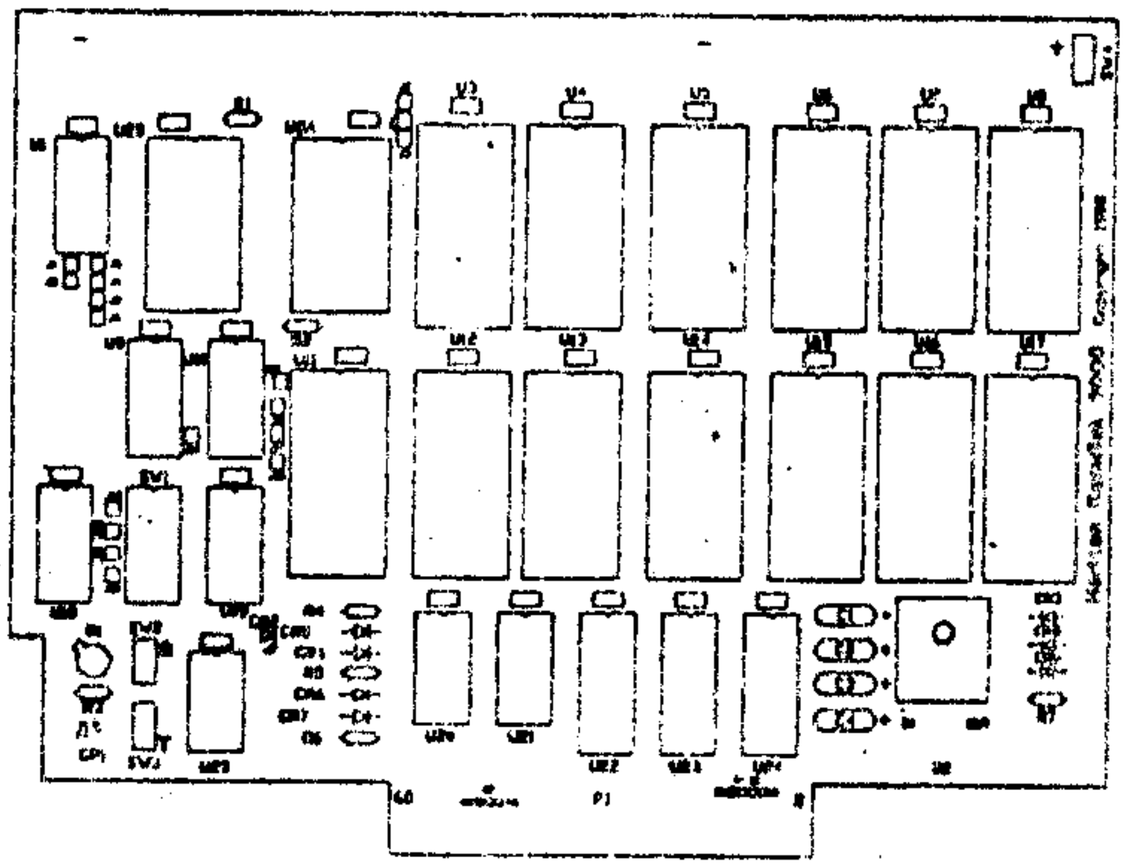
HORIZON 3000
RAMDISK



CONSTRUCTION GUIDE

BY

BUD MILLS

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*                                                           *
*  The CONSUMER assumes full risk and liability for         *
*  direct or consequential damages arrising from            *
*  attempted construction of the HORIZON 3000 RAMDISK       *
*                                                           *
*  EXCLUSION OF WARRANTIES: The HORIZON RAMDISK circuit     *
*  board is provided on an AS IS basis.  No warranty of     *
*  any kind is assumed by BUD MILLS SERVICES.               *
*  The user assumes full responsibility for quality of      *
*  all parts associated with construction of the HORIZON    *
*  3000 RAMDISK.  BUD MILLS SERVICES does not recommend     *
*  or endorse the quality of parts sold by any other        *
*  party.  In any case, BUD MILLS SERVICES shall be         *
*  liable only for the cost of the circuit board,           *
*  associated manuals, disk based software, or parts,       *
*  only if purchased from BUD MILLS SERVICES.               *
*                                                           *
*  Fully constructed HORIZON 3000 RAMDISKS are available    *
*  with a 90 day limited warrenty for an additional cost    *
*  covering parts and labor.  Contact BUD MILLS SERVICES    *
*  for current list of Dealers or Builders.                 *
*                                                           *
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Prior familiarity with construction of digital circuits is assumed. Read all construction suggestions and notes provided with the eight figures before proceeding. The following eleven pages show progressive stages in completion of the HORIZON 3000 RAMDISK. If you encounter a problem or Have a question at any step DO NOT PROCEED UNTIL THE PROBLEM IS RESOLVED. If you have any questions contact: Bud Mills at (419) 385-5946.

Although static can be a problem with CMOS devices (i.e. the 6264LP-15's) we have not seen a single case of IC damage under ordinary handeling procedures; nor have we seen problems do to excessive heat. While you may decide to take precautions against excessive static and heat transfer, remember that it is equally important THAT ALL SOLDER CONNECTIONS ARE OF GOOD INTEGRITY.

Use a low wattage (about 25 watts) SOLDERING PENCIL and fine 60:40 tin/lead solder. DO NOT USE a soldering gun or acid core solder! Make sure that sufficient solder is supplied to all connections with good wet-out, but that there are no solder bridges between connections. Upon completion of all soldering, remove flux from the solder side of the board with a commercial flux remover or you can use the old fashioned 91% rubbing alcohol and an old toothbrush (works better).

When inserting IC's bend the pins to fit the socket by placing the IC on it's side on a flat surface. Bend the pins against the surface by moving the body of the IC. Make sure all pins are properly aligned with the socket holes and that all pins actually go into the socket holes upon insertion.

PARTS LIST FOR HORIZON 3000 RAMDISK

Quan.	Part Discription.
1	7805 Voltage Regulator
1 - 2	74HC154 (see note 1 below)
4	74LS138
1	74LS156
2	74LS244
1	74LS245
2	74LS259
1	6264LP-12
-->	62256LP-12 or 43256-121 (see note 2)
1	14 pin socket
8	16 " "
3	20 " "
2	24 " "
1	28 " "
12	32 " " (cut down 40 pin)
1	2N2222 Transistor + | PN2222 or 2 of EITHER ONE
4	1N34A Diode (radio shack)
2	1N914 Diode
1	IN4001 to 1N4004
1	LED (Green)
1	LED (Red)
1	Dip Switch 8 position
3	NiCad AAA Battery
3	AAA Battery Holders
6	2.7k resistor
1	100 resistor
2	33 "
3	10uf Tantalum Capacitors
26	.1 or .Oluf Capacitors (these may be Ceramic or Glass)
1	Heat Sink for the Regulator
1	MINI SWITCH

One 74HC154N will support 512k of Memory. A second 74HC154N will be needed for 512k to One MEG. This chip may be either of the .300 "J"package or the .600 wide "N"package

32K x8 chips

ONLY ONE 74HC154 IS NEEDED IN 42A for THE 128KX8

Note 2: The Hitachi HM62256 LP12 and the NEC 43256 12L are "equivelent". Each of these chips provide 32k of Memory in our circuit. The size that you want to build will determine the number of chips to obtain. 3x32=96k,6x32=196k, 8x32=256k, 12x32=384k, 16x32=512k and so on,,,,32x32=1024k (ONE MEG+)

The Hitachi HM66204 LP12 is a 128kx8 memory and requires the 32 pin socket. Equivelent and also more expensive is the Hitachi HM628128 LP12. (The 128x8 chips may be harder to locate at the present time.)

THE HM628128 IS THE PERFERRED MEMORY
THE NEC UPD431000 IS ALSO ACCEPTABLE

DO NOT USE SONY 128K

THE HORIZON 3000 RAMDISK

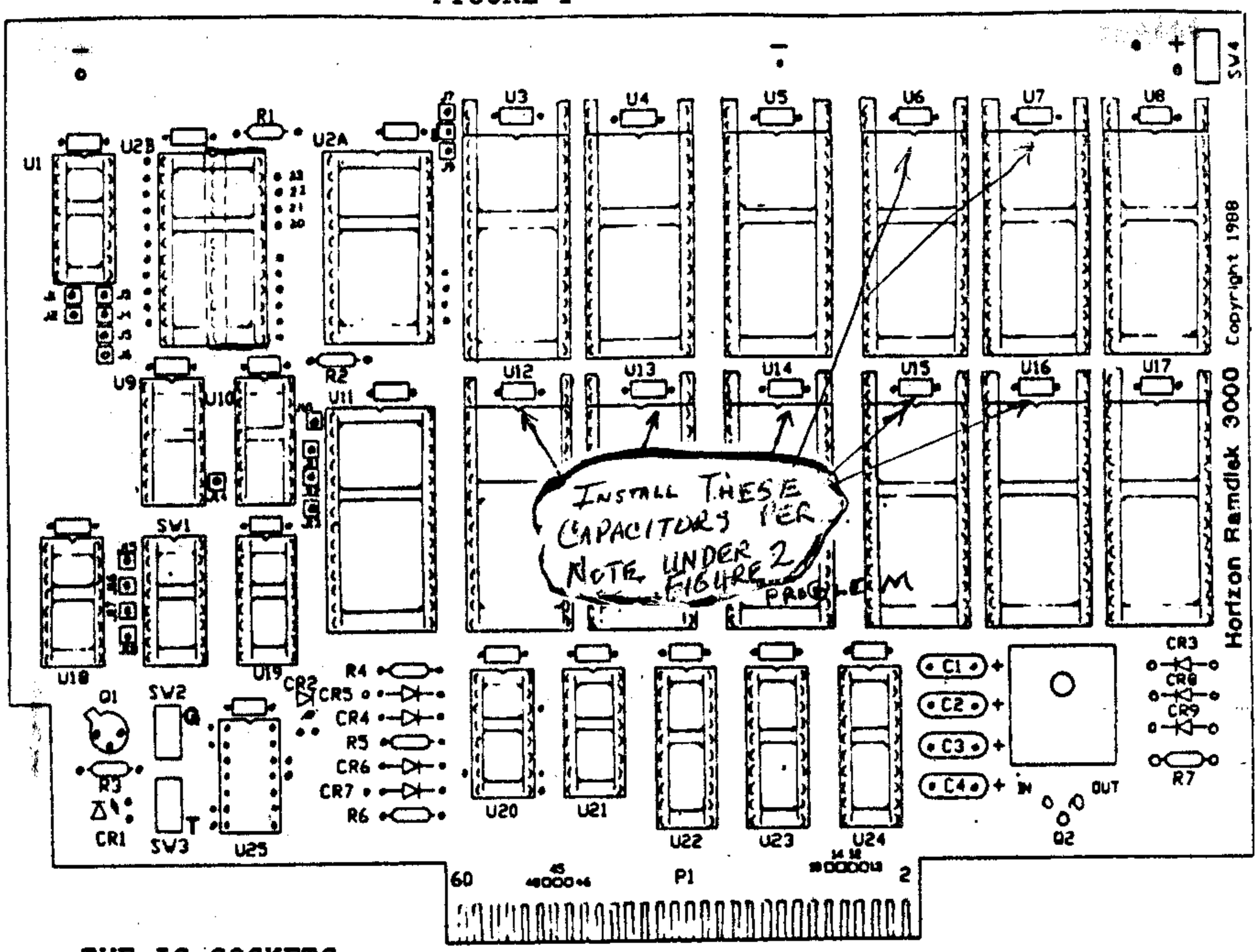
This version of the HORIZON RAMDISK is basically the same as the preceeding versions that use the 32k x 8 Memory chips, (HRD+ and HRD2000). This card replaces the HRD2000 card and has been redesigned to allow the use of the newer 128k x 8 Memory chips OR the existing 32k x 8 Memories. Two minor changes have also been made to improve the RAMDISK reliability. The first change is in the POWER-UP circuit to utilize the Console "RESET" line. The second change is to ADD a switch to the top back edge of the card to allow you to "TURN-OFF" or HIDE the RAMDISK. Very help-ful if a lock-up should occur or if you are experimenting with a program that can (or has) crashed the RAMDISK.

The HORIZON 3000 RAMDISK set up to accomodate the newer 128k x 8 Memory chips that require 32 pin sockets. We have even included the option for the FUTURE 512 x 8 Memories IF they are ever manufactured. The card may be optioned by installing six jumpers when assembling the RAMDISK. The option for the 32k x 8 is Figure 6A, the option for the 128k x 8 is Figure 6B. The option for the FUTURE 512k x 8 is shown in Figure 6C. NOTE: The card may be optioned for ONE size of memory chip. If you initially build the card using the 32k x 8 chips and later decide to change to the larger 128k x 8 chips, you can change the option jumpers and REPLACE the 32x8 with the 128k x 8 chips. We CAN NOT intermix the 32x8 with the 128x8 due to the addressing of the memory blocks.

Inclosed is a page showing how to add a modification to any HORIZON card to replace the 32k Memory Card with a single 32k chip on the HORIZON. TWO other changes may also be described on the same sheet, but those are already built-in on the 3000 card. If you have another "older" HORIZON you should consider making those changes.

The 3000 board has an extra socket, U25 that is NOT involved in the normal construction of the HORIZON. U25, SW2 and SW3 are reserved for the PHOENIX modification that actually allows a second distinct RAMDISK to be added to this single card. The PHOENIX mod was originally created to provide a seperate BOOT drive for the GENEVE 9640. The switches allow us to TEST or USE the double RAMDISK on the 99/4A. the PHOENIX mod can be ordered seperatly.

FIGURE 1



THE IC SOCKETS

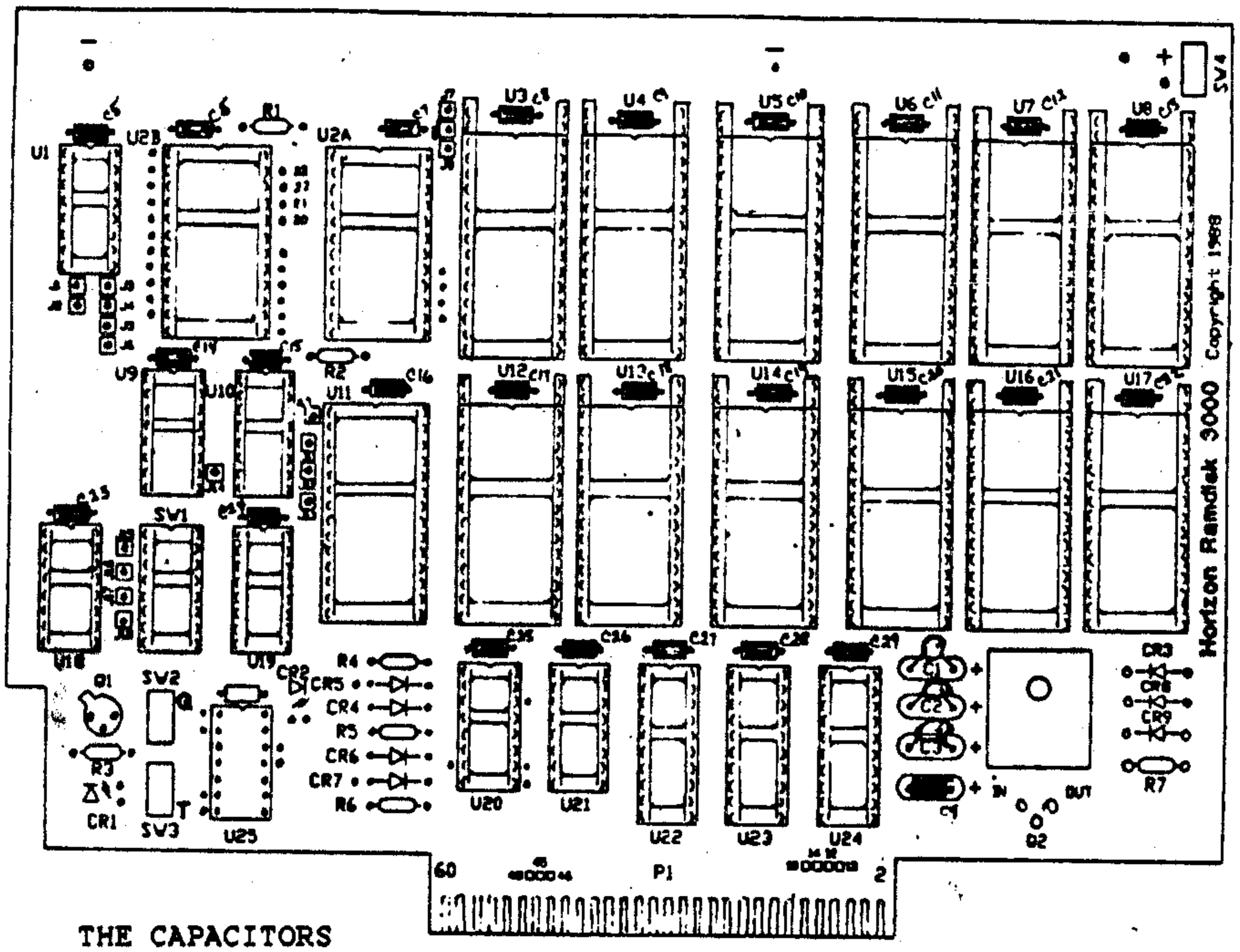
This requires 1 - 28 pin IC socket, 12-32 pin sockets, 2-24 pin sockets, 3-20 pin sockets, 8-16 pin sockets and 1-14 pin socket. Put them in the board with the notch facing upward and solder them in. NOTE; the 32 pin sockets will surround the bypass capacitor. It usually works best to place a piece of rigid cardboard over the top of the sockets and the CAREFULLY FLIP the board into position and begin soldering. I always tack the opposite corner pins before removing the cardboard. I can then go back and adjust any socket that is not fully seated by reheating the appropiate pin. Proceed to solder ALL the remaining pins. Remember, TOO much solder may fill the socket and render it useless or may create a solder bridge on the top side of the board under the socket. This is tedious work and care must be taken not to bridge to adjacent pads or lines. If any bridges are created the board will crash in testing.

NOTE; The 32 pin sockets may not be avaiable, however you can cut down 40 pin sockets to size.

ALSO before you install the 24 pin sockets, CHECK the size of the 74LS154 IC Chip to determine which set of holes in the board to use.

IF the 74LS154 is as wide as the U3 socket then install the 24 pin sockets normally. IF the 74LS154 is narrow like U9 then cut the socket webs out and install in the right side row of holes and the center row holes.

FIGURE 2



THE CAPACITORS

This requires 26 - .1 uf capacitors with .2 inch lead spacing. Insert them in C4, and C5 thru C29. Insert 3 - 10uf tantalums with + polarity facing right in C1, C2 and C3.

10uf
tantalum

.1 or .01uf
ceramic

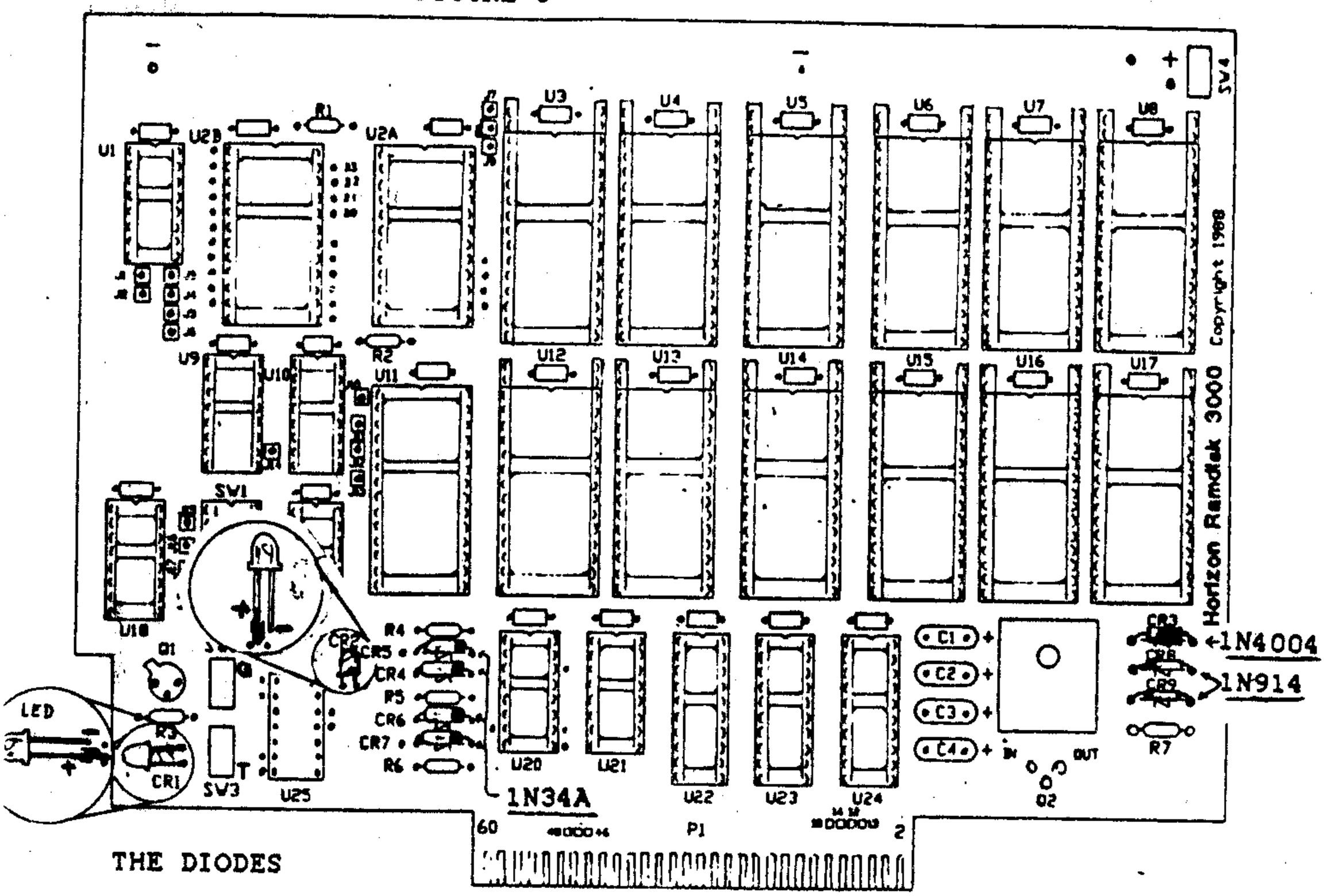
or

glass

NOTE

Depending on the Style of 32 pin Socket You may have to install the capacitors before the Sockets allow enough lead length to lay the capacitor down to clear the Socket web.

FIGURE 3



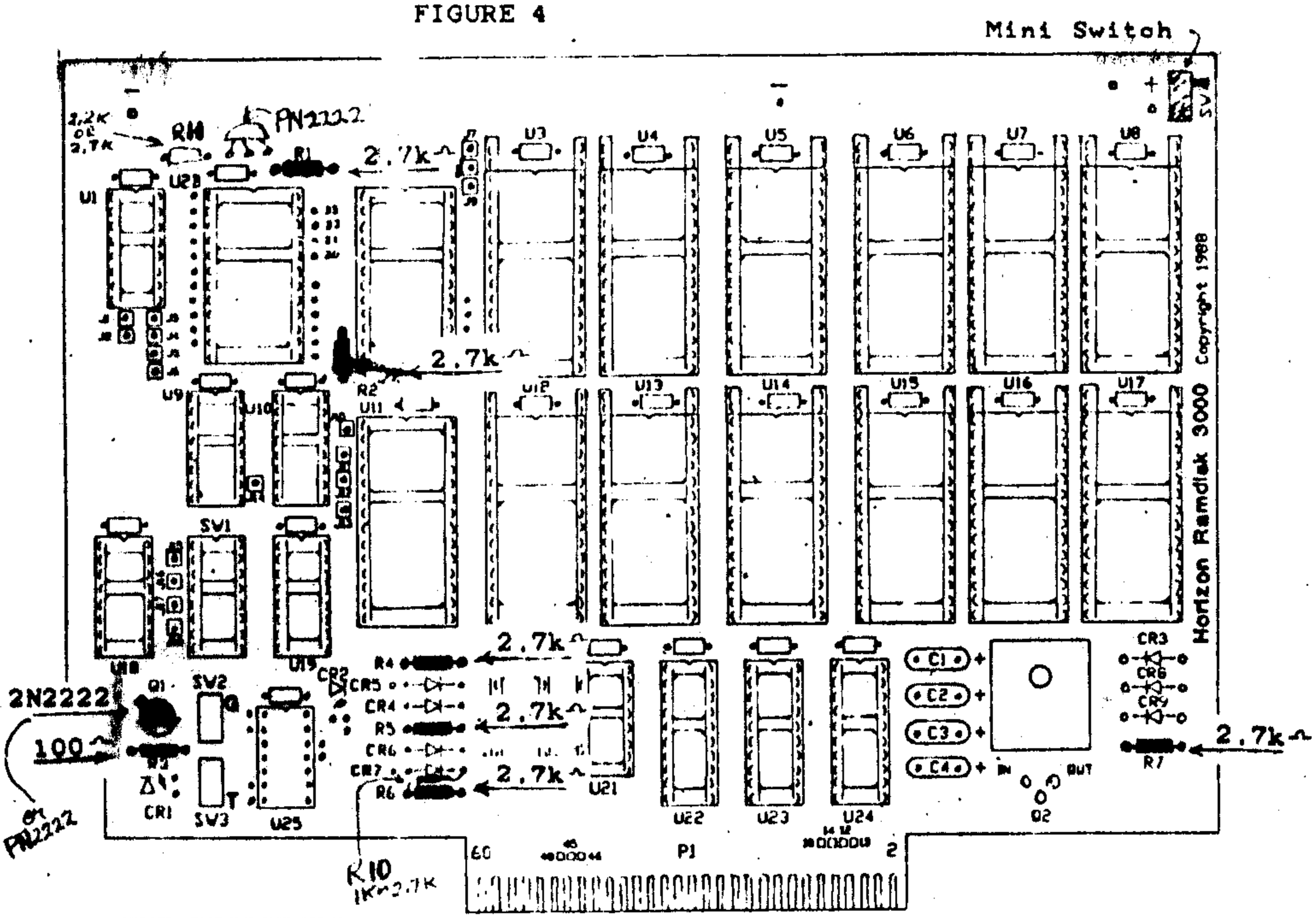
THE DIODES

Refer to Figure 3 for diode placement. Three diode types are shown; CR8, and CR9 are 1N914 silicon diodes; CR4, CR5, CR6, and CR7 are 1N34A germanium diodes; and CR3 is a 1N4004 rectifier diode. Although similar in appearance, the 1N914 silicon diodes are smaller than the 1N34A germanium diodes.

Diodes are polar. In the ->| notation the arrow points toward the cathode (-). Silicon and germanium diodes have a black or blue band on one end to indicate the cathode (-) lead. The rectifier diode will likely be black with a silver cathode band. Make sure the components you are working with are banded (glass bypass capacitors look similar but are not banded), and make sure you orient each diode with the cathode band in the direction shown in Figure 3.

Next install the 2 Light Emitting Diodes (LED's). CR2 must be green or yellow. CR1 may be any color of LED. LED's have polarity, and the cathode (-) of those you are using will be indicated by a flat side on the LED body or the shorter of the two leads. Orient the LED's as shown in the inset. CR1 should be installed so that the lens points toward the front of the card but does not extend past the card edge. CR2 should be positioned so it may be seen from the top of the card.

FIGURE 4



THE RESISTORS

Mount resistors R1 - R7 as shown. Although resistors have no polarity, you may orient them so that the color codes can be read from left to right. Resistor values and corresponding color codes are as follows:

R1 - 1K or 2.2K or 2.7K

R2 and R2 2.7K Red Violet Red

R3 100 Brown Black Brown

R 4,5,6,7 2.7K Red Violet Red

R8 and R9 33 ohm Orange Orange black. (See figure 5)

R1 470 Ω

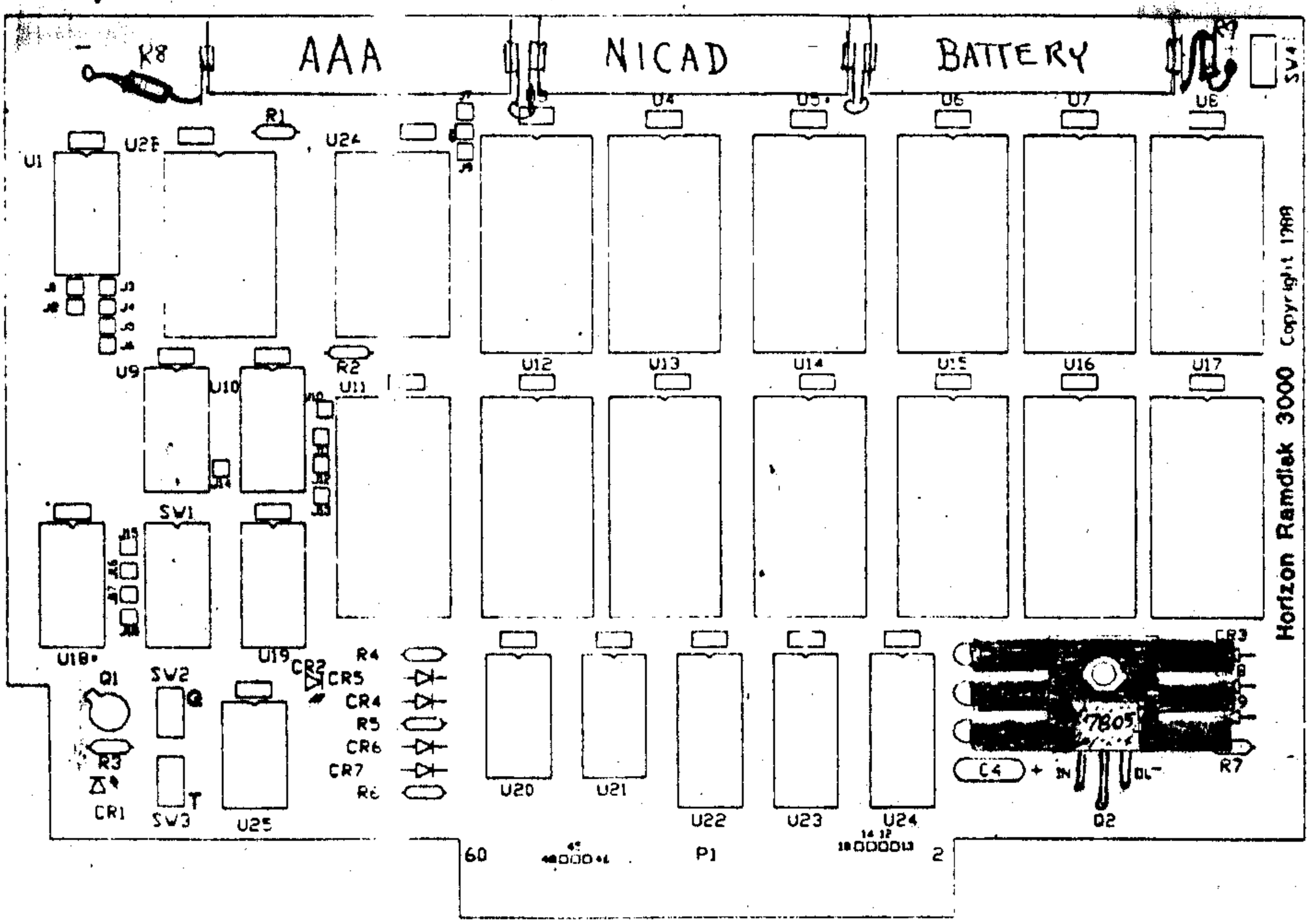
Connect R2 VERTICALLY above U1 as shown
Do Not connect any other way unless building As A Phoenix

EXPLANATION: This board will need to have Battery pulled on pin 20 of U11 - THE HORIZON NEEDS REG 5V

Install the 2N2222 transistor Q1. From the top starting with the tab and going counter clockwise the three pins of Q1 are emitter, base, and collector (E B and C). Solder the leads so that the case stands about 1/4" above the surface of the board.

Take the Mini Switch& cut off the mounting tabs and insert in SW 4 at the top of the card.

FIGURE 5



THE POWER OPTIONS

Lightly sand the underside of each battery holder to promote adhesion. Rotate the solder tabs on each battery holder so they are parallel with the surface of the board. Observing correct polarity, with batteries in place, use five minute epoxy to cement the holders to the board surface. Leave space between the holders as shown. When the cement has set, use short lengths of wire to connect the center holder with the two end holders.

Solder a 33 ohm resistor, R8 (orange orange black) to the board and the negative end of the left battery holder. Solder a 33 ohm resistor, R9 (orange orange black) to the board and the positive end of the right battery holder.

Solder the 7805 voltage regulator in place making sure that the hole in the tab lines up with the hole in the board. Install a heat sink on top of the tab with a 6-32 1/4" machine screw and nut.

FIGURE 6A

JUMPER Options for using

32 x 8 Static RAM's
HM62256-LP12
D43256-12L

Connect	To
J1	J4
J2	J5
J3	U2B Pin 20
J11	" " 21
J12	" " 22
J13	" " 23
J15	J16
U25 Pin7	U25 " 12
CR2	R10

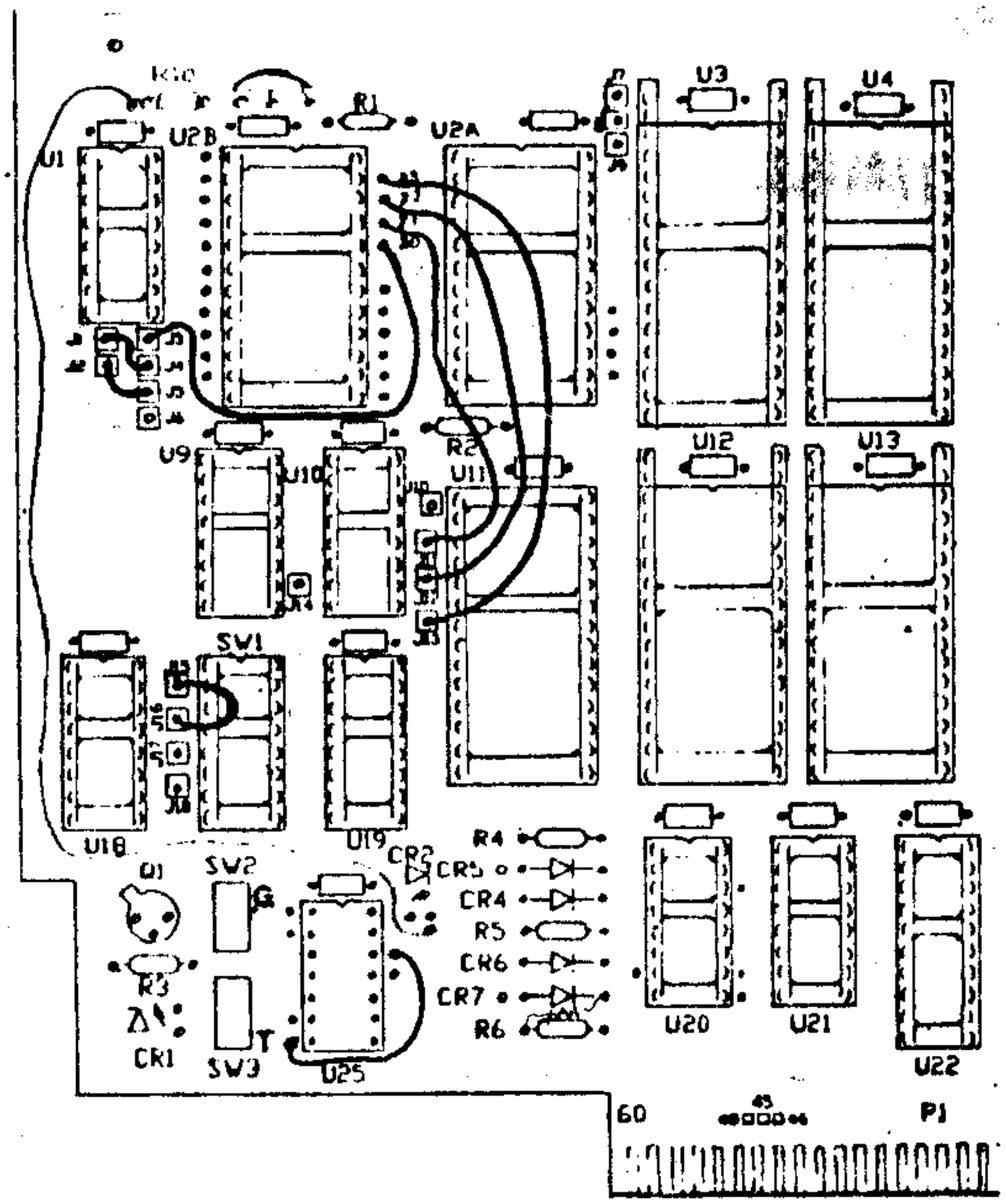
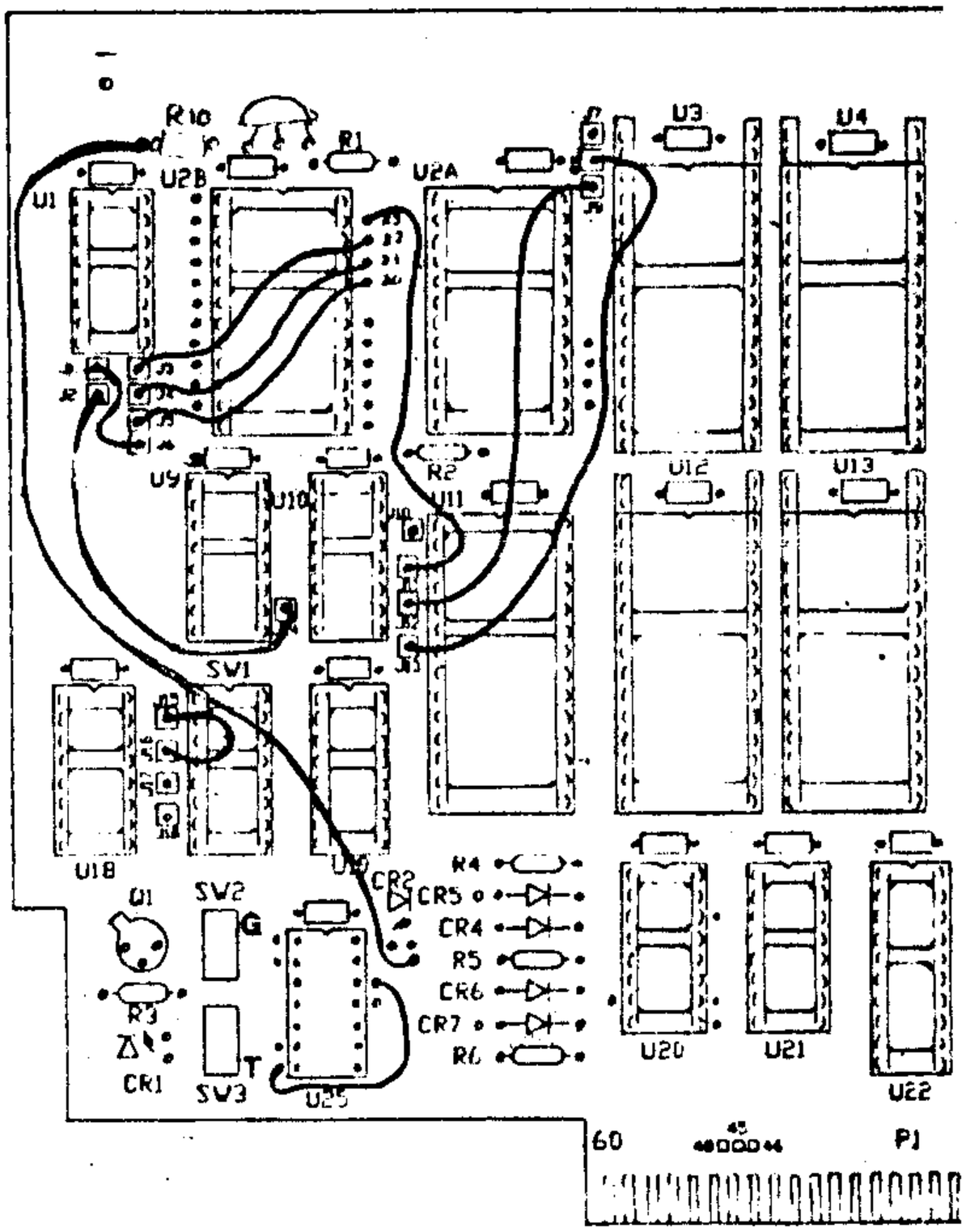


FIGURE 6B

JUMPER Options for using

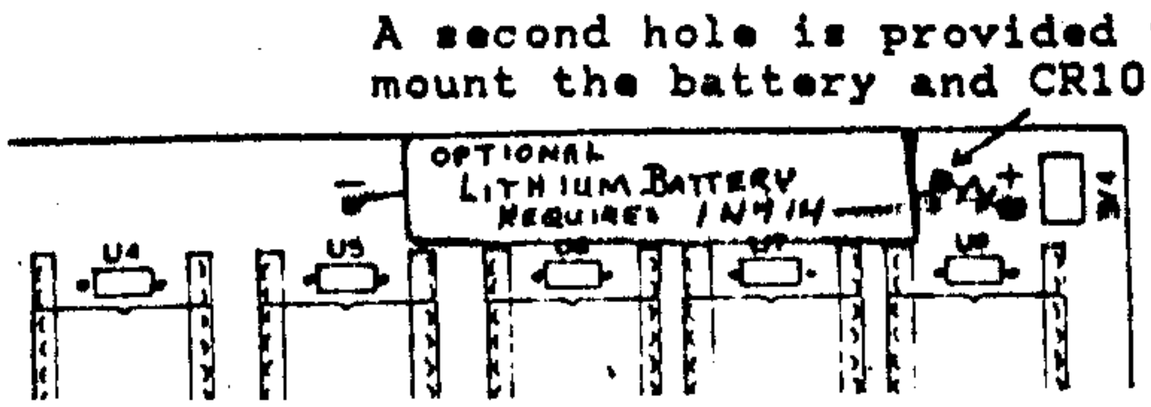
128 x 8 Static RAM's
HM628128-LP12
HM66204-12L

Connect	To
J1	J6
J2	J14
J3	U2B Pin 22
J4	" " 21
J5	" " 20
J8	J13
J9	J12
J11	U2B Pin 23
J15	J16
U25 Pin7	U25 " 12
CR2	R-10



We normaly supply and recommend AAA NiCad Rechargable batteries, however you could use regular AAA DRY batteries with a protective diode (CR10). The 4.5v Lithium Cell is also Acceptable with a protective diode (should last 5 to 10 years). the REGULAR batteries may last up to a year before they have to replaced. CAUTION you MUST use a protective doide with the REGULAR or LITHIUM BATTERIES... Do not use the diode on the NiCad Batteries (inhibits charging).

LITHIUM BATTERY INSTALLATION FIGURE



Your RAMDISK is almost ready to test in your P-BOX. But before we PLUG it in, Lets go back and RECHECK ALL of the steps and carefully examine ALL solder connections. Use a flux remover or rubbing alcohol to clean up all connections (an old toothbrush helps). A magnifing glass is also recommended to help you check the connections.

If the results at any step are not as described, STOP AND CORRECT THE PROBLEM BEFORE PROCEEDING.

BEFORE proceeding with the following test, we recommend you remove ALL of the cards from the Phripheral Expansion Box. (Smoke Test)

With NO IC's inserted, place the card in the Peripheral Expansion Box and switch on the power. The CR2 LED should light and the CR1 LED should not light. CR2 LED cannot be seen from the front of the PEB, you must look down from the top. CR2 will be dim and very hard to see. Leave the power on for 5 minutes and check the voltage regulator for excess heat. Turn off the power and WAIT FOUR minutes before removing the ramdisk or reinserting any other card.... (It takes longer for the VOLTAGE to drain off when there are not any cards in the box.)

After the through cleaning and the initial test we can proceed to add the plug in parts

Install the 8-position DIP switch in the 16 pin socket SW1. Select a setting from the following chart and close only one switch to the ON position. All other switches should be OFF or open.

Switch Position	CRU#	
1	1000	
2	1100	Used by DISK CONTROLLER card
3	1200	
4	1300	Used by RS232 card
5	1400	
6	1500	
7	1600	
8	1700	

NOTE: The DIP Switch selection of the CRU base for the HORIZON card is also dependant on on the other devices you may have installed.

EXAMPLES The MYARC 512k card uses CRU 1000 and CRU 1700
The P-CODE card uses CRU 1200
A RS232 card modified for 3/4 uses CRU 1500
The P-GRAM card should use the highest available CRU

If you are using the HORIZON card with a GENEVE 9640 then set the First card at CRU 1400 and a second card may be installed at CRU 1600. To use the HORIZON with the GENEVE you will have to obtain the Routines written by Mr. Jim Schroeder. You will need LHDROS, HDROS, CFG, and RAMDOS for the Version of MDOS that you want to use. Due to changes in MDOS with every issue, there are different patches required.

Jim's address is; Mr. J. Schroeder
2856 N. Holton St.
Milwaukee Wi. 53212

FIGURE 6C

JUMPER Options for using

512 x 8 Static RAM's
FUTURE

Connect	To
J1	U9 PIN 10
J2	U9 PIN 11
J3	PIN 30 of EACH MEMORY
J4	U2B PIN 23
J5	" " 22
J6	" " 21
J7	J11
J8	J13
J9	J12
J15	J16
U25 Pin7	U25 " 12
J14	U2B PIN 20

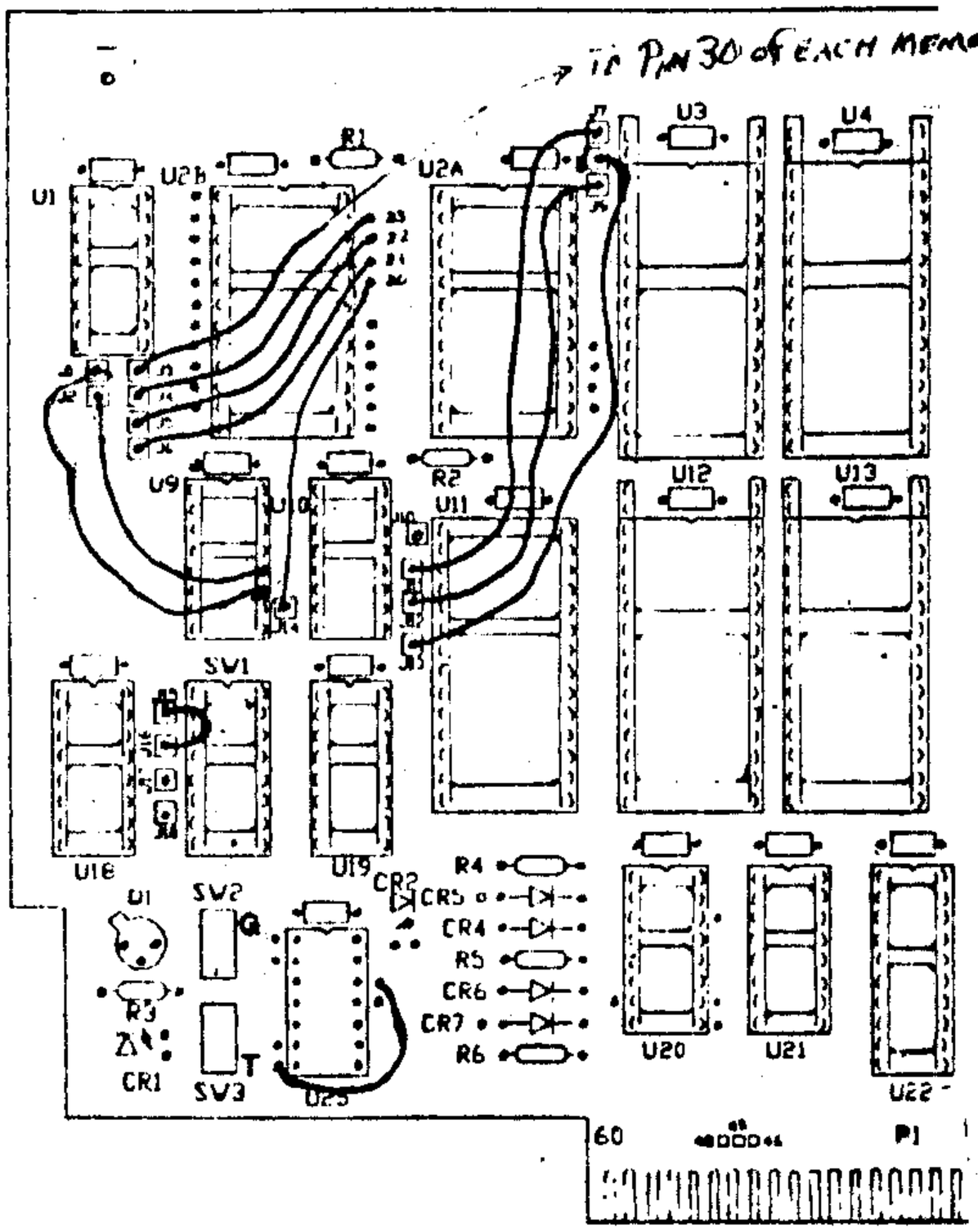
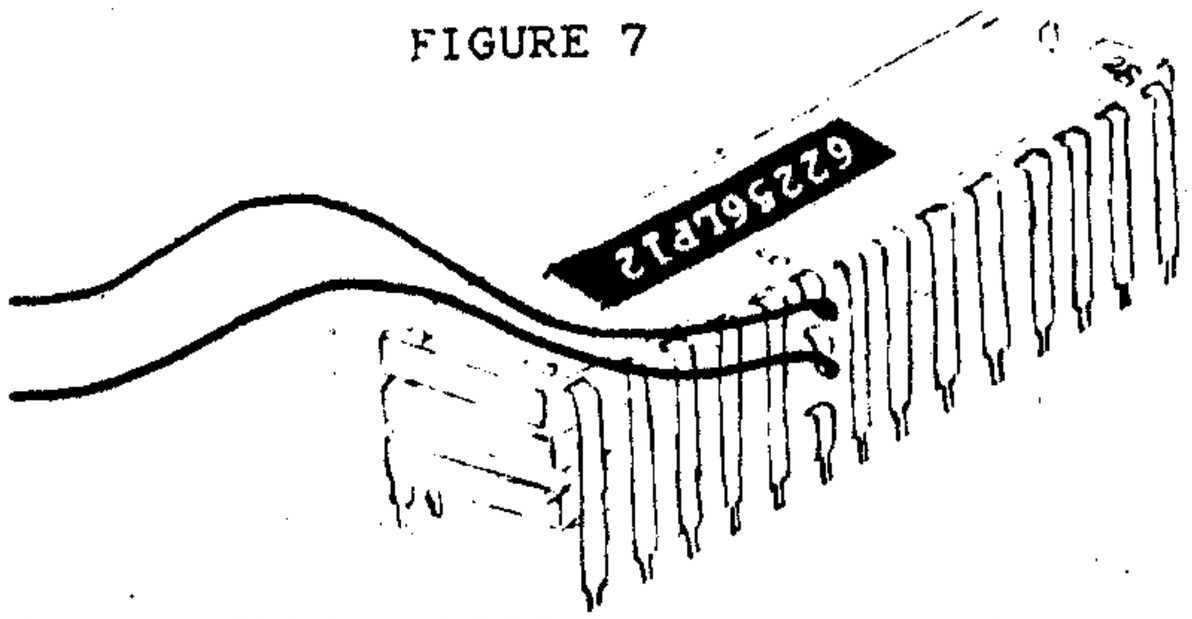


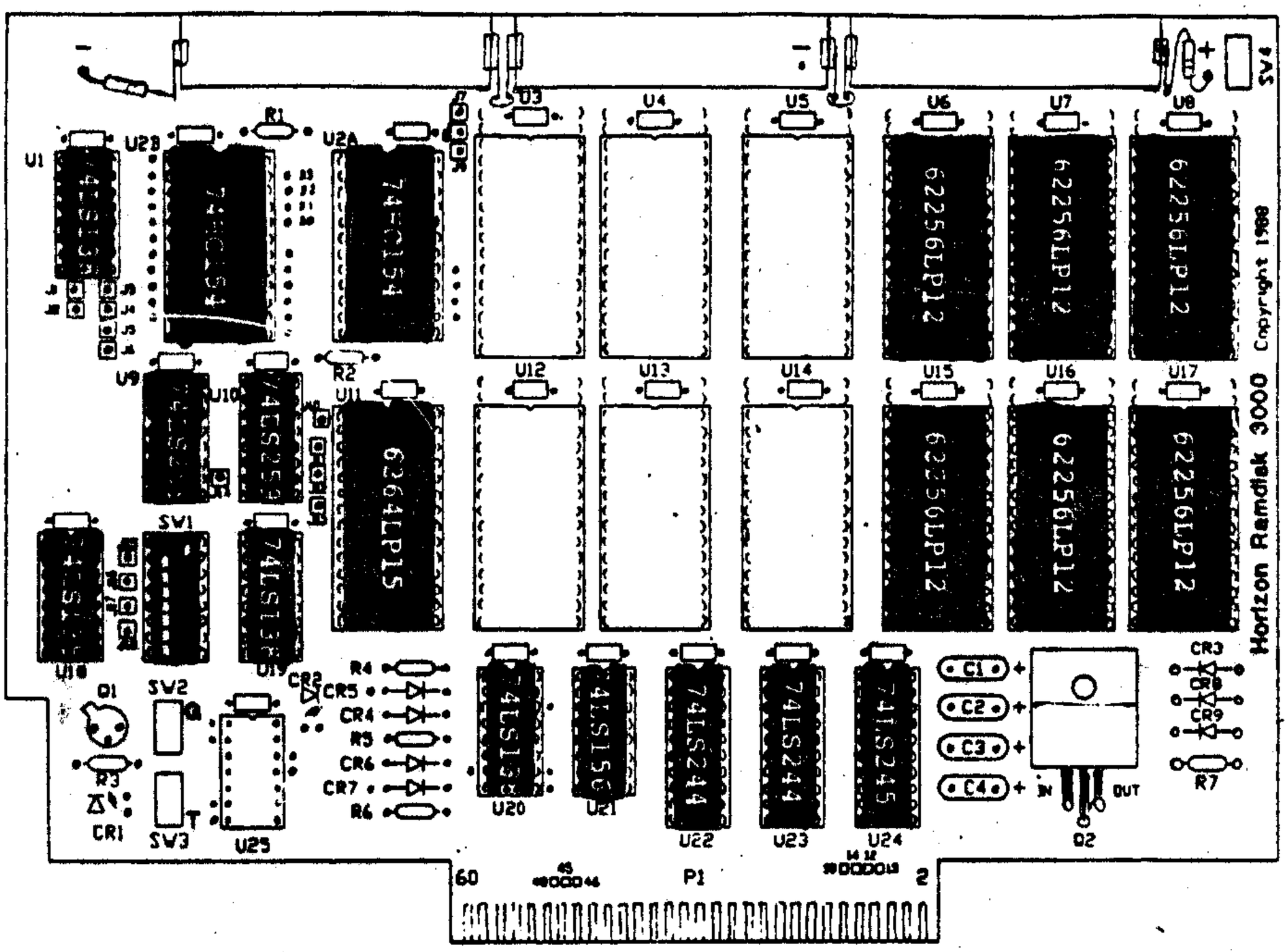
FIGURE 7



To build the HORIZON 3000 larger than 384k, using the 32k x 8 Memory chips you will have to STACK and solder the chips as shown in the drawing.
Each upper chip will have a wire connected to pin 20 that will connect to a pad on the circuit board as described in Figure 6 CONTROL LEAD ASSIGNMENTS.

If you are using the 128k x 8 chips and want to go above 1.5 Meg, a piggy back board is available to allow you to go to 3 Meg without stacking any of the 128k Chips. U2A [illegible] TO 2 MEG
This same piggy back board may be used with the 32k x 8 chips BUT you can only add a second 384k without solder stacking any chips.
THE PIGGY BACK 3000 BOARD IS ONLY SOLD AS A PREBUILT UNIT. You can the add the memory chips.

FIGURE 6



THE INTEGRATED CIRCUITS

INSTALL JUMPERS PER FIG 6A OR 6B FIRST

Insert all IC's except the MEMORY CHIPS. Make sure the notch of each IC points toward the battery holder and that the labels on the IC backs are oriented as shown in Figure 6. Install U11, the 6264LP-15 nearest the left side of the board. TO AVOID MEMORY DAMAGE, NEVER PLACE THE CARD IN THE PE-BOX WITHOUT ITS BATTERIES! Run the MEGTEST program as described in the MEGTEST Instructions. As the program runs, the CR1 LED should turn on and off. If the program stops or has errors check that the DIP switch setting and the CRU address MEG TEST is testing match. If the DIP switch setting is correct check the germanium diodes. We have found that the germanium diodes CR4-CR7 can be the problem. The diodes can be replaced with Radio Shack Cat. No. 276-1123. More often we find an "open" solder connection. Another cause may be a defective chip, try replacing U18, U20, after rechecking the DIP SW1 setting.

IF using 128K Memory Then U2A is the only U2 chip you will need

If using 32K MEMORY then U2B will be needed to Expand ABOVE 512 K

Next insert the 62256LP12 or 43256-12L MEMORY chips per the following chart. These 32x8 chips must be inserted in the lower portion of the 32-pin sockets, as indicated by the white outline on the board. Re-run the MEGTEST program. This time selecting the MEG CARD option. No bad chips should be found.

IMPORTANT: If you are building your card at less than 12 memory chips then you MUST insert the Memory Chips in the following sockets.

First 96K:	U17	U8	U16	OR=384k if using the 128x8 memory chips
192K:	U7	U15	U6	=768k " "
288K:	U14	U5	U13	=1.152 meg " "
384K:	U4	U12	U3	(the twelve sockets will each have one memory chip inserted) =1.536meg (128x8)

NOTE: You can add more chips (even one at a time) but you must follow the order of U17,U8,U16,U7,U15,U6,U14,U5,U13,U4,U12,U3. (32x8 OR 128x8)

If you are using the 32x8 (62256 or 43256) to go above 384k, then proced as follows.

After testing the remaining chips proceed to stack and solder the memory chips for U3 thru U8, U12 and U13, three chips high. Do not solder pin 20 on any chip. Looking at at IC from the top with notch up, pin 20 is the sixth from the bottom on the right side. Bend the remaining pins inward so they make firm contact when placed over the bottom IC. Making sure notches are matched, place top IC (pin 20 bent out) over the bottom IC. Repeat for the third level. Stack chips U14 thru U17 two high. Bend pin 20 outward on each of the upper chips. All pins on the bottom chip should be clean, straight, and free of excess solder for proper fit in the sockets. Keep the ends of the bottom IC pins free of solder and scrape off flux before reinsertion. THE INTEGRITY OF EACH SOLDER JOINT IS VERY IMPORTANT. After soldering and carefully inspecting as IC pair, re-heat each joint to INSURE GOOD WET-OUT OF BOTH PINS. Attach a wire to each bent out pin 20, each wire should be long enough to reach pin 1 thru thru pin 17 of the U2B socket. Make sure there NO solder bridges between adjacent pins. Proceed to insert the chip stacks and connect the wires (Chip Select Control Leads).

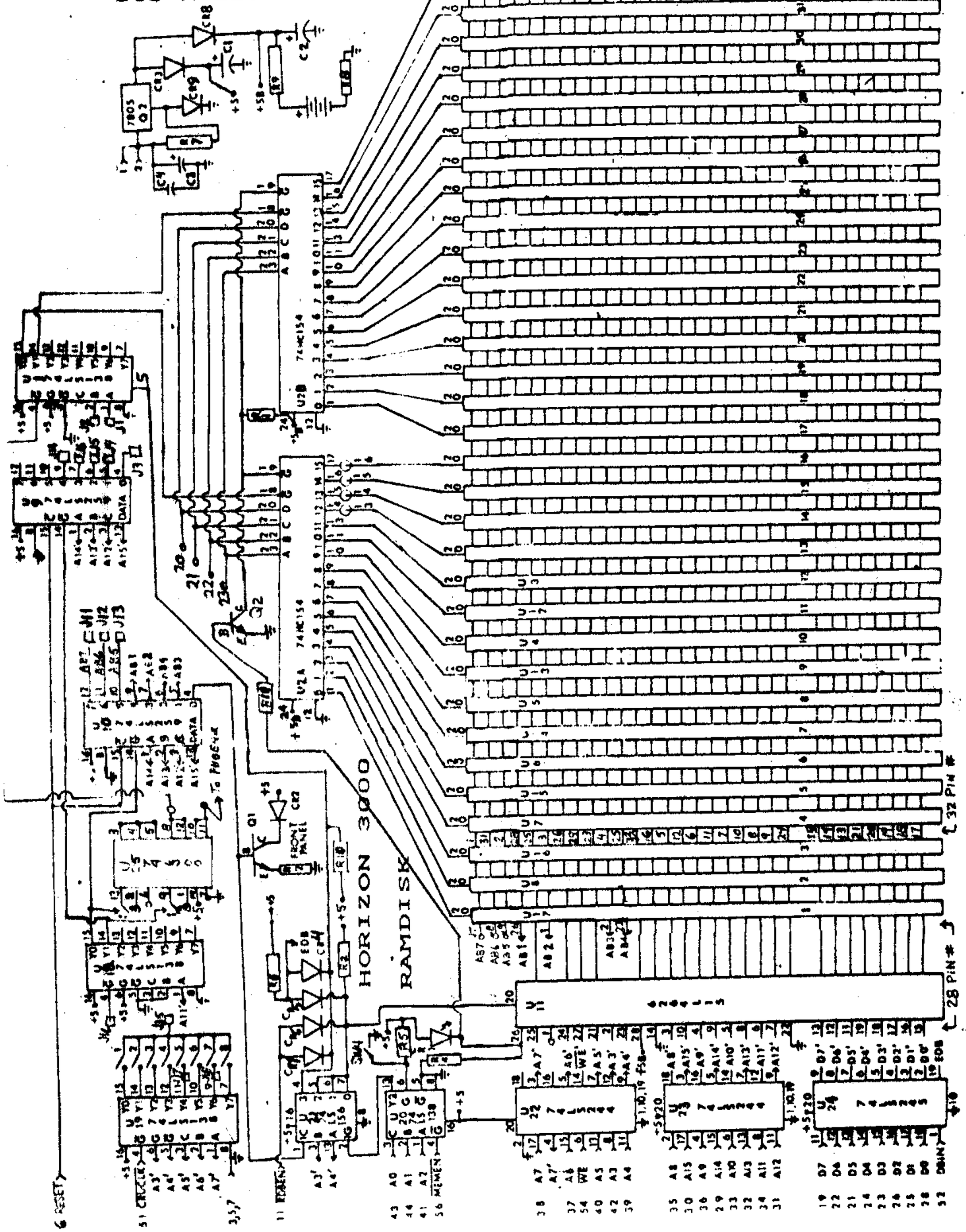
Chip Select CONTROL LEAD ASSIGNMENTS

The "order" of assignment is critical to proper operation of the HORIZON RAMDISK above 384K. The first 12 chip select leads to pin 20 of each memory socket are hardwired in the board directly to U2A. The next four appear next to the U2A socket holes 13, 14, 15, 16. (This will take you up to 512K). The next leads are connected next to holes by U2B pin 1 thru pin 11, and pin 13 thru pin 17 (in ASCENDING 1,2,3 order). The physical location of the 62256 memory chips is limited only to sockets U3 thru U8 and U12 thru U17 and should not exceed three high unless you want to sacrifice the adjacent slot in your PEB or if you are expanding beyond one meg.

After you have connected the last control lead, recheck all connections, and re-run the MEGTEST, all chips should test good. Proceed to configure your card to (L)oad the ROS , (C)onfigure to devide and initialize the available memory into the size drives that YOU want. (E)dit to enter the page 3 MENU selections and assign the DRIVE numbers.

Rev 1-91

BUD MILLS SERVICES



APPENDIX 2 (Continued)

System Lock-Up on Power-Up

Occasionally (especially if you choose to experiment with writing your own routines for the card) you may find that when you turn on your computer, you get a blank screen and that the computer is "locked-up". If you find that this happens only when the RAMDISK is plugged into the PE-Box, bad data has found its way into the RAMDISK operating system memory, and the operating system must be re-loaded. To test if the RAMDISK is causing the "LOCKUP", turn the Card "off" by setting SW4 down to make the RAMDISK invisible to the system. Turn ON the P-BOX, then the CONSOLE, put your SYSTEM DISK in Drive 1, turn ON SW4 (UP) and reload the RAMDISK Operating System.

Alternatively, you can follow this procedure with Editor/Assembler.

1) Power-down the console and PE-Box;

2) Turn on the console FIRST, then the PE-Box;

3) Enter E/A

4) Select Option 5

5) Make sure system disk is in Drive 1 and type in DSK1.CFG

6) Re-load the RAMDISK operating system.

If this program fails to work the only other alternative is to power-down the system, remove the RAMDISK, and take out one of the three NI-CAD batteries. Allow the card to stand for at least 15 to 30 minutes so the memory contents are lost. Then re-insert the battery and place the card back in the PE-Box. (RUNNING THE CARD WITHOUT ALL THREE NI-CAD BATTERIES IN PLACE MAY CAUSE DAMAGE TO THE MEMORY CHIPS!) RUNNING ONE of the TEST PROGRAMS WILL ALSO CLEAR THE MEMORY

Your system should now power-up normally. Re-load the operating system as usual.

Should you need further assistance, you may write to or call Bud Mills (419) 385-5946 (sorry, but our extremely low margins will not allow us to accept collect calls.)

BUD MILLS SERVICES
166 Dartmouth Dr.
Toledo, Oh. 43614

APPENDIX 1

MEGTEST INSTRUCTIONS For Use on TI OR GENEVE....

Insert the System Disk into Drive one.

Memory chips can fail, and so can any of the other components of your RAMDISK. In order to facilitate a test of your RAMDISK memory, a TI BASIC program called MEGTEST has been included on the System Master diskette. MEGTEST wipes out the ENTIRE contents of the RAMDISK including the operating system, so make sure you copy important files to a floppy diskette before running MEGTEST. After running MEGTEST, the operating system must be reloaded.

Troubleshooting with MEGTEST will identify the chip # for the bottom layer of chips, jack # for the next four chips and also the pin number of the second U2 so you can trace or "pull" the control lead to physically identify the chip in trouble if you have any

The Extended Basic "Load" program DSK1.LOAD provides a menu selection to load MEGTEST. The MEGTEST program rolls up a SWITCH assignment MENU and asks for the number of your DIP.SWITCH setting. The test Menu will then appear;

[U] for U11 TEST
[M] MEMORY TEST
[L] LOOP TEST
[A] 128x8 MEMORY TEST

When "U" is Selected the U11 chip is Tested. When "M" is Selected the program asks how many chips are installed. Enter the number of 32K memory chips. The "A" test will ask for the number of 128x8 chips. It then proceeds to fill the ENTIRE memory on the card with a series of eighteen special numbers and subsequently test each of the 32K chips on your card to see if they retain the values written. If you have a single-sided RAMDISK, 3 chips will be tested for each fill number -- 6 for a double-sided; 12 for DSDD; 16 for 512K; 32 for One MEG.

The [L] loop test is only used to positivily identify a bad chip using a Digital Voltmeter or Digital Probe. The chip under test will be pulsed on and off to allow a test measurment (HI LO) to verify the physical location of the chip under test. MEGTEST does identify the "JACK" number or the U2B Pin that controls the chip with errors. Simply trace the attached wire to the chip.

You may find one or more bad memory chips. Alternatively, you may find that for certain numbers several chips appear bad. An even more rigorous test is the Disk Manager II comprehensive test. Test 6 of the series has been able to locate problems on double-sided cards that no other test detects. All such problems have been due to poor solder connections on piggy-backed IC's. If you find errors, that you cannot correct, contact us regarding repair of your card.

Note: To use DM2 you will have to configure the card with 7,3 in a TI994A, Use CRU 1000 and renumber the drives to two(2) and three(3) (DM2 won't read above four(4) drives) and test each drive individually.

APPENDIX 2

IN CASE OF DIFFICULTY

Problems and "bugs" of various kinds have been found with many computer products, and the HORIZON RAMDISK will probably be no different in this regard. However, because the operating system for the card is in RAM, we can correct software problems by sending you a new disk. You can help us to improve your RAMDISK by letting us know about the kinds of problems you experience in a way that will help us identify and correct the problem.

Whenever you experience a problem in using your RAMDISK, there are several questions you should try to answer. The first is:

Is the Problem Repeatable?

Using the same piece of software or the same disk, can you make the problem happen consistently. (While ramdom problems are difficult to diagnose, we would still like to know about them.) If the problem is repeatable, try making it happen after powering-down your system and waiting several minutes. Also try it immediately after re-loading the operating system (this will not affect the contents of your disk). Any information you can provide to pin down the factors which cause the problem will be of help.

Is the Problem Specific to the RAMDISK?

If you make a sector copy of the RAMDISK contents to a floppy, set the RAMDISK number at 6, and try the problem situation again using a floppy drive in place of the RAMDISK, does the problem occur? If so, it may not be related to the RAMDISK. In the process of RAMDISK software development there have been many times we thought there were problems with the RAMDISK only to discover the true source of the problem was elsewhere in the system.

Is the Problem Hardware Related?

Use the MEGTEST to check the HORIZON RAMDISK. If you do not find errors, the problem is likely to be in the software which controls the RAMDISK. When you have verified that the problem is repeatable, that it is specific to the RAMDISK, and that your hardware tests OK, please notify us of your problem so that it can be corrected.

No Access to Floppy Drives

If your system appears normal on power-up, but locks up when you try to access your floppy drives, re-load the operating system as follows: Power-down and wait two minutes. Remove the card and turn DIP switch 1 to the OFF or OPEN position. Turn switch 3 to the ON or CLOSED position to set the CRU base address at >1200. This will allow the disk controller card to be accessed before the RAMDISK. Re-install the card and load the operating system as usual. Power-down again and wait two minutes. Then remove the card and re-set the DIP switches as desired.

This chart is provided to allow you to translate the TST error address above 1.5 meg up to 3.0 meg. this chart is used with the first chart.

16 bit CRUbits bus reported 1111111 column # 6543210987654321 BAD VALUE AT:	128k Chip number by expansion method stack solder	Piggy-Back board
0000011000011111	U2aPin14	\
0000011000111111	U " 14	\PU 1
0000011001011111	U " 14	/
0000011001111111	U " 14	_/
0000011010011111	U " 15	\
0000011010111111	U " 15	\PU 2
0000011011011111	U " 15	/
0000011011111111	U " 15	_/
0000011100011111	U " 16	\
0000011100111111	U " 16	\PU 3
0000011101011111	U " 16	/
0000011101111111	U " 16	_/
0000011110011111	U " 17	\
0000011110111111	U " 17	\PU 4
0000011111011111	U " 17	/
0000011111111111	U " 17	_/
0000100000011111	U2b " 1	\
0000100000111111	U " 1	\PU 5
0000100001011111	U " 1	/
0000100001111111	U " 1	_/
0000100010011111	U " 2	\
0000100010111111	U " 2	\PU 6
0000100011011111	U " 2	/
0000100011111111	U " 2	_/
0000100100011111	U " 3	\
0000100100111111	U " 3	\PU 7
0000100101011111	U " 3	/
0000100101111111	U " 3	_/
0000100110011111	U " 4	\
0000100110111111	U " 4	\PU 8
0000100111011111	U " 4	/
0000100111111111	U " 4	_/
0000101000011111	U " 5	\
0000101000111111	U " 5	\PU 9
0000101001011111	U " 5	/
0000101001111111	U " 5	_/
0000101010011111	U " 6	\
0000101010111111	U " 6	\PU10
0000101011011111	U " 6	/
0000101011111111	U " 6	_/
0000101100011111	U " 7	\
0000101100111111	U " 7	\PU11
0000101101011111	U " 7	/
0000101101111111	U " 7	_/
0000101110011111	U " 8	\
0000101110111111	U " 8	\PU12
0000101111011111	U " 8	/
0000101111111111	U " 8	_/

This chart is contines further expansion above the first piggy-back board to the maximum 4 meg by solder stacking or a second piggy-back board.

16 bit CRUbits bus reported 1111111 column # 6543210987654321 BAD VALUE AT:	128k Chip number by expansion method stack solder	Piggy-Back board
0000111000011111	U2bPin9	\SECOND
0000111000111111	U " 9	\PU 1
0000111001011111	U " 9	/
0000111001111111	U " 9	_/
0000111010011111	U " 10	\
0000111010111111	U " 10	\PU 2
0000111011011111	U " 10	/
0000111011111111	U " 10	_/
0000111100011111	U " 11	\
0000111100111111	U " 11	\PU 3
0000111101011111	U " 11	/
0000111101111111	U " 11	_/
0000111110011111	U " 13	\
0000111110111111	U " 13	\PU 4
0000111111011111	U " 13	/
0000111111111111	U " 13	_/
0001000000011111	U " 14	\
0001000000111111	U " 14	\PU 5
0001000001011111	U " 14	/
0001000001111111	U " 14	_/
0001000010011111	U " 15	\
0001000010111111	U " 15	\PU 6
0001000011011111	U " 15	/
0001000011111111	U " 15	_/
0001000100011111	U " 16	
0001000100111111	U " 16	\PU 7
0001000101011111	U " 16	/
0001000101111111	U " 16	_/
0001000110011111	U " 17	\
0001000110111111	U " 17	\PU 8
0001000111011111	U " 17	/
0001000111111111	U " 17	_/

Note: The second Piggy-back must be ordered special to include the U2B socket extension.

HORIZON TST PROGRAM

The TST program has been written by Gary Bowser of OPA Tronto Canada for use on ANY size Horizon. Each CHART is arranged seperate the memory chip sizes. When using the TST program you will see instruction screens that will explain each test as you proceed into the test. If a Valid ROS is loaded you will be challenged if you want to proceed.

THESE CHARTS WILL ONLY BE NEEDED IF A MEMORY ERROR IS DETECTED DURING A TEST.
If testing a 16 bit address card (32k or 128k memory chips), you can ignore the value reported in columns 4321.

This chart is provided to allow you to translate the TST error address to the correct chip that is causing the error for OLD 8k Horizons using 6264LPxx.
90k , 180k or 265k

8 bit CRUbits bus reported column # 87654321	Chip number by card size 90k	180k	256k
LAST BAD VALUE AT:			
00000010	U11		
00000111	U17		
00001111	U 8		
00010111	U16		
00011111	U 7		
00100111	U15		
00101111	U 6		
00110111	U14		
00111111	U 5		
01000111	U13		
01001111	U 4		
01010111	U12		
01011111	U 3		
01100111	JACK 13		
01101111	" 14		
01110111	" 15		
01111111	" 16		
10000111	Top U 3	or U2bPin1	
10001111	" U 4	U " 2	
10010111	" U 5	U " 3	
10011111	" U 6	U " 4	
10100111	" U 7	U " 5	
10101111	" U 8	U " 6	
10110111	" U12	U " 7	
10111111		U " 8	
11000111		U " 9	
11001111		U " 10	
11010111		U " 11	
11011111		U " 13	
11100111		U " 14	
11101111		U " 15	
11110111		U " 16	
11111111		U " 17	

This chart is provided to allow you to translate the TST error address to the correct chip that is causing the error on Horizons using 32k or 128k chips up to 1.5 meg.

16 bit CRUbits bus reported 1111111 column # 6543210987654321	Chip number by chip type 32k	128k
BAD VALUE AT:		
0000000000001011	U11	U11
0000000000011111	U17	
0000000000111111	U 8	U17
0000000001011111	U16	
0000000001111111	U 7	
0000000010011111	U15	
0000000010111111	U 6	U 8
0000000011011111	U14	
0000000011111111	U 5	
0000000100011111	U13	
0000000100111111	U 4	U16
0000000101011111	U12	
0000000101111111	U 3	
0000000110011111	U2aPin14	
0000000110111111	U " 15	U 7
0000000111011111	U " 16	
0000000111111111	U " 17	
0000001000011111	U2b " 1	
0000001000111111	U " 2	U15
0000001001011111	U " 3	
0000001001111111	U " 4	
0000001010011111	U " 5	
0000001010111111	U " 6	U 6
0000001011011111	U " 7	
0000001011111111	U " 8	
0000001100011111	U " 9	
0000001100111111	U " 10	U14
0000001101011111	U " 11	
0000001101111111	U " 13	
0000001110011111	U " 14	
0000001110111111	U " 15	U 5
0000001111011111	U " 16	
0000001111111111	U " 17	
0000010000011111	U2c " 1	
0000010000111111	U " 2	U13
0000010001011111	U " 3	
0000010001111111	U " 4	
0000010010011111	U " 5	
0000010010111111	U " 6	U 4
0000010011011111	U " 7	
0000010011111111	U " 8	
0000010100011111	U " 9	
0000010100111111	U " 10	U12
0000010101011111	U " 11	
0000010101111111	U " 13	
0000010110011111	U " 14	
0000010110111111	U " 15	U 3
0000010111011111	U " 16	
0000010111111111	U " 17	