MAIN BOARD
USER'S MANUAL
FOR
MODEL: B637/B638/B639/B640/B641/B642
386SX-AT

Rev. A

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1. INTRODUCTION

This system series Mainboard is an 80386SX-based system that is fully compatible with IBM PC/AT systems. It is designed for the use of both system integrators and end users. This system board performs 16-bit memory access and supports the 80387SX numeric coprocessor. Thus, it provides greater computational power when used for numerical computations, such as during scientific, engineering and mathematical applications. The B637/B640 operates at 16MHz; the B638 operates at 20MHz; the B639 /B642 operates at 25MHz; and the B641 operates at 33MHz. All six boards support 4 banks of SIM: SIM 1&2 is bank 0; SIM 3&4 is Bank 1; SIM 5&6 is Bank 2; and SIM 7&8 is Bank 3. Thus configured, the system can support from 512KB to 20MB of memory with page interleave modes. The system also supports EMS 4.0 and Shadow RAM operation.

> CAUTION:
>
> To conserve battery power, the factory default jumper setting position of Pins 1&2 at JP106 is "short". Therefore, the user should short Pins 2&3 at JP106 position instead of Pins 1&2 prior to initial operation.

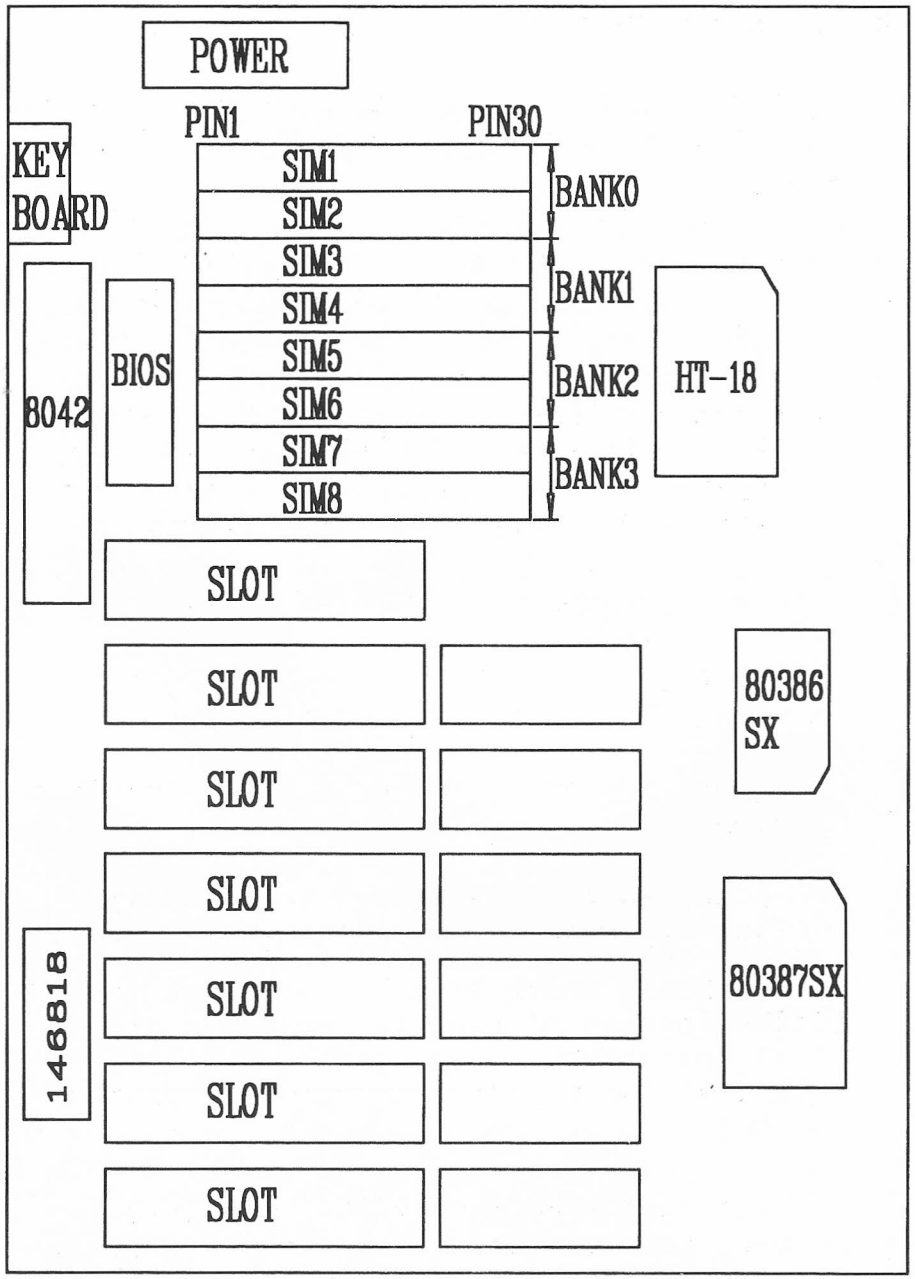

Figure 1. Major Components (B637/38/39/41)

2. SPECIFICATIONS AND FEATURES:

This system series' Main Boards have the following specifications and features:

-The B637/B640 Main Board operates at 16MHz; the B638 Main Board operates at 20MHz; the B639/B642 Main Board operates at 25MHz; and the B641 Main Board operates at 33MHz. All six use an 80386SX microprocessor, have a full 32-bit Internal Architecture and are 100% 80386 code compatible. The series accepts and runs all 32-bit software.

-Hardware supports L-I-M EMS 4.0.

-Contains 2 sets of EMS map register and utilizes a 16KB EMS page size.

-Supports Shadow RAM for System and video BIOS.

-Memory configuration can be from 512KB to 20MB with Interleave support. Memory beyond 16MB can only be used as expanded memory.

-An 80387SX Coprocessor runs synchronous mode.

-Models B637/B638/B639/B641 have six 16-bit slots and one 8-bit slot. Models B640 & B642 have six 16-bit slots.

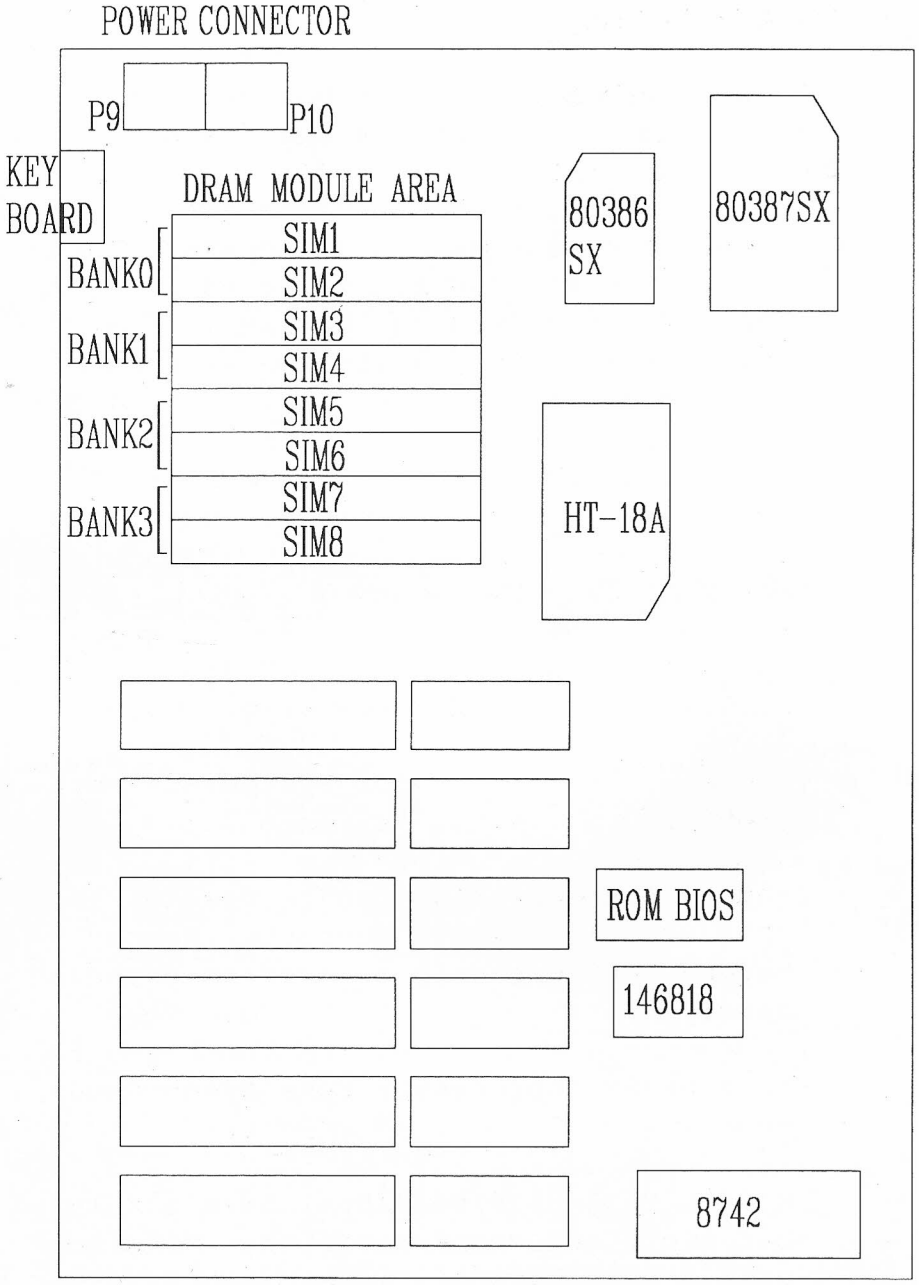

Figure 1a. Major Components of the B640/2

3. CONFIGURATION

3.1 Jumper Setting:

a) Power Good Signal Selector (P7)

Pin 1,2	Short	Signal from Main Board (Default)
Pin 2,3	Short	Signal from Switching Power Supply.

b) Display Adapter Selector (JP103)

Pin 1,2	Short	Color Graphic Adapter
Pin 1,2	Open	Monochrome Adapter(Default)

c) Hardware Turbo Jumper Selection (W2)

Pin 1-2	Short	Turbo Mode Set
Pin 1-2	Open	Normal Mode Set

d) System Configuration CMOS Memory (JP106)

Pin 2-3	Short	CMOS IC Connected to Battery Power
Pin 1-2	Short	Discharge CMOS Memory

If the system becomes unable to boot up due to an improper setting of the CMOS memory during setup, take the following corrective measures:

(1) Turn off power.
(2) Remove the jumper from Pins 2 & 3 at the Jumper 106 position. (This removes the power supplied by the battery.)
(3) Short Pins 1 & 2 at Jumper 106 position with the jumper taken from Pins 2 & 3. (This discharges the power of the CMOS Memory.)
(4) Now remove the jumper just used to short Pins 2 & 3 at Jumper 106 position and again place it on Pins 2 & 3 at Jumper 106 position.
(5) Turn the power back on.
(6) The system CMOS setup value will return to the BIOS default value. User can now re-start setup.

(e) Parity Enable/Disable (P8).

Pin 1-2	Short	DRAM Parity Enabled
Pin 2-3	Short	DRAM Parity Disabled

Selection of "Turbo" or "Normal"mode can be accomplished by CMOS Setup after the power is turned on. However, if the user prefers to change the mode manually through the use of the keyboard, the following procedure should be used:

1. Press and hold down the "CTRL" and "ALT" keys simultaneously.

2. With the two above mentioned keys still depressed, press the gray "+" key to set the "Turbo" mode, or the gray "-" key to set the "Normal" mode.

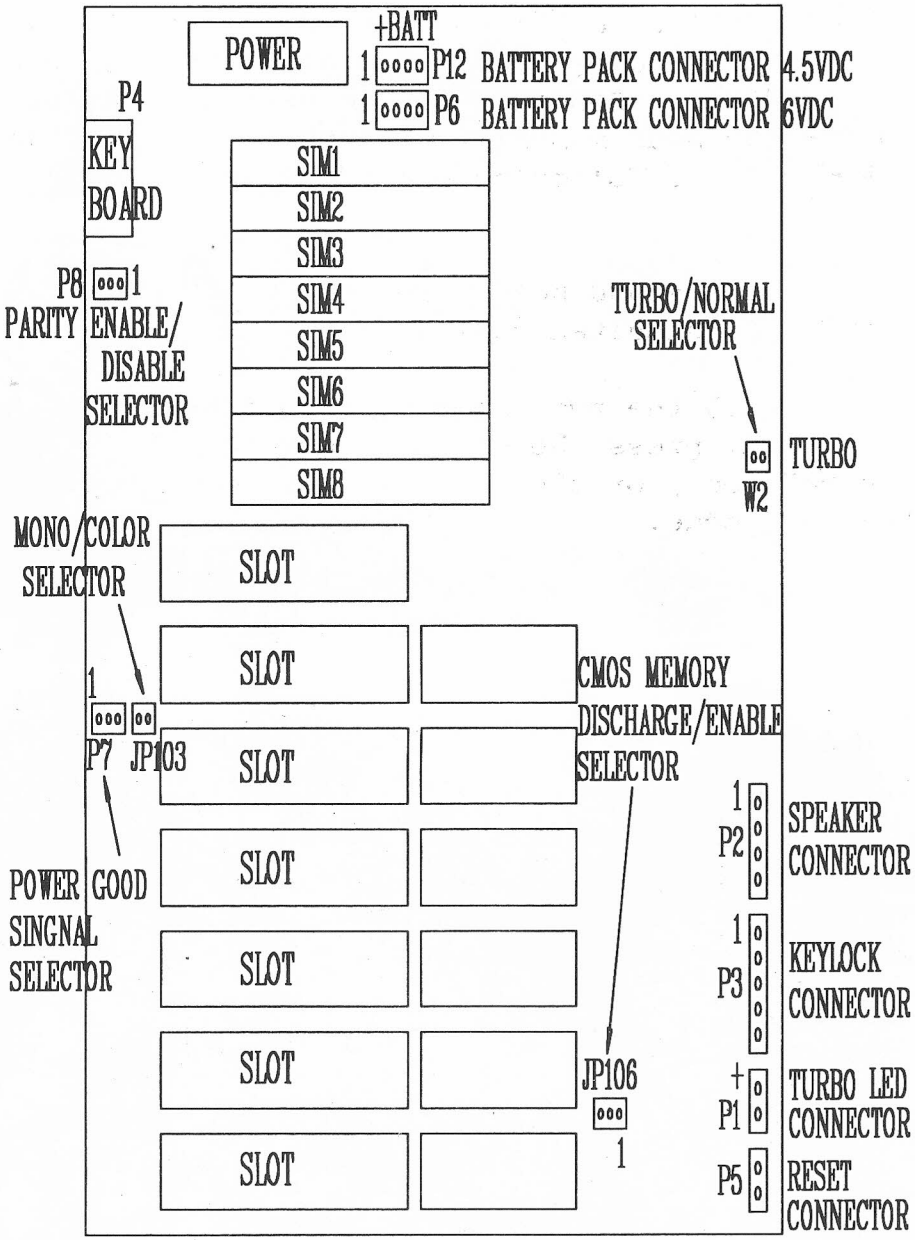

Figure 2. Jumpers & Connectors B637/8/9/641

3.2 On-board Connectors Description

The following section describes the seven connection points found on this board for the various devices and indicators.

a.) Battery Pack Connector (P6,P12)

Pin 1	4.5VDC (P12)/6VDC (P6)
Pin 2	Not used
Pin 3	Gnd
Pin 4	Gnd

b.) Speaker Connector (P2)

Pin 1	Data
Pin 2	Data (Same signal as Pin 1)
Pin 3	+5V
Pin 4	+5V

c.) Power LED & Key Lock Connector (P3)

Pin 1	LED Power +
Pin 2	Gnd
Pin 3	Gnd
Pin 4	Keyboard inhibit
Pin 5	Gnd

d.) Hardware Reset Connector (P5)

Pin 1-2	Short - System reset
Pin 1-2	Open - Reset disabled

e.) Turbo LED Connector (P1)

Pin 1	+5V
Pin 2	Signal

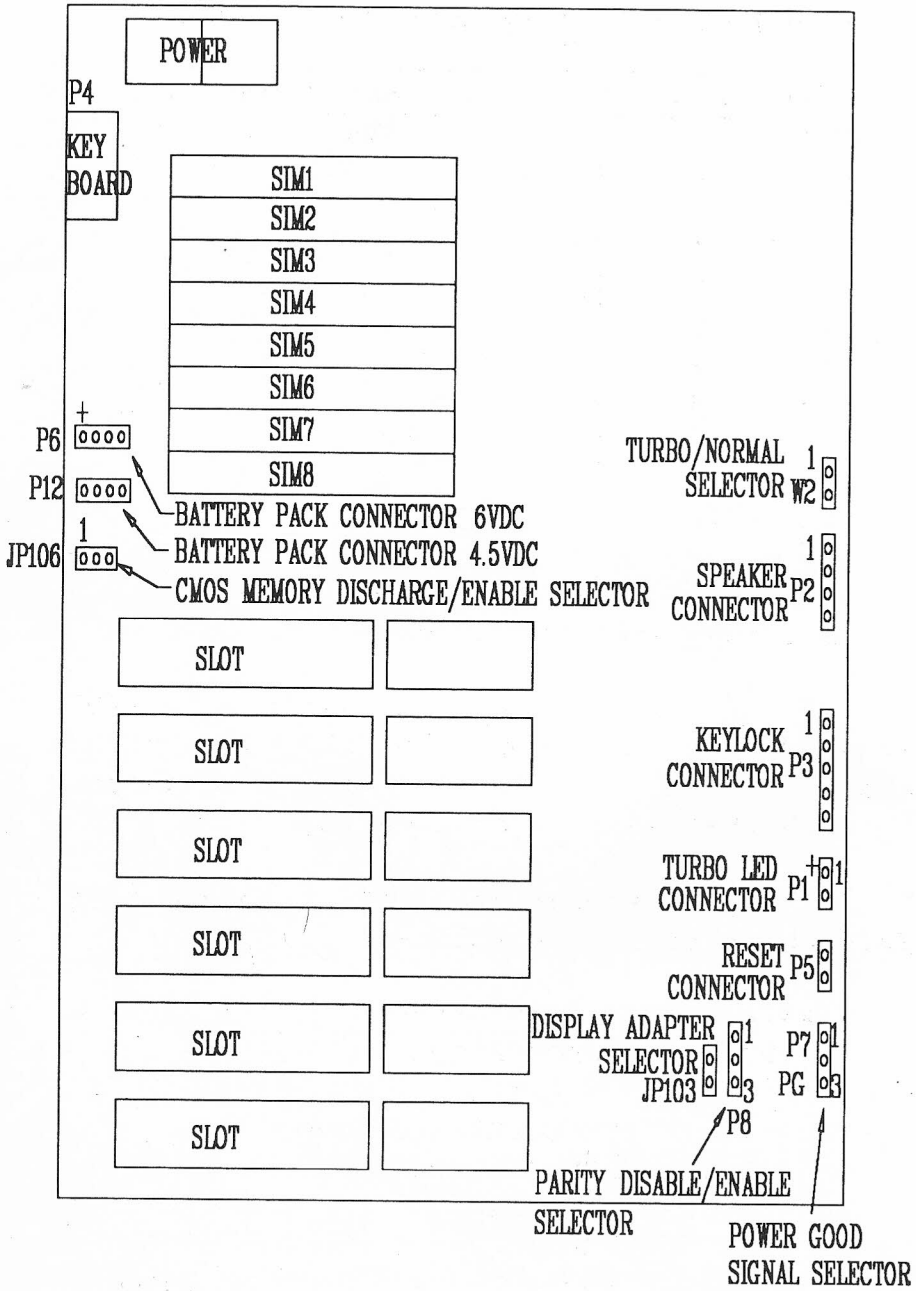

Figure 2a. Jumpers & Connectors for B640/2

(f.) Power Supply Connector (P9, P10)

PIN	DESCRIPTION
1	POWER GOOD
2	+5V
3	+12V
4	-12V
5	GND
6	GND
7	GND
8	GND
9	-5V
10	+5V
11	+5V
12	+5V

3.3 External I/O Interfaces

The keyboard interface is the only I/O interface built into this mainboard. Various other external I/O functions can be employed through the use of add-on cards.

The pin assignment of the keyboard interface connector is as follows:

Keyboard Connector (P4)

PIN	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	NOT USED
4	GND
5	+5V

3.4 MEMORY CONFIGURATION

SIMM 1, 2, 3, 4, 5, 6, 7, and 8 are socket SIM type DRAM Modules. Two SIM DRAM modules configure one bank. The DRAM memory configuration can be from 512K up to 20MB. All of these configurations are supported by page only or 2/4 way page interleaving mode. Shadow RAM is also supported. To optimize OS/2 operation, fast reset and Gate A20 are also supported.

To install DRAM module please take note of the correct direction sequence. (See Figure #3.)

Caution: RAM Modules may be damaged if they are inserted in an improper direction.

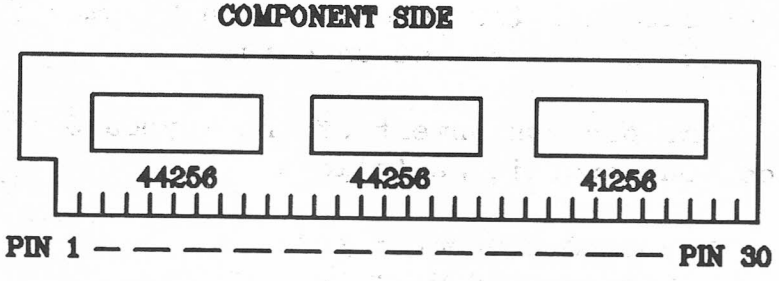

Figure 3. Front View of SIM Module

The system supports three types of SIM modules: 256K x 9, 1M x 9, and 4Mx9. The page / interleaved features are accomplished by the combination of SIMM and its individual unit capacity. **(Note: B641 must use 70ns DRAM).**

Table 3.2, following, shows the possible configurations.

TABLE 3.2

REGISTER BITS					DRAM TYPE					
CR1	CR6	CR0								
D6	D0	D7	D6	D5	BANK0	BANK1	BANK2	BANK3	TMS	I/L
0	0	0	0	0	256K				512K	0
0	0	0	0	1	256K	256K			1M	2
0	0	0	1	0	256K	256K	256K		1.5M	2*
0	0	0	1	1	256K	256K	256K	256K	2M	2x2
0	0	1	0	0	1M				2M	0
0	0	1	0	1	1M	1M			4M	2
0	0	1	1	0	1M	1M	1M		6M	2*
0	0	1	1	1	1M	1M	1M	1M	8M	2x2
0	1	0	0	0	4M				8M	0
0	1	0	0	1	4M	4M			16M	2
0	1	1	0	1	1M	4M			10M	0
0	1	1	1	0	1M	4M	4M		18M	2
1	0	0	1	0	256K	256K	1M		3M	2*
1	0	0	1	1	256K	256K	1M	1M	5M	2
1	0	1	1	0	1M	1M	256K		4.5M	2*
1	0	1	1	1	1M	1M	256K	256K	5M	2
1	1	0	1	0	256K	256K	4M		9M	2*
1	1	0	1	1	256K	256K	4M	4M	17M	2
1	1	1	1	0	1M	1M	4M		12M	2*
1	1	1	1	1	1M	1M	4M	4M	20M	2

4. NUMERIC COPROCESSOR

This system contains an option socket for the installation of an 80387SX Floating Point Coprocessor. When installed, this chip--commonly referred to as a ``math coprocessor''--substantially increases the speed at which scientific functions and mathematical calculations are processed.

80387SX INSTALLATION

The installation of the above Floating Point Coprocessor chips are handled as follows:

Take notice of the fact that both these chips and the socket are ``square'' shaped. Look at both the top and underside of the chip to make sure that it is properly oriented with receptacle socket before inserting it. Also take care to press it into place with even pressure on all sides so as not to bend the chip pins during installation.

5. SYSTEM I/O ADDRESS MAP

The following table shows the standard AT I/O Address Map.

Hex Range	Device
000-01F	DMA Controller
020-03F	Interrupt Controller, Master
040-05F	Timer
060-06F	8042 Keyboard
070-07F	Real-Time Clock, NMI (Non-Maskable Interrupt)
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller
0C0-0DF	DMA Controller
0F0	Clear Math Processor Busy
0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC or Bisync 2
3A0-3AF	Bisync 1
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CE	Local Area Network Controller
3D0-3DF	Color/Graphics Monitor Adapter
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

Hex 000 to 0FF are reserved for the system board I/O. Hex 100 to 3FF are available on the I/O channel.

6. SYSTEM INTERRUPTS

This main board contains programmable interrupt controllers that provide 16 levels of system interrupts. The following list shows the interrupt assignments in descending priority:

NM1 Parity of I/O Check

CTLR 1 CTLR 2

IRQ 0 Timer Out 0
IRQ 1 Keyboard
IRQ 2 From CLTR 2
IRQ 8 Clock Interrupt
IRQ 9 To INT 0AH
IRQ 10 Reserved
IRQ 11 Reserved
IRQ 12 Reserved
IRQ 13 Coprocessor
IRQ 14 Hard Disk
IRQ 15 Reserved
IRQ 3 Serial Port 2
IRQ 4 Serial Port 1
IRQ 5 Parallel Port 2
IRQ 6 Diskette-Controller
IRQ 7 Parallel Port 1

7. ON-BOARD EXPANSION SLOTS

	B	A	
GND	1	1	-I/O CHECK
RESET DRV	2	2	SD7
+5 VDC	3	3	SD6
IRQ9	4	4	SD5
-5 VDC	5	5	SD4
DRQ2	6	6	SD3
-12 VDC	7	7	SD2
0WS	8	8	SD1
+12 VDC	9	9	SD0
GND	10	10	-I/O CH RDY
-SMEMW	11	11	AEN
-SMEMR	12	12	SA19
-IOW	13	13	SA18
-IOR	14	14	SA17
-DACK3	15	15	SA16
DRQ3	16	16	SA15
-DACK1	17	17	SA14
DRQ1	18	18	SA13
-REFRESH	19	19	SA12
SYSCLK	20	20	SA11
IRQ7	21	21	SA10
IRQ6	22	22	SA9
IRQ5	23	23	SA8
IRQ4	24	24	SA7
IRQ3	25	25	SA6
-DACK2	26	26	SA5
T/C	27	27	SA4
BALE	28	28	SA3
+5 VDC	29	29	SA2
0SC	30	30	SA1
GND	31	31	SA0

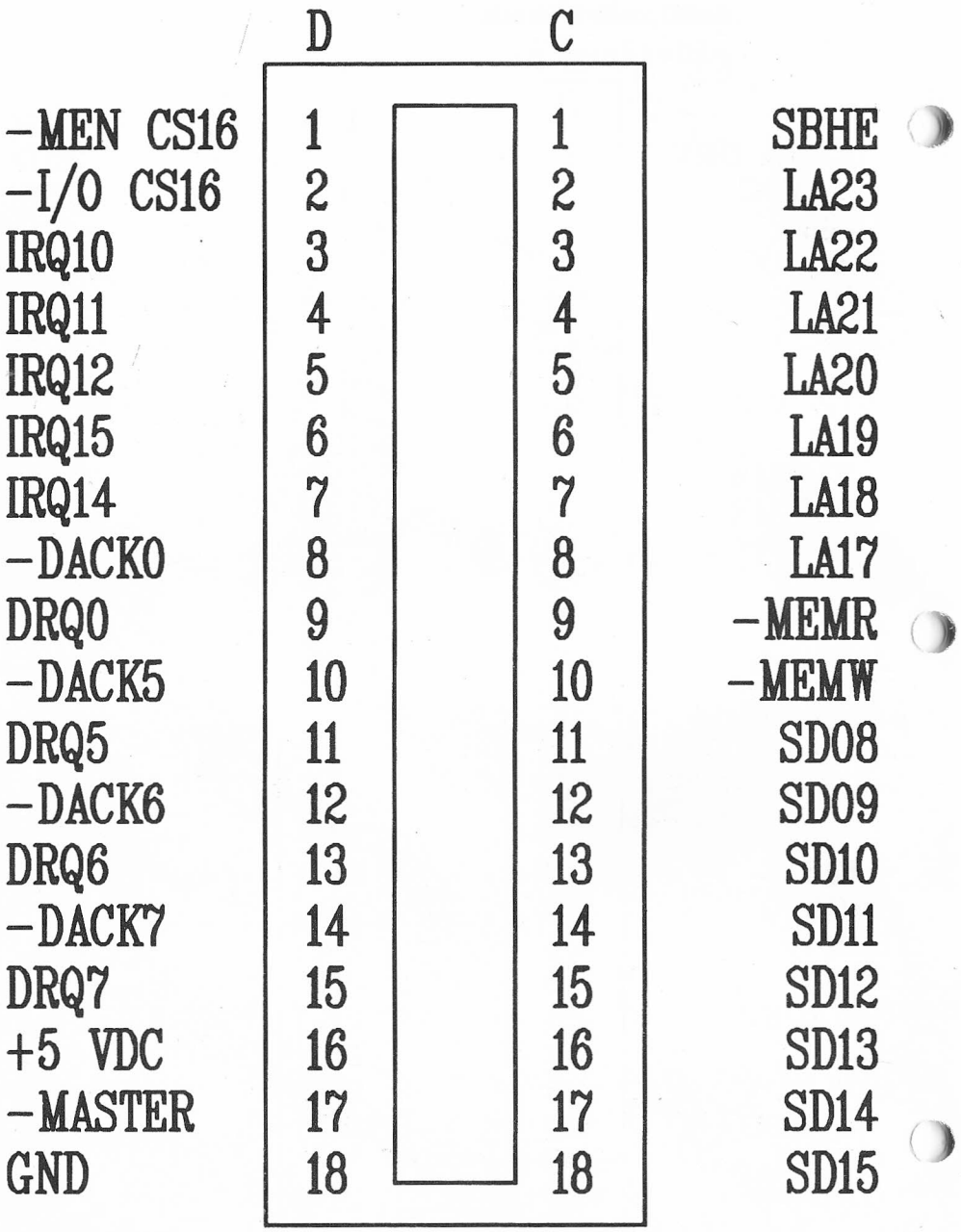

Figure 4. Expansion Bus Connector

8. System Performance Enhancement

8.1 EMS

The system main board has a built-in EMS hardware circuit. An EMS program diskette is supplied with the board. For the activation of EMS, on-board memory should exceed 640KB and the EMS memory size must be defined in the extended CMOS setup procedure. The EMS drive program should then be copied to a formatted diskette. With this diskette in drive "A", type the following at the prompt:

```
COPY CON:CONFIG.SYS
DEVICE=MME.SYS
```

Once this has been acomplished, re-boot the machine. You should see the following message:

```
EXPANDED MEMORY MANAGER VERSION 4.0
COPYRIGHT 1989 QUADTEL CORPORATION.
ALL RIGHTS RESERVED

TEST MEMORY : XXXX KB
```

8.2 Shadow RAM

The Shadow Ram function of this board is implemented by simply going to the CMOS Setup Menu and selecting the desired setting. The procedure is accomplished as follows:

1. Hold down the "CTRL" and "ALT" keys while pressing the "S" key. This will take you to the CMOS Setup Program Menu.

2. Using the "Up", "Down", "Left", and "Right" Cursor Keys, move the cursor to the "Shadow RAM" sector.

3. Make the appropriate selection in this sector with the cursor.

4. Press the "ESC" key. This will cause the system to reboot automatically, with the selected Shadom RAM setting in place.