IBM

IBM 5120
Computing System Logic Manual

SY34-0193-0

5120

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Use this publication only as an aid in servicing the IBM 5120 Computing System.

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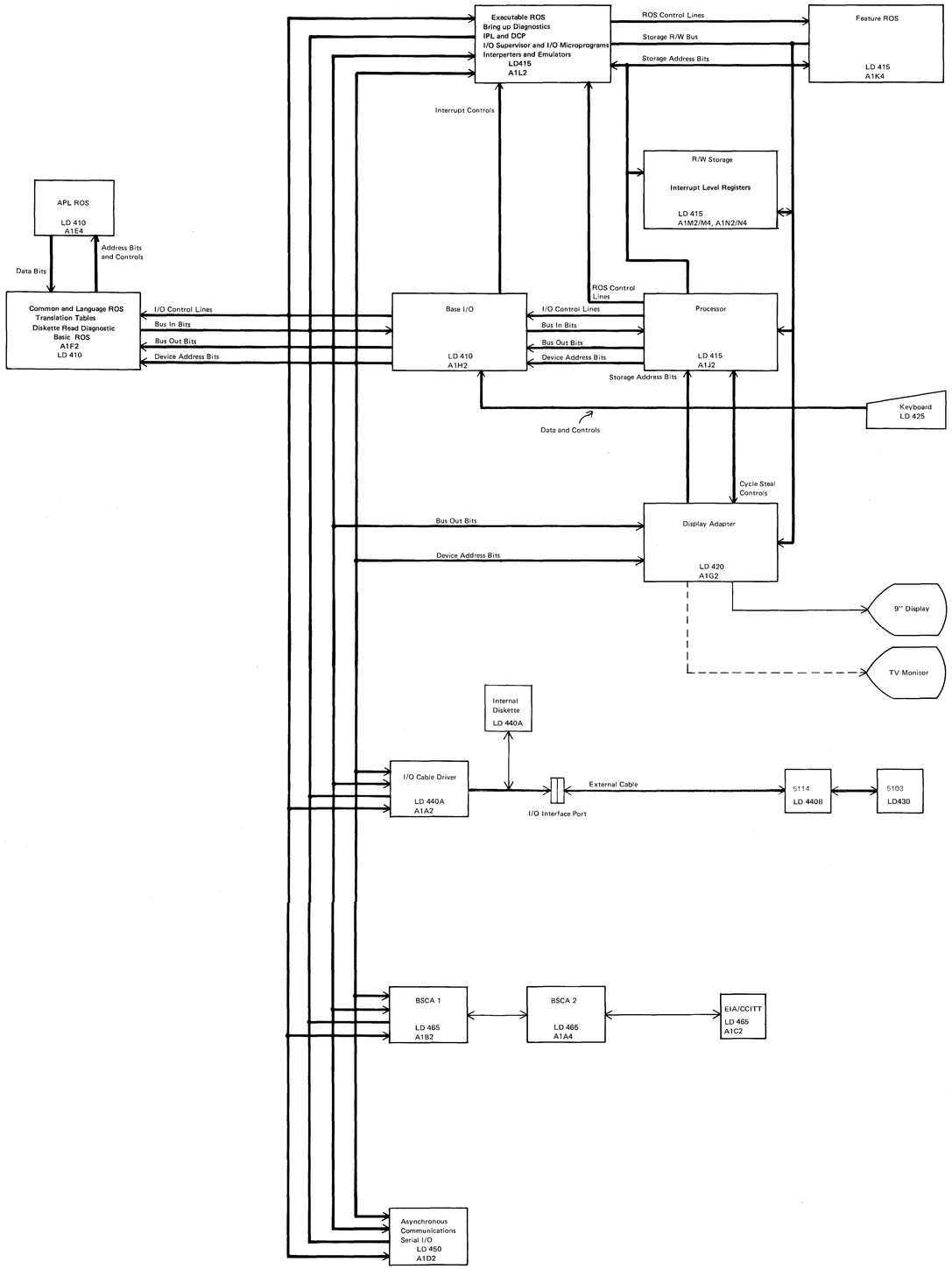
Executable ROS
Bring up Diagnostics
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I/O Supervisor and I/O Microprograms
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Storage R/W Bus
Storage Address Bits
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Internal
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I/O Cable Driver
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LD 440B
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BSCA 2
LD 465
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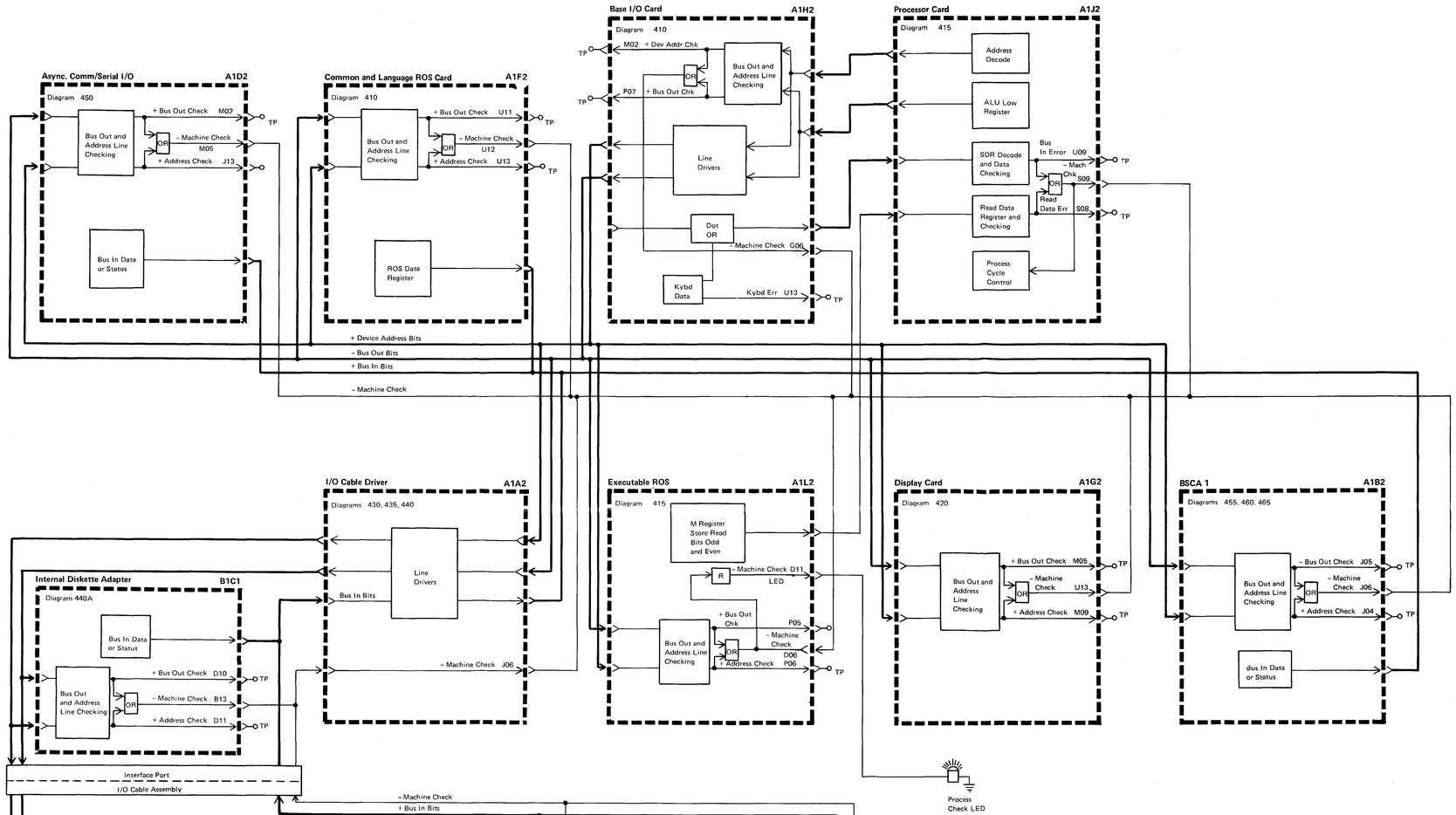
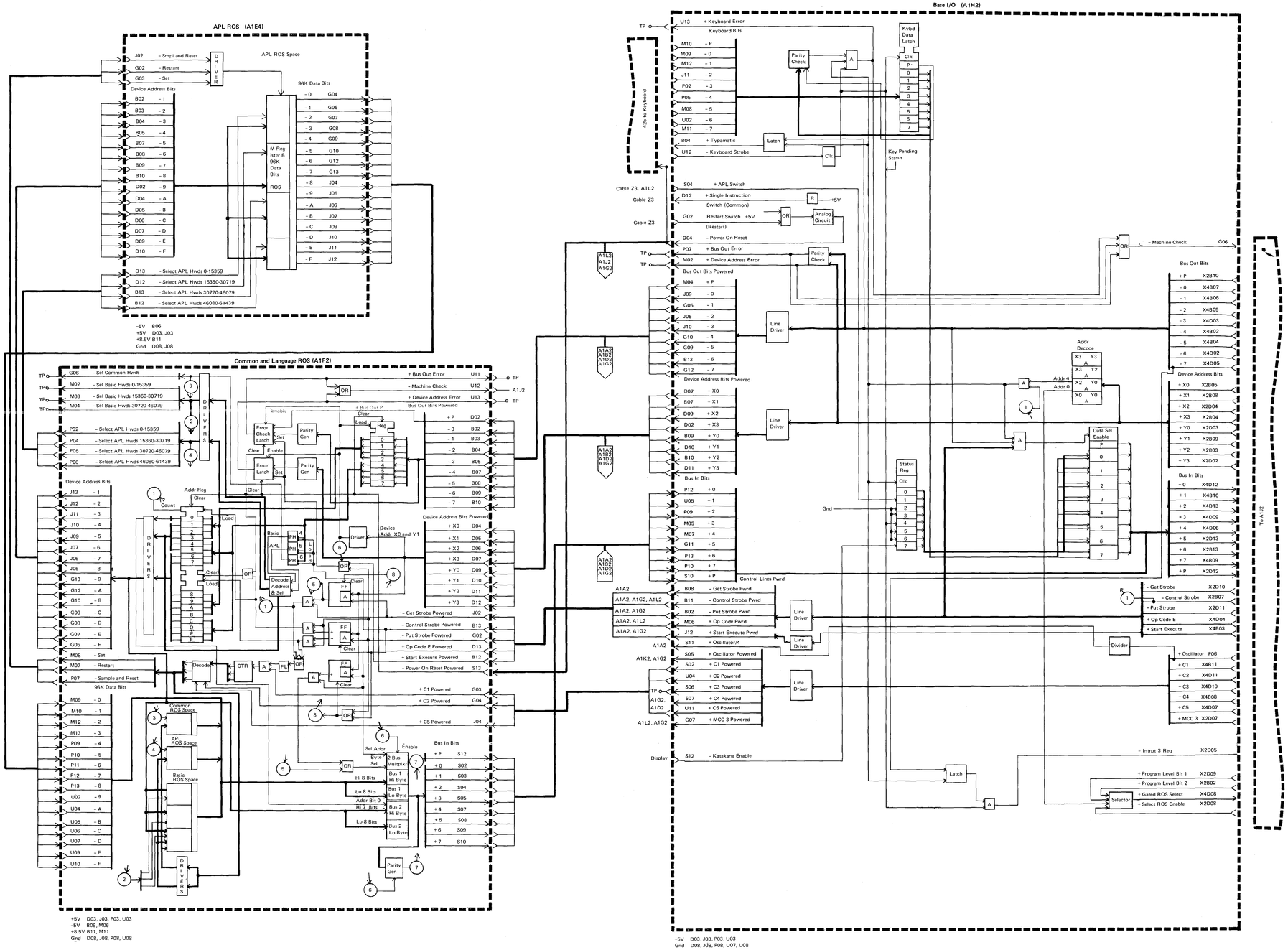
EIA/CCITT
LD 465
A1C2
Asynchronous
Communications
Serial I/O
LD 450
A1D2

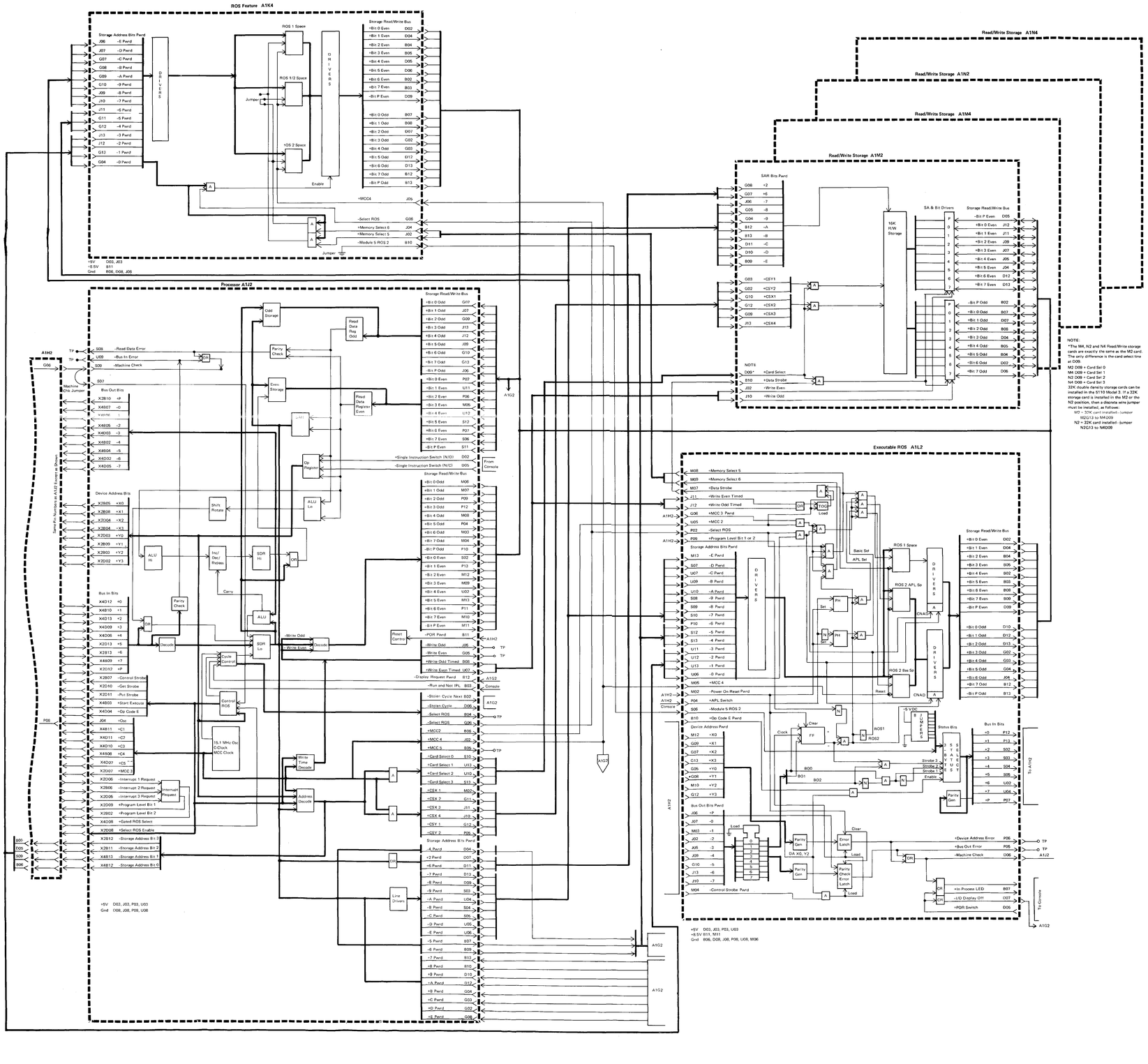


Process Check Chart 405

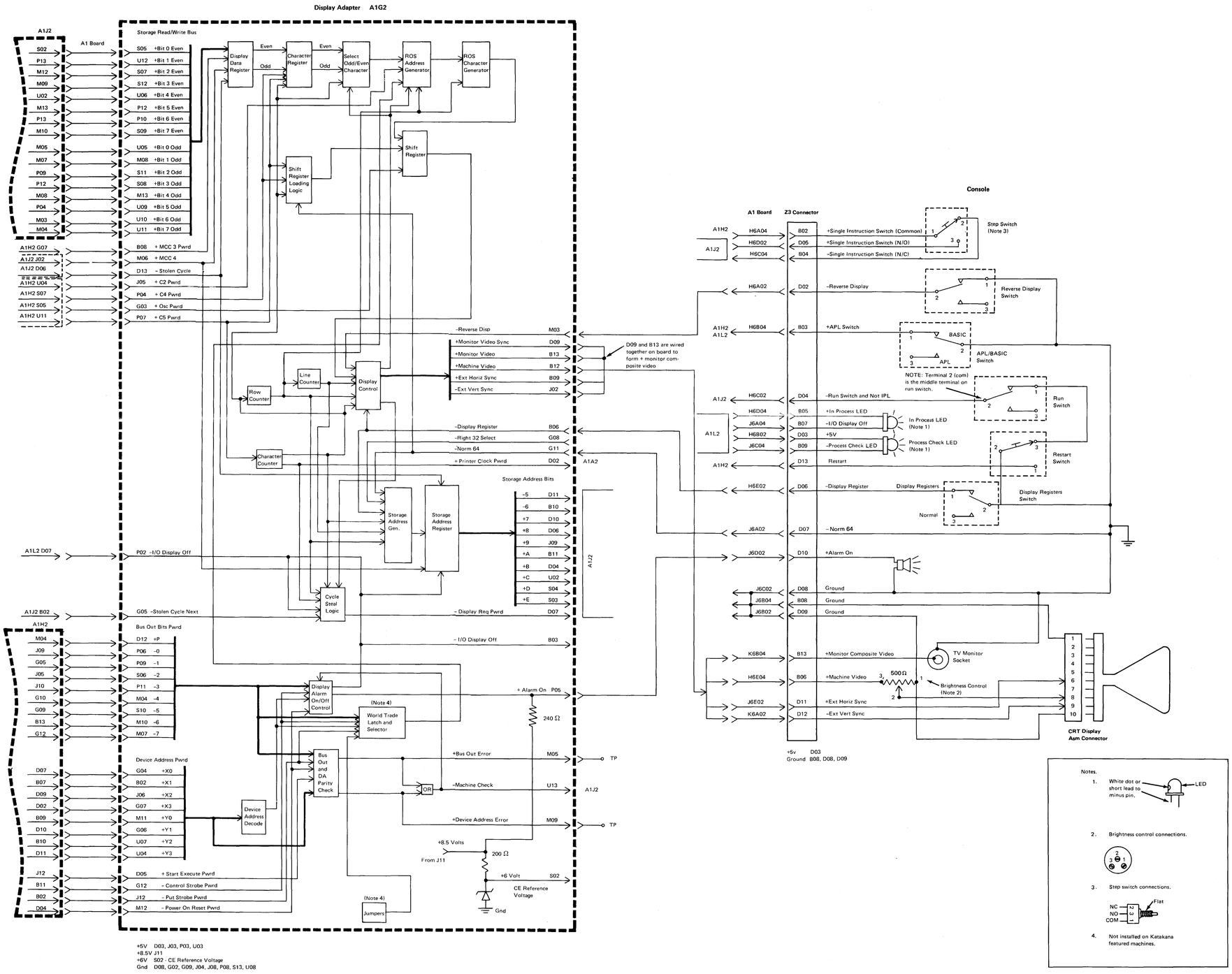
	B1C1 Internal Diskette Adapter	A1C1 5114 Diskette Adapter	B1A2 5103 Printer Adapter	A1B2 BSCA 1	A1D2 Async. Comm/Serial I/O	A1F2 ROS Control	A1G2 Display	A1H2 Base I/O	A1J2 Controller	A1L2 Executable ROS
Bus Out Parity Check	D10	D10	P11	J05	M02	U11	M05	P07	U09	P05
Address Check	D11	D11	P12	J04	J13	U13	M09	M02	S08	P06
Keyboard Parity Error								U13		



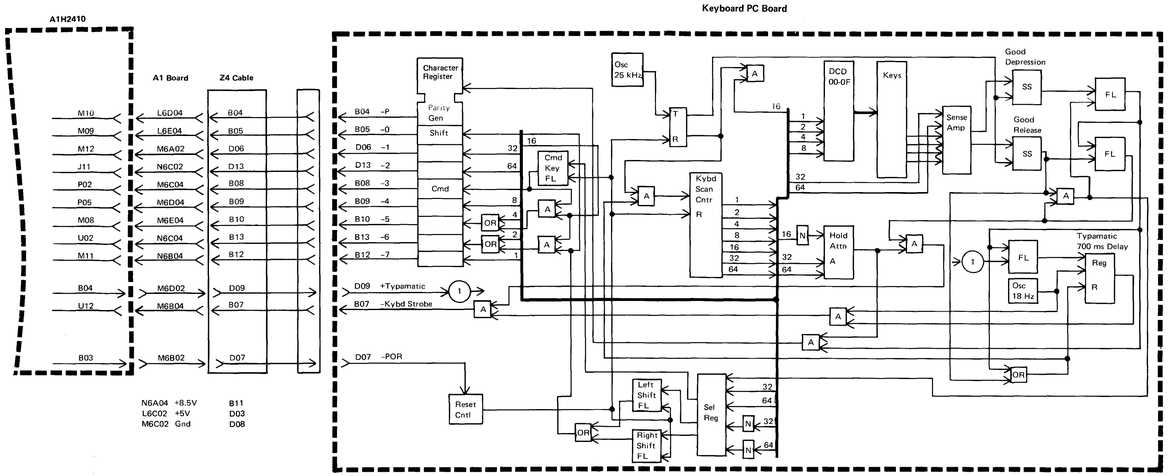
Base I/O **410**
APL ROS
Common/Language ROS



Processor 415
R/W Storage
Executable ROS
Feature ROS



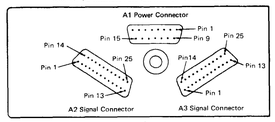
Console 420
Display Adapter


A1H2410
A1 Board
Z4 Cable
Keyboard PC Board
M10 L6D04 B04
M09 L6E04 B05
M12 M6A02 D06
J11 N6C02 D13
P02 M6C04 B08
P05 M6D04 B09
M08 M6E04 B10
U02 N6C04 B13
M11 N6B04 B12
B04 M6D02 D09
U12 M6B04 B07
B03 M6B02 D07
N6A04 +8.5V
L6C02 +5V
M6C02 Gnd
B11
D03
D08
Character Register
Parity Gen
Shift
Cmd
B04 -P
B05 -0
D06 -1
D13 -2
B08 -3
B09 -4
B10 -5
B13 -6
B12 -7
D09 +Typamatic
B07 -Kybd Strobe
D07 -POR
Reset Cntl
Osc 25 kHz
Cmd Key FL
Kybd Scan Cntr
Hold Attn
DCD 00-0F
Keys
Sense Amp
Good Depression
Good Release
SS
FL
Typamatic 700 ms Delay
Reg
Osc 18 Hz
Left Shift FL
Right Shift FL
Sel Reg
OR
A
N
T
R

5103

To 5110 Interface Port Logic 440A

External I/O Interface Port (On Rear Of Base Machine)



Printer Adapter B1A2

Connector A2 Pins	B1B2	B1 Board	Device Address
12	B03		+ X0
11	B04		+ X1
10	B05		+ X2
09	B06		+ X3
08	B07		+ Y0
07	B08		+ Y1
06	B09		+ Y2
05	B10		+ Y3
04	B11		– Get Strobe Pwrd
03	B12		– Control Strobe Pwrd
02	B13		– Put Strobe Pwrd
15	D13		+ Op Code E
			Bus In Bits
25	D02		+ 0
23	D04		+ 1
22	D05		+ 2
21	D06		+ 3
20	D07		+ 4
19	D09		+ 5
18	D10		+ 6
17	D11		+ 7
16	D12		+ P

Connector A3 Pins	B1B3	B1 Board	
03	B12		– Irpt Req 2
20	D07		+ Start Execute
25	D02		– POR
			(Note 3)
			Bus Out Bits
04	B11		G11 + P
05	B10		G10 + 0
06	B09		G09 + 1
07	B08		G08 + 2
08	B07		G07 + 3
09	B06		G06 + 4
10	B05		G05 + 5
11	B04		G04 + 6
12	B03		G03 + 7
02	B13		+ Osc/4
22	D05		+ Ext Horiz Drive
23	D04		+ Printer Clock
			P11 + Bus Out Check
			J06 – Machine Check
21	D06		P12 + Address Check

(Note 1)

Control Commands
Print Go
Forms Go
Forms A & B
Print A & B
Select Pre-Drivers
– A Forms U05
– Not A Forms S04
– B Forms U04
– Not B Forms S03
– A Print Head S08
– Not A Print Head S07
– B Print Head U06
– Not B Print Head S05
Status Register
– Left Margin S10
– Wire Check S09
– Forms Emitter B S12
– Forms Emitter A U07
+ End of Forms P13
+ Ready P02
+ Speed M13
Forms Det
Card Test Gnd S06
Gnd – Grounded on Board
Irpt Cont
Print Emitters
Print Emitter Timing
– 1 M10
– 2 M09
– 3 M08
– Reset M12
OR
Reset
Print Wires
– 1 M03
– 2 P04
– 3 M04
– 4 P05
– 5 M05
– 6 P06
– 7 M07
– 8 P07
Char Latch
ROS Wire Select
Character Set Jumper Pins
Country Latch
Intpr Timer
Card Test Net M02
U09
+5V J05 + Ext Horiz Drive
J04 + Printer Clock
P11 + Bus Out Check
J06 – Machine Check
P12 + Address Check
DR
Error Checking
TP

Cables

B1 Board	A1 Board
B5D05	A4D05
B5B04	A4B04
B5D04	A4D04
B5B03	A4B03
B5B08	A4B08
B5B07	A4B07
B5D06	A4D06
B5B05	A4B05
B5B10	A4B10
B5B09	A4B09
B5B12	A4B12
B5D07	A4D07
B4D13	A3D13
B4D02	A3D02
(Note 2)	
B4B10	A3B10
B4B09	A3B09
B4B08	A3B10
B4B12	A3B12
B4B03	A3B03
B4D04	A3D04
B4B04	A3B04
B4D05	A3D05
B4B05	A3B05
B4D06	A3D06
B4B07	A3B07
B4D07	A3D07

Gnd B1B4 D08, D09 A1A3 D08, D09
B1B5 D08, D09 A1A4 D08, D09
+5V B1B4 D11, D12 A1A3 D11, D12
B1B5 D11, D12 A1A4 D11, D12

To A1A3

Stepper Motor Driver A1B1

B10	D12	
B09	D11	
B08	D10	
B07	D09	
G10	J12	
G09	J11	
G08	J10	
G07	J09	

Driver

+30V J04
+ 5V G05
Gnd D05, D06, D07, D08, J05, J06, J07, J08

To A1A1

TP-FMA

– EC2 –

B10	D12
B09	D11
D10	
D09	
D06	
B06	
B07	

Jumper Z3 A1–14 A1–15

+10.8 Vdc

End-of-Forms Latch Card EC4

EC4 present only if end-of-forms (EOF) latch card installed (EC 386125)

TPB2

4A	4B	Red/White	Forms Feed Stepper Motor
5A	5B	Red	
2A	2B	Blue/White	
3A	3B	Blue	
6A	6B	6C Black	
		White	

TPB1

4A	4B	Red/White	Print Head Stepper Motor
3A	3B	Red	
6A	6B	Blue/White	
5A	5B	Blue	
7A	7B	7C White	
		Black	

Jumper TP 22 TP LM1 LM2

EC1

– EC1 –

B04	P2A-4
D03	P2B-1
B03	P2B-2
D02	P2B-3
B05	P2A-2
D04	P2A-3

J2-3 J2-4 J2-5 J2-6 J2-7 J2-8 J2-1 J2-2

Print Emitter Pickup Amp

Osc 4.25 MH

– Print Emitter 1
– Print Emitter 2
– Print Emitter 3
+5V A4D12
Gnd A4D09
A1-13A A1-13B TP-V5 TP-GB A1-J11 A1 D08
Print Emitter

– EC2 –

D04	
B04	
D11	
D07	

TPB2 1A 1B
TPB1 8A 8B N/O Comm
EOF Sw.
+ End of Forms
See Note 4

Voltage Regulator and Sense Amp A1A1

B09 – Left Margin
D04 – Wire Check
J12 – Reset
J10 + Ready
J02 +24V Control In
J03
G12 – Forms Emitter A
G13 – Forms Emitter B

Wire Check
Wire Lock On Detect
– Wire On
+ Left Margin D09
D12
AR +10.8V J04
+5V G02
Over Voltage
Under Voltage
+24V J06
J07
+24V Regulator
+24V Control Out J05
Forms Feed Emitter Amp
GND J08

J4 P-4
G04 J4-1 P4-1
G05 J4-2 P4-2
G08 J4-5 P4-5
G09 J4-6 P4-6
G10 J4-7 P4-7
G11 J4-8 P4-8
G06 J4-3 P4-3
G07 J4-4 P4-4

LED B LED A
Photocell B Photocell A

+30 Vdc A1-5A A1-5B TP-V2 A1-10 A1-11 Q1 P 05B
+10.8V A1-6 TP-V3
A1-4E A1-4C A1-9 TP-G7
CR1 A1-2 A1-4B
CR2 TP-G6 A1-8
CR3 A1-3
R1 C2 R2 C1

TB-1 1 2 3 4 5 6 7 8 9 10
T1
F1 2A
Note: 1A on 220 Vac and 235 Vac
– Note:
B1 Fan
SI 0-A Neutral
Line Filter
LI
Printer Power Cable

TB1 Connections			
Input	0-A	Neutral	Jumpers
100 Vac	9	10	4-9, 5-10
115 Vac	7	10	2-7, 5-10
220 Vac	3	10	5-8
235 Vac	1	10	5-7

Print Wire Driver A1B3

A1 Board
A3B03
A3D04
A3B04
A3D05
A3B05
A3D06
A3B07
A3D07

Print Wires
B07 – 1
B08 – 2
B09 – 3
B10 – 4
G07 – 5
G08 – 6
G09 – 7
G10 – 8
– Wire On B03

Driver

D09
D10
D12
D13
J09
J10
J11
J12

Print Head Coils L1 L2 L3 L4 L5 L6 L7 L8

TP-W1 TP-W2 Z1

To + 24 Vdc C3 TP-V1

– EC1 –

D12	
D10	
B12	
B13	
B11	
B10	
D06	
D11	
D09	
D08	
B06	
B07	
B08	
D07	
D05	

– EC3 –

D04	
D06	
B05	
B04	
B06	
B07	
D10	
D05	
D07	
D08	
B11	
B10	
B08	
B09	
D09	
D11	

+8.5V M11
+5V D03, J03, P03, U03
Gnd D08, J08, P08, S06, U08
–5V G02

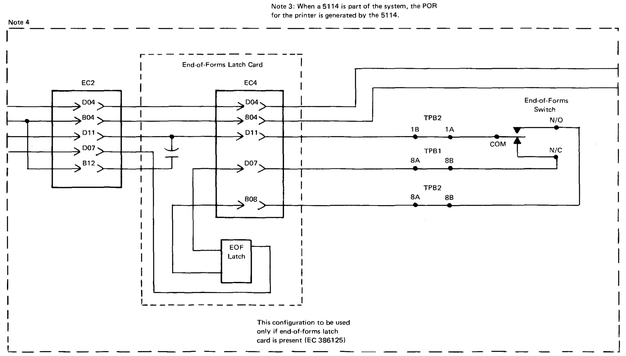
+5V D04
Gnd D05, D06, D07, D08, J05, J06, J07, J08

Note 1: Ground is provided via the signal cables rather than the power cable.

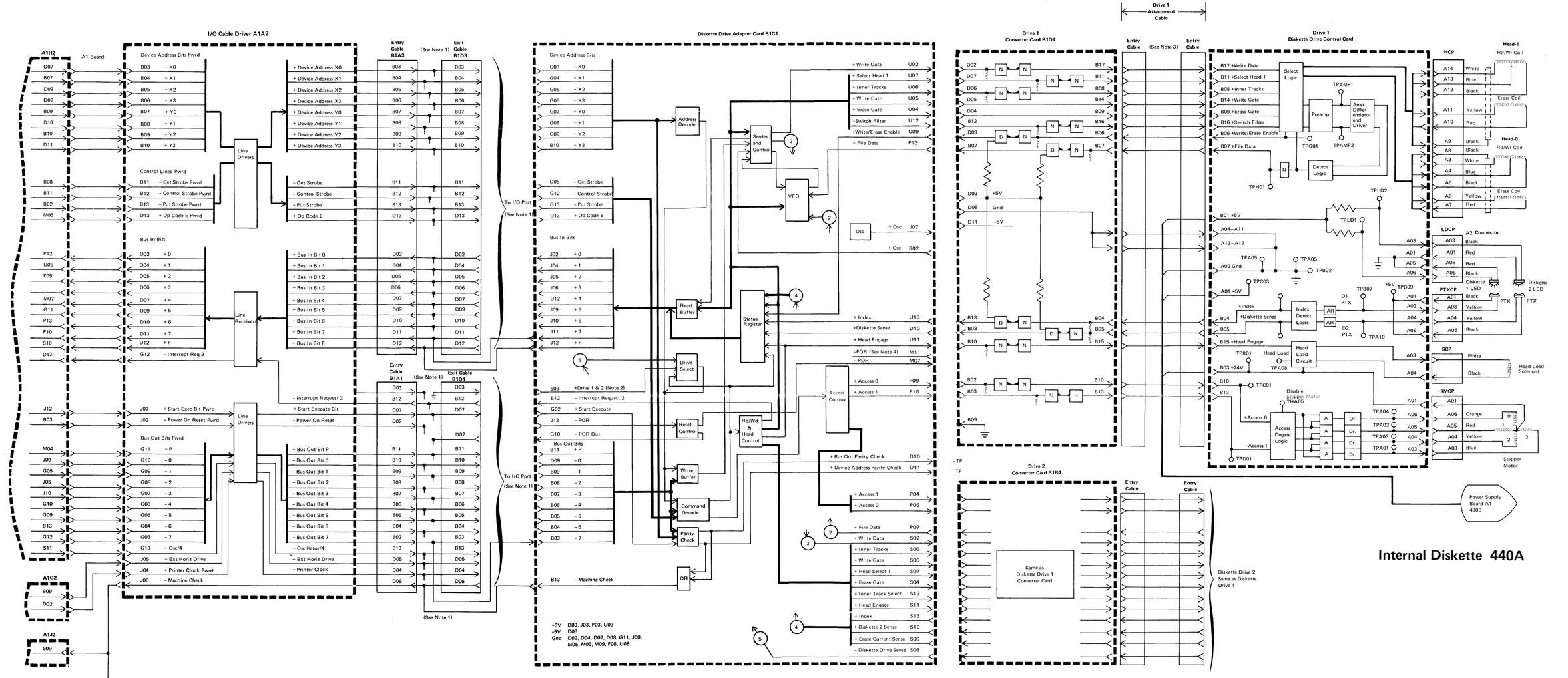
Note 2: This line is grounded on 80 CPS printers.

Note 3: When a 5114 is part of the system, the POR for the printer is generated by the 5114.

Note 4



This configuration to be used only if end-of-forms latch card is present (EC 386125)



Notes:
1. B1D3 & B1D1 are cables to the I/O port (see figure 1) for additional devices or terminator. The wiring from B1A3 and B1A1 to the B1C1 card are all as shown by pins D11, D12 of B1A3 and pins B03 and D06 of B1A1.
2. This line is always floating for drive 1 and 2.
3. Attachment cable pin layout (see figure 2).
4. POR is the General Reset line for the Adapter Card.

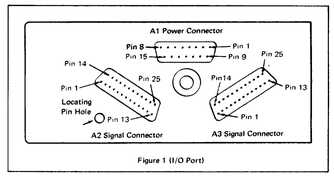


Figure 1 (I/O Port)

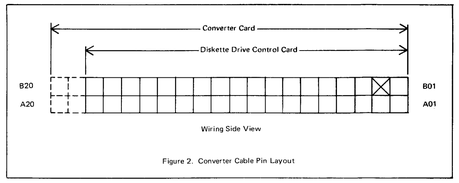


Figure 2. Converter Cable Pin Layout

Internal Diskette 440A

5114 440B Diskette Unit

5114

To 5110 Interface Port Logic 440A

Connector A2 Pins	Entry Cable A1A3 (See Note 9)	Exit Cable A1D3
	B03	B03
11	B04	B04
10	B05	B05
09	B06	B06
08	B07	B07
07	B08	B08
06	B09	B09
05	B10	B10
04	B11	B11
03	B12	B12
02	B13	B13
15	D13	D13
25	D02	D02
23	D04	D04
22	D05	D05
21	D06	D06
20	D07	D07
19	D09	D09
18	D10	D10
17	D11	D11
16	D12	D12

To 5114 I/O Port (See Note 17)

Connector A3 Pins	Entry Cable A1A1 (See Note 9)	Exit Cable A1D1
24	D03	D03
03	B12	B12
20	D07	D07
25	D02	D02
04	B11	B11
05	B10	B10
06	B09	B09
07	B08	B08
08	B07	B07
09	B06	B06
10	B05	B05
11	B04	B04
12	B03	B03
02	B13	B13
22	D05	D05
23	D04	D04
21	D06	D06

To 5114 I/O Port (See Note 17)

(See Note 9)

Diskette Drive Adapter A1C1

Device Address Bits
- G03 + X0
- G04 + X1
- G05 + X2
- G06 + X3
- G07 + Y0
- G08 + Y1
- G09 + Y2
- B10 + Y3

- D05 – Get Strobe
- G12 – Control Strobe
- G13 – Put Strobe
- D13 + Op Code E

Bus In Bits
- J02 + 0
- J04 + 1
- J05 + 2
- J06 + 3
- D12 + 4
- J09 + 5
- J10 + 6
- J11 + 7
- J12 + P

- S03 – Drive 3 & 4 (Note 3)
- B12 – Interrupt Request 2
- G02 + Start Execute
- J13 – POR
- G10 – POR Out

Bus Out Bits
- B11 + P
- D09 – 0
- B09 – 1
- B08 – 2
- B07 – 3
- B06 – 4
- B05 – 5
- B04 – 6
- B03 – 7

- B13 – Machine Check

Address Decode
Serdes and Control
VFO (Note 4)
Osc
Read Buffer
Status Register
Drive Select
Reset Control
Rd/Wd & Head Control
Write Buffer
Command Decode
Parity Check
Access Control
OR

- + Write Data U02
- + Select Head 1 U07
- + Inner Tracks U06
- + Write Gate U05
- + Erase Gate U04
- + Inner Track Select U12
- + Erase Current Sense U09
- + File Data P13
- + Osc J07
- + Osc B02
- + Index U13
- + Diskette 2 Sense U10
- + Head Engage U11
- – POR (See Note 8) M11
- – POR M07
- + Access 0 P09
- + Access 1 P10
- + Access 2 P11
- + Access 3 P12
- + Bus Out Parity Check D10
- + Device Address Parity Check D11
- + Access 0 P02
- + Access 1 P04
- + Access 2 P05
- + Access 3 P06
- + File Data P07
- + Write Data S02
- + Inner Tracks S06
- + Write Gate S05
- + Head Select 1 S07
- + Erase Gate S04
- + Inner Track Select S12
- + Head Engage S11
- + Index S13
- + Diskette 2 Sense S10
- + Erase Current Sense S09
- – Diskette Drive Sense S08

+5V D03, J03, P03, U03
-5V D06
Gnd D02, D04, D07, D08, G11, J08, M05, M06, M09, P08, U08

Drive 1

A1D4	A1 Connector
D02	B02
D07	B07
D06	B06
D05	B05
D04	B04
B12	D12
D09	B09
B07	D07
B13	D13
B08	D08
B10	D10
B02	D02
B03	D03
B04	D04
B05	D05

Drive 2

A1B4	A1 Connector
B02	D02
B03	D03
B04	D04
B05	D05
B07	D07
D02	B02
D06	B06
D05	B05
D07	B07
D04	B04
B12	D12
B10	D10
B13	D13
B08	D08
D09	B09
B09	D09

Diskette Drive 2 Same as Diskette Drive 1

Diskette Drive Control

- D02 + Write Data — TP A1
- D07 + Select Head 1 — TP A5
- D06 + Inner Tracks — TP A4
- D05 + Write Gate — TP A3
- D04 + Erase Gate — TP A2
- B12 + Inner Track Sel — TP B8
- D09 + Erase Current Sns (Note 11)
- B07 + File Data

Select Logic, Driver, GND, THP 15, TPA 7, THP 8, THP 16, THP 13, Amp Differentiator and Driver, Preamp, THP14, THP 9, THP10, THP 1, OR, TPB 14, Gnd, G07, G06, J06, +5V, TPA 12, J07, TPA 14, G08, TPB 9, +5V, J09, THP 7, Index Detect Logic, THP 6, Amp, TPB 16, G11, G10, TPB 13, G05, A, TPB 6, TPB 7, TPA 11, +24V (from 5114), J04, J05, TPB 11, G03, TPA 10, J02, TPB 12, G04, TPB 10, G02, Access Degate Logic, THP 5, THP 4, THP 3, THP 2, Driver

- B13 + Index
- B08 + Diskette 2 Sense
- B10 + Head Engage
- B09 – Diskette Drive Sense (Used on DD2 only)
- B02 + Access 0
- B03 + Access 1
- B04 + Access 2
- B05 + Access 3

TP B1, TP B2, TP B3, TP B4

P/N 8528195 or 4178068

(from 5114)
+5V D03, J03, G07, J07, J09, G11, TPB 5
-5V D11, TPA 9
Gnd D08, J08, G06, J06, TPA 6, TPA 13
+24V D10, J04, J05, TPA 8,

Amp, TPB 16, G11, G10, TPB 13, G05, A, TPA 11, OR, J11, J04, TPA 11, J05, +24V, TPB 11, G03, TPA 10, J02, TPB 12, G04, TPB 10, G02, Driver

P/N 4178065

Head-1 Rd/Wr Coil
Erase Coil
Head-0 Rd/Wr Coil
Erase Coil

HCP		
14	White	
13	Blue	
12	Black	
11	Yellow	
10	Red	
9	Black	
8	Black	
3	White	
4	Blue	
5	Black	
6	Yellow	
7	Red	

A2 Connector

D07	Black	
D06	Red	
B06	Red	
B07	Black	
	Diskette 1 LED	Diskette 2 LED
	Black	PTX PTX
B09	Yellow	
D11	Yellow	
D10	Black	
D05	Black 28 Ω	Head Load Solenoid 160 Ω
B04	Yellow	
B05	Black	
D03	Orange	0
B02	Red	1
D04	Yellow	2 3
D02	Blue	

Stepper Motor

Card P/N 4178065 Only
D05 Black Yellow — With TP Block Asm
B04
OR
B11 White Black — Without TP Block Asm
B04

Control Card Test Points

TPA1	+ Write Data
TPA2	+ Erase Gate
TPA3	+ Write Gate
TPA4	+ Inner Tracks
TPA5	+ Select Head 1
TPA6	Ground
TPA7	+ Erase Current Sense (Note 11)
TPA8	+ 24 Vdc
TPA9	– 5 Vdc
TPA10	MC-1
TPA11	MC Common (Note 12)
TPA12	Diskette 1 LED Voltage
TPA13	Ground
TPA14	Diskette 1 PTX

THP1	+ Diskette Loaded
THP2	+ Predrive MC-3 (Note 13)
THP3	+ Predrive MC-2 (Note 14)
THP4	+ Predrive MC-1 (Note 15)
THP5	+ Predrive MC-0 (Note 16)
THP6	Diskette 2 Index
THP7	Diskette 1 Index
THP8	Diff Read A
THP9	Diff Read B
THP10	– High Gain
THP11	– Align Access 0
THP12	– High Current
THP13	Preamp TP1
THP14	Preamp TP2
THP15	– High Gain A
THP16	– High Gain B

TPB1	+ Access 0
TPB2	+ Access 1
TPB3	+ Access 2
TPB4	+ Access 3
TPB5	+ File Data
TPB6	+ Diskette 2 Sense
TPB7	+ Head Engage
TPB8	+ Inner Track Select
TPB9	+ Index
TPB10	MC-3
TPB11	MC-0
TPB12	MC-2
TPB13	– Head Load
TPB14	Diskette 2 LED Voltage
TPB15	+ 5 Vdc
TPB16	Diskette 2 PTX

Notes:
1. A2 I/O Signal Cable enters A1 Board via A1A3 and exits via A1D3 to the I/O Interface Port A2.
2. A3 I/O Signal Cable enters A1 Board via A1A1 and exits via A1D1 to the I/O Interface Port A3.
3. Drive 3 & 4 is created in the 5114 by grounding that line in the 5110 Internal Diskette Drive Board (B1).
4. On some machines, the VFO circuitry is on a separate card in the A1B1 position.
5. These voltages go to the A1 Power Connector on the 5114 I/O Interface Port.
6. +5V from the 5110 terminates at the 5114. The 5114 generates +5V for internal use and use for all I/O devices attached after it. Also, there is no ground via the power cable (A1).
7. TB 1 Connections

	60 Hz		50 Hz		
	100 Vac	115 Vac	100 Vac	220 Vac	235 Vac
P3-13	TB1-2	TB1-3	TB1-2	TB1-3	TB1-4
P3-14	TB1-4	TB1-4	TB1-5	TB1-5	TB1-5

8. –POR is the General Reset Line for the Adapter Card.
9. A1D3 & A1D1 are cable outputs for additional devices or terminator. The wiring from A1A3 and A1A1 to the A1C1 card are all as shown by pins D11, D12 of A1A3 and pins B03 and D06 of A1A1.
10. Some power supplies do not have C2. In this case F1 is 8A.

A1 Power Connector
Pin 8, Pin 15, Pin 1, Pin 9, Pin 14, Pin 25, Pin 1, Locating Pin Hole, Pin 13
A2 Signal Connector

Pin14, Pin 25, Pin 13, Pin 1
A3 Signal Connector

Notes 11 through 16 apply to diskette drive control card P/N 4178065.

11. + Current Enabled.
12. + Hd Load Solenoid.
13. – Hd Load Osc.
14. + 14 Vdc
15. Gnd
16. Gnd
17. A1D3 & A1D1 are cables to the I/O port (see Figure 1) for additional devices or terminator. The wiring from A1A3 and A1A1 to the A1C1 card are all as shown by pins D11, D12 of A1A3 and pins B03 and D06 of A1A1.

Connector A1 Pins	A1A2	A1A4	
	B12	B12	+12V
13	B12	B13	+12V
14	D12	D12	–12V
		D13	–12V
12	B11	B11	+ 8.5v
15	D11	D11	-5V

To 5110 Interface Port Logic 480C

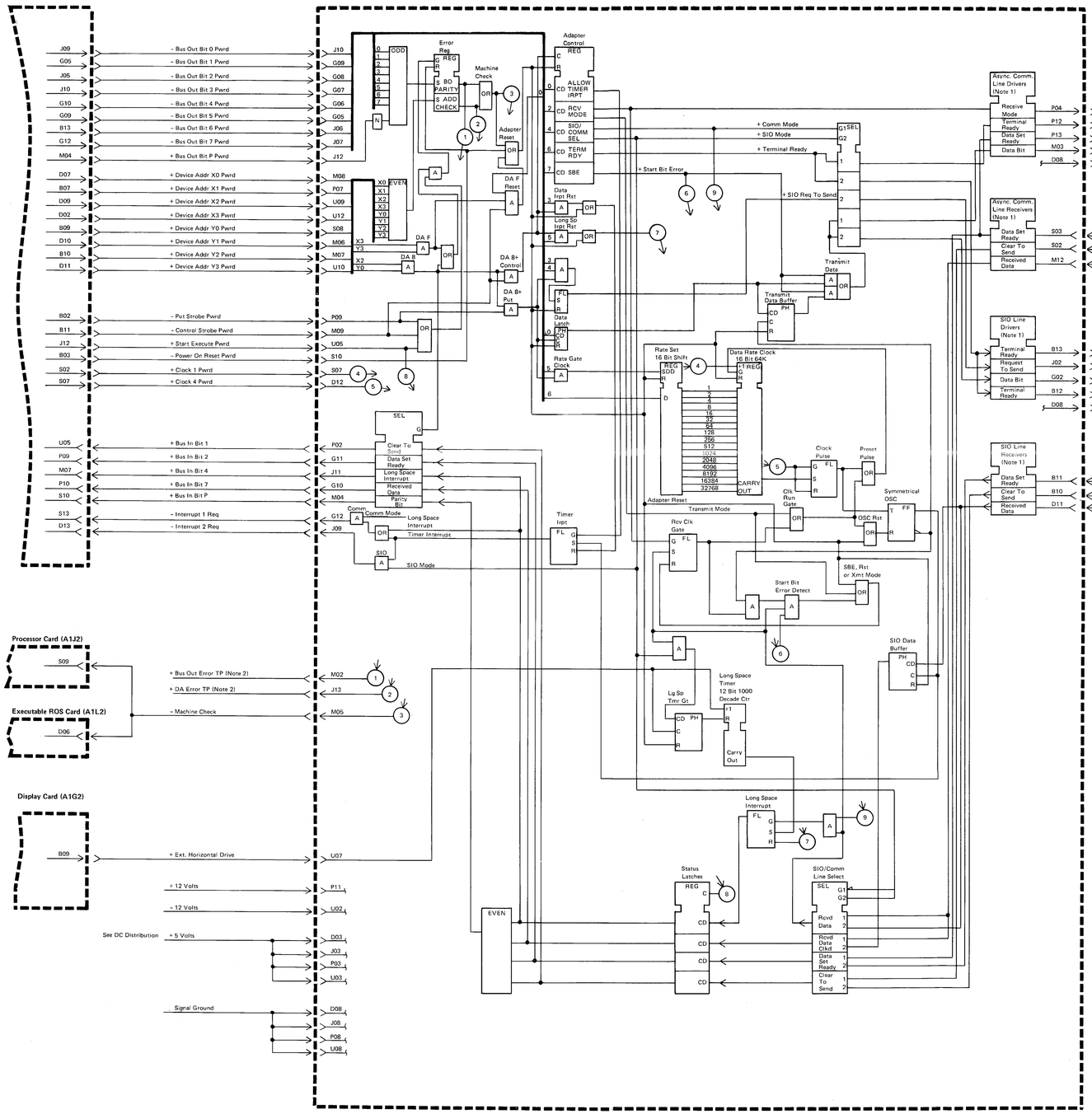
See Note 5

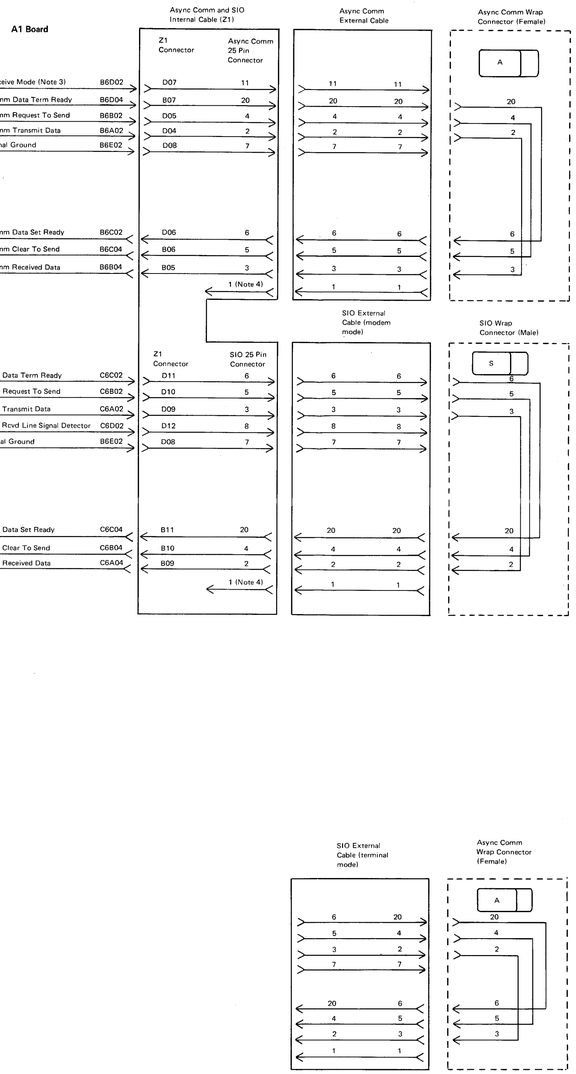
See Note 5

I/O Cable Assembly Connector
A1 Power Connector
Pin 1, Pin 8, Pin 9, Pin 15, Pin25, Pin1, Pin 14, Pin 14, Pin 13, Pin1, Pin 25, Pin 13, Locating Pin, Cables
A3 Signal Connector, A2 Signal Connector

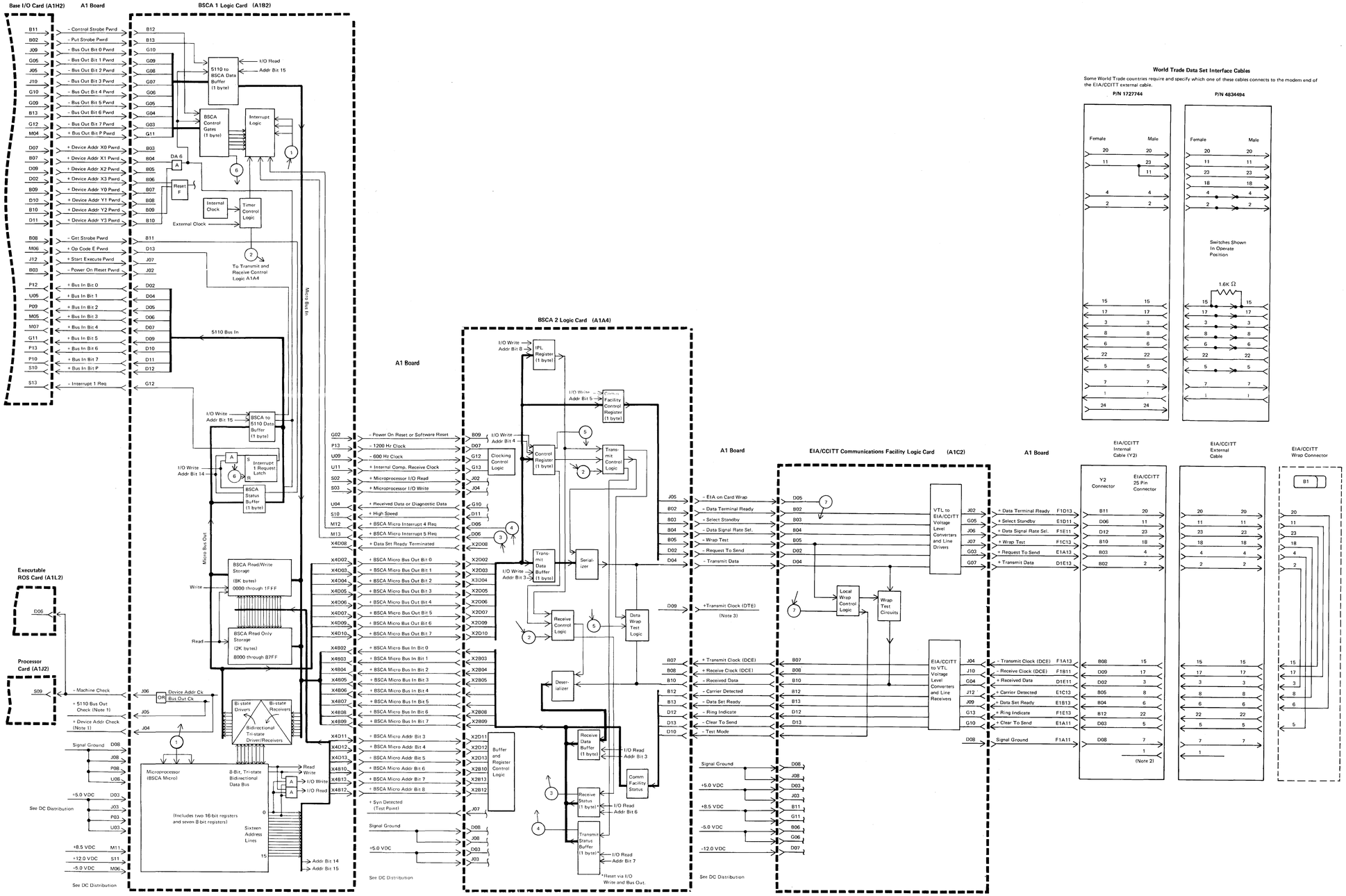
Figure 1

AC Box
Grn/Yel
Black
Grn/Yel
White
L1
J3, P3
Power On/Off IPO Switch
Diskette Drive 1 Motor
J6, P6
J5, P5
Fan
RI
TB1
T1
Transformer
C5
See Note 7
1.5A Time Lag
F4
J4, P4
J7, P7
Diskette Drive 2 Motor
D1
D2
R1
C1
C2
See Note 10
F1
10A
E1
E2
P1, J1
D3
D4
D5
D6
C3
R2
C4
R3
F2
5A
+24V
F3
1A
-5V
+5
Gnd
J2
A1A4
Note 6
Note 6
01 (Note 6)
02
03 A1 Power Connector on the I/O Interface Port
04
05





Note 1 – The line driver and line receiver circuits are EIA voltage levels. Acceptable voltage levels are:
Up +3 to +25 VDC
Down –3 to –25 VDC
Note 2 – CE probe points–These pins are not connected to any nets on the A1 Board. The check circuit is active (plus) if an odd number of device address bits are active or if an even number of bus out bits are active.
Note 3 – This line used by TRAP tester only.
Note 4 – Pin 1 is the protective ground. It is connected to the machine frame.



World Trade Data Set Interface Cables

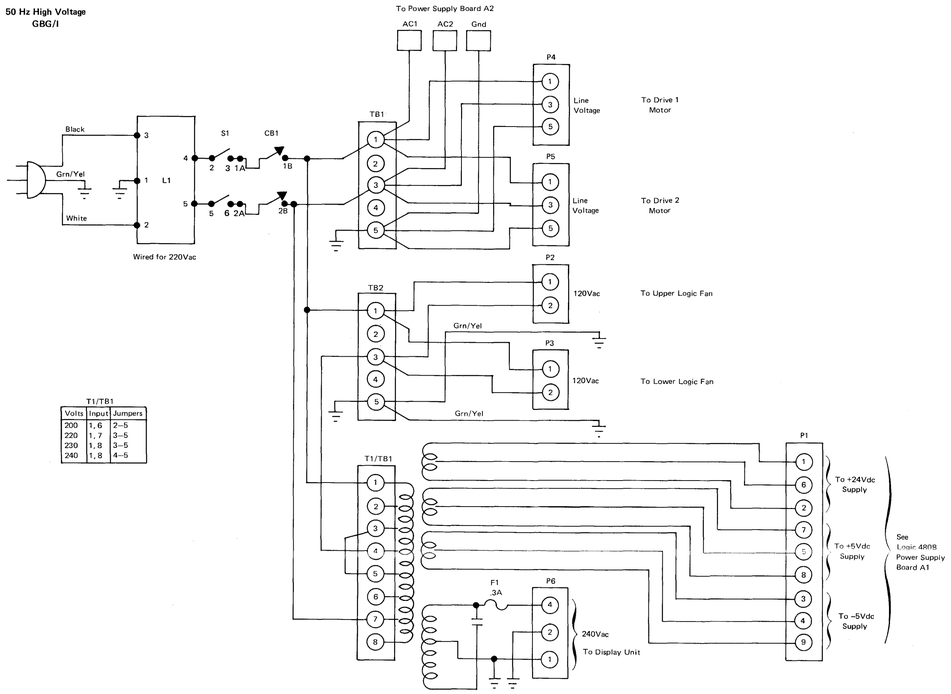
Some World Trade countries require and specify which one of these cables connects to the modem end of the EIA/CCITT external cable.

Note 1 — CE probe points — These pins are not connected to any nets on the A1 Board. The check circuit is active (plus) if an odd number of device address bits are active or if an even number of bus out bits are active.

Note 2–Pin 1 is the protective ground. It is connected to the machine frame.
Note 3–Used by TRAP tester only.

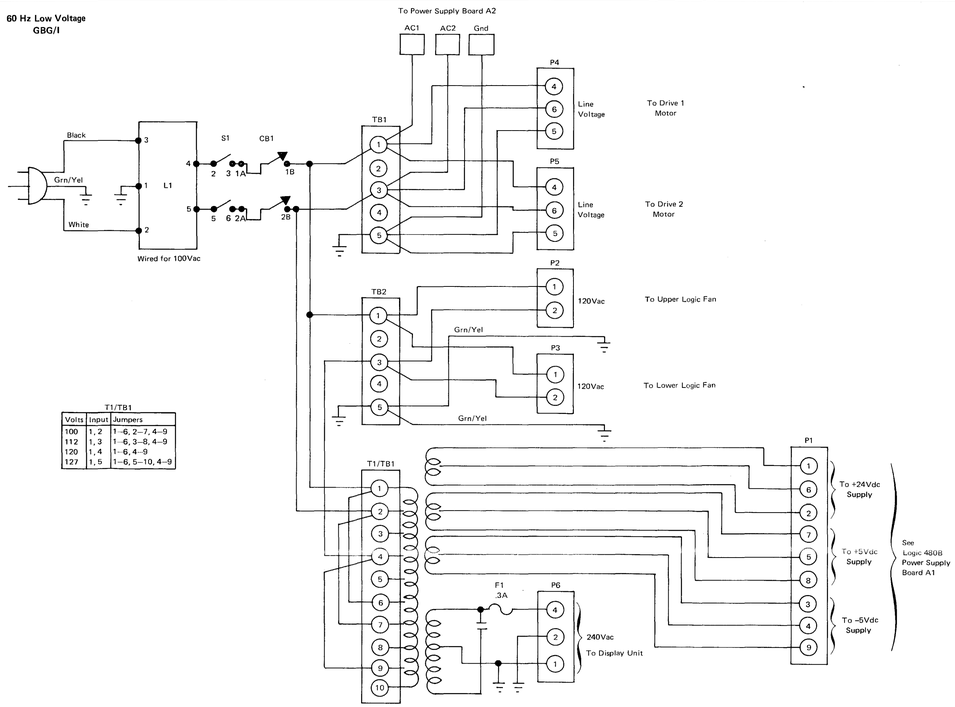
5110 Model 3 480A
AC Power Distribution

50 Hz High Voltage
GBG/I



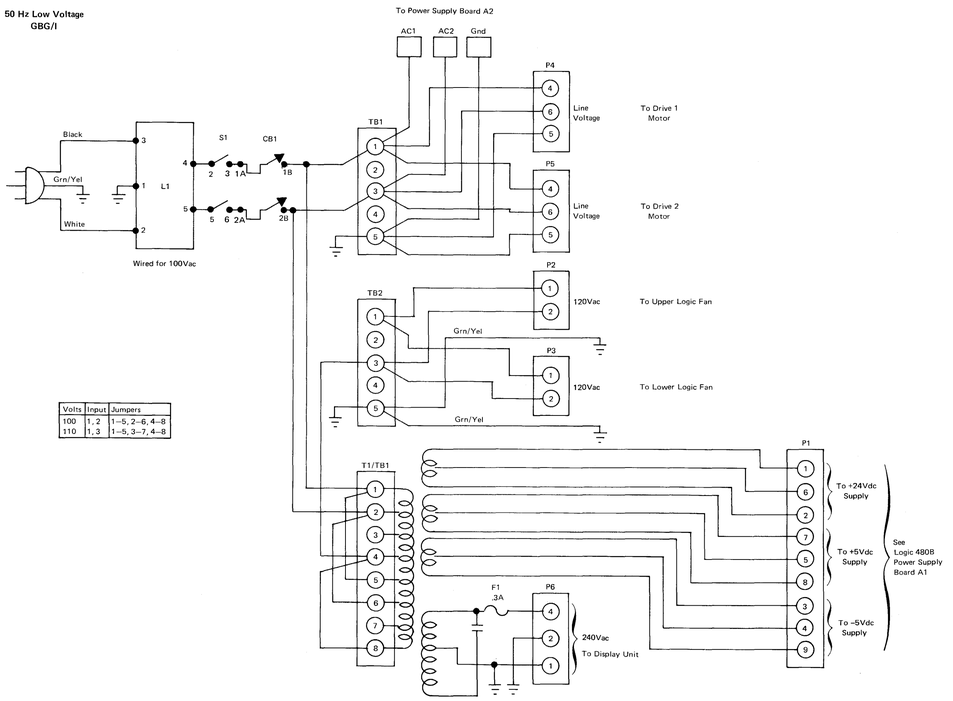
T1/TB1		
Volts	Input	Jumpers
200	1, 6	2–5
220	1, 7	3–5
230	1, 8	3–5
240	1, 8	4–5

60 Hz Low Voltage
GBG/I



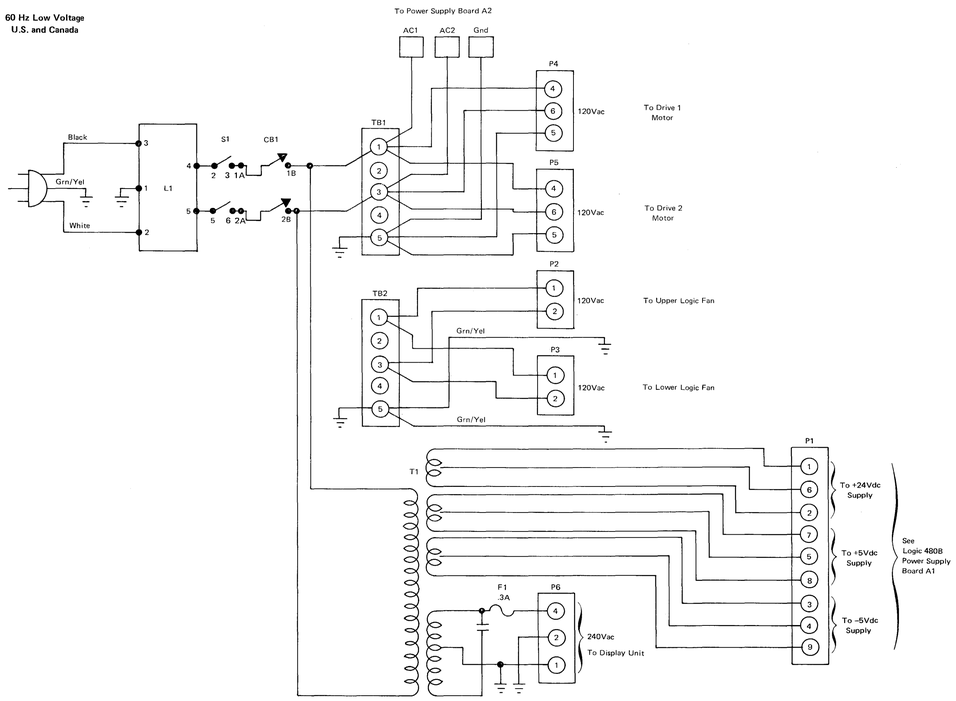
T1/TB1		
Volts	Input	Jumpers
100	1, 2	1–6, 2–7, 4–9
112	1, 3	1–6, 3–8, 4–9
120	1, 4	1–6, 4–9
127	1, 5	1–6, 5–10, 4–9

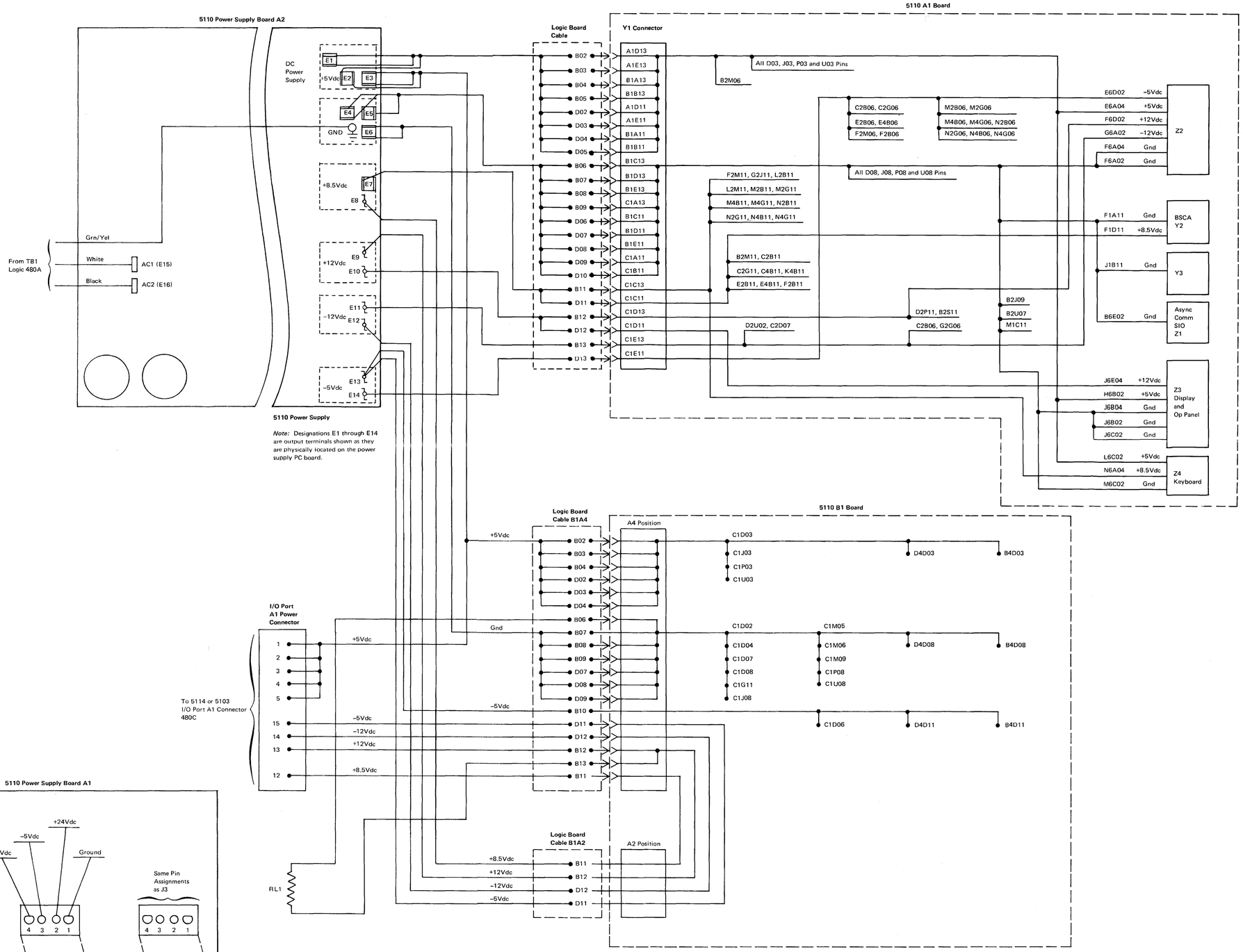
50 Hz Low Voltage
GBG/I



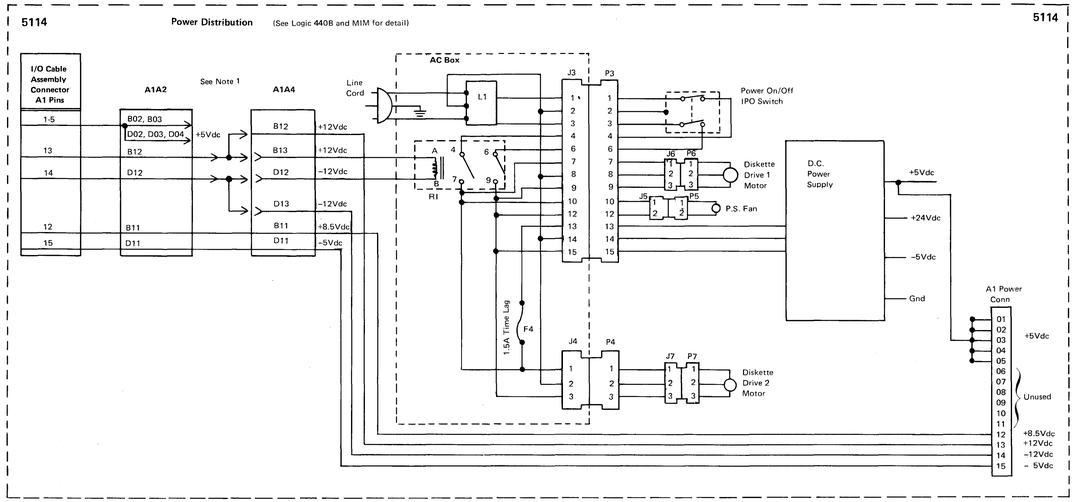
Volts	Input	Jumpers
100	1, 2	1–5, 2–6, 4–8
110	1, 3	1–5, 3–7, 4–8

60 Hz Low Voltage
U.S. and Canada





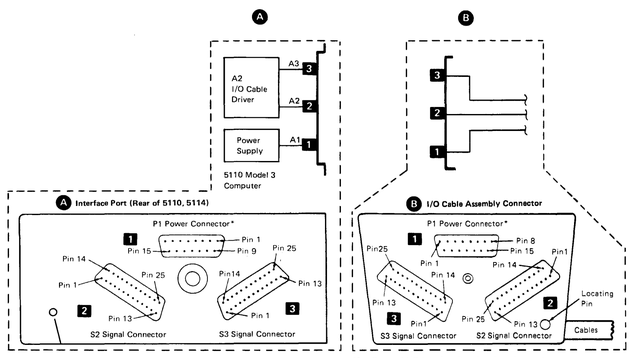
5110 Model 3 480B
DC Power Distribution

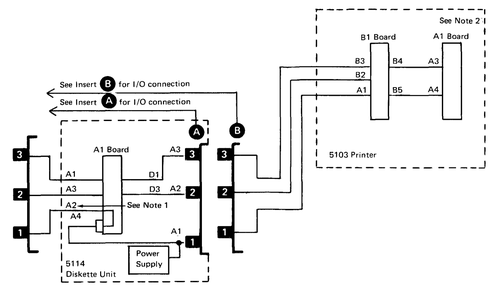


5110 I/O Interface Port
A1 Power Connector
(Logic 480B)

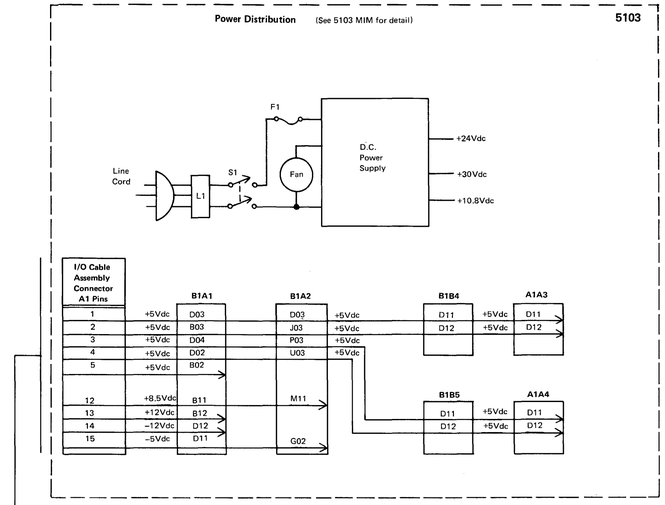
External I/O Interface Port

A1 Power Conn	
Pin	Voltage
01	+5Vdc
02	+5Vdc
03	+5Vdc
04	+5Vdc
05	+5Vdc
06	Unused
07	Unused
08	Unused
09	Unused
10	Unused
11	Unused
12	+8.5Vdc
13	+12Vdc
14	–12Vdc
15	–5Vdc





Notes:
1. The 5110 +5Vdc stops here. The 5114 provides its own +5Vdc and +5Vdc for attaching devices. Also, ground is distributed via A2 and A3 connectors.
2. The cable terminator is permanently wired to the 5103 printer adapter card. If the printer is not in the system, a terminator must be installed on the last I/O device.



LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+APL SWITCH										S04				P04		Z3B03(H6B04)
+BUS IN BIT P		D12		D12			M04		S12	S10				P07		
+BUS IN BIT P										X2D12	X2D12					
+BUS IN BIT 0		D02		D02					S02	P12	D12			P12		
+BUS IN BIT 0										X4D12	X4D12					
+BUS IN BIT 1		D04		D04			P02		S03	U05				P13		
+BUS IN BIT 1										X4B10	X4B10					
+BUS IN BIT 2		D05		D05			G11		S04	P09				S02		
+BUS IN BIT 2										X4D13	X4D13					
+BUS IN BIT 3		D06		D06					S05	M05				S03		
+BUS IN BIT 3										X4D09	X4D09					
+BUS IN BIT 4		D07		D07			J11		S07	M07				S04		
+BUS IN BIT 4										X4D06	X4D06					
+BUS IN BIT 5		D09		D09					S08	G11				S05		
+BUS IN BIT 5										X2D13	X2D13					
+BUS IN BIT 6		D10		D10					S09	P13				U02		
+BUS IN BIT 6										X2B13	X2B13					
+BUS IN BIT 7		D11		D11			G10		S10	P10				U04		
+BUS IN BIT 7										X4B09	X4B09					
+BUS OUT BIT P										X2B10	X2B10					

LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+BUS OUT BIT P	G11		G11			J12		D02	D12	M04				J06		
-BUS OUT BIT 0 PWRD	G10		G10			J10		B02	P06	J09				J07		
-BUS OUT BIT 1 PWRD	G09		G09			G09		B03	P09	G05				M03		
-BUS OUT BIT 2 PWRD	G08		G08			B04		B04	S06	J05				J02		
-BUS OUT BIT 4 PWRD	G06		G06			G06		B07	M04	G10				J09		
-BUS OUT BIT 5 PWRD	G05		G05			G05		B08	S10	G09				G10		
-BUS OUT BIT 6 PWRD	G04		G04			J06		B09	M10	B13				J13		
-BUS OUT BIT 7	G03		G03			J07		B10	M07	G12				J10		
-BUT OUT BIT 3	G07		G07					B05	P11	J10				J05		
-CONTROL STROBE PWRD	B12		B12			M09		B13	G12	B11				M04		
+C1 PWRD						S07		G03		S02						
+C2 PWRD								G04	J05	U04						
+C4 PWRD						D12			P04	S07						
+C5 PWRD								J04	P07	U11						
+DEVICE ADDR X0										X2B05	X2B05					
+DEVICE ADDR X0 PWRD	B03		B03			M08		D04	G04	D07				M12		
+DEVICE ADDR X1										X2B08	X2B08					
+DEVICE ADDR X1 PWRD	B04		B04			P07		D05	B02	B07				G09		
+DEVICE ADDR X2										X2D04	X2D04					
+DEVICE ADDR X2 PWRD	B05		B05			U09		D06	J06	D09				G07		

LINE NAME	A2	A4	B2	C2	C4	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+DEVICE ADDR X3									X2B04	X2B04					
+DEVICE ADDR X3 PWRD	B06		B06			U12		D07	G07	D02				G13	
+DEVICE ADDR Y0										X2D03	X2D03				
+DEVICE ADDR Y0 PWRD	B07		B07			S08		D09	M11	B09				G05	
+DEVICE ADDR Y1										X2B09	X2B09				
+DEVICE ADDR Y1 PWRD	B08		B08			M06		D10	G06	D10				G08	
+DEVICE ADDR Y2										X2B03	X2B03				
+DEVICE ADDR Y2 PWRD	B09		B09			M07		D11	U07	B10				M10	
+DEVICE ADDR Y3										X2D02	X2D02				
+DEVICE ADDR Y3 PWRD	B10		B10			U10		D12	U04	D11				G12	
+DEVICE ADDRESS Y1										X2B09	X2B09				
+EXT HORIZ. DRIVE	J05					U07			B09							Z3D11(J6E02)
-GET STROBE PWRD	B11		B11					J02		B08						
-INTERRUPT 1 REQ			G12			G12				S13						
-INTERRUPT 1 REQ										X2D06	X2D06					
-INTERRUPT 2 REQ	G12					J09				D13						
-INTERRUPT 2 REQ										X2B06						
-MACHINE CHECK	J06		J06			M05		U12	U13	G06	S09			D06		
+MCC 3 PWRD									B08	G07				G06		
+MCC 4									M06		J02		J05	M05		

LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+MONITOR VIDEO OUT									D09							Z3B13(K6B04)
+MONITOR VIDEO OUT									B13							
+OP CODE E PWRD	D13		D13					D13		M06				B10		
+OSC PWRD									G03	S05						
-POWER ON RESET PWRD	J02		J02			S10		S13	M12	D04	B11			M02		Z4D07(K6B02)
-PUT STROBE PWRD	B13		B13			P09		G02	J12	B02						
-RESTART SWITCH										G02				D05		Z3D13(K6B02)
-SELECT ROS											B04		G06	P02		
-SELECT ROS											G06					
+START EXECUTE PWRD	J07		J07			U05		B12	D05	J12						
-STORAGE ADDR BIT A PWRD											U04		G09	U10	B12	
-STORAGE ADDR BIT B PWRD											S04		G08	U09	B13	
-STORAGE ADDR BIT C PWRD											S05		G07	U07	D11	
-STORAGE ADDR BIT D PWRD											U05		J07	S07	D10	
-STORAGE ADDR BIT E PWRD											U06		J06	M13	B09	
-STORAGE ADDR BIT 0										B06			G04	U06		
-STORAGE ADDR BIT 0										X4B12	X4B12					
-STORAGE ADDR BIT 1										S09			G13	U13		
-STORAGE ADDR BIT 1										X4B13	X4B13					
-STORAGE ADDR BIT 2										D05			J12	U12		

LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
-STORAGE ADDR BIT 2											X2B11	X2B11				
-STORAGE ADDR BIT 2 PWRD											D07				G08	
-STORAGE ADDR BIT 3											B05		J13	U11		
-STORAGE ADDR BIT 3											X2B12	X2B12				
-STORAGE ADDR BIT 4 PWRD											D04		G12	S13		
-STORAGE ADDR BIT 5										D11	B07		G11	S12		
-STORAGE ADDR BIT 6										B10	B09		J11	P10		
-STORAGE ADDR BIT 7 PWRD											D13		J10	S10	J06	
-STORAGE ADDR BIT 8 PWRD											D09		J09	S09	G05	
-STORAGE ADDR BIT 9 PWRD											S03		G10	S08	G04	
-STORAGE R/W BUS BIT P EVEN											M11		D09	D09	D05	
-STORAGE R/W BUS BIT P EVEN											S11					
-STORAGE R/W BUS BIT P ODD											J06		B13	B13	B02	
-STORAGE R/W BUS BIT P ODD											P10					
+STORAGE R/W BUS BIT 0 EVEN										S05	P02			D02	D02	J12
+STORAGE R/W BUS BIT 0 EVEN											S02					
+STORAGE R/W BUS BIT 0 ODD										U05	G07			B07	D10	B07
+STORAGE R/W BUS BIT 0 ODD											M06					
+STORAGE R/W BUS BIT 1 EVEN										U12	P13			D04	D04	J11
+STORAGE R/W BUS BIT 1 EVEN											U11					

LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+STORAGE R/W BUS BIT 1 ODD										M08	J07			B08	D12	D07
+STORAGE R/W BUS BIT 1 ODD											M07					
+STORAGE R/W BUS BIT 2 EVEN										S07	M12			B04	B04	J09
+STORAGE R/W BUS BIT 2 EVEN											P06					
+STORAGE R/W BUS BIT 2 ODD										S11	G09			D07	D13	B08
+STORAGE R/W BUS BIT 2 ODD											P09					
+STORAGE R/W BUS BIT 3 EVEN										S12	M05			B05	B05	J07
+STORAGE R/W BUS BIT 3 EVEN											M09					
+STORAGE R/W BUS BIT 3 ODD										S08	J13			G02	G02	D04
+STORAGE R/W BUS BIT 3 ODD											P12					
+STORAGE R/W BUS BIT 4 EVEN										U06	U02			D05	B02	J05
+STORAGE R/W BUS BIT 4 EVEN											U12					
+STORAGE R/W BUS BIT 4 ODD										M13	J12			G03	G03	B05
+STORAGE R/W BUS BIT 4 ODD											M08					
+STORAGE R/W BUS BIT 5 EVEN										P12	M13			D06	B03	J04
+STORAGE R/W BUS BIT 5 EVEN											S12					
+STORAGE R/W BUS BIT 5 ODD										U09	J09			D12	G04	B04
+STORAGE R/W BUS BIT 5 ODD											P04					
+STORAGE R/W BUS BIT 6 EVEN										P10	P07			B02	B08	D12
+STORAGE R/W BUS BIT 6 EVEN											P11					

LINE NAME	A2	A4	B2	C2	C4	D2	E4	F2	G2	H2	J2	K2	K4	L2	M2	CABLE
+STORAGE R/W BUS BIT 6 ODD										U10	G10			D13	J04	D02
+STORAGE R/W BUS BIT 6 ODD											M03					
+STORAGE R/W BUS BIT 7 EVEN										S09	M10			B03	B09	D13
+STORAGE R/W BUS BIT 7 EVEN											S06					
+STORAGE R/W BUS BIT 7 ODD										U11	G13			B12	B12	D06
+STORAGE R/W BUS BIT 7 ODD											M04					
+WRITE EVEN TIMED											U07			J11	J02	
+WRITE ODD TIMED											B08			J12	J10	

Note:
This net listing does not contain any 1 or 2 pin nets.