89758600

CONTROL DATA CORPORATION

CONTROL DATA®
TTL A/Q-DSA BUS EXPANDER

AT310-A

GENERAL DESCRIPTION
OPERATION AND PROGRAMMING
INSTALLATION AND CHECKOUT
THEORY OF OPERATION
DIAGRAMS
MAINTENANCE
PARTS DATA
WIRE LISTS
MAINTENANCE AIDS

HARDWARE REFERENCE/
CUSTOMER ENGINEERING MANUAL

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SHEET 1 OF 1

EQUIPMENTS							
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SECTION 1

GENERAL DESCRIPTION

INTRODUCTION

The CONTROL DATA® AT310-A TTL A/Q-DSA Bus Expander consists of two basic 50-Pak TTL type IC logic assemblies and a flat cable, used in either the A/Q or DSA bus to expand the capabilities of the CPU. The AT310-A may be used with the standard BT148-A Expansion Enclosure or in a special purpose enclosure and the AB107/AB108 CPU. Up to two expansion enclosures may be connected to the computer, each with a set of expanders. When expansion of both the A/Q and DSA buses is required, two sets of expanders must be used.

Figure 1-1 shows the expansion of both the A/Q and DSA buses, using two sets of expanders. The flat cable supplied, is connected to P2 in each enclosure.

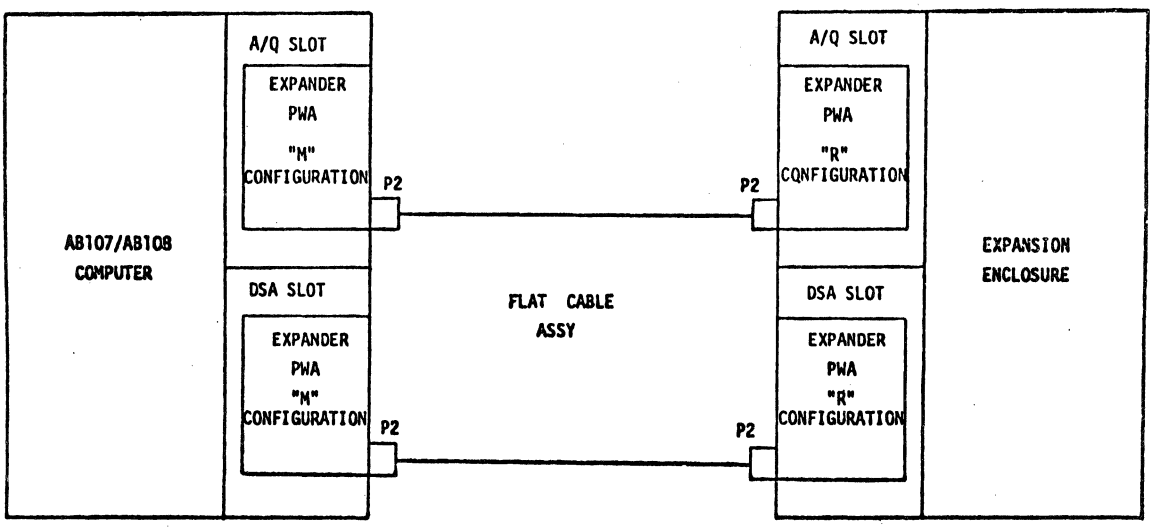


Figure 1-1. Basic A/Q-DSA Expansion Configuration

TABLE 1-1. SPECIFICATIONS

Specifications	Explanation
PHYSICAL CHARACTERISTICS	
Dimensions	
Width	$6\frac{13}{16}$ inches
Length	$12\frac{3}{8}$ inches
Depth	$\frac{3}{8}$ inches
ENVIRONMENT	
Temperature	
Shipping	-40°F to 158°F (-40°C to 70°C)
Storage	14°F to 122°F (10°C to 50°C)
Operating	40°F to 120°F (5°C to 50°C)
Humidity	
Shipping	0 to 100% RH non-condensing
Storage	10% to 90% RH non-condensing
Operating	10% to 90% RH non-condensing
POWER	
Input Requirements	5 Volts dc
Signal Level	
Low State (0)	0.4 Volts dc, or less
High State (1)	2.4 Volts dc, or more
Ground	Logic ground is connected to computer logic ground

SECTION 2

OPERATION AND PROGRAMMING

OPERATION AND PROGRAMMING

Programming of the AT310-A TTL A/Q-DSA Bus Expander is not required. Refer to the 1784 Computer Reference Manual or to the AB107/AB108 Computer Customer Engineering Manual and the reference or customer engineering manuals of the controllers to be used with the system,for programming.

Refer to Section 3 for installation, checkout and operation of the bus expander.

SECTION 3

INSTALLATION AND CHECKOUT

INSTALLATION

Unpacking

1. Carefully remove wrapping from the AT310-A TTL A/Q-DSA Bus Expander PWA's. Check for physical damage to each and record damage on the packing list. Check that part numbers agree with packing list.

2. Remove wrapping from cable and check for physical damage. Record damage on packing list. Check that part number agrees with packing list.

Physical Limitations

Care must be taken to prevent damage to the bus expander PWA's. They must not be flexed, bent or dropped.

Power Requirements

The bus expanders require +5 vdc derived from the power supply of the AB107/AB108.

Cabling and Connectors

An external interconnecting flat-cable is available for use between the controller and the distribution unit. The cable part number is 89821800. It is approximately four feet long.

Where two sets of expander PWA's are required, two sets of flat cables must be installed.

Cooling Requirements

The expander PWA's are cooled by the forced air system of the enclosure. No further cooling is required. Refer to the computer customer engineering manual (89633300) for further information concerning cooling capabilities of the computer and expansion enclosure.

Environmental Considerations

The environmental considerations necessary for operation (or storage) of the controller cards are listed in Table 1-1.

Preparation and Installation

To install the TTL bus expanders perform the following with the computer power switched "off":

1. Remove the air-flow blocks from lower slide of card slots to be used in both the main and remote enclosures. Refer to Figure 3-1 for selection of the location for PW board.

2. Inspect both enclosures, card slots, PW board slides and connector pins, for physical damage.

3. Place the internal select jumpers in the positions on each PWA's as described below and shown in Figure 3-2:

For A/Q expansion:

On the main enclosure PWA (89821600 or 89876000)

1) At U1, place jumper plugs at 1 and at 3 (both marked M)
2) Below U6-U7 (marked AQM), place jumper plug.
3) Below U20, place jumper plug at 6 (marked AQM).
4) At U40, place jumper plugs at 12, 15 and 16 (marked M, M and AQM respectively).

On the remote enclosure PWA (89759200 or 89880700)

1) At U1, place jumper plugs at 2 and at 4 (marked R).
2) Below U6-U7 (marked AQM-DSR) place jumper plug.
3) Below U20, place jumper plug at 5 (marked AQR).
4) Below U34-U35, place jumper plug at 9 (marked R), at 10 (marked AQR) and at 11 (marked R).
5) At U40, place jumper plugs at 13, 14 and 17 (marked AQR, R and R respectively).

For DSA expansion:

On the remote enclosure PWA (89759200 or 89880700)

1) At U1, place jumper plugs at 2 and at 4 (both marked R).
2) Below U6-U7 (marked DSR-AQM), place jumper plug.
3) Below U20, place jumper plug at 7 (marked DSR).
4) Below U34-U35, place jumper plug at 9 (marked R) and 11 (marked R).
5) At U40, place jumper plugs at 16, 14 and 17 (marked R, DSR and R respectively).

On the main enclosure PWA (89821600 or 89876000)

1) At U1, place jumper plugs at 1 and at 3 (both marked M).
2) Below U20, place jumper plug at 8 (marked DSM).
3) Below U34-U35, place jumper plug at 9, 10 and 11 (marked DSM).
4) At U40, place jumper plugs at 12, 13 and 15 (marked M, DSM and M, respectively).

CAUTION

Do not install cables or expanders PWA's in computer enclosure or expansion enclosure with power on.

4. Interrupt connections are transferred to the computer through the Sint line driver receivers. Connect a wire jumper from the controller Interrupt signal to an available Sint position on P1 of the A/Q expansion position in the remote enclosure. Connect a wire jumper from chosen Sint pin in the computer A/Q expansion enclosure to the required Interrupt position on the CPU. Refer to Table 3-1 for Interrupt positions available for selection.

5. Scanner connection must be made by connecting wire jumpers from the scanner sections of required controllers through MTR and RTM signals. See Figure 4-3 of Section 4.

   Signal MTR is connected to P1B19.
   Signal RTM is connected to P1A19.

6. Install expander flat cable(s) on back-plane at P2 in the position assigned.

7. Carefully install the bus expander PWA's (part no. 89821600 or 89876000 for the main enclosure and 89759200 or 89880700 for the remote enclosure) in each enclosure, making certain that it slides in smoothly.

CHECKOUT

1. Refer to the CPU reference manual, publication number 89633400 and to the reference or maintenance manuals for the controllers used with this expander for progamming and operation of that equipment.

2. Perform diagnostics checks for each of the controllers used with this equipment, as described in the Systems Maintenance Monitor Manual (SMM17), publication number 60182000.

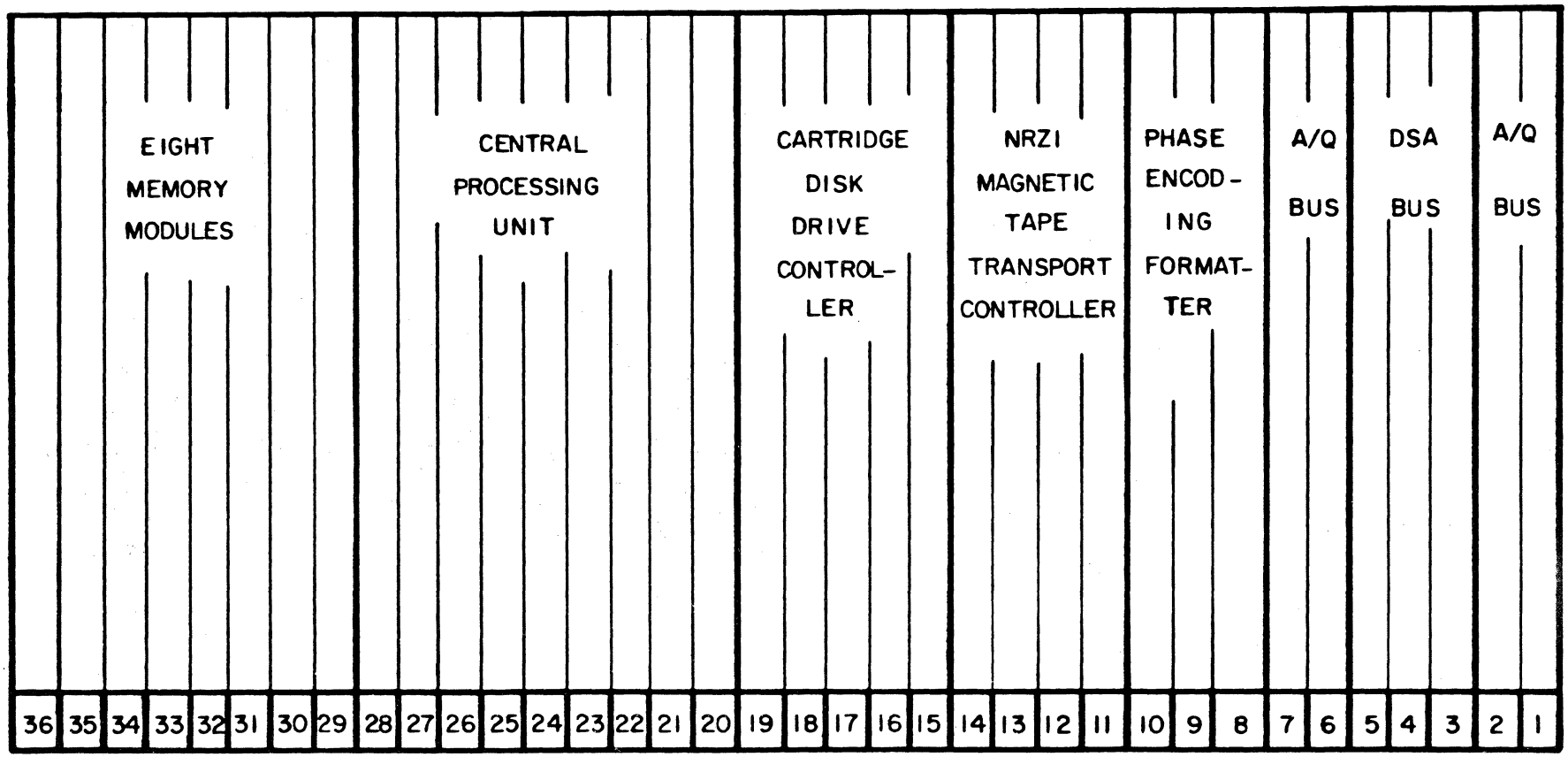


Figure 3-1. Locations of PWA's in Enclosure

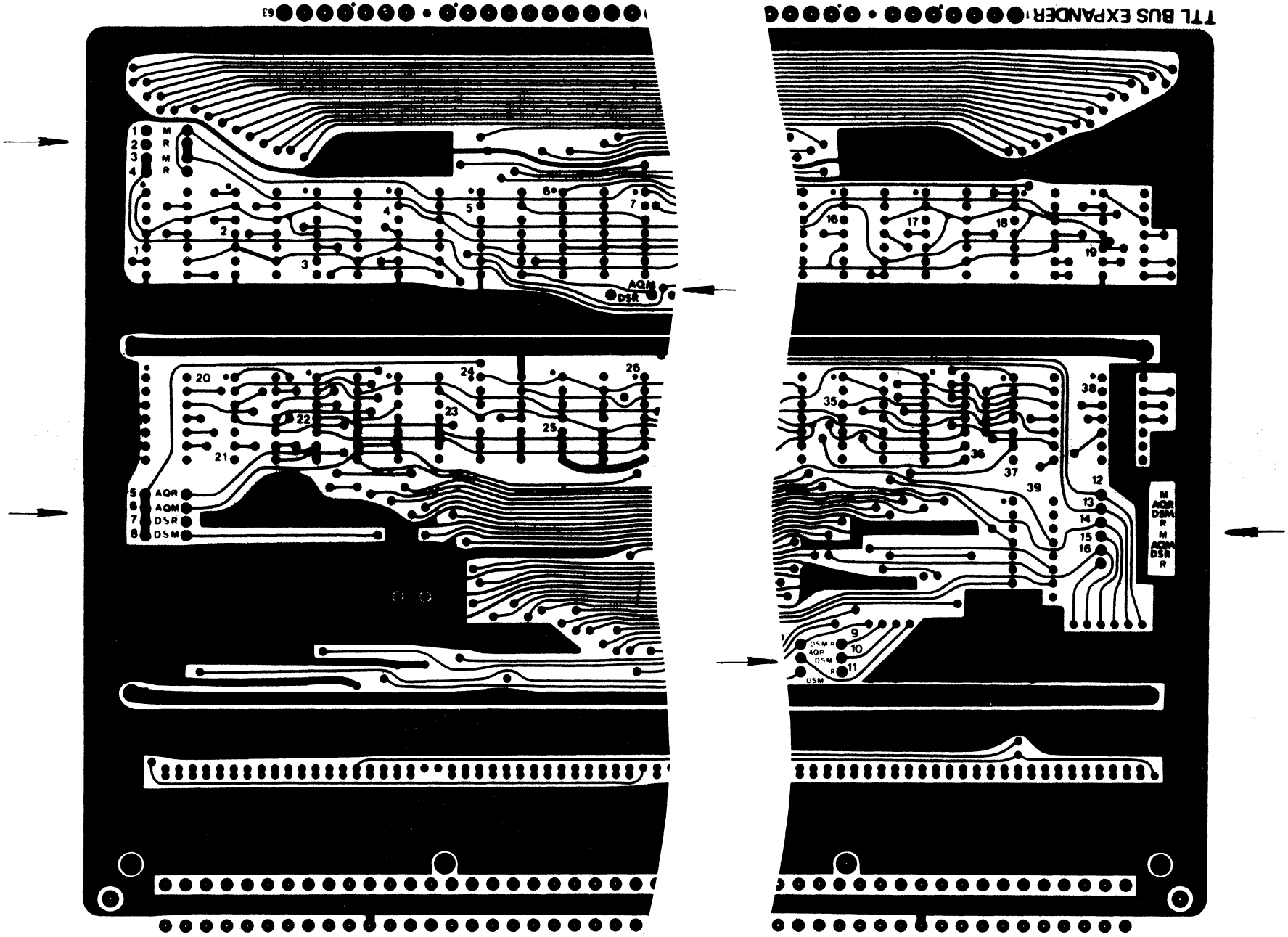


Figure 3-2. Locations For Jumper Plug Placement

TABLE 3-1. INTERRUPT POSITIONS

SIGNAL NAME	INPUT/OUTPUT
SINT 1	P1A24
SINT 2	P1A25
SINT 3	P1A26
SINT 4	P1A27
SINT 5	P1A28
SINT 6	P1A20
SINT 7	P1A31
SINT 8	P1B20
SINT 9	P1B24
SINT 10	P1B25
SINT 11	P1B26
SINT 12	P1B27
SINT 13	P1B28
SINT 14	P1B30
SINT 15	P1B31

SECTION 4

THEORY OF OPERATION

INTRODUCTION

This section presents general and detailed functional descriptions of the equipment, using aids such as overall and detailed block diagrams. Descriptions are keyed to the detailed logic diagrams in the diagram section (Section 5) and afford a basis in understanding the detailed description of the specific circuit in that section.

NOTE

It is assumed that the reader is familiar with Control Data equipment and with the programming characteristics of the Computer as described in the 1784 Computer System Reference Manual, Publication Number 89633400.

GENERAL

The AT310-A TTL A/Q-DSA Bus Expander is comprized of two standard 50-PAK PWA's and a single interconnecting flat cable. Both PWA's use the sampe type of board, but have different components. The main PWA is installed in the AB107/AB108 enclosure with its jumper plugs placed as described in Section 3, while the remote PWA (with jumper plugs set) is placed in either the BT148-A expansion enclosure or another suitable enclosure. The function of each expander is set by placing or omitting jumper plugs from the positions shown in Figure 3-2. Access in and out of the enclosures is made by leading the flat cable through the slots in the case on the backside of the enclosures.

Two sets of bus expanders may be used to extend the capabilities of both the A/Q and DSA buses. The AB107/AB108 will allow the use of a maximum of two expansion enclosures employing both the A/Q and the DSA buses, as shown in Figure 4-1.

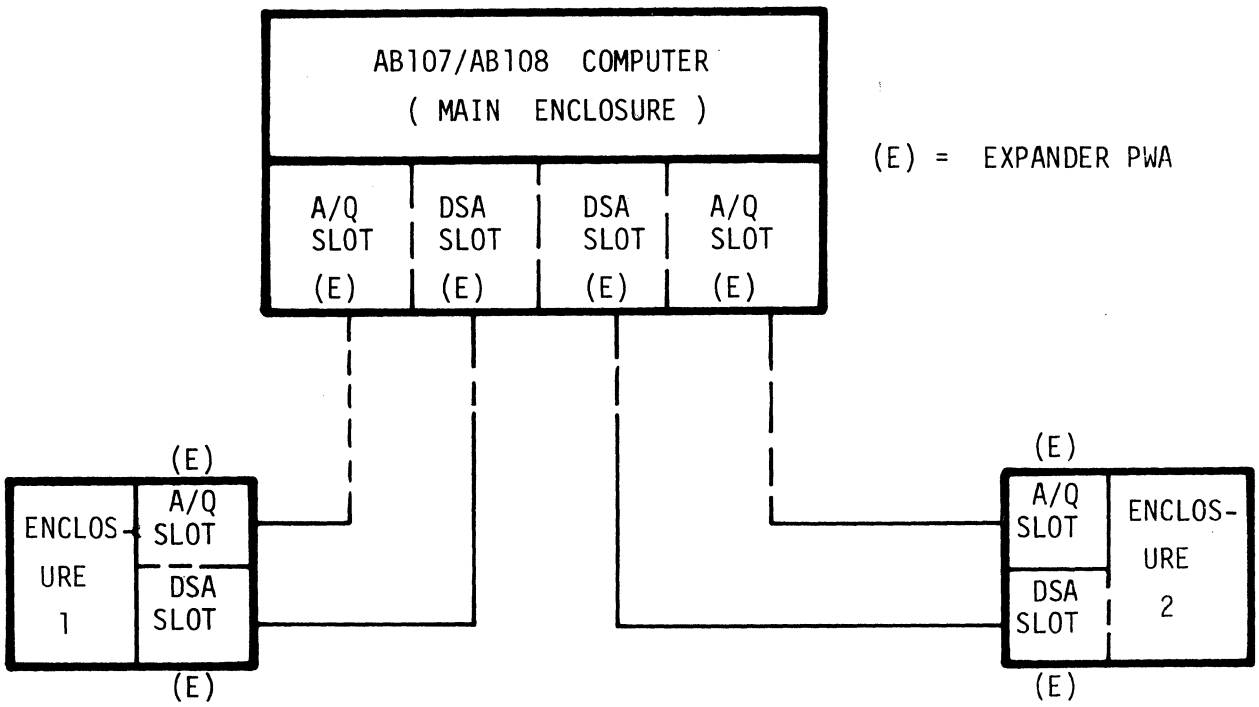


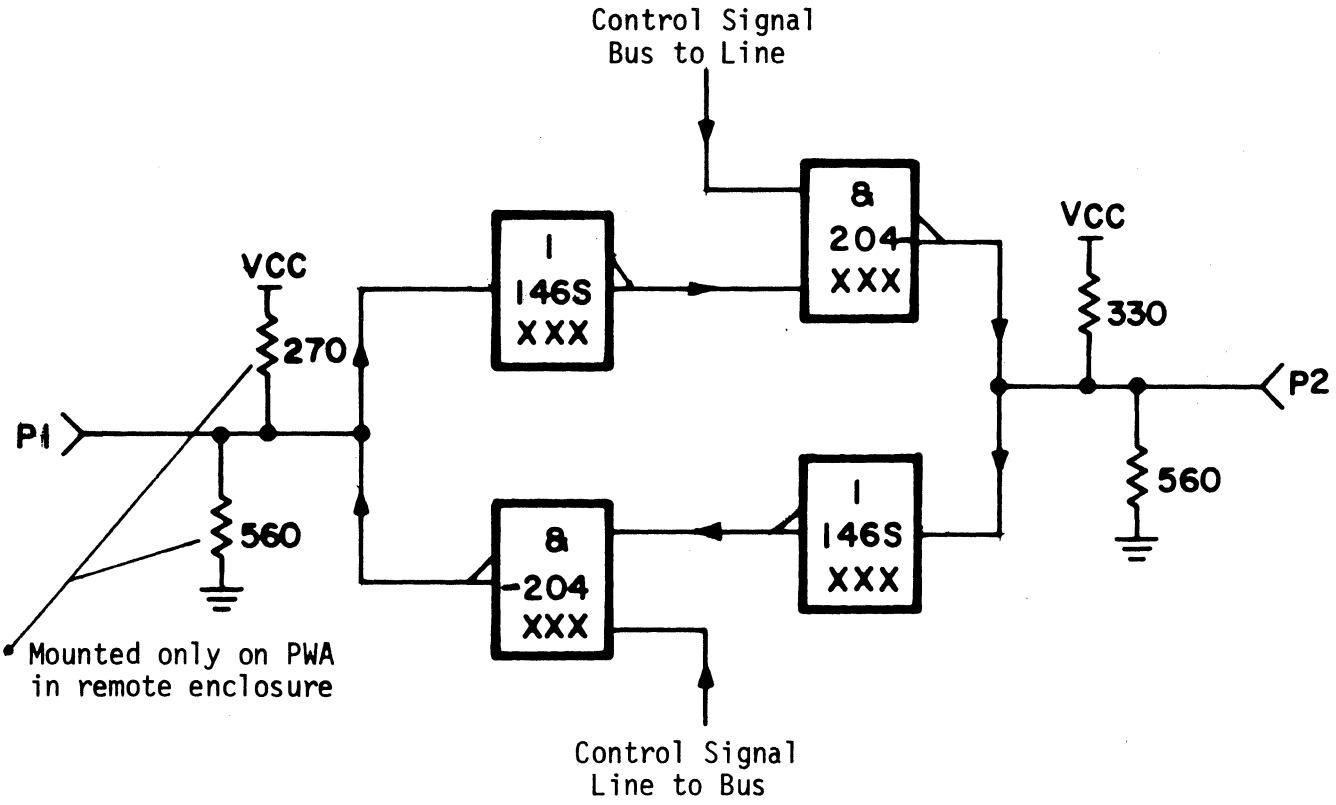
Figure 4-1. Expansion Through Two Enclosures

CIRCUIT TYPES

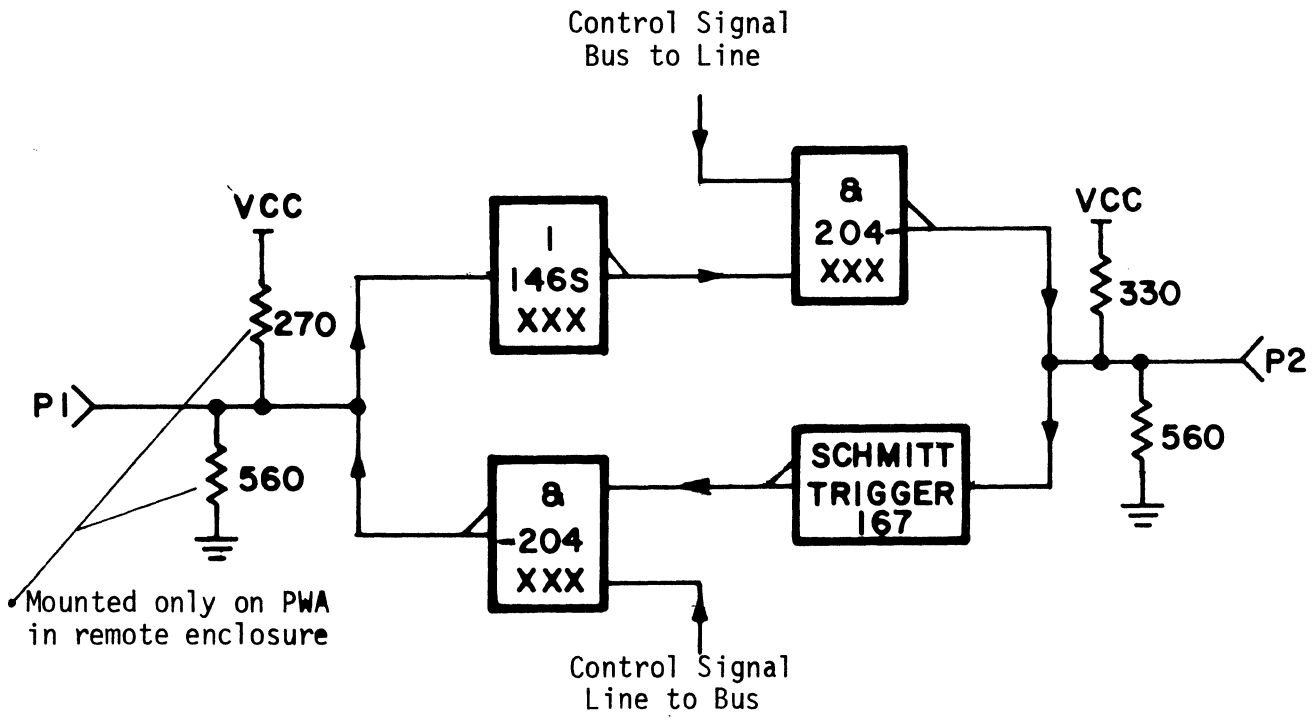
The circuits used in the TTL expanders are bi-directional. Signals may enter from P1 and exit at P2 or enter P2 and leave at P1. Four types of line driver circuits are used.

Type 1 utilizes a 146S inverter in series with a 204 inverting AND gate. This circuit is symetrical. Line driver Type 2 uses an inverter (146S) and an inverting AND gate (204) in the circuit from P1 to P2, while the signal flow from P2 to P1 passes through an inverting Schmitt Trigger (167), shaping the signal first and then through an inverting AND gate. Type 3 uses only inverting AND gates (204's) in each of the signal paths and both paths are symetrical. Type 4 uses a NAND Buffer with the inputs to each AND gate section paralleled in the circuit from P1 to P2, and an inverting AND gate (204) in the P2 to P1 circuit.

These circuits are shown in Figure 4-2.

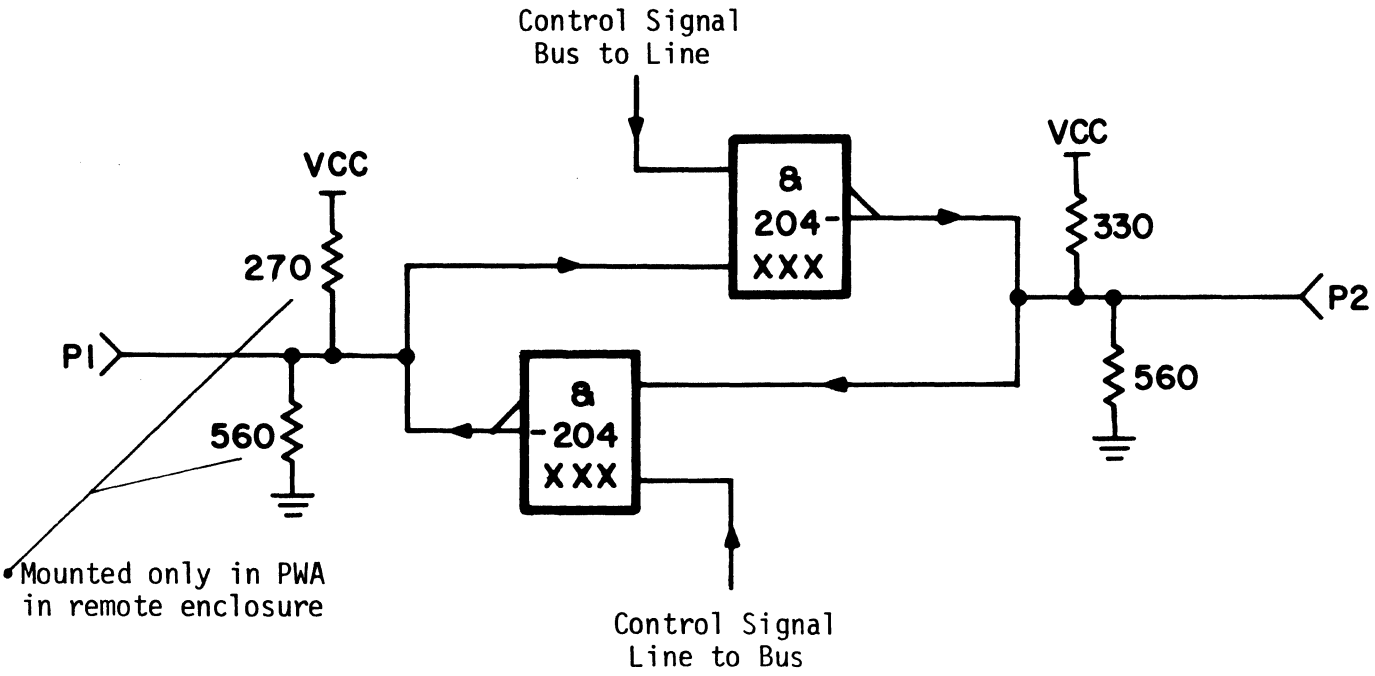


LINE DRIVER - TYPE 1

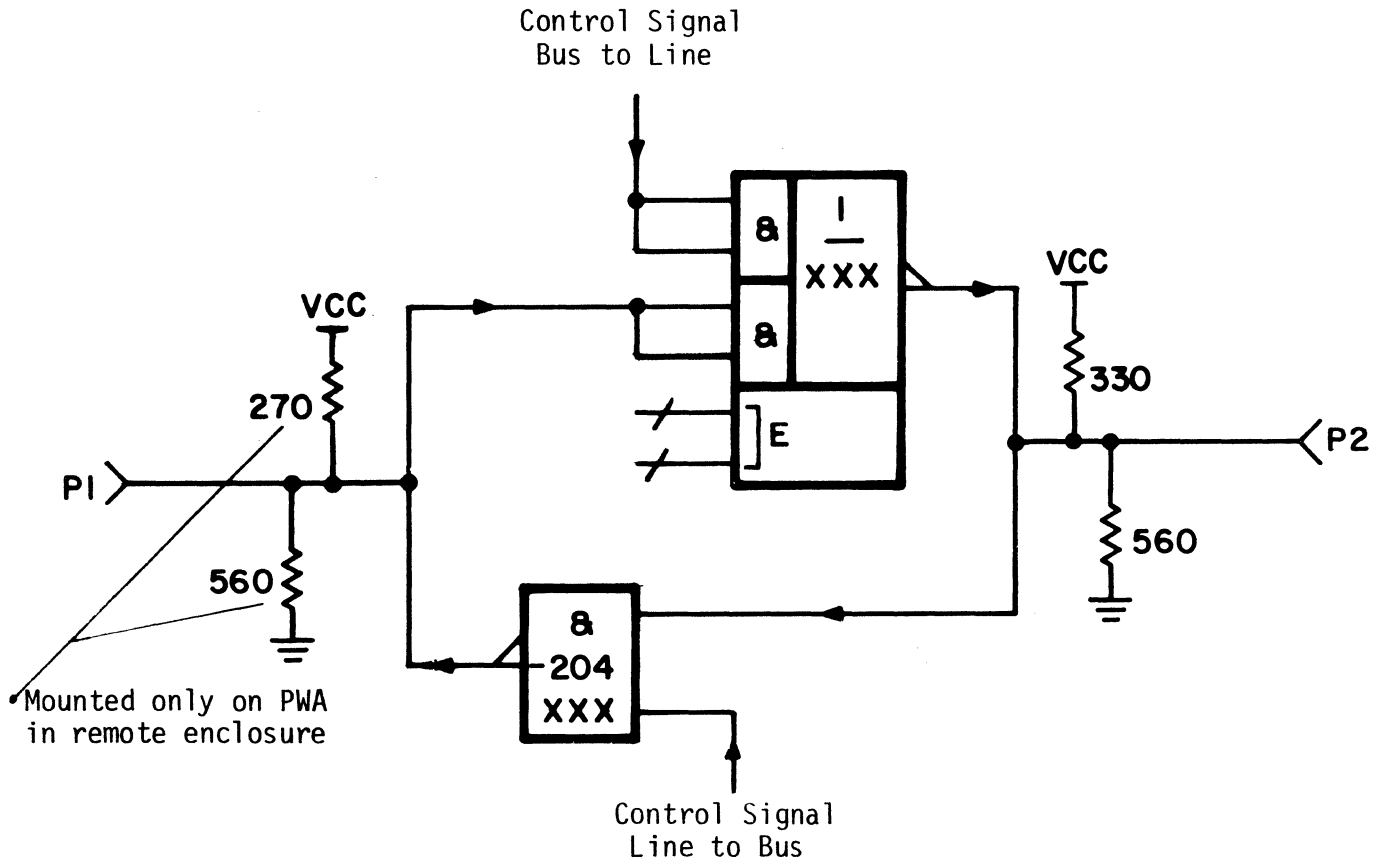


LINE DRIVER - TYPE 2

Figure 4-2. Line Driver Circuit Types



LINE DRIVER - TYPE 3



LINE DRIVER - TYPE 4

Figure 4-2. Line Driver Circuit Types (continued)

PROPAGATION DELAY

The propagation delay, measured between the time the signal at the sending side crosses the 1.5V level and the time the received signal crosses the 1.5V level, is measured at P1. For fixed-direction signal flow the propagation delay is less than:

70 nanoseconds for Driver/Receiver TYPE 1
90 nanoseconds for Driver/Receiver TYPE 2
60 nanoseconds for Driver/Receiver TYPE 3
50 nanoseconds for Driver/Receiver TYPE 4

} Refer to Figure 4-2

FAN-IN AND FAN-OUT

The fan-in on P1 in the main frame for all signals, except MTR and RTM in DSA operation, is one TTL Load.

For MTR, a 560-ohm pull-up resistor is used. For RTM, a combination of a 280-ohm pull-up and a 560-ohm resistor to ground is used.

In the remote enclosure on P1 signals, a combination of a 270-ohm pull-up and a 560-ohm resistor to ground is used on each signal except MTR and RTM.

For MTR, a combination of a 280-ohm pull-up and a 560-ohm resistor to ground is used.

For RTM, only one pull-up of 560-ohm is used to allow non-buffered components to drive the scanner.

The fan-out on all P1 signals in the remote enclosure is 16 TTL Loads.

BASIC PWA DIFFERENCES

The two PWA's used differ basically in the omission of certain components and in the placement of jumper plugs.

The PWA used in the main enclosure mounts a 1K resistor at R72 and omits the following components:

U6, U11, U12, U25, and U30
R1-R28, R57-R71, R73-R84, R113-R140, R169-R196, R185, and R238.

The PWA used in the remote enclosure mounts a 270-ohm resistor at R72 and omits the following components:

U10, U14, U15, U27, U29, and U33

Jumper plugs are inserted in specific locations on the PWA's to prepare them for use as A/Q or DSA channel expanders in the main enclosure, or as A/Q or DSA channel expanders in the remote enclosure.

To use the PWA's for A/Q or DSA expansion, refer to Section 3 for placement of the jumper plugs.

INTERRUPT AND SCANNER CONNECTIONS

Interrupt Connection

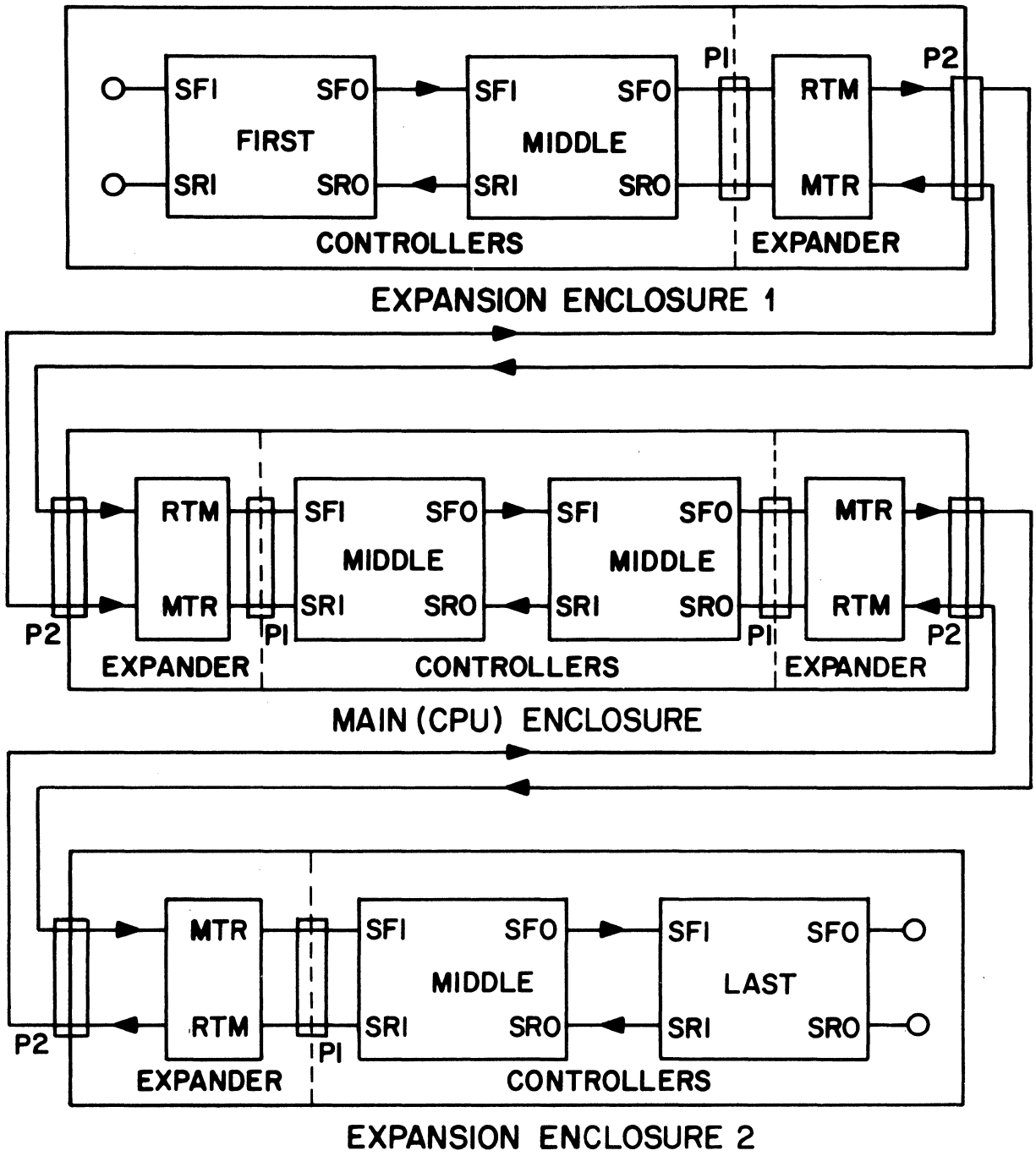
The Interrupt signals from the remote controllers are transferred via the Sint signal line driver receiver. See Section 3 for selection of Interrupts.

DSA Scanner Connection

The scanner connection is made by placing jumpers between the input/output scanner signals of the DSA scanner and the appropriage connections at P1 of the expander PWA. These connections are made on the back-plane of the enclosure.

Two signal lines are used for the scanner, MTR, allowing signal flow from the main frame to the remote, and RTM operating in the reverse direction.

A typical connection is shown schematically in Figure 4-3.



SFO - SCAN FORWARD OUT
SFI - SCAN FORWARD IN
SRO - SCAN REVERSE OUT
SRI - SCAN REVERSE IN

MTR-SCAN MAIN TO REMOTE
RTM-SCAN REMOTE TO MAIN

Figure 4-3. Scanner Connections

SIGNAL ROUTING

The direction of signal flow of all signals except data lines is determined by jumper plugs set on the expander PWA's according to PWA use (A/Q main, A/Q remote, DSA main, DSA remote). The data signal flow direction is determined by the combination of the jumper plug settings and the state of the Read signal for A/Q expansion, or the Write Enable for DSA expansion. Refer to Section 3 and Figure 3-1 for location of the positions for the jumper plugs.

The following lists provide the signal data flow direction:

A/Q expansion

Data lines: Normally flowing from main enclosure to remote enclosure. When the Read signal is present the direction is reversed.

Signals from main enclosure to remote enclosure:

Address lines, $\overline{\text{Timing Pulse}}$, $\overline{\text{MC}}$, $\overline{\text{W=0}}$
$\overline{\text{Read}}$, $\overline{\text{Write}}$, $\overline{\text{Program Protect}}$

Signals from remote enclosure to main enclosure:

$\overline{\text{Sint}}$ lines, $\overline{\text{Char Input}}$, $\overline{\text{Reject}}$, $\overline{\text{Reply}}$

DSA expansion

Data lines: Write Enable active - from remote enclosure to main enclosure

Write Enable not active - from main enclosure to remote enclosure

Signals from main enclosure to remote enclosure:
$\overline{\text{Protect Fault}}$, $\overline{\text{Autoload}}$, $\overline{\text{MC}}$, $\overline{\text{Resume}}$, $\overline{\text{Par Error}}$, $\overline{\text{Par Bit}}$, $\overline{\text{Protect Bit}}$, $\overline{\text{65K Memory}}$, SMTR.

Signals from remote enclosure to main enclosure:
Memory Address lines, $\overline{\text{Request}}$, $\overline{\text{Priority}}$, $\overline{\text{Protect}}$, $\overline{\text{Write Enable}}$, SRTM.

SECTION 5

LOGIC DIAGRAMS

KEY TO LOGIC SYMBOLS

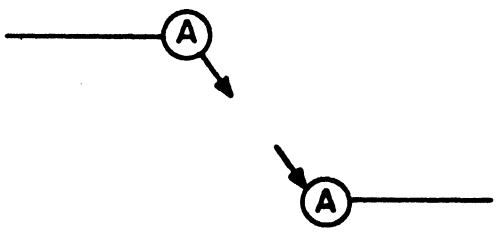
Publication 89723700 (Key to Logic Symbols) or equivalent, lists the symbols used in the logic diagrams in this manual and gives a short description of the functions they represent. The symbols conform generally to Control Data usage (Microcircuit Handbook, publication number 15006100), using the polarity logic convention.

The following paragraphs describe the signal flow conventions used.

SIGNAL FLOW

Input signals are drawn coming from the left or above; output signals are drawn going to the right or down.

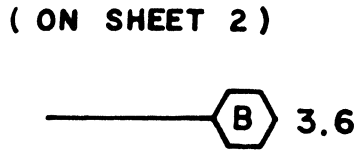
The signal lines are sometimes interrupted to allow logical grouping of components. At each such interruption one of the following indicators is used:

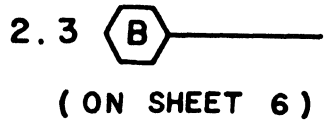


On-Sheet Continuation Reference Symbols

These symbols when used with the logic symbols in the following diagrams indicate that a connection exists between two points on a sheet. The arrows attached to each circle point from signal origin to signal destination. The letters, C, H, I, O and P are not used inside the circles, since they bear special significance on logic diagrams.

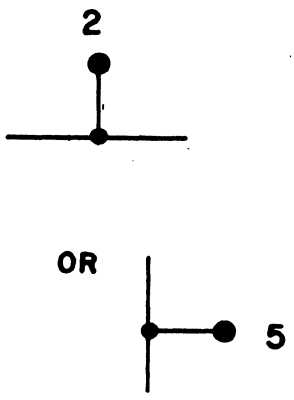
Off-Sheet Continuation Reference Symbols





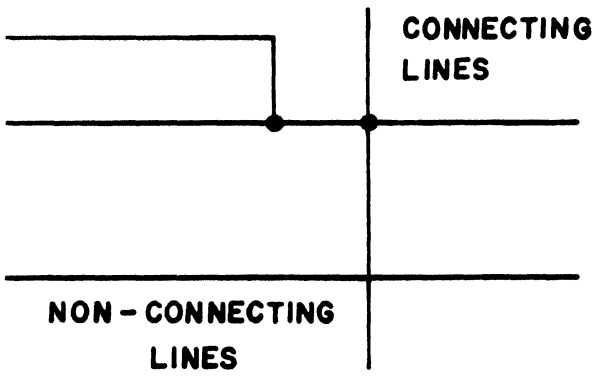
These symbols when used with the logic symbols in the following diagrams indicate that a common signal point exists between two sheets in a series of related drawings. These symbols point from output to direction of input as shown in the illustration. The letters C, H, I, O and P are not used in the hexagons, since they bear special significance on logic diagrams. The number(s) next to each hexagon indicate the sheet(s) that the signal is continued from or on. For instance, the numbers 3.6 refer to sheets 3 and 6, while 2.3 refers to sheets 2 and 3. It should be noted that the referenced sheet number(s) is always placed opposite the line extending from the hexagon. The sheet number where the signal originates is underlined.

Test Points



The test point symbol on the logic diagram shows the connection of a test point on the printed wiring board (PWB). The number adjacent to the symbol refers to the test point position on the PWB at the edge opposite the connectors. Only test point one is labeled on the edge of the PWB.

Connecting and Non-Connecting Lines

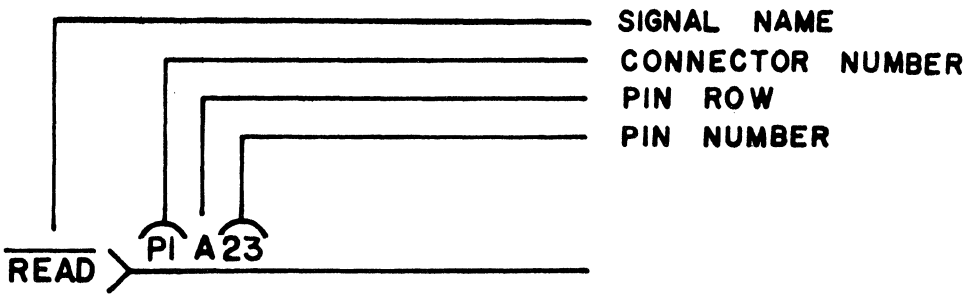


Lines connected to a common point or at a junction point are shown in the upper part of this illustration. No more than four lines are connected to a common point in the diagrams.

Lines crossing but not connected are shown in the lower part of this illustration.

Connectors

Connectors are represented on the logic diagram by the symbol for a female connector, for both input and output signals. The name of the signal is placed in the open end of the connector symbol (shown below), using the full name of the signal or the common abbreviation applicable to logic diagrams. The connector number, pin row and pin number are located above the line extending from the connector symbol.



LOGIC DIAGRAM 89759000

Each circuit of the AT310-A TTL A/Q-DSA Bus Expander is bi-directional. The flat cable is connected from P2 of one enclosure to P2 of the other. The presence or lack of jumper plugs determine the direction and conditions of signal flow.

As stated in Sections 3 and 4, during use in the main enclosure PWA 89821600 will have all jumper plugs marked M installed. PWA 89759200, mounted in the remote expansion enclosure will have all jumper plugs marked R set.

When the PWA in the main enclosure is used for A/Q expansion, all jumper plugs marked AQM will be set and the PWA in the remote enclosure will have all AQR jumper plugs set.

For DSA operation the main enclosure PWA will have the DSM jumper plugs set and that installed in the remote enclosure will have the DSR jumpers set.

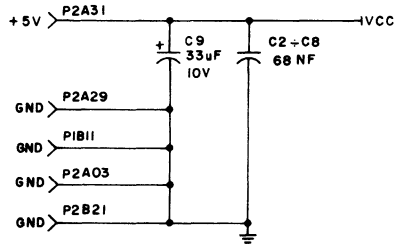
The jumper plugs are used to either enable or inhibit the inverting AND gates in one-half of circuitry or the other, causing the signal flow to occur from P1 to P2, or from P2 to P1. The gate(s) shown in the logic diagrams, herein, in the upper part of each circuit allows the signals to flow from P1 to P2, when enabled. At this time the AND gate(s) shown in the lower part of each circuit will be inhibited. For signal flow from P2 to P1, the lower half of each circuit is enabled and the upper half inhibited. Control of all but the data circuitry, inhibiting or enabling one half or the other, is accomplished through the jumper plugs set at U40. Flow of data in either direction is controlled by the READ/WRITE circuitry (sheet 5 and sheet 2, lower half)

The circuitry used herein is of the four types described previously in Section 4.

SHEET REVISION STATUS								
1	2	3	4	5	6			
02	02	02	02	02				
03	02	03	02	03				
04	04	04	02	04	04			
A	A	A	A	A	A			

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP
02	CK 941	REDRAWN TO CDC STD R72 IN MAIN PWA ADDED				
03	CK1047	DRAWING ERRORS CORRECTED SH1: ADDED TO TABLE RI SH 3, MI SH 3, NY SH 5, D SH 5				
		SH 2: SH 3, ADDED TO RI AND MI SH 5 ADDED TO NY				
		SH 3, D-3 1 ADDED P1B24, R78 R190, U31-4,5,6; U8-8,9,10; R106, R218, P2B07				
		SH 5 A-4 INPUT NY ADDED AT U13-10 OUTPUT D ADDED AT U22-12				
04	CK 1072	REVISION RECORD FOR REV.03 ADDED IN DETAIL.				
		TO FIT ASSY. THREE SEPARATE CIRCUITS ON NEW SH6 REPLACE GENERAL CIRCUIT AND TABLE ON SH5, LOWER RIGHT (CONVERSION OF XE TO XE)				
		SHEET LOCATIONS FOR RI, R2, MI, Y, NY UPDATED IN SH1 TABLE, TO FIT DWG.				
A	CK 1535	DWG. ERRORS CORRECTED. NO LOGIC CHANGES. DETAILS IN E.C.O.				

ØFF-SHEET REFERENCE LETTERS	SHEET LØCATIONS				
	2	3	4	5	6
RI	D-1▼	C-4	C-4		D-3
R2	D-1▼	B-4	B-4	B-4	C-3
MI	D-1▼	D-4	B-4		B-3
M2	C-1▼	B-4	D-4	C-4	
Y	C-1▼	D-4	C-4	B-4	
NY	C-1▼	C-4	B-4	A-4	
Z	A-1▼			D-4	
NZ	A-1▼			C-4	
A	B-2			B-3▼	
B	B-2			C-3▼	
C	B-2			B-3▼	
D	B-2			A-3▼	



NØTES:

1. SIGNAL REFERENCES IN TABLES AND CØNNECTORS:
   NA INDICATES NØ SIGNAL TRANSMITTED.
   UPPER SIGNAL NAMES IN TABLES AND ØN CØNNECTORS REFER TØ A/Q SIGNALS WHEN PWA IS USED TØ EXPAND A/Q.
   LØWER SIGNAL NAMES IN TABLES AND ØN CØNNECTØRS REFER TØ DSA SIGNALS WHEN PWA IS USED TØ EXPAND DSA.
2. NØT MØUNTED IN REMØTE PWA: U10, U14, U15, U27, U29, U33
3. NØT MØUNTED IN MAIN PWA: U6, U11, U12, U25, U30
4. ▼ DENOTES SIGNAL ORIGIN
5. ALL RESISTORS ARE 1/4 WATT, 5%

AY 89876000 (MAIN)
AY 89880700 (REMOTE)
DETACHED LISTS

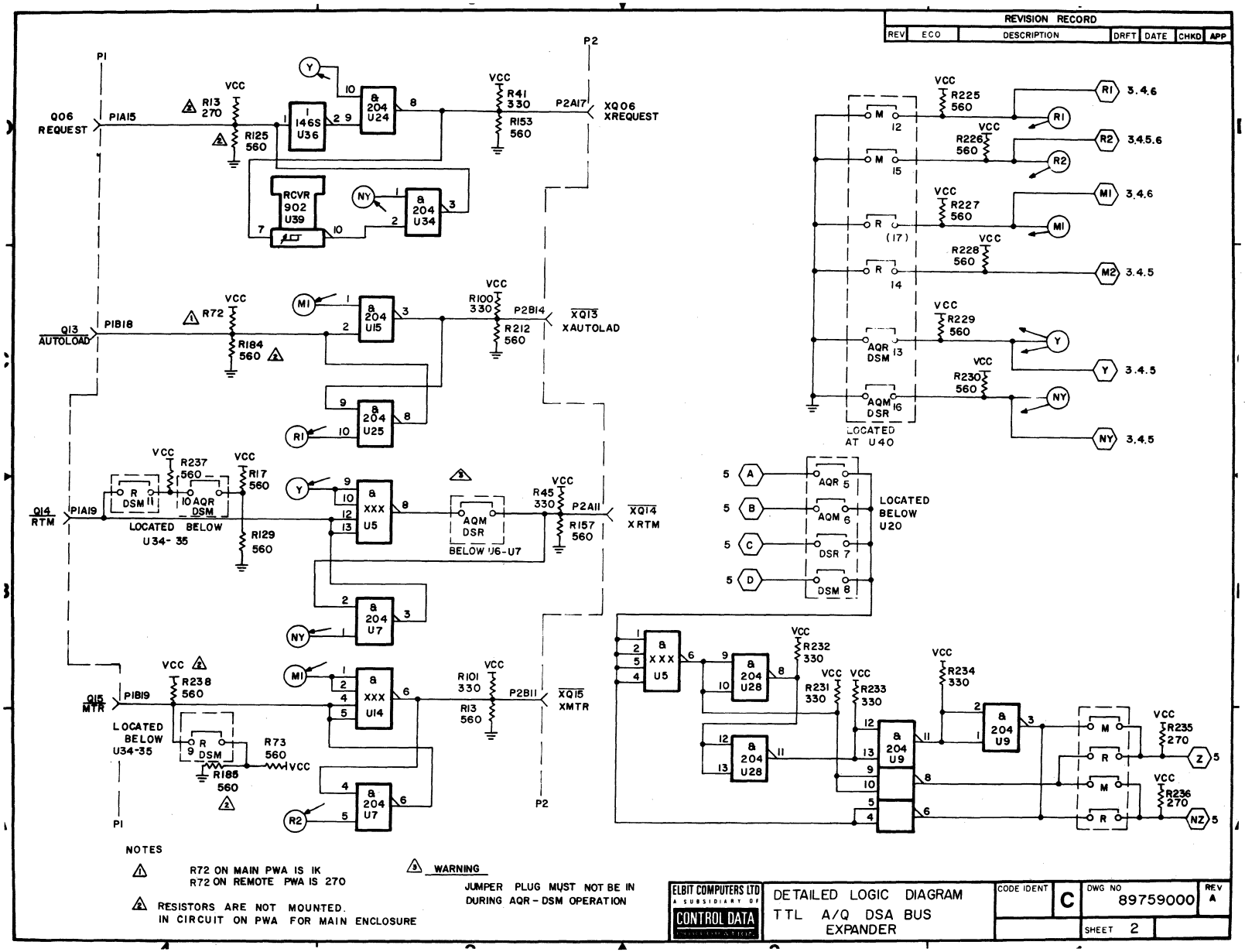
UNLESS OTHERWISE SPECIFIED DIMENSION ARE IN INCHES TOLERANCES
3 PLACE ± 2 PLACE ± ANGLES ±
DO NOT SCALE DRAWING
MATERIAL N/A
FINISH N/A

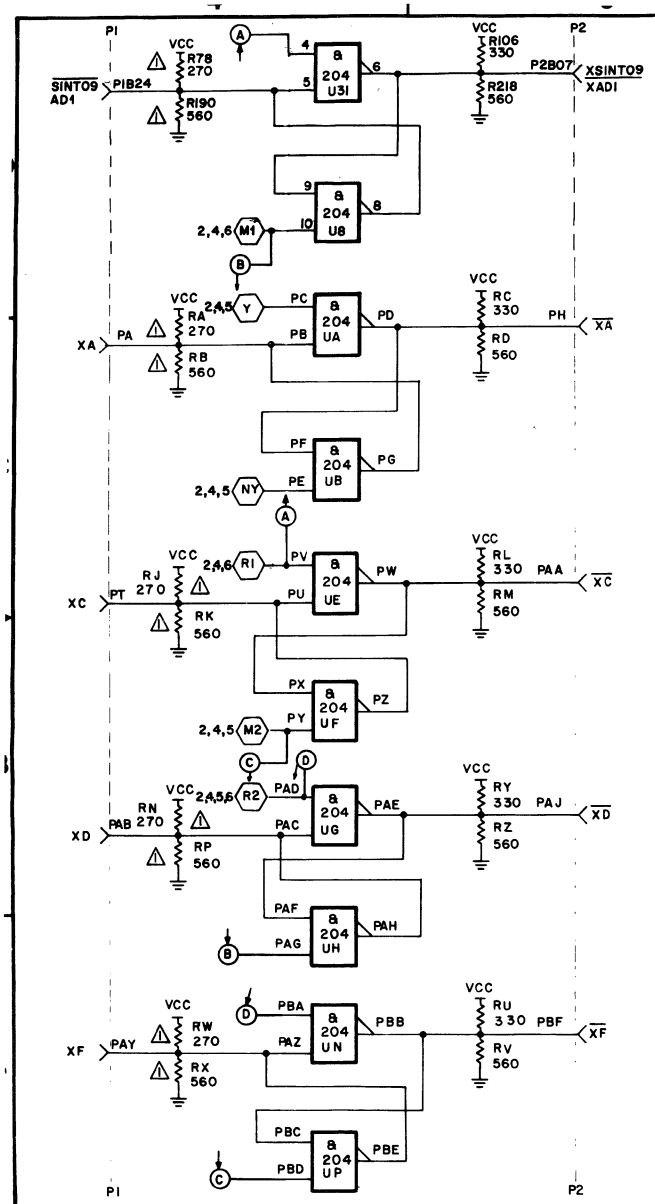
ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA
DWN CHKD ENGR MFG APPR

FIRST USED ON AT310-A

TITLE DETAILED LOGIC DIAGRAM TTL A/Q DSA BUS EXPANDER

CODE IDENT C
DRAWING NO 89759000
SCALE
SHEET 1 OF 6


REVISION RECORD
REV ECO DESCRIPTION DRFT DATE CHKD APP
Q06 REQUEST
P1A15
R13 270
R125 560
U36
U24
R41 330
R153 560
P2A17
XQ06 XREQUEST
RCVR 902 U39
U34
Q13 AUTOLOAD
P1B18
R72
R184 560
U15
R100 330
R212 560
P2B14
XQ13 XAUTOLAD
U25
Q14 RTM
P1A19
R237 560
R17 560
R129 560
LOCATED BELOW U34-35
U5
R45 330
R157 560
P2A11
XQ14 XRTM
AQM DSR
BELOW U6-U7
U7
Q15 MTR
P1B19
R238 560
R73 560
R185 560
U14
R101 330
R13 560
P2B11
XQ15 XMTR
P1
P2
R225 560
R226 560
R227 560
R228 560
R229 560
R230 560
LOCATED AT U40
LOCATED BELOW U20
R232 330
R231 330
R233 330
R234 330
R235 270
R236 270
U28
U9
NOTES
1. R72 ON MAIN PWA IS 1K
R72 ON REMOTE PWA IS 270
2. RESISTORS ARE NOT MOUNTED. IN CIRCUIT ON PWA FOR MAIN ENCLOSURE
3. WARNING
JUMPER PLUG MUST NOT BE IN DURING AQR - DSM OPERATION
ELBIT COMPUTERS LTD
A SUBSIDIARY OF
CONTROL DATA
DETAILED LOGIC DIAGRAM
TTL A/Q DSA BUS EXPANDER
CODE IDENT C
DWG NO 89759000
REV A
SHEET 2



⚠ RESISTOR DOES NOT EXIST ON PWA FOR MAIN ENCLOSURE.

REVISION RECORD					
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP

P1 P2

SIGNAL XA	CONNECTOR PA	RA	RB	UA	PINS PE	PINS PC	PINS PD	UB	PINS PE	PINS PF	PINS PG	RC	RD	CONNECTOR PH	SIGNAL XA
PROG. PROTECT AD08	P1A23	R21	R133	U31	9	10	8	U8	4	5	6	R49	R161	P2A09	PROG. PROTECT XAD08
MC AD00	P1B23	R77	R189	U31	12	13	11	U28	4	5	6	R105	R277	P2B06	XMC XAD00

SIGNAL XC	CONNECTOR PT	RJ	RK	UE	PINS PU	PINS PV	PINS PW	UF	PINS PX	PINS PY	PINS PZ	RL	RM	CONNECTOR PAA	SIGNAL XC
W-O PROTECT	P1A20	R18	R130	U33	5	4	6	U25	12	13	11	R46	R158	P2A13	XW-O XPROTECT
SINT11 AD03	P1B26	R80	R192	U31	2	1	3	U27	9	10	8	R108	R220	P2B05	XSINT11 XAD03
SINT12 AD04	P1B27	R81	R193	U30	12	13	11	U29	12	13	11	R109	R221	P2B04	XSINT04 XAD12
SINT14 AD06	P1B30	R83	R195	U8	2	1	3	U29	2	1	3	R111	R223	P2B02	XSINT06 XAD14
SINT04 AD12	P1A27	R25	R137	U30	9	10	8	U29	9	10	8	R53	R165	P1B05	XSINT12 XAD04
SINT06 AD14	P1A30	R27	R139	U30	5	4	6	U29	5	4	6	R55	R167	P1B02	XSINT14 XAD06
SINT08 NA	P1B20	R74	R186	U34	9	10	8	U26	2	1	3	R102	R214	P2B13	XSINT08 NA

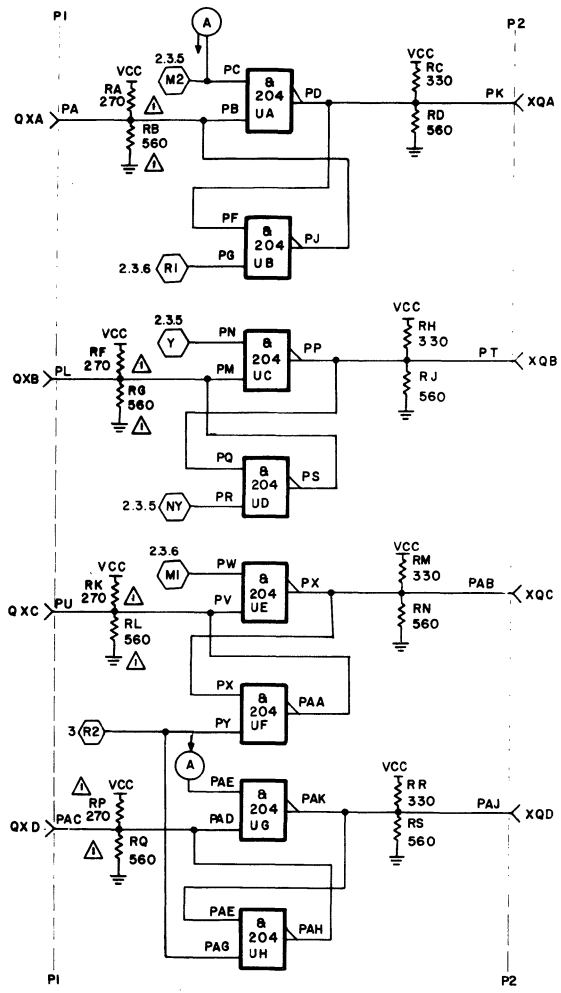
SIGNAL XD	CONNECTOR PAB	RN	RP	UG	PINS PAC	PINS PAD	PINS PAE	UH	PINS PAF	PINS PAG	PINS PAH	RQ	RR	CONNECTOR PAJ	SIGNAL XD
CHAR INPUT NA	P1B07	R63	R175	U16	10	9	8	U4	1	2	3	R91	R203	P2B22	XCHAR INPUT NA
SINT13 AD05	P1B28	R82	R194	U11	12	13	11	U10	13	12	11	R110	R222	P2B03	XSINT13 XAD05
SINT15 AD07	P1B31	R84	R196	U11	1	2	3	U10	2	1	3	R112	R223	P2B01	XSINT15 XAD07
SINT03 AD11	P1A26	R24	R136	U12	12	13	11	U8	13	12	11	R52	R164	P2A06	XSINT03 XAD11
SINT07 AD15	P1A31	R28	R140	U11	5	4	6	U10	5	4	6	R56	R168	P2A01	XSINT07 XAD15
SINT05 AD13	P1A28	R26	R138	U11	9	10	8	U10	9	10	8	R54	R166	P2A04	XSINT05 AD13

SIGNAL XF	CONNECTOR PAY	RW	RX	UN	PINS PAZ	PINS PBA	PINS PBB	UP	PINS PBC	PINS PBD	PINS PBE	RY	RZ	CONNECTOR PBF	SIGNAL XF
SINT10 AD02	P1B25	R79	R191	U12	5	4	6	U27	2	1	3	R107	R219	P2B08	XSINT10 XAD02
SINT01 AD09	P1A24	R22	R134	U12	9	10	8	U27	5	4	6	R50	R162	P2A08	XSINT01 XAD09
SINT02 AD10	P1A25	R23	R135	U12	1	2	3	U27	12	13	11	R51	R163	P2A07	XSINT02 XAD10

P1 P2

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION	DETAILED LOGIC DIAGRAM TTL A/Q DSA BUS EXPANDER	CODE IDENT C	DWG NO 89759000	REV A
			SHEET 3	

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP



SIGNAL QXA	CONNECTOR PA	RA	RB	UA	PINS PB	PINS PC	PINS PD	UR	PINS PF	PINS PG	PINS PJ	RC	RD	CONNECTOR PK	SIGNAL XQA
Q00 NA	P1A12	R10	R122	U35	9	10	8	U23	12	13	11	R38	R150	P2A20	Q00 NA
Q03 NA	P1B13	R67	R179	U33	2	1	3	U24	2	1	3	R95	R207	P2B19	Q03 NA
Q04 NA	P1A14	R12	R124	U34	12	13	11	U24	5	4	6	R40	R152	P2A18	Q04 NA
Q10 PE	P1A17	R15	R127	U33	9	10	8	U25	5	4	6	R43	R155	P2A15	XQ10 XPE
Q11 PF	P1B17	R71	R183	U33	12	13	11	U25	2	1	3	R99	R211	P2B15	XQ11 XPF

SIGNAL QXB	CONNECTOR PL	RF	RG	UC	PINS PM	PINS PN	PINS PP	UD	PINS PQ	PINS PR	PINS PS	RH	RJ	CONNECTOR PT	SIGNAL
Q01 PRIORITY	P1B12	R66	R178	U35	5	4	6	U23	9	10	8	R94	R206	P2B20	XQ01 X PRIORITY
Q05 PROTECT	P1B14	R68	R180	U24	12	13	11	U7	12	13	11	R96	R208	P2B18	XQ05 X PROTECT

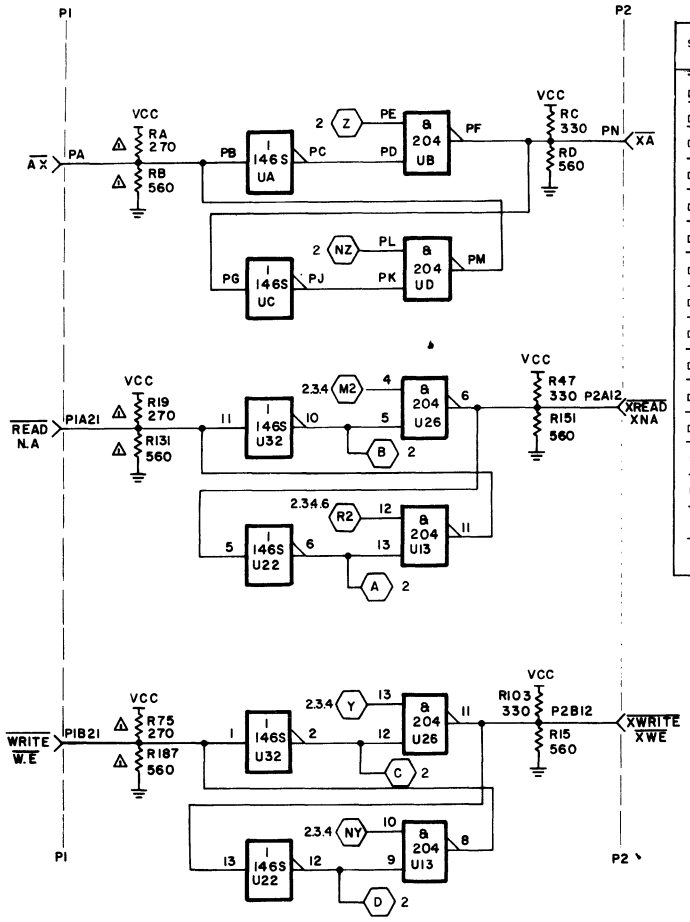
SIGNAL QXC	CONNECTOR PU	RK	RL	UE	PINS PV	PINS PW	PINS PX	UF	PINS PY	PINS PZ	PINS PAA	RM	RN	CONNECTOR PAB	SIGNAL XQC
Q02 RESUME	P1A13	R11	R123	U14	12/13	9/10	8	U7	9	10	8	R39	R151	P2A19	XQ02 X RESUME
Q09 NA	P1B16	R70	R182	U15	13	12	11	U6	13	12	11	R98	R210	P2B16	XQ09 NA

SIGNAL QXD	CONNECTOR PAC	RP	RQ	UG	PINS PAD	PINS PAE	PINS PAF	UH	PINS PAF	PINS PAG	PINS PAH	RR	RS	CONNECTOR PAJ	SIGNAL XQD
Q07 NA	P1B15	R69	R181	U34	5	4	6	U6	2	1	3	R97	R209	P2B17	XQ07 NA
Q08 NA	P1A16	R14	R126	U15	10	9	8	U6	4	5	6	R42	R154	P2A16	XQ08 NA
Q12 X PARITY	P1A18	R16	R128	U15	5	4	6	U6	9	10	8	R44	R156	P2A14	XQ12 X PARITY

⚠ RESISTORS MARKED DO NOT EXIST ON MAIN ENCLOSURE PWA.

ELBIT COMPUTERS LTD / CONTROL DATA	DETAILED LOGIC DIAGRAM TTL A/Q DSA BUS EXPANDER	CODE IDENT C	DWG NO 89759000	REV A	SHEET 4

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP

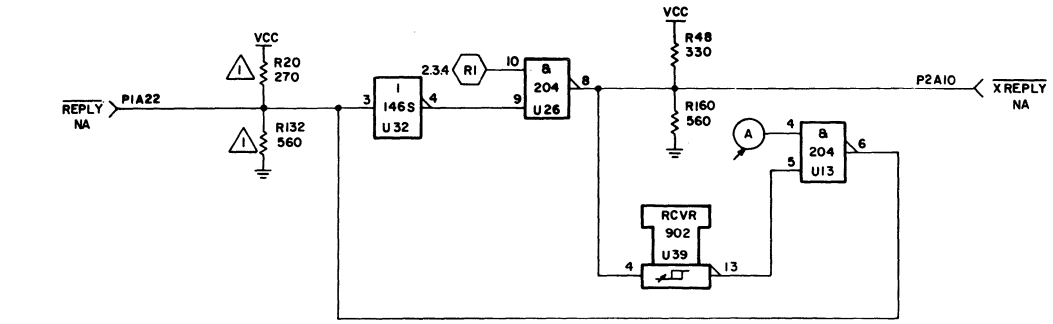


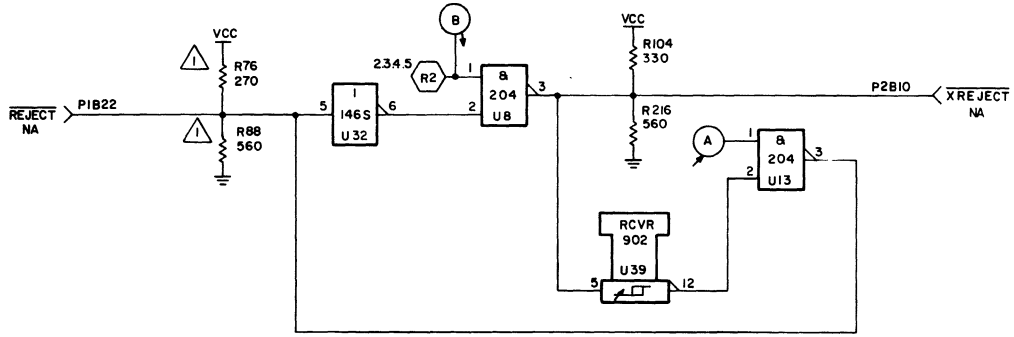
SIGNAL AX	CONNECTOR PA	RA	RB	UA	PINS PB	PINS PC	UB	PINS PD	PINS PE	PINS PF	UC	PINS PG	PINS PJ	UD	PINS PK	PINS PL	PINS PM	RC	RD	CONNECTOR PN	SIGNAL XA
A00 DA00	P1A03	R3	R115	U38	3	4	U2	1	2	3	U20	11	10	U18	9	10	8	R31	R143	P2A28	XA00 XDA00
A01 DA01	P1B01	R57	R169	U38	11	10	U1	2	1	3	U20	4	3	U19	13	12	11	R85	R197	P2B30	XA01 XDA01
A02 DA02	P1B02	R58	R170	U38	1	2	U1	10	9	8	U20	9	8	U19	2	1	3	R86	R198	P2B29	XA02 XDA02
A03 DA03	P1A06	R6	R118	U37	3	4	U3	10	9	8	U21	11	10	U17	1	2	3	R34	R196	P2A25	XA03 XDA03
A04 DA04	P1A07	R7	R119	U36	13	12	U4	4	5	6	U22	1	2	U16	13	12	11	R35	R147	P2A24	XA04 XDA04
A05 DA05	P1A01	R1	R113	U38	13	12	U1	5	4	6	U20	1	2	U19	9	10	8	R29	R141	P2A30	XA05 XDA05
A06 DA06	P1A02	R2	R114	U38	9	8	U1	13	12	11	U20	5	6	U19	5	4	6	R30	R142	P2A29	XA06 XDA06
A07 DA07	P1B03	R59	R171	U38	5	6	U2	4	5	6	U20	13	12	U18	13	12	11	R87	R199	P2B28	XA07 XDA07
A08 DA08	P1B04	R60	R172	U37	11	10	U2	10	9	8	U21	3	4	U18	1	2	3	R88	R200	P2B27	XA08 XDA08
A09 DA09	P1B05	R61	R173	U37	1	2	U3	5	4	6	U21	9	8	U17	10	9	8	R89	R201	P2B26	XA09 XDA09
A10 DA10	P1B06	R62	R174	U37	5	6	U3	13	12	11	U21	1	2	U17	4	5	6	R90	R202	P2B25	XA10 XDA10
A11 DA11	P1A05	R5	R117	U37	13	12	U3	1	2	3	U21	13	12	U17	13	12	11	R33	R145	P2A26	XA11 XDA11
A12 DA12	P1A04	R4	R116	U37	9	8	U2	13	12	11	U21	5	6	U18	5	4	6	R32	R144	P2A27	XA12 XDA12
A13 DA13	P1B09	R64	R176	U36	9	8	U4	10	9	8	U22	3	4	U16	4	5	6	R92	R204	P2B23	XA13 XDA13
A14 DA14	P1B10	R65	R177	U36	3	4	U23	5	4	6	U22	9	8	U35	2	1	3	R93	R205	P2B24	XA14 XDA14
A15 DA15	P1A11	R9	R121	U36	5	6	U23	2	1	3	U22	11	10	U35	12	13	11	R37	R149	P2A22	XA15 XDA15

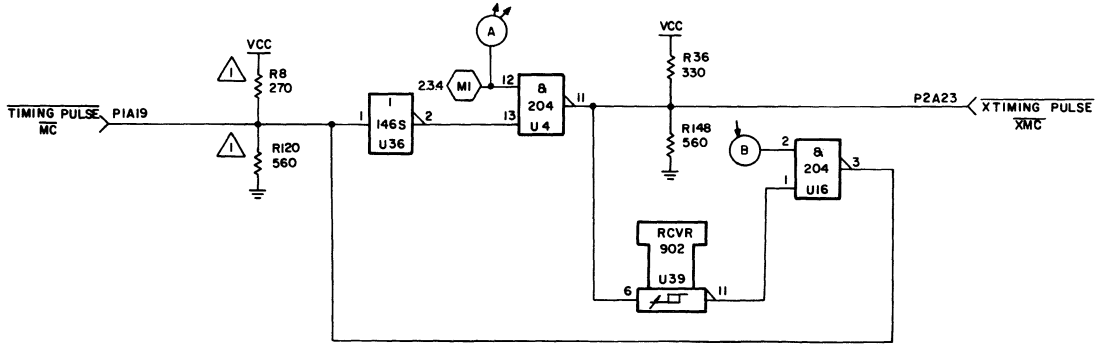
⚠ RESISTOR DOES NOT EXIST ON PWA FOR MAIN ENCLOSURE.

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION	DETAILED LOGIC DIAGRAM TTL A/Q DSA BUS EXPANDER	CODE IDENT C	DWG NO 89759000	REV A
			SHEET 5	

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP







ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA	DETAILED LOGIC DIAGRAM TTL A/Q DSA BUS EXPANDER	CODE IDENT	C	DWG NO 89759000	REV A
				SHEET 6	OF 6

SECTION 6

MAINTENANCE

SCOPE

This section supplies references and procedures for the maintenance of the equipment listed in Section 1 of this manual.

TOOLS AND SPECIAL EQUIPMENT

The following is a list of maintenance tools required for this equipment:

Part Number	Part Description	Quantity
89688700	Board Extender	1
89670300	Board Extractor	1
	Oscilloscope	1
	Digital Voltmeter	1

PUBLICATIONS

The publications listed below are applicable to maintenance of this equipment.

Publication	Pub. No.
1784 Computer Reference Manual	89633400
AB107/AB108 Computer Customer Engineering Manual	89633400
1700 Computer System Codes Manual	60163500
System Maintenance Monitor (SMM17)	60182000

MAINTENANCE

Preventive maintenance of a PW assembly is not required. After it is determined that a PW assembly has failed, the PWA should be replaced by an identical trouble-free PWA. For replacement of a PW assembly, refer to Section 3 of this manual. After replacement, a diagnostic check should be performed as described in SMM17.

CAUTION

Do not remove or replace PWA's or cables with system power ON.

SECTION 7

MAINTENANCE AIDS

(Not Required)

SECTION 8

PARTS DATA

This parts list is applicable to the AT310-A TTL A/Q and DSA Bus Expander.

Nomenclature		Part Number
Main PW Assembly	A02	89821600
	A03	89876000
Remote PW Assembly	A02	89759200
	A03	89880700
External Cable		89821800

SECTION 9

WIRE LIST

The wire list included in this section is applicable to the AT310-A TTL A/Q and DSA Bus Expander. Wire size, color, origin, destination and name of signal normally found on that wire are included in the table.

A pin list for each of the PWB's is also included in this section.

TABLE 9-1. EXTERNAL CABLE WIRE LIST

DWN. RUBY U. 8/5/74	ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION	TITLE WIRING LIST FOR CABLE ASSEMBLY EXTERNAL	PREFIX WL	DOCUMENT No. 89821800	REV. 01
CHKD.					
ENG. Haller 5/8/74					
MFG.					
APPR.	CODE IDENT	FIRST USED ON AT 310-A		SHEET 1 OF 8	

SHEET REVISION STATUS

1	2	3	4	5	6	7	8
01	01	01	01	01	01	01	01

REVISION RECORD

REV.	ECO	DESCRIPTION	DRFT.	DATE	APP.
01	CK 762	RELEASED TO CLASS B FITS EXTERNAL CABLE ASSY 89821800 REV 01	RUBY	8/5/74	Haller

NOTES: ⚠1 CABLE 1 AND CABLE 2 ARE ARBITRARY REFERENCE DESIGNATIONS TO IDENTIFY THE WIRES, THEY ARE NOT GIVEN IN THE ASSEMBLY DRAWING AND PL.

PL 89821800
DETACHED LISTS

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION		CODE IDENT.	SHEET 2	WL	DOCUMENT No. 89821800	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ASSY ORIGIN 89821800		ACCESS FIND No.	ASSY DESTINATION 89821800		ACCESS FIND No.	REMARKS
1			GRN-WHT.		P1	Gnd		P2	Gnd		CABLE 1 ⚠
2			BLK			B01			B01		
3			GRN-WHT			Gnd			Gnd		
4			GRN-WHT			Gnd			Gnd		
5			BRN			B02			B02		
6			GRN-WHT			Gnd			Gnd		
7			GRN-WHT			Gnd			Gnd		
8			RED			B03			B03		
9			GRN-WHT			Gnd			Gnd		
10			GRN-WHT			Gnd			Gnd		
11			ORN			B04			B04		
12			GRN-WHT			Gnd			Gnd		
13			GRN-WHT			Gnd			d		
14			YEL			B05			B05		
15			GRN-WHT			Gnd			Gnd		
16			GRN-WHT			Gnd			Gnd		
17			GRN			B06			B06		
18			GRN-WHT			Gnd			Gnd		
19			GRN-WHT			Gnd			Gnd		
20			BLU			B07			B07		
21			GRN-WHT			Gnd			Gnd		
22			GRN-WHT			Gnd			Gnd		
23			VIO.			Gnd			Gnd		
24			GRN-WHT			B08			B08		
25			GRA-WHT			Gnd			Gnd		
26			GRA		P1	Gnd		P2	Gnd		CABLE 1

(Cont.)

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA		CODE IDENT.	SHEET 3	WL	DOCUMENT No. 89821800	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN		ACCESS FIND No.	DESTINATION		ACCESS FIND No.	REMARKS
27			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 1
28			GRN-WHT			B10			B10		
29			WHT.			Gnd			Gnd		
30			GRN-WHT			Gnd			Gnd		
31			GRN-WHT			Gnd			Gnd		
32			BLK			B11			B11		
33			GRN-WHT			Gnd			Gnd		
34			GRN-WHT			Gnd			Gnd		
35			BRN			Gnd			Gnd		
36			GRN-WHT			B12			B12		
37			GRN-WHT			Gnd			Gnd		
38			RED			Gnd			Gnd		
39			GRN-WHT			B13			B13		
40			GRN-WHT			Gnd			Gnd		
41			ORN			Gnd			Gnd		
42			GRN-WHT			B14			B14		
43			GRN-WHT			Gnd			Gnd		
44			YEL			Gnd			Gnd		
45			GRN-WHT			B15			B15		
46			GRN-WHT			Gnd			Gnd		
47			GRN			Gnd			Gnd		
48			GRN-WHT			B16			B16		
49			GRN-WHT			Gnd			Gnd		
50			BLU			Gnd			Gnd		
51			GRN-WHT			B17			B17		
52			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 1

(Cont.)

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD
A SUBSIDIARY OF
CONTROL DATA CORPORATION

CODE IDENT.

SHEET 4

WL

DOCUMENT No. 89821800

REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN		ACCESS FIND No.	DESTINATION		ACCESS FIND No.	REMARKS
53			VIO.		P1	Gnd		P2	Gnd		CABLE 1
54			GRN-WHT			B18			B18		
55			GRN-WHT			Gnd			Gnd		
56			GRA			Gnd			Gnd		
57			GRN-WHT			B19			B19		
58			GRN-WHT			Gnd			Gnd		
59			WHT			Gnd			Gnd		
60			GRN-WHT			B20			B20		
61			GRN-WHT			Gnd			Gnd		
62			BLK			Gnd			Gnd		
63			GRN-WHT			B22			B22		
64			GRN-WHT			Gnd			Gnd		
65			BRN			Gnd			Gnd		
66			GRN-WHT			B23			B23		
67			GRN-WHT			Gnd			Gnd		
68			RED			B24			B24		
69			GRN-WHT			Gnd			Gnd		
70			GRN-WHT			B25			B25		
71			ORN			Gnd			Gnd		
72			GRN-WHT			B26			B26		
73			GRN-WHT			Gnd			Gnd		
74			YEL			B27			B27		
75			GRN-WHT			Gnd			Gnd		
76			GRN-WHT			B28			B28		
77			GRN			Gnd			Gnd		
78			GRN-WHT		P1	B29		P2	B29		CABLE 1

(Cont.)

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION		CODE IDENT.	SHEET 5	WL	DOCUMENT No. 89821800	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN		ACCESS FIND No.	DESTINATION		ACCESS FIND No.	REMARKS
79			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 1
80			BLU			B30			B30		|
81			GRN-WHT		|	Gnd		|	Gnd	CABLE 1
82			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 2 △
83			BLN		|	A01		|	A01	|
84			GRN-WHT		|	Gnd		|	Gnd	|
85			GRN-WHT		|	Gnd		|	Gnd	|
86			BRN		|	A02		|	A02	|
87			GRN-WHT		|	Gnd		|	Gnd	|
88			GRN-WHT		|	Gnd		|	Gnd	|
89			RED		|	A04		|	A04	|
90			GRN-WHT		|	Gnd		|	Gnd	|
91			GRN-WHT		|	Gnd		|	Gnd	|
92			ORN		|	A05		|	A05	|
93			GRN-WHT		|	Gnd		|	Gnd	|
94			GRN-WHT		|	Gnd		|	Gnd	|
95			YEL		|	A06		|	A06	|
96			GRN-WHT		|	Gnd		|	Gnd	|
97			GRN-WHT		|	Gnd		|	Gnd	|
98			GRN		|	A07		|	A07	|
99			GRN-WHT		|	Gnd		|	Gnd	|
100			GRN-WHT		|	Gnd		|	Gnd	|
101			BLU		|	A08		|	A08	|
102			GRN-WHT		|	Gnd		|	Gnd	|
103			GRN-WHT		|	Gnd		|	Gnd	|
104			VIO		P1	A09		P2	A09		CABLE 2

(Cont.)

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION		CODE IDENT.	SHEET 6	WL	DOCUMENT No. 89821800	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN		ACCESS FIND No.	DESTINATION		ACCESS FIND No.	REMARKS
105			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 2
106			GRN-WHT			Gnd			Gnd		
107			GRA			A10			A10		
108			GRN-WHT			Gnd			Gnd		
109			GRN-WHT			Gnd			Gnd		
110			WHT			A11			A11		
111			GRN-WHT			Gnd			Gnd		
112			GRN-WHT			Gnd			Gnd		
113			BLN			Gnd			Gnd		
114			GRN-WHT			A12			A12		
115			GRN-WHT			Gnd			Gnd		
116			BRN			Gnd			Gnd		
117			GRN-WHT			A13			A13		
118			GRN-WHT			Gnd			Gnd		
119			RED			Gnd			Gnd		
120			GRN-WHT			A14			A14		
121			GRN-WHT			Gnd			Gnd		
122			ORN			Gnd			Gnd		
123			GRN-WHT			A15			A15		
124			GRN-WHT			Gnd			Gnd		
125			YEL			Gnd			Gnd		
126			GRN-WHT			A16			A16		
127			GRN-WHT			Gnd			Gnd		
128			GRN			Gnd			Gnd		
129			GRN-WHT			A17			A17		
130			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 2

(Cont.)

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION		CODE IDENT.	SHEET 7	WL	DOCUMENT No. 89821800,	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN		ACCESS FIND No.	DESTINATION		ACCESS FIND No.	REMARKS
131			BLU		P1	Gnd		P2	Gnd		CABLE 2
132			GRN-WHT			A18			A18		
133			GRN-WHT			Gnd			Gnd		
134			VIO			Gnd			Gnd		
135			GRN-WHT			Gnd			Gnd		
136			GRN-WHT			A19			A19		
137			GRA			Gnd			Gnd		
138			GRN-WHT			Gnd			Gnd		
139			GRN-WHT			Gnd			Gnd		
140			WHT			A20			A20		
141			GRN-WHT			Gnd			Gnd		
142			GRN-WHT			Gnd			Gnd		
143			BLK			A22			A22		
144			GRN-WHT			Gnd			Gnd		
145			GRN-WHT			Gnd			Gnd		
146			BRN			A23			A23		
147			GRN-WHT			Gnd			Gnd		
148			GRN-WHT			Gnd			Gnd		
149			RED			A24			A24		
150			GRN-WHT			Gnd			Gnd		
151			GRN-WHT			A25			A25		
152			ORN			Gnd			Gnd		
153			GRN-WHT			A26			A26		
154			GRN-WHT			Gnd			Gnd		
155			YEL			A27			A27		
156			GRN-WHT		P1	Gnd		P2	Gnd		CABLE 2

TABLE 9-1. EXTERNAL CABLE WIRE LIST (Cont'd)

ELBIT COMPUTERS LTD A SUBSIDIARY OF CONTROL DATA CORPORATION		CODE IDENT.	SHEET 8	WL	DOCUMENT No. 89821800	REV. 01

CONDUCTOR IDENT.	FIIND No	GAUGE (REF.)	COLOR (REF.)	LENGHT (APPROX.)	ORIGIN	ACCESS FIND No.	DESTINATION	ACCESS FIND No.	REMARKS
157			GRN-WHT		P1 A28		P2 A28		CABLE 2
158			GRN		Gnd		Gnd		
159			GRN-WHT		A29		A29		
160			GRN-WHT		Gnd		Gnd		
161			BLU		A30		A30		
162			GRN-WHT		P1 Gnd		P2 Gnd		CABLE 2

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TABLE 9-2. PWB PIN LIST

CONNECTOR/PIN	SIGNAL NAME		CONNECTOR/PIN	SIGNAL NAME	
	A/Q	DSA		A/Q	DSA
P1A1	$\overline{A5}$	DA5	P1B1	$\overline{A1}$	DA1
2	$\overline{A6}$	DA6	2	$\overline{A2}$	DA2
3	$\overline{A\emptyset}$	DA$\emptyset$	3	$\overline{A7}$	DA7
4	$\overline{A12}$	DA12	4	$\overline{A8}$	DA8
5	$\overline{A11}$	DA11	5	$\overline{A9}$	DA9
6	$\overline{A3}$	DA3	6	$\overline{A10}$	DA10
7	$\overline{A4}$	DA4	7	$\overline{\text{Char input}}$	N/A
8	Vcc TER	Vcc TER	8		
9	$\overline{\text{Timing Pulse}}$	MC	9	$\overline{A13}$	DA13
10	Vcc TER	Vcc TER	10	$\overline{A14}$	DA14
11	$\overline{A15}$	DA15	11	GND	GND
12	Q$\emptyset$	N/A	12	Q1	Priority
13	Q2	$\overline{\text{Resume}}$	13	Q3	N/A
14	Q4	N/A	14	Q5	Protect
15	Q6	$\overline{\text{Request}}$	15	Q7	N/A
16	Q8	N/A	16	Q9	N/A
17	Q10	$\overline{PE}$	17	Q11	PE
18	Q12	$\overline{\text{Par Bit}}$	18	Q13	$\overline{\text{Autoload}}$
19	Q14	SRTM	19	Q15	SMTR
20	$\overline{W=0}$	$\overline{\text{Protect Bit}}$	20	$\overline{\text{Sint 8}}$	N/A
21	$\overline{\text{Read}}$	$\overline{65K}$	21	$\overline{\text{Write}}$	WE
22	$\overline{\text{Reply}}$	N/A	22	$\overline{\text{Reject}}$	N/A
23	$\overline{\text{Prog Protect}}$	AD8	23	$\overline{MC}$	AD$\emptyset$
24	$\overline{\text{Sint 1}}$	AD9	24	$\overline{\text{Sint 9}}$	AD1
25	$\overline{\text{Sint 2}}$	AD10	25	$\overline{\text{Sint 10}}$	AD2
26	$\overline{\text{Sint 3}}$	AD11	26	$\overline{\text{Sint 11}}$	AD3
27	$\overline{\text{Sint 4}}$	AD12	27	$\overline{\text{Sint 12}}$	AD4
28	$\overline{\text{Sint 5}}$	AD13	28	$\overline{\text{Sint 13}}$	AD5
29	GND	GND	29		
30	$\overline{\text{Sint 6}}$	AD14	30	$\overline{\text{Sint 14}}$	AD6
P1A31	$\overline{\text{Sint 7}}$	AD15	P1B31	$\overline{\text{Sint 15}}$	AD7

(Cont.)

TABLE 9-2. PWB PIN LIST (Cont'd)

CONNECTOR/PIN	SIGNAL NAME		CONNECTOR/PIN	SIGNAL NAME	
	A/Q	DSA		A/Q	DSA
P2A1	XSint 7	$\overline{\text{XAD15}}$	P2B1	XSint 15	$\overline{\text{XAD7}}$
2	XSint 6	$\overline{\text{XAD14}}$	2	XSint 14	$\overline{\text{XAD6}}$
3	GND	GND	3	XSint 13	$\overline{\text{XAD5}}$
4	XSint 5	$\overline{\text{XAD13}}$	4	XSint 12	$\overline{\text{XAD4}}$
5	XSint 4	$\overline{\text{XAD12}}$	5	XSint 11	$\overline{\text{XAD3}}$
6	XSint 3	$\overline{\text{XAD11}}$	6	XSint 10	$\overline{\text{XAD2}}$
7	XSint 2	$\overline{\text{XAD10}}$	7	XSint 9	$\overline{\text{XAD1}}$
8	XSint 1	$\overline{\text{XAD9}}$	8	XMC	XADØ
9	XProg Prot	$\overline{\text{XAD8}}$	9		
10	XReply	N/A	10	XReject	N/A
11	$\overline{\text{XQ14}}$	$\overline{\text{XRTM}}$	11	$\overline{\text{XQ15}}$	$\overline{\text{XMTR}}$
12	XRead	X65K	12	XWrite	$\overline{\text{XWF}}$
13	XW=0	XProtect Bit	13	XSint 8	N/A
14	$\overline{\text{XQ12}}$	XParity Bit	14	$\overline{\text{XQ13}}$	XAutoload
15	$\overline{\text{XQ10}}$	XPE	15	$\overline{\text{XQ11}}$	XPE
16	$\overline{\text{XQ8}}$	N/A	16	$\overline{\text{XQ9}}$	N/A
17	XQ6	XRequest	17	$\overline{\text{XQ7}}$	N/A
18	$\overline{\text{XQ4}}$	N/A	18	$\overline{\text{XQ5}}$	XProtect
19	$\overline{\text{XQ2}}$	XResume	19	$\overline{\text{XQ3}}$	N/A
20	$\overline{\text{XQØ}}$	N/A	20	$\overline{\text{XQ1}}$	XPriority
21			21	GND	GND
22	XA15	XDA15	22	XChar Input	XDA14
23	XTime Pulse	XMC	23	XA13	XDA13
24	XA4	XDA4	24	XA14	N/A
25	XA3	XDA3	25	XA10	XDA10
26	XA11	XDA11	26	XA9	XDA9
27	XA12	XDA12	27	XA8	XDA8
28	XAØ	XDAØ	28	XA7	XDA7
29	XA6	XDA6	29	XA2	XDA2
P2A30	XA5	XDA5	P2B30	XA1	XDA1

COMMENT SHEET

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