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Macromodular Computer Design, Part 2, Volume 13, Frame Section and Base Pedestal

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MACROMODULAR
COMPUTER DESIGN
PART 2
MANUFACTURING DESCRIPTION

VOLUME XIII
FRAME SECTION AND BASE PEDESTAL

Technical Report No. 42

FINAL REPORT - FEBRUARY, 1974
CONTRACT SD-302 (ARPA)
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR COMPUTER DESIGN
FINAL REPORT - CONTRACT SD-302
FEBRUARY, 1974

Technical Report No. 42

PART 2 - MANUFACTURING DESCRIPTION
VOL. XIII-FRAME SECTION AND BASE PEDESTAL

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The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Advanced Research Projects Agency or the U.S. Government.

Computer Systems Laboratory
Washington University
St. Louis, Missouri

ABSTRACT

A complete description of mechanical and electrical components, assembly specifications, and procedures for manufacture of the macromodular frame block and base pedestal comprises this report.

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BASE PEDESTAL CIRCUIT BOARD SUB-SUBASSEMBLY
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PEDESTAL POWER/CONTROL INPUT ASSEMBLY
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PEDESTAL ASSEMBLY
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COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY

422

**BASE PEDESTAL
CIRCUIT BOARD SUB-SUBASSEMBLY**

PAGE	TITLE	CHANGE
422-1	TITLE PAGE	A
422-2	GENERAL SPECIFICATION	A
422-3	COMPONENT IDENTIFICATION PEDESTAL MAIN LOGIC BOARD	
422-4	PARTS LIST PEDESTAL MAIN LOGIC BOARD	A
422-5	HOLE SIZE AND LOCATION PEDESTAL MAIN LOGIC BOARD	
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CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.	CHG.	E.C.O.	DATE	APPR.
ISSUE	-	4-26-72	<i>T.J.C.</i>								
A	0294	8-7-73	<i>T.J.C.</i>								

General Specification

1. Printed Circuit Board Manufacture:

The printed circuit boards shall conform to pages 010-12 through 010-16 of the CSL General Standards, and outline drawings 200.50D30 and 200.50D41.

2. Printed Circuit Board Assembly:

Printed circuit board PTV0133-0A is assembled per pages 422-22 through 422-40. The remaining four boards are assembled per pages 010-24 through 010-35 of the CSL General Standards with the following additions:

(a) Integrated Circuits:

The dual-in-line integrated circuit packages are 14 pin Motorola MC600L series packages, and 6 pin Monsanto MCT2 packages. The identifying marks and insertion methods of the CSL General Standards apply.

(b) Axial-lead Components:

CSL General Standards pages 010-26 and 010-35 apply except the diode cathode end designation may be a blue band or a white band.

(c) Terminals:

Four bifurcated terminals are mounted on PTV0132-0. These terminals must be oriented such that the leads of an axial lead resistor may be pressed into the slots of the terminals.

(d) Other Components:

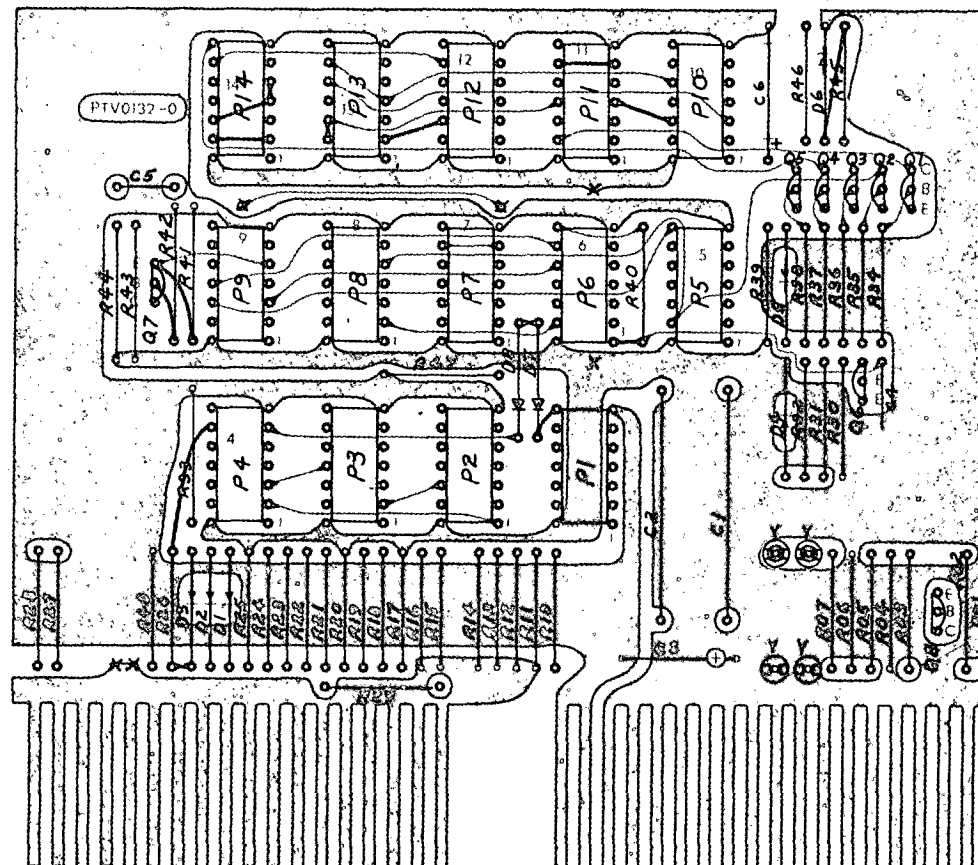
The rectangular components; the power supply, the relays, and the potentiometer, must be mounted flush with the board. The 6 and 8 pin round semiconductor packages (LM311H, MD8001, and MD8003) must extend above the board less than 0.30 inch. The transistors (2N3903, 2N4401, 2N5400, and 2N5550) must extend above the board less than 0.35 inch. The P.C. Board handles are mounted with the handle pulling tap over the components.

CHG.	E.C.O.	DATE	APPR.
ISSUE	-	9-25-72	J.E.
A	0294	8-7-73	J.E.

NOTE:

1. HOLES MARKED WITH AN X INDICATES PLATED THROUGH HOLES THAT MUST BE LEFT FREE OF SOLDER (6 PLACES)

2. HOLES MARKED WITH A Y INDICATES TERMINAL MOUNTING LOCATIONS. (4 PLACES)
TERMINALS ORIENTED AS SHOWN.



COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
**COMPONENT IDENTIFICATION
PEDESTAL MAIN LOGIC BOARD**

APPROVED			ENG. TJC	DRAWING NO. 422-3
BY TJC	FOR PROD	DATE 9-25-72	DRAWN BY PLL	
			CHECKED NTK	DATE 4-21-72

ISSUE **9-25-72**

CHANGE NO.	DATE	DESCRIPTION
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INTEGRATED CIRCUITS

TYPE	REQUIRED	LOCATION
MC672L (MOTOROLA)	6	P1 P3 P8 P9 P10 P11
MC680L (MOTOROLA)	2	P2 P4
MC667L (MOTOROLA)	1	P5
MC660L (MOTOROLA)	3	P6 P7 P13
MC671L (MOTOROLA)	2	P12 P14

RESISTORS

*±5%, 1/4 W, CARBON COMP

TYPE	REQUIRED	POSITION
*RA=560 OHMS	4	R02 R18 R21 R24
*RB=15K OHMS	13	R01 R04 R06 R11 R12 R13 R14 R15 R16 R17 R20 R25 R39
*RC=360 OHMS	2	R03 R05

RESISTORS (Cont'd)

TYPE	REQUIRED	POSITION
*RE=24 OHMS	5	R07 R19 R22 R27 R28
*RF=1.5K OHMS	6	R23 R33 R41 R46 R47, R48
*RG=1.2K OHMS	1	R26
<input type="checkbox"/> RH=SELECTED	1	R08
<input type="checkbox"/> RJ=SELECTED	1	R09
*RK=68 OHMS	1	R44
*RL=5 1K OHMS	1	R42
*RM=1K OHM	3	R31 R32 R40
*RN=3K OHM	6	R34 R35 R36 R37 R38 R43
*RP=2K OHM	1	R30
*R Q=150 OHMS	1	R45
RR=ZERO OHMS (JUMPER)	2	R10 R29

☐ TO BE INSTALLED DURING TEST

DIODES

TYPE	REQUIRED	POSITION
1N5231	1	D1
MMD-694 (CSL DIODE)	6	D2 D3 D5 D6, D7, D8
1N5242B	1	D4

TRANSISTORS

TYPE	REQUIRED	LOCATION
2N3903	8	Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8

ISSUE		6-13-72	
CHANGE NO.	DATE	DESCRIPTION	
<p align="center">COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI</p>			
<p align="center">MACROMODULAR PROJECT</p>			
<p>TITLE PARTS LIST 1 OF 2 PEDESTAL MAIN LOGIC BOARD</p>			
APPROVED		ENG	TJC
BY	FOR	DATE	DRAWING NO
<i>J.P.C.</i>	PROD	9-25-72	422-4
DRAWN BY			SHEET 1 of 2
CHECKED			DATE
<i>NTK</i>			3-17-72

CAPACITORS

TYPE

REQUIRED LOCATION

40 ufd 15V NON-POLAR TANTALUM ETCHED FOIL
(MALLORY TBF406U015N1B)

2

C1
C2

15 ufd 20V ELECTROLYTIC (KEMET K15J20KS OR
MALLORY TASI56M020P1C)

2

C3
C6

0.01 ufd 1KV, CERAMIC (SPRAGUE 5GA-S10)

1

C4

0.10 ufd 20V CERAMIC (CENTRALAB UK16-104 OR
UK20-104)

1

C5

PRINTED CIRCUIT BOARD

1 REQUIRED
PTV0132-0

HANDLES
2 REQUIRED

TERMINALS

TYPE

REQUIRED

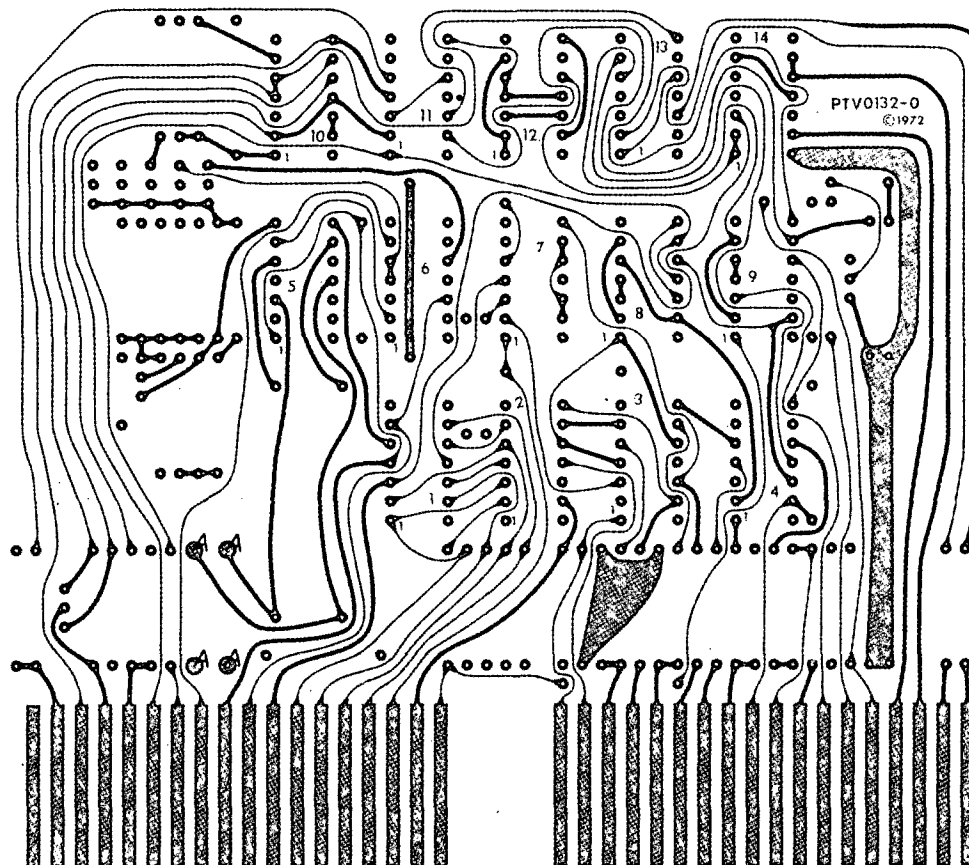
USECO PART NO 2002B
BIFURCATED

4

HANDLES

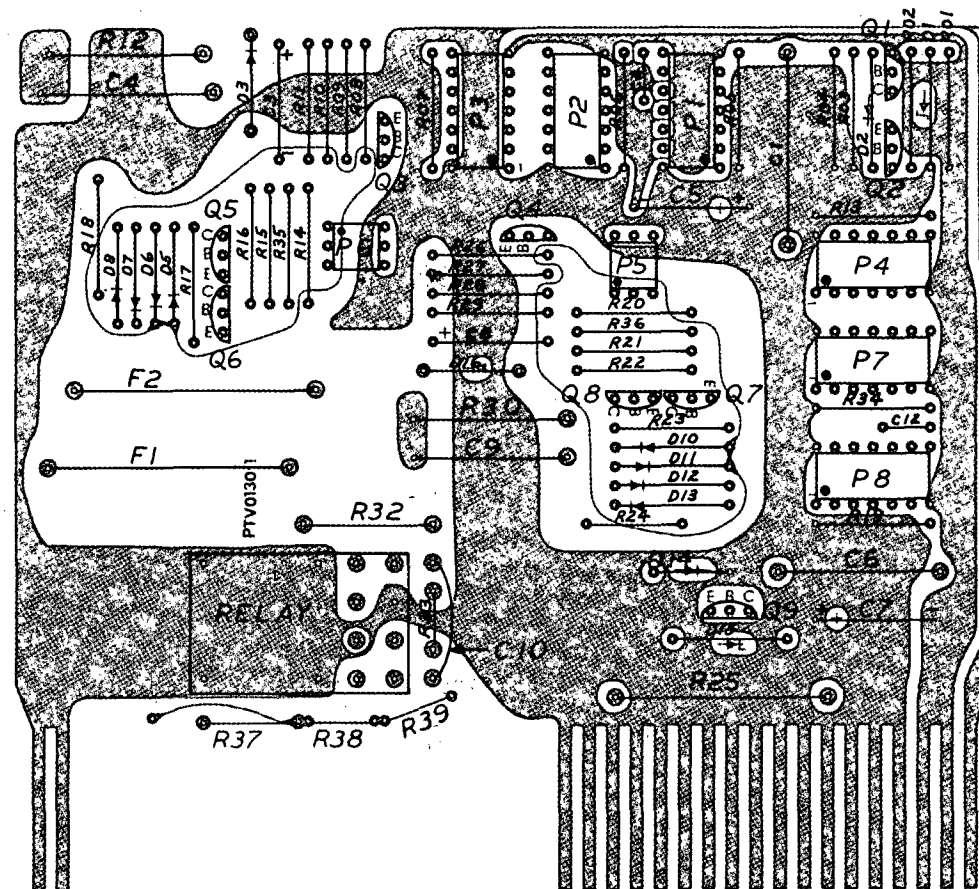
2 REQUIRED
D.E.C. STANDARD
HANDLE FOR FLIP CHIP BOARDS,
WITH RIVETS

<i>type</i> A	8-7-73	ECO 6294
ISSUE	6-13-72	
CHANGE NO	DATE	DESCRIPTION
COMPUTER SYSTEMS LABORATORY		
WASHINGTON UNIVERSITY		
ST. LOUIS, MISSOURI		
MACROMODULAR PROJECT		
TITLE PARTS LIST 2 OF 2 PEDESTAL MAIN LOGIC BOARD		
APPROVED		ENG TJC
BY	FOR	DATE
<i>TJC</i>	PROD	9-25-72
DRAWN BY MBP		DRAWING NO 422-4A
CHECKED		DATE
<i>NTK</i>		3-17-72
SHEET 2 of 7		



TYPE A - 4 HOLES
 TYPE B - 346 HOLES
 (NOT MARKED)

		COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI		TITLE HOLE SIZE AND LOCATION PEDESTAL MAIN LOGIC BOARD			
				APPROVED BY <i>TJC</i> FOR PROD. DATE 9-25-72			
ISSUE 4/24/72		MACROMODULAR PROJECT		ENG. TJC		DRAWING NO. 422-5	
CHANGE NO. DATE DESCRIPTION				DRAWN BY PLL		CHECKED NTK		DATE 4-24-72



COMPUTER SYSTEMS LABORATORY

WASHINGTON UNIVERSITY

ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

COMPONENT IDENTIFICATION
AC LINES 1 & 2 SWITCHBOARD

APPROVED

BY

FOR

DATE

9-25-72

PROD

9-25-72

ENG.

TJC

DRAWN BY

PLL

CHECKED

NTK

DRAWING NO.

422-7

DATE

4-21-72

ISSUE 9-25-72

CHANGE NO.

DATE

DESCRIPTION

RESISTORS *±5% CARBON COMP.

TYPE	REQUIRED	LOCATION
*RA = 8.2K OHMS, 1W	2	R12 R30
*RB = 150K OHMS, 1/4 W	2	R18 R24
*RC = 20K OHMS, 1/4 W	2	R11 R29
*RD = 200K OHMS, 1/4 W	2	R10 R28
*RE = 47K OHMS, 1/4 W	4	R15 R16 R21 R22
*RF = 100K OHMS, 1/4	2	R08 R26
*RG = 10K OHMS, 1/4 W	2	RG R27
*RH = 430K OHMS, 1/4 W	2	R17 R23
*RJ = 3K OHMS, 1/4 W	3	R04 R14 R20
*RK = 15K OHMS, 1/4 W	3	R03 R07 R13
*RL = 1K OHMS, 1/4 W	5	R01 R02, R35, R36, R38
*RM = 24K OHMS, 1/4 W	2	R06 R34
*RN = 27K OHMS, 1/4 W	2	R05 R19
RP = ZERO OHMS (JUMPER)	1	R33
*RR = 100 OHMS, 1/2 W	1	R32
RS = 1200 OHMS, 5 W, WIRE WOUND (OHMITE NO. 4625, STYLE 995-5B)	1	R25
RT = 200 OHMS 1/2 W	1	R37
RU = 330 OHMS 1/4 W	1	R39

CAPACITORS

TYPE	REQ.	LOCATION
22µfd 80 VDC MYLAR (SPRAGUE #192P2249R8)	2	C1 C6
68µfd 1000 VDC CERAMIC 2 (SPRAGUE 5GA-Q68 OR CENTRALAB DD-680)	2	C2 C12
2.2µfd 100 V (KEMET CS13BJ225K) OR MALLORY TAS225M100P1C	2	C3 C8
0.15µfd 80 V (SPRAGUE NC 192P1549R8)	2	C4 C9
15µfd 20 V TANTALUM 2 (KEMET K15J20KS OR MALLORY TAS156M020P1C	2	C5 C7
0.1 fd 500V CERAMIC 1 (SPRAGUE 5GA-P10)	1	C10

INTEGRATED CIRCUITS

TYPE	REQ.	LOCATION
MC667L (MOTOROLA)	2	P1 P8
MC671L (MOTOROLA)	2	P2 P3
MC672L (MOTOROLA)	2	P4 P7
MCT2 (MONSANTO)	2	P5 P6

DIODES

TYPE	REQ.	LOCATION
1N5242B	1	D1
MMD-694	10	D2, D5 thru D8 D10 thru D14 D3, D16
1N4004	2	
1N5235	1	D15

TRANSISTORS

TYPE	REQ.	LOCATION
2N3903	4	Q1 Q2 Q6 Q7
2N5550	2	Q5 Q8
2N5400	3	Q3 Q4 Q9

PRINTED CIRCUIT BOARD ONE REQUIRED

PTV0130-1

FUSES TWO REQUIRED

TYPE	LOCATION
1 AMP (BUSSMAN GJV-1)	F1
	F2

HANDLES

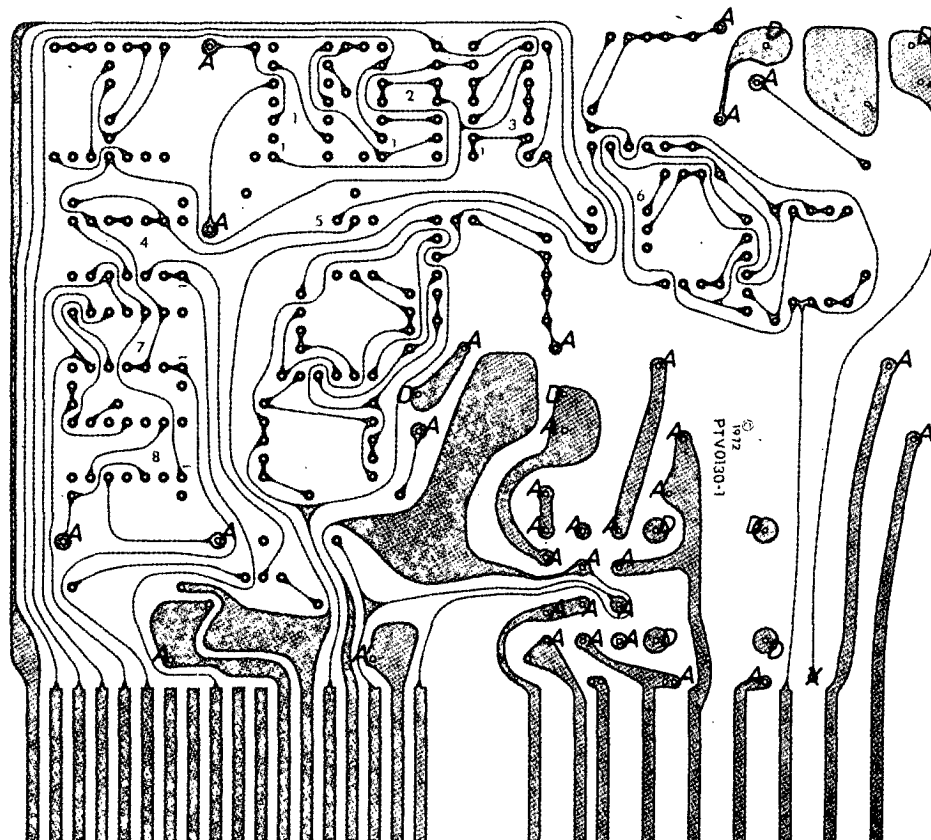
2 REQUIRED
D.E.C. STANDARD
HANDLE FOR FLIP
CHIP BOARDS, WITH
RIVETS.

RELAY ONE REQUIRED

CLARE SF-6210-100

(SELECTED FOR 7.1 VDC
MIN. HOLD IN VOLTAGE
AND 1.1 VDC MAX. DROP
OUT VOLTAGE.)

8-7-73		ECO 0294	
ISSUE	6-13-72		
CHANGE NO.	DATE	DESCRIPTION	
COMPUTER SYSTEMS LABORATORY			
WASHINGTON UNIVERSITY			
ST. LOUIS, MISSOURI			
MACROMODULAR PROJECT			
TITLE			
PARTS LIST			
AC LINES 1 & 2 SWITCHBOARD			
APPROVED		ENG.	DRAWING NO.
BY	FOR	TJC	422-8
PROD.	DATE	DRAWN BY	
	9-25-72	CH	
CHECKED	DATE		
NTK	2-25-72		



TYPE A 34 HOLES
 TYPE D 8 HOLES
 TYPE B 224 HOLES
 (NOT MARKED)

NOTE: HOLE MARKED
 WITH AN X INDICATES
 PLATED THROUGH
 HOLE WITH NO COMP-
 ONENTS INSTALLED.
 THIS MUST BE KEPT
 FREE OF SOLDER

COMPUTER SYSTEMS LABORATORY
 WASHINGTON UNIVERSITY
 ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
 HOLE SIZE AND LOCATION
 AC LINE 1 & 2 SWITCH BOARD

APPROVED		
BY	FOR	DATE
<i>TJC</i>	PROD.	9-25-72

ENG. TJC

DRAWING NO.
 422-9

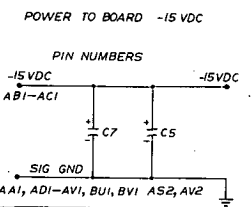
DRAWN BY
 PII

CHECKED
 NTK

DATE
 4-24-72

ISSUE 4-24-72

CHANGE NO.	DATE	DESCRIPTION
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1. MC667
2. MC671
3. MC671
4. MC672
5. MCT2
6. MCT2
7. MC672
8. MC667

RAXX = 8.2K OHMS	2 REQ.
RBXK = 150K OHMS	2 REQ.
RCXK = 20K OHMS	2 REQ.
RDXK = 200K OHMS	2 REQ.
REXK = OHMS	4 REQ.
RFXX = 10K OHMS	2 REQ.
RGXX = 10K OHMS	2 REQ.
RHXK = 430K OHMS	2 REQ.
RJXX = 3K OHMS	3 REQ.
RKXX = 15K OHMS	3 REQ.
RLXX = 5K OHMS	3 REQ.
RMXX = 24K OHMS	2 REQ.
RNXX = 27K OHMS	2 REQ.
RPXX = ZERO OHMS (JUMPER)	1 REQ.
RXXK = 100 OHMS	1 REQ.
RSXX = 1200 OHMS	1 REQ.
RTXX = 200 OHMS	1 REQ.
RUXX = 3 OHMS	5 REQ.

Q1, Q2, Q6, Q7 = 2N3903
Q3, Q4, Q9 = 2N5400
Q5, Q8 = 2N5550

C1, C6 = .22 ufd	80 VDC
C2, C12 = 68 pfd	1,000 VDC
C3, C8 = 2.2 ufd	100 V
C4, C9 = .15 ufd	80 V
C5, C7 = 15 ufd	20 V TANT
C10 = 0.1 ufd	500 V CER

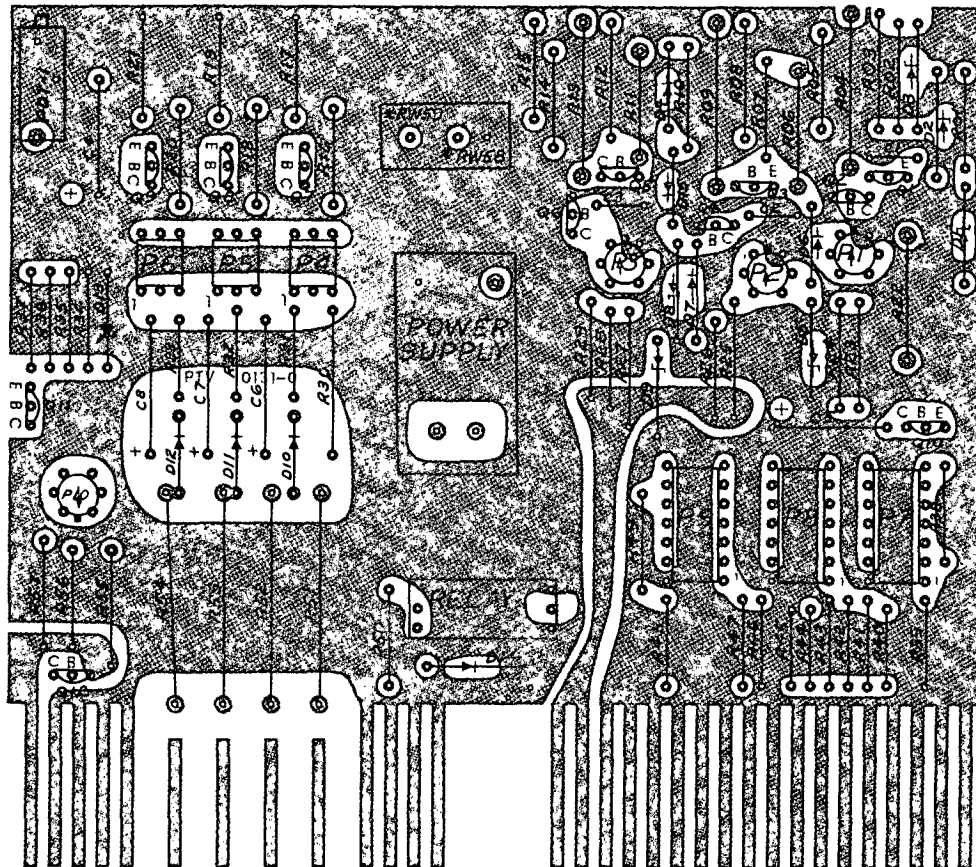
D1 INS242B
D2, D3 thru D14 WMD-694
D3 IN4004
D15 INS235
D16 IN4004

CLARE SF-6210-J100

F1, F2 1 AMP (BUSSMAN GJV-1)

PRINTED CIRCUIT BOARD 114000-2

CHANGE NO.	DATE	DESCRIPTION		
<p align="center">COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI</p>				
MACROMODULAR PROJECT				
TITLE				
AC LINES 1 & 2 SWITCHBOARD				
DESIGN APPROVED	DRAWN	CHECKED	DATE	DATE NO.
W. CAMP	MANUJ	TEAL	JJC PLL FUR	422-10 2-10-72



*SINGLE COMPONENT

ISSUE 4-24-72		COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI	TITLE COMPONENT IDENTIFICATION PEDESTAL AC LOGIC TRANSLATOR BOARD																			
			<table border="1"> <tr> <td colspan="2">APPROVED</td> <td>ENG.</td> <td rowspan="2">DRAWING NO.</td> </tr> <tr> <td>BY</td> <td>FOR</td> <td>DATE</td> </tr> <tr> <td><i>PL</i></td> <td>PROD</td> <td>9-25-72</td> <td> TJC PLL </td> </tr> <tr> <td colspan="2">CHECKED</td> <td>DATE</td> <td></td> </tr> <tr> <td colspan="2">NTK</td> <td>4-24-72</td> <td></td> </tr> </table>				APPROVED		ENG.	DRAWING NO.	BY	FOR	DATE	<i>PL</i>	PROD	9-25-72	TJC PLL	CHECKED		DATE		NTK
APPROVED		ENG.	DRAWING NO.																			
BY	FOR	DATE																				
<i>PL</i>	PROD	9-25-72	TJC PLL																			
CHECKED		DATE																				
NTK		4-24-72																				
CHANGE NO.		DATE	DESCRIPTION																			
			MACROMODULAR PROJECT																			

INTEGRATED CIRCUITS

TYPE	REQUIRED	LOCATION
MD8001 (MOTOROLA)	3	P1 P2 P3
MCT2 (MONSANTO)	3	P4 P5 P6
MC672L (MOTOROLA)	2	P7 P8
MC671L (MOTOROLA)	1	P9
MD8003 (MOTOROLA)	1	P10

POTENTIOMETERS

TYPE	REQUIRED	LOCATION
2K OHMS (CTS NO. 190PC202A)	1	POT-1

RELAY

TYPE	REQUIRED
REED, SPST (CLARE NO. PRB-2013HE)	1

POWER SUPPLY

TYPE	REQUIRED
5VDC, 300ma (VARADYNE MODEL UMP-5/300)	1

PRINTED CIRCUIT BOARD

1 REQUIRED
PTV0131-0

RESISTORS

*±5% CARBON COMPOSITION

TYPE	REQUIRED	LOCATION
*RA = 3K OHMS, 1/4 W	9	R05 R10 R14 R15 R29 R34 R36 R56
*RB = 360 OHMS, 1/4 W	2	R37 R50
*RC = 8.2K OHMS, 1W	3	R52 R53 R54
*RD = 15K OHMS, 1/4 W	7	R17 R19 R21 R39 R43 R45 R46
*RE = 20K OHMS, 1/4 W	3	R31 R32 R33
*RF = 5.1 K OHMS, 1/4 W	6	R16 R18 R20 R24 R26 R28
RG = 1960 OHMS, ±1%, 1/8 W, 3 METAL FILM TYPE CEA, T-0 TEMP. COFF.		R03 R08 R12 R35
RH = 3480 OHMS ±1%, 1/8 W, 3 METAL FILM TYPE CEA, T-0 TEMP. COFF.		R23 R25 R27
*RJ = 100 OHMS, 1W	3	R04 R09 R13

RESISTORS (Cont'd)

TYPE	REQUIRED	LOCATION
*RK=820 OHMS, 1/4 W	2	R01 R02
*RL= 47 OHMS, 1/2 W	3	R06 R11 R22
*RM=750 OHMS, 1/4 W	1	R07
*RN=10K OHMS, 1/2 W	1	R55
RP=36.5K OHMS ±1%, 1/8 W, METAL FILM, TYPE CEA, T-0 TEMP. COFF.	1	R57
RS=ZERO OHMS (JUMPER)	1	R30
RT=1K OHMS, 2W WW	1	R51
*RU=560 OHMS, 1/4 W	4	R40 R42 R44 R47

HANDLES

2 REQUIRED
D.E.C. STANDARD
FOR FLIP CHIP BOARDS,
WITH RIVETS.

7/22. A		8-7-73	E.C.O. 0294
ISSUE	4/24/77		
CHANGE NO.	DATE	DESCRIPTION	
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			
MACROMODULAR PROJECT			
TITLE PARTS LIST 1 OF 2 PEDESTAL A C LOGIC TRANSLATOR BOARD			
APPROVED		ENG TJC	DRAWING NO.
BY	FOR	DATE	422-12
PROD.	9-15-77	DRAWN BY	SHEET 1 OF 2
		CAH	
		CHECKED	DATE
		NTK	3-17-72

RESISTORS (Cont'd)

<u>TYPE</u>	<u>REQUIRED</u>	<u>LOCATION</u>
*RV= 24 OHMS, 1/4 W	4	R38 R41 R48 R49
RW=VISHAY NETWORK#300180 RESISTANCES 100 OHMS 1,970 OHMS	1	R58 R59

TRANSISTORS

<u>TYPE</u>	<u>REQUIRED</u>	<u>LOCATION</u>
2N4401	3	Q1 Q3 Q5
2N3903	6	Q2 Q4 Q6 Q7 Q8 Q9
2N5400	3	Q10 Q11 Q12

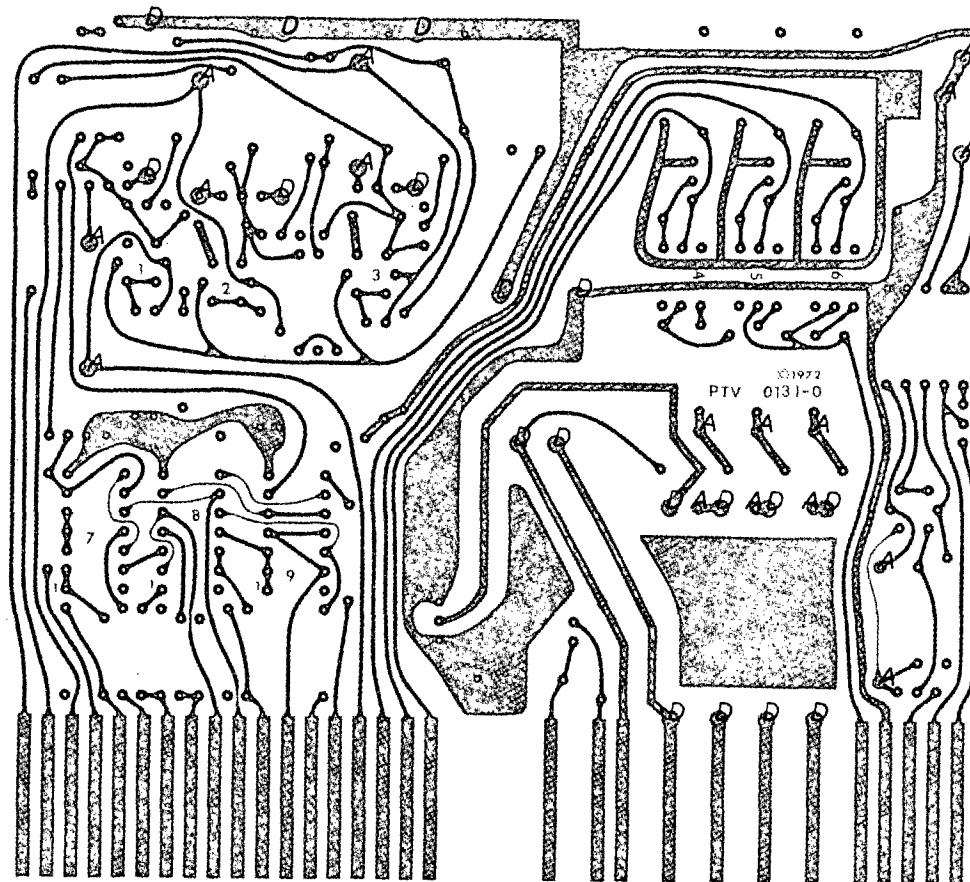
DIODES

<u>TYPE</u>	<u>REQUIRED</u>	<u>LOCATION</u>
1N5225	6	D1 D2 D3 D5 D8 D9
MMD-694 (CSL DIODE)	5	D4 D6 D7 D14 D15
1N4004	3	D10 D11 D12
1N5232A	1	D13

CAPACITORS

<u>TYPE</u>	<u>REQUIRED</u>	<u>LOCATION</u>
1,000 pfd, 1KV CERAMIC (CENTRALAB DD-102G)	3	C1 C2 C3
15 ufd 20V ELECTROLYTIC (KEMET K15J20KS OR MALLORY TAS156J020 PIC)	2	C4 C5
2.2 ufd 100V ELECTROLYTIC (KEMET CS13BJ225K OR MALLORY TAS225M100PIC)	3	C6 C7 C8

ISSUE	4/24/72		
CHANGE NO.	DATE	DESCRIPTION	
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			
MACROMODULAR PROJECT			
TITLE PARTS LIST 2 OF 2 PEDESTAL A C LOGIC TRANSLATOR BOARD			
APPROVED		ENG. TJC	DRAWING NO.
BY	FOR	DATE	422-12A
<i>TJC</i>	PROD.	9-25-72	SHEET 2 of 2
DRAWN BY MBP		CHECKED	DATE
		<i>NTK</i>	3-17-72



TYPE A - 17 HOLES
 TYPE D - 18 HOLES
 TYPE B - 260 HOLES
 (NOT MARKED)

COMPUTER SYSTEMS LABORATORY
 WASHINGTON UNIVERSITY
 ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
 HOLE SIZE AND LOCATION
 PEDESTAL AC LOGIC TRANSLATOR BOARD

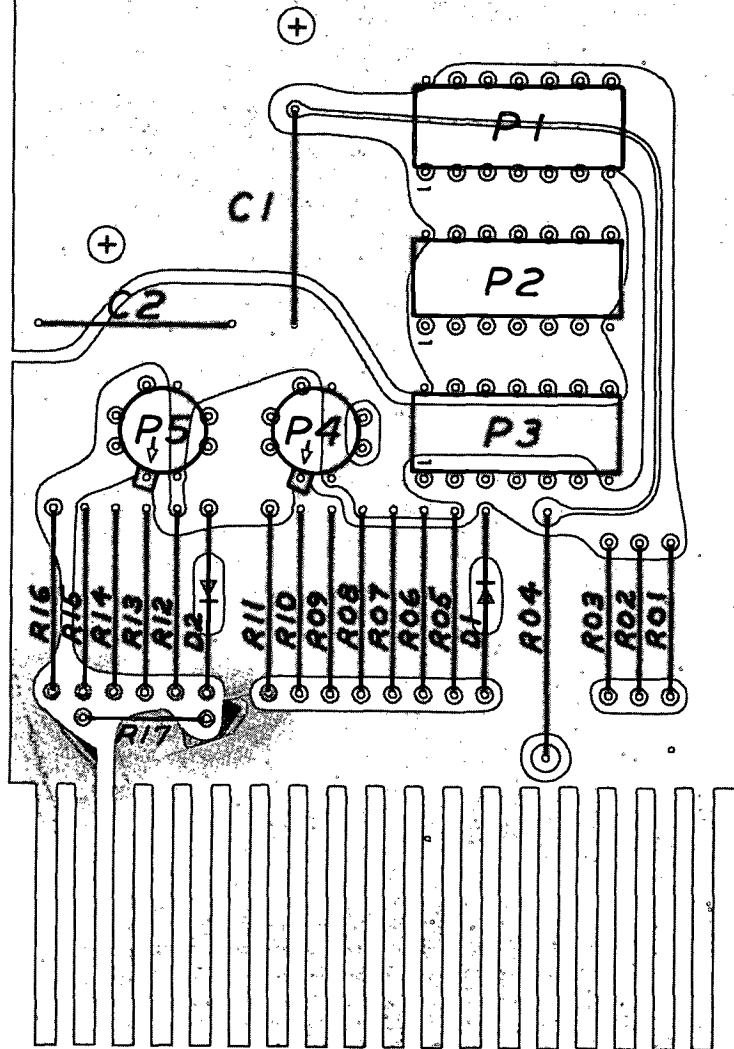
ISSUE 4-24-72

CHANGE NO. DATE DESCRIPTION

APPROVED			ENG. TJC	DRAWING NO. 422-13
BY	FOR	DATE		
<i>the</i>	PROD.	9-25-72	DRAWN BY PLL	
			CHECKED NTK	DATE 4-24-72

PTV0133-1
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(B)



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TITLE

COMPONENT IDENTIFICATION
"B" PEDESTAL SYSTEM SENSE BOARD

ISSUE	4-24-72		APPROVED			ENG TJC	DRAWING NO. 422-15
			BY <i>PLC</i>	FOR PROD	DATE 9-25-72	DRAWN BY PLL	
CHANGE NO.	DATE	DESCRIPTION				CHECKED <i>NTK</i>	DATE 4-24-72

RESISTORS

TYPE	REQUIRED	LOCATION
RA = 1500 OHMS $\pm 5\%$, 1/4W, CARBON COMPOSITION	7	R01 R02 R03 R05 R06 R11 R16
RB = 5100 OHMS $\pm 5\%$, 1W, CARBON COMPOSITION	1	R04
RC = 3000 OHMS $\pm 5\%$, 1/4W, CARBON COMPOSITION	2	R10 R15
RD = 1960 OHMS $\pm 1\%$, 1/8W, METAL FILM TYPE CEA, T-0 TEMP. COFF.	4	R07 R08 R09 R13
RE = 2550 OHMS $\pm 1\%$, 1/8W, METAL FILM TYPE CEA, T-0 TEMP. COFF.	1	R12
RF = 1000 OHMS $\pm 1\%$, 1/8W, METAL FILM TYPE CEA, T-0 TEMP. COFF.	1	R14
RG = 200K OHMS $\pm 5\%$ 1/4 W CARBON COMPOSITION	1	R17

DIODES

TYPE	REQUIRED	LOCATION
MMD-694 (CSL DIODE)	2	D1 D2

CAPACITORS

TYPE	LOCATION
15.4d, 20 VDC TANTALUM (KEMET K15J20KS OR MALLORY TAS 156M020PIC)	C2
2.24d 100 VDC TANTALUM (KEMET CS13BJ225K OR MALLORY TAS225M100PIC)	C1

INTEGRATED CIRCUITS

TYPE	REQUIRED	LOCATION
MC660L (MOTOROLA)	1	P1
MC672L (MOTOROLA)	2	P2 P3
LM311 (NATIONAL)	2	P4 P5

PRINTED CIRCUIT BOARD

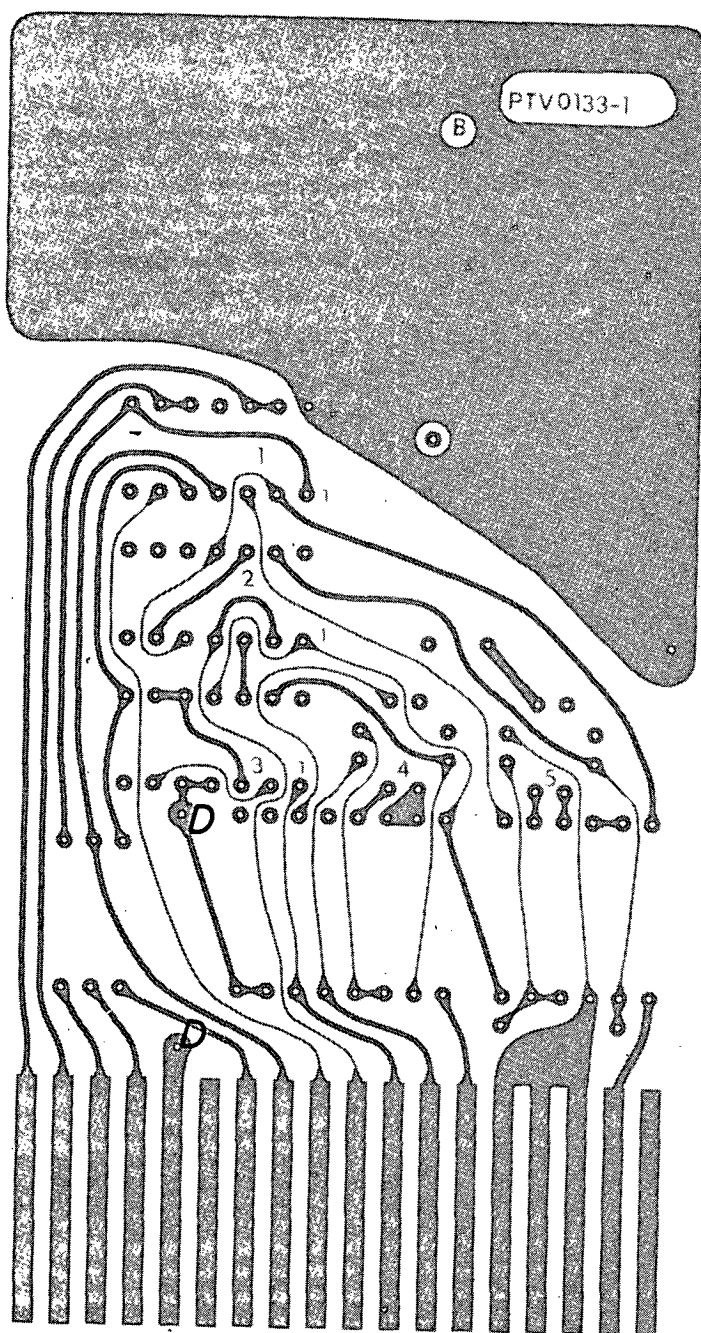
ONE REQUIRED

PTV0133-1 B

HANDLES

1 REQUIRED
D.E.C. STANDARD HANDLE
FOR FLIP CHIP BOARDS,
WITH RIVETS.

E.C.A		8-7-73	E.C.O. 0294
ISSUE		6-13-72	
CHANGE NO.	DATE	DESCRIPTION	
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			
MACROMODULAR PROJECT			
TITLE		PARTS LIST PEDESTAL SYSTEM SENSE BOARD	
APPROVED		ENG.	DRAWING NO.
BY	FOR	TJC	422-16
MBP	PRUD	DATE	
		9-25-72	
CHECKED		DRAWN BY	
NTK		DATE	
		6-13-72	



TYPE D 2 HOLES
TYPE B 98 HOLES
(NOT MARKED)

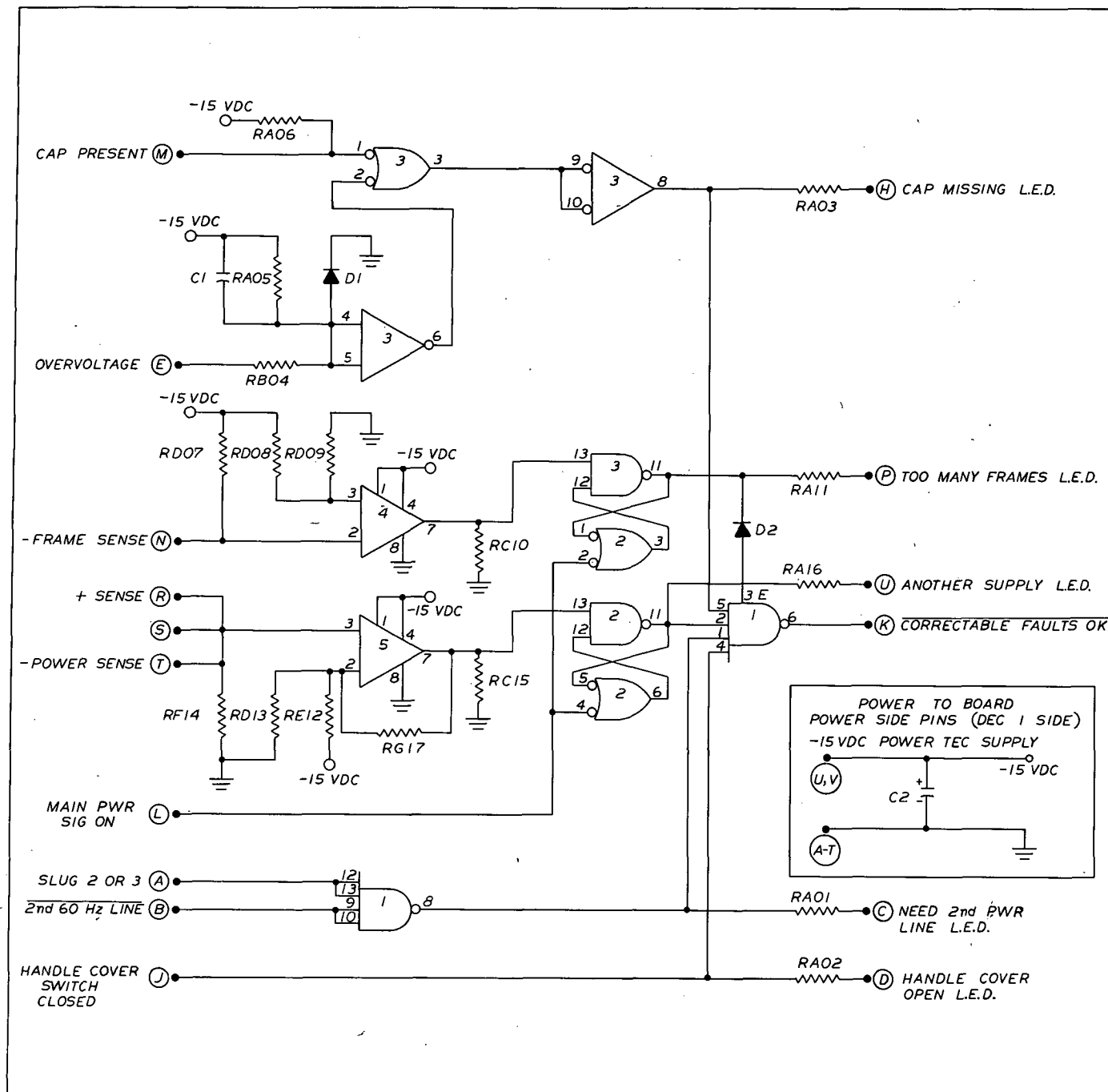
COMPUTER SYSTEMS LABORATORY
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ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

HOLE SIZE AND LOCATION
"B" PEDESTAL SYSTEM SENSE BOARD

ISSUE	4-24-72		APPROVED	BY <i>T.J.C. PROD.</i>	FOR	DATE <i>9-25-72</i>	ENG TJC	DRAWING NO. 422-17
CHANGE NO.	DATE	DESCRIPTION					DRAWN BY PLL	
						CHECKED <i>NTK</i>	DATE 4-24-72	



INTEGRATED CIRCUIT IDENTIFICATION

1. MC660
2. MC672
3. MC672
4. LM311
5. LM331

RESISTOR IDENTIFICATION

- RAXX = 1500 OHMS 7 REQ.
 RBXX = 5100 OHMS 1 REQ.
 RCXX = 3K OHMS 2 REQ.
 RDXX = 1960 OHMS 4 REQ.
 REXX = 2550 OHMS 1 REQ.
 RFXX = 1K OHMS 1 REQ.
 RGXX = 200K OHMS 1 REQ.

CAPACITOR IDENTIFICATION

- C1 = 2.2 ufd, 100 VDC TANTALUM
 C2 = 15 ufd, 20 VDC TANTALUM

DIODE IDENTIFICATION

- D1 = MMD-694
 D2 = MMD-694

NOTES:

1. THE MC PACKAGES HAVE -15 VDC ON PIN 7 AND GROUND ON PIN 14.
2. ANY PIN NOT ASSIGNED ON THIS SCHEMATIC IS UNCONNECTED.
3. I/O PIN DESIGNATIONS ARE SIGNAL SIDE PINS (DEC BLOCK SIDE 2) UNLESS OTHERWISE NOTED.

CIRCUIT BOARD PTV0133-1 B

CHANGE NO.	DATE	DESCRIPTION
COMPUTER SYSTEMS LABORATORY		
WASHINGTON UNIVERSITY		
ST. LOUIS, MISSOURI		
MACROMODULAR PROJECT		
TITLE		
PEDESTAL SYSTEM SENSE BOARD		
APPROVED	ENG.	DRAWING NO.
BY	FOR	DATE
CM	MA	7 JUL 72
CHECKED	DATE	
FUR	1-28-72	

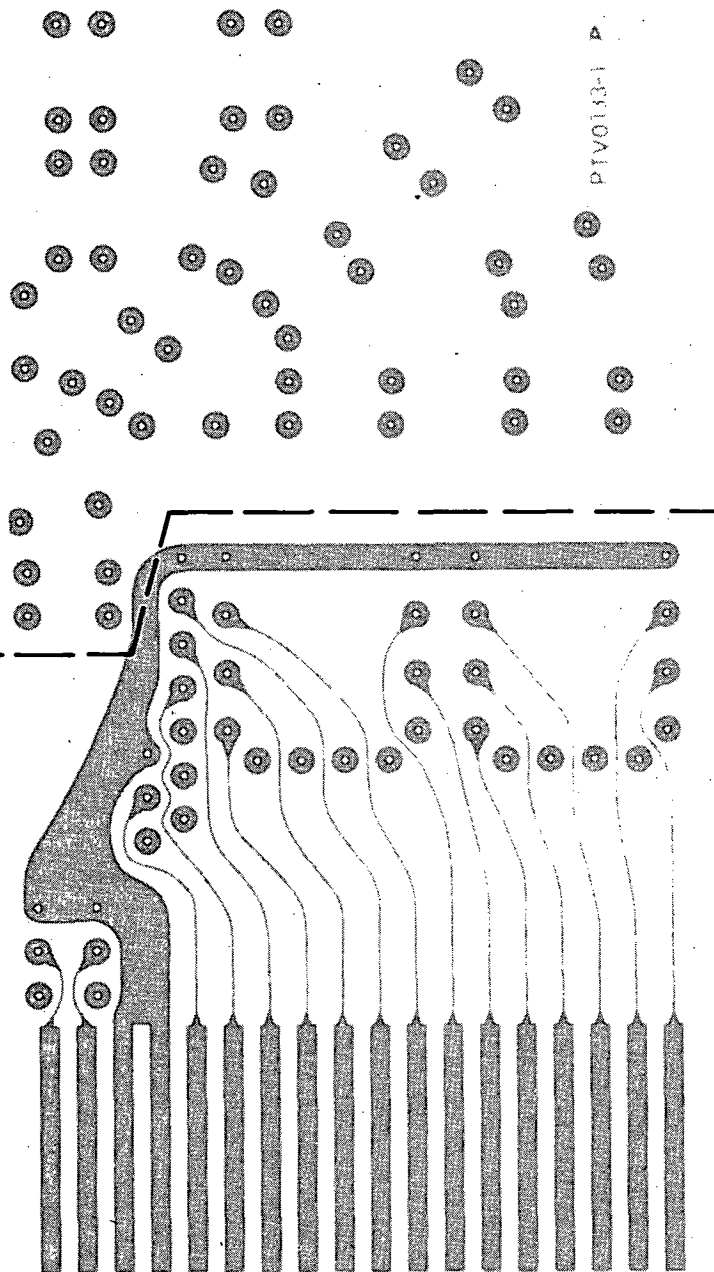
"A" Pedestal Cable Board

Parts List

Qty.	Dec-CSL	Item
1	-	PTV0133-1A Printed circuit board
1	421-12	Base Pedestal Back cover support channel
1	421-68	Base Pedestal ind. wire chase channel
1	-	1042-C rubber grommet 1/4 inch internal dia. or equivalent
6	-	H.P. 5082-4403 light emitting diode and mounting clip
2	-	8-32 x 1/4 long cadmium plate steel flathead screws
1	-	National S10-1445 cable 24-1/4 inches long
1	-	National S10-1445 cable 23-1/2 inches long
1	-	Alpha wire 1177 cable 39.5 inches long
1	-	Alpha wire 1173 cable 50.5 inches long
1	-	Alpha wire 1173 cable 14 inches long
1	-	Alpha wire 1173 cable 12 inches long
4	-	AWG 24 stranded wire GREEN PVC insulation 9 inches long
5	-	AWG 22 solid wire BLUE PVC insulation 3 inches long
2	-	AWG 22 stranded wire BLACK PVC insulation 5 inches long
10	-	Amp 42599-2 crimp terminal
2	-	Astro 348-40E10-12P1 connector and contacts
6	-	Adhesive back paper labels 2" x 1/2"
-	-	Lacing string, as required
1	-	Handle, D.E.C. Standard Handle For Flip-Chip Boards with rivets.

CHG.	E.C.O.	DATE	APPR.
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A	0294	8-7-73	<i>[Signature]</i>

DRILL 3/32 INCHES 51 PLACES - UNPLATED HOLES USED FOR LACING CABLES TO BOARD.



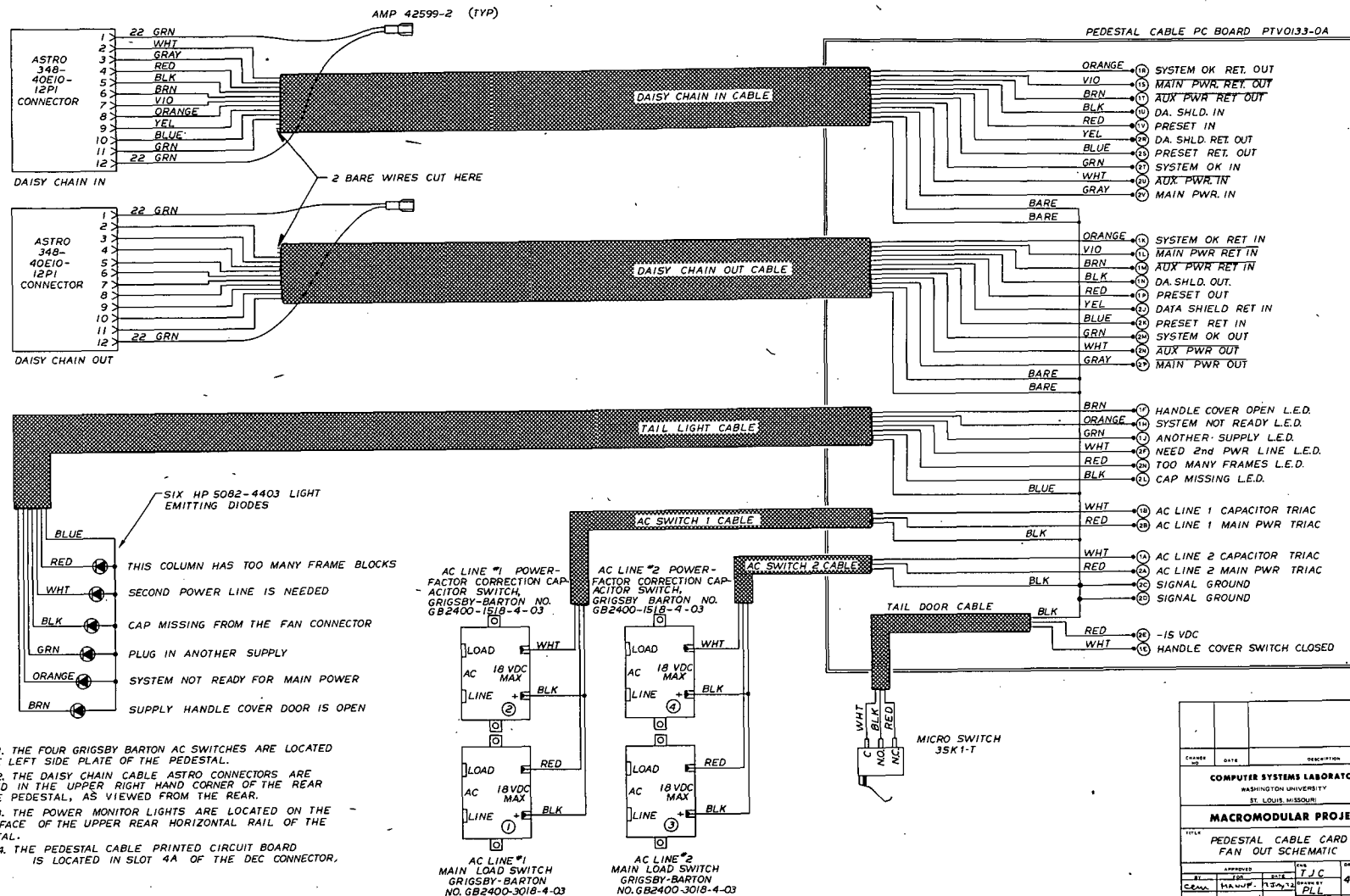
TYPE A - 40 PLACES

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
HOLE SIZE AND LOCATION
"A" PEDESTAL CABLE BOARD

ISSUE	4-24-72		APPROVED			ENG TJC	DRAWING NO. 422-20
			BY <i>T.J.C.</i>	FOR PROD	DATE 9-25-72	DRAWN BY PLL	
CHANGE NO.	DATE	DESCRIPTION				CHECKED <i>NTK</i>	DATE 4-24-72



DESIGN	DATE	DESCRIPTION
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI		
MACROMODULAR PROJECT		
TITLE PEDESTAL CABLE CARD FAN OUT SCHEMATIC		
BY C.E.M.	APPROVED J.C.	DATE 2-2-72
DESIGNED F.V.	CHECKED F.V.	DATE 2-2-72

"A" PEDESTAL CABLE BOARD

Cable Preparation and Assembly Procedure

I. Cable Identification

Identification of each cable will be accomplished by writing the cable name on a paper label and adhering it to the cable. (Place leading edge of label from end of cable as specified below).

A. National S10-1445 cable 24-1/4 long (Daisy chain cable INPUT) 5 inches from one end.

B. National S10-1445 cable 23-1/2 inches long (Daisy Chain Cable OUTPUT) 5 inches from one end.

C. Alpha wire 1177 cable 39.5 inches long (Tail light cable) 8 inches from one end.

D. Alpha wire 1173 cable 50.5 inches long (Tail Door cable) 8 inches from one end.

E. Alpha wire 1173 cable 12 inches long (A.C. Sw. #1) 3-1/2 inches from end.

F. Alpha wire 1173 cable 14 inches long (A.C. Sw. #2) 3-1/2 inches from end.

CHG.	E.C.O.	DATE	APPR.
iss	-	4/19/72	<i>[Signature]</i>

II. Cable Preparation

A. Daisy chain cables

1. Marked end. (INPUT & OUTPUT cables the same)
 - a. Cut back outer jacket 1-3/4"
 - b. Cut away the exposed aluminum/mylar tape jacket.
Cut the two stranded bare tined copper wires flush with the outer jacket.
 - c. Remove the exposed aluminum/mylar tape from each of the 10 insulated wires.
 - d. Trim the ends of all 10 wires 1/8 inch to eliminate damage from the cable cutting operation.
 - e. Strip the individual wires (0.188 to 0.219 inches).
 - f. Strip one end of 2 of 4 nine inch long green AWG 24 wires back 0.25 inches and insert into an AMP 42599-2 and crimp.
 - g. Strip the other end of the two Green wires 0.188 to 0.219 inches.
 - h. Crimp contacts for an Astro 348-40E10-12P1 connector onto all 10 wires of the cable and the two stripped ends of one set of the green wires with an Amphenol No. 294-268 crimp tool with contact locator (Amphenol No. 294-1551) and a setting of 4.
(Equivalent automatic tooling is preferable.)

ENG.	REV.	DATE	APP.
iss.	-	4/19/72	<i>J.P.E.</i>

i. Insert the contacts into the connector per Amphenol's ASTRO 348 technical manual and the following wiring list:

<u>Wire Color</u>	<u>Pin</u>
1 end of GREEN wire set	.... 1
White	..... 2
Gray	..... 3
Red	..... 4
Black	..... 5
Brown	..... 6
Violet	..... 7
Orange	..... 8
Yellow	..... 9
Blue	..... 10
Green	..... 11
Other end of GREEN wire	
set	..... 12

j. Complete the assembly by screwing the rear nut into the connector shell -- tighten carefully with channellock pliers.

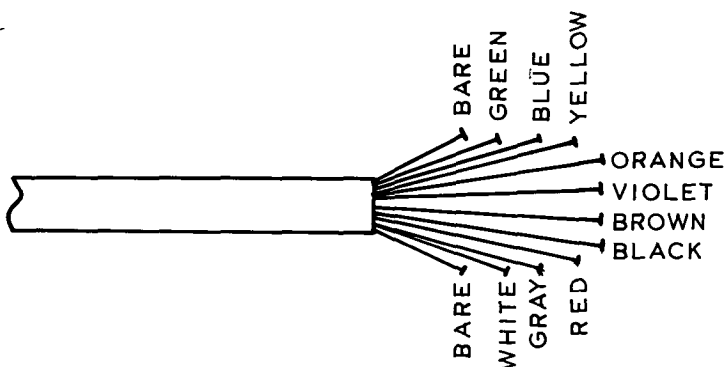
2. Unmarked end.

a. Cut back outer-jacket of INPUT cable so length from jacket edge to back face of Astro 348 connector is 22.0 inches.

U.P.G.	T.C.G.	DATE	APPR.
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- b. Cut back outer jacket of OUTPUT cable so length from jacket edge to back face of Astro 348 connector is 21.0 inches.
- c. Cut away the exposed aluminum/mylar tape jacket on both cables. (Do not cut the two stranded bare tinned copper wires.)
- d. Remove the exposed aluminum/mylar tape from each of the 10 insulated wires on both cables.
- e. Cut the individual wires to length using drawing on page 422-26 as a template on both cables.
- f. Strip each insulated wire 0.15 inch on both cables.

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NOTE:
FAN OUT WIRING
AS SHOWN.

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT			
			TITLE BASE PEDESTAL DAISY CHAIN CABLE CUTTING TEMPLATE			
ISSUE	4/19/72		APPROVED		ENG	DRAWING NO.
			BY	FOR	DATE		TJC
			PROD.	9-25-72	DRAWN BY	422-26
					PLL	
CHANGE NO.	DATE	DESCRIPTION			CHECKED	DATE
					NTK	4-12-72

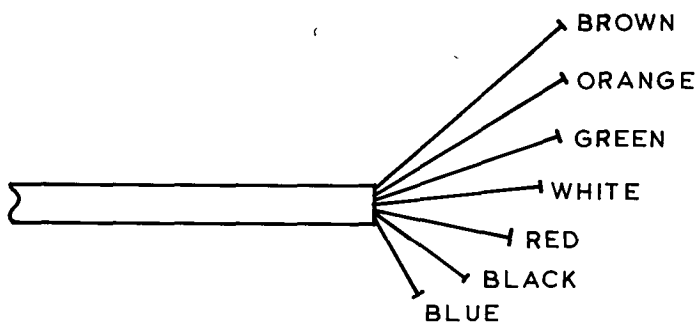
B. Tail light cable

1. Marked end

- a. Cut back outer jacket 1.75 inches.
- b. Cut individual wires to length using the drawing on page 422-28 as a template.
- c. Strip each conductor 0.15 inches.

2. Unmarked end-leave, will be prepared later.

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ISS.	-	4-19-72	<i>J.E.</i>



NOTE:

FAN OUT WIRING
AS SHOWN.

COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE BASE PEDESTAL TAIL LIGHT CABLE CUTTING TEMPLATE				
			APPROVED			ENG TJC	DRAWING NO. 422-28
			BY <i>TJC</i>	FOR PROD	DATE 9-25-72	DRAWN BY PLL	
ISSUE 1/19/72						CHECKED NTR	DATE 4-13-72
CHANGE NO.	DATE	DESCRIPTION					

C. Tail Door Cable

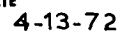
1. Marked end preparation

- a. Cut back outer jacket 1 inch.
- b. Cut individual wires to length using the drawing on page 422-30 as a template.
- c. Strip each wire 0.15 inch.

2. Unmarked end preparation

- a. Cut back outer jacket 0.75 inch.
- b. Strip each wire 0.4 inch.

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D. AC Switch (#1 and #2 prepare the same)

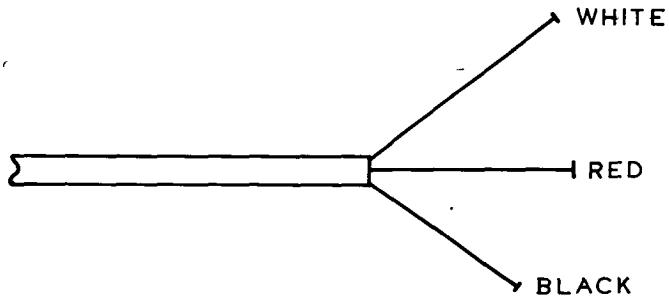
1. Unmarked end preparation

- a. Cut back outer jacket 1.37 inches.
- b. Cut individual wires to length using the drawing on page 422-32 as a template.
- c. Strip each wire 0.15 inch.

2. Marked end preparation

- a. Cut back outer jacket 3 inches.
- b. Strip each wire 0.2 inch.
- c. Strip both ends of the 5 inch BLACK AWG 22 wire 0.2 inches.
- d. Bring one end of the 5 inch BLACK wire and the BLACK cable wire together and crimp an AMP 42599-2 terminal on them.
- e. Crimp an AMP 42599-2 terminal on each of the three remaining wire ends.

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COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE BASE PEDESTAL AC SWITCH 1&2 CABLE CUTTING TEMPLATE				
			APPROVED			ENG TJC	DRAWING NO. 422 -32
			BY <i>M.P.C.</i>	FOR PROD	DATE 9-25-72	DRAWN BY PLL	
ISSUE	4/19/72					CHECKED NTK	DATE 4-13-72
CHANGE NO.	DATE	DESCRIPTION					

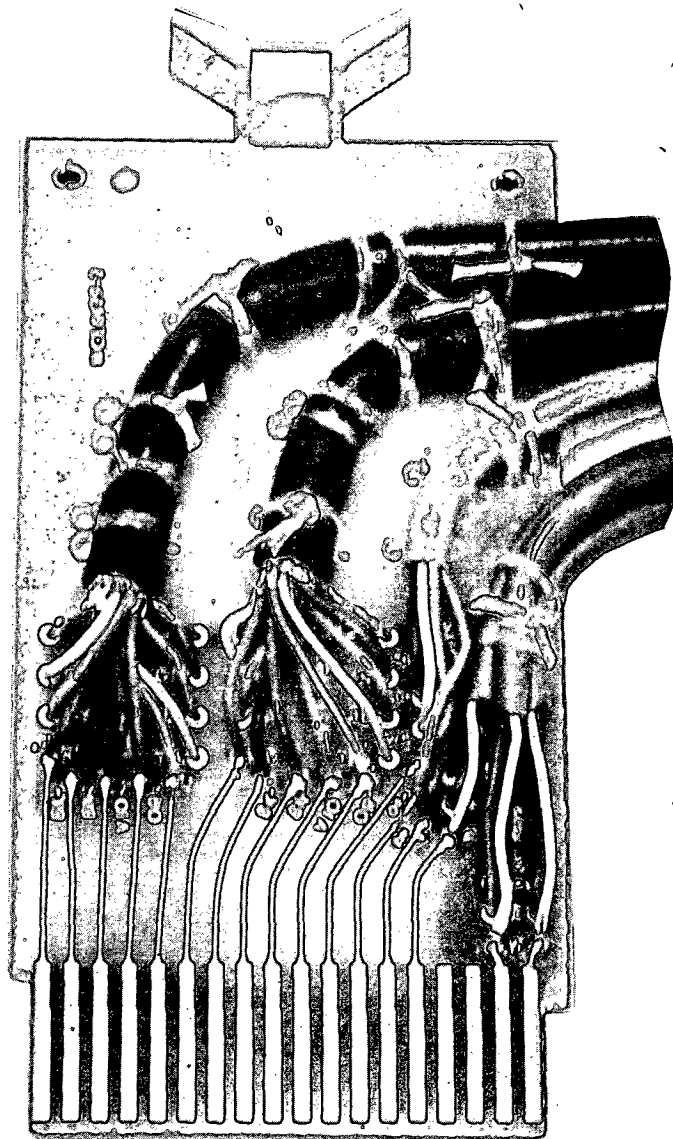
III. Connect cables to cable card board

A. Mount handle on cable card board. (Computer Systems Lab.)

B. Tie and solder the cables to the cable card board in the following order: (Ref: to page 422-34)

1. Unmarked end of Daisy Chain Cable OUTPUT.
 2. Unmarked end of Daisy Chain Cable INPUT.
 3. Marked end tail light cable.
 4. Marked end of tail door cable
 5. Unmarked end of A.C. Sw #1
 6. Unmarked end of A.C. Sw #2
- tied together {

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MACROMODULAR PROJECT

TITLE

CABLES TO CABLE CARD DETAIL

ISSUE 4/19/72

CHANGE NO. DATE DESCRIPTION

APPROVED

BY

FOR

DATE

PROD

9-25-72

ENG

TJC

DRAWN BY
GWP

CHECKED

NTK

DRAWING NO.
422-34

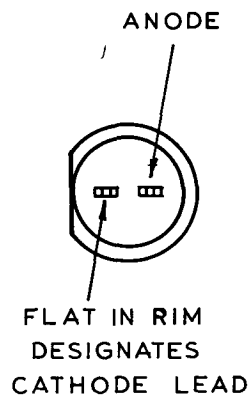
DATE
4-19-22

IV. Connect Tail light cable to channel

A. Prepare ind. wire chase channel 421-68

1. Place the indicator wire chase channel on bench, flat side down with 6-17/24 holes toward you.
2. Insert the 6 light emitting diode mounting clips into place from the front.
3. Insert the 6 light emitting diodes (LED) from the back. (insure the flat key is up on each LED ref. to 421-36).
4. Strip 5 three inch long Blue wires 0.3 inches on both ends.
5. With the 5 stripped wires connect the bottom lead end (anode) of each LED together and solder.

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iss	-	4/19/72	<i>A.J.E.</i>



COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE BASE PEDESTAL L.E.D. ORIENTATION				
			APPROVED			ENG	DRAWING NO.
			BY <i>[Signature]</i>	FOR PROD	DATE 9-25-72	T J C	422-36
						DRAWN BY P L L	
ISSUE	4/19/72					CHECKED NTK	DATE 4-13-72
CHANGE NO.	DATE	DESCRIPTION					

B. Prepare Back cover support channel 421-12

1. Insert rubber grommet into back cover support channel.
2. Thread the unmarked end of the tail light cable through the back cover support channel grommet (about 15 inches).
3. Cut outer jacket back 6.5 inches.
4. Cut the green and white wires to 4.5 inches.
5. Cut the red and black wires to 1.75 inches.
6. Strip all 7 wires .25 inches.

C. Assemble the cable and two channels

1. Line up the 6 LED's with the 6 holes on the engraved channel. Ref. to 422-39 for orientation.
2. Solder the blue wire of tail light cable to LED anode of, System Not Ready for Main Power.
3. Solder the remaining 6 wires to the cathodes of the 6 LED's per the following table:

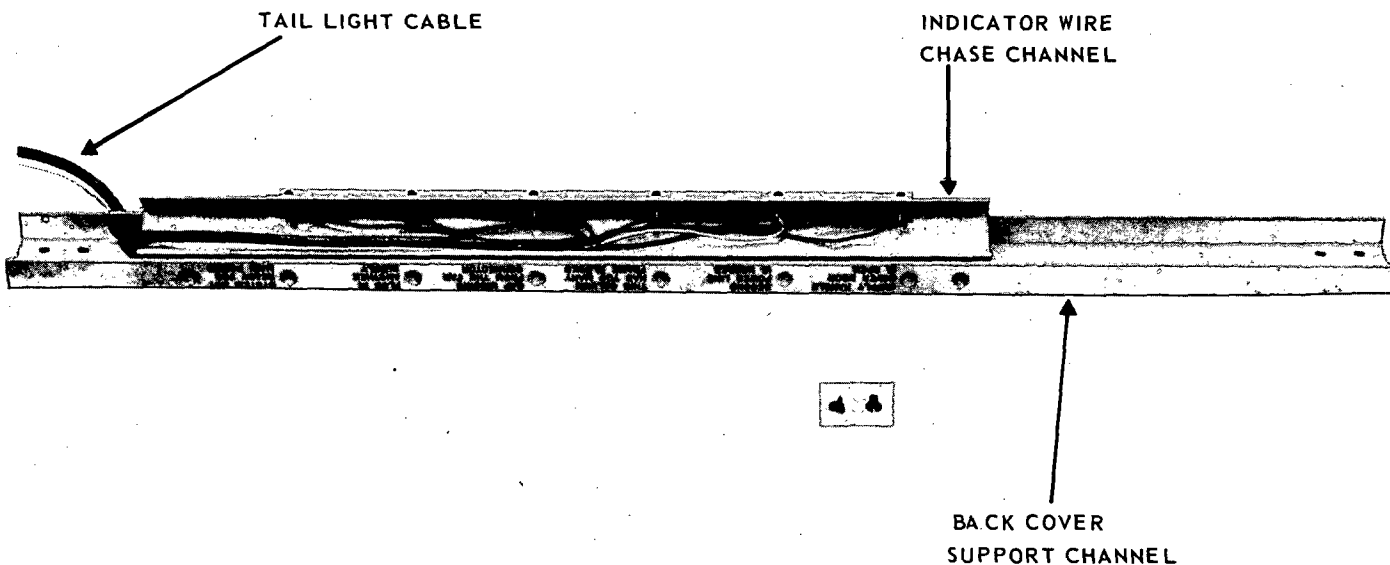
Lettering on channel	Wire Color
System Not Ready For Main Power	ORANGE
Plug In Another Supply	GREEN
Cap Missing From the Fan Connector	BLACK

CHG.	E.C.O.	DATE	APPR.
iss	-	4/19/72	<i>A.G.C.</i>

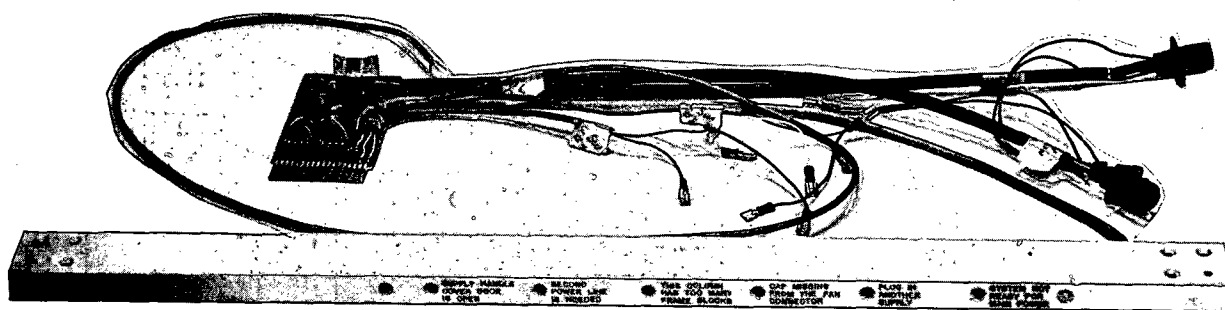
Lettering On Channel	Wire Color
This Column Has too Many Frame Blocks	RED
Second Power Line Is Needed	WHITE
Supply Handle Cover Door Is Open	BROWN

4. Place the ind. wire chase channel into the Back cover support channel by rotating the ind. wire chase channel 180°. (be careful not to push any of the LED's out of place)
5. Pull excess cable through channel grommet.
6. Using the two 8-32 screws secure the two channels together.

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iss	-	4-19-72	<i>A.C.</i>



COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			MACROMODULAR PROJECT				
			TITLE TAIL LIGHT CABLE - CHANNELS ORIENTATION				
			APPROVED			ENG TJC	DRAWING NO. 422-39
			BY <i>TJC</i>	FOR PROD	DATE 9-25-72	DRAWN BY MBP	
						CHECKED NTK	
ISSUE CHANGE NO.	DATE 4/19/72	DESCRIPTION					



COMPUTER SYSTEMS LABORATORY
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TITLE "A" PEDESTAL CABLE BOARD
COMPLETED SUB ASSEMBLY

ISSUE	4-19-72	DESCRIPTION	APPROVED			ENG	DRAWING NO. 422-40
			BY	FOR	DATE	TJC	
CHANGE NO.	DATE	DESCRIPTION	BY	FOR	DATE	DRAWN BY	DATE
			MBP	PROD	9-25-72	NTK	

COMPUTER SYSTEMS LABORATORY

WASHINGTON UNIVERSITY

423

PEDESTAL
RESIDENT SUPPLY PAN ASSEMBLY

PAGE	TITLE	CHANGE
423-1 thru 423-2	TITLE PAGE	A
423-3 thru 423-4	PARTS LIST	
423-5	TOOLING CHART	
423-6	INTRODUCTION	
423-7	GENERAL INSTRUCTIONS	
423-8	PEDESTAL ASSEMBLY SEQUENCE DIAGRAM	
423-9 thru 423-11	SERVICE COLUMN CONNECTOR WIRE PREPARATION TABLE	
423-12 thru 423-13	SERVICE COLUMN CONNECTOR ASSEMBLY PROCEDURE	
423-14 thru 423-15	HARNESS WIRE PREPARATION TABLE	
423-16	HARNESS JIG	
423-17 thru 423-22	HARNESS ASSEMBLY PROCEDURE	A
423-23	DEC CONNECTOR ORIENTATION	
423-24 thru 423-26	DEC CONNECTOR INTERWIRING	

CHG	E.C.O.	DATE	APPR.
Issue		9-17-72	<i>A.J.C.</i>
A	0294	8-7-73	

MACROMODULAR SYSTEMS PROJECT

423-I

PEDESTAL
RESIDENT SUPPLY PAN ASSEMBLY (cont.)

PAGE	TITLE	CHANGE
423-27	TRIAC WIRED ASSEMBLY PROCEDURE	ISSUE ✓
423-28 thru 423-31	RESIDENT SUPPLY PAN ASSEMBLY PROCEDURE	
423-32 thru 423-33	RESIDENT SUPPLY PAN ASSEMBLY WIRE PREPARATION TABLE	
423-34 thru 423-38	RESIDENT SUPPLY PAN WIRING PROCEDURE 423-40	A
423-39 thru 423-41	DEC CONNECTOR WIRING PROCEDURE	
423-42	WIRING DIAGRAM	

CHG	E.C.O.	DATE	APPR.
ISS.		10/2/72	J.G.C.
A	0294	8-7-73	

Parts List

QTY	CSL DOC.	PART
1	421-21	BASE PEDESTAL FAN MODULE CONNECTOR ADAPTER
1	421-70	D.E.C. BLOCK BAR
1	421-58	BRACKET FOR CAPACITOR AND AUX. SUPPLY
1	421-59	RESIDENT SUPPLY COVER
1	421-61	RESIDENT SUPPLY BASE
2	421-63	CAPACITOR STRAPS TYPE I
2	421-64	CAPACITOR STRAPS TYPE II
2	421-65	PAN SUPPORT BAR
1	421-69	BRACKET HANDLE
1		SILICON CONTROL RECTIFIER, MOTOROLA MCR3935-3
1		POWER SUPPLY, -15 VDC, POWER TEC 3D15-1.2 WITH OVP
1		POWER SUPPLY, +55.64 VDC, SOLA #39067
1		TRIAC, MOTOROLA 2N 6155 OR MAC 11-6
1		TRIAC, MOTOROLA SAC-64
2		CONTACT, AMP 34161, RING TONGUE LUG PLASTI-GRIP (BLUE)
1		CONTACT, AMP 34322, BUTT SPLICE NO. 6
1		CONTACT, AMP 34323, BUTT SPLICE NO. 4
15		CONTACT, AMP 42599-2, RECEPTACLE FASTON (RED)
4		CONTACT, AMP 160314-3, RECEPTACLE FASTON (YELLOW)
30		CONTACT, AMP 201328-1, NO. 22 FEMALE TYPE II CONTACT
49		CONTACT, AMP 201568-1, NO. 14 FEMALE TYPE II CONTACT
7		CONTACT, AMP 322249, SLOTTED TONGUE LUG PLASTI-GRIP (RED)
6		CONTACT, AMP 324165, SLOTTED TONGUE LUG PLASTI-GRIP (BLUE)
3		CONTACT, AMP 42844-1, RECEPTACLE FASTON (BLUE)
1		CONTACT, AMP 324581, SLOTTED TONGUE LUG PLASTI-GRIP (YELLOW)
3		CONNECTOR, AMP #201545-1, TYPE W CONNECTOR, 20 PIN
1		CONNECTOR, AMP #200474-1, TYPE W CONNECTOR, 40 PIN
1		PRINTED CIRCUIT CARD CONNECTOR DEC H-803
1		TERMINAL STRIP, 2-POLE, JONES 2-541 OR EQUIV.
2		CAPACITORS, 30 ufd 330 VAC, G.E. #45F173
2		RESISTORS, 36K OHMS 2-WATT CARBON COMPOSITION
2		RESISTORS, 1 OHM 30-WATT FLAT POWER, DALE HL-24-08Z-1 OHM $\pm 5\%$ W/DALE #301 MOUNTING HARDWARE OR EQUIV.
1		RESISTORS, 1 OHM, 100-WATT TUBULAR POWER, DALE HL-100-03Z-1 OHM $\pm 5\%$ W/DALE #302 MOUNTING HARDWARE OR EQUIV.

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QTY	CSL DOC	PART
1		RESISTOR, 1 OHM 25 WATT TUBULAR POWER DALE HL-25-02Z - $1\Omega \pm 5\%$ W/DALE #302 MOUNTING HARDWARE OR EQUIVALENT
1		RESISTOR, 2500 OHM 8 WATT TUBULAR POWER, OHMITE #1540 OR EQUIVALENT.
1		CABLE CLAMP, H.H. SMITH #771 OR EQUIVALENT
44		WASHER, INTERNAL STAR TOOTH LOCK, FOR 6-32 SCREW.
22		SCREW, 6-32 x 3/8" FILLISTER BINDING HEAD
18		SCREW, 6-32 x 5/8" " " "
6		SCREW, 6-32 x 3/4" " " "
1		SCREW, 6-32 x 1" " " "
4		SCREW, 8-32 x 3/4" " " "
4		SCREW, 4-40 x 3/8" " " "
28		NUTS, 6-32
4		NUTS, 8-32
1		GROMMET, RUBBER 1/4" I.D., G.C. ELECTRONICS 1042-C OR EQUIVALENT
2		SPACERS, 6-32 x 1", H.H. SMITH 8428 OR EQUIV.
5"		SHRINK TUBING, HEAVY WALL, AMP #603101
		LACING STRING OR TIE WRAPS AS REQUIRED
		APPROX. 17 FT. 16 (26 x 30) AWG, RED, STRANDED PVC
		APPROX. 4 FT. 16 (26 x 30) AWG, BLACK STRANDED PVC
		APPROX. 18 FT. 16 (26 x 30) AWG, BROWN STRANDED PVC
		APPROX. 21 FT. 16 (26 x 30) AWG, WHITE STRANDED PVC
		APPROX. 17 FT. 16 (26 x 30) AWG, BLUE STRANDED PVC
		APPROX. 8 FT. 16 (26 x 30) AWG, GREEN STRANDED PVC
		APPROX. 6 FT. 16 (26 x 30) AWG, VIOLET STRANDED PVC
		APPROX. 22 FT. 24 AWG, KOVAR SOLID BLACK
		APPROX. 21 FT. 24 AWG, KYNAR SOLID BLUE
		APPROX. 9 FT. 24 AWG, KYNAR SOLID BROWN
		APPROX. 10 FT. 24 AWG, KYNAR SOLID GREEN
		APPROX. 18 FT. 24 AWG, KYNAR SOLID RED
		APPROX. 24 FT. 24 AWG, KYNAR SOLID SLATE
		APPROX. 7 FT. 24 AWG, KYNAR SOLID WHITE
		APPROX. 15 FT. 24 AWG, KYNAR SOLID YELLOW
1		21 INCH BUSSING STRIP, D.E.C. #933
		APPROX 3 FT. 24 AWG, TINNED BUS WIRE
1		HANDLE, METAL, H.H. SMITH #1662
1		RESISTOR, 100 OHM, 1/4 WATT, $\pm 5\%$ CARBON COMP.
1		SHRINKABLE TUBING, 1/8 INCH DIA., 2.5 INCH LONG

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MACROMODULAR SYSTEMS PROJECT

423-4

TOOLING CHART

CONTACT OR TERMINAL	CRIMP TOOL
AMP 34322	BANTAM ROTO-CRIMP 601075 SETTING #6 OR ROTO-CRIMP 600850 SETTING #6
AMP 34323	SAME TOOLS AS ABOVE, SETTING #4
AMP 324581 AMP 42844-1 AMP 160314-3	AMP 59239-4 12-10 PIDG
AMP 34161 AMP 324165	AMP 47387 16-14 PIDG
AMP 201568-1	AMP 45098. TOOL IS COLOR CODED TO COLOR STRIPES ON CONTACTS; BLUE, VIOLET, GREEN
AMP 201328-1	AMP 45099 SAME AS ABOVE, BUT WHITE, RED, YELLOW
	EXTRACTION TOOL FOR ALL TYPE II CONTACTS AMP 305183
AMP 42599-2	AMP 90035-1 FASTON
AMP 322249	AMP 47386

INTRODUCTION

This document contains instructions for assembling the Resident Supply Pan. This assembly, along with two other assemblies, is used in the final assembly of a Macromodular Pedestal. An overview of the assembly sequence is shown on page 423-8.

The assembly of the Resident Supply Pan is accomplished by first constructing three subassemblies. One of the subassemblies, the Harness, is constructed in two parts. After the instructions for the three subassemblies are given; instructions for the construction of the Pan mechanical assembly, the Pan interwiring, and the incorporation of the subassemblies are given in order.

This document may be subdivided into the following assemblies:

1. Service Column Connector Assembly, part of Harness Assembly
(423-9 through 423-13)
2. Harness Assembly
(423-14 through 423-22)
3. DEC Connector Interwiring
(423-23 through 423-26)
4. Triac wiring
(423-27)
5. Resident Supply Pan Assembly
 - a) Mechanical (423-28 through 423-31)
 - b) Wiring and Adding Subassemblies (423-32 through 423-41)

GENERAL INSTRUCTIONS

The 3 wire preparation tables are given just before the sections that require them. In general, all the strip lengths given are ± 0.015 inches. Stripping must be done with a tool which does not nick or break any strands of the wire. The termination columns contain starred AMP contact numbers which are to be crimped onto the wires as part of the preparation. The other contacts contain more than one wire so are added during the assembly procedure.

A tooling chart is given on page 423-5 which must be consulted. Care must be exercised to assure all strands of the wire (or wires) are fully inserted into the contacts and splices before crimping. (Strands MUST not be allowed to unravel and bunch outside the crimp area.)

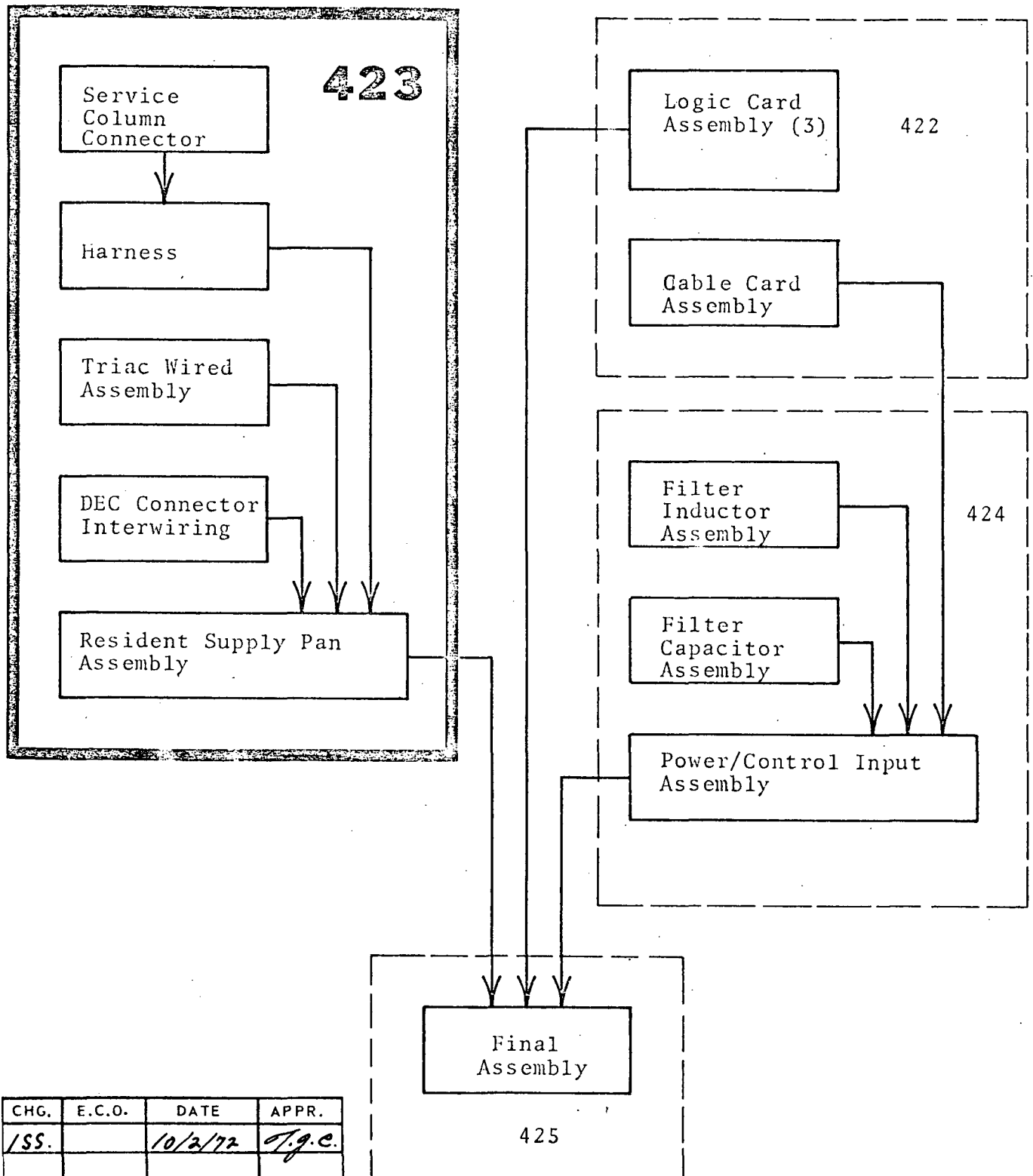
The DEC Connector wiring is done, in part, by mechanical wrapping. An acceptable wrap has 5 full wraps of bare wire; and insulation wrapped over 2 post corners. Open spiral and over wraps are not acceptable. Care must also be exercised to assure the wire is not stretched so tight between pins that the insulation is pierced.

The wiring diagram (the last page) should be used as an aid when testing the completed assembly.

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PEDESTAL ASSEMBLY

SEQUENCE DIAGRAM



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SERVICE COLUMN CONNECTOR
WIRE PREPARATION TABLE

R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N I N C H E S	S T R I P L E N G T H		T E R M I N A T I O N		(Starred [*] Term To Be Added Now)
					END 1	END 2	END 1	END 2	
1	13	16	BLUE	6	.250	.600	*201568-1	34323	OV TO CONNECTOR
2	10	16	RED	4.5	.250	.500	*201568-1	34322	+55 TO CONNECTOR
3	1	16	GREEN	26.5	.200	.600	* 42599-2	34323	POW GND TO CRIMP
4	2	16	BLUE	11.5	.250	.600	*201568-1	34323	OV TO SLUG #1
5	1	16	GREEN	11.5	.250	.600	*201568-1	34323	EARTH TO SLUG #1
6	1	16	BLUE	17	.500	.600	SOLDER	34323	TO CAP. DIS. SCR
7	1	16	BLUE	14.5	.200	.600	*324165	34323	TO MASTER OV POWER
8	1	16	BLUE	16.5	.200	.600	*324165	34323	TO MAS. OV SENSE
9	2	16	BLUE	14.5	.250	.600	*201568-1	34323	OV TO SLUG #3
10	1	16	GREEN	14.5	.250	.600	*201568-1	34323	EARTH TO SLUG #3
11	2	16	BLUE	8.5	.250	.600	*201568-1	34323	OV TO SLUG #2
12	1	16	GREEN	8.5	.250	.600	*201568-1	34323	EARTH TO SLUG #2
13	1	16	GREEN	10.5	.200	.600	*34161	34323	BASE EARTH
14	1	16	GREEN	21	.200	.600	*34161	34323	CENT. WALL. EARTH
15	3	24	BLUE	22	.000	.600	H-803	34323	OV REF TO DEC BK
16	2	16	RED	12.5	.250	.600	*201568-1	34322	+55 TO SLUG #1
17	1	16	RED	23.5	.500	.600	SOLDER	34322	TO CAP DIS. RES.
18	1	16	RED	15.5	.200	.600	*324165	34322	TO MAST. +55 POW
19	1	16	RED	17.5	.200	.600	*324165	34322	TO MAS +55 SENSE
20	2	16	RED	16.5	.250	.600	*201568-1	34322	TO SLUG #3 +55

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R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N C H E S	S T R I P L E N G T H		T E R M I N A T I O N		
					END 1	END 2	END 1	END 2	
(Starred [*] Term To Be Added Now)									
21	2	16	RED	9.0	.250	.600	*201568-1	34322	TO SLUG #2 +55
22	1	16	VIOLET	27.5	.250	.250	160314-3	*201568-1	AC FAN POW]HIGH
23	1	16	VIOLET	34	.250	.250	160314-3	*201568-1	AC FAN POW]LOW
24	1	24	BLUE	28	.200	000	*201328-1	H-803	}TWISTED +FRAME }TOGETHER -SENSE
		24	BROWN	[2]	.200	000	*201328-1	H-803	
25	1	24	RED	28	.200	000	*201328-1	H-803	}TWISTED SENSE }TOGETHER
		24	BROWN	[2]	.200	000	*201328-1	H-803	
26	1	24	SLATE	28	.200	000	*201328-1	H-803	}TWISTED POW DN ACK }TOGETHER CAP SNS
		24	YELLOW	[2]	.200	000	*201328-1	H-803	
27	1	24	YELLOW	28	.200	000	*201328-1	H-803	POW DWN REQ
28	1	24	GREEN	28	.200	000	*201328-1	H-803	DATA SHIELD
29	1	24	WHITE	28	.200	000	*201328-1	H-803	PRESET
30	1	24	BLUE	23	.40	.60	*322249[1]	34323	OV REF TO AUX. SUPPLY
31	1	24	BLACK	28	.200	000	160314-3	H-803	SW #1 HI AC OUT
32	1	16	WHITE	19.5	.200	.250	160314-3	*201568-1	AC HI PW TO SLG1
33	1	16	WHITE	28.5	.200	.200	160314-3	*324165	AC HI POW TO MAS
34	1	16	WHITE	26.0	.200	.250	160314-3	*201568-1	LINE1 LO TO SLG1
35	1	16	WHITE	35.0	.200	.200	160314-3	*324165	LINE1 LO TO MAS
36	1	24	RED	28	.200	000	*201328-1	H-803	COOLING SENSE

[1]: Bend the striped length of End 1 back on itself to form a
.20 length of doubled bare wire before inserting in terminal.

[2]: Length after twisting together.

SERVICE COLUMN
CONNECTOR ASSEMBLY PROCEDURE

1. Insert the prepared wires into an AMP 200474-1 connector per the following table: (The contacts are inserted into the face nearest the flange.)

WIRE PREP. REF. NO.	AMP CONNECTOR PIN NUMBER
1	17, 26, 35, 19, 20, 27, 28, 29, 30, 36, 37, 38, 39,
2	3, 4, 5, 6, 10, 11, 12, 13, 21, 22
22	31
23	40
24 (Blue)	33
24 (Brown)	32
25 (Red)	24
25 (Brown)	15
26 (Slate)	16
26 (Yellow)	18
27	8
28	25
29	34
36	9

2. Fill pin holes 1, 2, 7, 14, and 23 with AMP sockets number 201328-1. (The AMP connector should now be full.)

3. Wrap lacing string around the wire bundle one-half inch from connector and tie with bundle approximately centered.

4. Mount the AMP connector assembly on a BASE PEDESTAL FAN MODULE CONNECTOR ADAPTER, 421-21, using four 4 x 40 screws 3/8 inch long such that pin 23 of the AMP connector is nearest the ADAPTER face with the two large threaded holes.

5. Insert the ten 16 AWG RED wires from the Connector Adapter into one end of an AMP 34322 BUTT SPLICE (wires extend 1/2 way through the BUTT SPLICE) and crimp the filled half.

6. Insert Reference Wires 16, 17, 18, 19, 20, and 21 (9 wires) into the other end of the AMP 34322 BUTT SPLICE and crimp.

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7. Insert the thirteen 16 AWG BLUE wires from the Connector Adapter into one end of an AMP 34323 BUTT SPLICE and crimp the filled half.
8. Insert Reference Wires 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 30 (19 wires) into the other end of the AMP 34323 BUTT SPLICE and crimp.
9. Center a 2 1/2 inch length of Heavy Wall Shrink Tubing over each splice and shrink with a heat gun. Care must be exercised as the PVC insulation will melt.
10. Insert the short 16 AWG VIOLET wire and Reference Wires 31, 32, and 33 into an AMP 160314-3 Receptacle and crimp.
11. Insert the long 16 AWG VIOLET wire and Reference Wires 34 and 35 into an AMP 160314-3 Receptacle and crimp.

End of Service Column Connector Assembly Procedure. This assembly is used in the Harness Assembly.

HARNESS WIRE PREPARATION TABLE

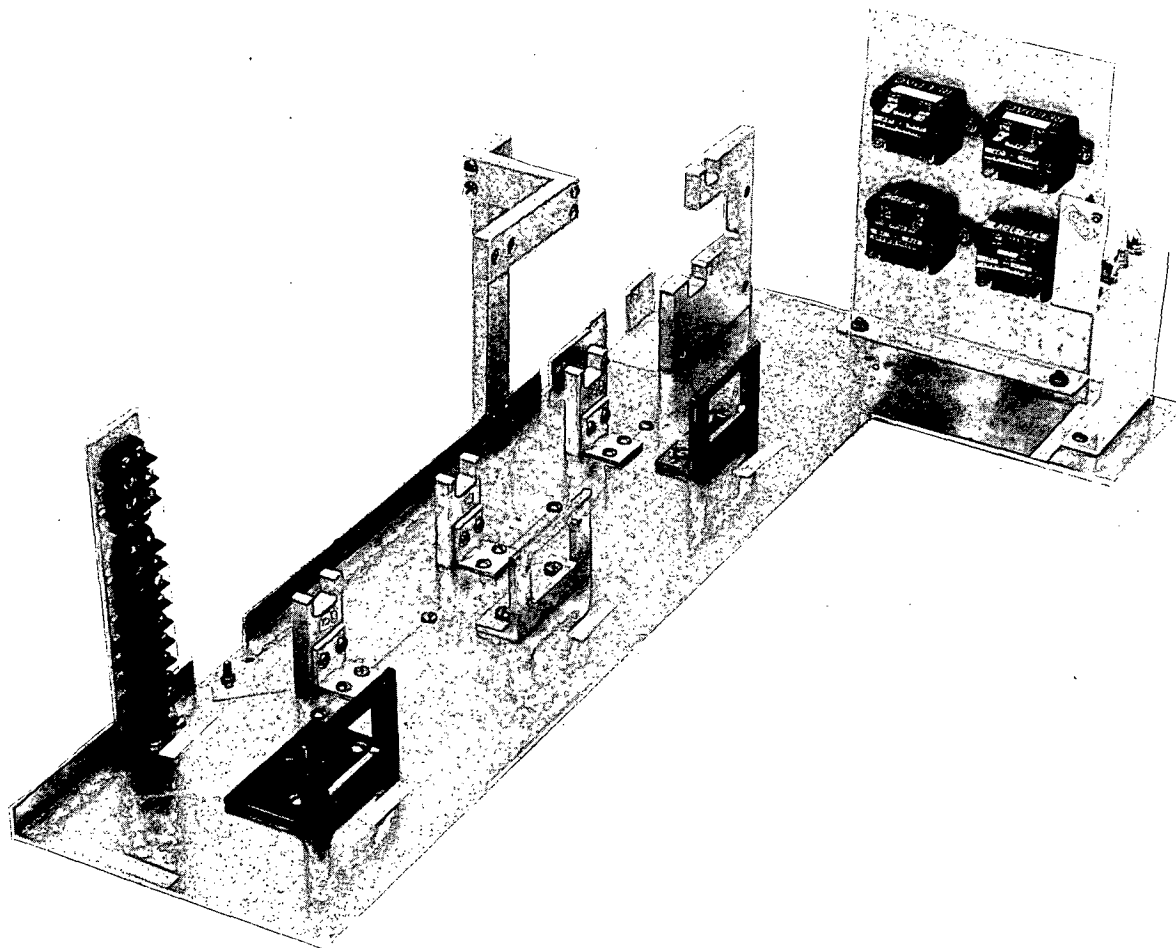
R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N C H E S	S T R I P L E N G T H		T E R M I N A T I O N		(Starred [*] Term To Be Added Now)
					END 1	END 2	END 1	END 2	
1	1	16	BROWN	9	.20	.20	*42599-2	42844-1	#2 AC HI TO CAP. SW.
2	1	16	BROWN	12.5	.20	.20	*42599-2	42844-1	#2 AC HI TO SUPPLY SW.
3	1	24	GREEN	32	00	.20	H-803	42844-1	} TWISTED #2 AC HIGH PAIR #2 AC LOW
		24	BROWN	[2]	00	.20	H-803	160314-3	
4	1	16	BROWN	19.5	.20	.20	*42599-2	160314-3	#2 LOW TO CAP
5	1	16	BROWN	31.5	.25	.20	*201568-1	160314-3	#2 LOW TO SUPPLY #3
6	1	16	BROWN	37.5	.25	.20	*201568-1	160314-3	#2 LOW TO SUPPLY #3
7	1	24	BROWN	22.5	00	.20	H-803	42844-1	#2 HIGH SW. TO LOGIC
8	1	16	BROWN	21.5	.25	.20	*201568-1	42844-1	#2 SW. TO SUPPLY #2
9	1	16	BROWN	28	.25	.20	*201568-1	42844-1	#2 SW. TO SUPPLY #3
10	1	16	WHITE	5	.20	.20	*42599-2	160314-3	#1 HIGH TO CAP. SW.
11	1	16	WHITE	8	.20	.20	*42599-2	160314-3	#1 HIGH TO POWER SW.
12	1	16	WHITE	21.5	.50	.20	SOLDER	160314-3	#1 HI TO CROWBAR RES.
13	1	16	BLACK	19	.25	.20	*201568-1	324581	BASE DRIVE #1
14	1	16	BLACK	13	.25	.20	*201568-1	324581	BASE DRIVE #2
15	1	16	BLACK	9.5	.25	.20	*201568-1	324581	BASE DRIVE #3
16	1	24	BLUE	32	.40	00	*322249	H-803	} TWISTED MASTER PAIR TEMP. SENSE
		24	YELLOW	[2]	.40	00	*322249[1]	H-803	
17	1	24	SLATE	32	.40	00	*322249[1]	H-803	MASTER 55 OK CUT
18	1	24	BLUE	23	.25	00	*201328-1	H-803	} TWISTED #1 SENSE+ PAIR SENSE-
		24	BLACK	[2]	.25	00	*201328-1	H-803	

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R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N I N C H E S	S T R I P L E N G T H		T E R M I N A T I O N		(Starred [*] Term To Be Added Now)
					END 1	END 2	END 1	END 2	
19	1	24	BLUE	29	.25	00	*201328-1	H-803	} TWISTED #2 SENSE+ PAIR SENSE-
		24	BLACK	[2]	.25	00	*201328-1	H-803	
20	1	24	BLUE	32	.25	00	*201328-1	H-803	} TWISTED #3 SENSE+ PAIR SENSE-
		24	BLACK	[2]	.25	00	*201328-1	H-803	
21	1	24	RED	23	.25	00	*201328-1	H-803	} TWISTED #1 -15V TRIPOLET THERM. SW. PRESENCE
		24	BLACK	[2]	.25	00	*201328-1	H-803	
		24	WHITE		.25	00	*201328-1	H-803	
22	1	24	RED	29	.25	00	*201328-1	H-803	} TWISTED #2 -15V TRIPOLET THERM. SW. PRESENCE
		24	BLACK	[2]	.25	00	*201328-1	H-803	
		24	YELLOW		.25	00	*201328-1	H-803	
23	1	24	RED	32	.25	00	*201328-1	H-803	} TWISTED #3 -15V TRIPOLET THERM. SW. PRESENCE
		24	BLACK	[2]	.25	00	*201328-1	H-803	
		24	GREEN		.25	00	*201328-1	H-803	

[1]: Bend the striped length of End 1 back on itself to form
a .20 length of doubled bare wire before inserting in terminal.

[2]: Length after twisting together.



COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

HARNESS JIG

CHANGE NO.	DATE	DESCRIPTION	APPROVED			ENG	DRAWING NO.
			BY	FOR	DATE	TJC	
ISSUE	10-2-72		A.G.C.	PROD.	10/3/72	DRAWN BY GWP	423-16
						CHECKED CEM	DATE 9-17-72

HARNESS ASSEMBLY PROCEDURE

1. The Harness is made up on a Harness Jig (page 423-16) with 3 AMP 201545-1 connectors mounted in the SUPPLY 2, SUPPLY 3 and SUPPLY 4 positions with pin 1 at the top and the connector skirt behind the mounting bracket. For general reference, see page 423-22 for wiring and wire positioning.
2. Insert Reference Wires 1, 2, and 3 (GREEN) into an AMP 42844-1 Receptacle and crimp.
3. Insert Reference Wires 3(BROWN), 4, 5, and 6 into an AMP 160314-3 Receptacle and crimp.
4. Connect step 2 crimped receptacle to CIRCUIT BREAKER Tab 4.
5. Connect Step 3 crimped receptacle to CIRCUIT BREAKER Tab 3.
6. From CIRCUIT BREAKER Tab 4:
 - a) Connect shortest BROWN wire to the AC SW 4 "Line" Tab.
 - b) Connect longest BROWN wire to the AC SW 3 "Line" Tab.
7. Route GREEN and BROWN pair through H1 and out H7.
8. From CIRCUIT BREAKER Tab 3:
 - a) Route shortest BROWN wire through H1 and out H6.
 - b) Route longest BROWN wire through H1, out H5 and insert in Pin 6 of SUPPLY 4 connector.
 - c) Route remaining BROWN wire through H1, out H4, and insert in Pin 6 of SUPPLY 3 connector.
9. Insert Reference Wires 7, 8, and 9 into an AMP 42844-1 receptacle and crimp. Connect this receptacle to the AC SW 3 "Load" Tab.
10. From the AC SW3 "Load" Tab:
 - a) Route small 24 AWG BROWN wire through H1 and out H7.
 - b) Route longest large 16 AWG BROWN wire through H1, out H5 and insert in Pin 1 of SUPPLY 4 connector.
 - c) Route remaining wire through H1, out H4 and insert in Pin 1 of SUPPLY 3 connector.

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11. Insert Reference Wires 10, 11, and 12 into an AMP 160314-3 receptacle and crimp. Connect this receptacle to CIRCUIT BREAKER Tab 1.
12. From CIRCUIT BREAKER Tab 1:
 - a) Connect shortest wire to AC SW 2 "Line" Tab.
 - b) Connect middle length wire to AC SW 1 "Line" Tab.
 - c) Route longest wire through H1 and out H6.
13. Insert Reference Wires 13, 14, and 15 into an AMP 324581 receptacle and crimp. Connect this receptacle to position 3 of the SUPPLY 1 terminal strip.
14. From position 3 of SUPPLY 1 terminal strip:
 - a) Route shortest wire down to plate, through H5 and insert in Pin 3 of SUPPLY 4 connector.
 - b) Route longest wire down to plate, through H3 and insert in Pin 3 of SUPPLY 2 connector.
 - c) Route other wire down to plate, through H4 and insert in Pin 3 of SUPPLY 3 connector.
15. Place Service Column Connector Assembly on Harness Jig.
16. Connect the nine 16 AWG RED wires from the Service Column Connector Assembly as follows:
 - a) Route two shortest wires through H4 and insert into Pins 25 and 26 of SUPPLY 3 connector.
 - b) Route two shortest of remaining wires through H3 and insert into Pins 25 and 26 of SUPPLY 2 connector.
 - c) Route two remaining wires with socket inserts through H5 and insert into Pins 25 and 26 of SUPPLY 4 connector.
 - d) Route two remaining wires with terminals along plate and up along SUPPLY 1 terminal strip. Connect the shorter wire to position 7 and the longer wire to position 9.
 - e) Route last 16 AWG RED wire along plate and out H6.

17. Connect the nine 16 AWG BLUE wires from the Service Column Connector Assembly as follows:
- a) Route two shortest wires through H4 and insert into Pins 21 and 22 of SUPPLY 3 connector.
 - b) Route two shortest of remaining wires through H3 and insert into Pins 21 and 22 of SUPPLY 2 connector.
 - c) Route the two remaining wires with socket inserts through H5 and insert into Pins 21 and 22 of SUPPLY 4 connector.
 - d) Route two remaining wires with terminals along plate and up along SUPPLY 1 terminal strip. Connect shorter wire to position 8 and longer wire to position 10.
 - e) Route last 16 AWG BLUE wire along plate and out H6.
18. Connect the six 16 AWG GREEN wires from the Service Column Connector Assembly as follows:
- a) Route the shortest wire through H4 and insert into Pin 23 of SUPPLY 3 connector.
 - b) Route the next shortest wire with a socket insert through H3 and insert in Pin 23 of SUPPLY 2 connector.
 - c) Route other wire with a socket insert through H5 and insert into Pin 23 of SUPPLY 4 connector.
 - d) Route longest wire along plate, through H1 and connect to the GND. Tab.
 - e) Route the shortest remaining wire to BOLT 1.
 - f) Route the remaining wire out END 1.
19. Connect the two violet and white 16 AWG wire groups as follows:
- a) Route the longest violet/white group along the plate, through H1, and connect to CIRCUIT BREAKER Tab 2. Route the longest white wire of the group back through H1, along the plate, and connect to position 2 of SUPPLY 1 terminal strip. Route the other white wire back through H1, along the plate, through H3 and insert in Pin 1 of SUPPLY 2 connector.
 - b) Route the remaining violet/white group along the plate, through H1, and connect to the AC SW1 "Load" tab. Route the longest white wire

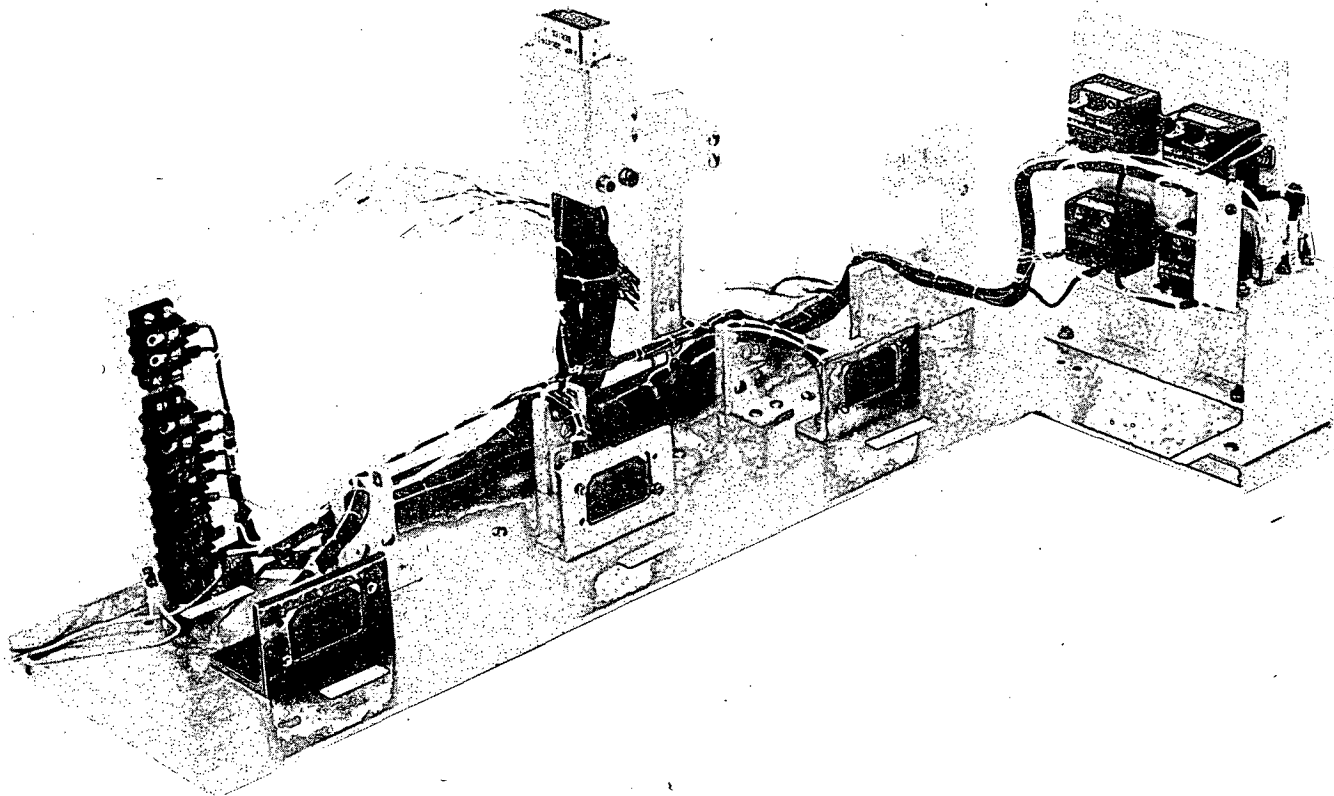
of the group back through H1, along the plate, and connect to Position 1 of SUPPLY 1 terminal strip. Route the other white wire back through H1, along the plate, through H3 and insert in Pin 6 of SUPPLY 2 connector. Route the 24 AWG black wire back through H1 and out H7.

20. Move the 24 AWG wires from the Service Column Connector Assembly, including the four BLUE wires, out of the way and tie the remaining wires into a harness forming the harness shown on page 423-22. Form but do NOT tie the wires between the SUPPLY connectors and H3, H4 and H5. Do not tie the wires extending beyond H6 and H7. Bundled wires may pass above H3, H4 and H5 to take up wire slack.
21. Insert Reference Wire 18 into SUPPLY 2 connector, BLUE-Pin 9, BLACK-Pin 11. Route wire through H3 and out H7.
22. Insert Reference Wire 19 into SUPPLY 3 connector, BLUE-Pin 9, BLACK-Pin 11. Route wire through H4 and out H7.
23. Insert Reference Wire 20 into SUPPLY 4 connector, BLUE-Pin 9, BLACK-Pin 11. Route wire through H5 and out H7.
24. Insert Reference Wire 21 into the SUPPLY 2 connector, RED-Pin 17, BLACK-Pin 18, WHITE-Pin 16. Route wire through H3 and out H7.
25. Insert Reference Wire 22 into the SUPPLY 3 connector, RED-Pin 17, BLACK-Pin 18, YELLOW-Pin 16. Route wire through H4 and out H7.
26. Insert Reference Wire 23 into the SUPPLY 4 connector, RED-Pin 17, BLACK-Pin 18, GREEN-Pin 16. Route wire through H5 and out H7.
27. Connect Reference Wire 17 into the SUPPLY 1 terminal strip, position 4. Route wire out H7.
28. Connect Reference wire 16 into the SUPPLY 1 terminal strip, BLUE - Position 5, YELLOW - Position 6. Route wire out H7.
29. Using tie string, bundle wires between H3, H4, and H5 and their respective SUPPLY connectors.
30. Using tie string, bundle all the 24 AWG wires (including wires from Service Connector) into a cable approximately 1.5 inches above the existing 16 AWG wire cable. Tie bundle only 1 inch beyond H7. Tied Harness must have:

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- a) Strain relief for 24 AWG SLATE wire to SUPPLY 1 terminal strip.
- b) Wires to SUPPLY 1 terminal tied in a string so harness will hold its shape when removed from the jig.
- c) Wires to the AC SW. and the CIRCUIT BREAKER each tied in strings so harness will hold its shape when removed from the jig.

End of Harness Assembly Procedure. Remove harness from jig. This assembly is used in the Resident Supply Pan Assembly.



COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE

HARNESS ASSEMBLY

ISSUE 10-2-72

CHANGE NO. DATE

DESCRIPTION

APPROVED

BY

FOR

DATE

L.J.C.

PROD

10/2/72

ENG

TJC

DRAWING NO.

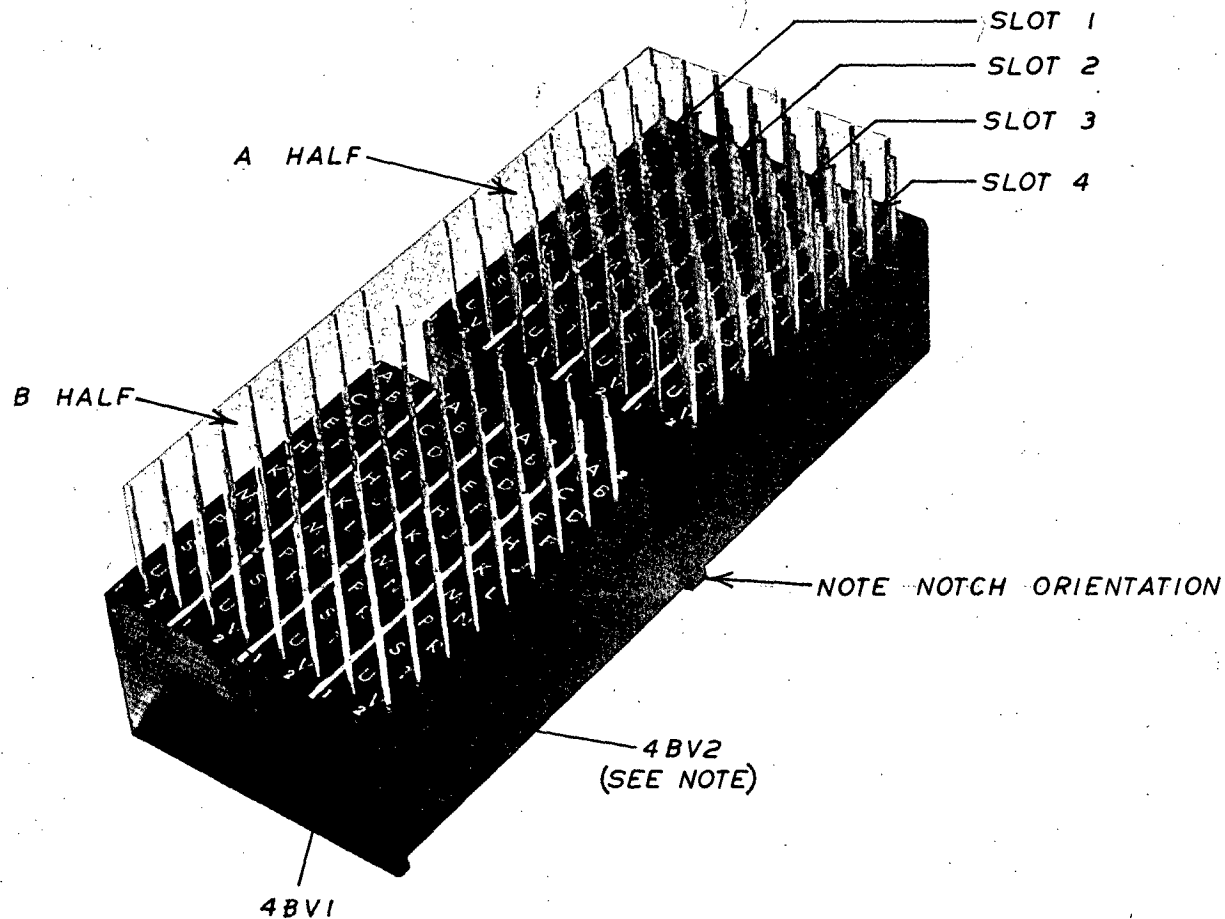
423-22

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GWP

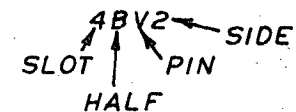
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DATE 9-17-72



NOTE:



		COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI		TITLE DEC CONNECTOR ORIENTATION	
		MACROMODULAR PROJECT		APPROVED BY: <i>T.J.C.</i> FOR: <i>PROD.</i> DATE: <i>10/2/72</i>	
ISSUE 10-2-72				ENG. <i>TJC</i> DRAWN BY <i>PLL</i>	
CHANGE NO.	DATE	DESCRIPTION	CHECKED <i>CFM</i>		DRAWING NO. 423-23 DATE 8-3-72

DEC CONNECTOR INTERWIRING

1. The DEC connector is a Digital Equipment Corporation H-803 Printed Circuit Board Connector. The connector orientation and pin coding is shown on page 423-23.
2. Buss the connector with D.E.C. 933 Bus Strip per the following table. Follow listing order.

From Pin	To Pin
1BU1	3BU1
1AA1	3AA1
3BA1	4BA1
3AC1	4AC1
3BP1	4BP1
1AS1	3AS1

Solder above strips at square holes. Do not solder at round holes.

1AC1	1BA1
2AA1	2AU1
3AC1	3BU1
4BA1	4BP1

Solder above strips at square holes. Do not solder at round holes.

3. The remaining wire connections are made with a Gardner-Denver 502129 Sleeve, and a 505415 bit in a suitable tool.
4. Using 24 AWG tinned bus wire, jumper the following pins:

1AA1 -- 1AC1
 1BU1 -- 1BS1
 1BS1 -- 1BS2
 2AA1 -- 2AA2
 2AU1 -- 2AV1
 2AV1 -- 2AV2

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2AS1 -- 2AU1
2AS2 -- 3AS1
2AP1 -- 2AP2
3AA1 -- 3AC1
4AC1 -- 4AC2
4BU1 -- 4BV1
4BR2 -- 4BT2

The following jumpers must not touch the bus strips

2AB1 -- 2AC1
1AU1 -- 1AV1
3AU1 -- 3AV1

5. Using 24 AWG RED solid conductor wire, connect the following pins:

1BV1 -- 2AU2 (route up slot 2)
2AB1 -- 4AE2
1AU1 -- 2AC1
3AV1 -- 4BU1
1AV1 -- 3AU1

6. Using 24 AWG SLATE solid conductor wire, connect the following pins:

1AB2 -- 3AV2
1AD2 -- 4AP1
1AE2 -- 4AV1
1AF2 -- 4AS2
1AH2 -- 4AK2
1AJ2 -- 4AJ2
1AK2 -- 3AC2
1AL2 -- 3AF2
1AM2 -- 4AU1
1AN2 -- 3AL2
1AP2 -- 4AN1
1AR2 -- 4AR2
1AT2 -- 4BB2
1AU2 -- 3BS2 } route up
1AV2 -- 3BT2 } slot 3
1BA2 -- 3AJ2
1BR2 -- 2AR2
1BT2 -- 4BE2
1BV2 -- 3BK2
2AB2 -- 4AB1
2AC2 -- 4AB2
2AD2 -- 4AA1
2AE2 -- 4AA2
2AF2 -- 3AK2

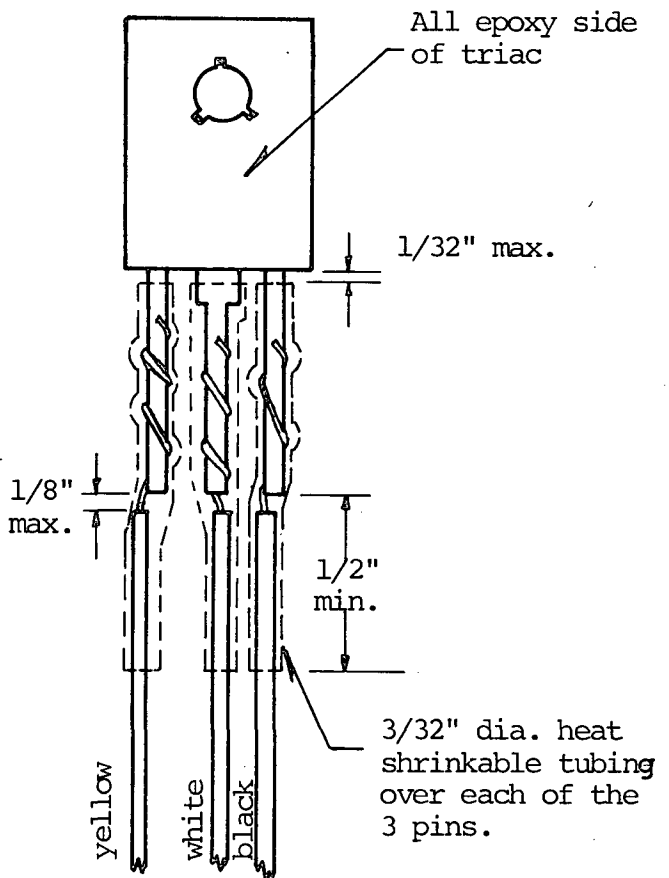
2AK2 -- 3AL2
2AT2 -- 3BL2
2BA2 -- 1BN2
2BN2 -- 1BD2
2BL2 -- 1BF2
3AB2 -- 4AL1
3AD2 -- 4AN2
3AE2 -- 4AM1
3AH2 -- 4AP2
3AM2 -- 4BA2
3BB2 -- 4BK2
3BC2 -- 4AT2
3BD2 -- 4AM2
3BF2 -- 4AR1
3BJ2 -- 4AV2
3BE2 -- 4AK1
3BH2 -- 4AH1
3BM2 -- 4AU2
3BN2 -- 4BL2
3BU2 -- 4AS1
3BV2 -- 4AT1
4AE1 -- 4BJ2
4AF1 -- 4BD2
4AJ1 -- 4BU2
4AF2 -- 4BC2
4AH2 -- 4BP2
4AL2 -- 4BH2

End of DEC Connector Interwiring. This assembly is used in the Resident Supply Pan Assembly.

TRIAC WIRED ASSEMBLY PROCEDURE

1. Solder three 10 inch long 24 AWG, Kynar solid wires to the three terminals of a 2N6155 or a Motorola MAC 11-6 triac as shown.
2. Shrink heat shrinkable tubing over each of the pins with no more than a 1/32" gap between the end of the tubing and the body of the triac. The tubing must also extend at least 1/2 inch beyond the end of the pin.
3. Twist the three wires together (approx. 1 twist per inch) and trim the wire length to 7 to 8 inches.
4. One side of the triac body contains a metal plate. Cover this plate with a coating of silicone rubber (General Electric RTV-102 or equiv.) to a depth of 1/16" min. (RTV will require 24 hours to cure.)

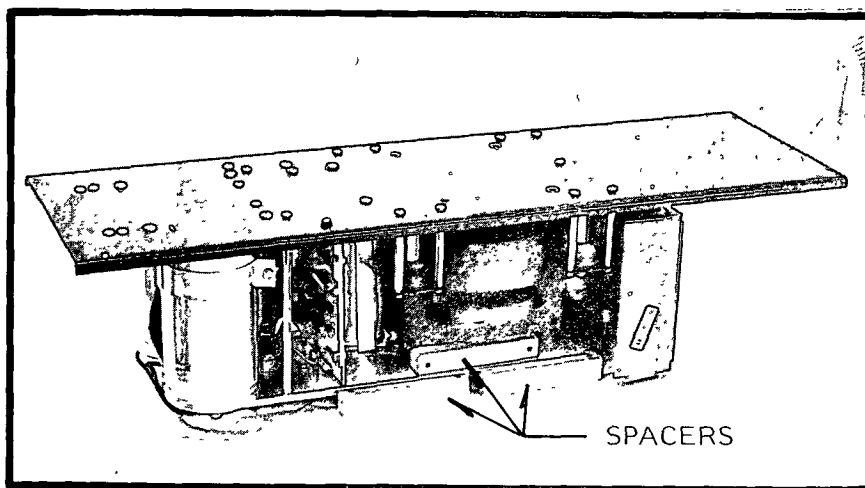
End of triac wired assembly procedure.
This assembly used in resident supply pan assembly.



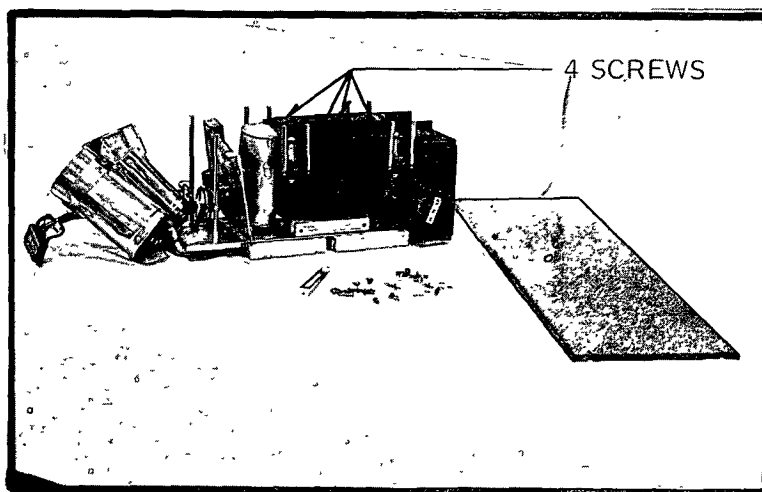
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RESIDENT SUPPLY PAN ASSEMBLY PROCEDURE

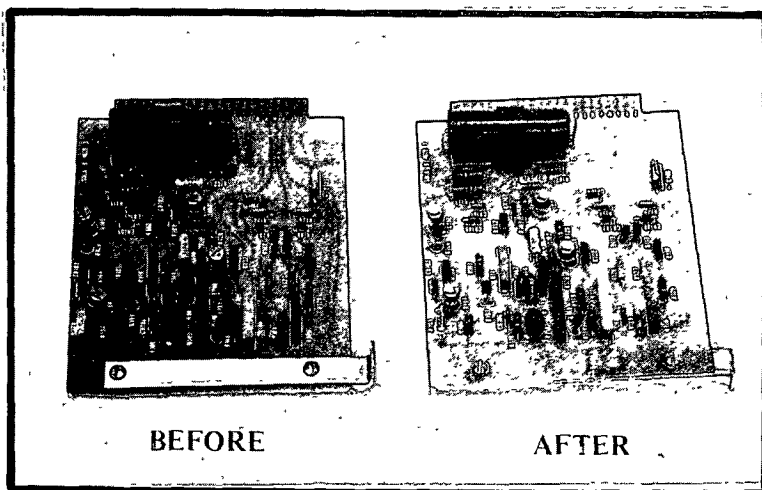
1. Turn Sola 39067 supply upside down using spacers to prevent damage to the wiring on top of the heat sink and to hold the transformer in position



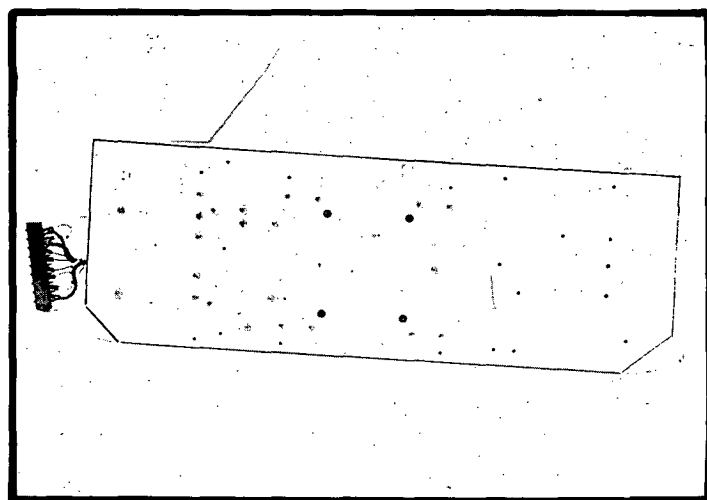
2. Remove the pan. Mount four 8-32 x 3/4 screws in the transformer support angles as shown.



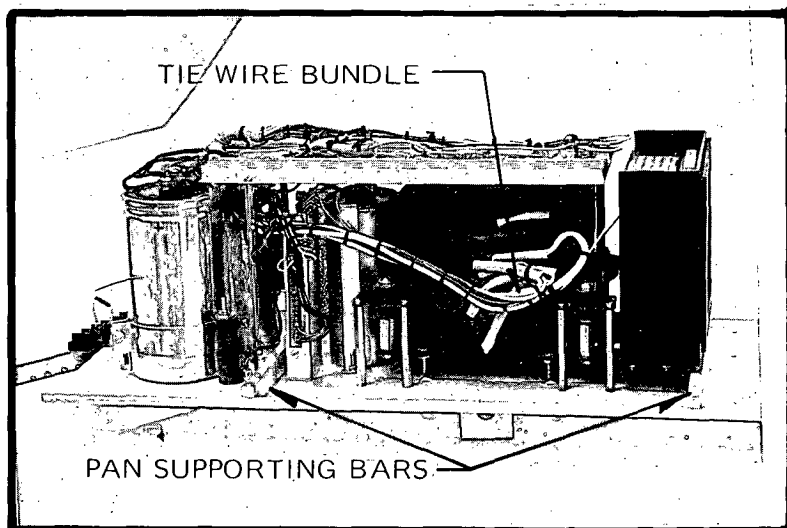
3. Remove the printed circuit card and move the mounting bracket to the other side of the card



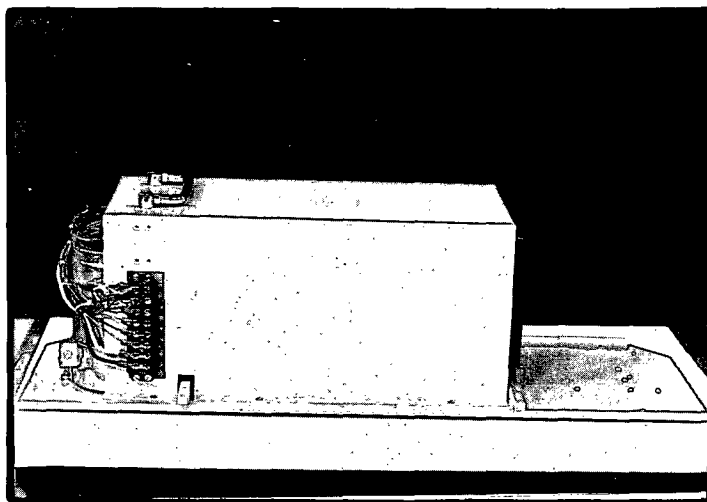
4. Mount new base, CSL 421-61, adding lock washers as needed. When mounting P.C. card connector, place card in connector and align card bracket mounting holes before tightening connector bracket screws. Picture shows holes unused at this point.



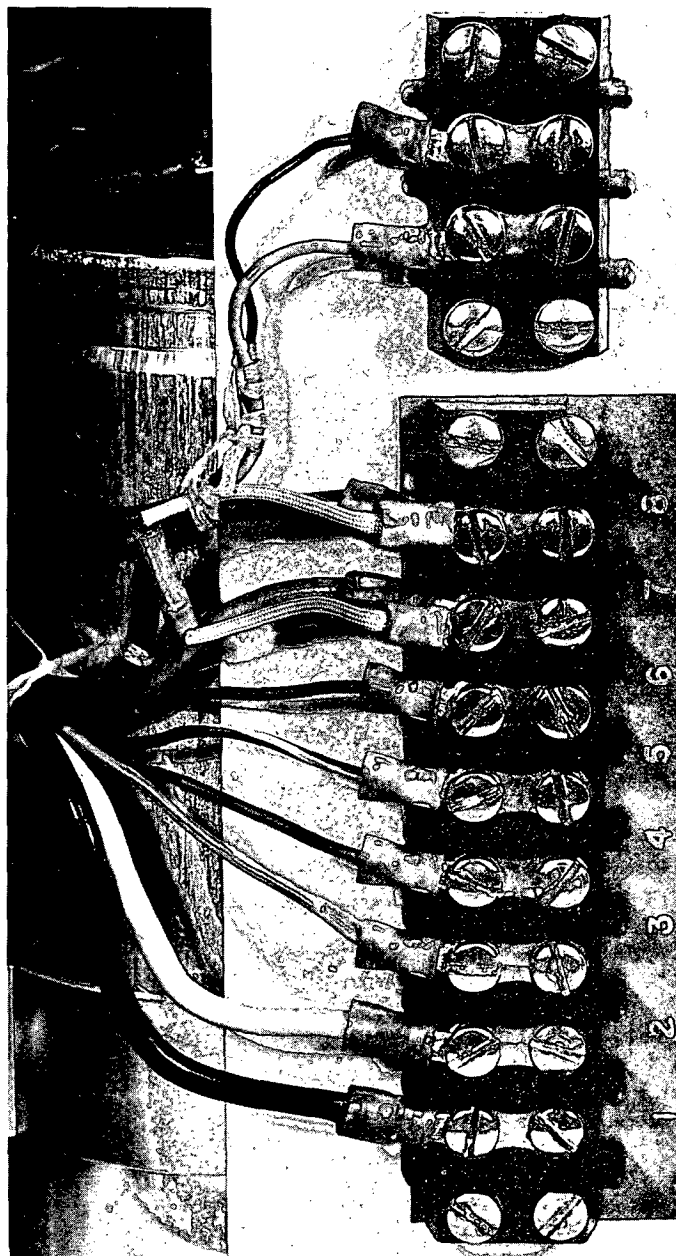
5. Mount 2 CSL 421-65 Pan Support Bars with six 6-32 x 3/8" screws and lock washers. Tie the wire bundle from the transformer to the transformer so that the cover (CSL 421-59) does not touch the bundle.



6. Mount a H.H. Smith Handle No. 1622 on a Resident Supply Cover, CSL 421-59. Then mount the Cover with six 6-32 x 3/8" screws, lock washers, and nuts as shown. Connect the terminal strip and numbered cards as shown, with four 6-32 x 5/8" screws and lock washers.



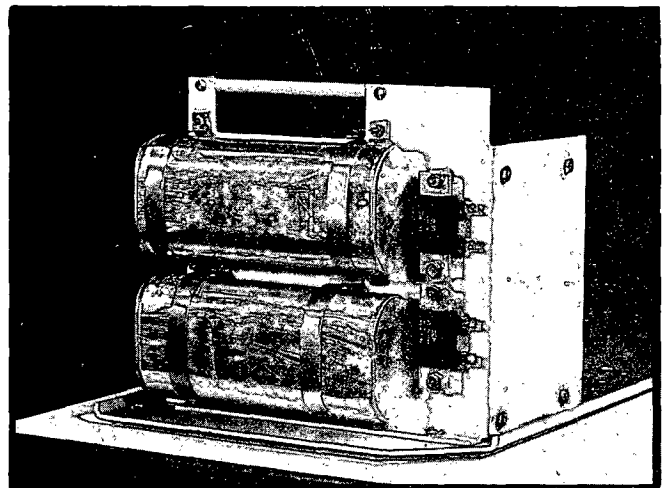
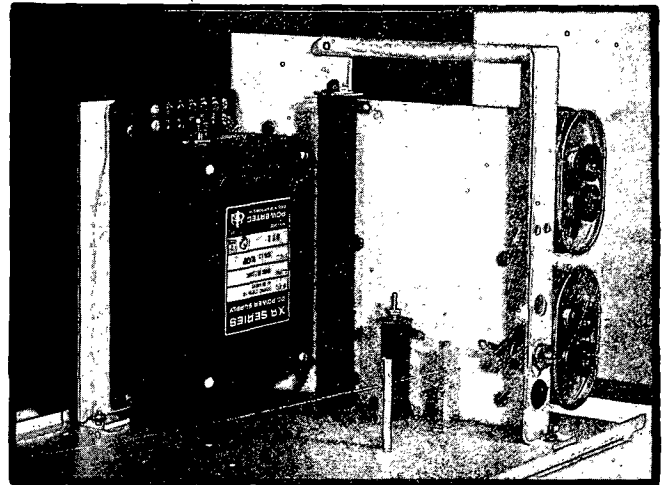
7. Mount a two terminal Jones strip #2-541 to the Resident Supply Cover with four 6-32 x 5/8" screws and lock washers. Remove the small red and black wires, one each from terminal positions 7 and 8, and connect them to the 2 terminal Jones strip. The black wire is connected to the top position. Wire bundle ties may be cut and retied as required.



8. Mount the following components in order:

- a) mount Bracket Handle, CSL 421-69 to Bracket for Capacitor and Auxiliary Supply CSL 421-58 using two 6-32 x 3/8" screws.
- b) mount 2 capacitors, G.E. 45F173, using two CSL 421-63 and two CSL 421-64 Capacitor Straps, four 6-32 x 3/8 screws four 6-32 x 5/8" screws, eight lock washers, and eight 6-32 nuts.
- c) mount two 24 watt, 1 ohm flat resistors using four 6-32 x 3/4" screws, nuts and lock washers.
- d) mount 1 Powertec XR series power supply using four 6-32 x 5/8" screws, nuts and lock washers.
- e) mount assembly on base, CSL 421-61.
- f) mount the 100 watt, 1 ohm, tubular resistor using mounting hardware provided. Bolt must not extend beyond nut on bottom of base more than 1/8 inch. Top of bolt may be cut off.
- g) mount 25 watt, 1 ohm tubular resistor using mounting hardware provided.
- h) mount two threaded spacers, H.H. Smith 8428 or equivalent, with two 6-32 x 5/8" screws and lock washers.
- i) mount the Motorola SAC-64 Triac. No insulating hardware is required.
- j) press 1/4 inch I.D. rubber grommet, G.C. Electronics 1042-C or equivalent in place.
- k) mount the assembled bracket on the pan using three 6-32 x 3/8" screws, lock washers, and nuts.

End of Pan Assembly Mechanical Assembly



RESIDENT SUPPLY PAN ASSEMBLY

WIRE PREPARATION TABLE

R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N	I N C H E S	S T R I P L E N G T H		T E R M I N A T I O N		
						END 1	END 2	END 1	END 2	
								(Starred [*] Term. To Be Added Now)		
								END 1	END 2	
1	1	16	BROWN	21.5	.50	.20		SOLDER	*42599-2	#2 CAP. SW. TO RES.
2	1	16	WHITE	20.5	.50	.20		SOLDER	42844-1	#1 LOW TO CROWBAR
3	1	16	WHITE	23.5	.20	.20		*42599-2	42844-1	#1 LOW TO CAP.
4	1	16	WHITE	26	.50	.20		SOLDER	*42599-2	#1 CAP. SW. TO RES.
5	1	16	BROWN	12	.50	.20		SOLDER	*42599-2	#2 CAP. TO RES.
6	1	16	WHITE	12	.50	.20		SOLDER	*42599-2	#1 CAP. TO RES.
7	1	16	WHITE	6.5	.50	.50		SOLDER	SOLDER	CROWBAR RES TO TRIAC
8	1	16	RED	7.5	.50	.50		SOLDER	SOLDER	CAP. DIS. RES. TO SCR
9	1	24	YELLOW	20	.50	00		SOLDER	H-803	} TWISTED TRIAC GATE PAIR TRIAC TERM. 1
		24	BLACK	[2]	.50	00		SOLDER	H-803	
10	1	24	GREEN	20	.50	00		SOLDER	H-803	SCR GATE
11	1	24	WHITE	20	.50	00		SOLDER	H-803	LINE 1 HIGH
12	1	24	BLACK	28	.40	00		322249	H-803	AUX. SUP. AC LOW
13	1	24	YELLOW	28	.40	00		322249	H-803	AUX. SUP. AC HIGH

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R E F E R E N C E	Q U A N T I T Y	W I R E S I Z E	C O L O R	L E N G T H I N I N C H E S	S T R I P E N D 1	L E N G T H E N D 2	T E R M I N A T I O N		
							E N D 1	E N D 2	
							(Starred [*] Term To Be Added Now)		
							E N D 1	E N D 2	
14	1	24	RED	28	.40	00	*322249 [1]	H-803	AUX. SUP.- OUTPUT
15	1	24	RED	20	.50	00	SOLDER	H-803	+55 TO DEC CON.
16	2	36K OHM, 2 WATT CARBON COMP.			.75	.75	*42599-2	*42599-2	BLEEDER RES.

[1]: BEND THE STRIPED LENGTH OF END 1 BACK ON ITSELF TO FORM A .20 LENGTH OF DOUBLED BARE WIRE BEFORE INSERTING IN TERMINAL

[2]: LENGTH GIVEN IS LENGTH AFTER TWISTING TOGETHER

RESIDENT SUPPLY PAN WIRING PROCEDURE

1. Route Reference Wire 1 between two large oval capacitors and solder End 1 to the top terminal on the bottom flat power resistor.
2. Connect End 2 of Reference Wire 5 to the top most tab of the bottom large oval capacitor. Route wire between the two large oval capacitors and solder End 2 to the bottom terminal on the bottom flat power resistor.
3. Route Reference Wire 2 End 1 through the grommet and connect to the longer of the 2 center terminals on the Motorola SAC-64 Triac. (DO NOT SOLDER).
4. Solder End 1 of Reference Wire 7 to the bottom terminal of the round 25 watt 1 ohm resistor. Solder End 2 to the body terminal on the Motorola SAC-64 Triac.
5. Connect End 1 (YELLOW) of Reference Wire 9 to the short center terminal on the Motorola SAC-64 Triac. Connect End 1 (BLACK) to the long center terminal on the Motorola SAC-64 Triac. Solder both terminals.
6. Connect Reference Wire 3 End 1 to the bottom tab of the top large oval capacitor.
7. Bring the free ends of the two 16 AWG WHITE wires together and crimp a 42844-1 receptacle on them.
8. Route Reference Wire 4 End 1 between the large oval capacitors and solder to the bottom terminal of the top flat power resistor.
9. Connect End 2 of Reference Wire 6 to the top tab of the top large oval capacitor. Route the wire between the two large oval capacitors and solder End 1 to the top terminal of the top flat power resistor.
10. Solder End 1 of Reference Wire 8 to the bottom terminal of the 100 watt, 1 ohm round power resistor. Solder End 2 to the body contact terminal of the Motorola MCR 3935-3.
11. Mount the Motorola MCR 3935-3 S.C.R. as shown on page 423-37. The body and body contact terminal of the S.C.R. must be insulated from the bracket.
12. Solder one end of a 100 ohm, 1/4 watt, +5% carbon composition to the short center terminal of the Motorola MCR 3935-3. After sliding a 2.5 inch long piece of 1/8 inch diameter heat shrinkable tubing over reference wire 10; solder End 1 of the wire to the other end of the 100 ohm, 1/4 watt resistor. Slide the tubing over the resistor and bare wires and shrink in place.

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13. Connect End 1 of Reference Wire 11 to the top terminal of the 25 watt, 1 ohm round resistor. (DO NOT SOLDER).
14. Cover the leads of a 2500 ohm, 8 watt tubular power resistor with insulating sleeving leaving 0.25 inch of lead exposed.
15. Wrap End 1 of Reference Wire 12 around one lead of the 2500 ohm, 8 watt resistor with a spaced wrap which covers the full exposed length of the resistor lead. Crimp the wrapped lead with a 322249 receptacle.
16. Wrap End 1 of Reference Wire 13 around the other lead of the 2500 ohm, 8 watt resistor with a spaced wrap which covers the full exposed length of the resistor lead. Crimp the wrapped lead with a 322249 receptacle.
17. Connect End 1 of the two wires prepared in steps 15 and 16 and Reference Wire 14 to the Powertec Power Supply:

BLACK -----INPUT 1 (TERMINAL 1)
 YELLOW -----INPUT 2 (TERMINAL 2)
 RED -----OUTPUT - (TERMINAL 5)

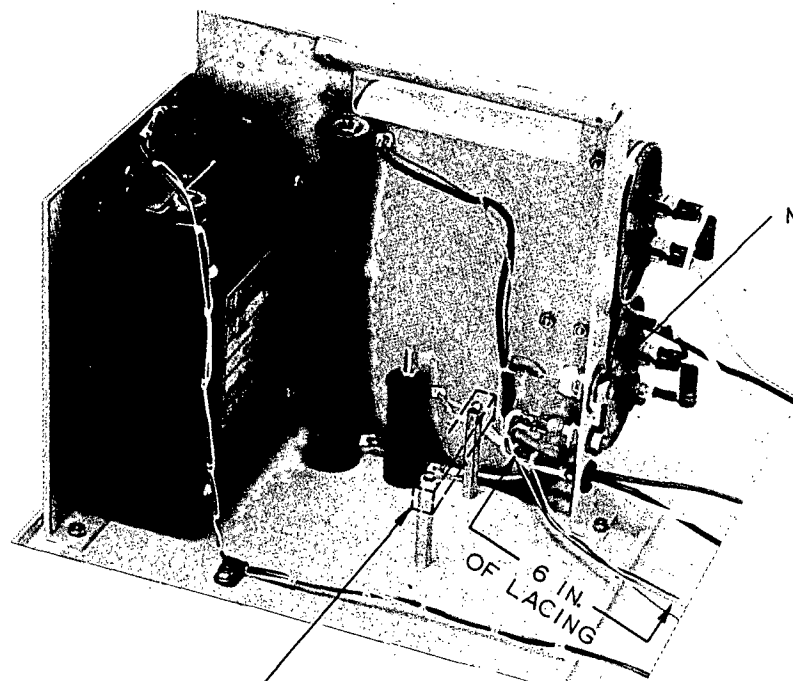
Dress the 2500 ohm, 8 watt resistor as shown on page 423-37. The resistor body should be approximately 0.5 inch above the power supply case. Route the 3 wires through a H.H. Smith 771 or equiv. cable clamp on the base plate near the Powertec supply as shown. Use a 6-32 x 3/8 binding head screw, nut and lock washer.

18. Connect Reference wire 15 to the top terminal of the 1 ohm 100 watt resistor. (DO NOT SOLDER).
19. Set the Pedestal Harness Subassembly in place and tie the Service Column Connector in place as shown on page 423-38.
20. Connect the wires to the Master Power Supply Terminal Strips and connect the 16 AWG GREEN wire as shown on page 423-38.
21. Connect the 16 AWG BROWN wire to the bottom tab of the bottom large oval capacitor.
22. Route the 16 AWG WHITE wire through the grommet and solder to the top terminal of the round 25 watt, 1 ohm resistor.
23. Route the 16 AWG RED wire through the grommet and solder to the top terminal of the round 100 watt, 1 ohm resistor.

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24. Route the 16 AWG BLUE wire through the grommet and solder to the long terminal of the Motorola MCR 3935-3.
25. Form and tie wiring as shown on page 423-37. Take care that no wires touch to the body of any of the power resistors and that there is clearance for the DEC card connector support bar. (Mounting a bar, CSL 421-70, may be helpful.)
26. Connect the two bleeder resistors, wire prep. table reference 16, across the two large oval capacitors as shown.
27. Route the 24 AWG BLUE wire from the Pedestal Harness Subassembly with a terminal through the cable clamp on the base plate near the Powertec supply and connect to the OUTPUT + (terminal 3) on the Powertec supply.
28. Form and tie the wires from the Powertec supply to the edge of the Pan. Merge the supply wires with the 24 AWG Harness wire bundle at the point the 24 AWG wire bundle is tied to the 16 AWG Harness wire bundle and tie in place. Route and tie the Powertec supply wires along the 24 AWG wire bundle for 5 inches from the junction point. The 3 Powertec supply wires must still be identifiable.

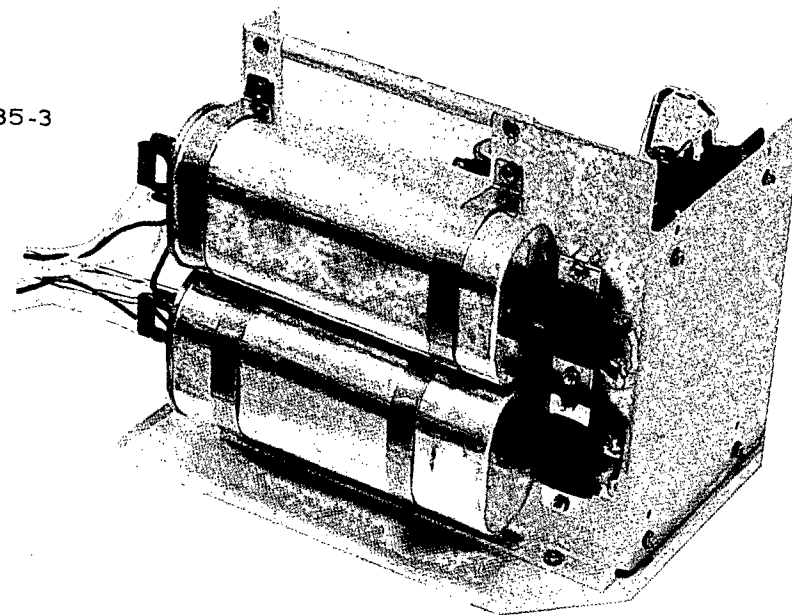
The Resident Supply Pan Assembly is now complete except for mounting and wiring the DEC connector.



MCR3935-3

6 IN
OF LACING

LOCATION OF DEC CARD CONNECTOR SUPPORT BAR



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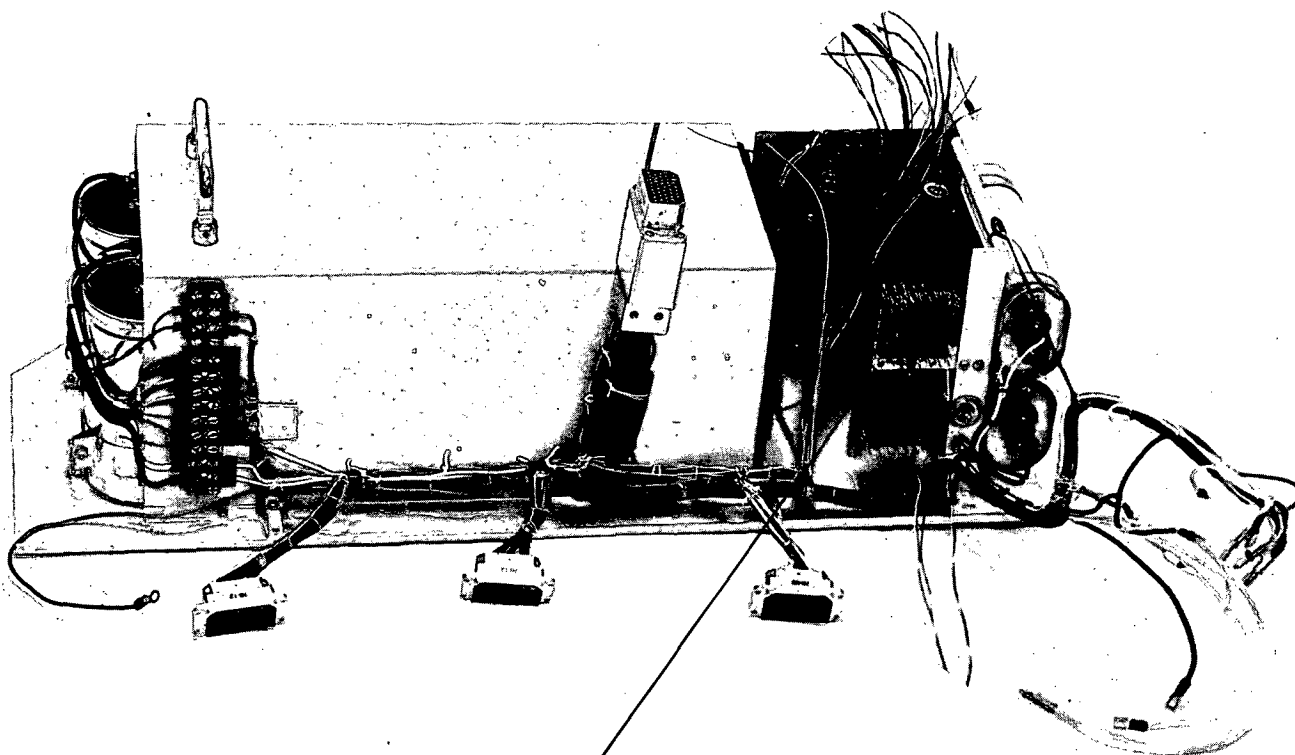
MACROMODULAR PROJECT

TITLE
**BASE PEDESTAL
BRACKET ASSEMBLY**

ISSUE 10-2-72

CHANGE NO. DATE DESCRIPTION

APPROVED			ENG. TJC	DRAWING NO. 423-37
BY J.F.C.	FOR PROD.	DATE 10/2/72	DRAWN BY PLL	
			CHECKED UEM	DATE 8-18-72



Wires must be clear of this mounting hole.

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MACROMODULAR PROJECT

TITLE

RESIDENT SUPPLY PAN ASSEMBLY

ISSUE

10-2-72

CHANGE
NO.

DATE

DESCRIPTION

APPROVED

BY

FOR

DATE

T.J.C.

PROD

10/2/72

ENG

TJC

DRAWN BY
GWP

CHECKED

WPM

DRAWING NO.

423-38

DATE

9-17-72

DEC CONNECTOR WIRING PROCEDURE

1. Mount a pre-wired DEC connector as shown on Page 423-38 using two 6-32 x 3/4 screws, nuts, and lock washers.
2. General Comments:
The Harness and Powertec Supply wire bundle should be formed in approximately a 9 inch long arc entering the DEC connector about midway up the left side. As the wires are wrapped in place, the area around the left DEC connector mounting hole must remain clear of wires. (see page 423-38). The 5 wire bundle from the bracket should enter from the right side of the DEC connector and should be short. The wires should be wrapped using a Gardner-Denver 502129 sleeve and a 505415 bit in a suitable tool. The DEC connector pin coding is shown on page 423-23.
3. Locate bundle of 3 single wires -- red, yellow, black -- from Powertec -15 VDC supply and connect as follows:

red -----	1AU1	(-15 VDC)
yellow --	2BC2	(Sw's. AC #1 High)
black ---	2BN2	AC #1 Low)
4. Locate bundle of five wires -- yellow/black (twisted pair), red, green, white -- from bracket assembly. Connect as follows:

yellow }	- 1BC2	(Crowbar Triac Gate)
black }	- 1BD2	(AC Line #1 Low In)
red -----	1BV1	(+55 VDC In)
green ---	2AN2	(Cap. Dis. SCR Gate)
white ---	2BT2	(AC Line #1 High In)
5. Locate bundle of 34 wires from harness and connect as follows:
 - a. Locate 10 single wires -- brown, black, yellow, slate, white, green, red, 3 blue -- and connect as follows:

yellow --	1AA2	(MECL Pow. Dn. Reg.)
white ---	1AC2	(MECL Preset)
black ---	1BJ2	(AC Sw. #1 In)
brown ---	1BL2	(AC Sw. #2 In)
slate ---	1BU2	(Sola +55 OK In)
green ---	1AS2	(MECL Data Shield)
red -----	3AT2	(Cooling Alarm)
blue -----	3AM1	} Sig. Gnd. from Ser. Column
blue -----	1AS1	
blue -----	4AC2	

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b. Locate single green/brown twisted pair:

green --- 2BR2 (AC Line #2 High In)
brown --- 2AR2 (AC Line #2 Low In)

c. Locate single red/black/ green twisted triplet and connect as follows:

black --- 3AP2 (Slug #3 Th. Sw.)
green --- 3AN2 (Slug #3 Present)
red ----- 3AU1 (-15 VDC)

d. Locate single red/black/yellow twisted triplet and connect as follows:

yellow -- 3AR2 (Slug #3 Present)
black --- 3AS2 (Slug #2 Th. Sw.)
red ----- 3AV1 (-15 VDC)

e. Locate single red/black/white twisted triplet and connect as follows:

white --- 3AU2 (Slug #1 Present)
black --- 3BA2 (Slug #1 Th. Sw.)
red ----- 4BU1 (-15 VDC)

f. Locate single blue/brown twisted pair and connect as follows;

blue ---- 4BK1 (Frame Sense +)
brown --- 4BN2 (Frame Sense -)

g. Locate three blue/black twisted pairs and connect as follows:

blue --- 4BP1 }
blue --- 3BP1 } Supply Sense
blue --- 3BU1 } +
black -- 4BR2 }
black -- 4BR2 } Supply Sense
black -- 4BT2 } -

h. Locate a single slate/yellow twisted pair and connect as follows:

slate --- 3BP2 (Pow. Down Ack. Bus)
yellow -- 4BM2 (Cap Sense)

i. Locate single brown/red twisted pair and connect as follows:

brown --- 4BT2 (Sense +)
red ----- 4BV1 (-15 VDC)

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j. Locate single yellow/blue twisted pair and connect as follows:

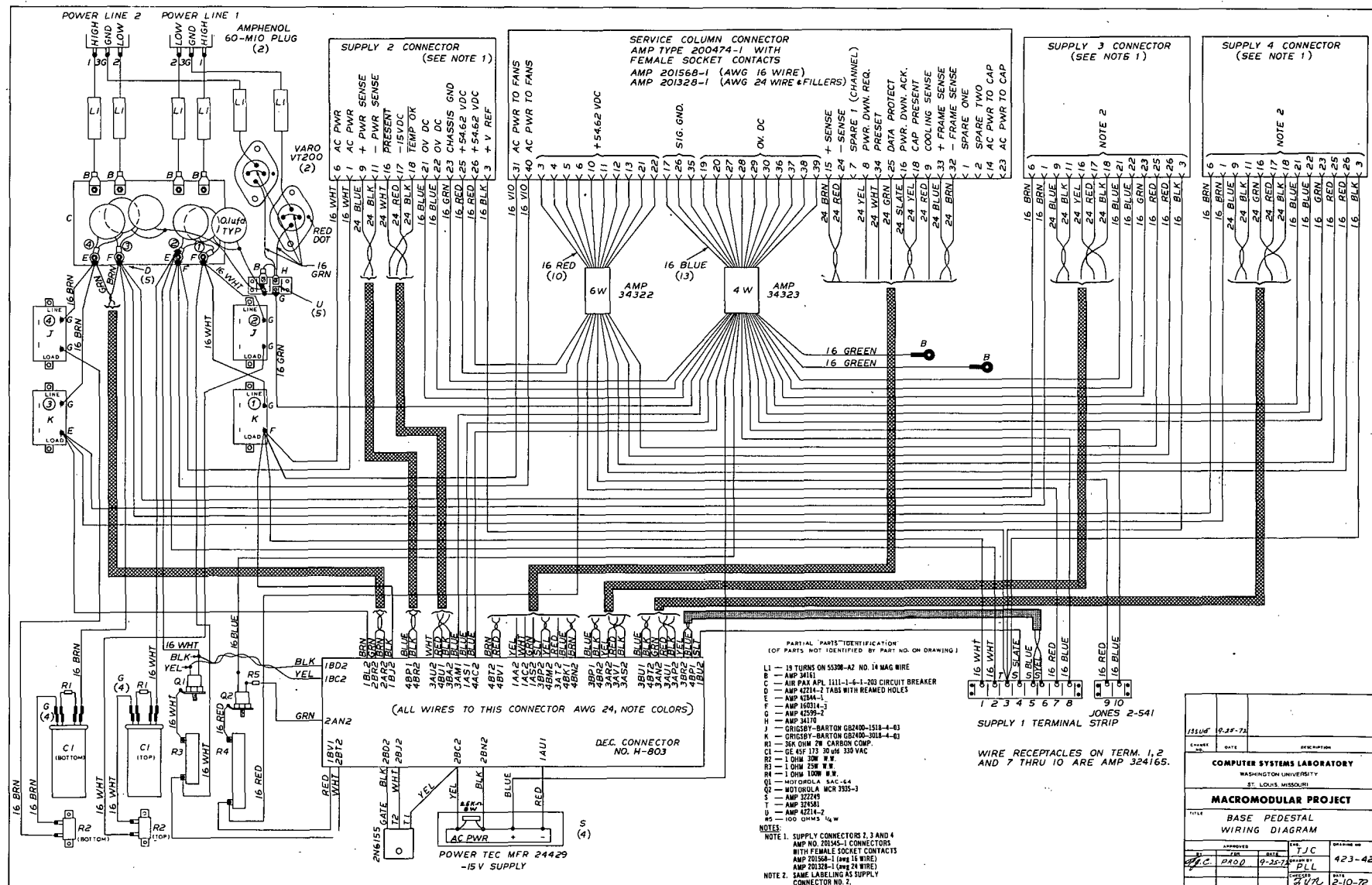
blue ---- 4BP1
yellow -- 3BR2

6. Add the Triac Wired Assembly and connect as follows:

yellow -- 2BC2
black --- 2BD2
white --- 2BJ2

7. Tie the wires and the Triac body into the Harness wire bundle.

8. Remove the 2 screws holding the DEC connector bar to the bracket and mount the DEC connect and bar in place (see page 423-37) on the standoffs on the pan with a 6-32 x 1" and a 6-32 x 3/4" screw.



WASHINGTON UNIVERSITY

424

PAGE	TITLE	CHANGE
424-1	TITLE PAGE	ISSUE
424-2	PARTS LIST	
424-3	TOOLING CHART	
424-4	INTRODUCTION AND GENERAL INSTRUCTIONS	
424-5	PEDESTAL ASSEMBLY SEQUENCE DIAGRAM	
424-6	FILTER INDUCTOR	
424-7	FILTER CAPACITORS	
424-8 thru 424-12	ASSEMBLY PROCEDURE	
424-13	ASSEMBLY JIG	

[illegible]

MACROMODULAR SYSTEMS PROJECT

PARTS LIST

QTY.	CSL DOC	PART
1		CIRCUIT BREAKER, AIR PAX 1111-1-6-1-203
6		MAGNET CORE, MAGNETICS No. 55308-A2
2		RECTIFIER BRIDGE, VARO VT200/T
2		CONNECTOR, AMPHENOL 60-M10
1		TERMINAL STRIP, 2 POLE, JONES 2-541
6		CAPACITORS, 0.1 ufd, 500 VDC DISC, CERAMIC SPRAGUE No. 5GA-P10
7		CONTACT, AMP No. 34161, RING TONGUE LUG PLASTI- GRIP(BLUE)
1		CONTACT, AMP No. 34170, RING TONGUE LUG PLASTI- GRIP (YELLOW)
5		CONTACT, AMP No. 42214-2, TAB FASTON
1		CONTACT, AMP No. 42599-2, RECEPTACLE FASTON (RED)
5		CONTACT, AMP No. 42214-2, TAB FASTON (WITH ENLARGED MOUNTING HOLE)
1	421-60	CONNECTOR MOUNTING BRACKET
1	421-67	CIRCUIT BREAKER ROD
1	421-72	CIRCUIT BREAKER ROD KNOB
8		SCREW, BINDER HEAD 4-40 x 3/8"
4		SCREW, BINDER HEAD 6-32 x 3/8"
4		SCREW, BINDER HEAD 6-32 x 2"
2		SCREW, BINDER HEAD 8-32 x 3/8 "
4		SCREW, FLAT HEAD 6-32 x 1/2"
4		SCREW, FLAT HEAD 6-32 x 5/8"
8		NUT, 4-40
12		NUT, 6-32
16		WASHER, INTERNAL STAR TOOTH LOCK, FOR 6-32 SCREW
8		WASHER, INTERNAL STAR TOOTH LOCK, FOR 4-40 SCREW
4		WASHER, FLAT, FOR 6-32 SCREW
4		SPACER, 6-32 x 1 1/2" H.H. SMITH 8509 OR EQUIV.
1 ft. approx.		SHRINK TUBING, AMP 603101 HEAVY WALL
5 ft. approx.		No. 14 SLEAVING, ALPHA TFT 250 OR EQUIV.
as required		SILICON RUBBER, G.E. RTV-102 OR EQUIV.
14 ft. approx.		14 AWG MAGNET WIRE, BELDEN HNC NYCLAD OR EQUIV.
2 ft. approx.		16 (26 x 30) AWG, GREEN STRANDED PVC

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MACROMODULAR SYSTEMS PROJECT

TOOLING CHART

CONTACT OR TERMINAL	CRIMP TOOL
AMP 34170	AMP 59239-4 12-10 PIDG
AMP 34161	AMP 47387 16-14 PIDG
AMP 42599-2	AMP 90035-1 FASTON

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INTRODUCTION AND GENERAL INSTRUCTIONS

This document contains instructions for assembling the Power/Control Input Assembly. This assembly, along with two other assemblies, is used in the final assembly of a Macromodular Pedestal. An overview of the assembly sequence is shown on page 424-5.

This assembly contains 2 subassemblies, the Filter Inductor and the Filter Capacitors, which are described before the assembly instructions begin.

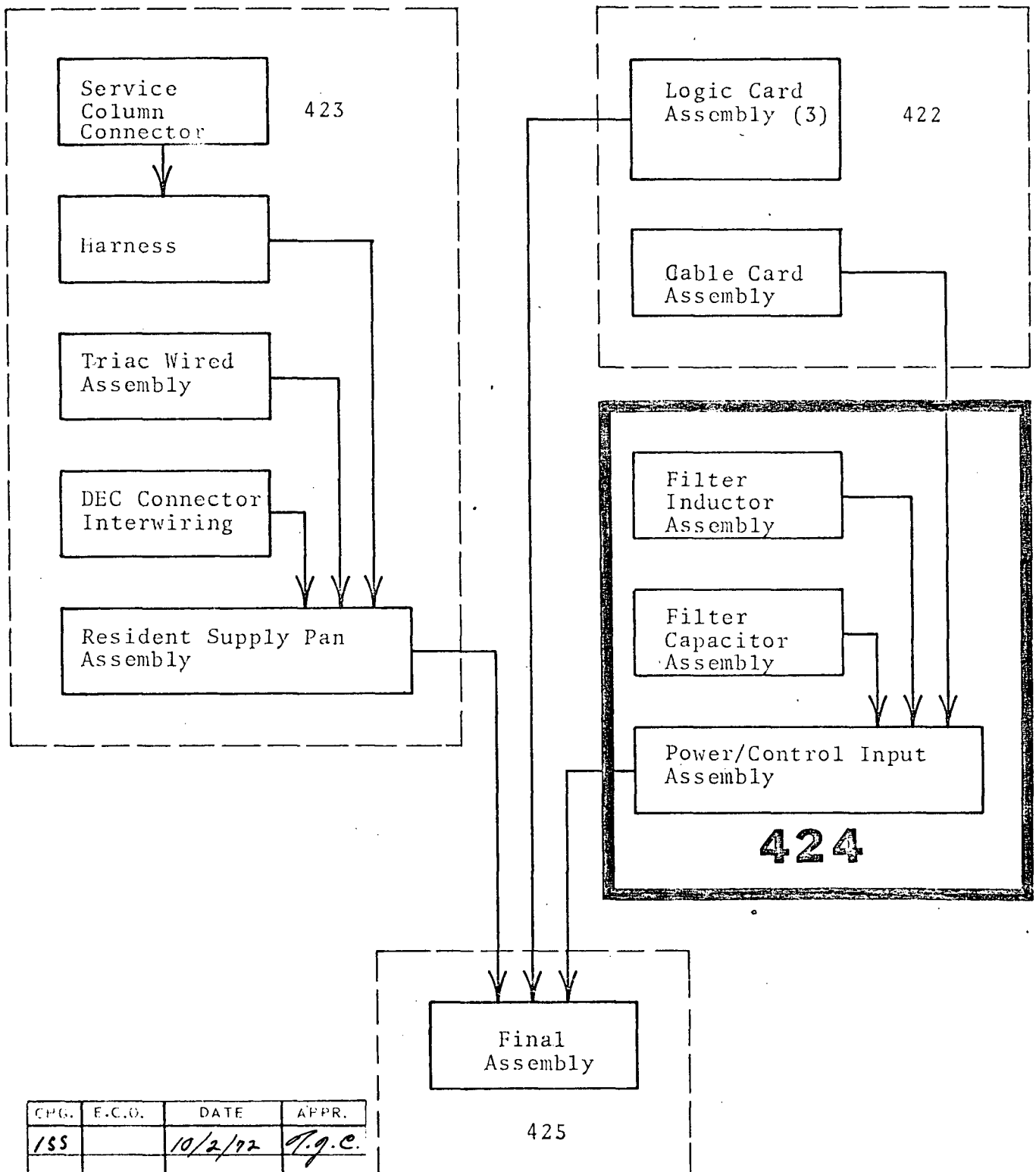
A tooling chart, page 424-3, is included for reference. When crimping, care must be exercised to assure all strands of the wire (or wires) are fully inserted into the contacts.

In general, all strip lengths given are ± 0.015 inch. Stripping must be done with a tool that does not nick or break any strands of the wire.

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PEDESTAL ASSEMBLY

SEQUENCE DIAGRAM



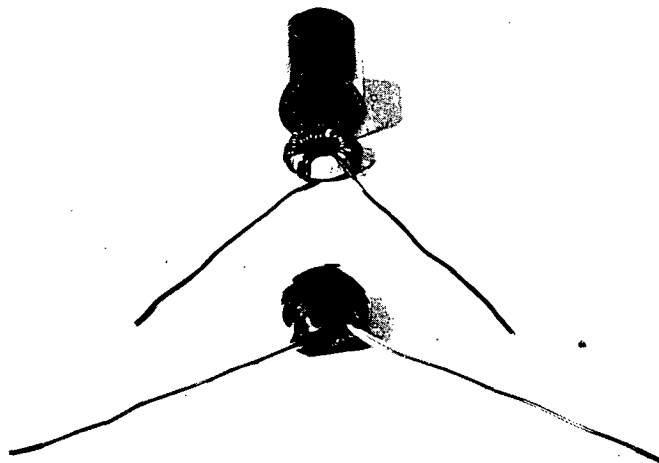
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FILTER INDUCTOR

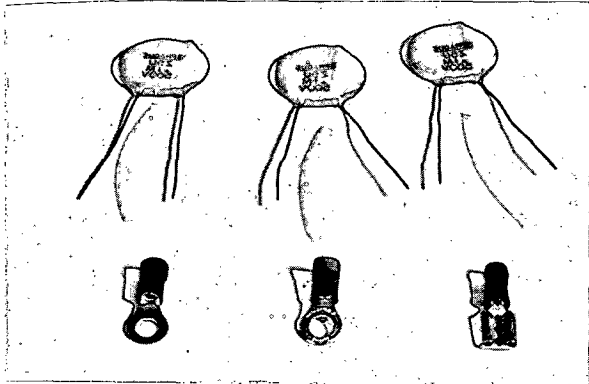
Six of these inductors are required to make one Power/Control Input Assembly.

Wind a single layer of 18 or 19 turns of 14 AWG magnet wire on a Magnetics 55308-A2 core. The ends of the wire must extend more than 4 inches from the core. (28 inches of magnet wire is adequate to do one coil.)

Cut a 1.5 inch piece of Amp 603101 Heavy Wall Shrink Tubing and two pieces of size 14 wire sleaving (Alpha TFT250 or equivalent) 4 inches long. Slide the two pieces of sleaving over the inductor leads and shrink the heat shrinkable tubing in place as shown.

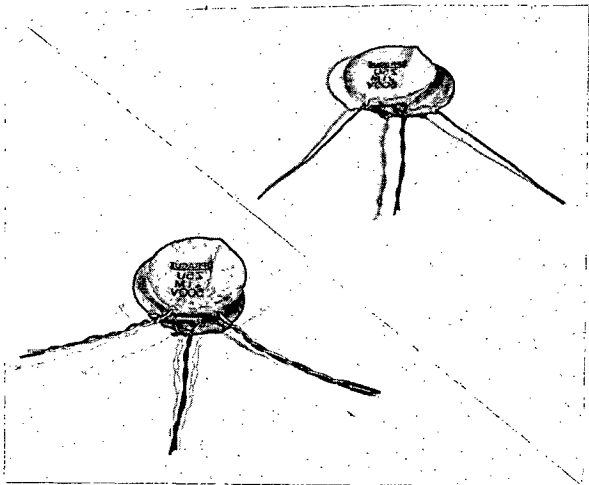


FILTER CAPACITORS



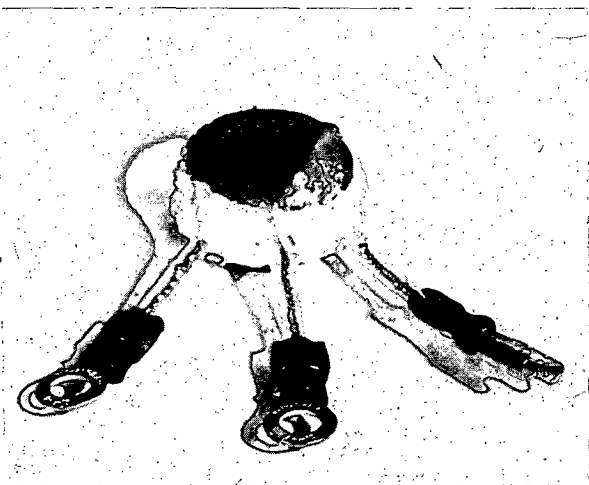
1. Two of these capacitor assemblies are required to make one Power/Control Input Assembly.

2. Connect three 0.1 μ fd 500 VDC, ceramic capacitors together as shown.



3. Slide size 14 wire sleaving (Alpha TFT 250 or equivalent) over the leads. Bend 2 leads double to form a 0.20 length of bare wire.

4. Crimp Amp 34161 terminals on the 2 bent leads and an Amp 42599-2 terminal on the other lead.



5. Form the capacitors and leads such that the separation between wires not electrically connected is at least 0.1 inch. Then cover the bare leads near the capacitors with silicon rubber, G.E. RTV-102 or equivalent.

ASSEMBLY PROCEDURE

1. The figures on page 424-12 should be consulted as needed during this assembly procedure.
2. Mount the following components on a CSL 421-60 Connector Mount Bracket:
 - a) 2 Amphenol 60-M10 plugs with the flange inside using 4 6-32 x 3/8" screws, nuts and lock washers. Mount the POWER LINE 1 plug with pin 3G lowest and the POWER LINE 2 plug with pin 3G highest.
 - b) 2 Varo VT200/T rectifier bridges with 4 6-32 x 1/2" flat head screws, nuts and lock washers.
 - c) 1 Jones strip 2-541 with 4 6-32 x 5/8" flat head screws, nuts, and lock washers.
3. Mount a CSL 421-67 Circuit Breaker Rod on a Airpax Circuit Breaker by removing the bar that connects the four switches, cutting 1/8 inch out of the middle plastic spacer, then reassembling as shown on page 424-12.
4. Mount the assembled bracket on an assembly jig (424-13) with 2 8-32 x 3/8" screws. Mount the circuit breaker and rod assembly on the jig with 4 1.5" spacers, 6-32 x 2" screws, flat washers, and lock washers.
5. Screw a CSL 421-72 Knob on the end of the Circuit Breaker Rod.
6. On each of the Varo bridges jumper the terminal with the red dot to opposite terminal using 16 AWG green wire. Solder the connections.
7. Using 16 AWG green wire, cut 2 lengths 3 inches long and 1 length 2 inches long. Strip one end of the 3 inch wires 0.25 inch. Strip both ends of the 2 inch long wire 0.25 inch. Crimp an AMP 34161 terminal on one end of the 2 inch wire. Crimp all 3 wires into an AMP 34170 terminal. Strip the remaining 2 ends 0.5 inch. Connect the yellow terminal to the upper left screw on the Jones strip along with an AMP 42214-2 tab. The edges of the terminal must be trimmed slightly so the terminal will fit in the slot. Connect the blue

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terminal to the lower left screw on the Jones strip along with an AMP 42214-2 tab. Connect 2 AMP 42214-2 tabs to the lower right screw on the Jones strip. Connect the 1 AMP 42214-2 tab to the upper right screw on the Jones strip.

8. Connect one of the loose green wires from the Jones strip to the closer unused terminal on the upper Varo rectifier bridge. Connect the other loose green wire from the Jones strip to the closer unused terminal on the lower Varo rectifier bridge. Solder both connections.

9. Form a filter inductor from pin G3 of the POWER LINE 1 plug to the unused terminal on the upper Varo rectifier bridge cutting the inductor leads as needed. Strip the sleaving and varnish from the magnet wire ends and solder in place.

10. Form a filter inductor from pin G3 of the POWER LINE 2 plug to the unused terminal on the lower Varo rectifier bridge cutting inductor leads as needed. Strip the sleaving and varnish from the magnet wire ends and solder in place.

11. Cut the leads on 2 filter inductors 2 inches on one end and 2.75 inches on the other end. Strip the sleaving and varnish on the inductor leads back 0.4 inch. Crimp an AMP 34161 terminal on the 2 inch lead of one inductor and crimp an AMP 34161 terminal on the 2.75 inch lead of the other inductor. Connect one inductor from the left hand circuit breaker terminal nearest the Varo rectifier bridges to pin 1 on the POWER LINE 1 plug. Solder to plug terminal. Connect the other inductor between the adjacent left hand circuit breaker terminal and pin 2 of the POWER LINE 1 plug. Solder to plug terminal.

12. Cut the leads of the last 2 filter inductors 2.25 inches on one end and 3.25 inches on the other end. Strip the sleaving and varnish on the inductor leads back 0.4 inch. Crimp an AMP 34161 terminal on the 2.25 inch lead of one inductor and crimp an AMP 34161 terminal on the 3.25 inch lead of the other inductor. Connect one inductor between the left hand circuit breaker terminal next to the last one used and pin 2 of the POWER LINE 2 plug. Solder to plug terminal. Connect the other inductor between the outside left hand circuit breaker terminal and pin 1 of the POWER LINE 2 plug. Solder to plug terminal.

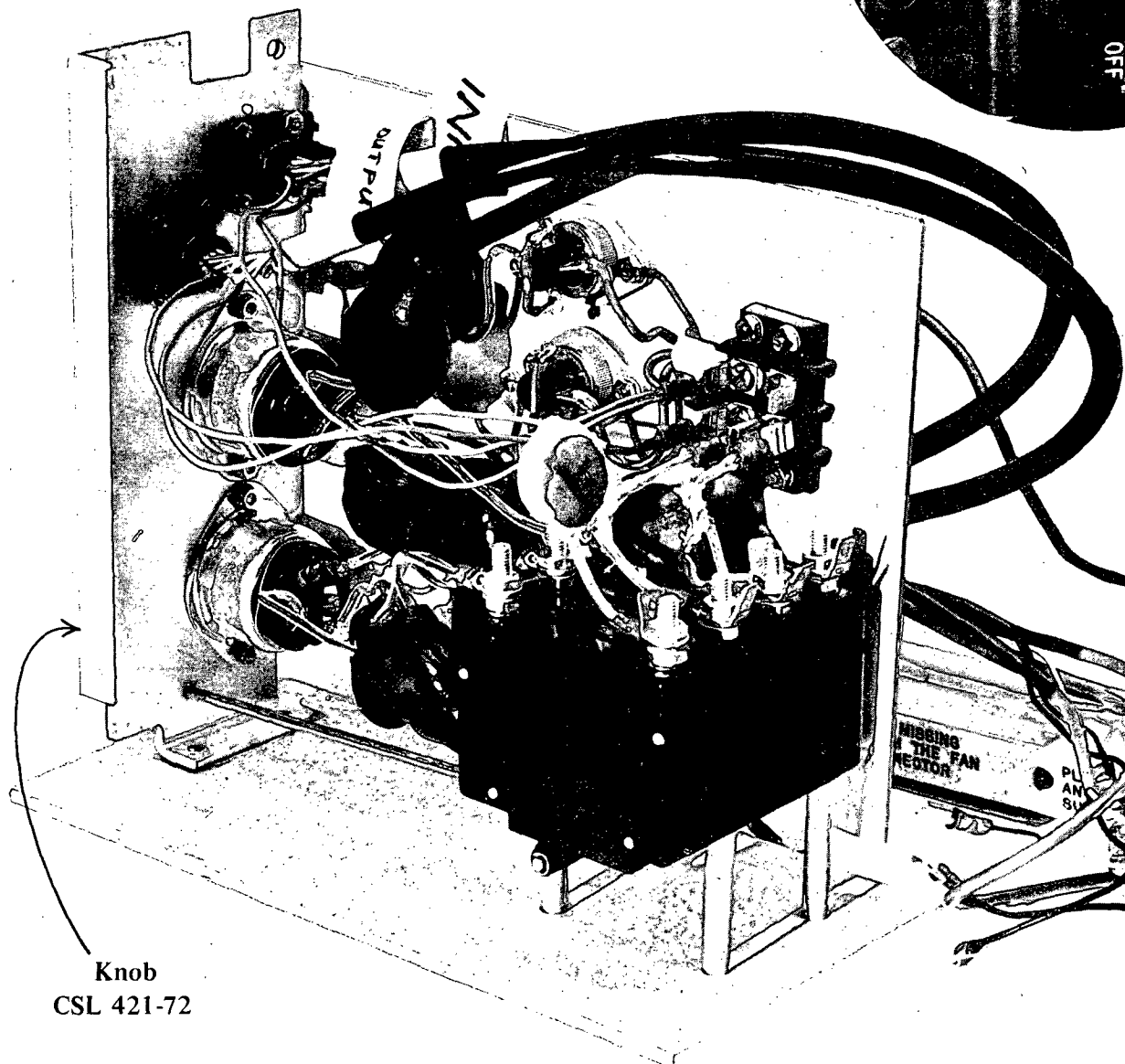
13. Form all six inductors so they do not touch anything.

14. Connect one capacitor filter assembly to the two right hand circuit breaker terminals nearest the Jones strip and plug the press-on terminal of the capacitor filter assembly onto the outside tab of the lower right hand terminal of the Jones strip. Place one AMP 42214-2 tab (with enlarged mounting hole) on the circuit breaker terminal nearest the Jones strip and 2 AMP 42214-2 tabs (with enlarged mounting holes) on the adjacent circuit breaker terminal.

15. Connect the other capacitor filter assembly to the remaining two right hand circuit breaker terminals along with one AMP 42214-2 tab (with enlarged mounting hole) on each terminal. Connect the press on terminal of the capacitor filter assembly to the inside tab on the lower right hand terminal of the Jones strip.

16. Mount the two Amphenol connectors from the Cable Card Assembly (CSL 422) in the INPUT and OUTPUT holes with 8 4-40 x 3/8" screws, nuts and lock washers. The cables are marked "input" and "output". Connect the green wires from the connectors to the lower left tabs on the Jones strip.

17. Remove the assembly from the jig. The screws, washers, and spacers on the circuit breaker are part of the assembly. CAUTION: The circuit breaker can be ruined by over tightening the 2 inch long screws.



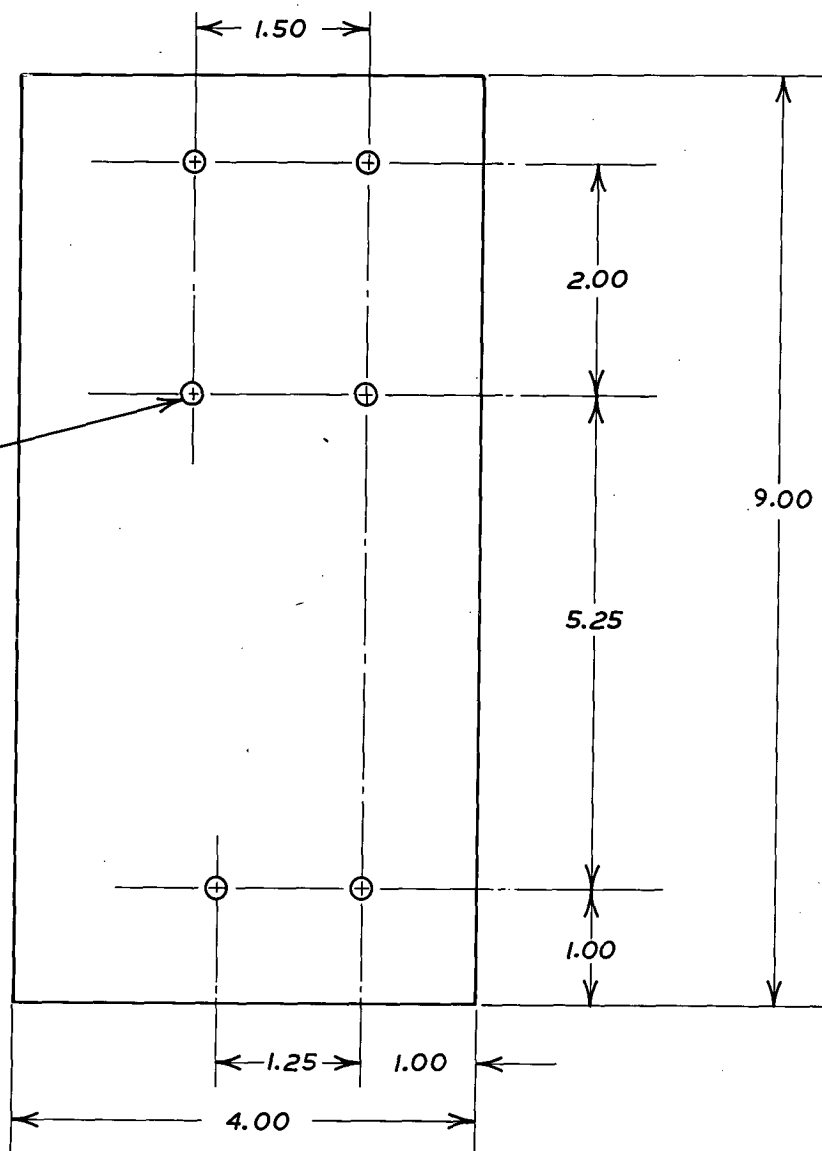
COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI

MACROMODULAR PROJECT

TITLE
POWER / CONTROL INPUT
ASSEMBLY

Issue	9-26-72		APPROVED			ENG TJC	DRAWING NO. 424-12
			BY <i>J.C.</i>	FOR Prod.	DATE 10/2/72		
CHANGE NO.	DATE	DESCRIPTION				CHECKED <i>JEM</i>	DATE 9-26-72

DRILL 6 HOLES
0.187 DIA



MAT'L: $\frac{3}{16}$ " THK. ALUM. 6061-T6
DIM: ± 0.05

ISSUE 9-25-72			
CHANGE NO.	DATE	DESCRIPTION	
COMPUTER SYSTEMS LABORATORY WASHINGTON UNIVERSITY ST. LOUIS, MISSOURI			
MACROMODULAR PROJECT			
TITLE			
ASSEMBLY JIG			
APPROVED		ENG.	DRAWING NO.
BY	FOR	DATE	
of g.c.	PROD.	10/2/72	424-13
		DRAWN BY	
		PLL	
		CHECKED	DATE
		Uem	9-25-72

COMPUTER SYSTEMS LABORATORY
WASHINGTON UNIVERSITY

PEDESTAL ASSEMBLY

PAGE	TITLE	CHANGE
425-1	TITLE PAGE	A
425-2 thru 425-4	PARTS LIST	A
425-5	INTRODUCTION	
425-6	PEDESTAL ASSEMBLY SEQUENCE DIAGRAM	
425-7	ASSEMBLY PREPARATION	
425-8 thru 425-9	SKELETON ASSEMBLY	
425-10	POWER/CONTROL ASSEMBLY INSTALLATION	A
425-11 thru 425-12	RESIDENT SUPPLY PAN INSTALLATION	
425-13 thru 425-15	COVERING UP	A
425-16 thru 425-17	POWER SUPPLY COVER ADDITION	

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MACROMODULAR SYSTEMS PROJECT

PARTS LIST

ITEM	QTY.	C.S.L DOC	PART
1	1	421-7	RIGHT SIDE WALL
2	1	421-8	LEFT SIDE WALL
3	1	421-9	COVER
4	1	421-10	REAR WALL
5	1	421-11	FRONT WALL
6	1	421-13	POWER SUPPLY COVER
7	12	421-14	RAIL
8	1	421-15	CONNECTOR ADAPTER COVER
9	4	421-16	RESIDENT COVERS
10	1	421-17	REAR SPLINE
11	1	421-18	FRONT SPLINE
12	6	421-19	FRAME ADAPTER
13	2	421-20	SIDE PANELS
14			
15	6	421-22	REAR POST ADAPTER
16	6	421-23	FRONT POST ADAPTER
17	1	421-24	RAIL SUPPORT ANGLE TYPE 1
18	1	421-25	RAIL SUPPORT ANGLE TYPE 2
19	1	421-26	RAIL SUPPORT ANGLE TYPE 3
20	1	421-27	RAIL SUPPORT ANGLE TYPE 4
21	1	421-28	RAIL SUPPORT ANGLE TYPE 5
22	1	421-29	RAIL SUPPORT ANGLE TYPE 6
23	2	421-30	END SLIDE PLATE
24	2	421-31	SLIDE PLATE
25	2	421-32	GUIDE RAIL
26	2	421-33	END GUIDE RAIL
27	2	421-34	CHANNEL
28	4	421-35	SCREW
29	6	421-36	RAIL SUPPORT CLIP ANGLE
30	3	421-37	CONNECTOR ADAPTERS
31	2	421-38	TRIM ANGLE TYPE 1
32	2	421-39	TRIM ANGLE TYPE 2
33	2	421-40	TRIM ANGLE TYPE 3
34	2	421-41	TRIM ANGLE TYPE 4
35	2	421-42	TRIM ANGLE TYPE 5
36	1	421-43	ANGLE FRAME SPACER
37	1	421-44	RAIL SUPPORT BAR TYPE 1
38	2	421-45	RAIL SUPPORT BAR TYPE 2

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Parts List (cont.)

ITEM	QTY.	C.S.L DOC	PART
39	1	421-46	UPPER FRAME ANGLE
40	1	421-47	LOWER FRAME ANGLE
41	2	421-48	SIDE FRAME ANGLE
42	2	421-49	HINGE SPACER
43			
44	4	421-51	NUT
45	3	421-52	COVER SUPPORT ANGLE
46	6	421-53	CLIP ANGLE
47	4	421-54	SCREW GUIDE
48	6	421-55	CORNER STIFFENER
49	2	421-56	SPRING PURCHASE
50	1	421-57	COVER CATCH
51	1	421-62	SAFETY COVER TYPE 1
52	1	421-66	CABLE CONDUIT
53	3	421-71	WIRE BUNDLE SUPPORT CLIP
54	1	421-73	SAFETY COVER TYPE 2
55	1	423	PEDESTAL RESIDENT PAN ASSEMBLY
56	1	424	POWER/CONTROL ASSEMBLY
57	1	422	PRINTED CIRCUIT BOARD ASSEMBLY PTV0130-1
58	1	422	PRINTED CIRCUIT BOARD ASSEMBLY PTV0131-0
59	1	422	PRINTED CIRCUIT BOARD ASSEMBLY PTV0132-0
60	1	422	PRINTED CIRCUIT BOARD ASSEMBLY PTV0133-1B
61	1	421-74	GRILL
62	1		ROLL PIN 1/8" D . x 1/2", CADMIUM PLATED STEEL
63	2		TENSION SPRING (LEE SPRING CO. #LE-029C-2)
64	2		PIANO HINGE, STANLEY, 1/2" WIDE X 9" LONG
65	2		COTTER PIN 3/32" dia. x 1 1/64" long
66	1		RIVET 3/32" D. x 1/8" long
67	12		ROLL PIN 3/32 D. x 1/4", CADMIUM PLATED STEEL
68	2		SWITCH, GRIGSBY-BARTON REEDAC 15 AMP AC #GB2400-1518-4-03
69	2		SWITCH, GRIGSBY-BARTON REEDAC 30 AMP AC #GB2400-3018-4-03
70	1		SWITCH, MICRO SWITCH 3SKI-T W/JX-40 MOUNTING HARDWARE
71	4		CABLE CLAMP, H.H. SMITH #771 OR EQUIVALENT
72	2		CABLE CLAMP, H.H. SMITH #772 OR EQUIVALENT
73	7		CABLE CLAMP, H.H. SMITH #774 OR EQUIVALENT
74	4		VLIER LEVELING PAD #P306B.
75	6		ROLL PIN, 3/32" D. x 9/16", CADMIUM PLATED STEEL
76			

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Parts List (cont.)

ITEM	QTY.	C.S.L DOC	PART
77	12		4-40 NUTS
78	2		5/16 x 24 NUTS
79	13		INTERNAL TOOTH STAR LOCK WASHER FOR 6-32 SCREWS
80			
81	12		INTERNAL TOOTH STAR LOCK WASHER FOR 4-40 SCREWS
82	12		4-40 x 1/2 FILLISTER BINDING HEAD SCREW
83	4		6-32 x 1/4 " " " "
84	11		6-32 x 3/8 " " " "
85	22		6-32 x 1/2 " " " "
86			
87	4		6-32 x 7/8 " " " "
88			
89	2		8-32 x 5/8 " " " "
90			
91	8		8-32 x 3/8 " " " "
92	24		4-40 x 1/4 FLAT HEAD SCREWS
93	20		4-40 x 1/4 " " "
94	24		4-40 x 3/8 " " "
95	8		8-32 x 3/8 " " "
96	18		8-32 x 1/2" " " "
97	20		10-32 x 3/4 SOCKET HEAD SCREWS, STAINLESS STEEL
98	24		10-32 x 5/8 " " " " "
99	6		10-32 x 1/2 " " " " "
100	18		1/4 -20 x 1 " " " " "
101	76		1/4 -20 x 1/2 " " " " "
102	24		1/4 -20 x 5/8 " " " " "
103	2		1/4 -20 x 3/8 " " " " "
104	24		1/4 -20 x 3/4" " " " "
105	24		4-40 x 3/8 " " " " "
106	2		2-56 x 1/4 ROUND HEAD SCREWS
107	4		HOLE COVERS, H.H. SMITH 655 OR EQUIV.
108	as req.		SILICON GREASE, GENERAL ELECTRIC G-64 OR EQUIV.

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A	0294	8-7-73	<i>J.P.C.</i>

INTRODUCTION

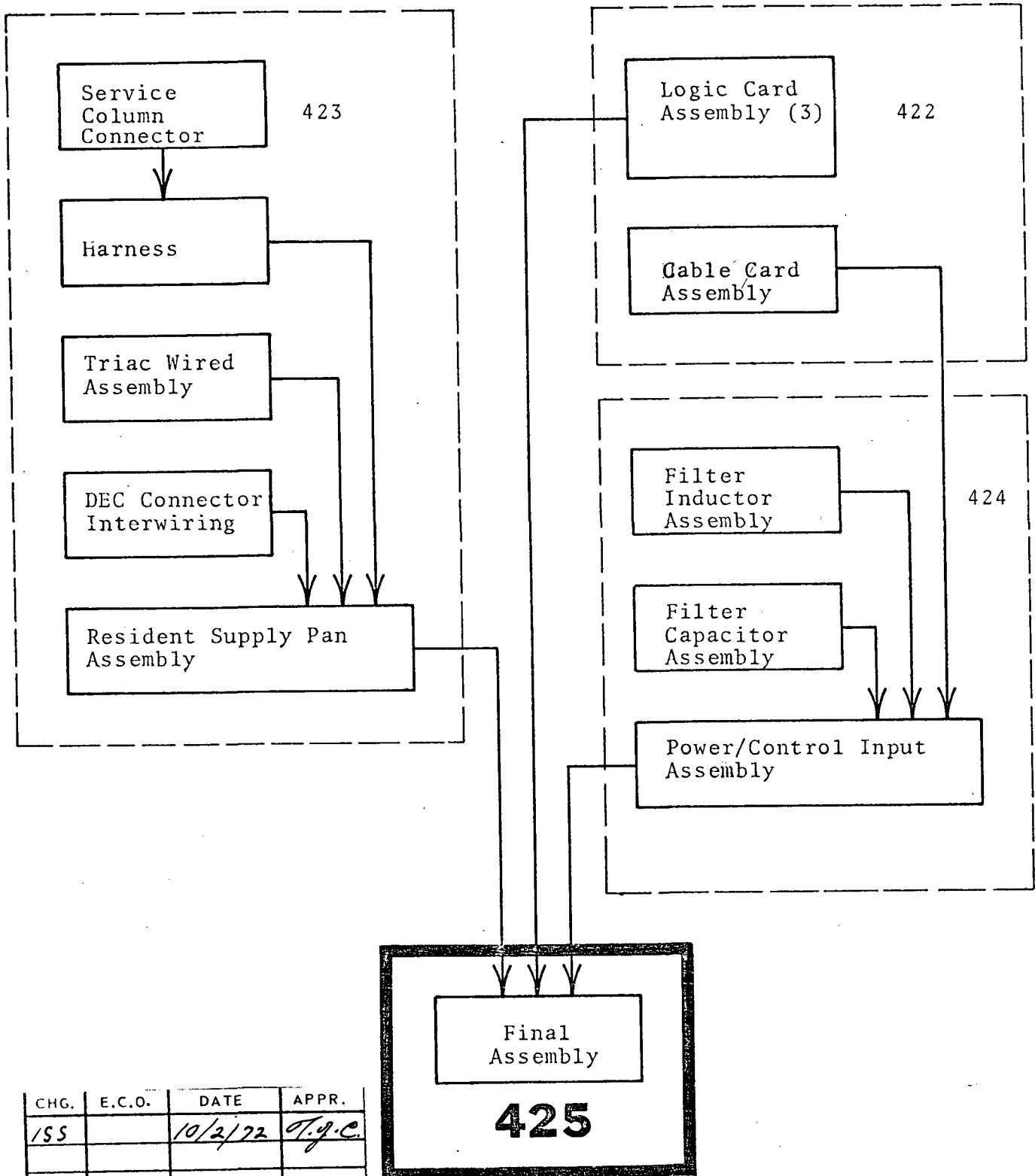
This document contains instructions for assembling a macromodular pedestal. The pedestal assembly requires special parts and subassemblies constructed using CSL documents 421, 422, 423, and 424. An overview of the assembly sequence is shown on page 425-6.

With the exception of soldering 3 wires to one switch; this entire document is a mechanical assembly. One special tool which is helpful, though not necessary, is a 5/32" socket head screw driver which may be operated at an angle. Such a tool, called a "balldriver", is made by Bandhus Tool Company, Monticello, Minn. 55362. This tool is useful when installing the Frame Adapters (Item 12).

The "item numbers" used in the assembly procedure refer to the "item" column of the parts list.

PEDESTAL ASSEMBLY

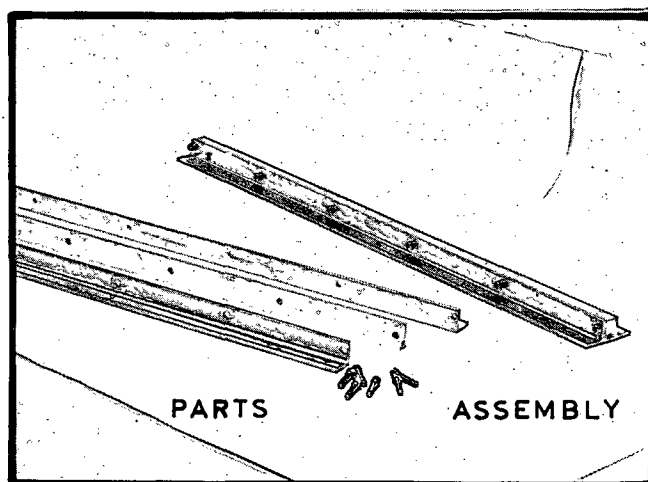
SEQUENCE DIAGRAM



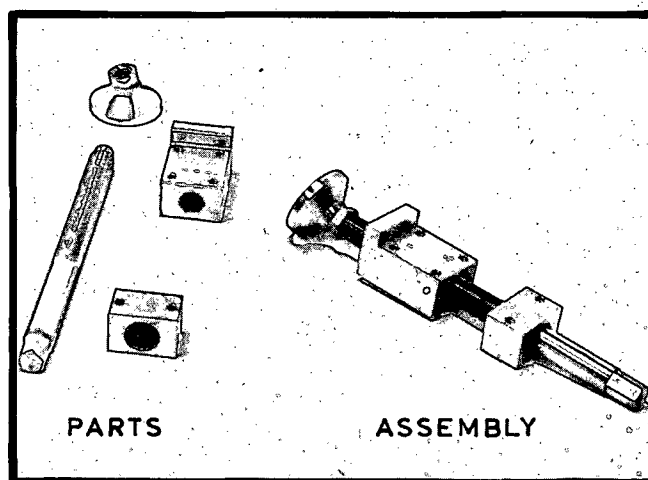
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ASSEMBLY PROCEDURE

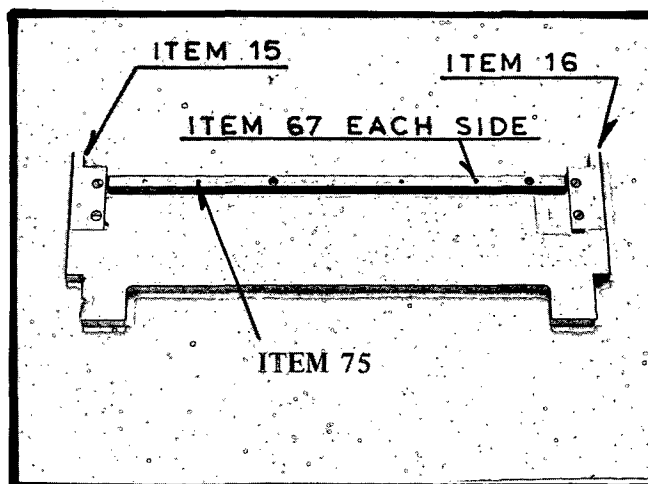
1. Assemble 3 different supports as follows:
 - (a) Assemble items 37, 17 and 18 using 6 item 100 screws such that the large hole is aligned in all three parts.
 - (b) assemble items 38, 19, and 20 as above.
 - (c) assemble items 38, 21, and 22 as above.



2. Assemble 4 feet as shown using:
 - 4 - Item 28
 - 4 - Item 44 (note lip position)
 - 4 - Item 47
 - 4 - Item 74 (tighten pad nut with wrench)

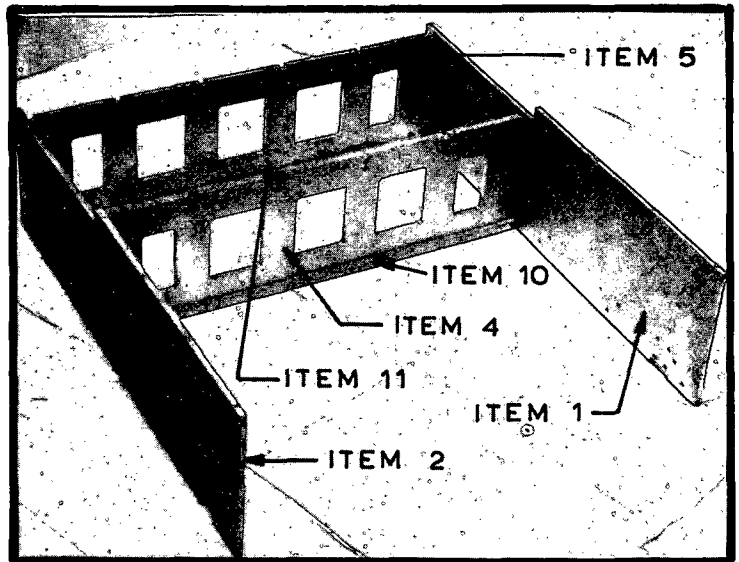


3. Assemble 6 assemblies of items 12, 15, 16, and 7 (2 per assembly) using 4 item 94 screws, 4 item 105 screws, 2 item 67 roll pins, and 1 item 75 roll pin per assembly. First assemble the rails to the plate by pressing in the item 75 roll pin until it is centered in the plate; then install the 4-40 screws. Fasten on items 15 and 16. Then press the 2 item 68 roll pins into the rails such that 0.054 to 0.058 inch of each pin is exposed and the pin slots face item 15.

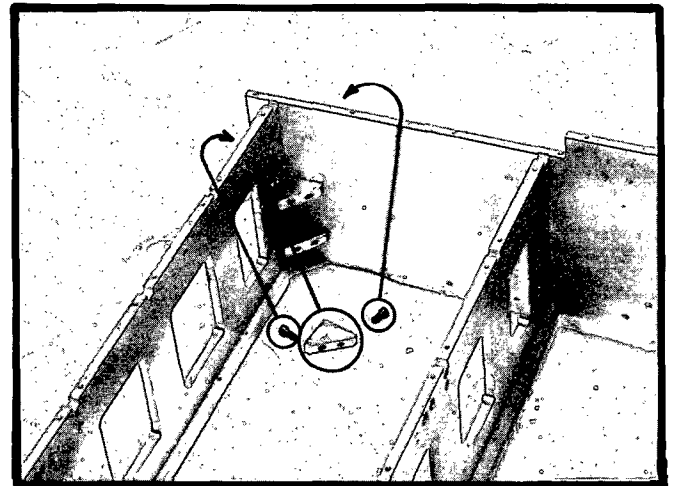


SKELETON ASSEMBLY

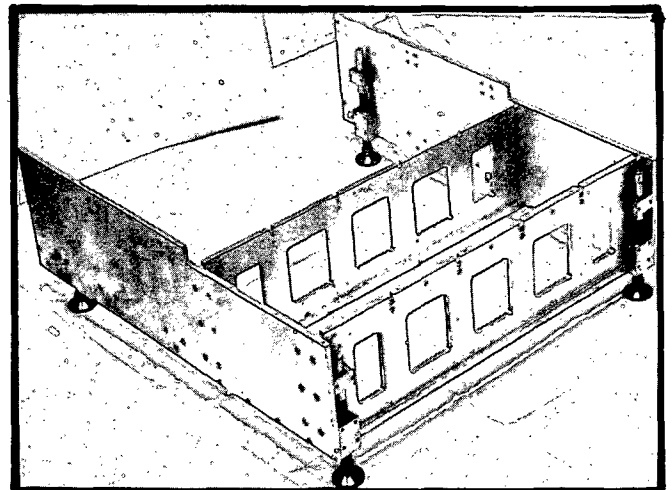
4. Assemble Items 10, 11, 4, 5, 1 and 2 as shown using 24 item 102 screws.



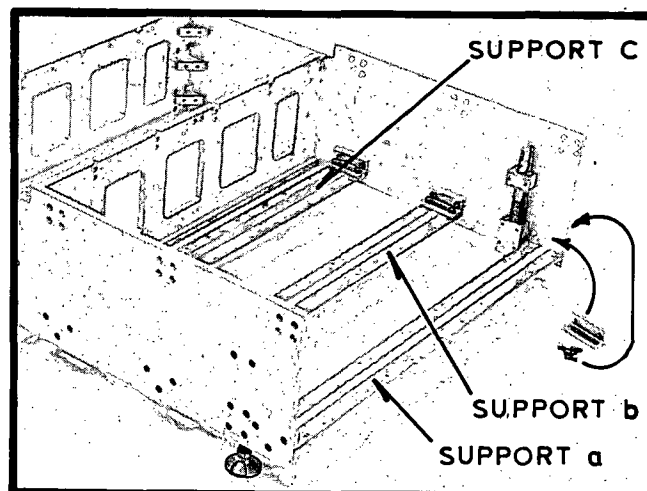
5. Attach 6 item 48 corner stiffeners using 12 item 101 screws. Mount 3 as shown and 3 in the other front corner.



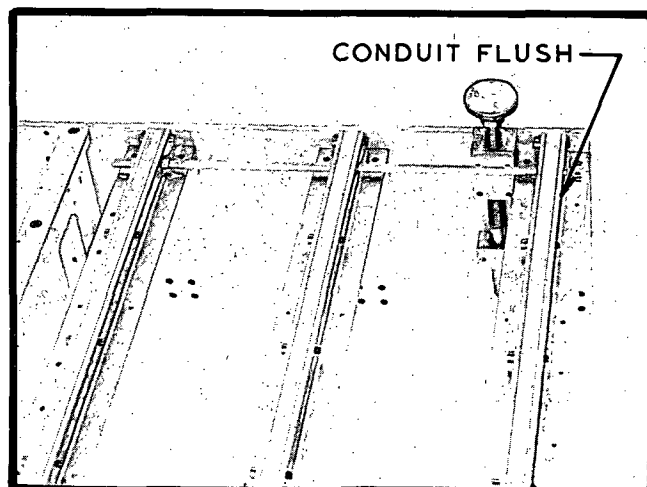
6. Attach the 4 feet assemblies made in paragraph 2 as shown using 24 item 104 screws.



7. Attach the 3 supports assembled in paragraph 1 at the locations shown with 6 item 29 clip angles and 30 item 101 screws.



8. Install item 52 as shown using 2 item 78 nuts with the unthreaded end of the conduit flush with the outside angle.



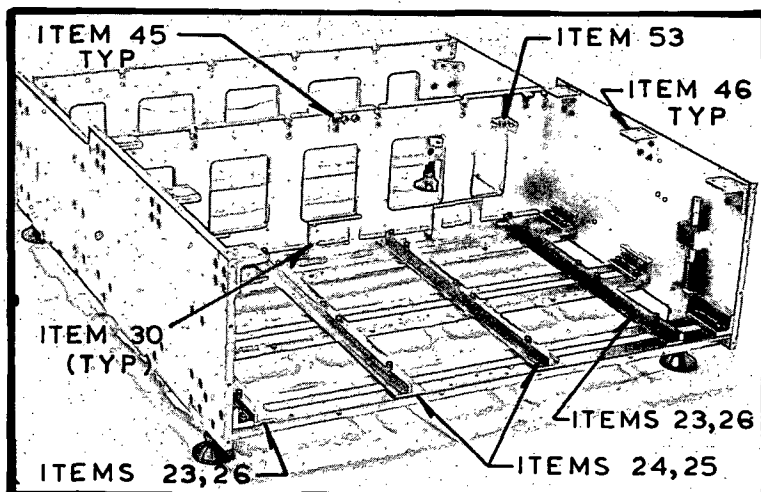
9. (a) Install the slide plates and guide rails; 2 each of items 23, 24, 25, and 26 using 20 item 97 screws as shown.

(b) Attach 6 item 46 clip angles as shown using 24 item 101 screws.

(c) Attach 3 item 30 connector adapters as shown using 6 item 101 screws.

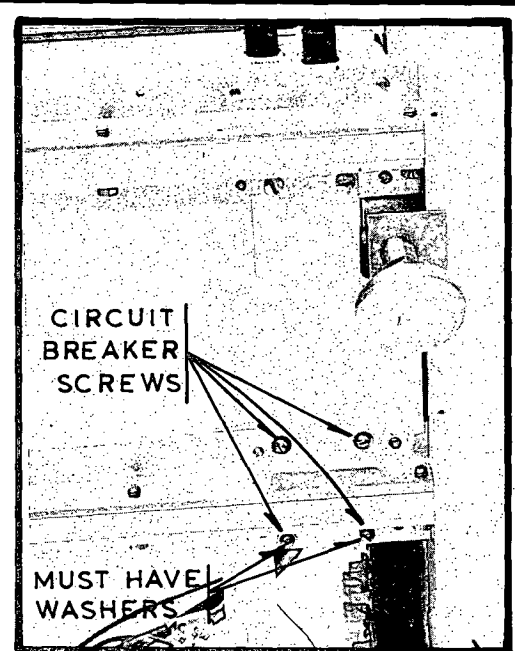
(d) Attach 3 item 45 cover support angles as shown using 6 item 91 screws.

(e) Attach 1 item 53 support clip as shown using 2 item 84 screws.

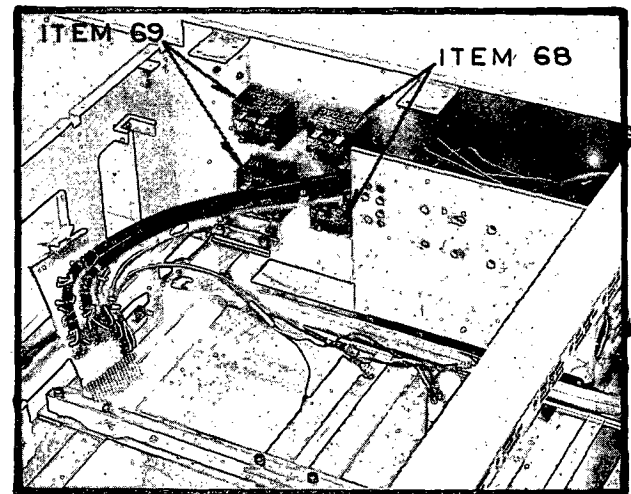


POWER/CONTROL ASSEMBLY INSTALLATION

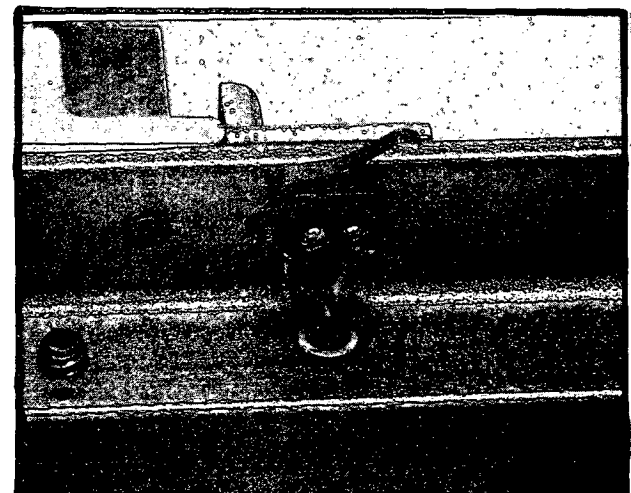
10. Install items 56 and 54 beginning with the bottom screws as shown. The 4 circuit breaker screws and spacers are attached. (The other 2 screws are item 89 screws.) Then put the channel in place and connect the bracket and channel with 2 item 91 screws. Connect the channel ends to the clip angles with 6 item 96 screws. (The 2 holes not counter sunk are used later.)



11. Mount 2 each items 68 and 69 as shown using 8 each item 85 and 79 screws and lockwashers. The backs of the Reedacs must be coated with a silicone grease, item 108 before mounting. When tightening the screws, care must be taken to ensure the Reedacs are flat against the plate.



12. Thread the long 3 wire cable from the cable card through the conduit and solder the wires to an item 70 switch: White wire to "C", black wire to "NO" and the red wire to "NC." Mount the switch as shown using the accompanying screws.

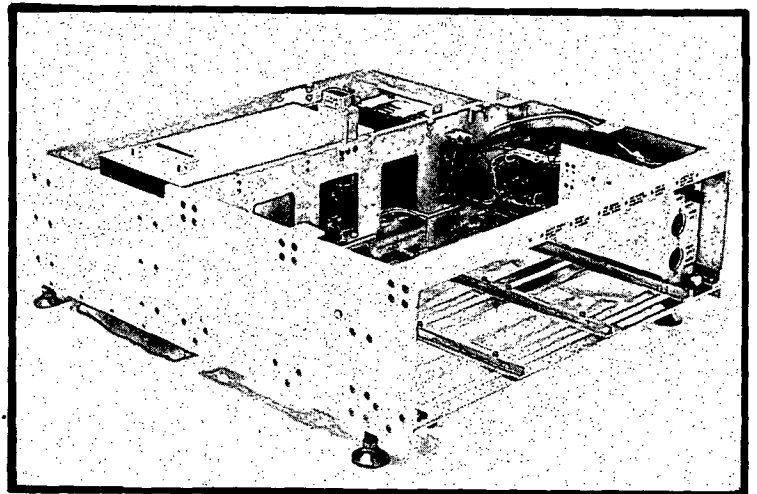
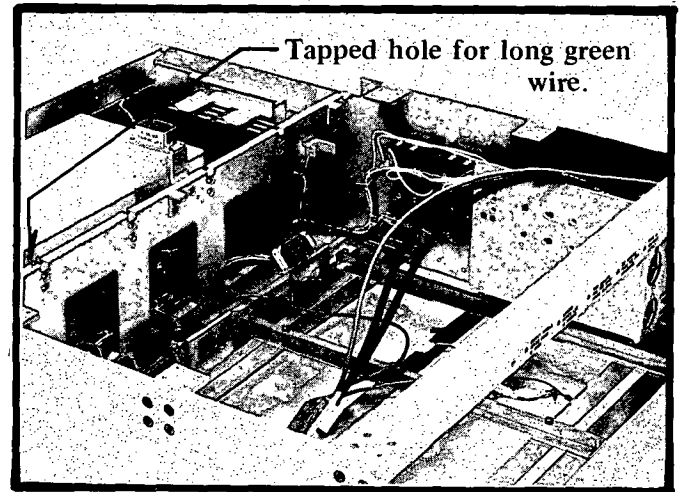


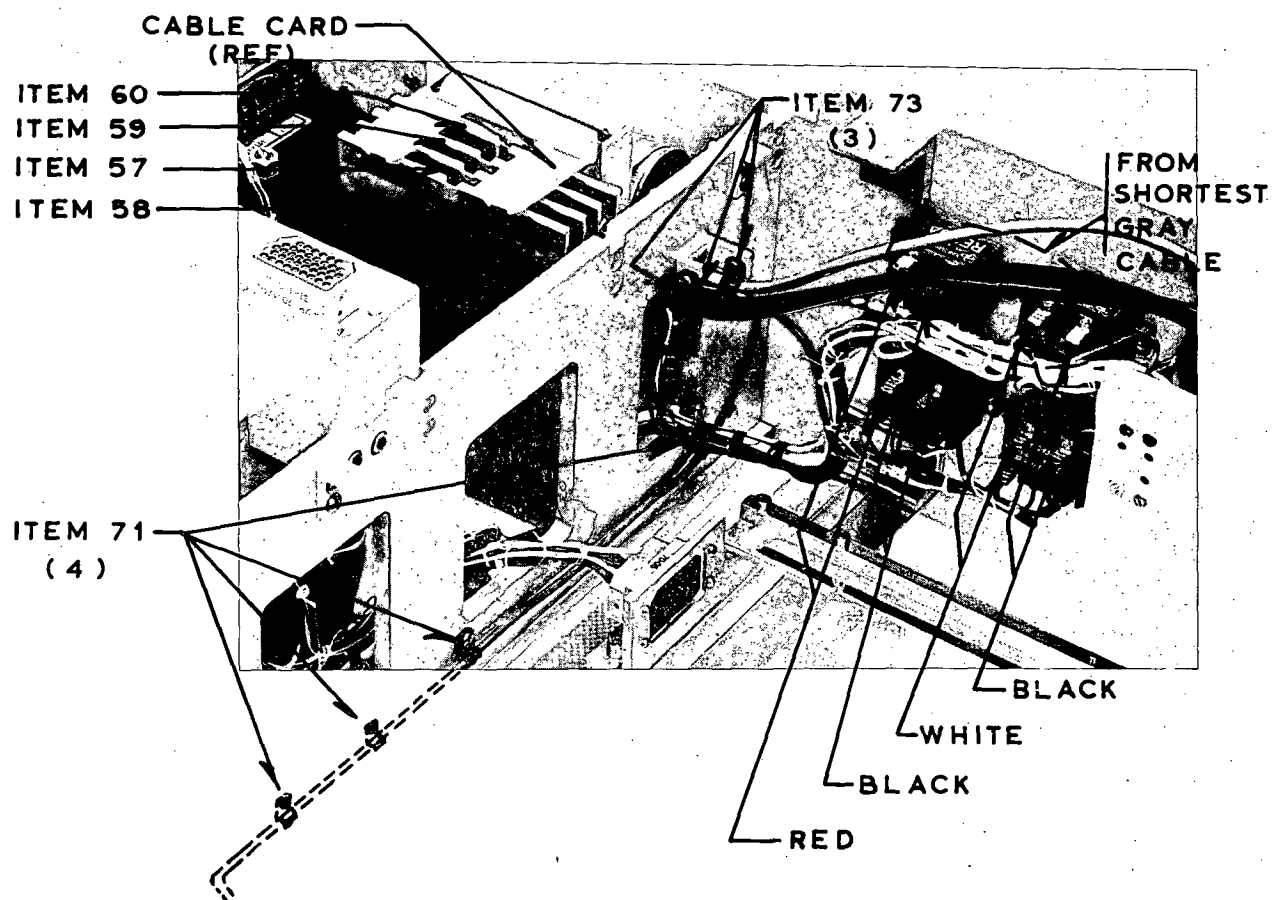
Button this end

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13. Installation of item 55:

- (a) Set the resident supply pan assembly in the pedestal while feeding the wires and the connectors through the wall holes as shown.
 - (b) Anchor the pan assembly between the front and rear walls with 4 each of item 87 and 79 screws and lockwashers.
 - (c) Connect the harness wiring to the Reedacs and the circuit breaker as shown. The harness wires are tied to fall into place. Connect the green wire to the terminal strip above the circuit breaker. The wiring diagram, page 423-42 of CSL document 423, may be consulted if necessary.
 - (d) Connect the long green wire from the pan harness to the center wall with a screw and lock washer, items 84 and 79, as shown.
14. Connect the 3 connectors to the 3 connector adapters with 12 each items 82, 77, and 81. Connect the upright connector to the center wall using 2 item 103 screws.





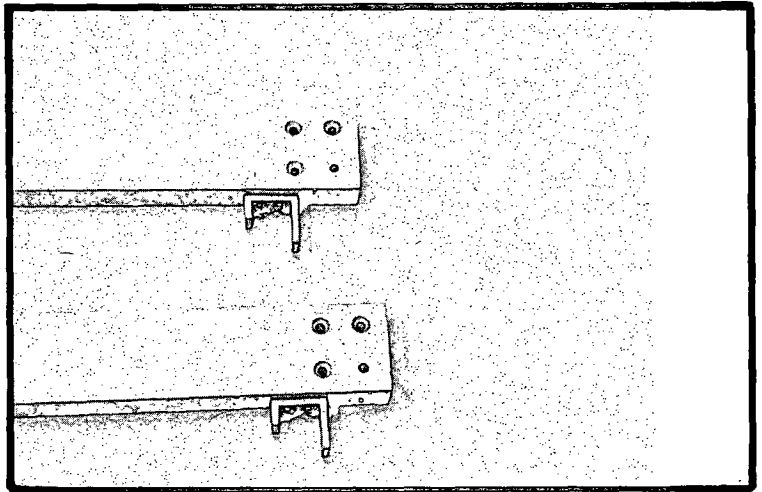
15. Place the cable card in the pan assembly P.C. card connector in position 4A. Mount 3 item 73 clamps using 2 item 85 screws, 1 clamp around each black cable and 1 clamp around the 4 gray cables. Mount item 71 clamps around the long gray cable with 4 item 85 screws in 4 places as shown.

16. Connect the longest loose gray cable to the bottom row of Reedacs as shown. Connect the other gray cable to the top row of Reedacs as shown.

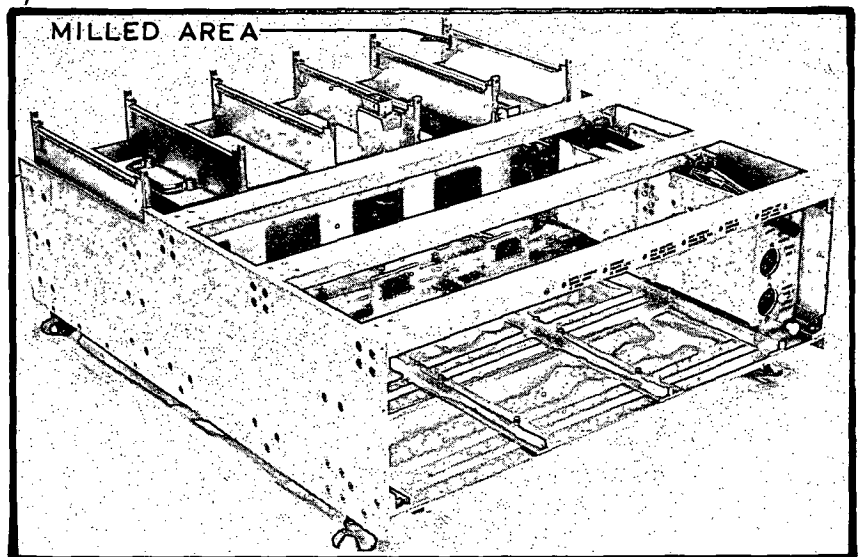
17. Install the printed circuit boards, items 57, 58, 59, and 60, in the order shown.

COVERING UP

18. Fasten 2 item 53 support clips to 2 item 27 channels using 4 item 83 screws as shown.



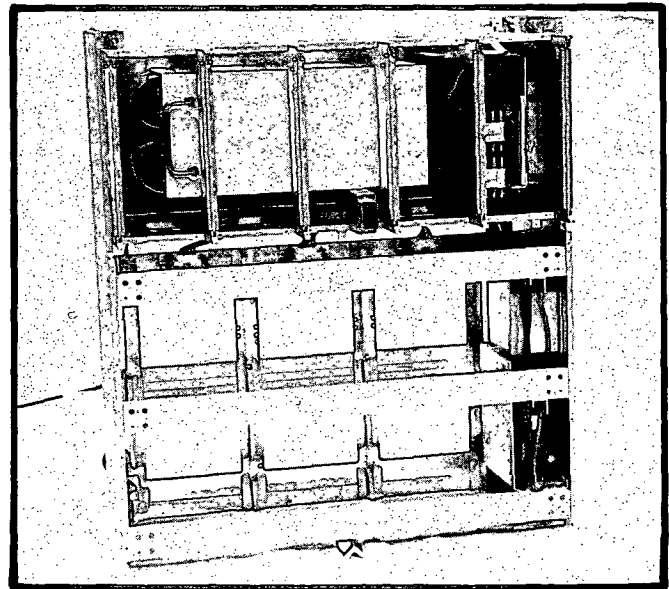
19. Fit the 6 assemblies from paragraph 3 in place as shown and fasten with 24 item 98 screws. ("Balldriver" tool helpful for this operation).



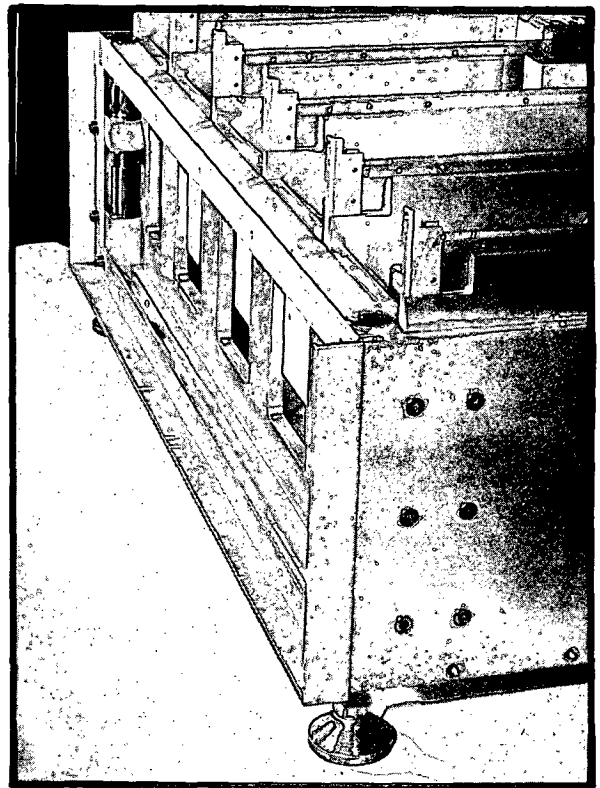
20. Mount item 51 cover to wall as shown with 4 item 84 screws.

21. Fit the 2 channels of paragraph 18 in place as shown and secure with 12 item 96 screws.

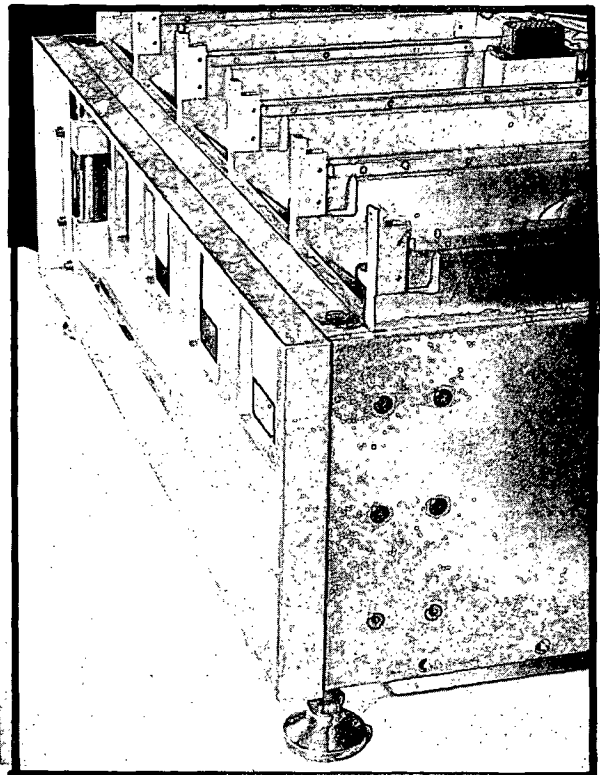
22. Hang the two black cables from the 2 channel support clips as shown using 4 item 73 clamps and 2 item 85 screws. Hang the gray cable as shown using 2 item 72 clamps and 2 item 85 screws.



23. Add item 36, the angle frame spacer to the upper front of the assembly using 3 item 99 screws. Add 2 item 41 side angles and a item 40 lower angle using 4 item 101 screws as shown. Add 2 item 107 hole covers to the top angle as shown.

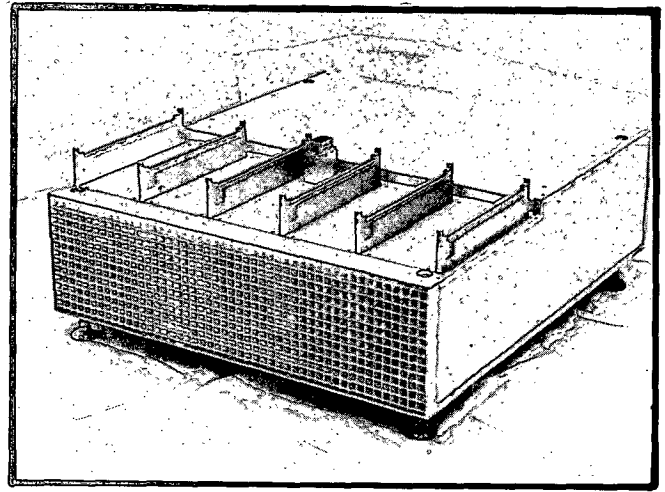


24. Add item 39 to the angle frame spacer as shown with 3 item 99 screws.

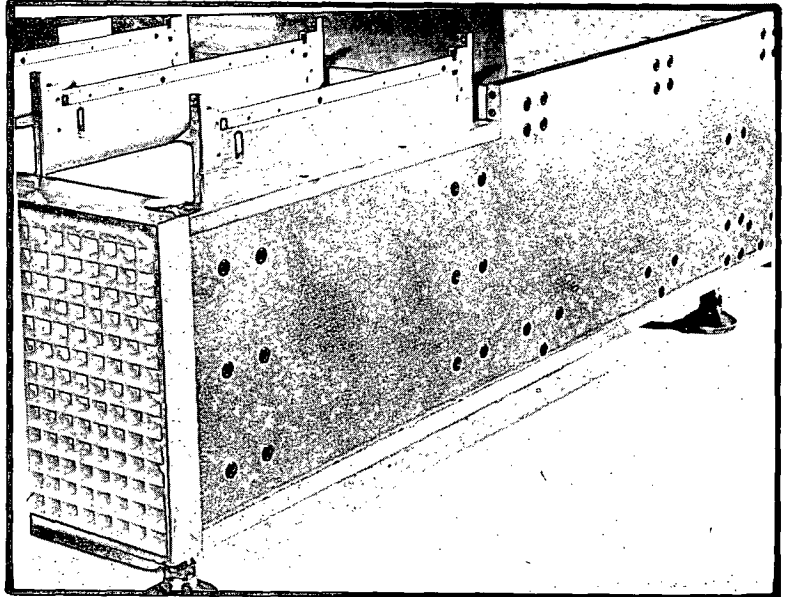


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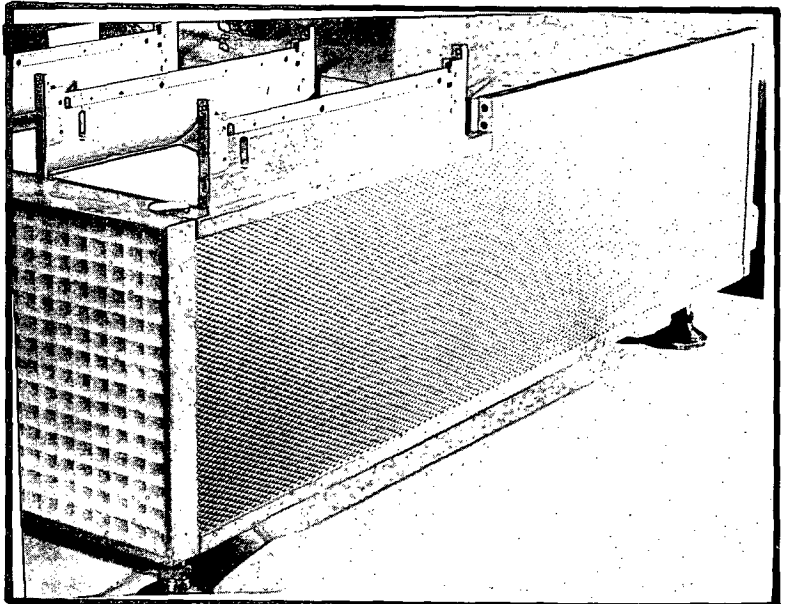
25. Install 4 item 9 and 1 item 8 covers with 20 item 93 screws as shown. Install item 3 cover with 8 item 95 screws and add 2 item 107 hole covers as shown. Force the grill, item 61, in place as shown.



26. Loosely fasten 1 each of items 31, 33, 34, and 35 with 10 item 92 screws as shown.



27. Slide item 13 side-panel under trim angles as shown. Put item 32 on end and secure with 2 item 92 screws. Tighten all 12 screws.

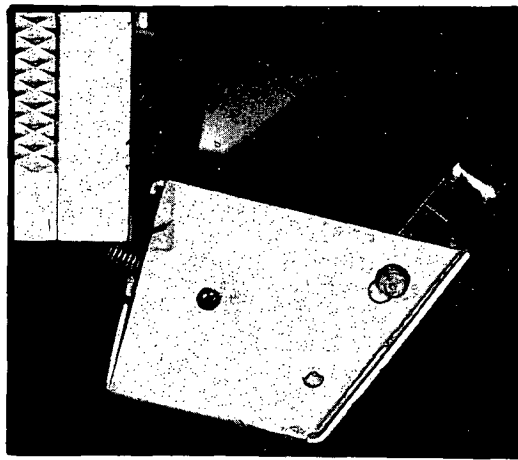


28. Repeat steps 25 thru 27 for other side of pedestal using same item numbers.

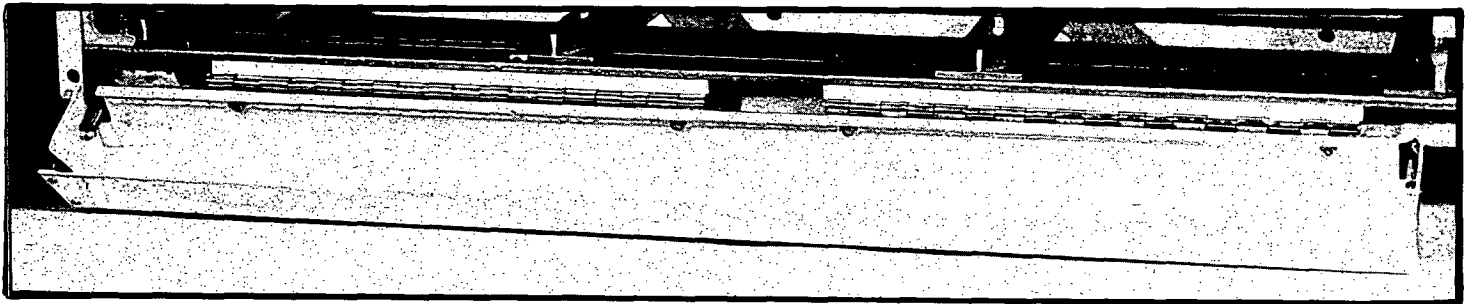
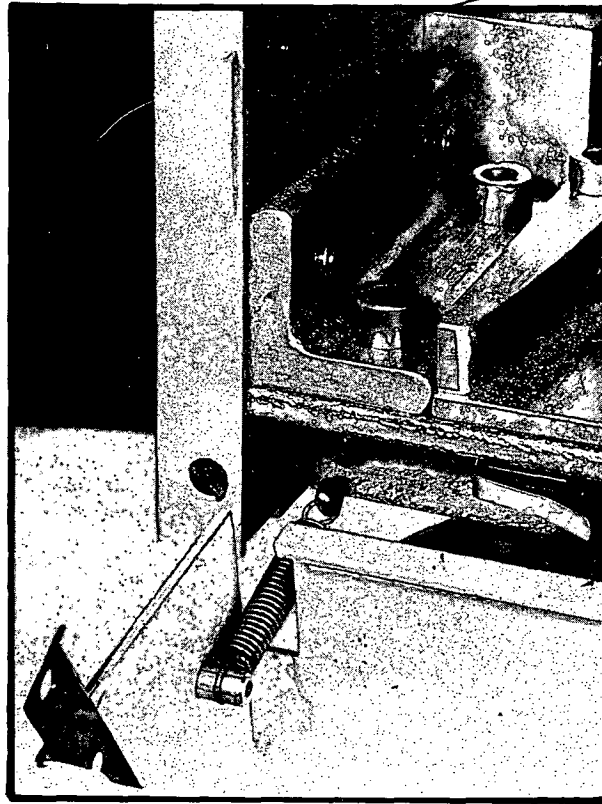
POWER SUPPLY COVER ADDITION

29. Fasten the item 50 cover catch to the item 6 cover using an item 66 rivet as shown on page 425-17. Add 2 item 49 spring purchases, 1 to each end of the cover with 2 item 106 screws.
30. Press the item 62 roll pin into the pedestal wall as shown on page 425-17.
31. Attach the cover to the pedestal using 2 item 42 spacers, 2 item 64 hinges, 4 item 85 screws and 4 item 84 screws as shown on page 425-17.
32. Attach 2 item 65 cotter pins and 2 item 63 springs to the cover and pedestal, 1 set at each end of the cover, as shown on page 425-17.

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ITEM 62
ROLL PIN



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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

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KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Macromodule Base Pedestal						
Macromodule Frame Block						
Macromodule Lateral Channel						
Macromodule Lateral Extension						
Macromodule Frame Section						
Macromodule Cooling Duct						

