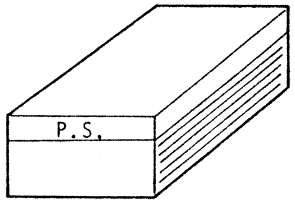
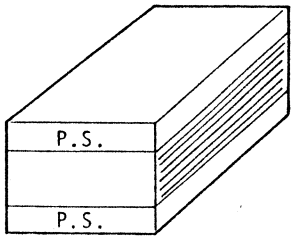
Chassis	Card Slots	Models	Maximum Memory Size (16-bit words)	Width - 19 inches (483mm) Depth - 21.65 in. (550mm)	Height
M4	10	P856	32K		6 U 267mm
		P857 MMU FPP optional	32K		
		P857 MMU standard FPP optional	64K		
OPTIONAL					
M5	17	P856	32K		11 U 489mm
		P857 MMU, FPP	128K		

- The Memory Management Unit (MMU) is required for all systems with more than 32k words of memory.
- The Floating Point Processor (FPP) is available with any P857M system.
- 1 U = 44.45 mm (1.75 inches)

Figure 4-1 P856M/P857M Chassis Configurations

SECTION IV

MECHANICAL

4.1 GENERAL

The P856M/P857M System is available in either of two basic chassis (M4 or M5), with two different extension chassis (E1, E2) available for additional control-unit cards. The different basic-chassis configurations are shown in Figure 4-1. Each chassis contains a power supply, ventilation, printed circuits, and I/O cable connectors, as well as the logic-card slots. Each chassis is slide mounted in a 19-inch (483mm) rack. Each basic chassis includes a control panel (either complete or simplified) mounted on the front face. The chassis dimensions and installation data are provided in Figure 4-2.

4.2 WIRING AND CABLING

4.3 General

The cable connections on the P857M basic chassis and the extension chassis, are shown on Figure 4-3. The uses of the different connectors on the cards are shown on Figure 4-4. Lists of signals and pin numbers for the card connectors are provided in the following tables :

Table	Connector
4-1	GP Bus connector, IOM-IOB
4-2	CPU-A connector-1 (V24 CU)
4-3	Connector-3 (CPU, Memory, IOP, CU)
4-4	CPU-A connector-5
4-5	Control Panel Connector
4-6	IOP Connectors 4, 5 (Break)
4-7	Extension Connectors AIE/TAIE

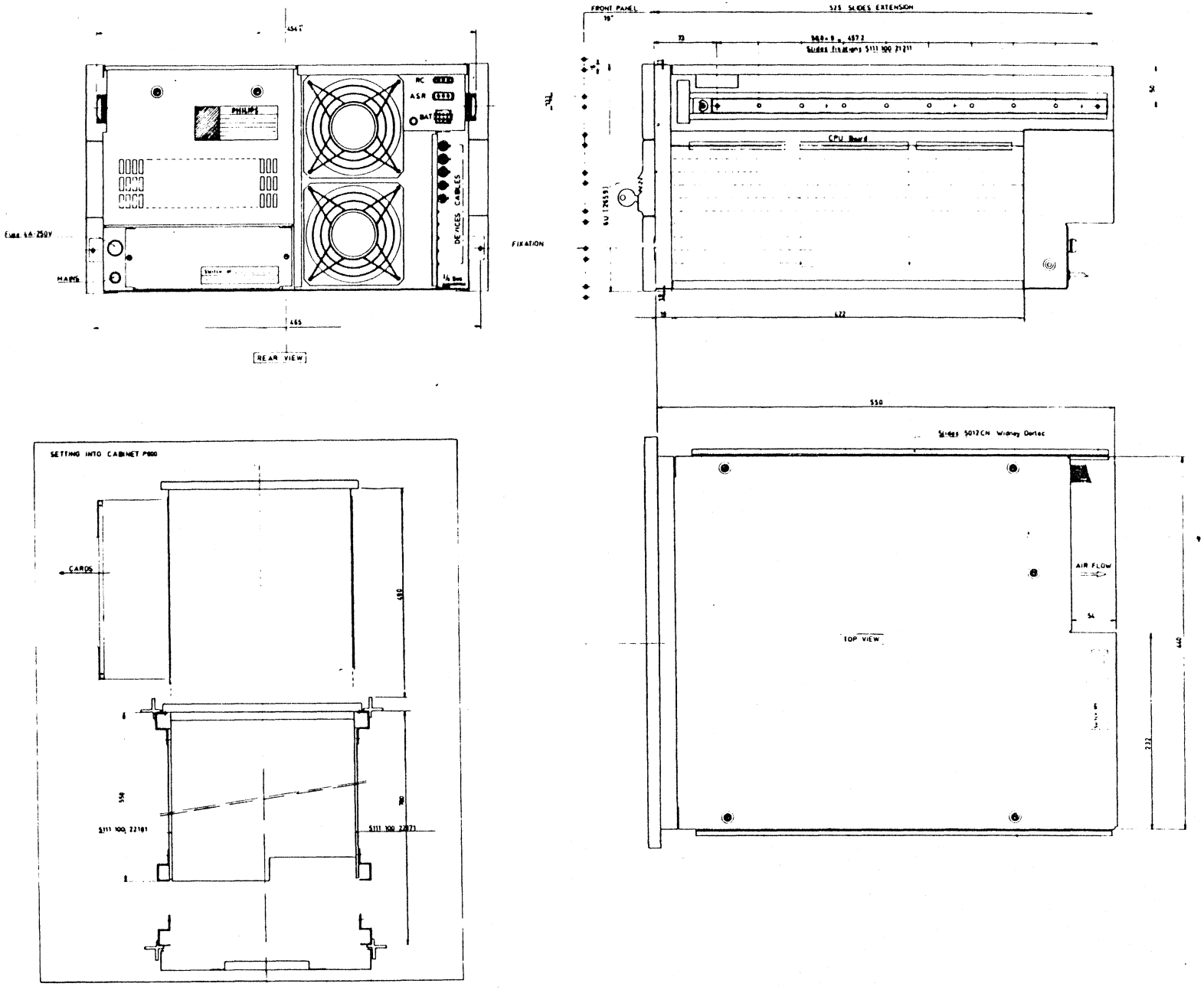


Figure 4-2A M4 Chassis Installation Data

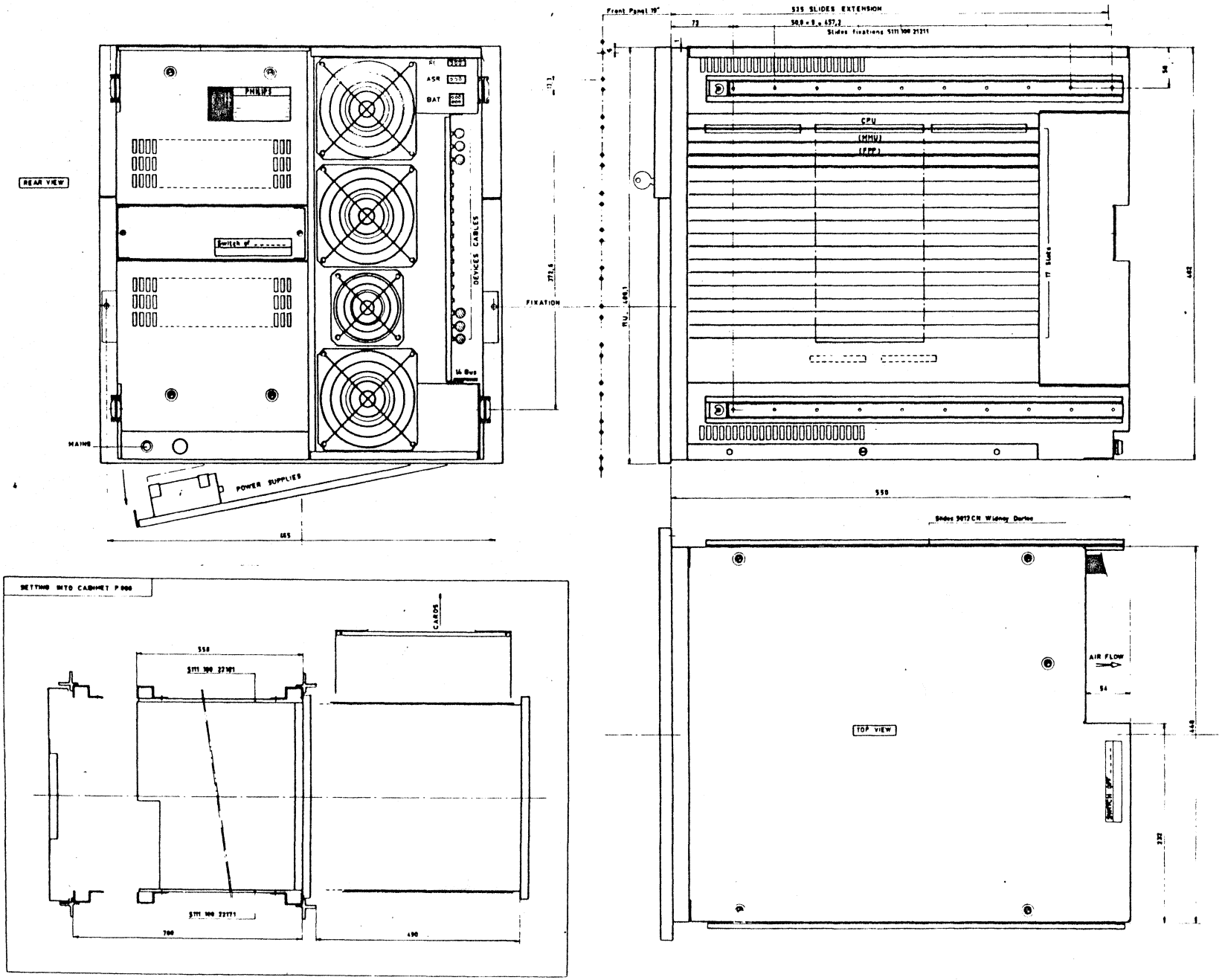


Figure 4-2B M5 Chassis Installation Data

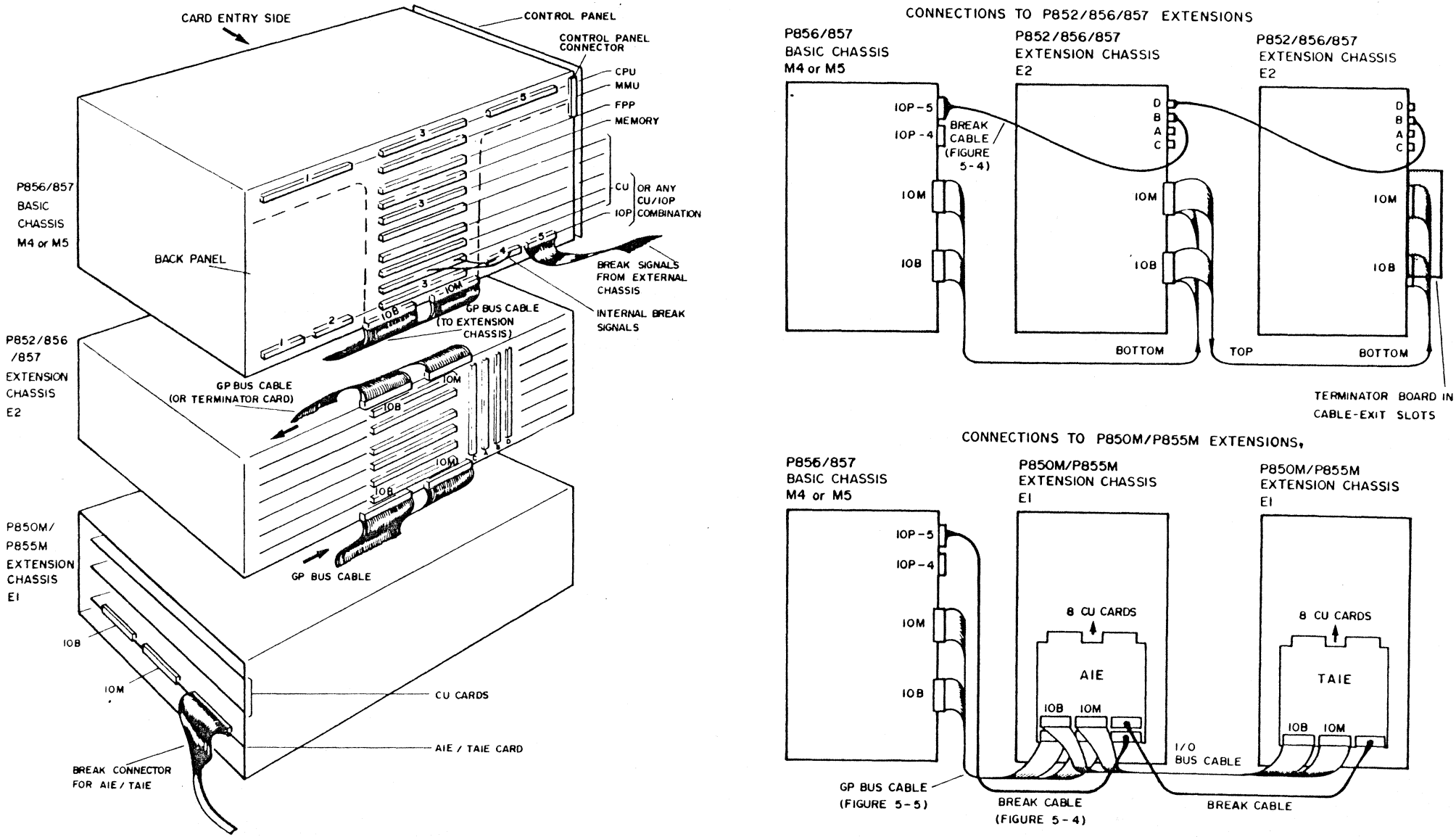


Figure 4-3 P856M/857M Basic/Extension Chassis Connections

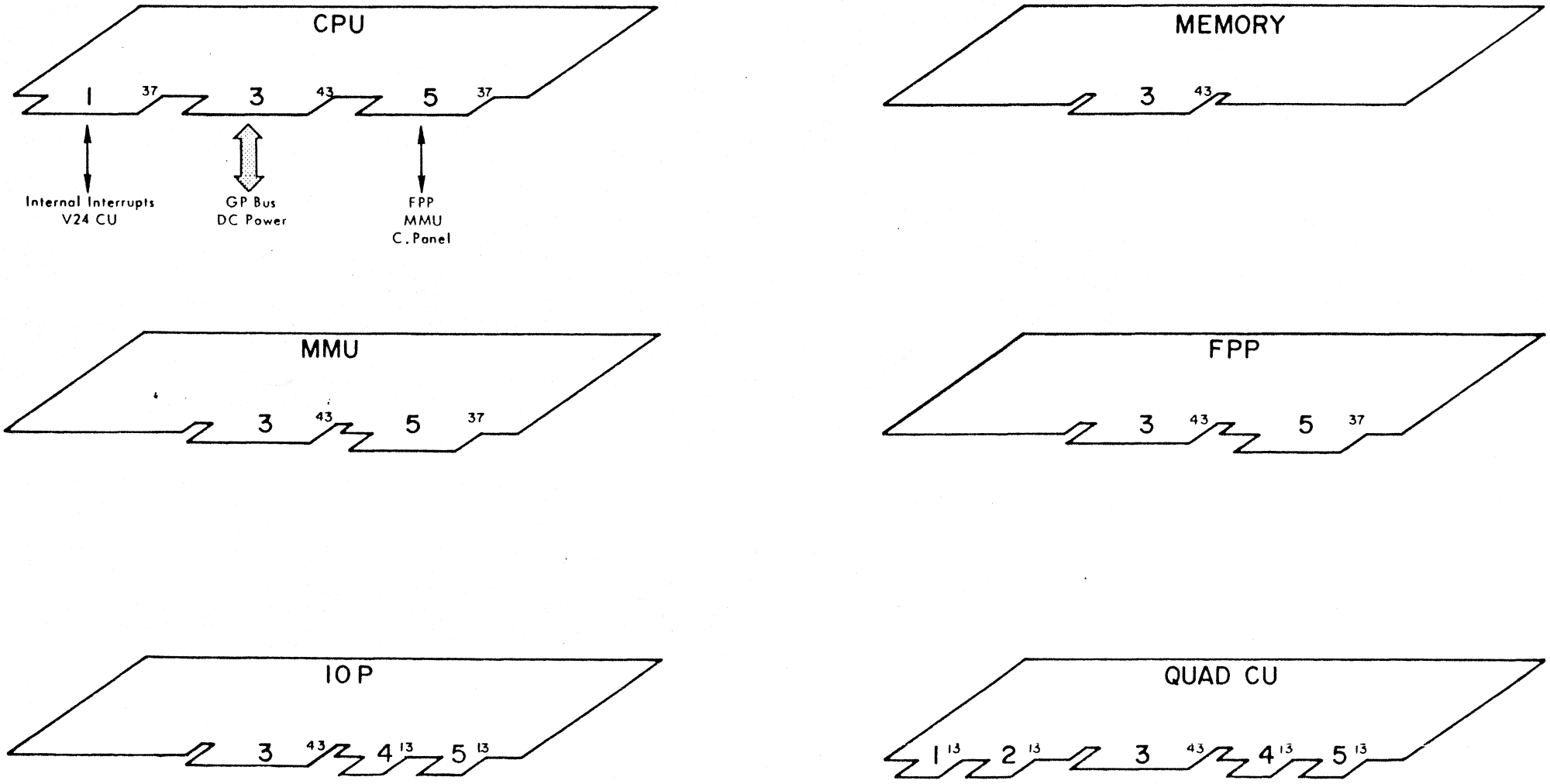
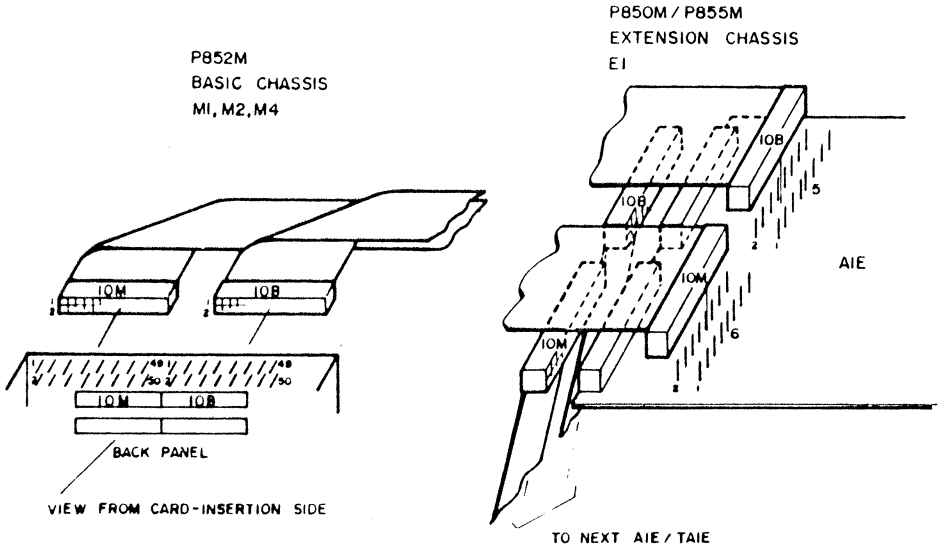
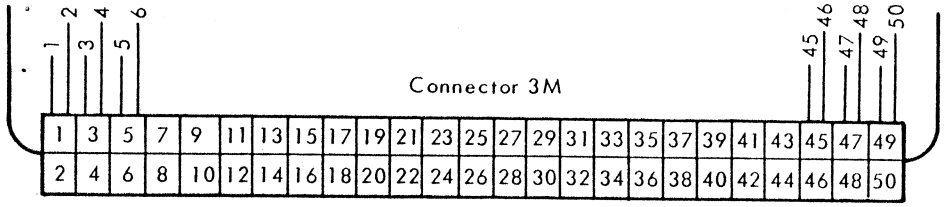


Figure 4-4 Circuit-Card Connector Uses

Table 4-1 GP Bus Connector 1OM, 1OB





Connector viewed from cable side

Connector I O M				Connector I O B			
N° Pin	Signal	N° Pin	Signal	N° Pin	Signal	N° Pin	Signal
1	M A	26	M C	1	M C	26	BIO 05N
2	MAD 04	27	CLEARN	2	RSLN	27	M 3
3	M A	28	M C	3	M C	28	BIO 04N
4	MAD 03	29	M C	4	PWFN	29	M B
5	M A	30	TPMN	5	M B	30	BIO 03N
6	MAD 08	31	M C	6	BIO 15N	31	M B
7	M A	32	M C	7	M B	32	BIO 02N
8	MAD 09	33	TMPN	8	BIO 14N	33	M B
9	M A	34	M C	9	M B	34	BIO 01N
10	MAD 10	35	M C	10	BIO 13N	35	M B
11	M A	36	TMEN	11	M B	36	BIO 00N
12	MAD 11	37	M C	12	BIO 12N	37	M B
13	M A	38	M C	13	M B	38	BIEC5
14	MAD 12	39	TRMN	14	BIO 11N	39	M C
15	M A	40	M C	15	M B	40	SCEIN
16	MAD 13	41	M C	16	BIO 10N	41	M C
17	M A	42	Spare	17	M B	42	BIEC3
18	MAD 14	43	M C	18	BIO 09N	43	M C
19	M A	44	Spare	19	M B	44	BIEC4
20	MAD 15	45	M C	20	BIO 08N	45	M C
21	M A	46	Spare	21	M B	46	BIEC1
22	ACN	47	M C	22	BIO 07N	47	M C
23	M C	48	Spare	23	M B	48	BIEC2
24	ARN	49	M D	24	BIO 06N	49	M C
25	M C	50	5V	25	M B	50	BIEC0

4.4 Operator I/O Device

The operator's input/output device is connected to the CPU-integral Serial Control Unit via CPU connector 1. The maximum cable length between the device and the CPU is 20 meters. The operator's interrupt does not use the encoded BIEC lines, but is connected from the Serial Control Unit directly to the internal-interrupt inputs (see Figure 1-3A).

4.5 Interface Signals

All interface signals between the CPU and the units (Serial CU, MMU, FPP, and interrupts) are listed in Table 4-8. The GP Bus signals are described in Section II. All these signals are also included in the signal lists for the connectors where they are used.

4.6 Interrupts and Breaks

The use of interrupts and breaks, and their interconnections, are described in Section I and shown in Figure 1-2.

4.7 CARDS

The complete CPU and the V24 Serial Control Unit are mounted on a single, multi-layer printed circuit card. The circuit-card locations within the chassis are shown in Figure 4-3. The CPU card fits in a dedicated slot at the top of the chassis. The MMU and FPP (P857 only), and memory cards fit in the next three dedicated slots. The MMU and FPP must be close to the CPU card. Both the MMU and the FPP have some discrete wiring connections to the CPU which are used to increase operating speed. If either the MMU or FPP are not used, a memory card may be placed in that dedicated slot. Card connector uses are shown in Figure 4-4. Circuit locations and parts lists are provided at the end of this section.

4.8 INTEGRATED CIRCUITS

A complete list of integrated circuits (ICs) and a guide which shows the IC symbols, input and output polarities, control codes, and pin numbers is provided in Appendix A.

4.9 Read Only Memories (ROMS) and PLA

The ROMs and the Programmable Logic Array (PLA) circuits are pre-loaded with special contents, or codes, which cannot be shown on the general IC-diagram drawing. The following list is a directory to the logic descriptions that use these circuits :

Circuit	Logic		Paragraph
6200 1024-bit ROM	LL	IPL	2.66
7488A 256-bit ROM	FF	A,D,L Command	2.47
	NN	CR code selection	2.76
8205 4096-bit ROM	BB	Microcommand Control Store	2.37
8576 96-code PLA	AA	Instruction Decode	2.42

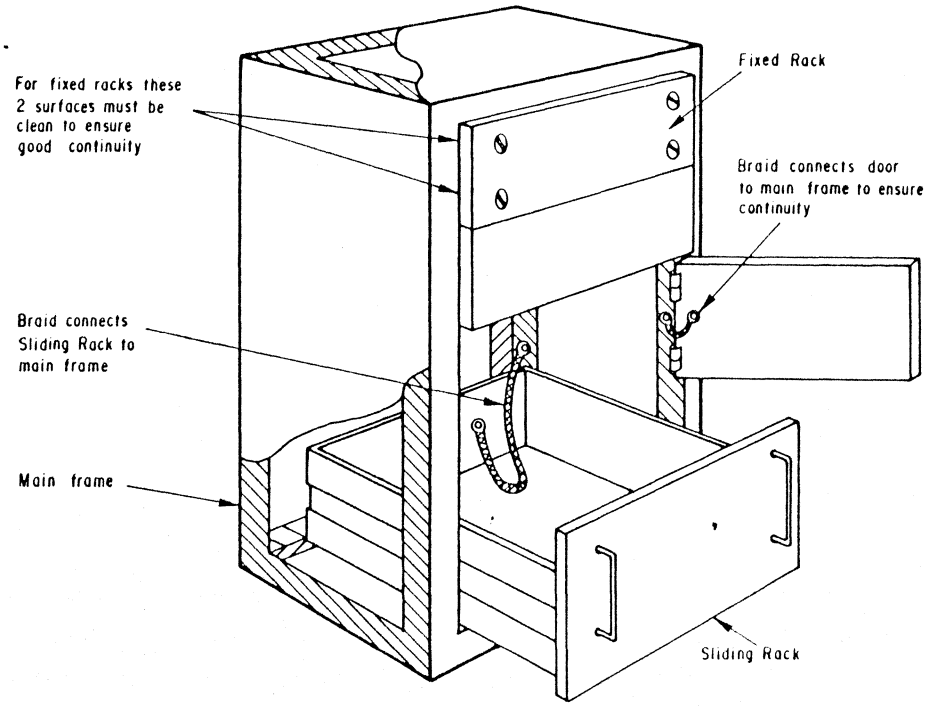
4.10 RULES FOR CONNECTING GROUNDS IN A SYSTEM

These rules must be observed for all installations to ensure that external interference is reduced to a minimum and that the electrical safety regulations are complied with.

4.11 Grounding for Cabinets and Racks

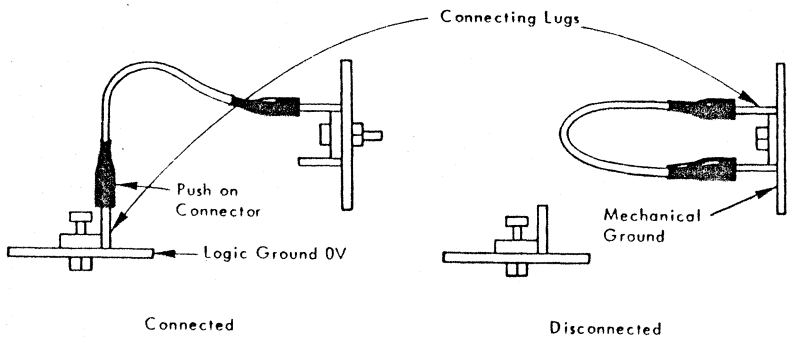
The following rules should ensure that the cabinets and racks have good ground continuity.

- Fixed Racks — The rack is fitted to the cabinet mainframe by screws. A good continuity between cabinet and rack is ensured by keeping the mating surfaces clean.
- Sliding Racks — A rack mounted on telescopic rails does not have a reliable ground path so it is essential that an electrical link is made using metal braid. Note that it is not acceptable to use the ground conductor of the mains lead or cable shielding for the ground connection.
- Cabinet Panels and Doors — All doors and panels must have a good electrical link with the mainframe and in particular the doors must be connected with metal braid.

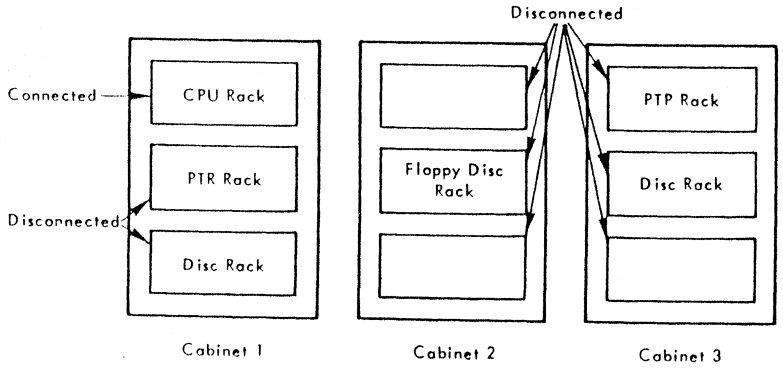


4.12 Logic Ground and Mechanical Ground

Logic ground and mechanical ground points are provided for each rack. They are situated close to each other and may be connected or unconnected.



A system may use several cabinets each containing a number of racks but only one rack may have this link connected. All other rack links are unconnected.

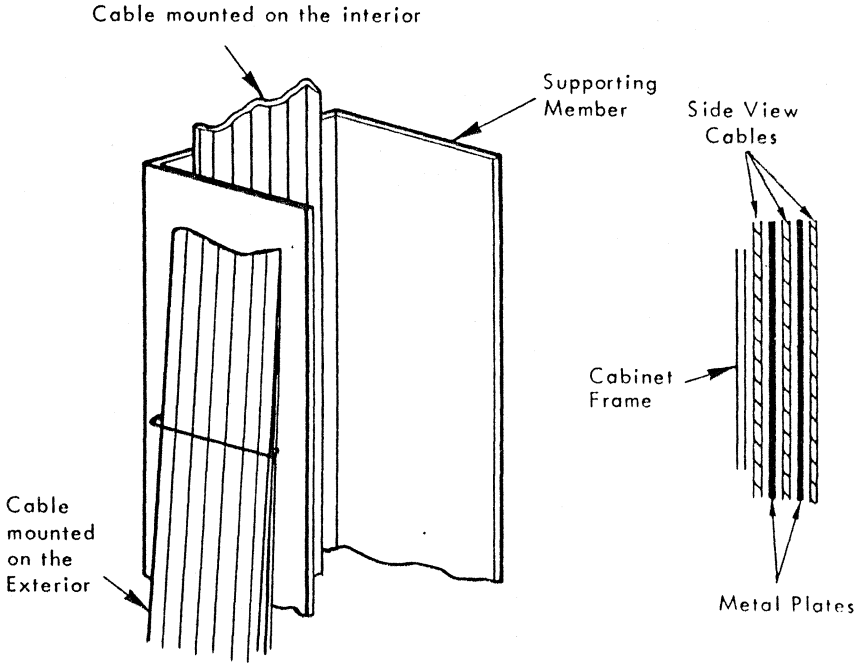


In a normal configuration the CPU rack is connected and all other racks are unconnected. If more than one CPU is being used in the system then the user decides on which CPU rack to have the link connected.

4.13 Flat Cables

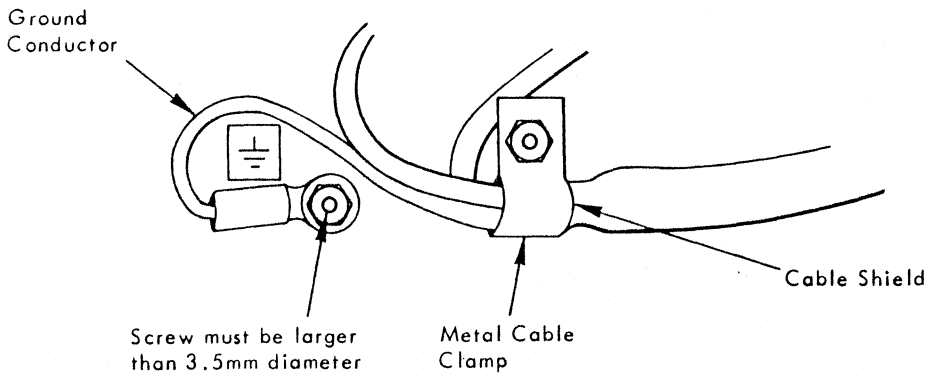
Flat cables without shielding may cause electromagnetic fields to be set up in the equipment so the use of non-shielded flat cables should be avoided. If it is essential to use non-shielded flat cables then special precautions must be taken to avoid these fields being set up.

- If channel type supporting members are in the cabinet then they should be used as they provide a shield around the cable.
- If these supporting members are not available then the cables should be run separately, either clamped flat against the panels or against the outside of other supporting members.
- Mounting flat cables one on top of the other should always be avoided. If this method must be used then a metal plate should be inserted between the flat cables, suitably supported and electrically connected to the cabinet.



4.14 Mains Cables

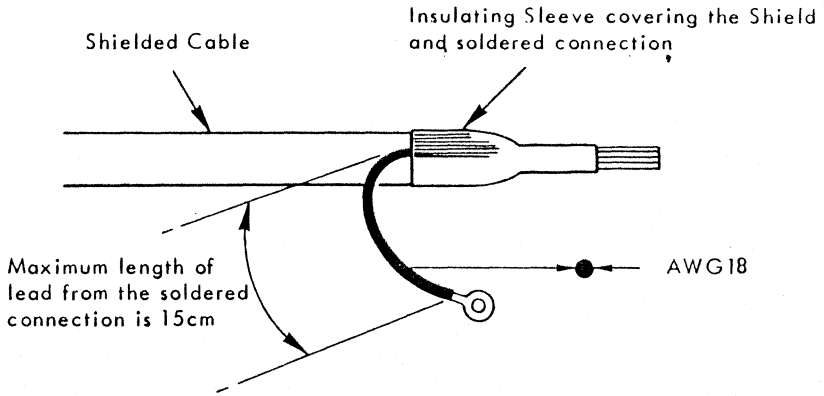
When planning an installation an area along the mainframe should be reserved for the mains cables and all other cables should be kept as far as possible from the mainframe. It is recommended that the cable be shielded either before or after filtering and that this shielding be connected to a mechanical ground at each end of the cable. The mains cable must be secured to the chassis by a metal clamp at the point where the shielding extends out of the cable sheath. Note that the screw fixing the ground conductor to the chassis must be as close as possible to the metal cable clamp.



4.15 General Rules for Connecting Shielded Cables

All twisted pairs must be contained inside a shielded cable and this shield must be connected to mechanical ground at each end. Specific lead dimensions are given for some peripherals but as a general rule the following dimensions should be adhered to.

- the lead must be as short as possible and never exceed a maximum length of 15cm.
- Connection to the shielding must be soldered and connection to the mechanical earth must be with either an eye-lug (for a 3mm screw) or a push-on type connector (Faston 6.35 or equivalent).
- The lead cross section must have a minimum guage of AWG18.



4.16 Special Rules for Connecting Shielded Cables

For some devices the lead dimensions for connecting the shielded cables at the device and at the CPU are different to the general rules. These devices are listed in the following table.

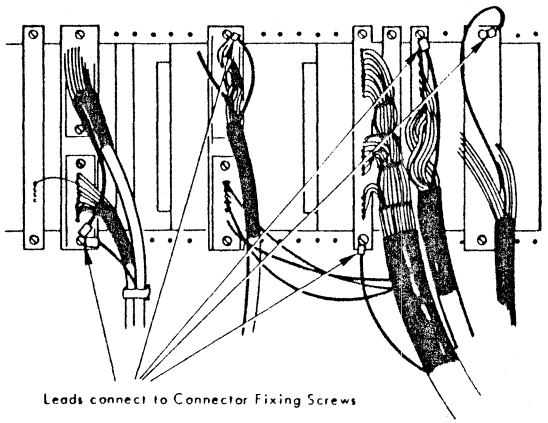
Table of Special Lead Dimensions

	At the Device			At the CPU		
	AWG	Max Length	Eye Lug	AWG	Max Length	Eye Lug
Mag Disc X1215/16	16	15cm	4mm	16	15cm	3mm
Mag Disc 9760/9762	16	08	3	16	10	3
Line Printer X1415/25	16	10	3	16	10	3
PER 3100 (V24 Interface)	16	15	4	16	10	3
PER 3100 (Curr. Loop Int.)	16	15	4	18	03	Molex pin 3
ASR33 (V24 Interface)	16	10	3	16	10	3
ASR33 (Curr. Loop Int.)	18	03	Molex pin 6	18	03	Molex pin 3
Tape Reader 2540EP	16	10	3	16	10	3
Card Reader CM300L	16	15	4	16	10	3
Tape Punch 4070	16	10	4	16	10	3
Display P817	16	10	4	16	10	3
	At the Terminal Box			At the CPU		
Remote Control Cables	18	10	-	18	03	Molex centre pin
	At the Extension Rack			At the CPU		
Break Cables	16	10	3	16	15	3
	At the Cassette Rack			At the CPU		
Break Cables	16	10	3	16	15	3

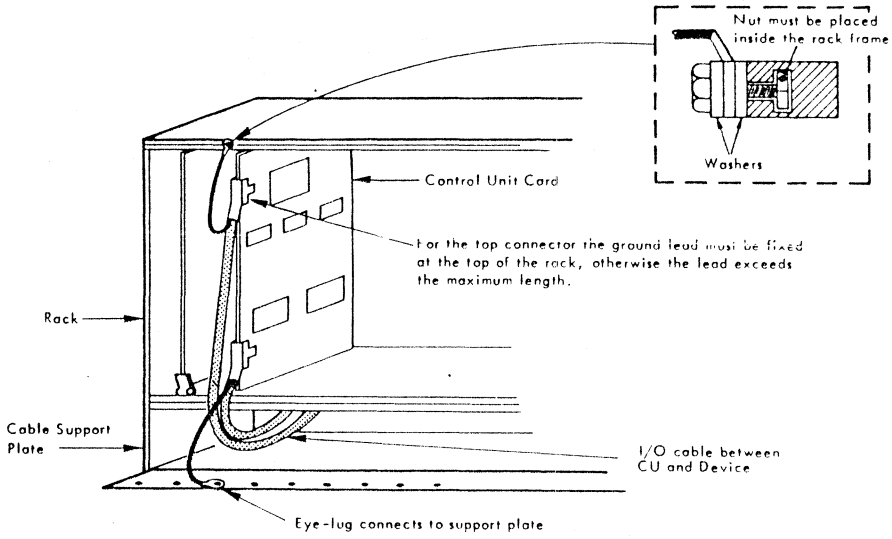
4.17 Connecting the Ground Lead in a Cabinet or Rack

The connection of ground leads for a Cabinet or Rack depends on the type of installation. In the following examples different types of ground connections are given.

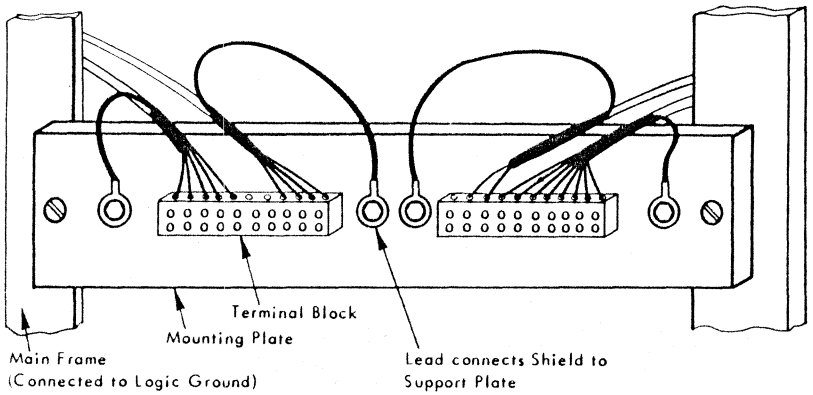
Example using Connector Fixing Screws



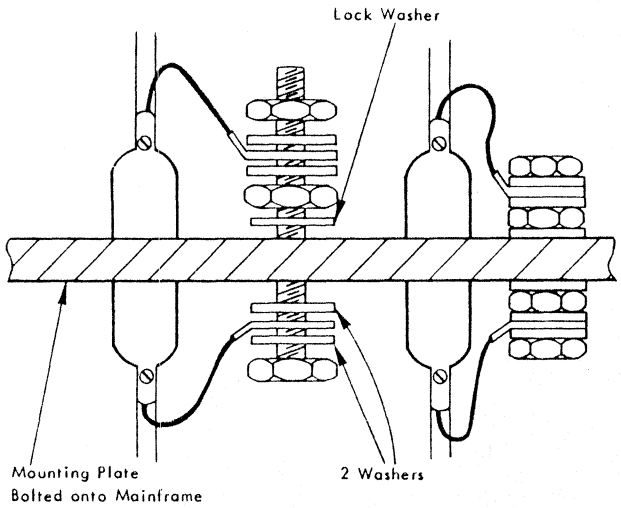
Example using Cable Support Plate



Example using Terminal Blocks



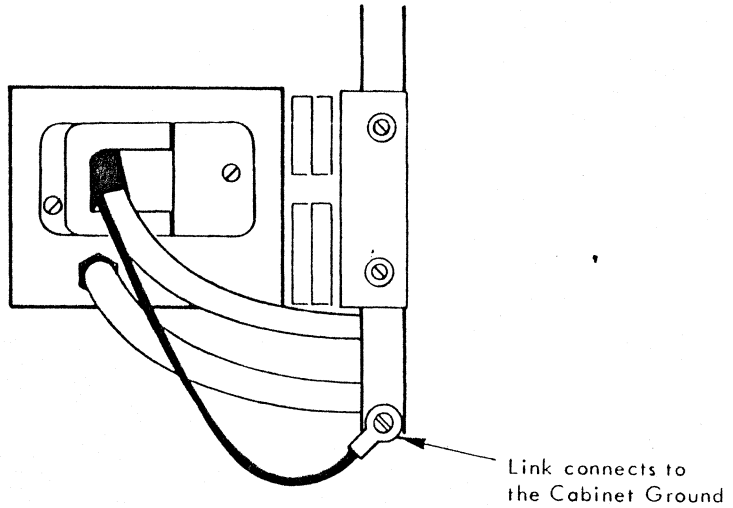
Example using Connectors (Top View)



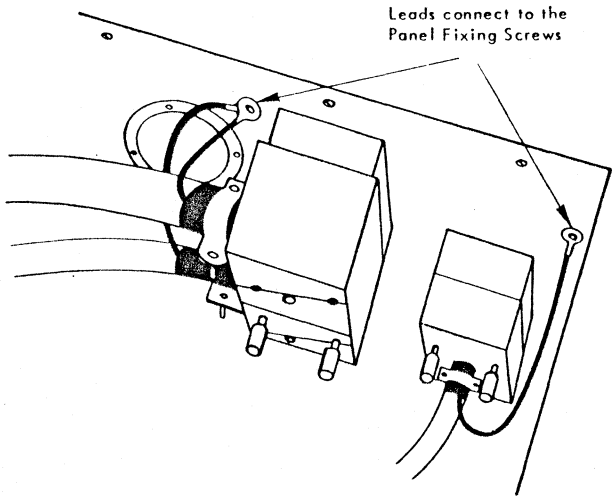
4.18 Connecting a Ground Lead at the Devices

The following illustrations show how a ground lead is connected at some peripheral devices.

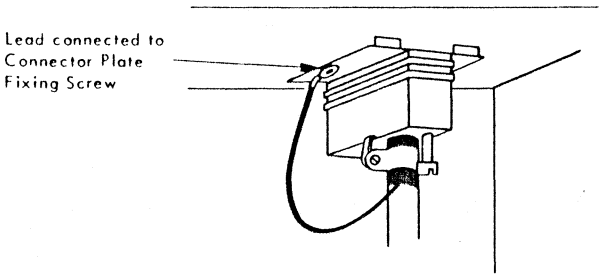
Connecting to the Mag. Disc Control Units (CDD X1215 and X1216)



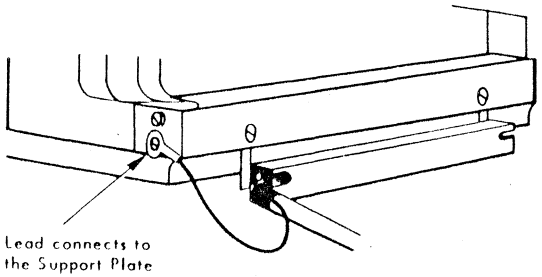
Connecting to the Mag Disc Control Units (CDD CDC 9760 and 9762)



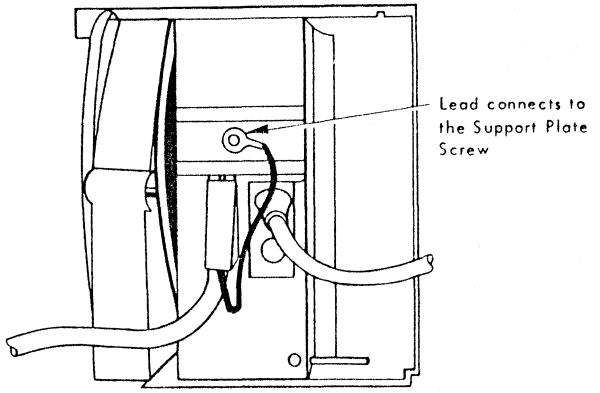
Connecting to the Line Printers (X1415 and X1425)



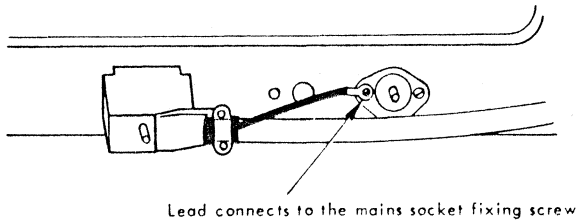
Connecting to the Paper Tape Reader (Digitronics 2540 EP)



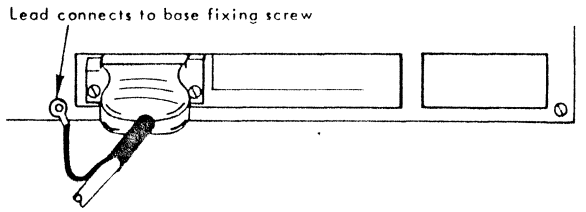
Connecting to the Paper Tape Punch (Facit 4070)



Connecting to the Card Reader (CM300L)

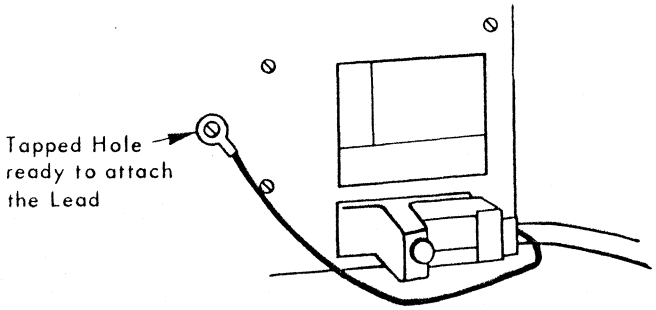


Connecting to the Display Console (P817)



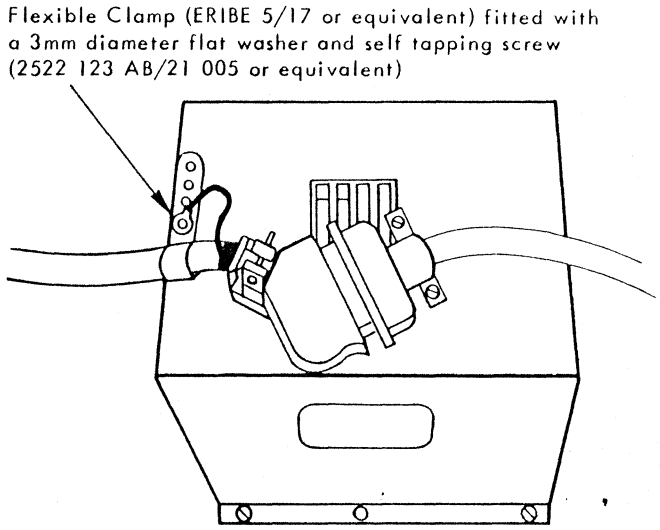
Connecting to the Serial Control Unit PER3100

V24 Interface: At the device a tapped hole is near the connector which should be used to attach the lead

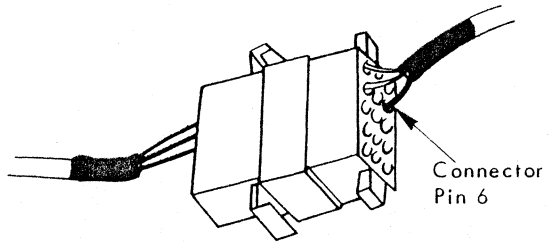


Connecting to the Serial Control Unit ASR33

V24 Interface: At the device the cable is attached to the metal cover of the transformer situated in the base of the ASR.

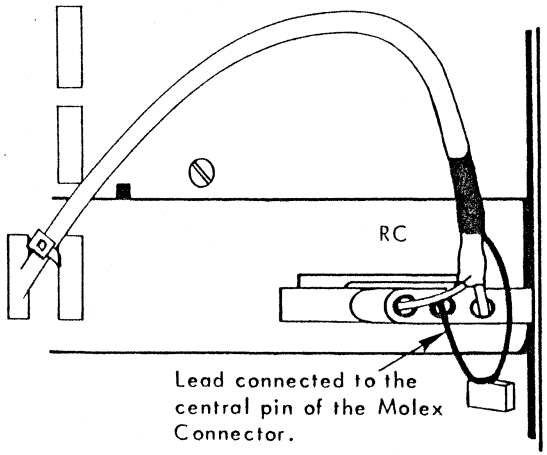


Current Loop Interface: At the device when using the extension cable the connection between Molex connector pin 6 and the ASR mechanical ground is made with the cable shielding. Note that under no circumstances must the Molex connectors be situated outside the ASR base.

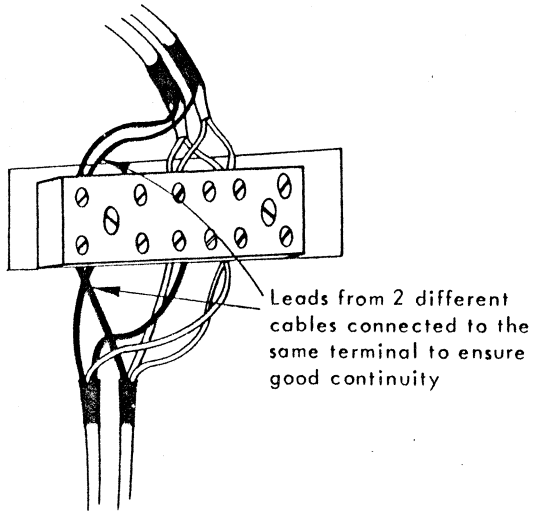


Connecting the Remote Control Cables

Rack Side: The shielding is connected to the central pin of the Molex connector. Note that for racks M1, M2, M4, M5, E2 and K7 a link connects the mechanical ground to the central pin of the Molex connector.

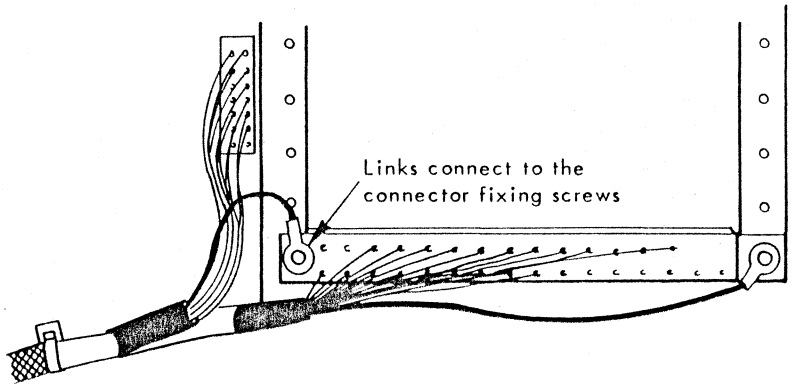


Connection at the Cabinet Terminal Box: When connecting the shielding of two cables at the Terminal Box connect to the same terminal to ensure good continuity.



Connecting the Break Cables

At the Extension Rack:



At the Cassette Rack:

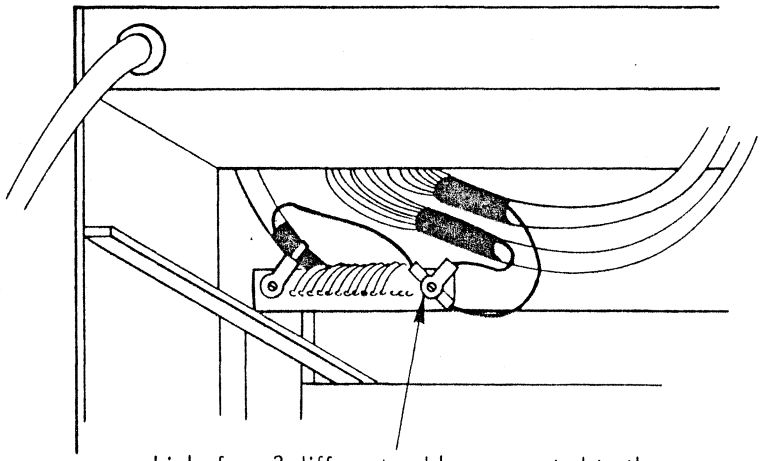


Table 4-2 CPU-A, Connector 1 (V24 CU)

1A01	0V	1B01	ASR LINE
1A02	PIFN	1B02	RTC AN
1A03	CPFN	1B03	SCEIN
1A04	IS02N	1B04	IS05N
1A05	PFFN	1B05	IS04N
1A06	BIEC4	1B06	RTCFZ1N
1A07	BIEC2	1B07	BIEC1
1A08	BIEC5	1B08	BIEC3
1A09	IS06N	1B09	BIEC0
1A10	IS03N	1B10	IS07N
1A11	IS01N	1B11	IS00N
1A12	INTASRN (INTSERN)	1B12	
1A13		1B13	
1A14		1B14	
1A15		1B15	
1A16		1B16	
1A17		1B17	
1A18		1B18	
1A19		1B19	
1A20		1B20	
1A21		1B21	
1A22		1B22	
1A23		1B23	
1A24		1B24	
1A25		1B25	
1A26		1B26	
1A27	0V	1B27	0V
1A28	5V	1B28	5V
1A29		1B29	
1A30	Mech. Ground	1B30	
1A31	CT103	1B31	0V
1A32	CT104	1B32	0V
1A33	CT106	1B33	0V
1A34	CT107	1B34	0V
1A35	CT1082	1B35	0V
1A36	CT109	1B36	0V
1A37	CT133	1B37	0V

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Table 4-3 Connector 3 (CPU, Mem, IOP, CU)

3A01	+18V		c	3B01	-18V		c
3A02	BIEC0		a c	3B02	Chassus Ground		c
3A03	BIEC2		a c	3B03	BIEC1		a c
3A04	BIEC4		a c	3B04	BIEC3		a c
3A05	SCEIN		a c	3B05	BIEC5		a c
3A06	+16V		b	3B06	+16V		b
3A07	0V			3B07	0V		
3A08	BIO 00N			3B08	BIO 01N		
3A09	BIO 02N			3B09	BIO 03N		
3A10	BIO 04N			3B10	BIO 05N		
3A11	BIO 06N			3B11	BIO 07N		
3A12	BIO 08N			3B12	BIO 09N		
3A13	BIO 10N			3B13	BIO 11N		
3A14	BIO 12N			3B14	BIO 13N		
3A15	BIO 13N			3B15	BIO 15N		
3A16	OKO	*	a c d	3B16	OKI	*	c d
3A17	PWFN		a c	3B17	~~-5V~~ KSLN		a b c
3A18	0V			3B18	-5V		b
3A19	+5V			3B19	+5V		
3A20	+5V			3B20	+5V		
3A21	0V			3B21	0V		
3A22	0V			3B22	0V		
3A23	BR (CU - 4)		c	3B23	+5V Battery		(b)
3A24	0V			3B24			
3A25	0V			3B25	+16VM		b
3A26	WRITE	*		3B26	MAD 15		
3A27	CHA	*		3B27	MAD 14		
3A28	TRMN	*		3B28	MAD 13		
3A29	TMRN		a b c	3B29	MAD 12		
3A30	TMEN		a c d	3B30	MAD 11		
3A31	TMPN		a c d	3B31	MAD 10		
3A32	TPMN		a c d	3B32	MAD 09		
3A33	0V			3B33	MAD 08		
3A34	ACN		a c	3B34	MAD 07	*	
3A35	SPYC	*	a c d	3B35	MAD 06	*	
3A36	BUSRN	*	a c d	3B36	MAD 05	*	
3A37	MSN	*	a c d	3B37	MAD 04		
3A38	BSYN	*	a c d	3B38	MAD 03		
3A39	CLEARN		a c d	3B39	MAD 02	*	
3A40	0V			3B40	MAD 01	*	
3A41	BR (CU-2)		c	3B41	MAD 00	*	
3A42	BR (CU-3)		c	3B42	MAD 64	*	
3A43	BR (CU-1)		c	3B43	MAD 128		

a- CPU only
b- Memory only
c- Control Unit only
d- IOP only

* CU use only on DMA (main chassis)

Table 4-4 CPU-A Connector-5

5A01		5B01	* SP05
5A02		5B02	* GBCPFN
5A03		5B03	* PREQN
5A04		5B04	* CPBABS
5A05		5B05	* TESTN
5A06		5B06	
5A07		5B07	
5A08		5B08	
5A09		5B09	
5A10	* SP03	5B10	* SP04
5A11	* FLOACTN	5B11	* SP01
5A12	* BSYCPUAN	5B12	* TMFN
5A13	* GFETCH	5B13	* BOFFN
5A14	* DONEFN	5B14	* PLOCR0
5A15	* FLOCR1	5B15	* FPPABS
5A16		5B16	
5A17	* OSCF0	5B17	* MOSCFL0
5A18		5B18	
5A19	* MMUABS	5B19	
5A20	* DONEMN	5B20	* MFAULTN
5A21	* BOMFN	5B21	
5A22	* FU	5B22	* S00
5A23	* S01	5B23	* S02
5A24	* S03	5B24	* TMMM
5A25	* SP02	5B25	* TMMU
5A26		5B26	
5A27	* 0V	5B27	* 0V
5A28	* 5V	5B28	* 5V
5A29	BIOEKEY	5B29	CPMCN
5A30	UNLOCKN	5B30	IPL
5A31	RUNN	5B31	START
5A32	RCP00N	5B32	CPINT
5A33	LOADRN	5B33	RUNFA
5A34	READSTN	5B34	RCP01N
5A35	RCP03N	5B35	RCP02N
5A36	LOADMN	5B36	READMN
5A37	READRN	5B37	INSTN

Table 4-5 Control Panel Connector

A01	BIO15N	B01	CPMN
A02	BIO14N	B02	BIOEKEY
A03	BIO13N	B03	IPL
A04	BIO12N	B04	UMLOCKN
A05	BIO11N	B05	START
A06	BIO10N	B06	RUNN
A07	BIO09N	B07	CPINT
A08	BIO08N	B08	RCP0N
A09	BIO07N	B09	RUNFA
A10	BIO06N	B10	LOADRN
A11	BIO05N	B11	RCP1N
A12	BIO04N	B12	READSTN
A13	BIO03N	B13	RCP2N
A14	BIO02N	B14	RCP3N
A15	BIO01N	B15	READMN
A16	BIO00N	B16	INSTN
A17		B17	LOADMN
A18	READRN	B18	LOCK
A19	0V	B19	+5V

Table 4-6 IOP Connectors 4, 5 (Break)

4A01	IR07N
4A02	IR05N
4A03	IR03N
4A04	IR01N
4A05	
4A06	BREX07N
4A07	BREX06N
4A08	BREX05N
4A09	BREX04N
4A10	BREX03N
4A11	BREX02N
4A12	BREX01N
4A13	BREX00N

4B01	IR06N
4B02	IR04N
4B03	IR02N
4B04	IR00N
4B05	
4B06	BR07N
4B07	BR06N
4B08	BR05N
4B09	BR04N
4B10	BR03N
4B11	BR02N
4B12	BR01N
4B13	BR00N

5A01	
5A02	
5A03	
5A04	
5A05	
5A06	BREX07N
5A07	BREX06N
5A08	BREX05N
5A09	BREX04N
5A10	BREX03N
5A11	BREX02N
5A12	BREX01N
5A13	BREX00N

5B01	
5B02	
5B03	
5B04	
5B05	
5B06	Ground (0V)
5B07	Ground (0V)
5B08	Ground (0V)
5B09	Ground (0V)
5B10	Ground (0V)
5B11	Ground (0V)
5B12	Ground (0V)
5B13	Ground (0V)

Table 4-7 Extention Connectors AIE/TAIE

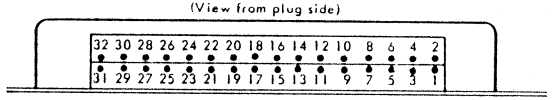
TAIE Connectors

1A01	+ 5V	1B01	0V
1A02		1B02	BIN00N
1A03	BIN00N	1B03	BIN01N
1A04	BIN01N	1B04	BIN02N
1A05	BIN02N	1B05	BIN03N
1A06	BIN03N	1B06	BIN04N
1A07	BIN04N	1B07	BIN05N
1A08	BIN05N	1B08	BIN06N
1A09	BIN06N	1B09	BIN07N
1A10	BIN07N	1B10	
1A11	BR00	1B11	ACCN
1A12	BR01	1B12	ACCN
1A13	ACCN	1B13	AREN
1A14	AREN	1B14	AREN
1A15		1B15	SP4
1A16		1B16	SP3
1A17	BR02	1B17	SP2
1A18	BR03	1B18	SP1
1A19	BR06	1B19	
1A20	BR07	1B20	
1A21	BIN08N	1B21	BIN08N
1A22	BIN14N	1B22	BIN14N
1A23	BR04	1B23	
1A24	BR05	1B24	S
1A25		1B25	
1A26	BIN13N	1B26	BIN13N
1A27	BIN15N	1B27	BIN15N
1A28	BIN09N	1B28	BIN09N
1A29	BIN10N	1B29	BIN10N
1A30	BIN11N	1B30	BIN11N
1A31	BIN12N	1B31	BIN12N

2A01	BOF02N	2B01	IR04N
2A02	EOP	2B02	IR02N
2A03	BOF01N	2B03	IR01N
2A04	BOF00N	2B04	IR07N
2A05	BOU14	2B05	IR00N
2A06	BOU13	2B06	IR01N
2A07	BOU12	2B07	IR03N
2A08	BOU09	2B08	IR05N
2A09	BOU10	2B09	
2A10	BOU11	2B10	
2A11	BOU15	2B11	
2A12	MCN	2B12	
2A13	BAD03N	2B13	
2A14	DAVN	2B14	
2A15	BAD04N	2B15	
2A16	BAD05N	2B16	
2A17	BOU08	2B17	
2A18	BOU07	2B18	
2A19	BOU06	2B19	
2A20	BOU05	2B20	
2A21	BOU04	2B21	
2A22	BAD00N	2B22	
2A23	BOU03	2B23	
2A24	BAD01N	2B24	
2A25	BAD02N	2B25	
2A26	BOU02	2B26	
2A27	BOU01	2B27	
2A28	BOU00	2B28	
2A29	+ 5V TELEC	2B29	PWR MOD1
2A30		2B30	PWR MOD2
2A31	+ 5V	2B31	0V

Break Connector for AIE/TAIE Cards

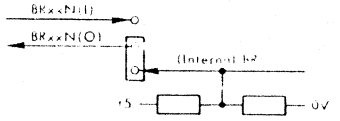
(View from plug side)



1	BR00N (I)	17	BR04N (I)
2	BR00N (O)	18	BR04N (O)
3	M	19	M
4	M	20	M
5	BR01N (I)	21	BR05N (I)
6	BR01N (O)	22	BR05N (O)
7	M	23	M
8	M	24	M
9	BR02N (I)	25	BR06N (I)
10	BR02N (O)	26	BR06N (O)
11	M	27	M
12	M	28	M
13	BR03N (I)	29	BR07N (I)
14	BR03N (O)	30	BR07N (O)
15	M	31	M
16	M	32	M

BR U-LINK

(shown in internal position)



Reference Berg 65268 - 005

Table 4-8 Interface Signal List

GP BUS (Section II)

Input to CPU	Input/Output	Output from CPU
BUSRN	ACN	CHA
MSN	BIO00-15N	WRITE
PWFN	BSYN	CLEARN
RSLN	TMEN	MAD128,64,00-15
BIEC0-5	TMPN	OK0/OK1
	TMRN	SCEIN
	TPMN	SPYC
	TRMN	

CONTROL PANEL (Section III)

Input to CPU		Output from CPU
* CPBABS	RCP0-3N	BIOEKEY
CPINT	READMN	* BSYCPUAN
CPMCN	READRN	* GBCPFN
INSTN	READSTN	RUNFA
IPL	RUNN	
LOADMN	START	
LOADRN	*TESTS	* = Extended (Address) half of panel, P857 only
* PREQN	UNLOCKN	

V24 SERIAL CONTROL UNIT (Section VI)

Input from Device	Output from Device	Ground Signals
CT103	CT104	CT101
CT1082	CT106	CT102
CT133	CT107	
	CT109	

CPU/V24 SERIAL CU (CPU Logic)

Input to CPU	Output from CPU					
AREDELA (TT)	BUSFDET (TT)		K04,08,10-15 (AA)		µQ1	(BB)
ASR0-7 (JJ)	CPGFZ0N (PP)		K04,08-15	(AA)	RSLAN	(RR)
BRGFN (PP)	D10,15	(HH)	L08-15	(HH)	RSLCN	(RR)
TYAC (TT)	FNU	(DD)	MCL, MCLN	(RR)	T5N,T7	(EE)
					TC810	(EE)

V24 CU to CPU Interrupt

INTSERN

MEMORY MANAGEMENT UNIT (MMU)

Input to CPU	Output from CPU	
DONEMN	BOMFN	OSCFLO
MFAULTN	BSYCPUAN	S00-03
MMUABS	FU	TMMN
	GFETCH	TMMU

FLOATING POINT PROCESSOR (FPP)

Input to CPU	Output from CPU	
DONEFN	BOFFN	GFETCH
FPPABS	BSYCPUAN	OSCFLO
FLOCR0, 1	FLOACT	TMFN

INTERNAL INTERRUPTS (LEVELS 0-7)

Input to CPU	Output from CPU	Input to CPU
(P.Supply) PWFN	PFFN	ISO0N
(C.Panel) CPINT	CPINTFN	ISO1N
(CPU program)	PIFN	ISO2N
(P.Supply) RTCFZ1N	RTCFAN	ISO3N
		ISO4N
(V24 CU) INSERN - - -	- - - - - - - - - - - - - - -	ISO5N
		ISO6N
		ISO7N

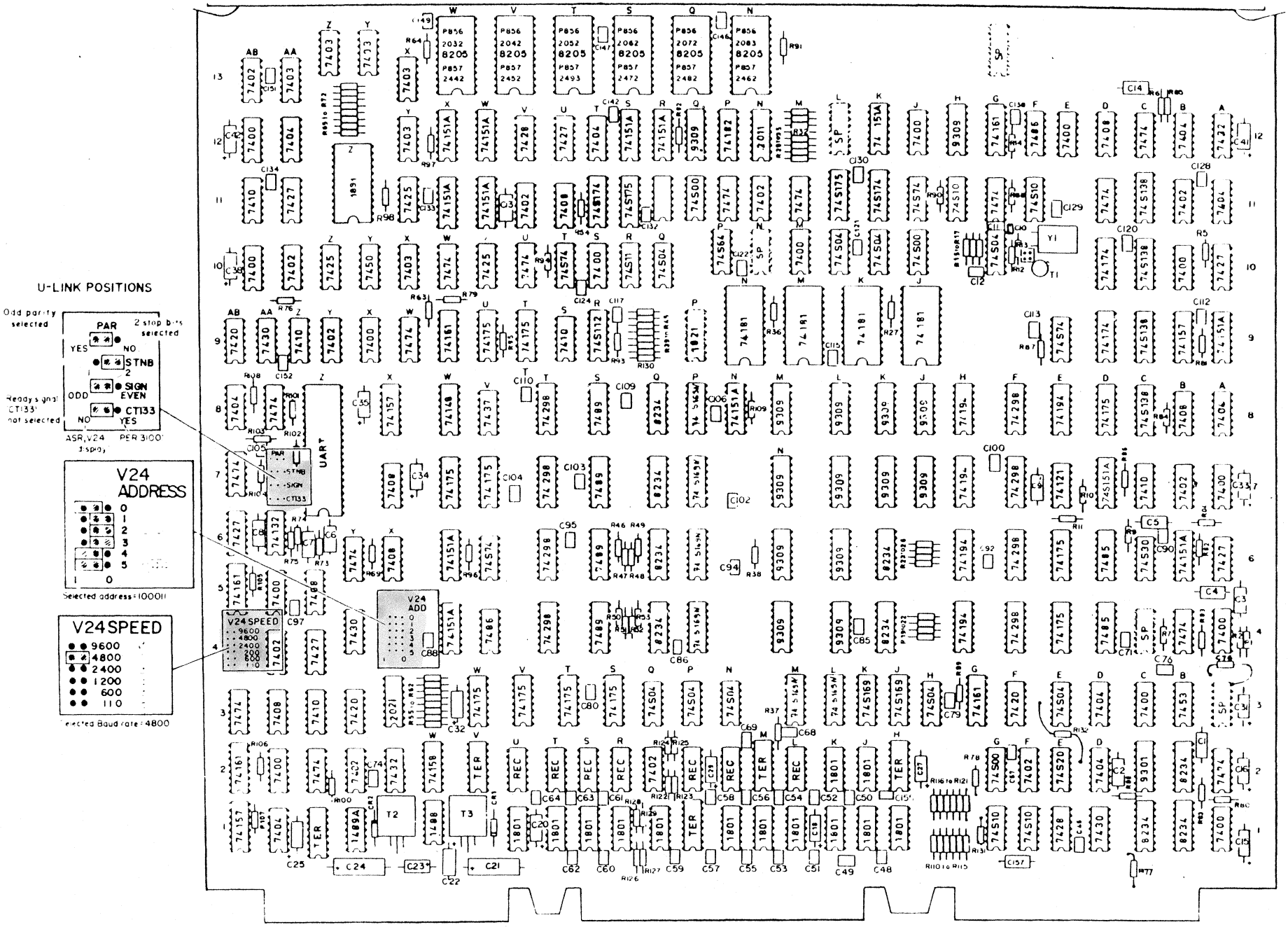


Figure 4-5 CPU Card Layout

Table 4-9A P856M CPU Parts List

Reference	Description	12NC Code
	Printed Circuit	5111 100 05701
	Heat Sink	
	Right Spring	
	Left Spring	
	Integrated Circuit 7400	
	Integrated Circuit 7402	
	Integrated Circuit 7403	
	Integrated Circuit 7404	
	Integrated Circuit 7408	
	Integrated Circuit 7410	
	Integrated Circuit 7420	
	Integrated Circuit 7425	
	Integrated Circuit 7427	
	Integrated Circuit 7428	
	Integrated Circuit 7430	
	Integrated Circuit 7432	
	Integrated Circuit 7437	
	Integrated Circuit 7450	
	Integrated Circuit 745	
	Integrated Circuit 7474	
	Integrated Circuit 7485	
	Integrated Circuit 7486	
	Integrated Circuit 7489	
	Integrated Circuit 74121	
	Integrated Circuit 74132	
	Integrated Circuit 74148	
	Integrated Circuit 74151A	
	Integrated Circuit 74157	
	Integrated Circuit 74158	
	Integrated Circuit 74161	
	Integrated Circuit 74174	
	Integrated Circuit 74175	
	Integrated Circuit 74181	
	Integrated Circuit 74182	
	Integrated Circuit 74194	
	Integrated Circuit 74298	
	Integrated Circuit 74S00	
	Integrated Circuit 74S10	
	Integrated Circuit 74S11	
	Integrated Circuit 74S20	
	Integrated Circuit 74S30	
	Integrated Circuit 74S04	
	Integrated Circuit 74S64	

Table 4-9A Contd.

Reference	Description	12NC Code
	Integrated Circuit 74S74	
	Integrated Circuit 74S112	
	Integrated Circuit 74S138	
	Integrated Circuit 74S169	
	Integrated Circuit 74S174	
	Integrated Circuit 74S175	
T3.	Integrated Circuit 7812 (TO220)	
T2.	Integrated Circuit 7912 (TO220)	
	Integrated Circuit 1488	
	Integrated Circuit 1489A	
	Integrated Circuit 1801	
	Integrated Circuit 1891 (8576)	
	Integrated Circuit 8234	
	Integrated Circuit 9301	
	Integrated Circuit 9309	
	Integrated Circuit ADL 2011	
	Integrated Circuit REC 0612	
	Integrated Circuit 2502 (UART)	
	Integrated Circuit CR 2021	
	Integrated Circuit ROM 2032 (8205)	
	Integrated Circuit ROM 2042 (8205)	
	Integrated Circuit ROM 2052 (8205)	
	Integrated Circuit ROM 2062 (8205)	
	Integrated Circuit ROM 2072 (8205)	
	Integrated Circuit ROM 2083 (8205)	
	Integrated Circuit SN 74LS169N	
C10.	Capacitor 1nF, 100V, 10%, ceramic.	
C68.	Capacitor 200pF, 500V, 1%.	
C8,76.	Capacitor 390pF, 250V, 1%.	
C157.	Capacitor 510pF, 250V, 1%.	
C1,5,14.	Capacitor 620pF, 250V, 1%.	
C9.	Capacitor 1000pF, 125V, 1%.	
C7,6.	Capacitor 1.3nF, 63V, 1%.	
C2,4.	Capacitor 430pF, 250V, 1%.	
C13.	Capacitor 2 nF, 63V, 1%	
C158.	Capacitor 150pF, 63V, 2%.	
C21,24.	Capacitor 10μF, 63V, FITCO.	
C15,18,20,22,23,25,27,29,31-35,38,41,42.	Capacitor 10μF, 25V, FITCO.	
C3.	Capacitor 1,8nF, 125V, 1%.	

Table 4-9A Contd.

Reference	Description	12NC Code
C12,46,49-64,67,69,71,74,79,80,85, 86,88,90,92,94,97,100, 102, 104-106, 109,110,112,113,115,117,120-122,124, 128-130,133,134,138,142,146,147,149, 151,152,155.	Capacitor 10nF, ceramic.	
R3,8,37,54,74,75.	Resistor 100n, 1/8W, 1%.	
R27,36,65-72.	Resistor 470n, 1/4W, 5%.	
R53.	Resistor 560n, 1/4W, 5%.	
R14,19-26,28-35,39-52,55-62,64,76, 80-109,130.	Resistor 1Kn, 1/4W, 5%.	
R04-06,07,38,63,77,79,131,132.	Resistor 10Kn, 1/4W, 5%.	
R16.	Resistor 464n, 1/8W, 1%.	
R17.	Resistor 681n, 1/8W, 1%.	
R12.	Resistor 2.15Kn, 1/8W, 1%.	
R11,13.	Resistor 3.16Kn, 1/8W, 1%.	
R110-115,122,123,126,127.	Resistor 220n, 1/4W, 5%.	
R116-121,124,125,128,129.	Resistor 390n, 1/4W, 5%.	
R15.	Resistor 1.47Kn, 1/8W, ± 1%.	
R1,2,10,73.	Resistor 110n, 0.125W, 1%.	
R9,78.	Resistor 147n, 0.125W, 1%.	
CR1,2.	IC. TERNET Resistors.	
Y 1.	Quartz QA 55A22.22 Mhz.	
T 1.	Transistor BSX20	
	U-Link DCW06.	
	Mica 56325.	

ble 4-9B P857M CPU Parts List

Reference	Description	12 NC Code
	Printed Circuit	5111 100 05701
	Heat Sink	
	Right Spring	
	Left Spring	
	Integrated Circuit 7400	
	Integrated Circuit 7402	
	Integrated Circuit 7403	
	Integrated Circuit 7404	
	Integrated Circuit 7408	
	Integrated Circuit 7410	
	Integrated Circuit 7420	
	Integrated Circuit 7425	
	Integrated Circuit 7427	
	Integrated Circuit 7428	
	Integrated Circuit 7430	
	Integrated Circuit 7432	
	Integrated Circuit 7437	
	Integrated Circuit 7450	
	Integrated Circuit 7453	
	Integrated Circuit 7474	
	Integrated Circuit 7485	
	Integrated Circuit 7486	
	Integrated Circuit 7489	
	Integrated Circuit 74121	
	Integrated Circuit 74132	
	Integrated Circuit 74148	
	Integrated Circuit 74151A	
	Integrated Circuit 74157	
	Integrated Circuit 74158	
	Integrated Circuit 74161	
	Integrated Circuit 74174	
	Integrated Circuit 74175	
	Integrated Circuit 74181	
	Integrated Circuit 74182	
	Integrated Circuit 74194	
	Integrated Circuit 74298	
	Integrated Circuit 74S00	
	Integrated Circuit 74S10	
	Integrated Circuit 74S11	
	Integrated Circuit 74S20	
	Integrated Circuit 74S30	
	Integrated Circuit 74S04	
	Integrated Circuit 74S64	
	Integrated Circuit 74S74	

Table 4-9B Contd.

Reference	Description	12NC Code
	Integrated Circuit 74S112	
	Integrated Circuit 74S138	
	Integrated Circuit 74S169	
	Integrated Circuit 74S174	
	Integrated Circuit 74S175	
T3.	Integrated Circuit 7812 (TO220)	
T2.	Integrated Circuit 7912 (TO220)	
	Integrated Circuit 1488	
	Integrated Circuit 1489A	
	Integrated Circuit 1801	
	Integrated Circuit 1891 (8576)	
	Integrated Circuit 8234	
	Integrated Circuit 9301	
	Integrated Circuit 9309	
	Integrated Circuit 2502 (UART)	
	Integrated Circuit ADL 2011	
	Integrated Circuit REC 0612	
	Integrated Circuit CR 2021	
	Integrated Circuit ROM 2442 (8205)	
	Integrated Circuit ROM 2452 (8205)	
	Integrated Circuit ROM 2462 (8205)	
	Integrated Circuit ROM 2472 (8205)	
	Integrated Circuit ROM 2482 (8205)	
	Integrated Circuit ROM 2493 (8205)	
	Integrated Circuit SN74LS169N	
C10.	Capacitor 1nF, 100V, 10%, ceramic.	
C68.	Capacitor 200pF, 500V, 1%.	
C8,76.	Capacitor 390pF, 250V, 1%.	
C157.	Capacitor 510pF, 250V, 1%.	
C1,5,14.	Capacitor 620pF, 250V, 1%.	
C9.	Capacitor 1000pF, 125V, 1%.	
C6,7.	Capacitor 1.3nF, 63V, 1%.	
C2,4.	Capacitor 430pF, 250V, 1%.	
C13.	Capacitor 2nF, 63V, 1%.	
C12,46,49-64,67,69,71,74,79,80,85,86,88,90,92,94,97,100,102,104-106,109,110,112,113,115,117,120-122,124,128-130,133,134,138,142,146,147,149,151,152,155.	Capacitor 10nF, ceramic.	
C21,24.	Capacitor 10µF, 63V, FITCO.	
C15,18,20,22,23,25,27,29,31-35,38,41,42.	Capacitor 10µF, 25V, FITCO.	
C158	Capacitor 150pF, 63V, 2%. ceramic.	
C3.	Capacitor 1.8nF, 125V, 1%.	
C159	Capacitor 100pF 2%	

Table 4-9B Contd.

Reference	Description	12NC Code
R3,8,37,54,74,75.	Resistor 100Ω, 1/8W, 1%.	
R27,36,65-72.	Resistor 470Ω, 1/4W, 5%.	
R53.	Resistor 560Ω, 1/4W, 5%.	
R14,19-26,28-35,39-52,55-62,64,76,80-109,130.	Resistor 1KΩ, 1/4W, 5%.	
R4,5,6,7,38,63,77,79,131,132.	Resistor 10KΩ, 1/4W, 5%.	
R16.	Resistor 464Ω, 1/8W, 1%.	
R17.	Resistor 681Ω, 1/8W, 1%.	
R12.	Resistor 2.15KΩ, 1/8W, 1%.	
R11,13.	Resistor 3.16KΩ, 1/8W, 1%.	
R110-115,122,123,126,127.	Resistor 220Ω, 1/4W, 5%.	
R116-121,124,125,128,129.	Resistor 390Ω, 1/4W, 5%.	
R15.	Resistor 1.47KΩ, 1/8W, 1%.	
R1,2,10,73.	Resistor 110Ω, 0,125W, 1%.	
R9,78.	Resistor 147Ω, 0,125W, 1%.	
CR1,2.	Diode AAZ 18.	
Y 1.	Quartz QA 55A 22.22 Mhz.	
T 1.	Transistor BSX 20.	
	IC TERNET Resistors.	
	U-Link DCW06.	
	Mica 56325.	
R 133	Resistor 100Ω 1/4W 5%	

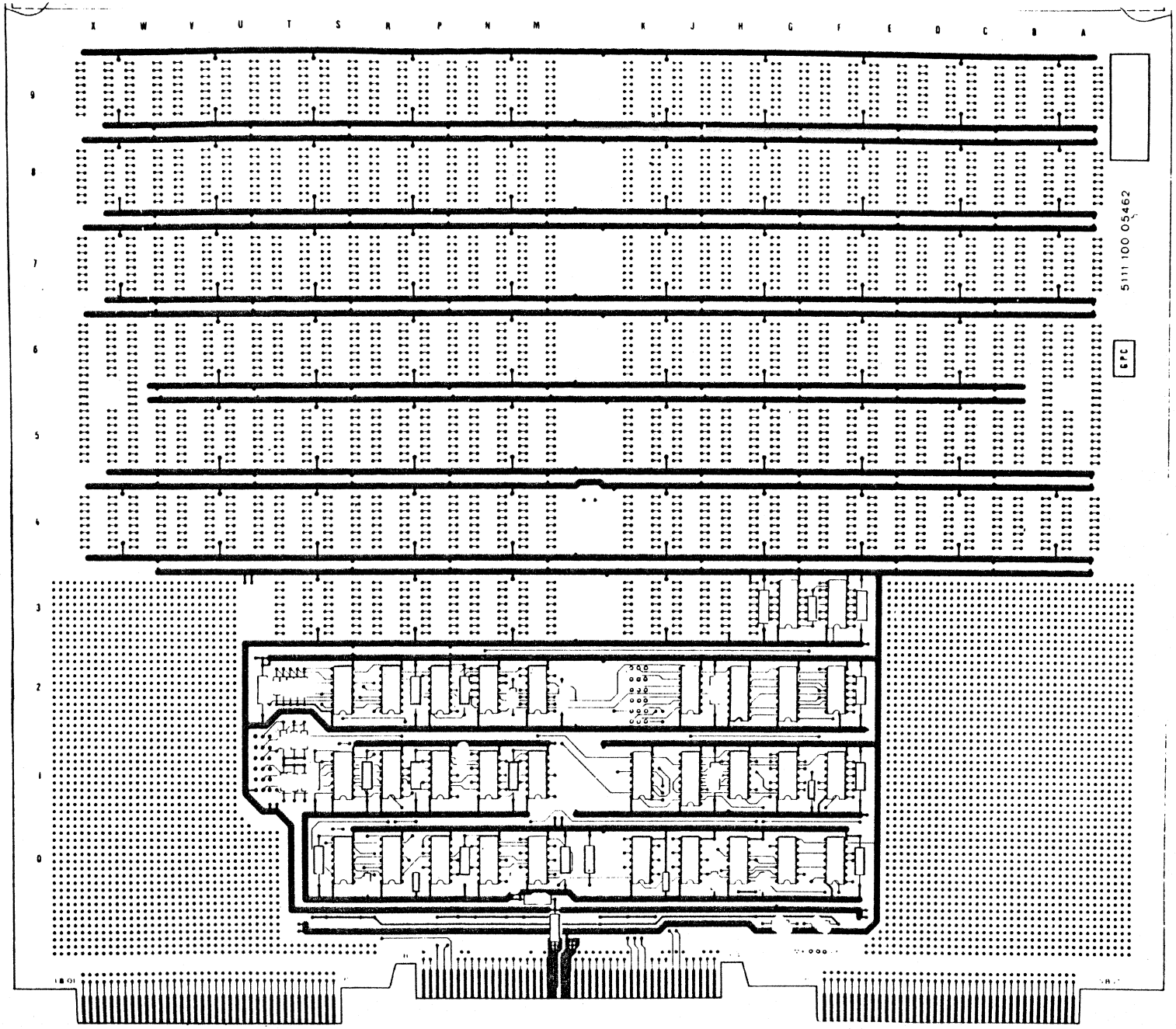


Figure 4-6 General Purpose Card Layout

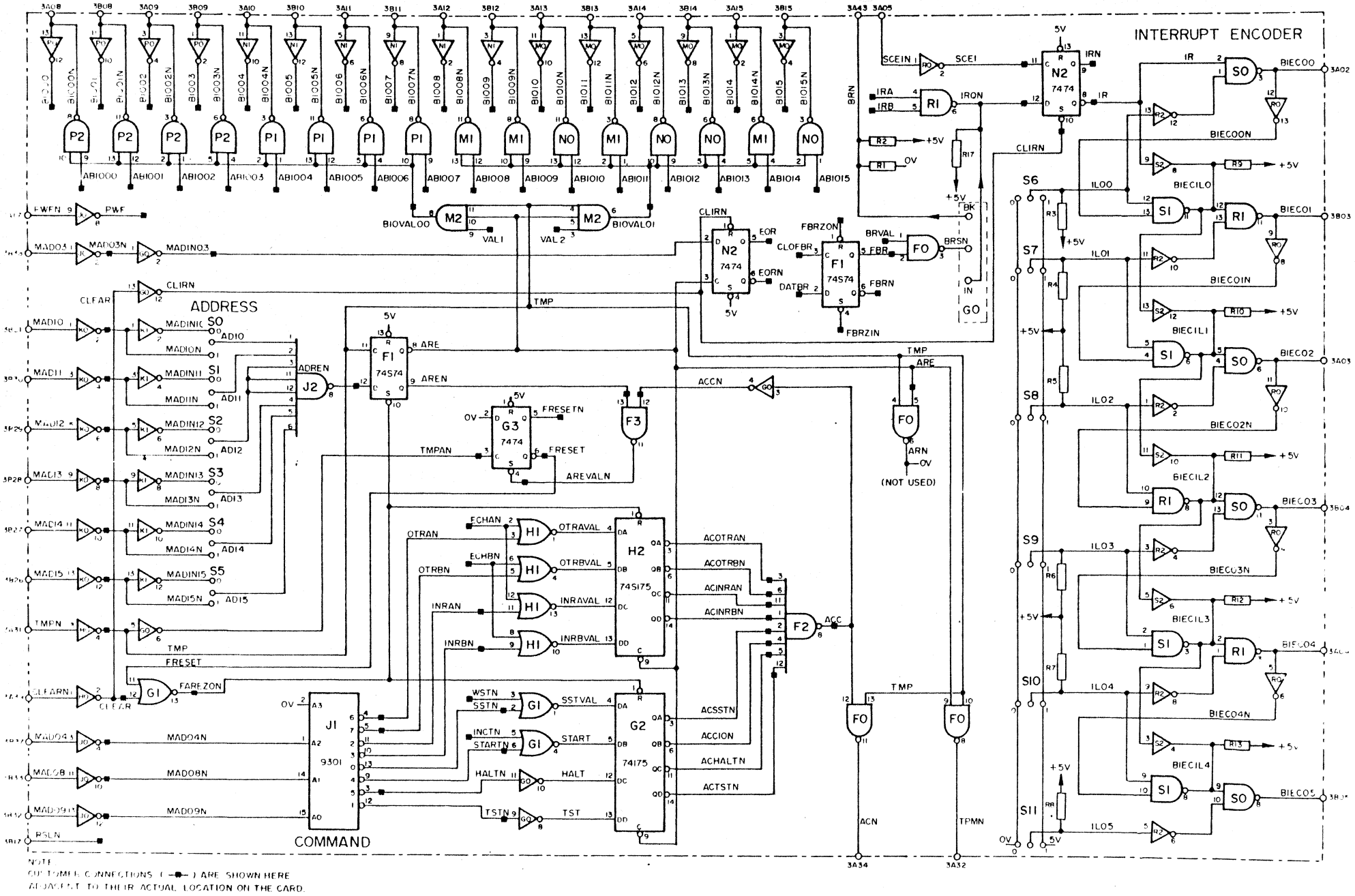


Figure 4-7 General Purpose Card Schematic

Table 4-10 General Purpose Card Parts List

Reference	Description	12NC Code
	Printed circuit	5111 100 05462
IC 1,4,10,12,13,15,23.	Integrated Circuit 1801	
IC 9,16,22.	Integrated Circuit 7404	
IC 11.	Integrated Circuit 7438	
IC 18,19.	Integrated Circuit 7402	
IC 20.	Integrated Circuit 74S74	
IC 21.	Integrated Circuit 7417	
IC 24,30.	Integrated Circuit 7474	
IC 25.	Integrated Circuit 74S11	
IC 26,29.	Integrated Circuit 7430	
IC 28.	Integrated Circuit 74175	
IC 31.	Integrated Circuit 7400	
IC 27.	Integrated Circuit 74S175	
IC 17.	Integrated Circuit 9301	
IC 2,3,5,6,7,8,14.	Integrated Circuit REC 0613	
C 7,8.	Capacitor 68µF, 16V, CTS.	
C 2,5,12-15,17-26.	Capacitor 3.3µF, 16V, CTS.	
C 3,4,6,9,10,11,16.	Capacitor 10µF, ± 20%, ceramic.	
R 1.	Resistor 220Ω, 0.250W, ± 5%.	
R 2,9,10,11,12,13.	Resistor 390Ω, 0.250W, ± 5%.	
R 3-8,14-17.	Resistor 1KΩ, 0.250W, ± 5%.	
L 1,2.	Inductance.	
S 0-12.	U-Link.	

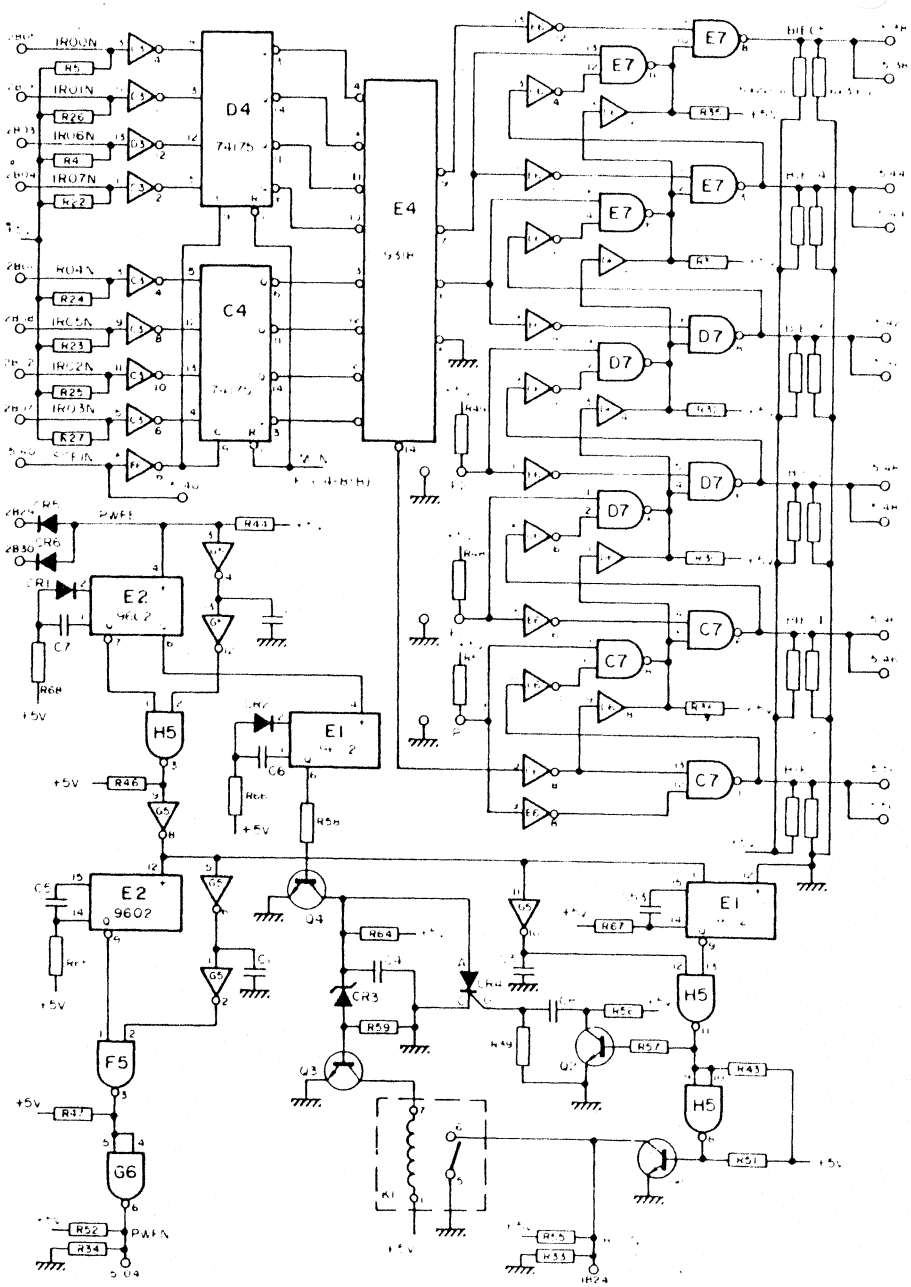


Figure 4-8(A) TAIE Card Schematic

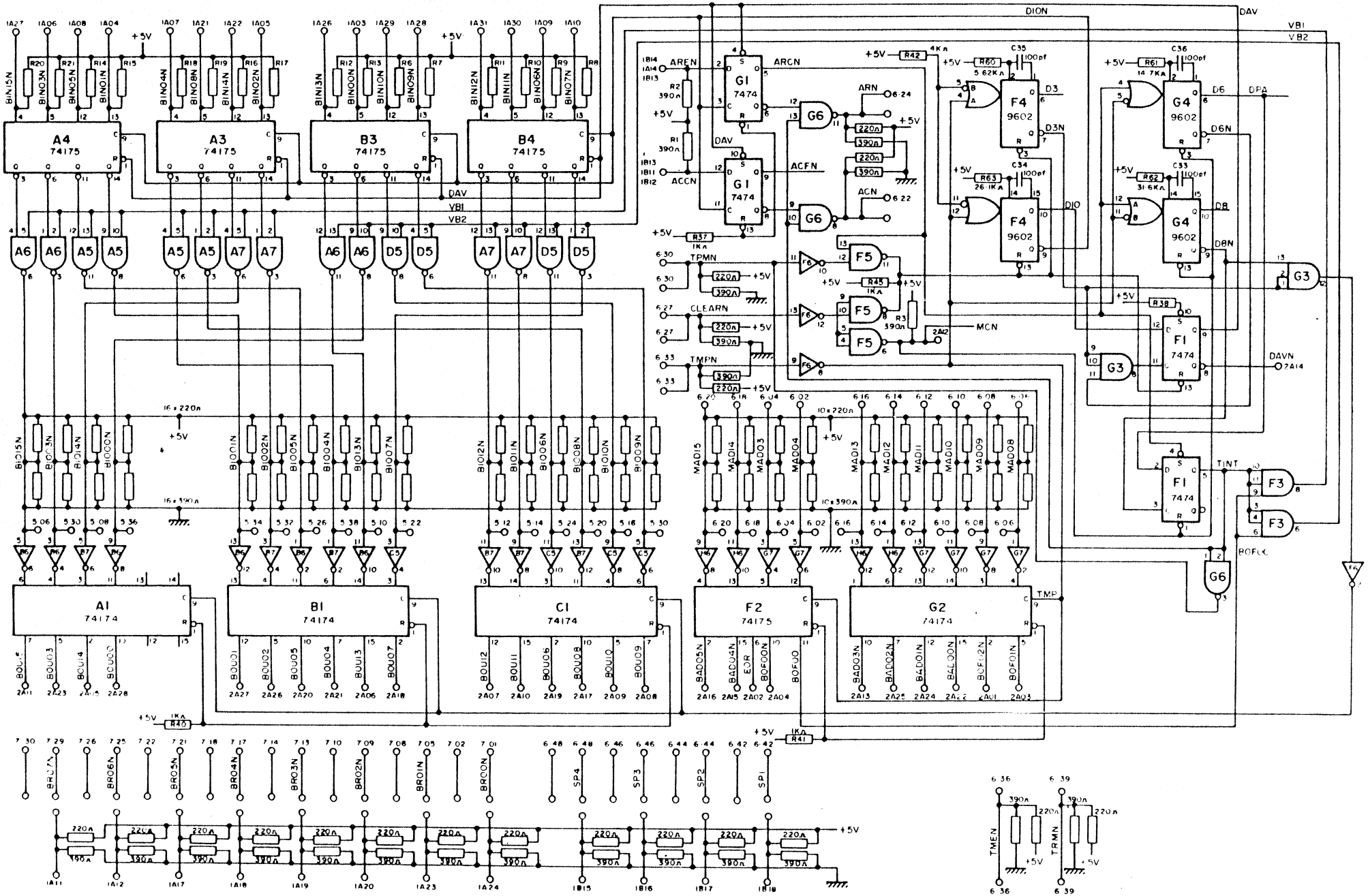


Figure 4-8(B) TAIE Card Schematic

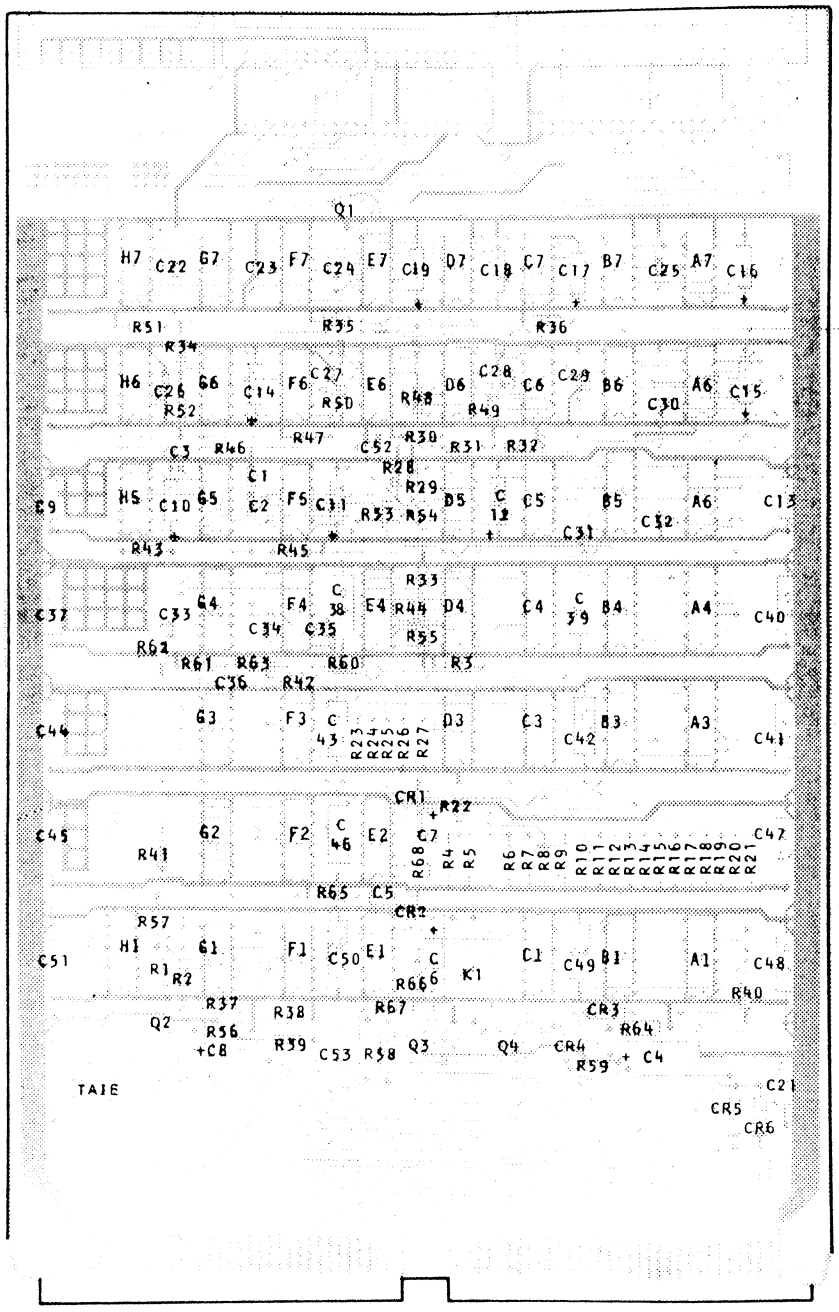


Figure 4-9 TAIE Card Layout

Table 4-11 TAIE Parts List

Reference	Description	12NC-Code
	TAIE CARD	5111 199 81440
	U-link	
A5,A6,A7,C7,D5,D7,E7,F5,G6,H5	IC 1801	
A1,B1,C1,G2	IC 74174	
G1,F1	IC 7474	
A3,A4,B3,B4,C4,D4,F2	IC 74175	
F3,G3	IC 74H11	
E1,E2,F4,G4	IC 9602	
E4	IC 9318	
B5,F7,H1,H7	IC Ternet Resistors	
C3,D3,E6,G5	IC 7404	
D6	IC 7417	
B6,B7,C5,C6,F6,G7,H6	IC REC 0612	
R37 thru R51	Resistor, 1Kn, ±5%, 0,25W	
R1 thru R36	Resistor, 390n, ±5%, 0,25W	
R60	Resistor, 5,62Kn, ±1%, 0,125W	
R61	Resistor, 14,7Kn, ±1%, 0,125W	
R62	Resistor, 31,6Kn, ±1%, 0,125W	
R63,R68	Resistor, 26,1Kn, ±1%, 0,125W	
R57	Resistor, 1,6Kn, ±5%, 0,25W	
R65	Resistor, 12Kn, ±5%, 0,25W	
R66	Resistor, 24Kn, ±5%, 0,25W	
R56,R58,R59	Resistor, 300n, ±5%, 0,5W	
R64	Resistor, 100n, ±5%, 0,5W	
R67	Resistor, 10Kn, ±1%, 0,125W	
R52 thru R55	Resistor, 220n, ±5%, 0,25W	
Q1	Transistor BSX60	
Q2,Q3,Q4	Transistor 2N2219	
K1	Relay MRMD 15005	
CR1,CR2	Diode BAX 13	
CR3	Diode 1N746A	
CR5,CR6	Diode AAZ 18	
CR4	Thyristor 2N1595	
C53	Capacitor, 0,33µf, 10%, 100V, MPR	
C1,C2,C3	Capacitor, 470pf, ±10%, 100V, cer.plat	
C4	Capacitor, 47µf, 25V, FITCO	
C5	Capacitor, 0,1µf, 10%, 100V, MPR	
C6	Capacitor, 22µf, 16V, CTS13	
C7	Capacitor, 33µf, 10V, CTS13	
C8	Capacitor, 1µf, 35V, CTS13	
C9 thru C19	Capacitor, 3,3µf, 16V, CTS13	
C20, C21	Capacitor, 10µf, 15V, FITCO	
C22 thru C32,C52	Capacitor, 10000pf, 40V, cer.plat.	
C33 thru C36	Capacitor, 100pf, 2%, 63V, cer.plat	
C37 thru C51	Capacitor, 0,01µf, -10%, 100V, MAC	

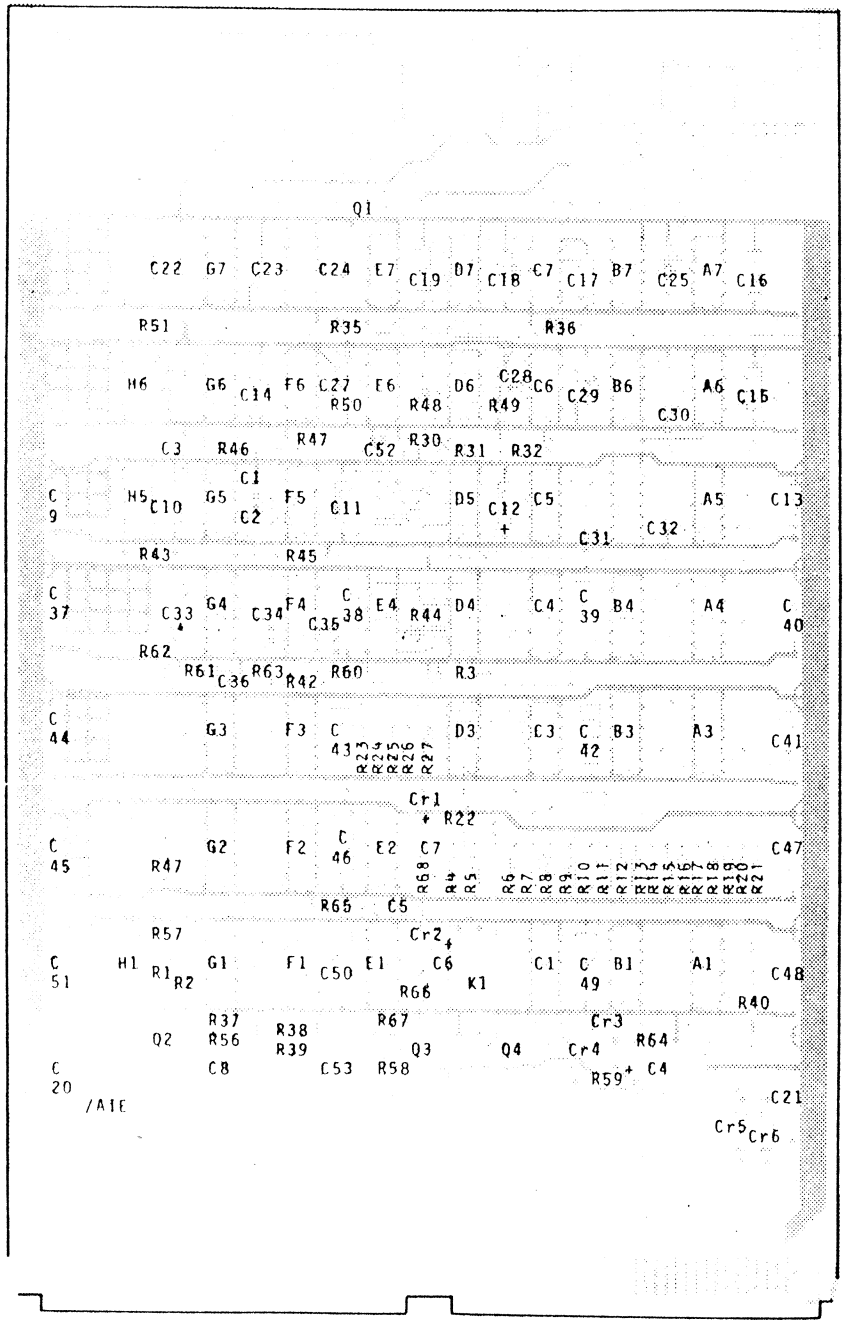


Figure 4-10 AIE Card Layout

Table 4-12 AIE Parts List

Reference	Description	12NC-Code
	AIE CARD	5111 199 78450
A5,A6,A7,C7,D5,D7,E7,F5,G6,H5	IC 1801	
A1,B1,C1,G2	IC 74174	
G1,F1	IC 7474	
A3,A4,B3,B4,C4,D4,F2	IC 74175	
F3,G3	IC 74H11	
E1,E2,F4,G4	IC 9602	
E4	IC 9318	
H1	IC Ternet Resistors	
C3,D3,E6,G5	IC 7404	
D6	IC 7417	
B6,B7,C5,C6,F6,G7,H6	IC REC 0612	
R37 thru R51	Resistor, 1Kn, ±5%, 0,25W	
R1 thru R27,R30,R31,R32,R35,R36	Resistor, 390n, ±5%, 0,25W	
R60	Resistor, 5,62Kn, ±1%, 0,125W	
R61	Resistor, 14,7Kn, ±1%, 0,125W	
R62	Resistor, 31,6Kn, ±1%, 0,125W	
R63,R68	Resistor, 26,1Kn, ±1%, 0,125W	
R57	Resistor, 1,6Kn, ±5%, 0,25W	
R65	Resistor, 12Kn, ±5%, 0,25W	
R66	Resistor, 24Kn, ±5%, 0,25W	
R56,R58,R59	Resistor, 300n, ±5%, 0,5W	
R64	Resistor, 100n, ±5%, 0,5W	
R67	Resistor, 10Kn, ±1%, 0,125W	
Q1	Trnasistor BSX 60	
Q2,Q3,Q4	Trnasistor 2N2219	
K1	Relay MRMD 15005	
CR1,CR2	Diode BAX 13	
CR3	Diode 1N746A	
CR5,CR6	Diode AAZ 18	
CR4	Thyristor 2N1595	
C53	Capacitor, 0,33µF, 10%, 100V, MPR	
C1,C2,C3	Capacitor, 470pf, ±10%, 100V, cer.plat	
C4	Capacitor, 47µF, 25V, FITCO	
C5	Capacitor, 0,1µf, 10%, 100V, MPR	
C6	Capacitor, 22µf, 16V, CTS13	
C7	Capacitor, 33µf, 10V, CTS13	
C8	Capacitor, 1µf, 35V, CTS13	
C9 thru C19	Capacitor, 3,3 µf, 16V, CTS13	
C20,C21	Capacitor, 10µf, 25V, FITCO	
C22 thru C32-C52	Capacitor, 10000pf, 40V, cer. plat	
C33 thru C36	Capacitor, 100pf, 2%, 63V, cer. plat	
C37 thru C51	Capacitor, 0,01µf, ±10%, 100V, MAC	

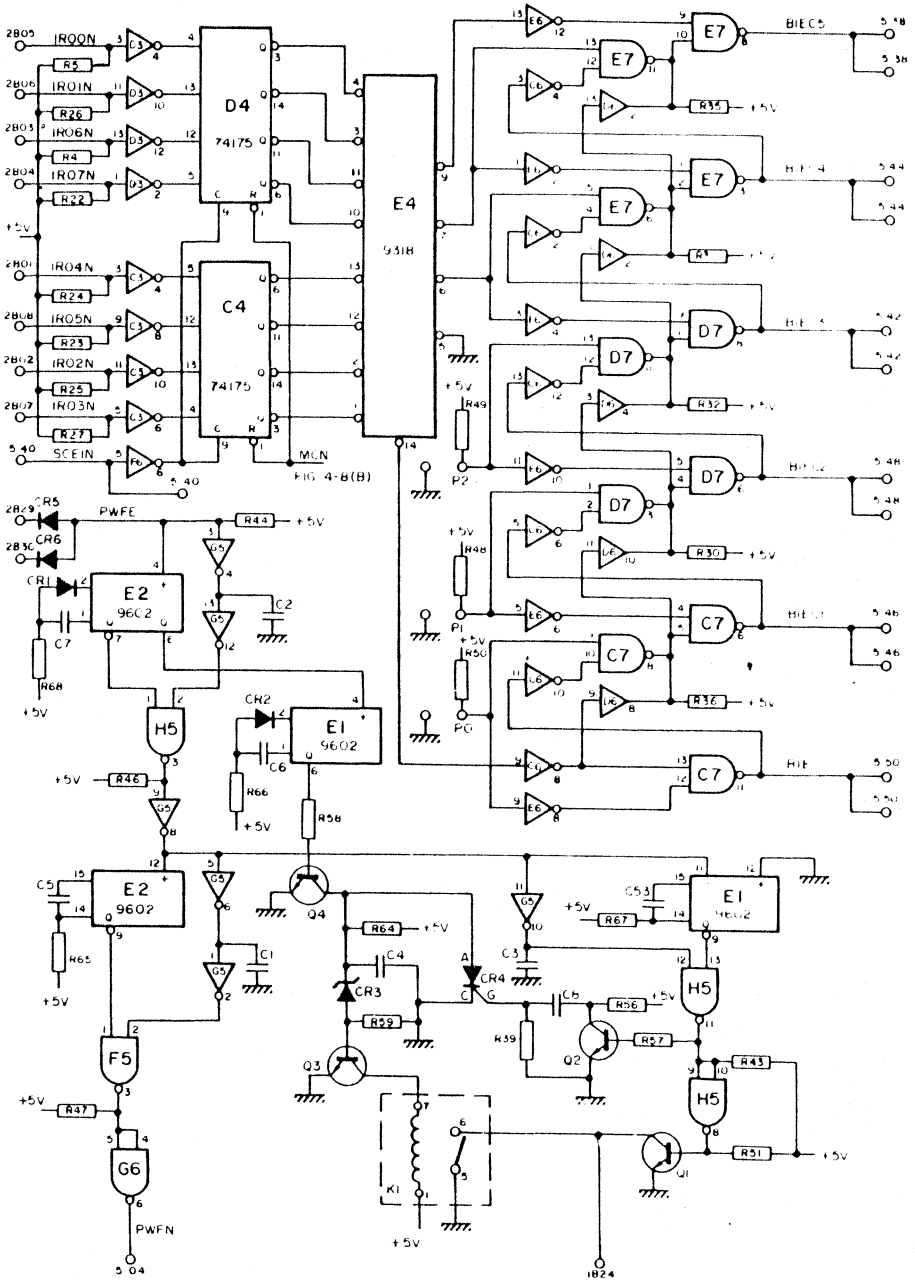


Figure 4-11(A) AIE Card Schematic

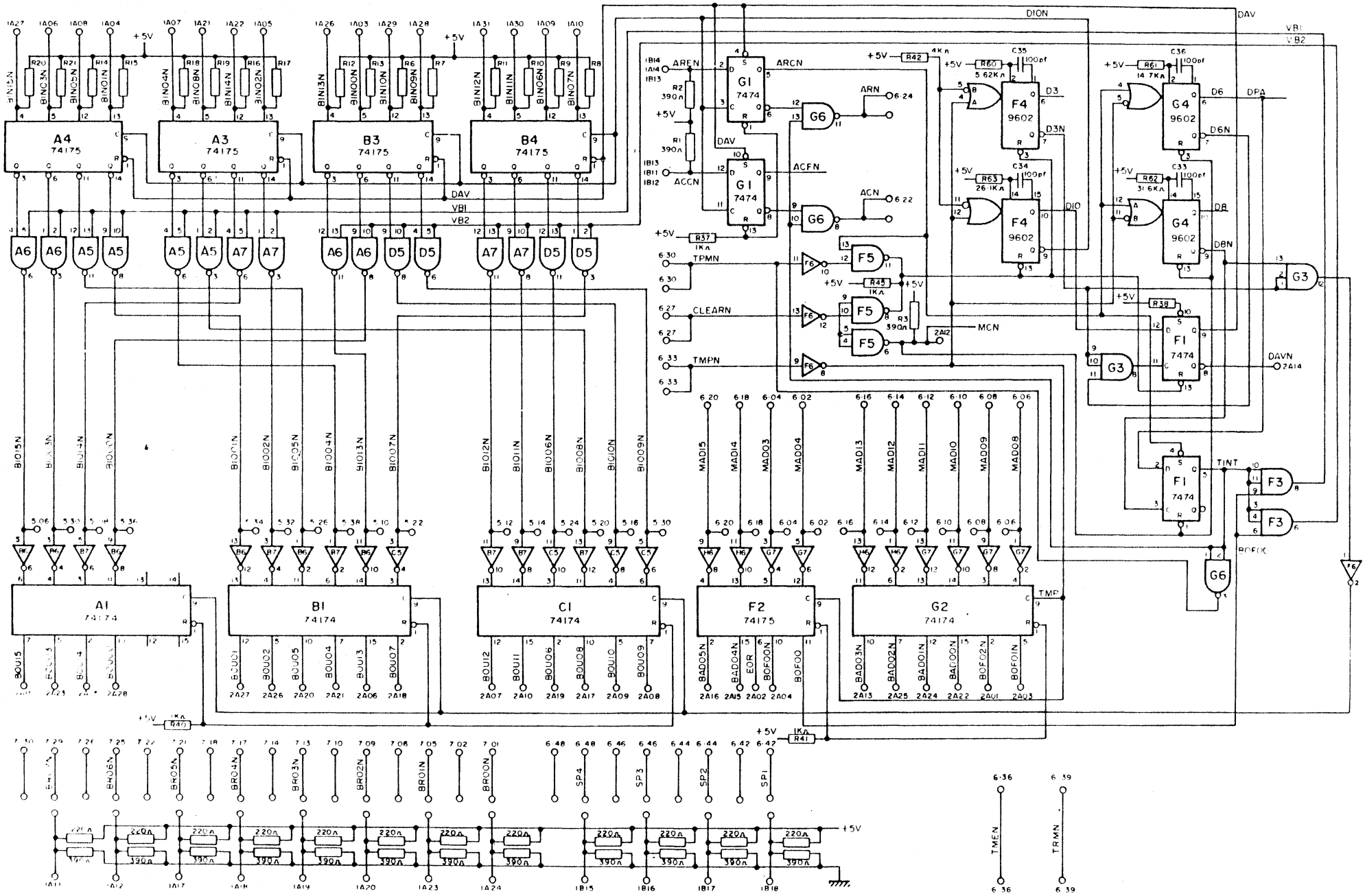
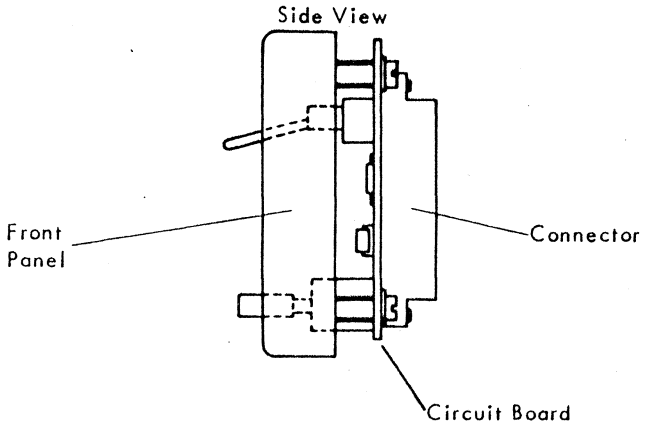
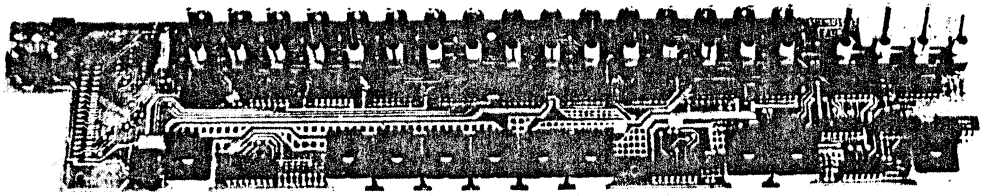


Figure 4-11(B) AIE Card Schematic





Control Panel Parts List

Reference	Description	12NC Code
	Control Panel	5111 199 81450
	Front Cover	79700
	Printed Circuit, equiped	82070
	Circuit Board	100 05213
IC18, IC19	Integrated Circuit 74729	
IC17	7410	
IC13	7404	
IC12	9602	
IC11; IC15	7432	
IC1, IC7, IC8	7416	
IC3, IC4, IC5, IC10	1801	
IC14	7420	
IC16	7400	
IC2, IC6, IC9	REC 0612	
C19, C20	Capacitor, 47µF, 20V,	CTS13
C1	Capacitor, 4700pF, 100V, ±10	cer plat
C2 thru C18, C21	Capacitor, 3900pF, 100V, ±10	cer plat
L1,L2,L3	Inductor	
R1	Resistor, 10Kn, 0.250W, ±5	
R2	Resistor, 46.4Kn, 0.125W, ±1	
R23 thru R38	Resistor, 330n 0.250W, ±5	
R3 thru R22, R39, R40	Resistor, 1Kn, 0.250W, ±5	
	Toggle Switch 7101 LYCG	
	Push Button Switch 2RT - TFB	
	Lamp 6V 30mA ref. 2306	
	Jumper Block F088	

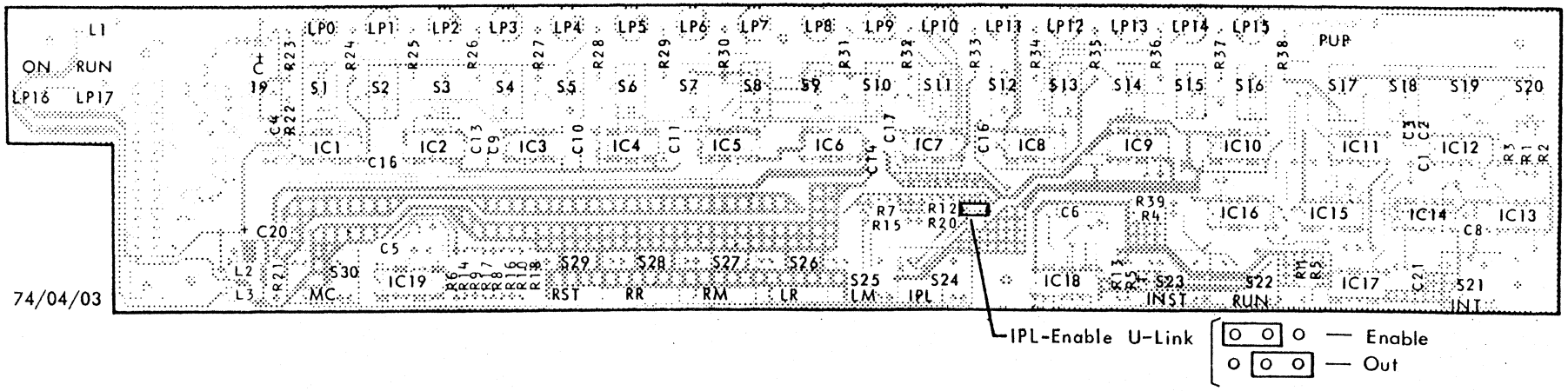


Figure 4-12A Standard Control Panel Layout

Extended Control Panel Parts List

Reference	Description	12NC Code
	Printed Circuit	5111 100 05764
U1,3,5,6,7,29.	Integrated circuit 1801	
U2,4,8,26.	Integrated circuit REC 0613	
U28.	Integrated circuit 74S11	
U27.	Integrated circuit 74S00	
U9,18,25.	Integrated circuit 7417	
U10,13,16,19,22.	Integrated circuit 74157	
U11,14,17,20,23.	Integrated circuit 74S169	
U12,15,21,24.	Integrated circuit 9324	
C1-17,19-39.	Capacitor 10nF, ceramic.	
C18.	Capacitor 560pF, 10%, ceramic.	
	Capacitor 22µF, 10V, FITCO.	
R18,19,20,22,23,24.	Resistor 1Kn, 0.25W, 5%.	
R1-17.	Resistor 330n, 0.25W, 5%.	
R21.	Resistor 100n, 0.25W, 5%.	
LP1-17.	Lamp 6V 30 mA ref. 2306.	

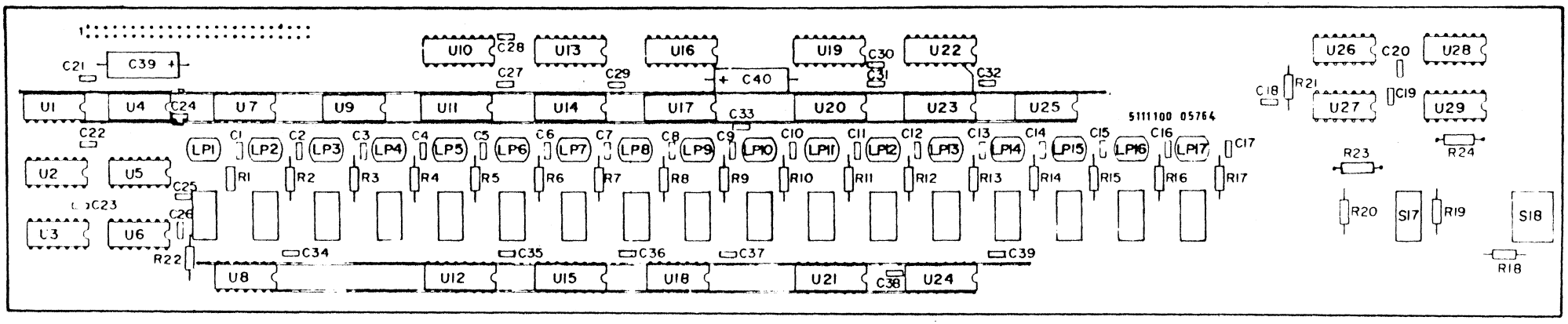


Figure 4-9B Extended Control Panel Layout