

## GEMINI ROBOT KITS

## Keyboard ( with IR ) Assembly Instructions

## Parts List

DESCRIPTION	QTY	PART #
<u>Resistors</u>		
200 ohm (RED-BLK-BRN-GOLD)	1	CCF25200
680 ohm (BLU-GRY-BRN-GOLD)	1	CCF25680
1.2K ohm (BRN-RED-RED-GOLD)	1	CCF251.2K
8.2K ohm (GRY-RED-RED-GOLD)	1	CCF258.2K
10K ohm (BRN-BLK-ORG-GOLD)	15	CCF2510K
15K ohm (BRN-GRN-ORG-GOLD)	1	CCF2515K
20K ohm (RED-BLK-ORG-GOLD)	1	CCF2520K
100K ohm (BRN-BLK-YEL-GOLD)	5	CCF25100K
10M ohm (BRN-BLK-BLU-GOLD)	1	CCF2510M
25K ohm Potentiometers	1	91ER25K
<u>Capacitors</u>		
.01 microfarad (103K)	2	CK05BX103K
27 pF (207K)	2	CK05BX270K
1 microfarad (104K)	1	CK05BX104K
.0022 microfarad (A222,green)	1	my.0022/100
<u>Diodes</u>		
1N4735	1	1N4735
1N4148 or 1N914	3	1N4148
1N34A	1	1N34A
IR LED's (clear)	3	TIL-906
<u>Misc.</u>		
4.00 M HZ Xtal	1	E400
phone connector (red, blk,grn, white wires are attached)	1	616D
toggle switch	1	7101-J51-ZQ
keypads	1	0500496
1/4" x shrink tubing	1	37N406
26" black wire	1	7195-B
10" green wire	1	7195-G
10" white wire	1	7195-W

10" red wire	1	7195-R
10" black wire	1	7195-B
1/16" shrink tubing	2	37N1166
batteries	5	N-180AAA
6" red wire	1	7195-R
12" black wire	1	7195-B
1/2" x 12" shrink tubing	1	37N409
coil cords	1	LH4-DU-06-LA

#### Headers

2 pin single male	2	929834-01
2 pin single female	2	929974

#### Sockets

40 pin socket	1	ICN-406-S5-T
24 pin socket	1	ICN-246-S5-T
20 pin socket	2	ICN-203-S3-T
16 pin socket	1	ICN-163-S3-T
14 pin socket	4	ICN-143-S3-T
8 pin socket	1	ICN-083-S3-T

#### ICs

HD6303	1	HD6303
27C16	1	27C16Q-45
74HC343	2	74HC373
74HC138	1	74HC138
74HC4078	1	74HC4078
74HC04	1	74HC04
74HC00	1	74HC00
74HC03	1	MC74HC03
ICM7555	1	ICM7555IPA

Keyboard circuit board	1	Keyboard P.C. Bd.
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Tie Down	2	MB-3A
Tie Wrap	2	TI8S
Keyboard Rubber Feet	4	8008
Standoff	2	A9741-A-0440
I.R. Material	1	I.R. Material
4-40 1/2 screw	2	91783A110
4-40 1/4 SS screw	2	91783A106
#6 3/8 Sheet Metal Screw	4	90053A146
4-40 Hex Nut	4	91841A005
Keyboard cover	1	G1KB-3
#4 Washers	4	92141A005

## Assembling the keyboard

1. Insert and solder all sockets into their proper locations. Take notice that pin 1 is marked on the circuit board with a square.

- ( ) U1 - 40 pin socket
- ( ) U2 - 24 pin socket
- ( ) U5 - 16 pin socket
- ( ) U4 - 20 pin socket
- ( ) U3 - 20 pin socket
- ( ) U6 - 14 pin socket
- ( ) U7 - 14 pin socket
- ( ) U8 - 14 pin socket
- ( ) U9 - 14 pin socket
- ( ) U10 - 8 pin socket

2. Insert and solder all resistors into their proper locations.

- ( ) R28 - 1.2K ohm (BRN-RED-RED-GOLD)
- ( ) R10 - 10M ohm (BRN-BLK-BLU-GOLD)
- ( ) R6 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R1 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R2 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R19 - 680 ohm (BLU-GRY-BRN-GOLD)
- ( ) R18 - 20K ohm (RED-BLK-ORG-GOLD)
- ( ) R17 - 100K ohm (BRN-BLK-YEL-GOLD)
- ( ) R7 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R26 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R8 - 100K ohm (BRN-BLK-YEL-GOLD)
- ( ) R11 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R21 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R20 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R9 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R5 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R3 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R4 - 100K ohm (BRN-BLK-YEL-GOLD)
- ( ) R22 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R23 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R24 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R25 - 10K ohm (BRN-BLK-ORG-GOLD)
- ( ) R27 - 100K ohm (BRN-BLK-YEL-GOLD)
- ( ) R12 - 15K ohm (BRN-GRN-ORG-GOLD)
- ( ) R13 - 200 ohm (RED-BLK-BRN-GOLD)
- ( ) R15 - 100K ohm (BRN-BLK-YEL-GOLD)
- ( ) R16 - 8.2K ohm (GRY-RED-RED-GOLD)

3. Insert and solder all diodes into their proper location.

- ( ) D6 - 1N4148 or 1N914
- ( ) D5 - 1N34A
- ( ) D7 - 1N4148 or 1N914
- ( ) D21 - 1N4735

\* Take notice that the circuit board is not marked with a white line for the diode. Make sure that the black line on the diode is pointing towards D7.

- ( ) D4 - 1N4148 or 1N914

4. Insert and solder the potentiometer into its proper location.

- ( ) R14 - 25K potentiometer

5. Insert and solder all capacitors into their proper locations.

- ( ) C3 - 27pF (270K)
- ( ) C2 - 27pF (270K)
- ( ) C1 - 1 microfarad (104K)
- ( ) C4 - .01 microfarad (103K)
- ( ) C5 - .01 microfarad (103K)
- ( ) C6 - .0022 microfarad (A222. green)

6. Insert and solder the crystal into its proper location.

- ( ) Y1 - 4M HZ crystal (silver can)

7. Insert and solder the Infra Red LEDs into their proper location. Notice the shorter lead. This is to go into the hole in the circuit board with the square pad.

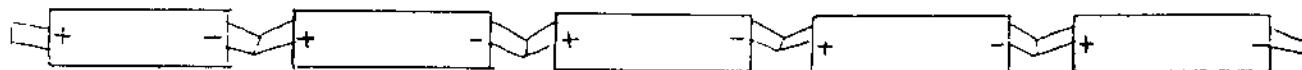
8. Insert and solder all headers into their proper location with short pins going into the circuit board.

- ( ) J3 - 2 pin single male header
- ( ) J2 - 2 pin single male header

9. Installing and soldering the key pad. Please use caution and make sure that all the leads on the back of the key pads come through the back of the circuit board. These leads tend to bend and break off easily.

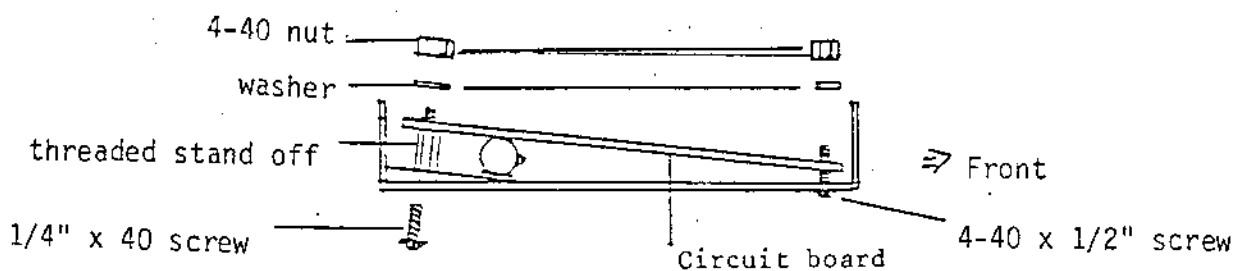
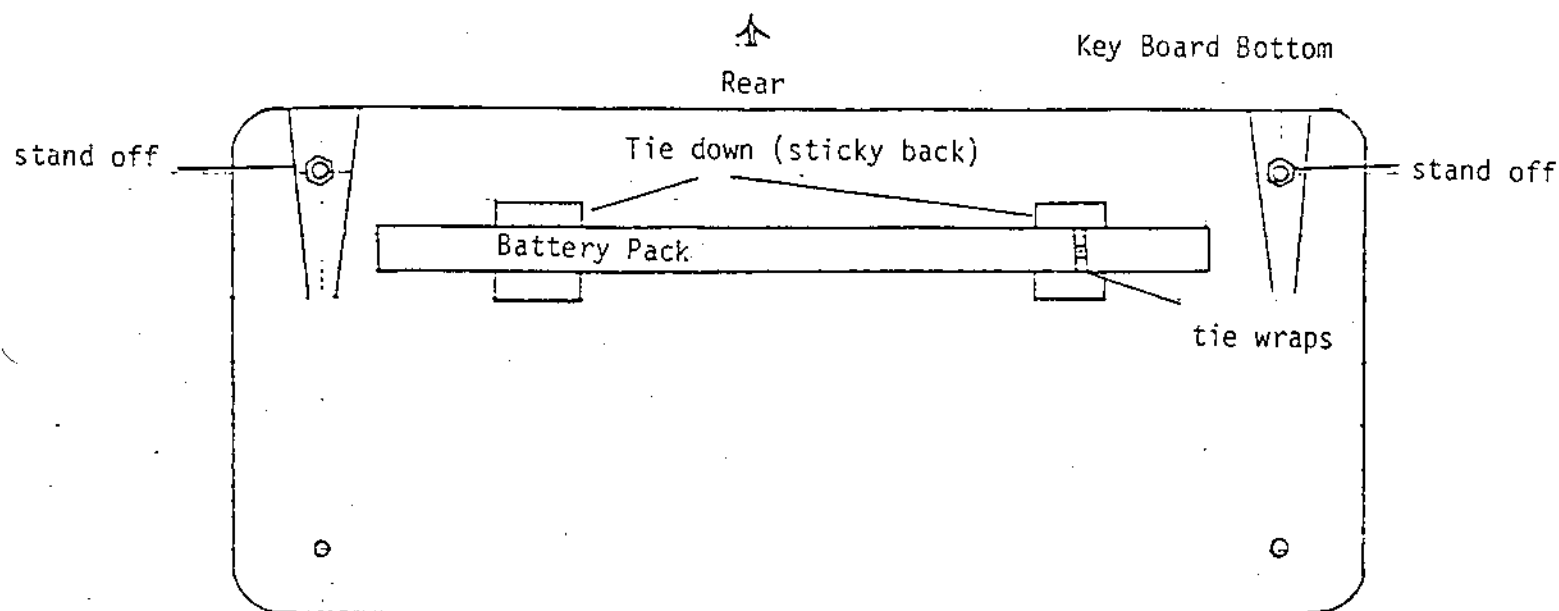
- ( ) KB1 - Keypads

10. At this point we recommend that you clean the circuit board. You can use alcohol and a scrub brush or purchase Flux Remover at your nearest electronics supply store.
11. Wiring the switch: Cut the 26" piece of black wire in half and twist it together leaving approximately 2" untwisted on each end. Strip approximately 1/8" of insulation off of the ends of the wires then tin the ends. (Tinning the wire means to put a light coat of solder on them.) Cut the 1/4" x 1" piece of shrink tubing so that it is 1/4" x 1/2" and slide it up the two wires at one end. Tin two of the pins on the switch making sure that the middle one is one of the two. Heat up a small amount of solder on your iron and solder the ends of the two wires to the pins on the switch. Slide the shrink tubing down over the pins. On the other two wires at the other end slide a piece of 1/8" x 1/2" of shrink tubing up each. You will solder these two wires onto a female header. Use caution since the female header can only withstand a small amount of heat. Then slide the shrink tubing down over the wires. Twist the remaining cable so that the twist meets up with the shrink tubing. You can use a hair dryer to shrink the tubing. The female header will be placed over J2.
12. Installing the phone connector: The wires on the phone connector are too short so you will have to splice a piece of 10" wire onto each. Match the colors of your wires when splicing and add a piece of shrink tubing to cover the splice. Shrink the tubing with a hair dryer and twist the cable. At the other end of the cable strip approximately 1/8" of insulation off each wire, tin the ends. From the underside of the board you will place the wires through the holes on J1 starting with the hole closest to J2. Use the following order: black, green, white, and red. Solder them on the top side of the board. You should spot clean this area.
13. Assembling the battery pack: Solder the five batteries in series as shown so that the tabs do not stick out on the sides.

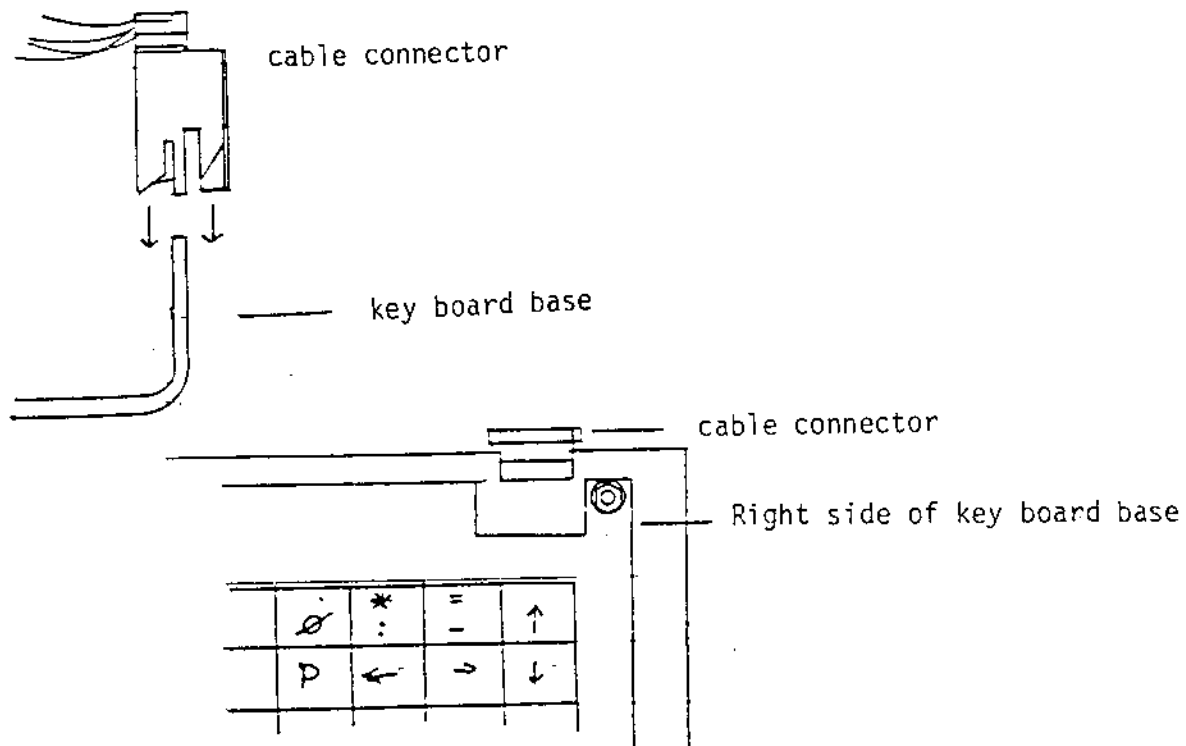


Strip insulation off one end of the 6" red wire and solder to the positive (+) end of the batteries. Strip insulation off one end of the 12" black wire and solder to the negative end of the batteries. Twist the black wire around the batteries so it meets with the red wire and continue twisting.

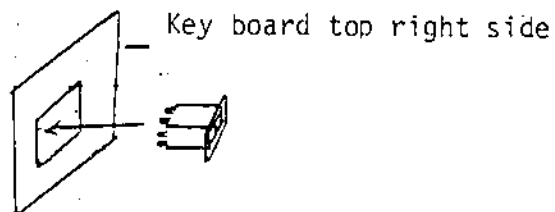
14. Slide the 1/2" shrink tubing over the batteries so that it extends 1/2" beyond the end of the batteries, and trim off the other end so it extends 1/2" beyond the batteries. Shrink with a hair dryer.
15. Cut the red and black wire coming from the batteries so that it is 4" long. Cut 2 1/8" x 1/2" pieces of shrink tubing, untwist the wires and slide the shrink tubing up each wire. Strip approximately 1/8" of insulation off of each wire and tin the ends. Solder these wires onto a two pin female header. Slide the shrink tubing down and shrink it with a hair dryer.
16. Place the female header from the batteries onto J3 with the black wire closest to J2.
17. Install battery pack with two tie downs and tie wraps. Mount keyboard to the keyboard case bottom with standoffs and screws as shown below.



18. Push cable connector onto the keyboard base as shown below.



19. Snap power switch into square hole in keyboard right side top.

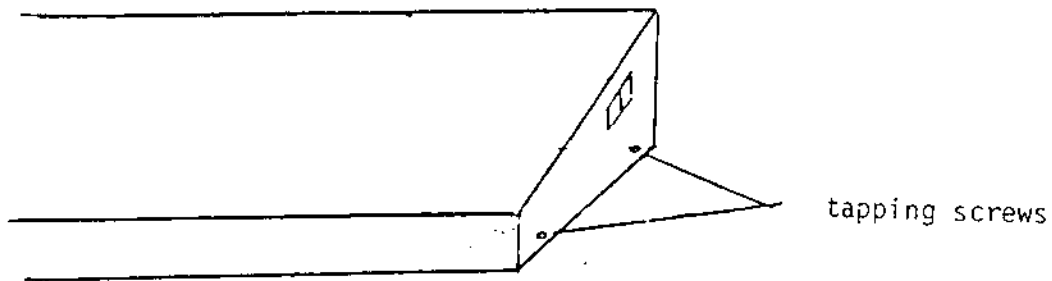


20. Turn keyboard base over and mount 4 sticky back feet.

21. Install all IC's on the circuit board. We recommend that you be grounded when doing this. Make sure all the legs on the chips go into the holes on the sockets properly and do not bend underneath the chip.

- ( ) U1 HD6303
- ( ) U2 27C16
- ( ) U5 74HC138
- ( ) U4 74HC383
- ( ) U3 74HC383
- ( ) U6 74HC4078
- ( ) U7 74HC04
- ( ) U8 74HC00
- ( ) U9 74HC03
- ( ) U10 IC1117555

22. Turn keyboard over and mount 4 sticky back feet, one to each cover. Place keyboard top over keyboard bottom and secure with 4 #6 x 3/4" self tapping screws.





## GEMINI ROBOT KITS

## Infra Red Receiver Assembly Instructions

## Parts List

DESCRIPTION	QTY	PART #
<u>Resistors</u>		
120 ohm (BRN-RED-BRN-GLOD)	1	CCF25120
1K ohm (BRN-BLK-RED-GOLD)	1	CCF251K
2.2K ohm (RED-RED-RED-GOLD)	1	CCF252.2K
4.7K ohm (YEL-VIO-RED-GOLD)	2	CCF254.7K
10K ohm (BRN-BLK-ORG-GOLD)	1	CCR2510K
22K ohm (RED-RED-ORG-GOLD)	1	CCF2522K
68K ohm (BLU-GRY-ORG-GOLD)	1	CCF2568K
150K ohm (BRN-GRN-YEL-GOLD)	1	CCF25150K
10K ohm potentiometer	1	91ER10K
<u>Capacitors</u>		
200pF (201)	2	21FK200
10 microfarad 16v Electrolytic	3	CRE10MF16v
.047 microfarad (473K)	2	CKO5BX473K
.01 microfarad (103K)	1	CKO5BX103K
470 pF (471K)	1	CKO5BX471K
.1 microfarad (104)	2	SR205E104M-AA
.033 microfarad (green)	1	MY .003/100
1000 microfarad 16v Electrolytic	1	CRE1000MF16v
<u>Diodes</u>		
1N4740	1	1N4740
1N4733	1	1N4733
TIL-413	1	TIL413
<u>Transistors</u>		
PN2222	1	PN2222
<u>Miscellaneous</u>		
3 pin right angle single male header	1	929835-01
LJ410 (light blue)	1	LJ410
<u>Sockets</u>		
16 pin socket	1	ICN-163-53-T

## ICs

SN76832	1	SN76832AN
Infra Red Receiver Board	1	I.R. Board

### Assembling the Infra Red Receiver Board

1. Insert and solder the socket into its proper location. Take note of where pin one is located.

( ) U1 - 16 pin socket

2. Insert and solder all resistors into their proper locations.

( ) R1 - 150K ohm (BRN-GRN-YEL-GOLD)  
( ) R2 - 1K ohm (BRN-BLK-RED-GOLD)  
( ) R5 - 22K ohm (RED-RED-ORG-GOLD)  
( ) R4 - 4.7K ohm (YEL-VIO-RED-GOLD)  
( ) R6 - 10K ohm (BRN-BLK-ORG-GOLD)  
( ) R7 - 2.2K ohm (RED-RED-RED-GOLD)  
( ) R8 - 4.7K ohm (YEL-VIO-RED-GOLD)  
( ) R9 - 68K ohm (BLU-GRY-ORG-GOLD)  
( ) R10 - 120 ohm (BRN-RED-BRN-GOLD)

3. Insert and solder all diodes into their proper locations.

( ) D1 - 1N4733  
( ) D2 - 1N4740

4. Insert and solder the potentiometer into its proper location.

( ) R3 - 10K (marked on the end of one lead)

5. Insert and solder the inductor into its proper location. You will notice that the location on the circuit board has its holes off center and the leads on the bottom of the inductor are off center. Insert the inductor into the circuit board so that these off centers match up.

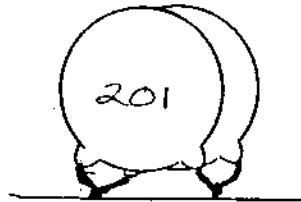
( ) L1 - LJ410 (light blue)

6. Insert and solder the transistor into its proper location so that the emitter (E) on the transistor matches up with the E on the circuit board.

( ) Q1 - PN2222

7. Insert and solder all capacitors into their proper location.

- ( ) C1 - 200pF (201) This capacitor is special. You will have to solder two capacitors side-by-side. The easiest way to do this is to insert one capacitor into the circuit board leaving some excess lead length on top. Solder that capacitor in, then bend the leads of the other (201) cap so that they lie next to the leads of the other cap on top of the circuit board. Get them as close to each other as possible, solder and clip excess lead length off.



- ( ) C5 - .047 microfarad (473K)  
( ) C3 - 1000 microfarad 16v Electrolytic  
( ) C2 - 10 microfarad 16v Electrolytic  
( ) C4 - 10 microfarad 16v Electrolytic  
( ) C7 - .1 microfarad (104)  
( ) C6 - .01 microfarad (103K)  
( ) C8 - .047 microfarad (473K)  
( ) C11 - .033 microfarad (green)  
( ) C12 - 10 microfarad 16v Electrolytic  
( ) C9 - 470pF (471K)

8. Insert and solder the 3 pin right angle male header into its proper location.

- ( ) J1 - 3 pin right angle single male header. (Bent pins should be inserted into the board.)

9. At this point we recommend that you clean the board using either alcohol and a scrub brush or you can purchase Flux Remover at your nearest electronics supply store.

10. Insert and solder the photodiode into its proper location with the dome side facing out.

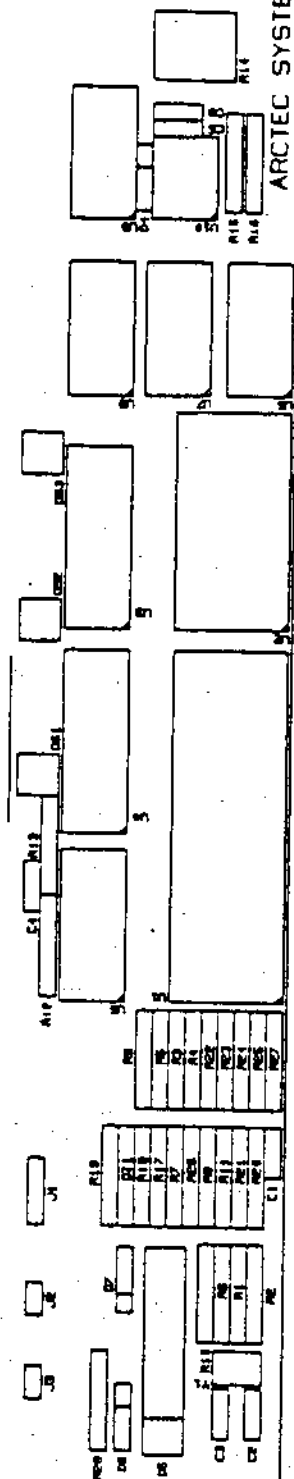
- ( ) D1 - TIL -413

11. Spot clean the underside of the board where you just soldered. Caution:  
Be careful not to get any solution on the photo diode.
12. Insert the chip into its socket making sure all the leads on the chip  
go into the holes in the socket properly and do not bend underneath the  
chip. We recommend that you should be grounded when doing this.

( ) U1 - SN76832

The board is now complete.





ARCTEC SYSTEMS KEYBOARD ©

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