PK-232/DSP MULTI-MODE CONTROLLER OPERATION

Welcome to the world of Digital Signal Processing. You may be acquainted with DSP in your new radio, or you may have a Timewave Technology DSP unit in your shack. Now you have DSP capability for your PK-232 digital modes. Here are the most frequently Asked Questions (FAQ's) we have been getting.

What exactly have I bought? The DSP board you have installed provides a proven set of DSP Brick Wall data filters to your PK-232MBX. These are:

45 Baud Baudot Twin Peak filter for RTTY
100/200 CW filters (Jumper selected, Shipped with jumper on, set at 200)
100/200 Adaptive PACTOR filters
100 Baud AMTOR/NAVTEXT
300 Baud HF Packet
1200 Baud UHF/VHF Packet
European/American Tone Set (Jumper selected, Shipped with jumper off, American Tones)
WEFAX
SIAM

Can I use my existing software? In a word, YES. The new firmware provides all the control necessary to select the proper filter, even switching between 100 and 200 baud PacTOR filters as the PK-232/DSP changes the baud rate to accommodate changes in the transmission path.

What should I expect from the new board? DSP provides sharper skirts that reduce the noise in the band pass as well as rejecting interference from adjacent signals. In RTTY this can improve error rates up to 100 times in weak signal and noisy environments. Tune slowly, signals will appear to just pop out of the noise. We suggest you start with a fairly wide filter setting in your radio and cascade that with the narrower filter of the Multi-Mode Controller.

What else has changed? The small red LED on the board will light when a signal overloads the DSP input (Note that a remote light can be tied to Jumper next to the overload LED). The startup sequence is also new, notice that an extra set of lights blink during startup. This tells you the version 7.2 firmware is installed.

Timewave Technology
Visit our web page: http://www.timewave.com to download a demo copy of our PK-Term'99 program.

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PLEASE READ THIS BEFORE INSTALLATION

INSTALLATION INSTRUCTIONS ADDENDUM

Before you start the installation on your PK-232MBX upgrade, please inspect the daughter-board. There are 2 28-pin double headers that plug the daughter-board into the PK-232 main circuit board. Take a minute and inspect this header and make sure the pins are not bent or badly aligned.

When you reach the point in the installation instructions asking you to “place the Pakmail daughter-board over the standoffs” make very certain that the pins of both headers align exactly over the main board sockets of U-2 and U-4.

After installing the Pakmail-board double check the alignment. Make certain the first row of the header pins is in the first row of IC socket holes, not one row behind.

Replacement headers are $6.00 each, plus shipping and handling.

73

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INSTALLATION INSTRUCTIONS
PK-232 PAKMAIL BOARD

With LITHIUM BATTERY

Thank you for purchasing the PakMail Upgrade for your PK-232/HK-232. The following instructions are to assist you with the installation on the PakMail daughter-board and the lithium battery. Please read these instructions completely before beginning this project.

PARTS LIST AND TOOLS

Your upgrade kit should contain, the following parts:

QTY	PART DESCRIPTION
1	PakMail daughter-board
1	Lithium Battery
1	PK-232MBX Manual
2	Stand-offs, male by female threads, 6-32 x ½
1	Warranty Card

You will need the following tools to perform this installation:

#2 Phillips screwdriver
Small flat-blade screwdriver
Pencil type soldering iron
Portable desoldering tool (solder remover)
1/4'inch nut driver - OR – 1/4 inch wrench
Small wire cutters
Small needle-nose pliers

PAKMAIL DAUGHTER-BOARD

Prepare a clean work area that is as static-free as possible.

-NOTICE-

Be sure to discharge any static build-up you may have incurred by touching a grounded appliance before proceeding.

Remove the PK-232 top cover by removing the six screws. Remove any AA batteries that may be installed in the top cover battery holder. Remove the three-cell battery holder by grasping firmly and twisting the battery holder off (if the battery holder is held by adhesive, some early PK-232's had battery holders screwed to the top cover). Cut the battery leads about six inches above the printed circuit board. Grasp each wire with the needle nose pliers and heat the solder connections on the board. When the solder has been heated, pull the wires out.

Using the soldering pencil and the desoldering tool, remove the old solder from the points where the battery wires were attached to the printed circuit board.

CAUTION: DO NOT TRY TO PRY THE SOCKET OFF THE BOARD. Be sure that you are working with the EPROM itself.

Using the small flat blade screwdriver, remove the following, socketed IC's from the PK-232 and set aside. Keep these parts in a safe place.

EPROM U-2 At this time, make a mental note as to the
EPROM U-3* location of the now empty sockets U-2 and U-4.
RAM U-4*
RAM U-5
Note: To install in older PK-232 and Heathkit HK-232 units, move jumper JP7 to JP8.
* These Parts may NOT be in your PK-232.

With the front panel of the PK-232 facing you, remove the two screws that hold the PK-232 printed circuit board to the bottom chassis that are located in the left rear and left front part of the board. Screw the male threads of each of the stand-offs in place of the two screws just removed. Now place the PakMail daughter-board along the left side of the PK-232, with the notch on the daughter-board towards the front.

Locate resistor R-186 on the PK-232 mother board Fig. 1. Solder the wire from the PakMail daughter-board to the LEFT side of resistor R-186 on the PK-232 mother-board. See Fig. 1.

Make sure that sockets U2, U3, U4 and U5 on the PK-232 motherboard are empty. Now place the PakMail daughter-board over the stand-offs. The two 28-pin plugs on the bottom of the PakMail board will be inserted into the now empty sockets U-2 and U-4. Line up all of the pins before pressing the daughter-board into place.

Attach the PakMail daughter-board to the stand-offs with the two screws you removed from the PK-232 motherboard earlier. This completes the installation of the PakMail daughter-board.

LITHIUM BATTERY

NOTE:

Some PK-232's may already have a lithium battery installed. If yours is one of these, disregard these instructions.

Locate the lithium battery. Observe that one side of this battery is labeled as the POSITIVE side.

- WARNING -
Do NOT short the leads of a lithium battery.
Do NOT dispose of in a fire.
Do NOT reverse polarity when installing a lithium battery.

Applying heat directly to the lithium battery or installing the battery backwards can cause damage to you and the PK-232. Use extreme caution. Timewave Technology Inc. will not be liable for any damage caused by improper installation.

Overheating the battery or reversing the polarity may cause damage to you or your PK-232. Please use care when installing the battery. Make sure that the battery has been installed properly. Be sure to use a pencil type soldering iron when installing the lithium battery. Please use extreme caution.

Cut the lead length of the lithium battery to 1/4 inch. Failure to trim the battery lead length may result in a short between the two battery terminals against the PK-232 bottom panel. See warning above.

Install the lithium battery in the two holes where the battery wires were. Of the two holes on the printed circuit board, the hole closest to jumper JP-l is the positive battery terminal. This battery may be soldered in from the component side of the board. Jumper JP-1 is used to isolate the battery from the circuit. If the jumper is covering both pins, then the battery IS in the circuit, and hence the PK-232MBX parameters will be stored in the PK-232 when power is removed. To take the battery out of the circuit, remove the jumper and replace on only one of the two pins.

Should jumper JP-1 be left on or off?

If you are going to be using the program PC-PakRatt for Windows or PK-Term'99, it is best to leave the battery out of circuit (Jumper JP-1 off). For all other applications, (COM-PakRatt, MacRatt or dumb terminal) leave the battery in circuit (Jumper JP-1 on).

This completes the installation of the lithium battery.

RE-ASSEMBLY

Replace the PK-232 top cover with the six screws.

PLEASE READ THIS BEFORE DSP BOARD INSTALLATION

INSTALLATION INSTRUCTIONS ADDENDUM

Before you start the installation on your PK-232/DSP upgrade, please inspect the DSP daughter-board. There is a 40-pin double header that plugs the daughter-board onto the PK-232 main circuit board. Take a minute and inspect this header and make sure the pins are not bent or badly aligned.

When you reach the point in the installation instructions asking you to “place the DSP daughter-board over the standoff” make very certain that the pins of the header are aligned exactly over the main board socket U-6.

After installing the DSP-board, double check the alignment of the daughter-board and socket on the main board. Make certain the first row of the header pins is in the first row of IC socket holes, not one row behind.

Replacement headers are $8.00 each, plus shipping and handling.

73

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READ CAREFULLY BEFORE STARTING INSTALLATION

INSTALLATION INSTRUCTIONS
PK-232/DSP BOARD

Thank you for purchasing the DSP upgrade for your PK-232MBX. The following instructions are to assist you with the installation of the DSP daughter-board. Please read these instructions completely before beginning this project.

PARTS LIST AND TOOLS

QTY PART DESCRIPTION

1 DSP daughter-board (A.06225)
1 Standoff

You will need the following tools to perform this Installation.

#2 Phillips screwdriver
Small flat blade screwdriver
Needle nose pliers
Small wire cutters or nippers
1/4" nut driver
Solder iron or pencil (Do not use a solder gun)
Solder

Please take a minute and make certain that the PK-232 you are upgrading is a PK-232MBX. If the unit you have was built as a PK-232MBX (Fig. B) skip to the next paragraph. If you are upgrading a PK-232 or PK-232 that has been upgraded to an MBX with an older wide board (Fig. A) you should replace that board with the narrow board supplied with this kit. The newer style narrow board is identified by the part number A.06239A. After installing the MBX upgrade, test the unit briefly before proceeding with the DSP upgrade.

Prepare a clean work area that is as static free as possible.

IMPORTANT NOTICE

Be sure to discharge any static build-up you may have incurred by touching a grounded appliance before proceeding.

1) Remove all cables and power from the PK-232.

2) Remove the top cover by removing the 6 screws from the side and back of the unit. Position the unit with the front toward you.

3) Determine if you have an old or new style board. Old boards have four 28 pin IC sockets running down the left side of the motherboard. New boards have three 28 pin IC sockets running down the

left side of the board (see figure B).

4) Locate and remove C-54 (located to the left of the fuse) using the wire cutters or nippers. (see fig. 3)

5) Using the flat blade of the screwdriver, carefully remove U6 from its socket and set aside. (Note how the chip is oriented in the socket, notch to the left as viewed from the front).

CAUTION: DO NOT TRY TO PRY THE SOCKET OFF THE BOARD. Be sure that you are working with the EPROM itself.

6) Using the Phillips screwdriver, remove the front center screw from the board and set the screw aside.

7) Install the standoff into the hole in the front where you just remove the screw. Secure the standoff with the 1/4" nut driver. **DO NOT OVER TIGHTEN.** This may damage the board or break the standoff.

8) Place the DSP board (part number A.063225) over the U6 socket. Be sure all 40 pins of the DSP board are aligned with the 40 holes of the socket U6. Press down firmly to seat the DSP board. Recheck the alignment of the pins into the socket.

9) Secure the DSP board with the screw set aside in step 5. **DO NOT OVER TIGHTEN.**

10) With the notch to the left, place U6 (removed in step 5) in the socket on the DSP board and After checking U6 to make sure all the pins are correctly aligned, press the chip firmly down. Check carefully that all pins are in the socket and not folded nor bent).

11) Starting with the left side wire on the DSP board. Attach this wire to R-186 (330 ohms Orange, Orange, Brown). Bend the wire in a “U” around lead of R-186, then press the ends of the “U” together using the needle nose pliers. If your PK-232 board is an “old” style board attach the wire to the left side of R-186 see fig 1. If your board is a “new” style board attaches the wire to the bottom (Toward the front) of R-186. Solder the connection. See fig. 2

12) The center wire is attached to the top lead of R-34 (10K ohms, Brown, Black, Orange) see fig. 4. Use the same “U” bend technique to attach the wire that you used on R-186. Solder.

13) T he right side wire is attached to the second pin from the top on the right side of the radio switch (SW2). Again make the “U” bend and attach the wire to the pin, then press the “U” together to make a strong mechanical attachment, Finish by soldering the connection. See fig 5. If the switch in yor PK-232 does not have external lugs the wire can be attached to the back pad of C-54 (C-54 was removed in step 4)

14) Replace the top cover and install the six screws removed in step 2.

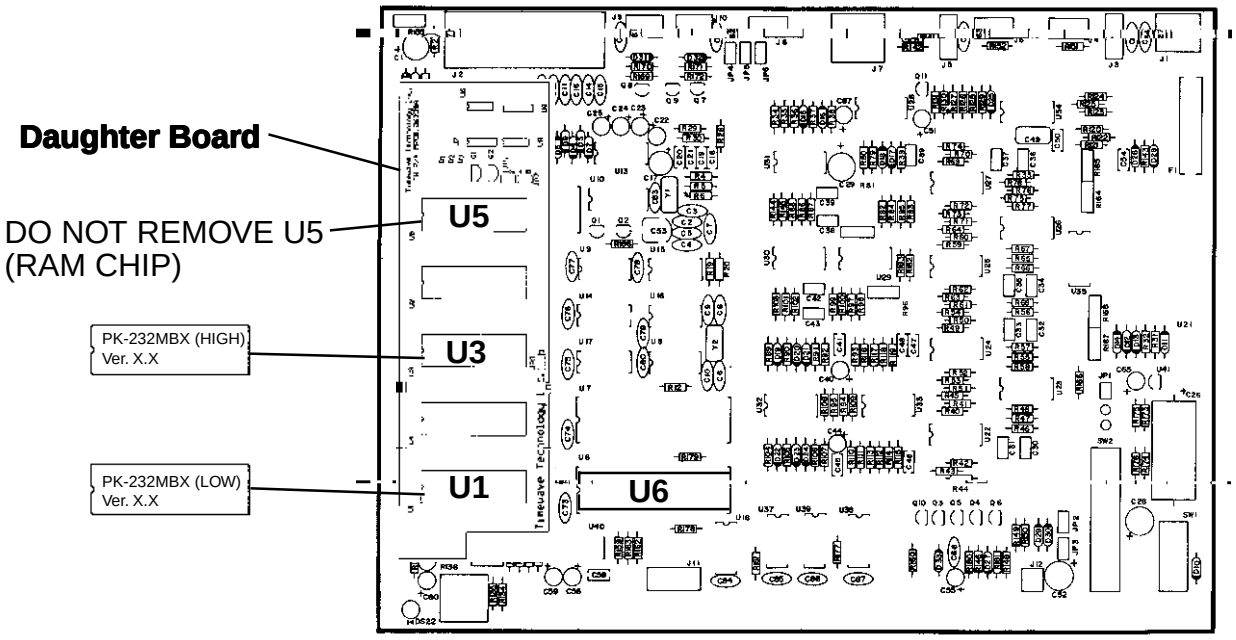


Figure A - PK-232 Main board with MBX daughter board installed

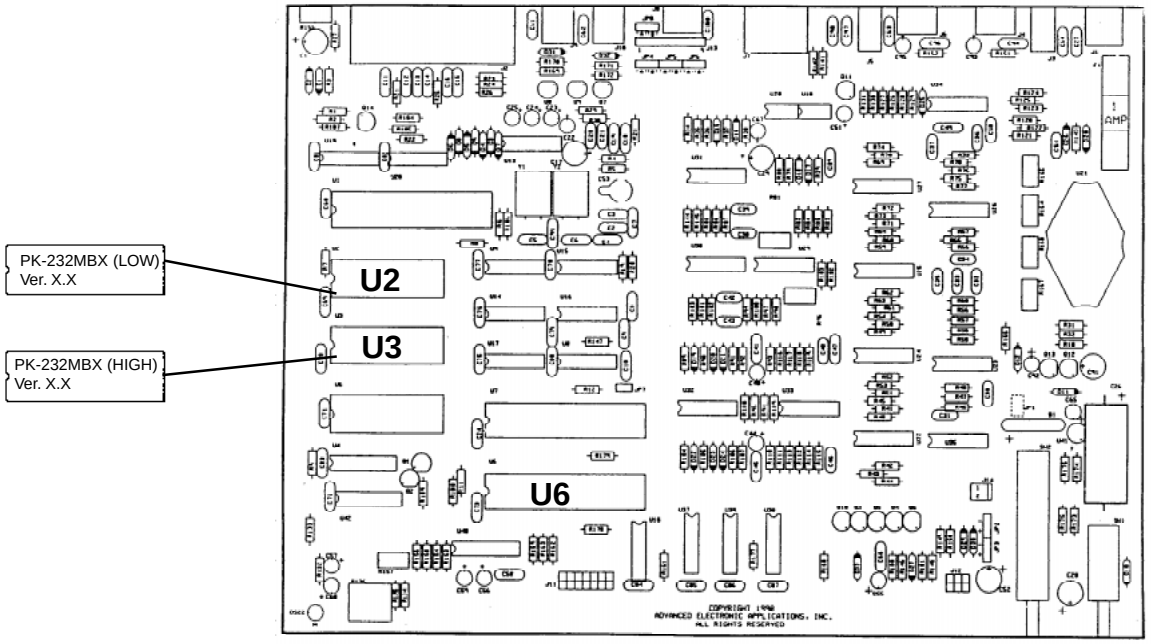


Figure B - PK-232MBX Main Board (No MBX daughter board necessary)

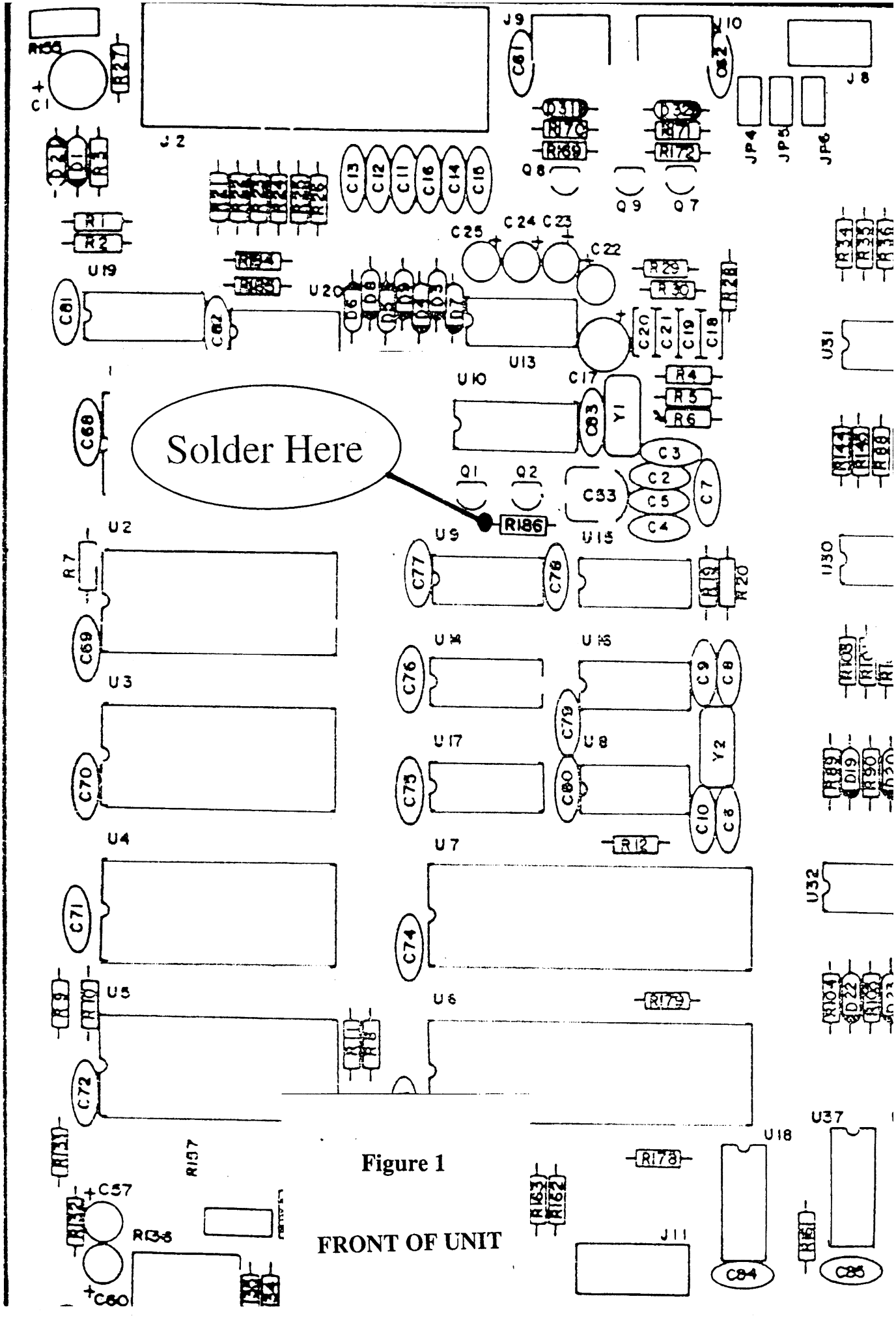


Figure 1

FRONT OF UNIT

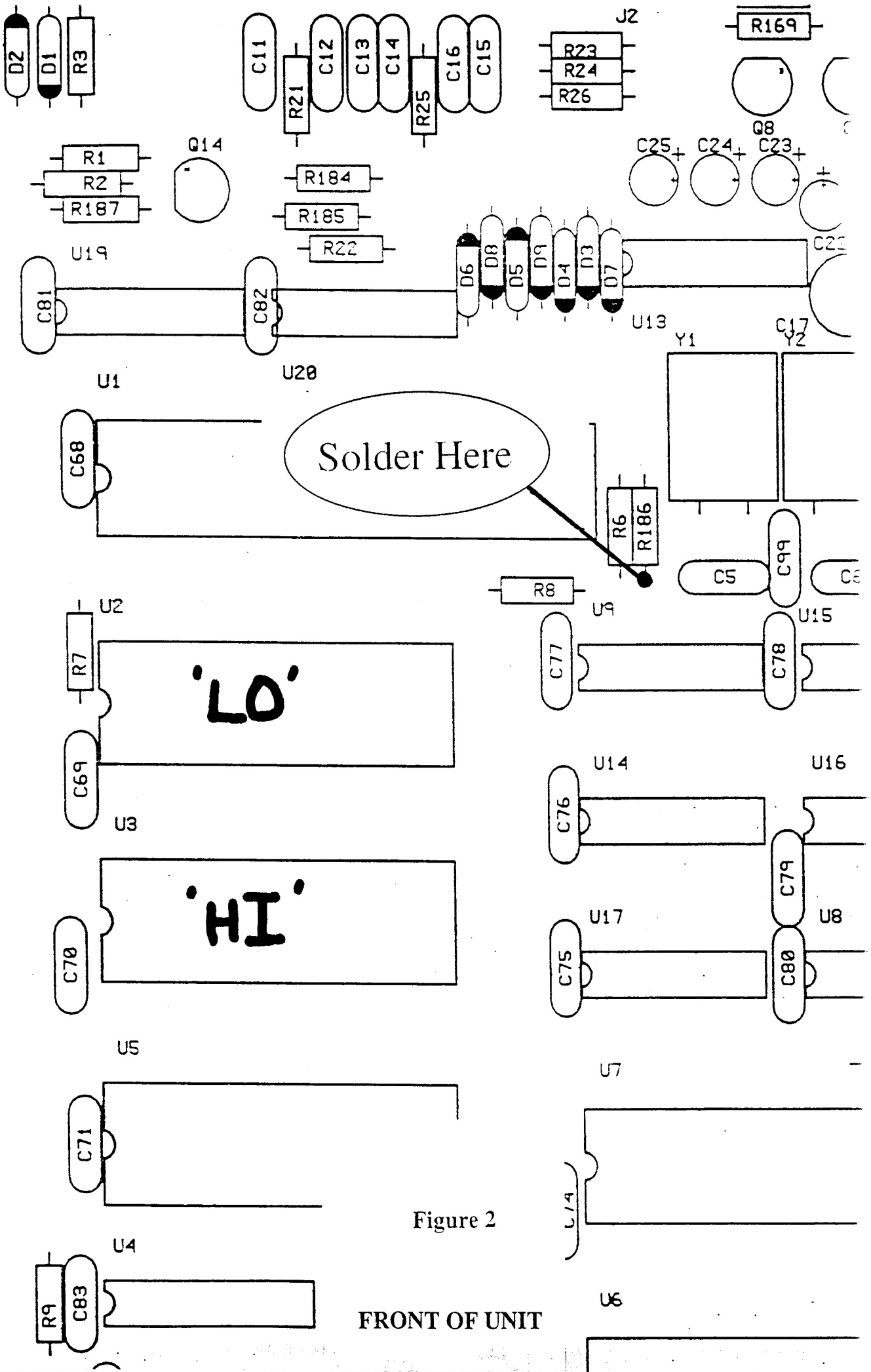

D2
D1
R3
C11
R21
C12
C13
C14
R25
C16
C15
J2
R23
R24
R26
R169
Q8
R1
R2
R187
Q14
R184
R185
R22
C25
C24
C23
U19
C81
C82
D6
D8
D5
D9
D4
D3
D7
U13
C17
Y1
Y2
U1
U20
Solder Here
C68
R6
R186
C99
C5
R8
U9
U2
R7
'LO'
C69
C77
C78
U15
U14
U16
C76
U3
'HI'
C70
C79
U17
U8
C75
C80
U5
C71
U7
U4
R9
C83
U6
FRONT OF UNIT

Figure 2

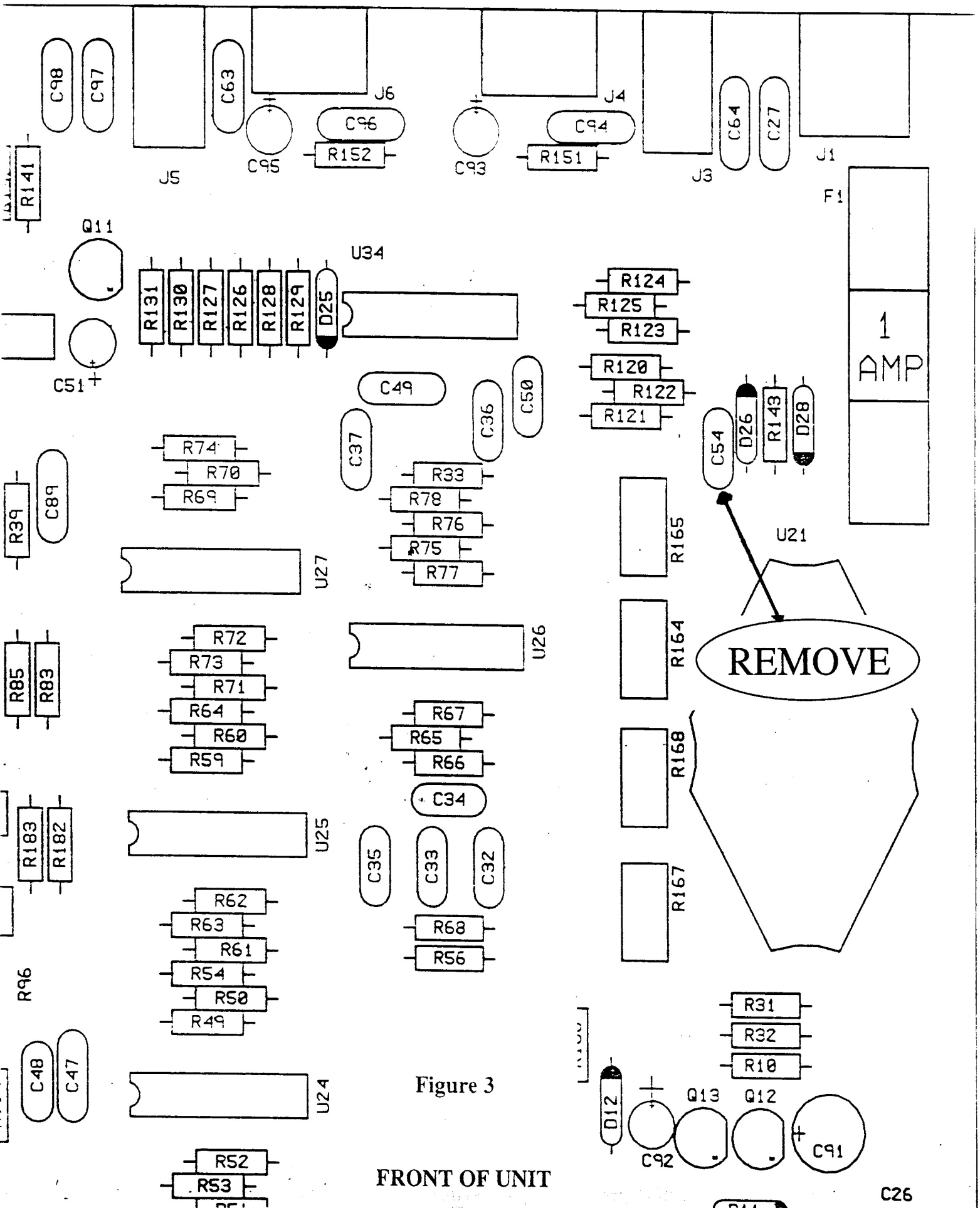

C98
C97
C63
J6
C96
R152
J4
C94
R151
C64
C27
J1
J5
C95
C93
J3
F1
R141
Q11
U34
R131
R130
R127
R126
R128
R129
D25
R124
R125
R123
R120
R122
R121
1
AMP
C51
C49
C36
C50
C37
C54
D26
R143
D28
R74
R70
R69
R33
R78
R76
R75
R77
R165
U21
C89
R39
U27
R72
R73
R71
R64
R60
R59
U26
REMOVE
R164
R85
R83
R67
R65
R66
C34
R168
R183
R182
U25
C35
C33
C32
R62
R63
R61
R54
R50
R49
R68
R56
R167
R96
C48
C47
U24
R31
R32
R10
D12
Q13
Q12
C92
C91
R52
R53
FRONT OF UNIT
C26

Figure 3

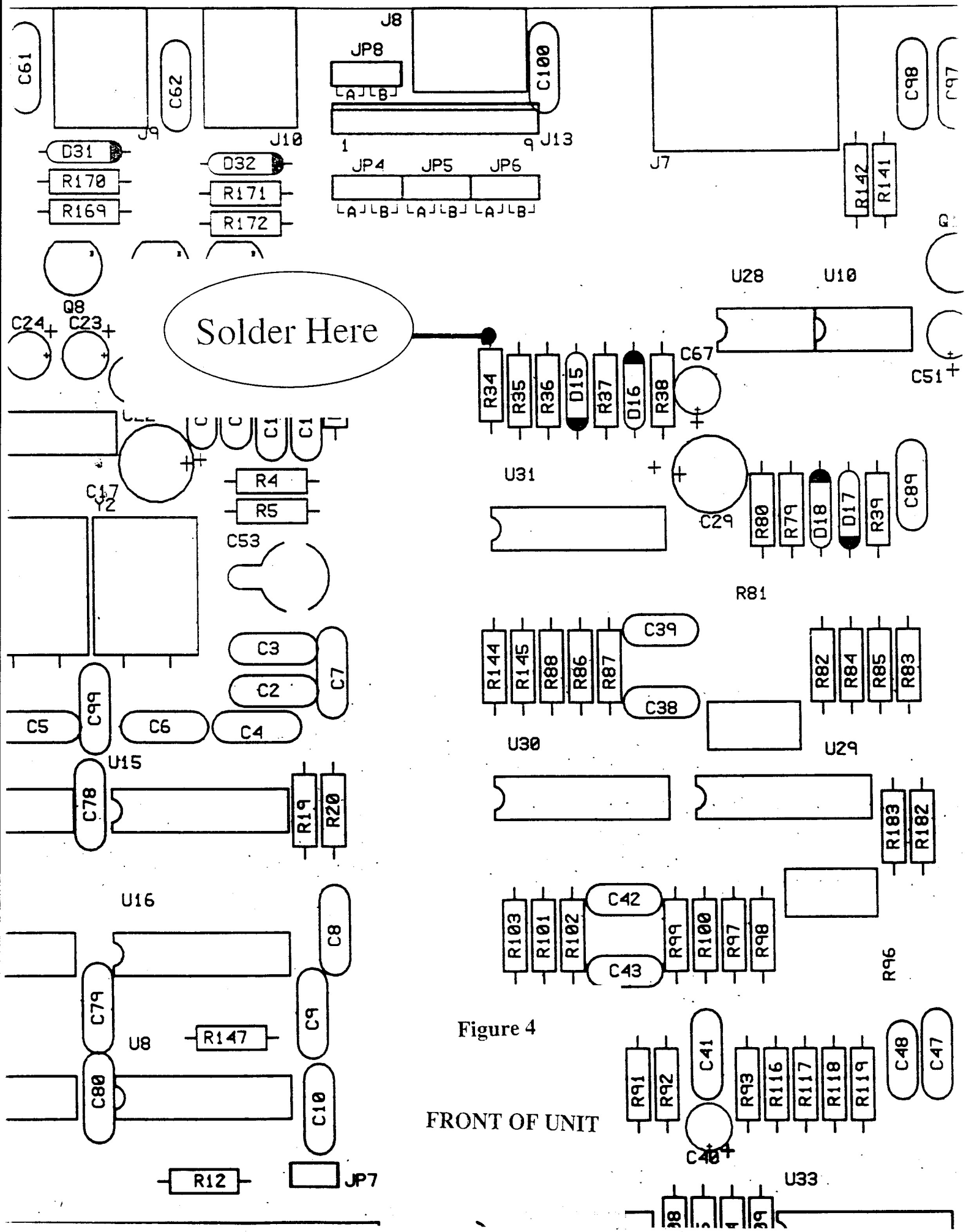


Figure 4

FRONT OF UNIT

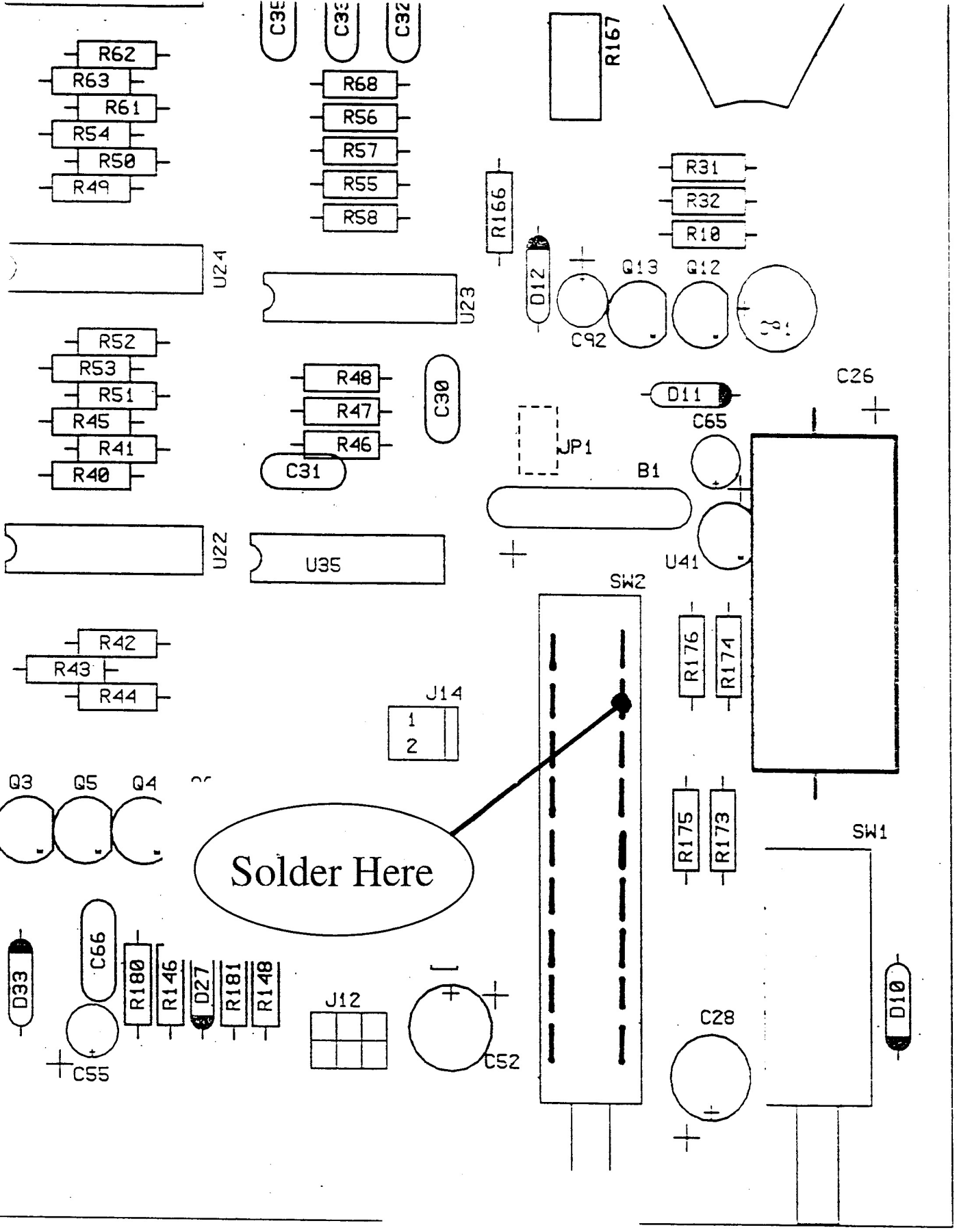
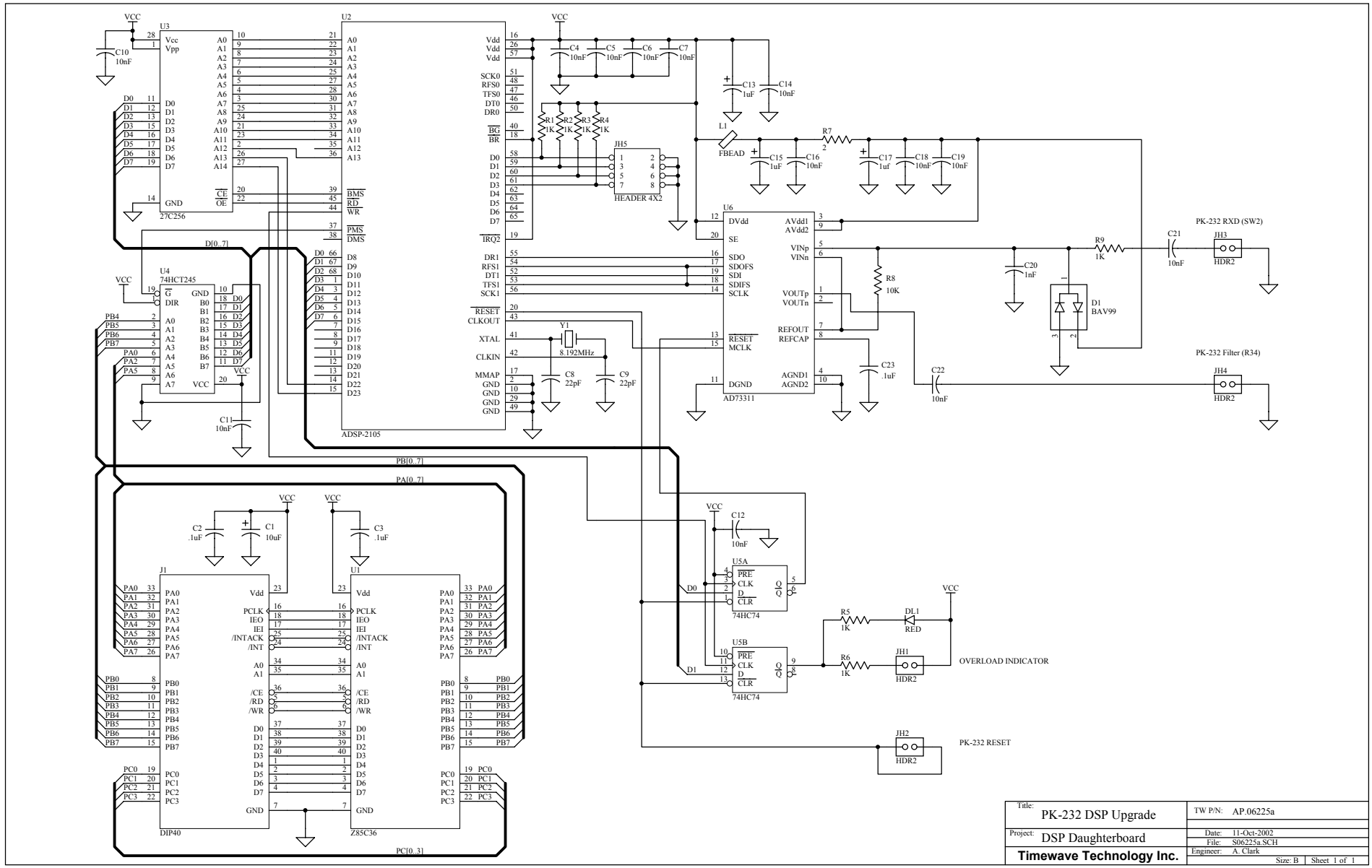


Figure 5

FRONT OF UNIT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27C256
U2
ADSP-2105
U4
74HCT245
U6
AD73311
Y1
8.192MHz
JH5
HEADER 4X2
L1
FBEAD
D1
BAV99
PK-232 RXD (SW2)
PK-232 Filter (R34)
PK-232 RESET
OVERLOAD INDICATOR
U5A
U5B
74HC74
J1
DIP40
U1
Z85C36
D[0..7]
PB[0..7]
PA[0..7]
PC[0..3]
Title:
PK-232 DSP Upgrade
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Project:
DSP Daughterboard
Timewave Technology Inc.
Date: 11-Oct-2002
File: S06225a.SCH
Engineer: A. Clark
Size: B
Sheet 1 of 1