

GEMINI ROBOT KITS

Torso Cable - Part A Assembly Instructions

PARTS LIST

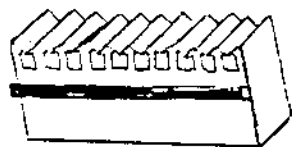
Please review the following parts list to be sure that you have all the parts before you begin assembling your kit.

<u>Description</u>	<u>Quantity</u>	<u>Part #</u>
Ribbon cable	19.5	BB1022-7B
2 Pin molex connector	5	22-26-7023
3 Pin molex connector	3	22-26-7033
4 Pin molex connector	2	22-26-7043
5 Pin molex connector	1	22-26-7053
6 Pin molex connector	1	22-26-7063
8 Pin molex connector	1	22-26-7083
10 Pin molex connector	8	22-26-7103
26 Pin connector	2	609-2601M
Cable	3	171-20
40 Pin connector	2	609-4001M
Card Edge connector	1	FCE34-101
Cable	3	171-40
Commercial sonar	6	604029
Connector RS232	1	DB25S
Crimp pins	4	86016-2
Tie down	4	MB-3A
Molex connector spring	1	09-50-30B1
Molex connector	2	09-50-3041
Molex Pins spring	16	08-50-0106
Telephone connector	1	616D
Tie wrap	94	T18S
Connector 34 win	1	68-34-10
Connector 26	1	68-26-10
Shrink tube	1	37N1166
LED	1	LFM035.4221
Molex connector female	1	03-06-1363
Female molex pins	27	02-06-1103
Cable	2.5	171-34
Quick disconnects	4	D-25-1104X
20 Pin connector	1	609-2001
Connector 34	1	609-3401
Cable 26 conductor	1 ft.	171-26

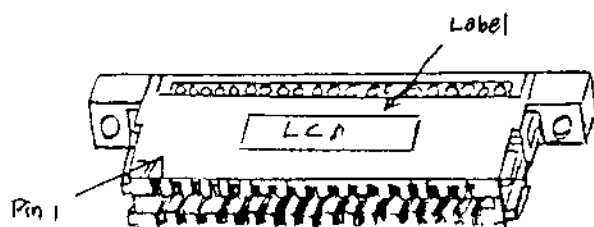
<u>Description</u>	<u>Quantity</u>	<u>Part #</u>
Buzzer	1	273-065
Fork lug	4	67F746
Amp connector	1	87499-7
Tie wrap	50	T18I
Yellow wire	1 ft.	7197/19-Y
Blue wire	1 ft.	7197/19-BL
Green wire	1.25 ft.	7197/19-G
Black wire	4.25ft.	7197/19-B
Red wire	1.25 ft.	7197/19-R
Red wire	7 ft.	7195-R
Black wire	7 ft.	7195-B
Caterpillar grommet	30"	760-3181
Sonar clips	12	S09202S
Labels	32	labels
4-40 1/2 screw	4	917B3A110
4-40 3/8 screw	4	917B3A108
#4 flat washer	4	92141A005
#4 lock washer	8	92146A005
4-40 Hex nut	8	91841A005
#12 flat washer	1	92141A013
Double-sided tape	3"	4016

Parts Identification

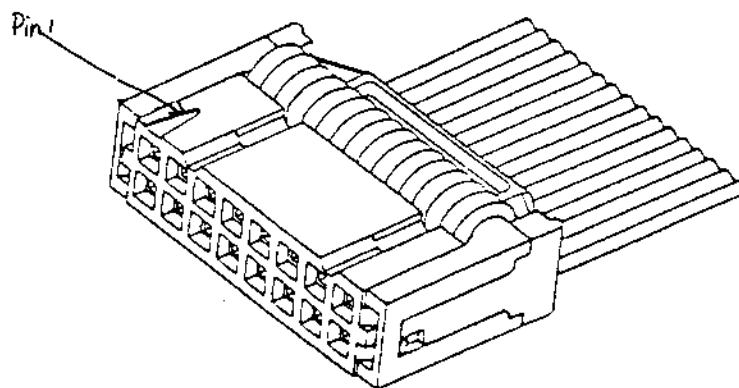
Small Molex connector



Card Edge connector

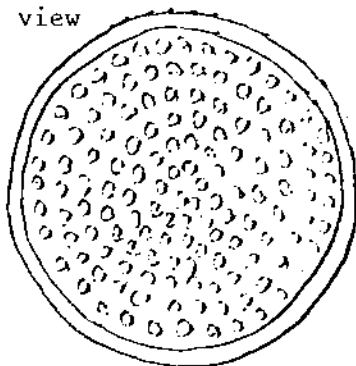


40, 34, 20 and 26-Pin connector



Sonar Transducer

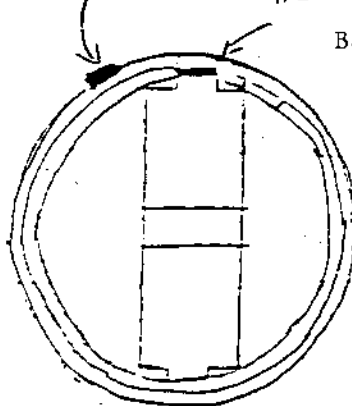
Front view



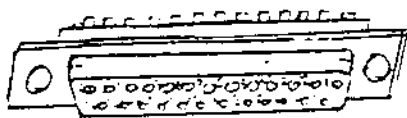
(-) TAB

(+) TAB

Back view



RS232 Connector

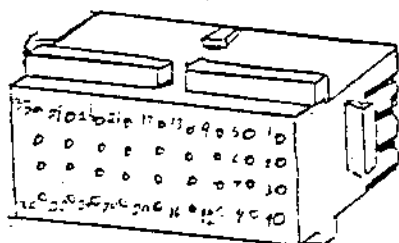


34 and 26 pin connector

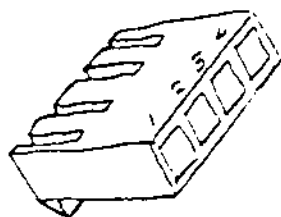


36 pin female molex connector

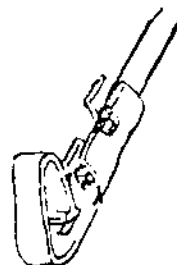
Back view



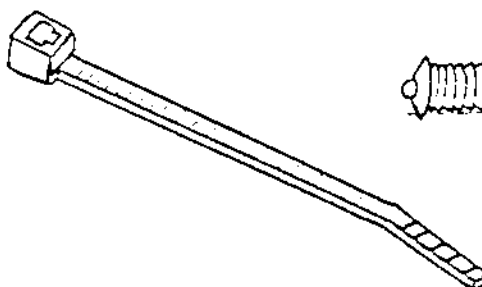
Molex spring connector



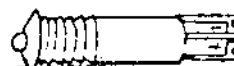
Molex spring pin



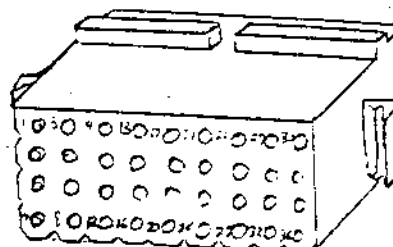
Tie wrap



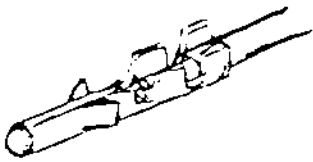
LED



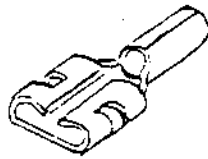
Front view



Female Molex pin



Quick disconnect

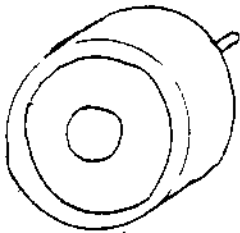


Fork Lug

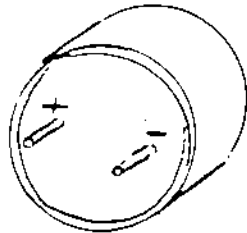


Buzzer

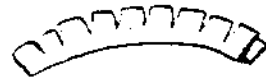
Front view



Back view



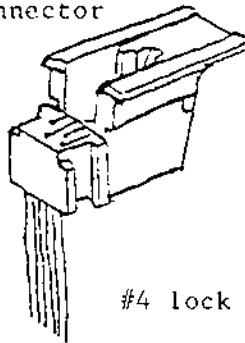
Caterpillar grommet



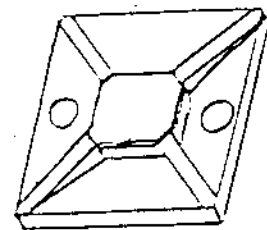
Sonar clip



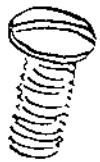
Keyboard connector



Cable tie down



4-40 screw



#4 flat washer



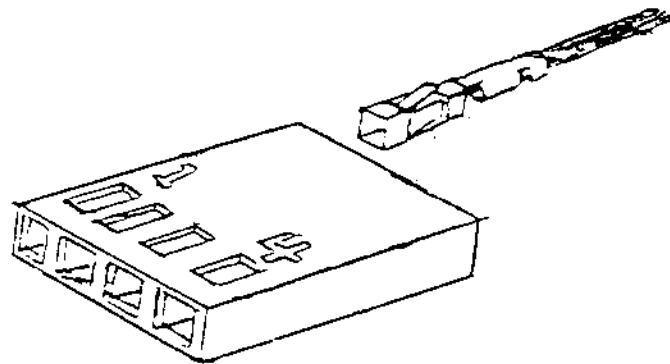
#4 lock washer



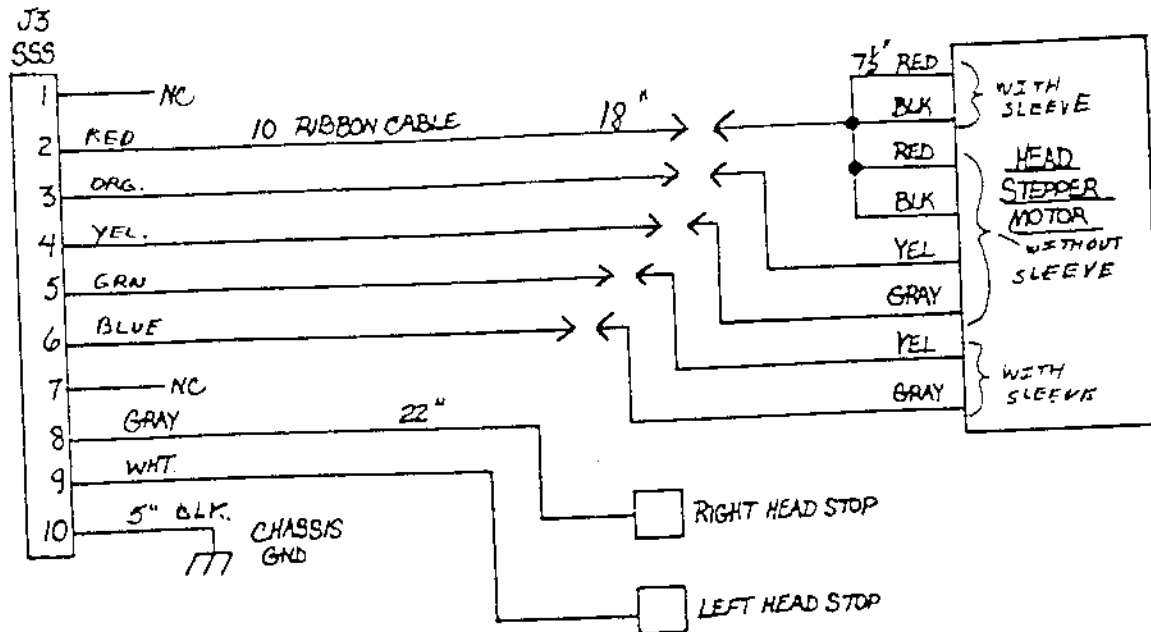
4-40 hex nut



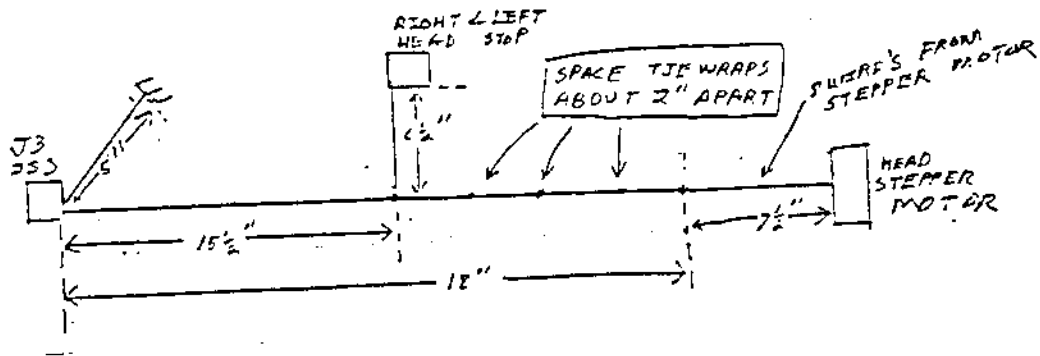
Amp connector and crimp pins gold



Head Motor Wiring Diagram

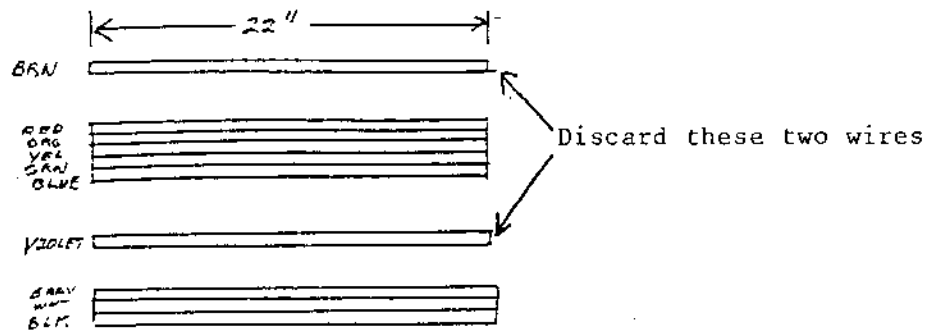


Lacing Diagram

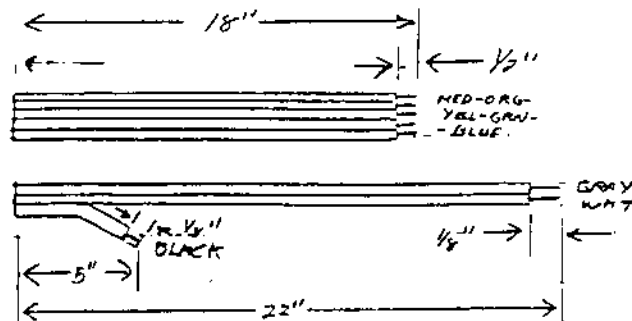


Torso Cable Assembly Instructions

1. Refer to the head motor wiring diagram for the following steps.
Cut a 22" length of the 10 conductor ribbon cable and separate wires as indicated. NOTE: The 10 conductor ribbon cable is color coded.



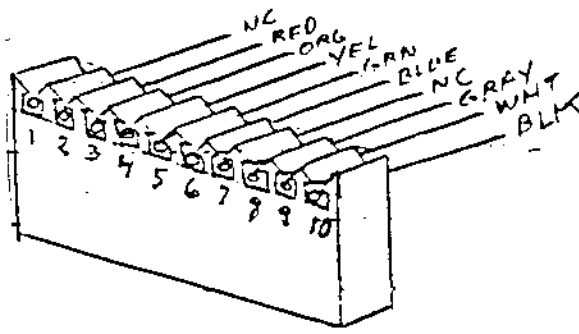
2. Take the red-org-yel-grn-blue group of wires and cut to 18". Take the gray-wht-blk group of wires and separate and peel back the black conductors and cut to 5".



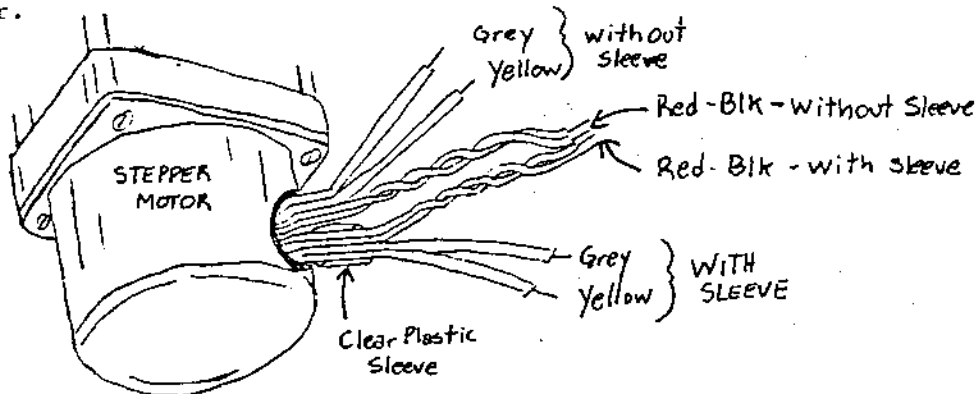
3. Remove insulation from one end of the red-org-yel-grn-blue group of wires. (see above) Remove insulation from one end of the gray-wht-blk group of wires.
4. Install a small 10 pin Molex connector (see how to section) on the insulated end of the cable as follows:

Pin 1 - no connection

red to pin 2
org to pin 3
yel to pin 4
grn to pin 5
blue to pin 6
pin 7 - no connection
gray to pin 8
wht to pin 9
blk to pin 10



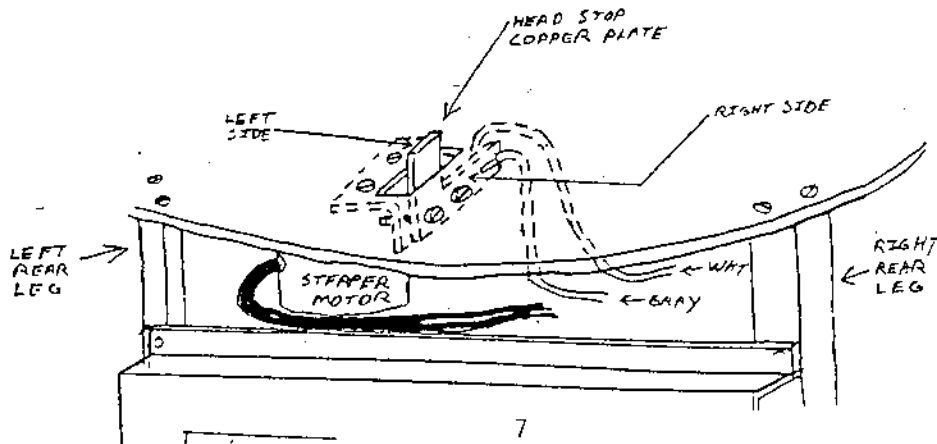
5. Locate the head stepper motor on the bottom of the head plate. There are 8 wires leading from this motor. Take note that there is a clear plastic sleeve on four of the wires. Twist all of the red and black wires together.



6. Take the small 10 pin Molex connector and label this connector J3 SSS. Twist together and solder the stepper motor wires to the small 10 pin Molex connector wires as follows:

10 pin connector wires	{ red to all 4 red and black wires org to yel wire without sleeve yel to gray wire without sleeve grn to yel wire with sleeve blue to gray wire with sleeve }	Stepper motor wires
------------------------	---	---------------------

7. Cover the individual solder connections with electrical tape.
8. Locate the head stop bracket. Solder the gray wire from the 10 pin Molex connector to the right side of the copper plate. Solder the white wire from the 10 pin Molex connector to the left side of the copper plate.



9. Install a fork lug on the other end of the black wire from the 10 pin Molex connector. (see how to section)
10. Lace the head motor cable wires together. (see lacing diagram and how to section)
11. Refer to fig. 1. Place the head stepper motor cable on the inside of the right rear torso leg and run cable down this leg to the J3 mate on the SSS board. (This board will be mounted later.)
12. Secure this cable to the chassis by using the large tie wraps. NOTE: Do not tighten these tire wraps yet. There will be other cables going down this torso leg.
13. Ground the fork lug on the end of the 5" black wire to any convenient screw on the torso chassis.

Fig.1

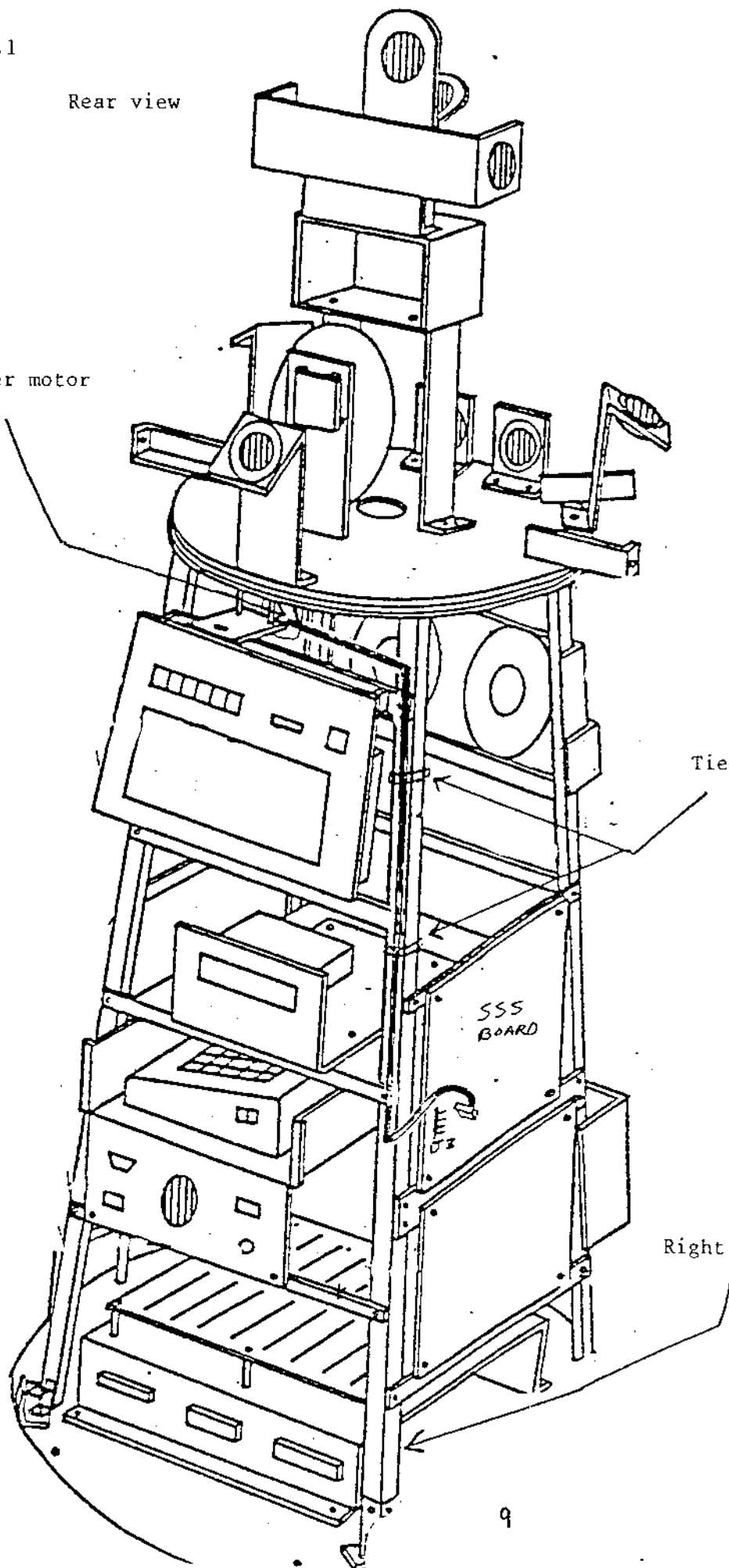
Rear view

Stepper motor

Tie wraps

SSS
BOARD

Right rear leg



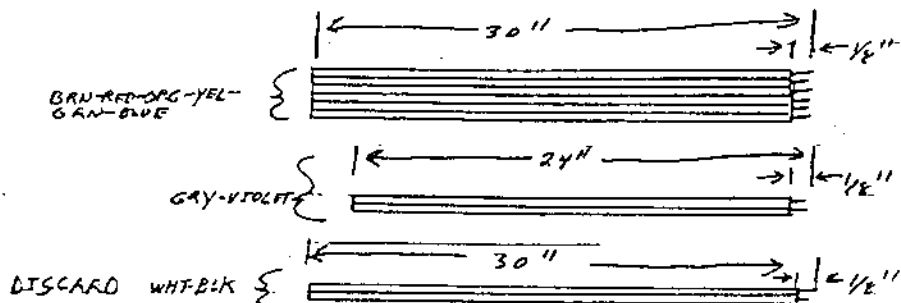
Refer to the Main Torso Harness Wiring Diagram in Fig.2 for the following steps.

1. Cut the following lengths of 10 conductor ribbon cable:
30", 29" and 26.5". Cut the black 22 gauge wire (thin black wire supplied) 14" long. Locate the 20 pin connector with wires attached.

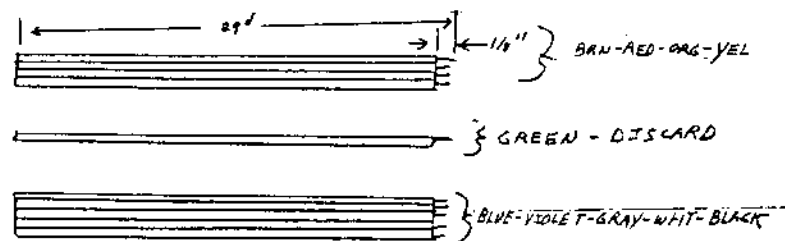
NOTE: There are only 18 conductors on this cable.

Remove insulation from conductors 1 through 6 on this cable. Remove insulation on one end of the three lengths of the 10 conductor ribbon cable.

2. On the 30" 10 conductor ribbon cable, separate conductors as shown below and discard the white and black wires. Cut the violet and gray pair to 24".



3. On the 29" 10 conductor ribbon cable, separate conductors as shown below and discard the green wire.



4. On the 26.5" 10 conductor ribbon cable separate conductors as shown below and discard the green, blue, violet, gray, white and black wires.

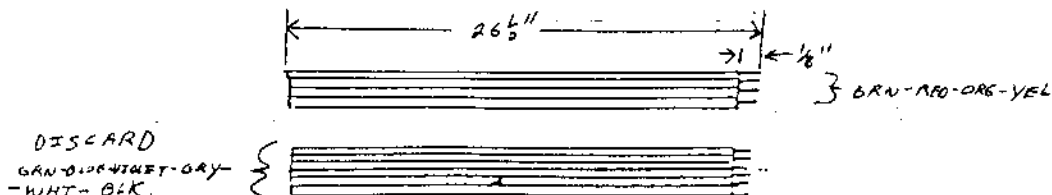
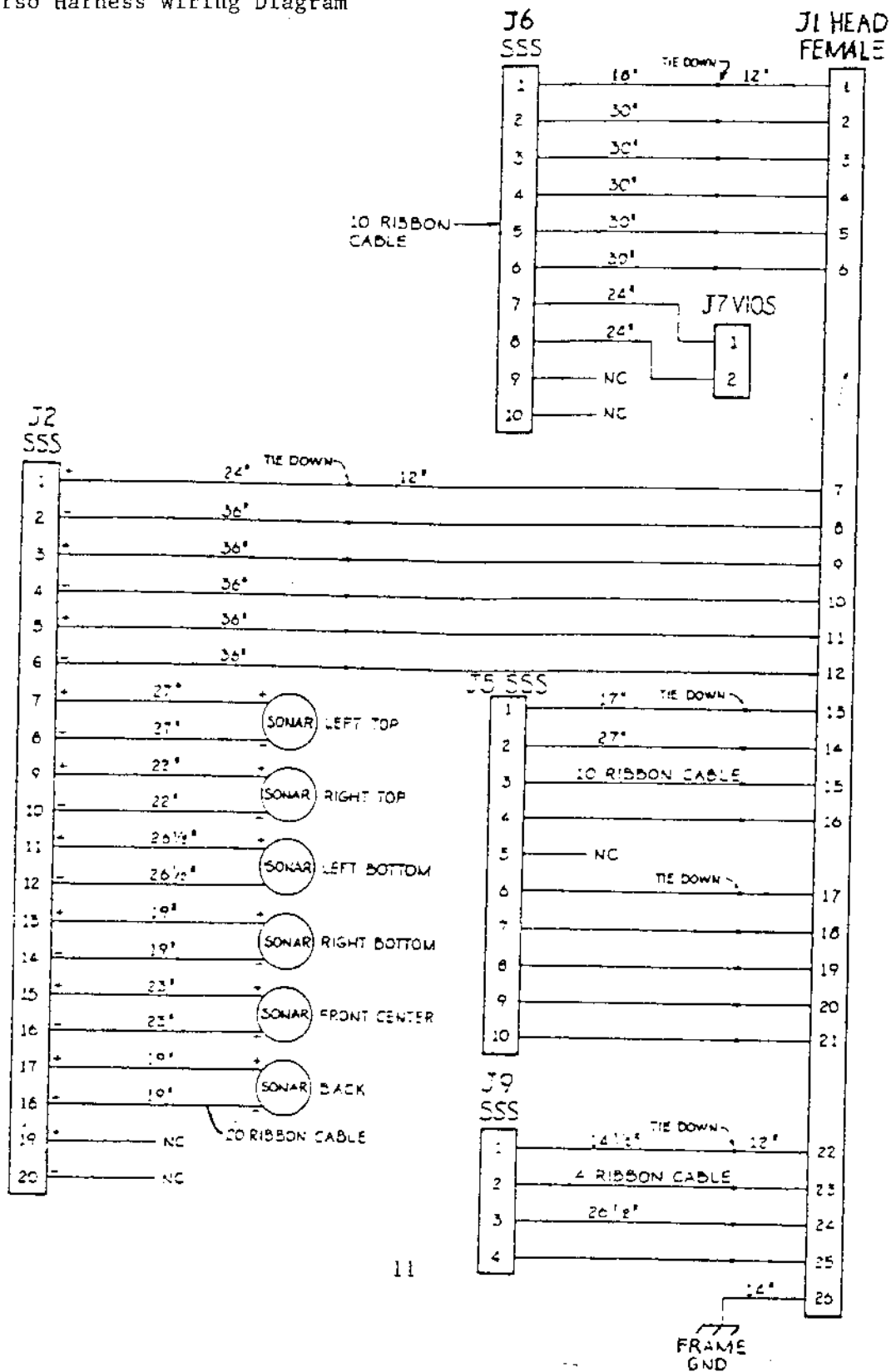


Fig.2

Main Torso Harness Wiring Diagram



5. Install a female molex pin on each of the conductors (except the 24" violet,gray cable) in the three lengths of the 10 conductor ribbon cables and conductors 1 through 6 in the 20 ribbon cable and on the 14" black 22 gauge wire.
6. Install the female molex pins into the back of the 36 pin female molex connector as follows:

30" ribbon cable	{	brn to hole 1 red to hole 2 org to hole 3 yel to hole 4 grn to hole 5 blue to hole 6
---------------------	---	---

20" ribbon cable	{	conductor 1 to hole 7 conductor 2 to hole 8 conductor 3 to hole 9 conductor 4 to hole 10 conductor 5 to hole 11 conductor 6 to hole 12
---------------------	---	---

29" ribbon cable	{	brn to hole 13 red to hole 14 org to hole 15 yel to hole 16 blue to hole 17 violet to hole 18 gray to hole 19 wht to hole 20 blk to hole 21
---------------------	---	---

26.5" ribbon cable	{	brn to hole 22 red to hole 23 org to hole 24 yel to hole 25
-----------------------	---	--

14" 22 gauge wire		blk 14" to hole 26
-------------------	--	--------------------

7. On the other end of the 30" ribbon cable install a small 10 pin molex connector as follows: (Refer to the SSS board for correct orientation of connectors to the board. The boards have pins 1 and 10 labeled on them for each of the connectors.)

brn to pin 1
red to pin 2
org to pin 3
yel to pin 4
grn to pin 5
blue to pin 6

Install the 24" ribbon cable on this connector as follows: violet to pin 7 - gray to pin 8. No connection on pins 9 and 10. Label this connector J6 SSS. On the other end of the 24" wires, install a small 2 pin connector as follows: violet to pin 1 - gray to pin 2. Label this connector J7 VIOS.

8. Install a sonar clip on conductors 7 through 18 on the 20 conductor ribbon cable.
9. Install a small 10 pin molex connector on the 29" ribbon cable as follows:

brn to pin 1	blue to pin 6
red to pin 2	violet to pin 7
org to pin 3	gray to pin 8
yel to pin 4	wht to pin 9
no connection on pin 5	blk to pin 10

Label this connector J5 SSS.

10. Install a small 4 pin molex connector on the other end of the 26.5" ribbon cable as follows:

brn to pin 1	org to pin 3
red to pin 2	yel to pin 4

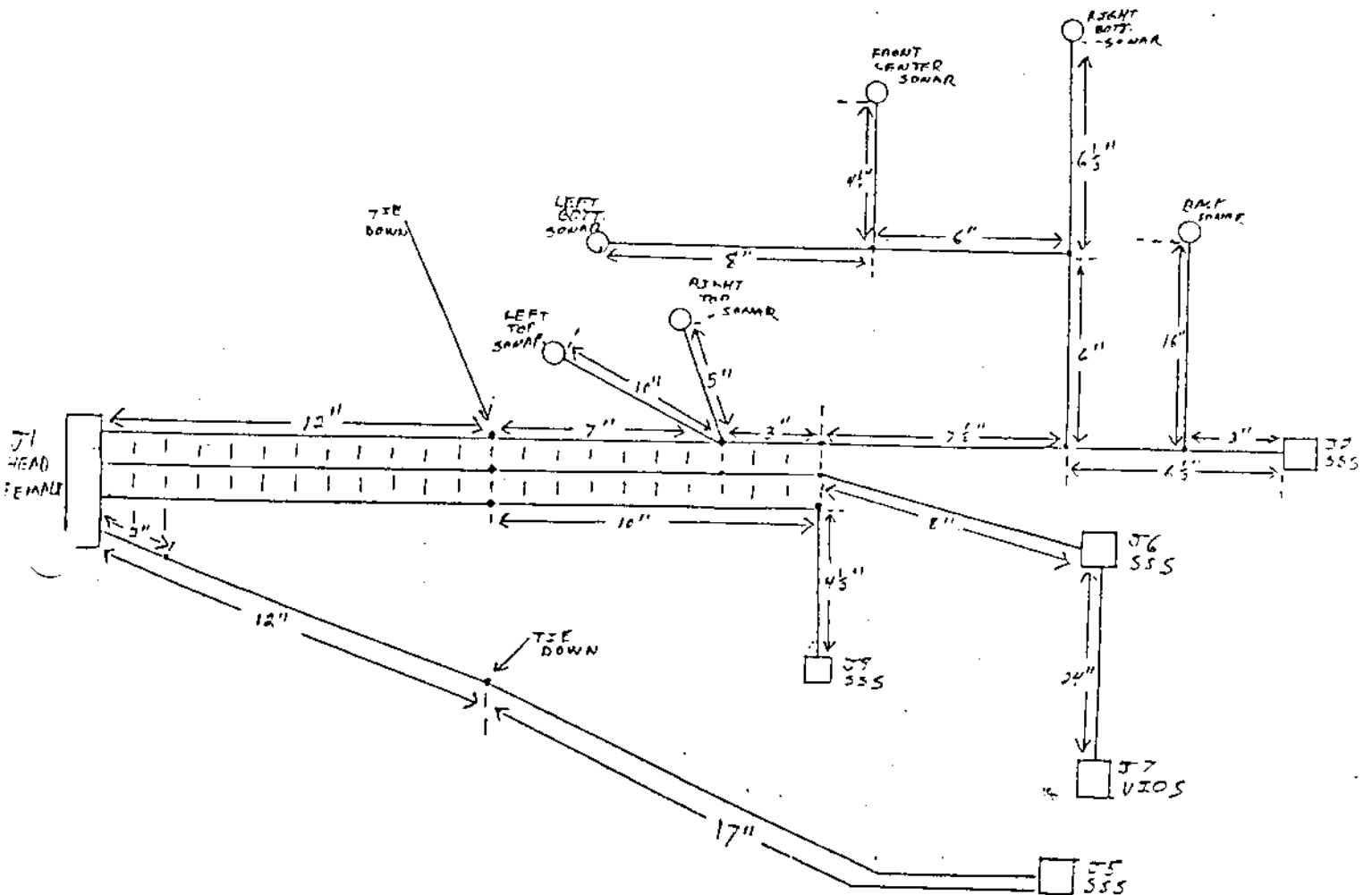
Label this connector J9 SSS.

11. Install a fork lug on the 14" black 22 gauge wire.

12. Lace wires according to the lacing diagram shown in Fig.3.

Fig.3

Lacing Diagram



13. Refer to Fig.4A and 4B. Peel paper off back of the cable tie downs and press into place where indicated (3 places). Place cable on torso and secure cable to torso using the large tie wraps. Note that the cable tie downs are attached to the under surface of the shoulder plate (GITS-23).
14. Insert the 36 pin connector through the hole in the shoulder plate. This connector will mate with the head cable.
15. Cut the caterpillar grommet into six 5" lengths. Install grommets into holes (6 places) for sonars. Make sure grommets are seated. Install sonar transducers into grommets. Be careful not to push in the center of transducers, as this can destroy them. Push sonar clips going to sonars onto the transducers while observing the correct polarity. (see main torso harness wiring diagram - Fig.2.)
16. Ground the fork lug on the end of the 14" black wire to any convenient screw on the torso.

Fig.4A

Back view

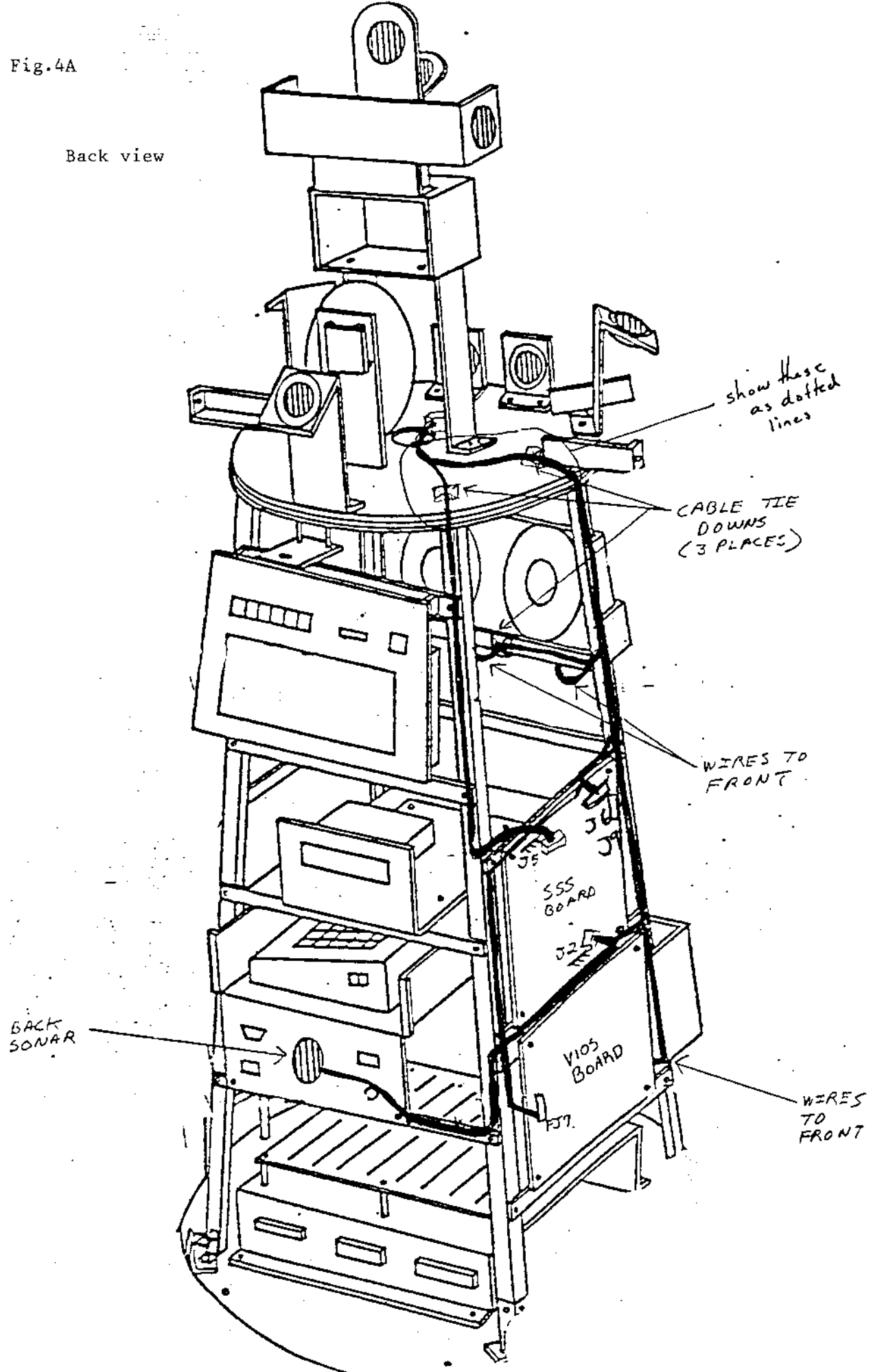
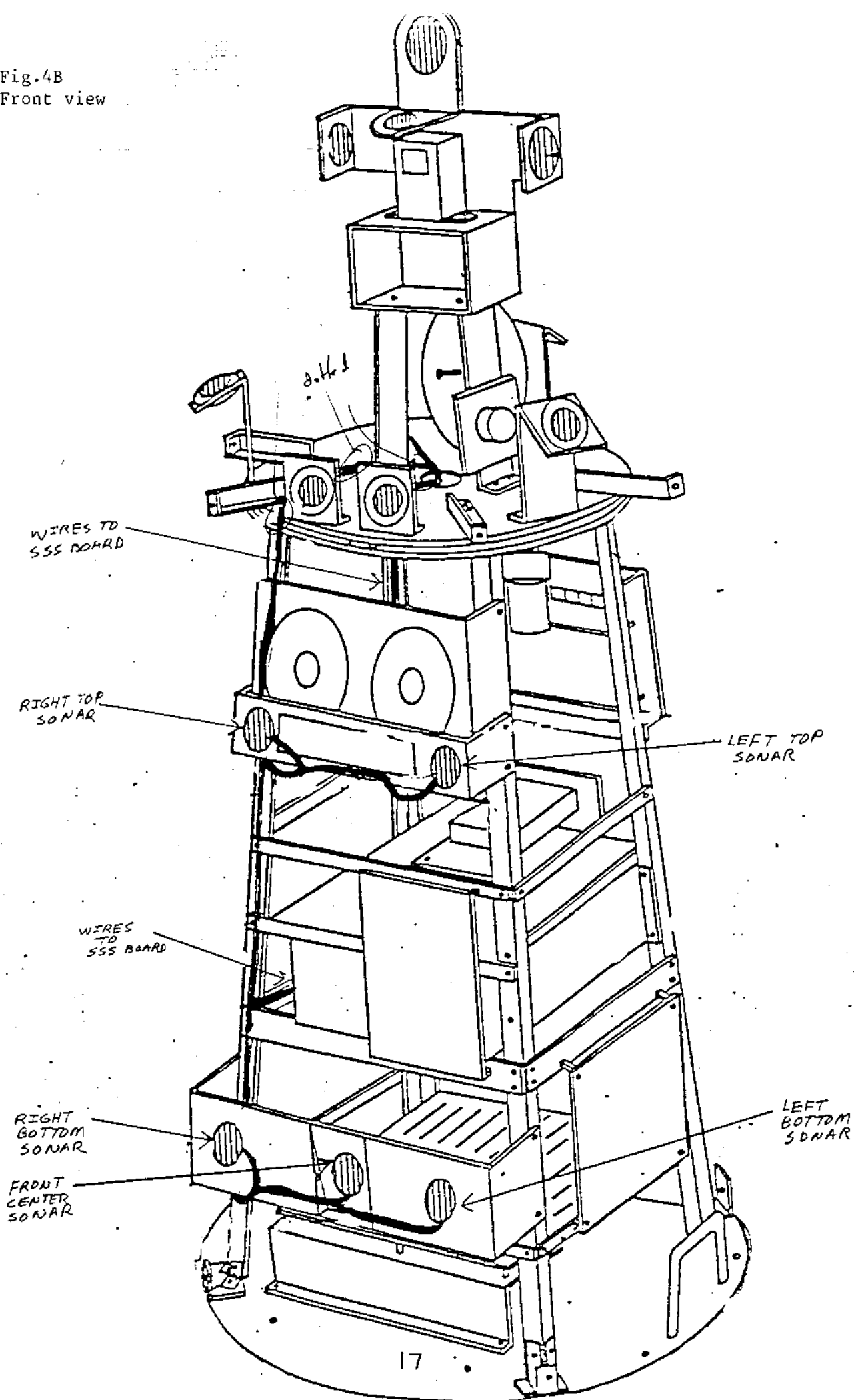
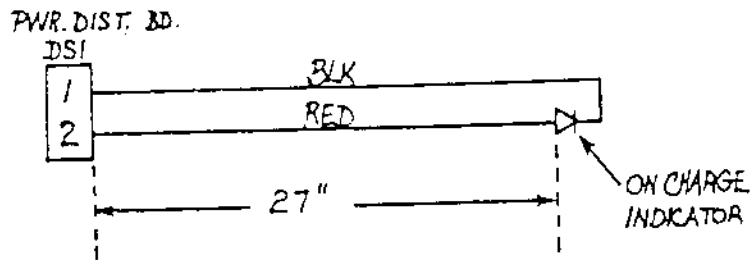


Fig.4B
Front view



On-Charge LED Wiring Diagram



Refer to the on-charge LED wiring diagram above for the following steps:

1. Cut a 27" length of the red and black (thin wire supplied) 22 gauge wires and remove insulation from one end of these wires.

2. Install a small 2 pin molex connector on these wires as follows:

27" blk wire to pin 1
27" red wire to pin 2

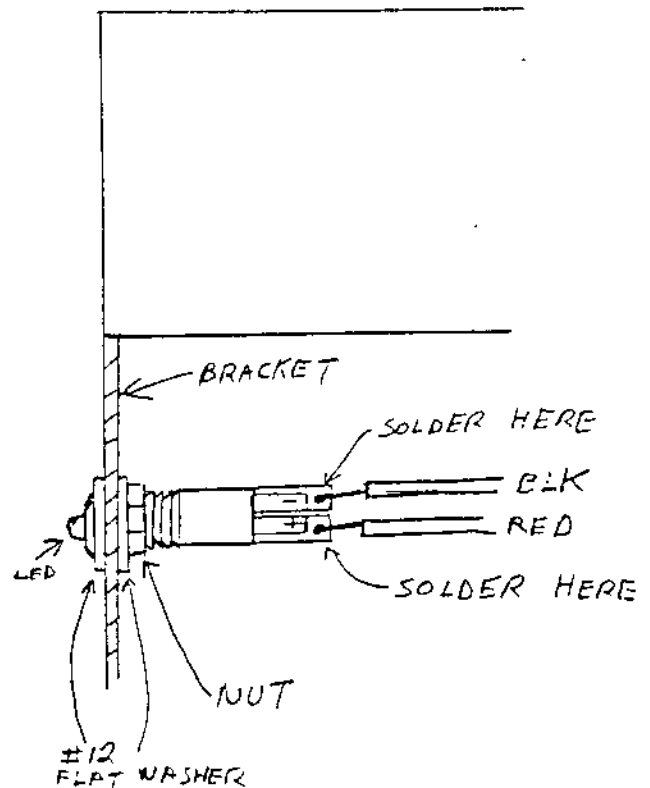
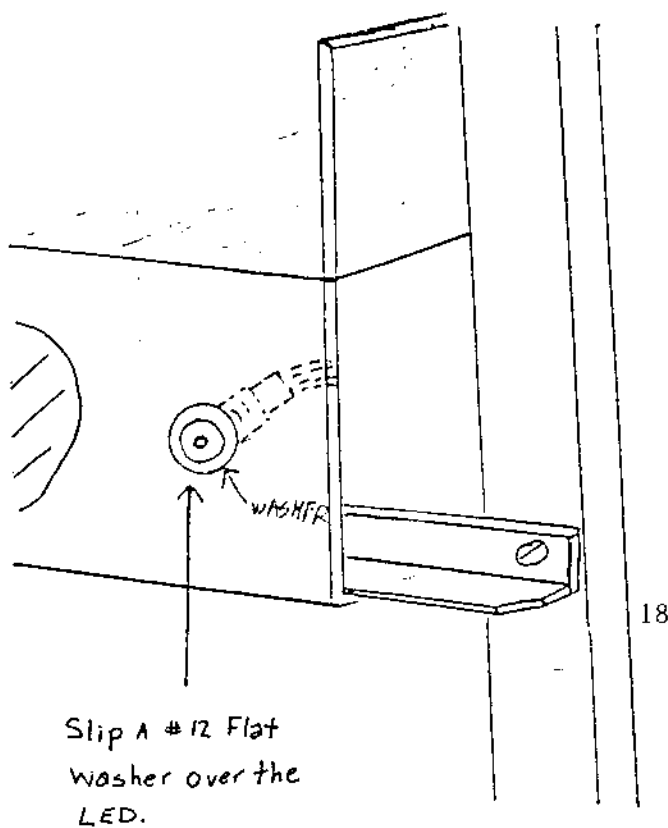
Label this connector PWR DSI

3. Lace these wires together. (see how to section)

4. Install the on-charge led on the keyboard holder bracket as shown:

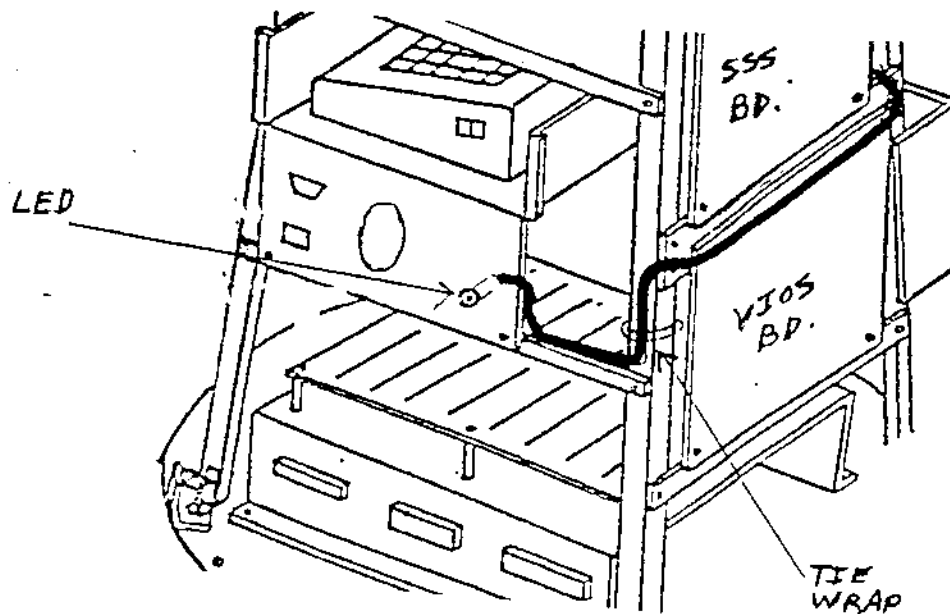
Rear view

Side view

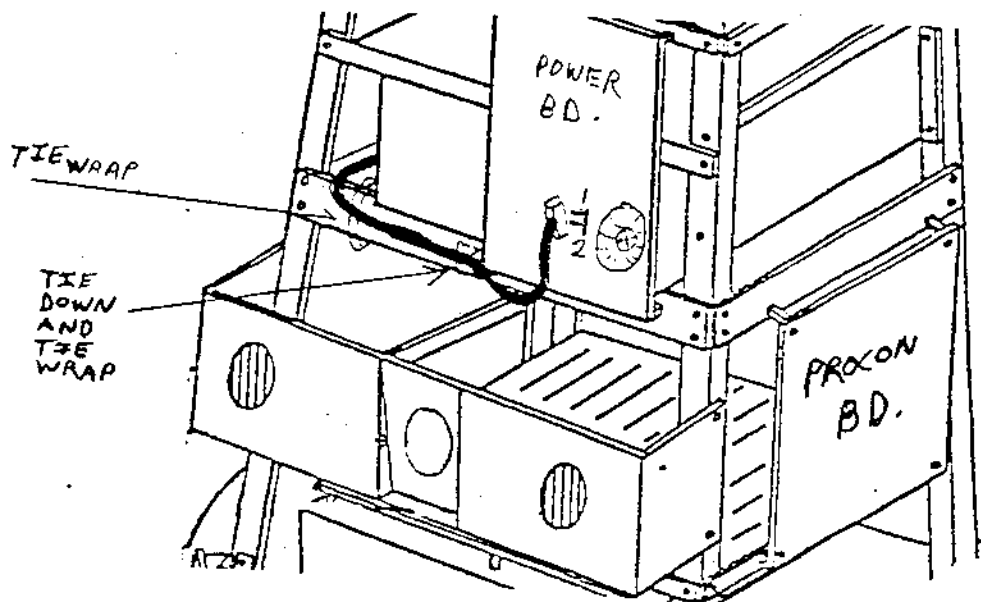


5. Install this cable as shown below. Secure cable to chassis by using one cable tie down and the large tie wraps. Don not tighten tie wraps.

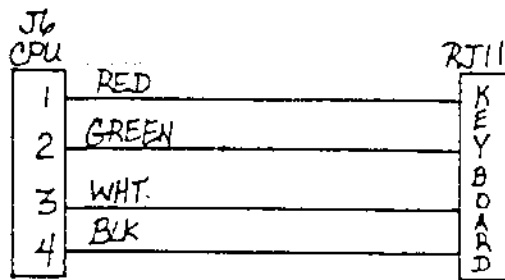
Rear view



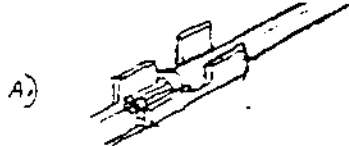
Front view



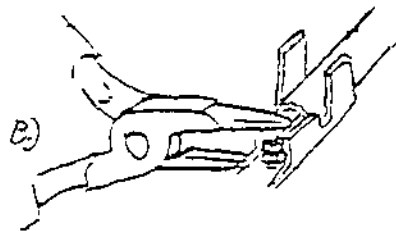
Keyboard User Interface Wiring Diagram



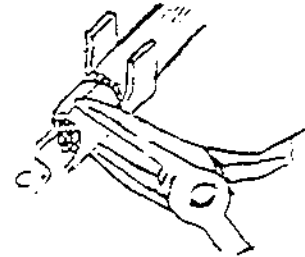
1. Take the keyboard jack and attach the four gold crimp pins on the other end of these wires.



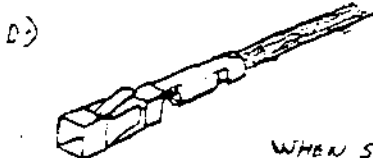
A)
PLACE WIRE BETWEEN TABS
IN CONNECTOR



B)
BEND THE TABS OVER BARE
WIRE FIRST THEN APPLY
SOLDER. DO NOT ALLOW SOLDER
TO FLOW INTO CONNECTOR END.



C)
BEND OPPOSITE TAB
AROUND FIRST TAB.



D)
WHEN SOLDER HAS COOLED
DOWN, BEND THE END TABS
AROUND THE INSULATION ON
THE WIRE.

2. Insert the four gold crimp pins into the 4-pin black amphenol connector as follows:

Red wire to hole 1
grn wire to hole 2
wht wire to hole 3
blk wire to hole 4

Label this connector J6 CPU

3. Take some 5 minute epoxy and apply to the back side of the keyboard jack. Install jack onto the keyboard holder bracket and apply some epoxy to the back of this bracket as shown in Fig.5.
4. Lace wires together on cable.
5. This cable does not get secured to the chassis. It should just hang loose and to be plugged into the J6 connector on the CPU board.

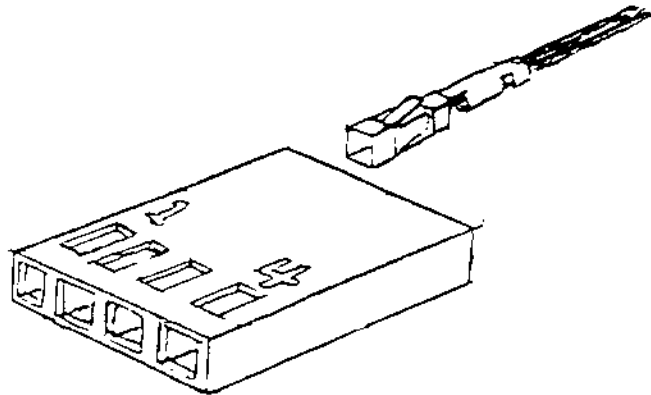
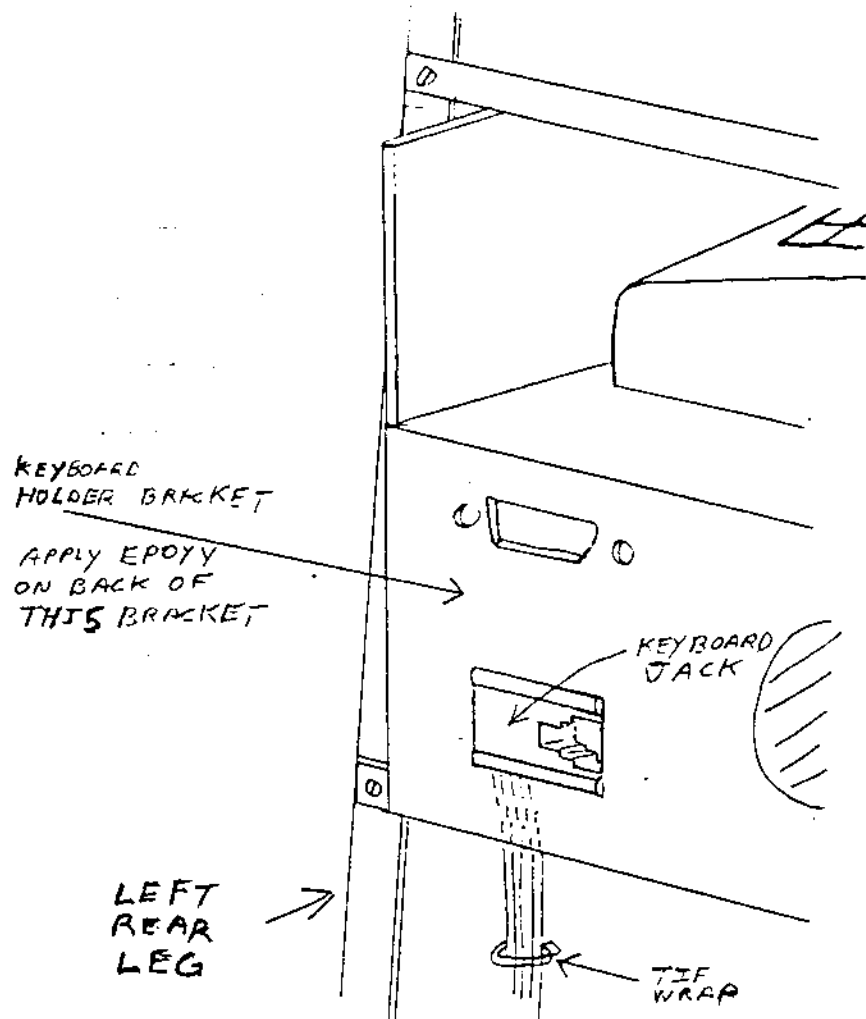
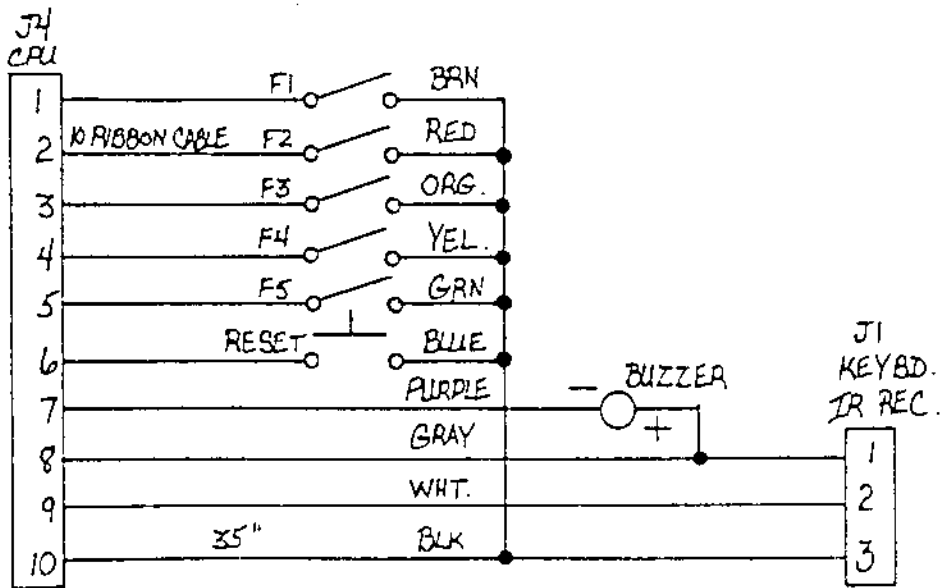


Fig.5

BACK VIEW



Function Switch User Interface Wiring Diagram



Refer to the above diagram for the following steps.

1. Cut a 35" length of 10 conductor ribbon cable.
2. Install a small 10 pin molex connector on this cable as follows:

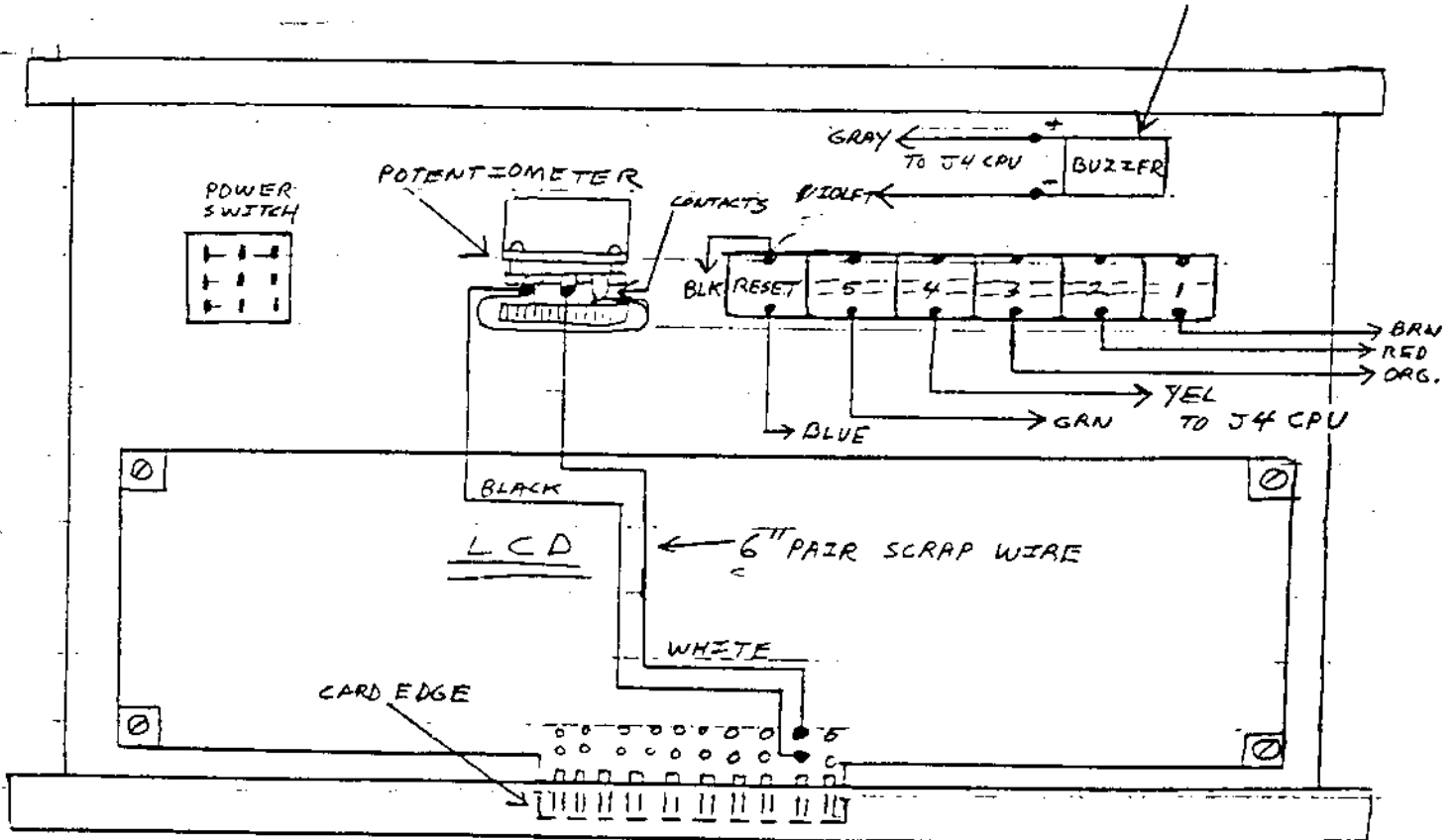
brn to pin 1	blue to pin 6
red to pin 2	violet to pin 7
org to pin 3	gray to pin 8
yel to pin 4	wht to pin 9
grn to pin 5	blk to pin 10

Label this connector J4 CPU.

3. Remove the LCD bracket from the torso.
4. Refer to Fig6. Measure back about 9" and separate wires. Starting with the brown wire, cut wires to length for each switch and remove insulation and solder to back of switches as shown below. Do this for the brn-red-org-yel-grn-blue-black wires.

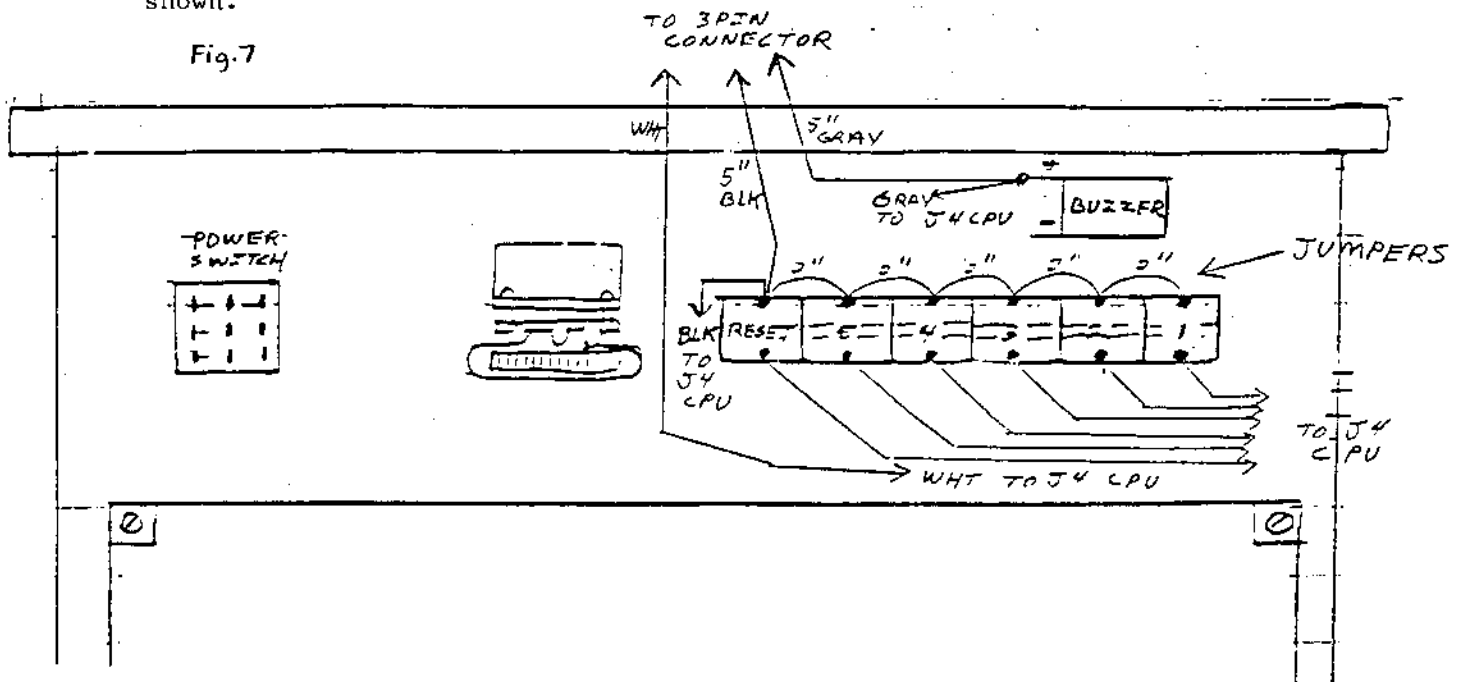
5. Refer to Fig6. Remove insulation and solder the violet and gray wires to the buzzer as shown. Take some scrap wire and cut and remove insulation from a 6" piece of white and black wires. Solder one end of the 6" pair of wires to the back of the LCD in the holes above the card edge connector. Solder the other end of this pair to the potentiometer contacts as shown. If your kit did not include the LCD, just tie off the wires for future use.

NOTE:
PLACE DOUBLE-SIDED
TAPE ON BRACKET
AND STICK BUZZER
ON TAPE HERE



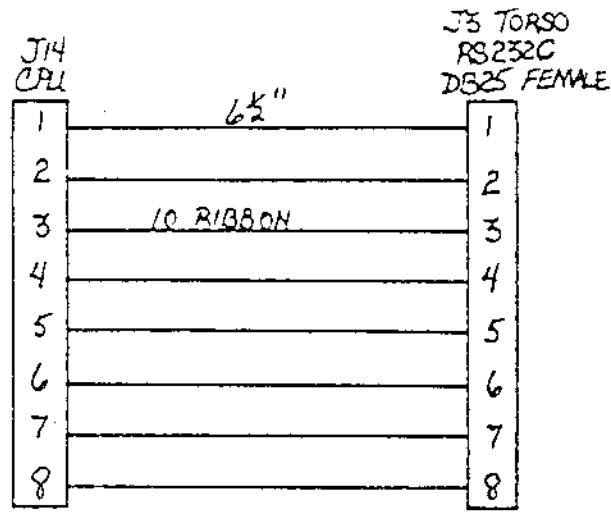
6. Refer to Fig.7. Take some more black scrap wire and cut and remove insulation from five 2" jumpers, one 5" black jumper. Also cut a 5" gray scrap wire. Solder the 5" black, 5" gray and 2" black jumpers as shown.

Fig.7



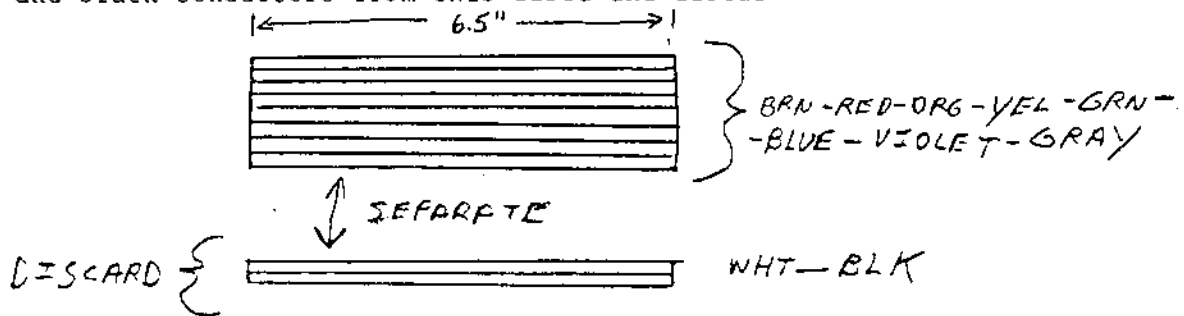
7. Install a small 3 pin molex connector on the 5" black and gray jumpers and the white wire from pin 9 on the J4 CPU connector as follows:
 5" gray to pin 1 wht to pin 2 - 5" black to pin 3
 Label this connector J1 Key Rec.
8. Leave the LCD assembly loosely attached to the torso structure until the power switch is wired later.

RS232C Wiring Diagram



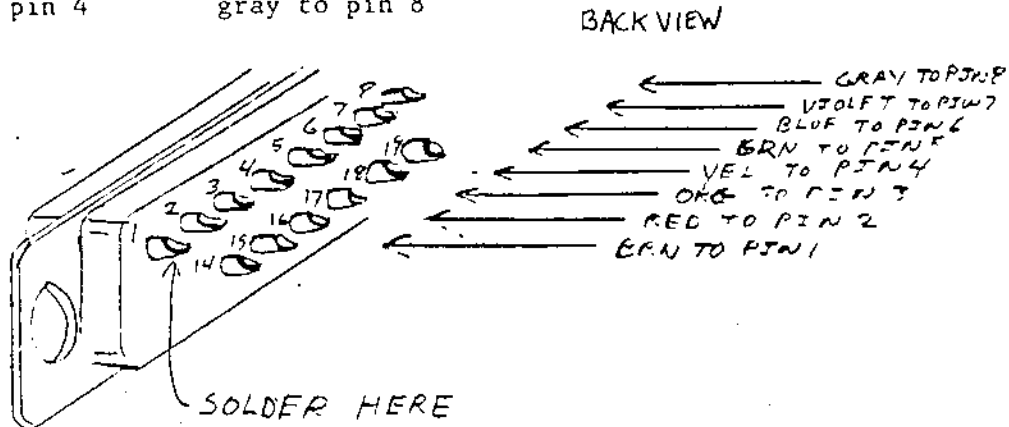
Refer to the above diagram for the following steps.

1. Cut a 6.5" length of the 10 conductor ribbon cable. Separate the white and black conductors from this cable and discard.



2. See Fig.8. Remove insulation from one end of this cable. Solder the wires to the RS232C connector as follows:

brn to pin 1	grn to pin 5
red to pin 2	blue to pin 6
org to pin 3	violet to pin 7
yel to pin 4	gray to pin 8



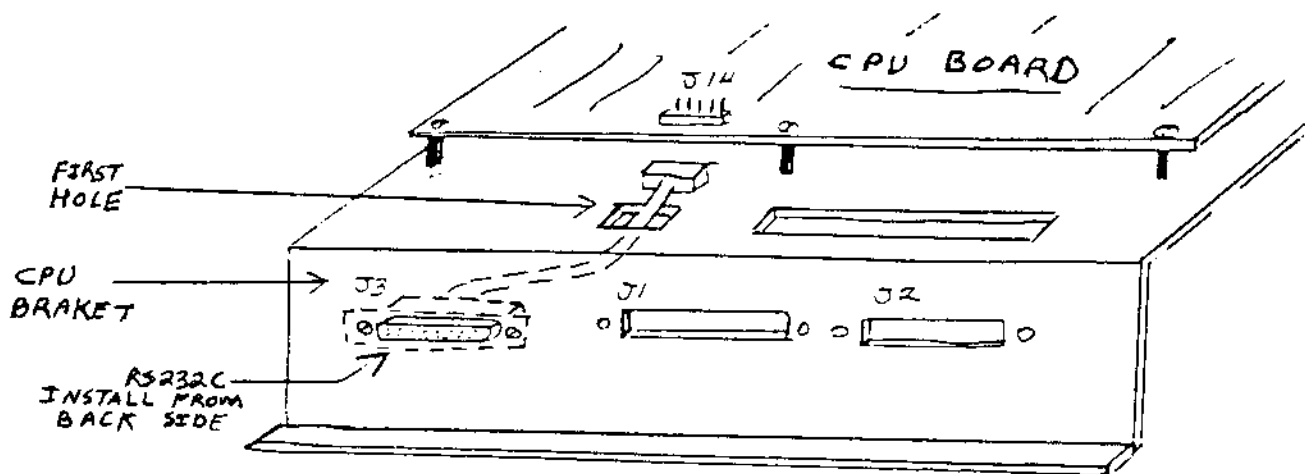
3. Install a small 8 pin molex connector to the other end of this cable as follows:

brn to pin 1	grn to pin 5
red to pin 2	blue to pin 6
org to pin 3	violet to pin 7
yel to pin 4	gray to pin 8

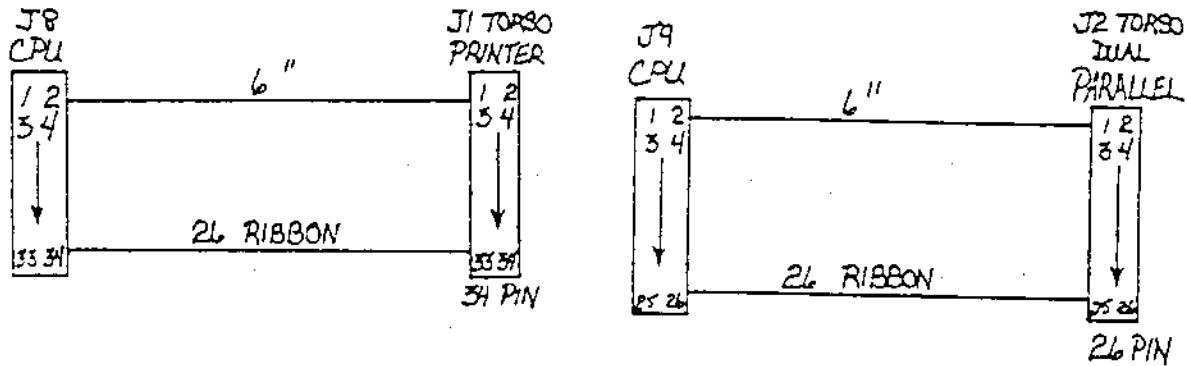
Label this connector J14 CPU.

4. Install the RS232C connector on the CPU bracket as shown below. Use two 4-40 3/8 screws, two #4 lock washers and two #4 hex nuts to do this. Bring the small 8 pin molex connector through the first hole in the top of the CPU bracket and plug into the CPU board when installed.

Back view

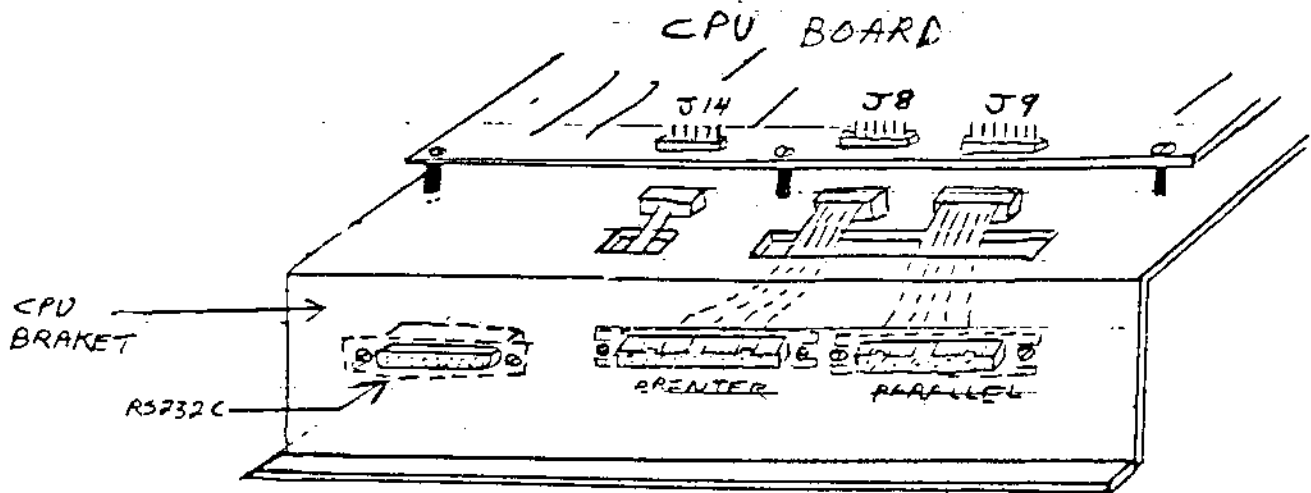


Printer and Parallel Ports Wiring Diagrams

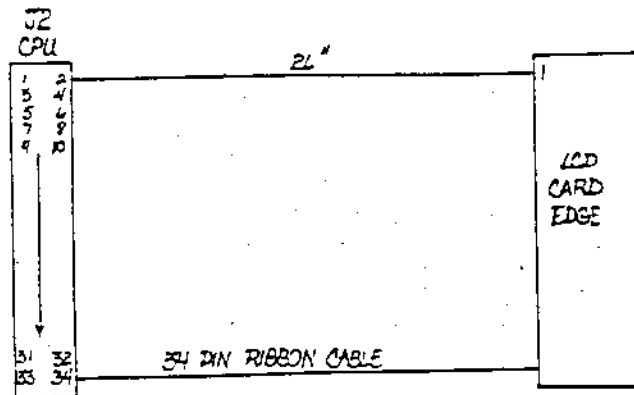


Refer to the above diagrams for the following steps.

1. These cables are already made up. Install cables into the CPU bracket as shown. Use four 4-40 1/2 screws, four #4 flat washers, four #4 lock washers, and four #4 hex nuts to mount cables.
2. Bring the other ends of these cables through the large hole in the top of the CPU bracket and plug into the CPU board when installed.

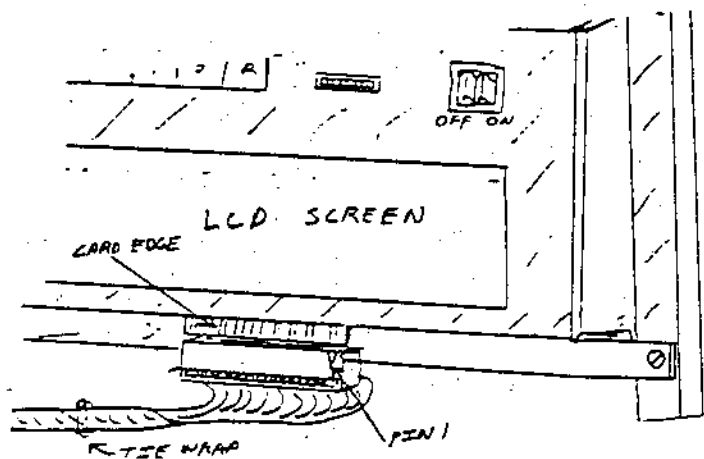


LCD Card Edge Wiring Diagram

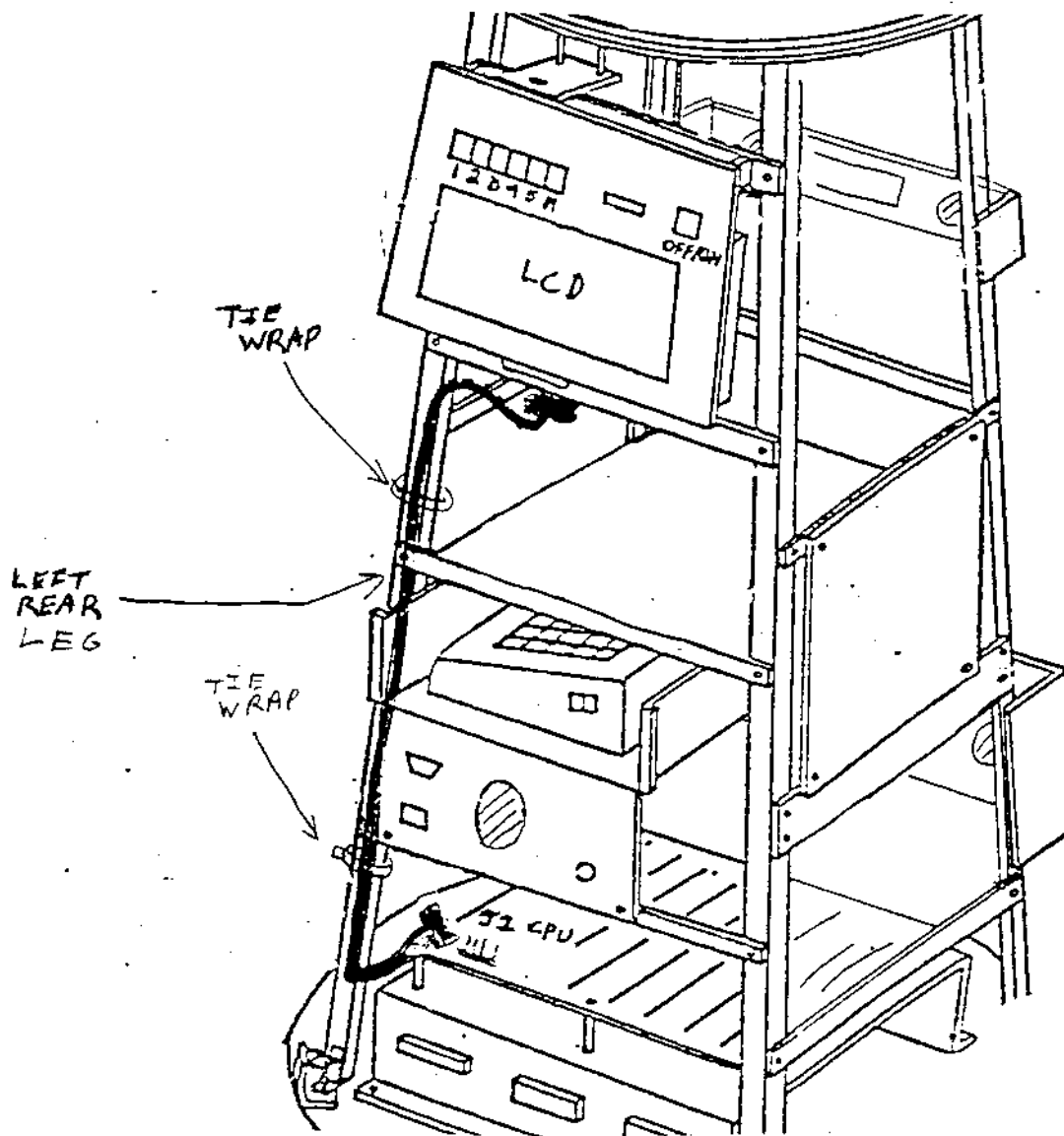


Refer to the above diagram for the following steps.

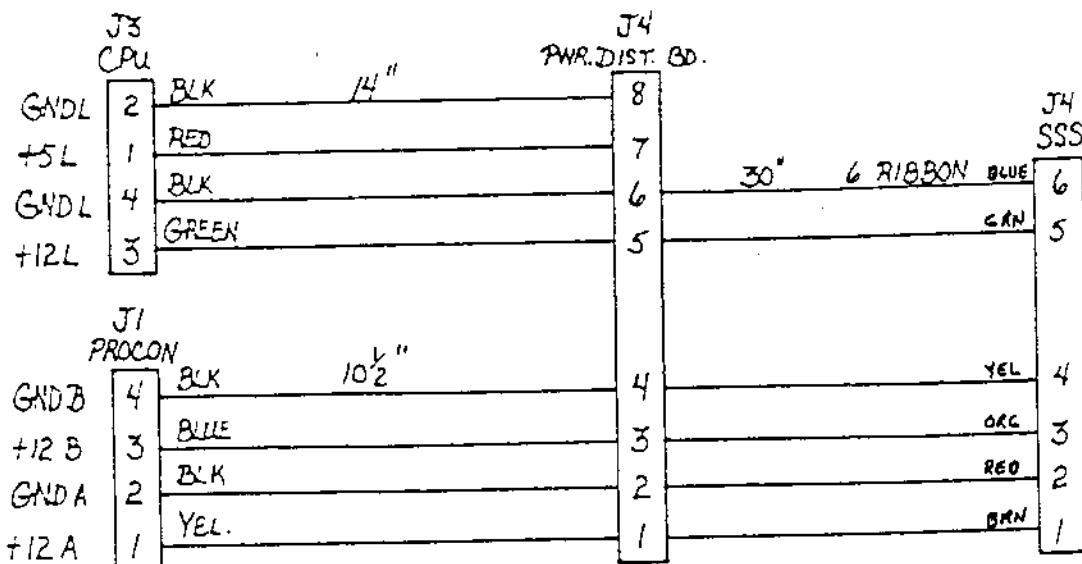
1. This cable is already made up. Take the card edge connector end of this cable, with pin one facing out, and plug into the card edge on the LCD. If your kit did not include the LCD, just leave this cable hanging for future use.



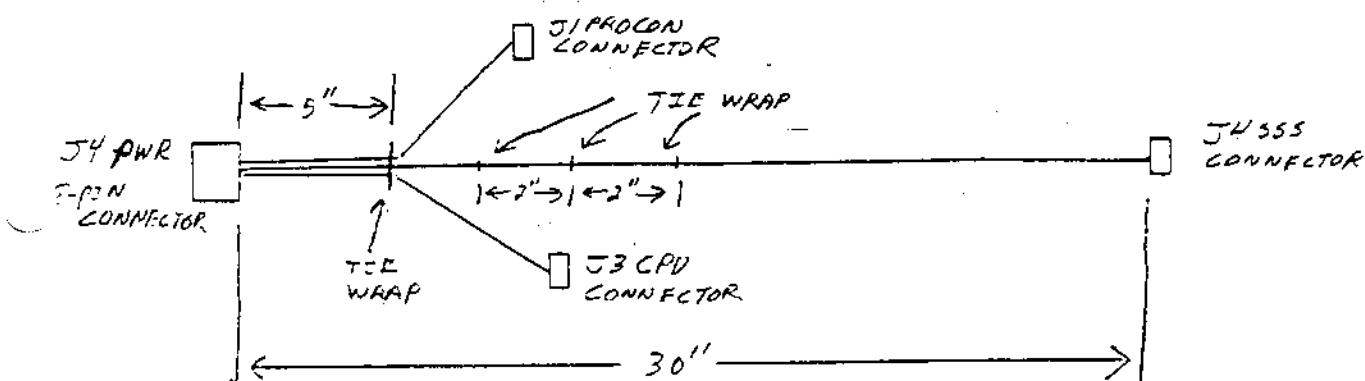
2. Secure this cable to the chassis by using the large tie wraps. (see diagram following page)



Power Supply Wiring Diagram



Lacing Diagram



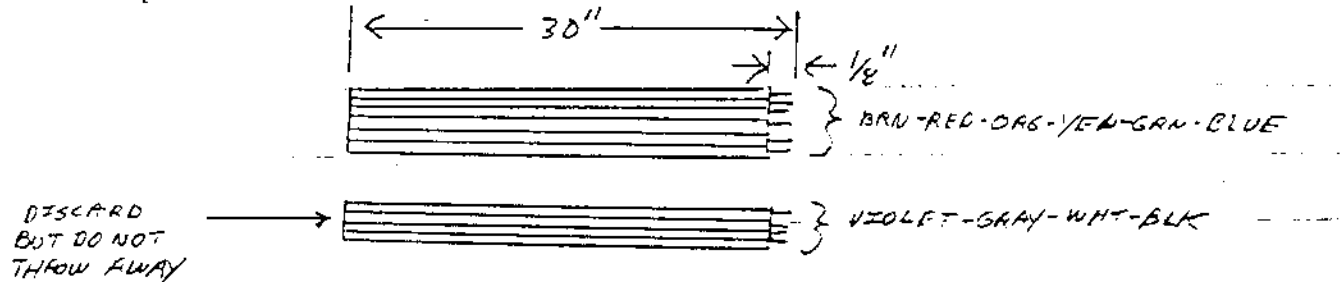
Refer to the above diagrams for the following steps.

1. Cut the following lengths of the 18 gauge wire (thick wire supplied) and remove insulation from both ends of these wires.

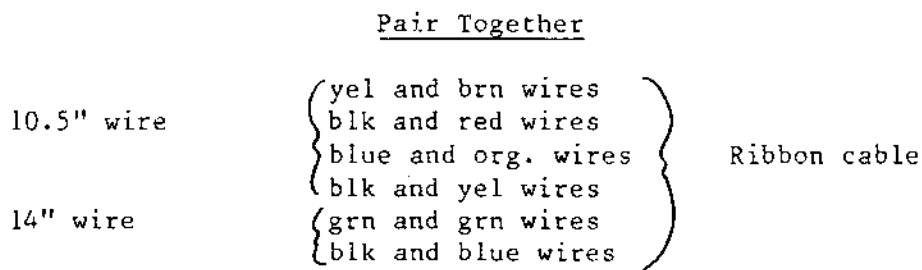
two 14" black wires	two 10.5" black wires
one 14" red wire	one 14" green wire
one 10.5" blue wire	one 10.5" yellow wire

2. Cut a 30" length of 10 conductor ribbon cable and remove insulation from one end of this cable.

3. Separate the 30" ribbon cable as shown below.

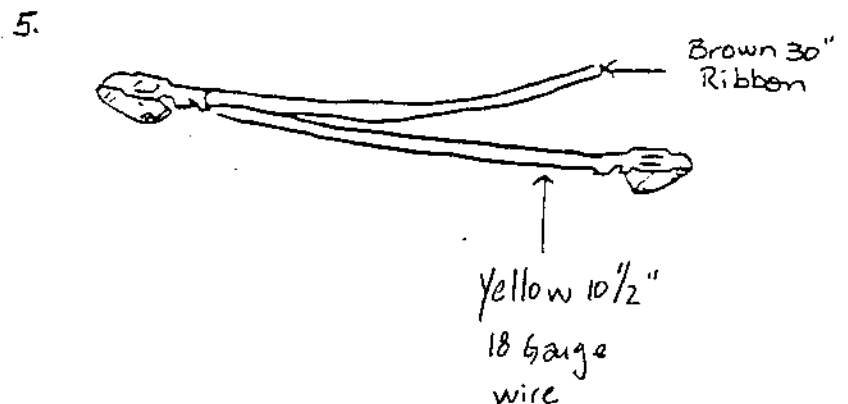
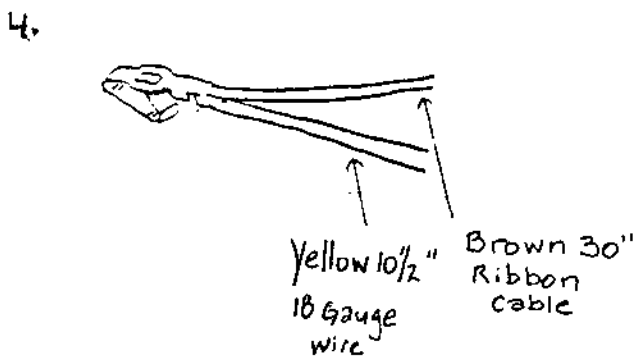


4. Install a molex spring pin on one end of each of the following pairs of wires:



5. Install a molex spring pin on the other ends of the 18 gauge wires.

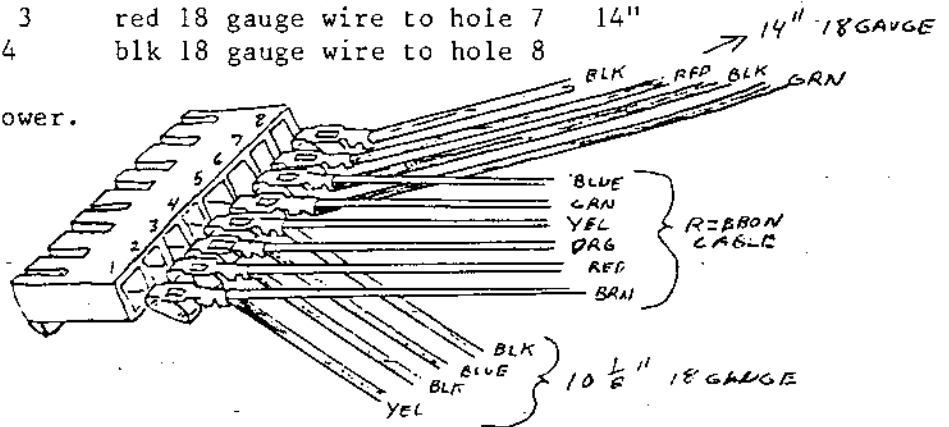
6. Install a molex spring pin on both ends of the remaining two 14" wires.



7. Insert eight spring pins into a molex 8 pin connector as follows:

yel and brn pair to hole 1	grn and grn pair to hole 5	
blk and red pair to hole 2	blk and blue pair to hole 6	
blue and org pair to hole 3	red 18 gauge wire to hole 7	14"
blk and yel pair to hole 4	blk 18 gauge wire to hole 8	

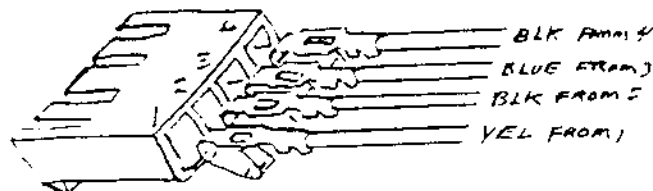
Label this connector J4 Power.



8. Insert four spring pins into a Molex 4 pin connector as follows:

	yel from pin to 1 hole 1
From J4 power	blk from pin to 2 hole 2
	blue from pin to 3 hole 3
	blk from pin to 4 hole 4

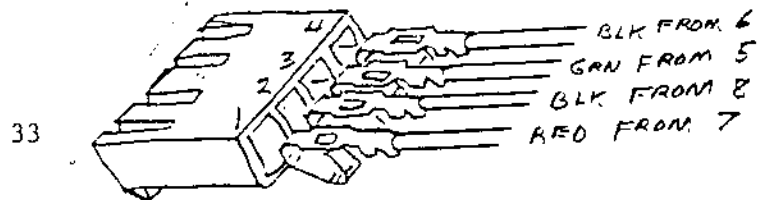
Label connector J1 Procon.



9. Inset the spring pins into a molex 4 pin spring connector on the molex spring pins as follows:

	red from pin 7 to hole 1
From J4 power	blk from pin 8 to hole 2
	grn from pin 5 to hole 3
	blk from pin 6 to hole 4

Label connector J3 CPU.

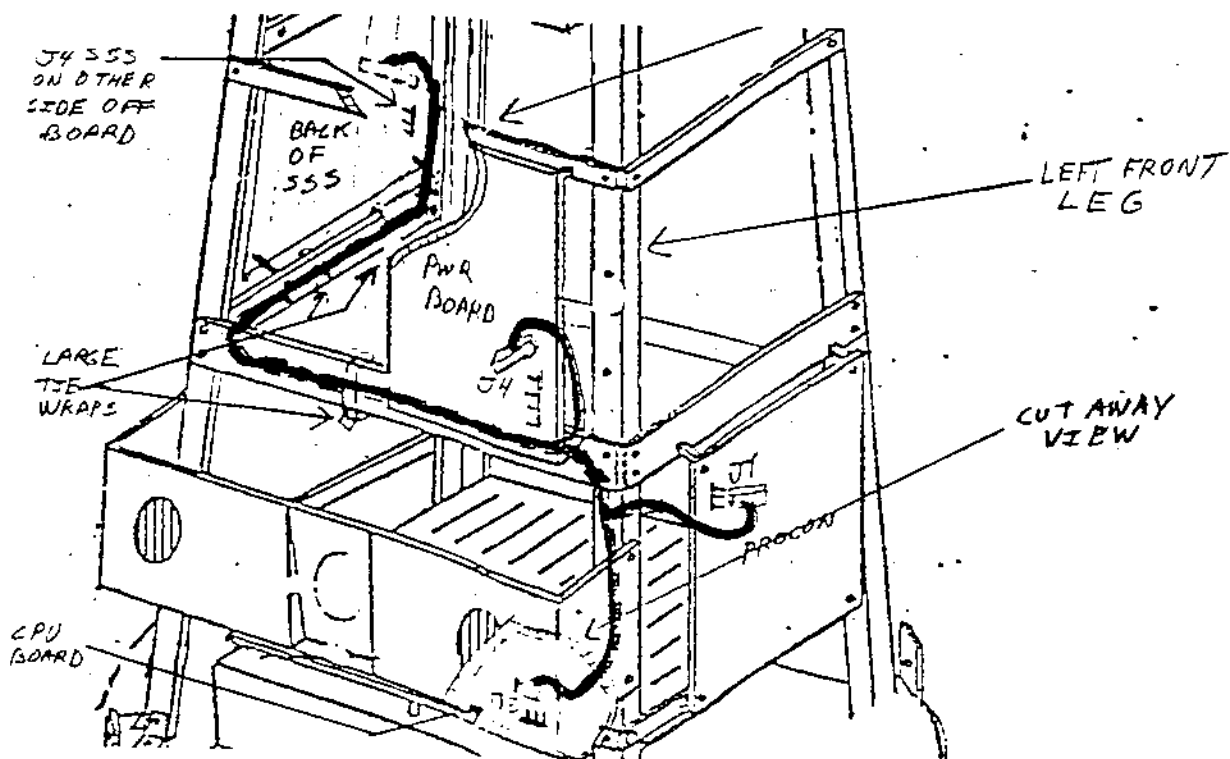


10. Install a small 6 pin molex connector on the other end of the ribbon cable as follows:

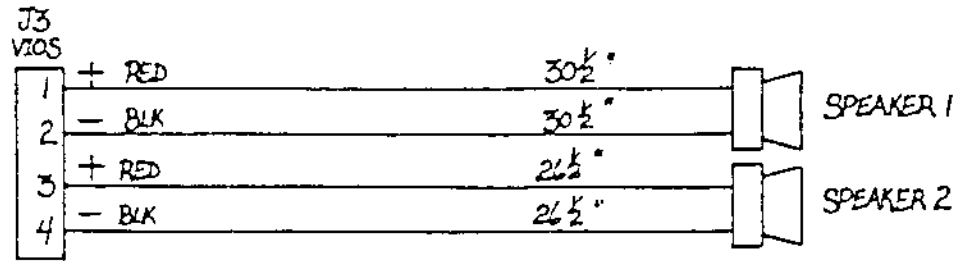
brn to pin 1	yel to pin 4
red to pin 2	grn to pin 5
org to pin 3	blue to pin 6

Label this connector J4 SSS.

11. Lace cable according to lacing diagram on previous page.
12. Secure cable to chassis as shown below using the large tie wraps.



Speaker Cable Wiring Diagram



Refer to the above diagram for the following steps.

1. Cut the following lengths of the red and black 22 gauge wires (thin wire supplied).

one 30.5" red one 26.5" red
one 30.5" black one 26.5" black

Remove insulation from one end of these wires.

2. Solder a quick disconnect on each of these wires.

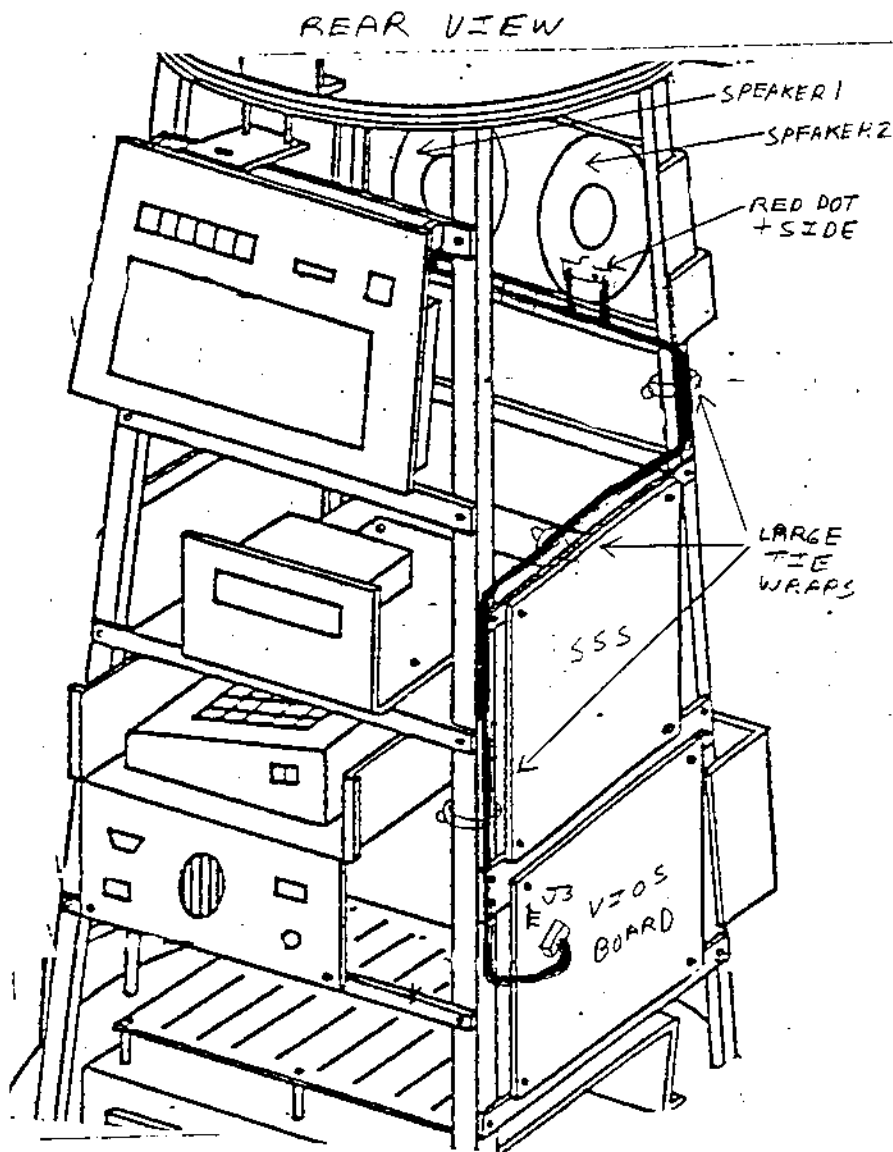


3. Install a small 4-pin molex connector on the other end of these wires as follows:

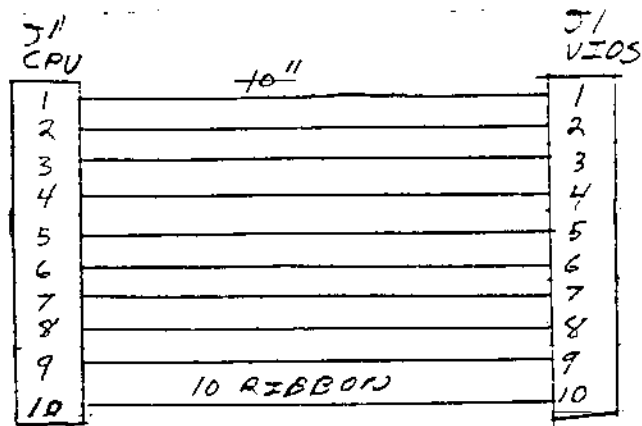
30.5" red to pin 1
30.5" black to pin 2
26.5" red to pin 3
26.5" black to pin 4

Label this connector J3 VIOS.

4. Lace wires together.
5. Plug the quick disconnects on the back of speakers as shown below. Note that there is a red dot on the speaker connectors to indicate the plus side. The red wires go to the dot and the blacks go to the other connector. Secure cable to the chassis using the large tie wraps as shown. (see next page)



Serial Port Wiring Diagram



Refer to the above diagram for the following steps.

1. Cut a 10" length of 10 conductor ribbon cable.
2. Install one small 10 pin molex connector at each end of this cable as follows:

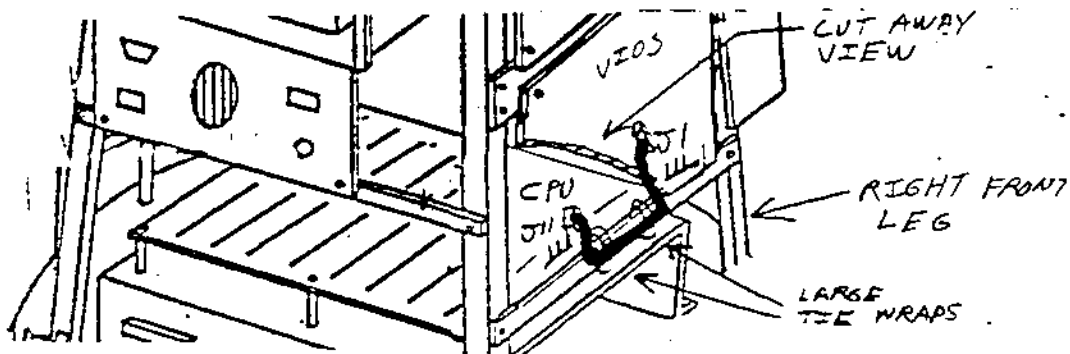
brn - pin 1 to pin 1
red - pin 2 to pin 2
org - pin 3 to pin 3
yel - pin 4 to pin 4
grn - pin 5 to pin 5

blue - pin 6 to pin 6
violet - pin 7 to pin 7
gray - pin 8 to pin 8
wht - pin 9 to pin 9
blk - pin 10 to pin 10

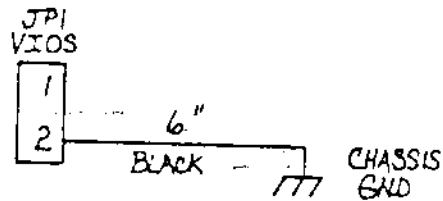
Label one connector J11 CPU and the other J1 VIOS.

3. Secure cable to chassis by using the large tie wraps.

Rear view



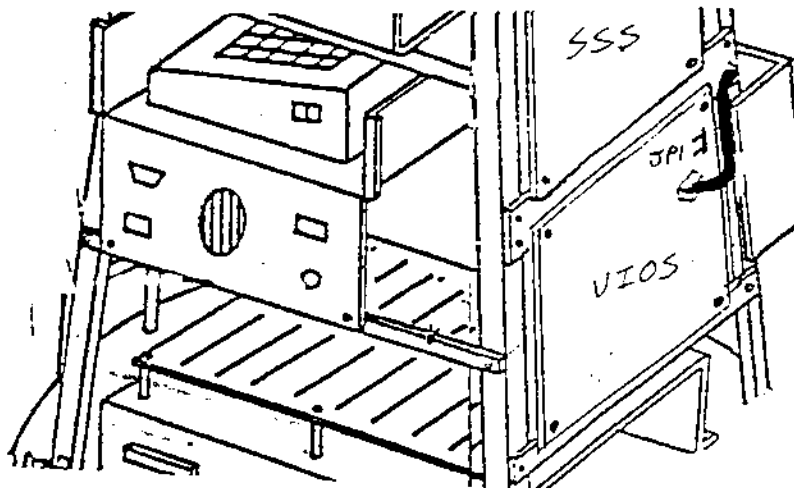
VIOS Grounding Wiring Diagram



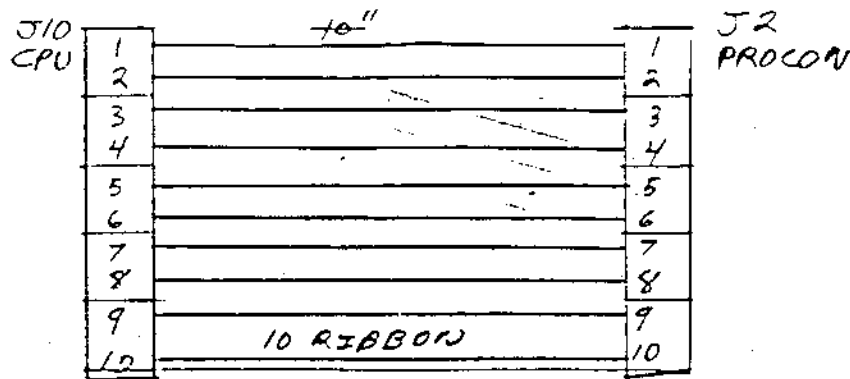
Refer to the above diagram for the following steps.

1. Cut a 6" length of black 22 gauge wire (thin wire supplied), remove insulation from one end.
2. Solder a fork lug on one end. Install a small 2 pin molex connector on the other end at pin 2. Label this connector JPI-VIOS.
3. Ground the fork lug to a screw near JPI on the VIOS board as shown.

Rear view



CPU-Procon Inter-Connect Wiring Diagram



Refer to the above diagram for the following steps.

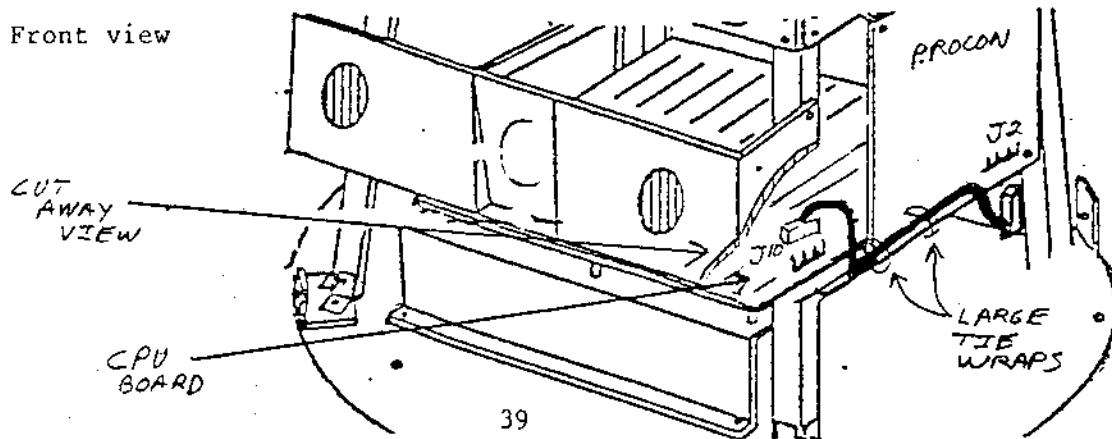
1. Cut a 10" length of 10 conductor ribbon cable.
2. Install one small 10 pin molex connector at each end of this cable as follows:

brn - pin 1 to pin 1
red - pin 2 to pin 2
org - pin 3 to pin 3
yel - pin 4 to pin 4
grn - pin 5 to pin 5

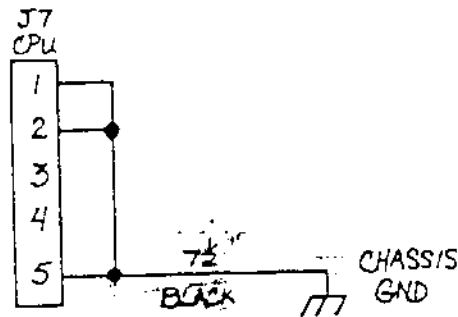
blue - pin 6 to pin 6
violet - pin 7 to pin 7
gray - pin 8 to pin 8
wht - pin 9 to pin 9
blk - pin 10 to pin 10

Label one connector J10 CPU and the other J2 Procon.

3. Secure cable to chassis by using the large tie wraps.

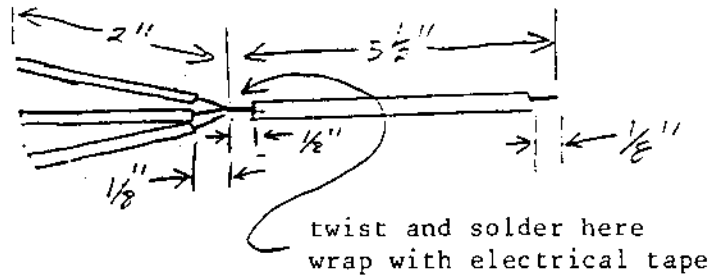


CPU Grounding Wiring Diagram



Refer to the above diagram for the following steps.

1. Cut three 2" lengths and one 5.5" length of the black 22 gauge wire (thin wire supplied) and remove insulation from one end of the 2" lengths and both ends of the 5.5" length.
2. Twist together and solder wires as shown below. Tape the solder joint with electrical tape.



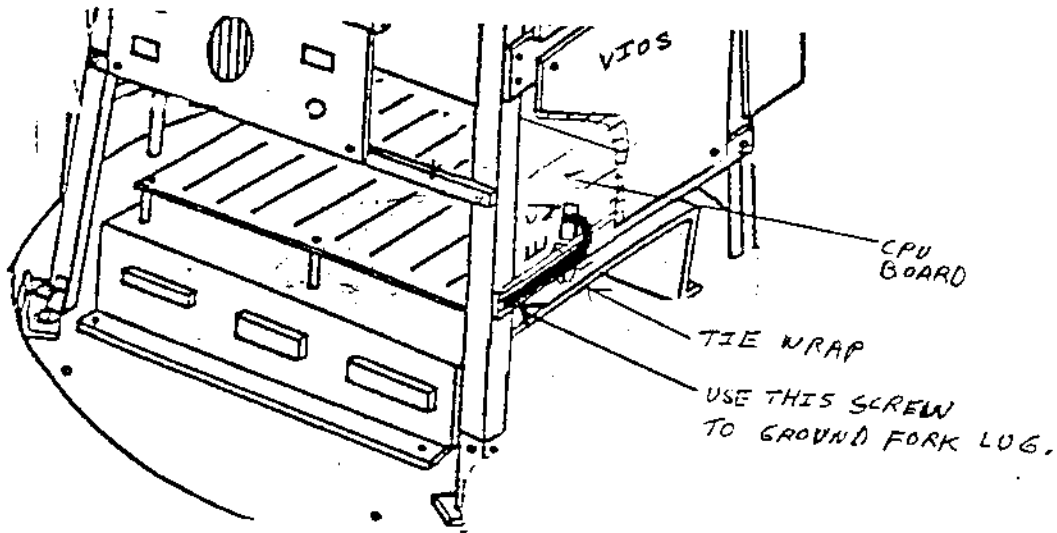
3. Install a small 5 pin molex connector on the ends of the two inch wires as follows:

blk 2" to pin 1
blk 2" to pin 2
blk 2" to pin 5

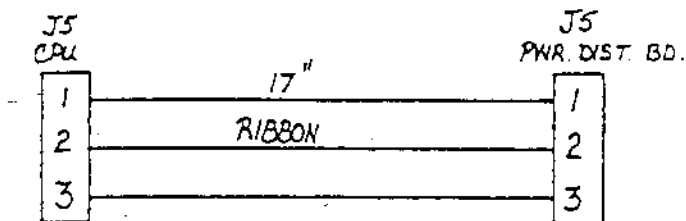
Label this connector J7 CPU.

4. Solder a fork lug on the 5.5" length of wire.

5. Secure cable to chassis by using the large tie wraps as shown. Ground the fork lug to the chassis as shown below.



Charger Signal Wiring Diagram



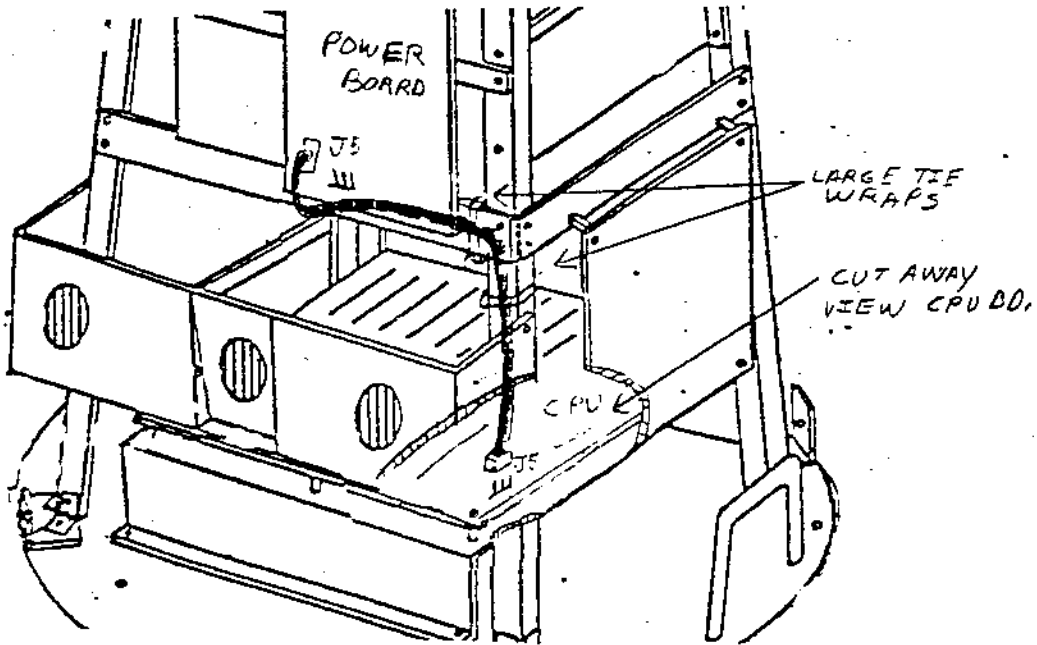
Refer to the above wiring diagram for the following steps.

1. Take the discarded violet-gray-white-black ribbon cable and cut a 17" length from this cable. Separate the violet wire from this group and discard.
2. Install a small 3 pin molex connector to both ends of the gray-white-black wires as follows:
 - gray - pin 1 to pin 1
 - white - pin 2 to pin 2
 - black - pin 3 to pin 3

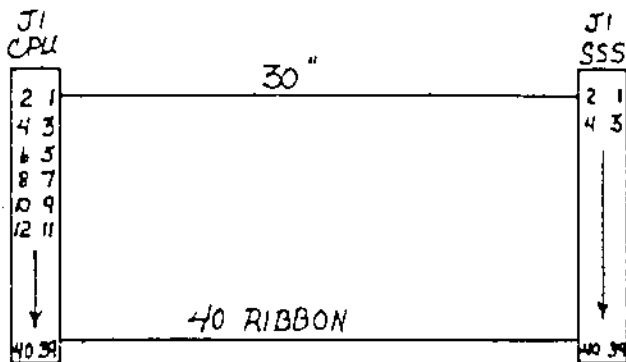
Label one connector J5 CPU and the other J5 Power.

3. Secure cable to chassis by using the large tie wraps as shown below.

Front view

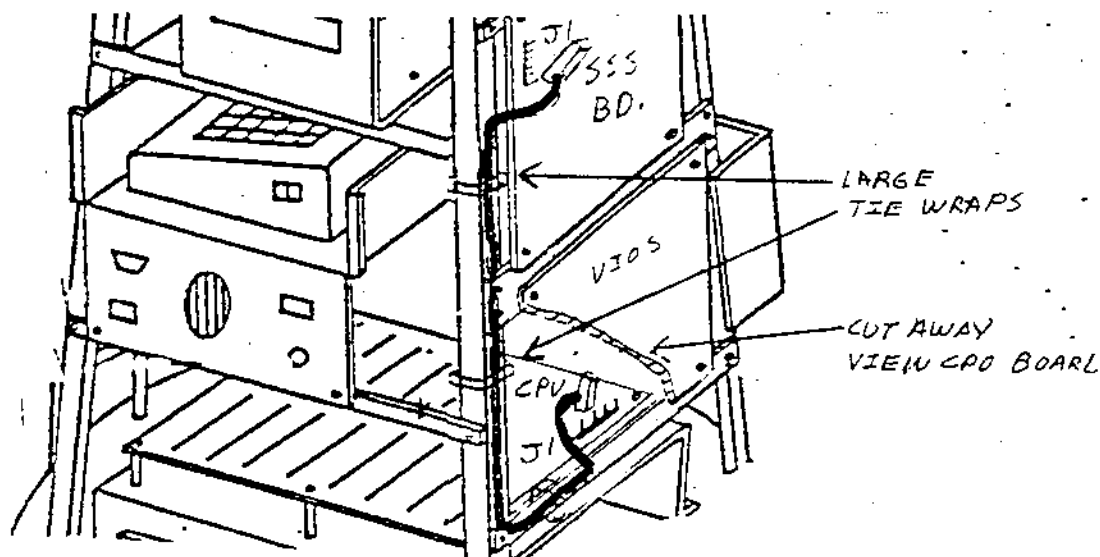


CPU -SSS Bus Wiring Diagram



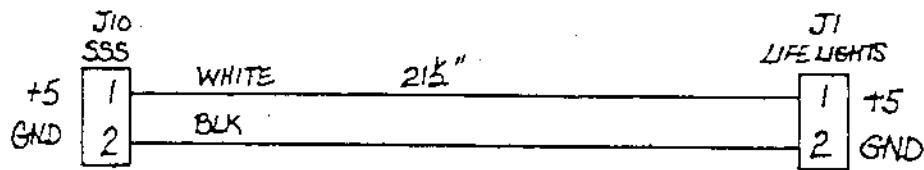
Refer to the above diagram for the following steps.

1. Locate the 40 conductor ribbon cable (already assembled) and secure this cable on chassis by using the large tie wraps.



2. Take note that the location of pin 1 on these connectors does not match up with the connectors on the CPU and SSS boards. This is due to a labeling error on the boards. When the cable is plugged into the boards, pin 1 on the connectors will actually be going to pin 2 on the boards. The cable must be plugged in this way.

Life Lights Wiring Diagram



If you did not purchase the life lights kit, you need not make this cable.

Refer to the life lights wiring diagram for the following steps.

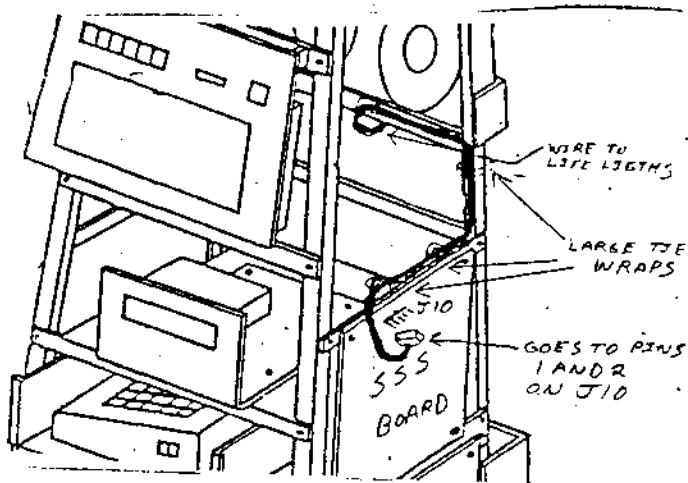
1. Take some scrap wire and cut a 21.5" length of white and black ribbon cable.
2. Install a small 2 pin molex connector on each end of this cable as follows:

white - pin 1 to pin 1
black - pin 2 to pin 2

Label one connector J10 SSS and the other J1 Life lights.

3. Secure cable to the chassis using the large tie wraps as shown below.

Rear view



Front view.

