1
 B3 - [6]      S8[6] - A0
 B4 - [7]      S9[7] - B0
 B5 - [8]     S10[8] - B1
 B6 - [9]     S11[9] - B2
 B7 - [10]    S13[10] - B3
GND - [11]     NC [11]
GND - [12]     S3[12] - A5
 A9 - [13]     S2[13] - A6
 A6 - [14]     S1[14] - A7
 A5 - [15]    S23[15] - A8
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] - CE̅
 A4 - [18]    S18[18] - (+5)
 A3 - [19]    S17[19] - B7
 A2 - [20]    S16[20] - B6
 A1 - [21]    S15[21] - B5
 A0 - [22]    S14[22] - B4
A10 - [23]    S19[23] - (+5)
 CE̅ - [24]    S19[24] -
```

1024X4 PROMS (18 PIN)

82S136
82S137
74S572
74S573

```
VccP - [1]    S20[1] - A7
(+5) - [2]     S4[2] - A6
 B0 - [3]      S5[3] - A5
 B1 - [4]      S6[4] - A4
 B2 - [5]      S7[5] - A3
 B3 - [6]      S8[6] - A0
 B4 - [7]      S9[7] - A1
 B5 - [8]     S10[8] - A2
 B6 - [9]     S11[9] - GND
 B7 - [10]    S13[10] - CE̅
GND - [11]     NC [11]
GND - [12]     S3[12] -
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] - VccP
 A4 - [18]    S18[18] - A9
 A3 - [19]    S17[19] - B7
 A2 - [20]    S16[20] - B0
 A1 - [21]    S15[21] - B2
 A0 - [22]    S14[22] - B3
A10 - [23]    S19[23] - A8
 CE̅ - [24]    S19[24] -
```

2048X4 PROMS (18 PIN)

82S184
82S185

```
VccP - [1]    S20[1] - A7
(+5) - [2]     S4[2] - A6
 B0 - [3]      S5[3] - A5
 B1 - [4]      S6[4] - A4
 B2 - [5]      S7[5] - A3
 B3 - [6]      S8[6] - A0
 B4 - [7]      S9[7] - A1
 B5 - [8]     S10[8] - A2
 B6 - [9]     S11[9] - A10
 B7 - [10]    S13[10] - CE̅
GND - [11]     NC [11]
GND - [12]     S3[12] -
 A9 - [13]     S2[13] -
 A6 - [14]     S1[14] -
 A5 - [15]    S23[15] -
 A8 - [16]    S22[16] -
 A7 - [17]    S21[17] - VccP
 A4 - [18]    S18[18] - A9
 A3 - [19]    S17[19] - B0
 A2 - [20]    S16[20] - B1
 A1 - [21]    S15[21] - B2
 A0 - [22]    S14[22] - B3
A10 - [23]    S19[23] - A8
 CE̅ - [24]    S19[24] -
```

1024X8 PROMS (24 PIN)

82S180
82S181
74S478
74S479

```
VccP - [1]    S20[1] - GND
(+5) - [2]     S4[2] - A4
 B0 - [3]      S5[3] - A3
 B1 - [4]      S6[4] - A2
 B2 - [5]      S7[5] - A1
 B3 - [6]      S8[6] - A0
 B4 - [7]      S9[7] - B0
 B5 - [8]     S10[8] - B1
 B6 - [9]     S11[9] - B2
 B7 - [10]    S13[10] - B3
GND - [11]     NC [11]
GND - [12]     S3[12] - A5
 A9 - [13]     S2[13] - A6
 A6 - [14]     S1[14] - A7
 A5 - [15]    S23[15] - A8
 A8 - [16]    S22[16] - A9
 A7 - [17]    S21[17] - CE̅
 A4 - [18]    S18[18] - (+5)
 A3 - [19]    S17[19] - B7
 A2 - [20]    S16[20] - B6
 A1 - [21]    S15[21] - B5
 A0 - [22]    S14[22] - B4
A10 - [23]    S19[23] - (+5)
 CE̅ - [24]    S19[24] -
```

2048X8 PROMS (24 PIN)

82S190
82S191

```
VccP - [1]    S20[1] - CE̅
(+5) - [2]     S4[2] - A4
 B0 - [3]      S5[3] - A3
 B1 - [4]      S6[4] - A2
 B2 - [5]      S7[5] - A1
 B3 - [6]      S8[6] - A0
 B4 - [7]      S9[7] - B0
 B5 - [8]     S10[8] - B1
 B6 - [9]     S11[9] - B2
 B7 - [10]    S13[10] - B3
GND - [11]     NC [11]
GND - [12]     S3[12] - A5
 A9 - [13]     S2[13] - A6
 A6 - [14]     S1[14] - A7
 A5 - [15]    S23[15] - A8
 A8 - [16]    S22[16] - A9
 A7 - [17]    S21[17] - A10
 A4 - [18]    S18[18] - (+5)
 A3 - [19]    S17[19] - B7
 A2 - [20]    S16[20] - B6
 A1 - [21]    S15[21] - B5
 A0 - [22]    S14[22] - B4
A10 - [23]    S19[23] - (+5)
 CE̅ - [24]    S19[24] -
```

BIPOLAR PROM PIN CONFIGURATION INFORMATION

32X8 PROMS

74S188
74S288
82S23
82S123

```
B0 -[1] S5    S20[16]- VccP
B1 -[2] S6    S19[15]- CE
B2 -[3] S7    S18[14]- A4
B3 -[4] S8    S17[13]- A3
B4 -[5] S9    S16[12]- A2
B5 -[6] S10   S15[11]- A1
B6 -[7] S11   S14[10]- A0
GND-[8]       S13[9] - B7
```

256X4 PROMS

74S287
74S387
82S126
82S129

```
A6 -[1] S5    S20[16]- VccP
A5 -[2] S6    S19[15]- A7
A4 -[3] S7    S18[14]- CE2(GND)
A3 -[4] S8    S17[13]- CE1
A0 -[5] S9    S16[12]- B0
A1 -[6] S10   S15[11]- B1
A2 -[7] S11   S14[10]- B2
GND-[8]       S13[9] - B3
```

512X4 PROMS

74S570
74S571
82S130
82S131

```
A6 -[1] S5    S20[16]- VccP
A5 -[2] S6    S19[15]- A7
A4 -[3] S7    S18[14]- A8
A3 -[4] S8    S17[13]- CE1
A0 -[5] S9    S16[12]- B0
A1 -[6] S10   S15[11]- B1
A2 -[7] S11   S14[10]- B2
GND-[8]       S13[9] - B3
```

1024X4 PROMS

74S572
74S573
82S136
82S137

```
A6  -[1] S4    S21[18]- VccP
A5  -[2] S5    S20[17]- A7
A4  -[3] S6    S19[16]- A8
A3  -[4] S7    S18[15]- A9
A0  -[5] S8    S17[14]- B0
A1  -[6] S9    S16[13]- B1
A2  -[7] S10   S15[12]- B2
CE1 -[8] S11   S14[11]- B3
GND -[9]       S13[10]- CE2
```

2048X4 PROMS

82S184
82S185

```
A6  -[1] S4    S21[18]- VccP
A5  -[2] S5    S20[17]- A7
A4  -[3] S6    S19[16]- A8
A3  -[4] S7    S18[15]- A9
A0  -[5] S8    S17[14]- B0
A1  -[6] S9    S16[13]- B1
A2  -[7] S10   S15[12]- B2
A10 -[8] S11   S14[11]- B3
GND -[9]       S13[10]- CE
```

512X8 PROMS

74S472
74S473
82S146
82S147

```
A0 -[1] S3     S22[20]- VccP
A1 -[2] S4     S21[19]- A8
A2 -[3] S5     S20[18]- A7
A3 -[4] S6     S19[17]- A6
A4 -[5] S7     S18[16]- A5
B0 -[6] S8     S17[15]- CE
B1 -[7] S9     S16[14]- B7
B2 -[8] S10    S15[13]- B6
B3 -[9] S11    S14[12]- B5
GND-[10]       S13[11]- B4
```

512X8 PROMS

74S474
74S475
82S140
82S141

```
A7 -[1]  S1          [24]- VccP
A6 -[2]  S2    S23[23]- A8
A5 -[3]  S3    S22[22]- NC
A4 -[4]  S4    S21[21]- CE1
A3 -[5]  S5    S20[20]- CE2(GND)
A2 -[6]  S6    S19[19]- CE3(+5)
A1 -[7]  S7    S18[18]- CE4(+5)
A0 -[8]  S8    S17[17]- B7
B0 -[9]  S9    S16[16]- B6
B1 -[10] S10   S15[15]- B5
B2 -[11] S11   S14[14]- B4
GND-[12]       S13[13]- B3
```

1024X8 PROMS

74S478
74S479
82S180
82S181

```
A7 -[1]  S1          [24]- VccP
A6 -[2]  S2    S23[23]- A8
A5 -[3]  S3    S22[22]- A9
A4 -[4]  S4    S21[21]- CE1
A3 -[5]  S5    S20[20]- CE2(GND)
A2 -[6]  S6    S19[19]- CE3(+5)
A1 -[7]  S7    S18[18]- CE4(+5)
A0 -[8]  S8    S17[17]- B7
B0 -[9]  S9    S16[16]- B6
B1 -[10] S10   S15[15]- B5
B2 -[11] S11   S14[14]- B4
GND-[12]       S13[13]- B3
```

2048X8 PROMS

82S190
82S191

```
A7 -[1]  S1          [24]- VccP
A6 -[2]  S2    S23[23]- A8
A5 -[3]  S3    S22[22]- A9
A4 -[4]  S4    S21[21]- A10
A3 -[5]  S5    S20[20]- CE1
A2 -[6]  S6    S19[19]- CE2(+5)
A1 -[7]  S7    S18[18]- CE3(+5)
A0 -[8]  S8    S17[17]- B7
B0 -[9]  S9    S16[16]- B6
B1 -[10] S10   S15[15]- B5
B2 -[11] S11   S14[14]- B4
GND-[12]       S13[13]- B3
```