

SECTION 1

INTRODUCTION

THE RTA-03D ADAPTER CONTAINS FOUR ASYNCHRONOUS PORTS USING RS-232C INTERFACES. ITS PURPOSE IS TO HANDLE ASYNCHRONOUS SERIAL DATA TRANSMISSION BETWEEN YOUR PC AND MODEMS, SERIAL PRINTER, REMOTE DISPLAY TERMINALS, OR OTHER SERIAL DEVICES.

YOUR RTA-03D ADAPTER CAN BE USED IN THE IBM PC, PC-XT, PC-AT, 386, 486, OR HARDWARE COMPATIBLES SYSTEM.

1.1 CHECKLIST

BEFORE GETTING STARTED, CHECK THAT YOUR RTA-03D ADAPTER PACKAGE INCLUDES THE FOLLOWING ITEMS:

- * RTA-03D ADAPTER.
- * USER MANUAL.
- * EXPANSION CABLE (DB37 TO \times 25-PIN CONNECTORS).

1.2 FEATURES

THE MULTI USER ADAPTER ARE SUMMARIZED BELOW:

- * IBM PC, AT, 386, 486 HARDWARE COMPATIBILITY.
- * FOUR RS-232C CHANNELS FOR ASYNCHRONOUS COMMUNICATIONS.
- * NS16450 OR NS16550ASN ASYNCHRONOUS COMMUNICATIONS ELEMENTS
- * VARIABLE PC INPUT/OUTPUT (I/O) ADDRESS CONFIGURATION.
- * INTERRUPT SELECTABLE.
- * COM1, COM2, COM3 AND COM4 SOFTWARE COMPATIBILITY.

SECTION 2

CONFIGURATION

IN ADDITION TO DESCRIBING THE CORRECT CONFIGURATION OF THE RTA-03D COMMUNICATIONS ADAPTER, THE SECTION EXPLAINS THE DIFFERENCE BETWEEN THE COMPATIBLE AND ENHANCED MODES OF OPERATION.

2.1 COMPATIBLE MODE

THE STANDARD DISKETTE OPERATION SYSTEM PROVIDES A DRIVER FOR COM1 COM2, COM3 AND COM4 PORTS, THE RTA-03D ADAPTER ADDING OTHER PORT ADDRESS FOR SPECIAL PURPOSE.

2.2 ENHANCE MODE

2.2.1 COMPATIBLE MODE VERSUS ENHANCED MODE

THE FIRST TWO SERIAL DEVICE SUPPORTED BY XENIX ARE REFERRED TO AS COM1 AND COM2 AND ARE TYPICALLY IMPLEMENTED WITH A MULTIFUNCTION BOARD INSERTED INTO THE PC. THE RTA-03D MAY BE CONFIGURED TO EMULATE THESE TWO "STANDARD" PORTS BY ADDRESSING TWO OF THE FOUR PORTS TO BE COMPATIBLE WITH THE STANDARD ASSIGNMENTS. THIS IS CALLED COMPATIBLE MODE OF OPERATION.

THE RTA-03D MAY ALTERNATIVELY BE CONFIGURED TO COEXIST WITH THE TWO STANDARD PORTS, ADDING FOUR PORTS FOR A TOTAL OF SIX. THIS CALLED ENHANCED MODE. THE XENIX'S HIDDEN DRIVE WILL SUPPORT A MAXIMUM OF TWO RTA-03D ADAPTERS, ADDING EIGHT ADDITIONAL PORTS FOR A TOTAL OF TEN.

2.2.2 MAPPING XENIX DEVICES TO ADAPTER PORT

THE STANDARD XENIX SYSTEM PROVIDES A DRIVER FOR THE COM1 AND COM2 PORTS WHICH ARE ACCESSED AS /dev/tty00 AND /dev/tty01, RESPECTIVELY. IN THE ENHANCED MODE, THE XENIX'S HIDDEN DRIVER SUPPORTS THE ADDITIONAL FOUR OR EIGHT PORTS WHICH ARE ACCESSED AS /dev/tty02 THROUGH /dev/tty09. THE MAPPING OF XENIX DEVICES TO ADAPTER PORTS IS ILLUSTRATED IN TABLE 2-1.

TABLE 2-1 XENIX DEVICE TO PORT MAPPING - ENHANCED MODE.

	Port	Device
Standard Ports	COM1	/dev/tty00
	COM2	/dev/tty01
First Adapter	0	/dev/tty02
	1	/dev/tty03
	2	/dev/tty04
	3	/dev/tty05
Second Adapter	4	/dev/tty06
	5	/dev/tty07
	6	/dev/tty08
	7	/dev/tty09

	Port	Device
First Adapter	0	/dev/tty00
	1	/dev/tty01
	2	/dev/tty02
	3	/dev/tty03
Second Adapter	4	/dev/tty04
	5	/dev/tty05
	6	/dev/tty06
	7	/dev/tty07

SECTION 3 INTERFACE DESCRIPTION

THIS SECTION DESCRIBES THE INTERFACE BETWEEN THE RTA-03D ADAPTER AND THE XENIX SUPPORTED PC.

3.1 I/O ADDRESS RESPONSE

THIS SECTION DESCRIBES HOW THE RTA-03D ADAPTER RESPONDS TO I/O INSTRUCTIONS WITHIN THE PC I/O SPACE.

DIP SWITCH, POSITION 1, SET THE RTA-03D ADAPTER INTO A COMPATIBLE MODE IN WHICH CHANNELS 1, 2, 3, 4 RESPOND AS COM1 THROUGH COM4 OR SPECIAL ADDRESS, AND ENHANCED MODE SELECTED.

THESE ADDRESS RANGES ARE ILLUSTRATED IN TABLES 3-1 AND 3-2.

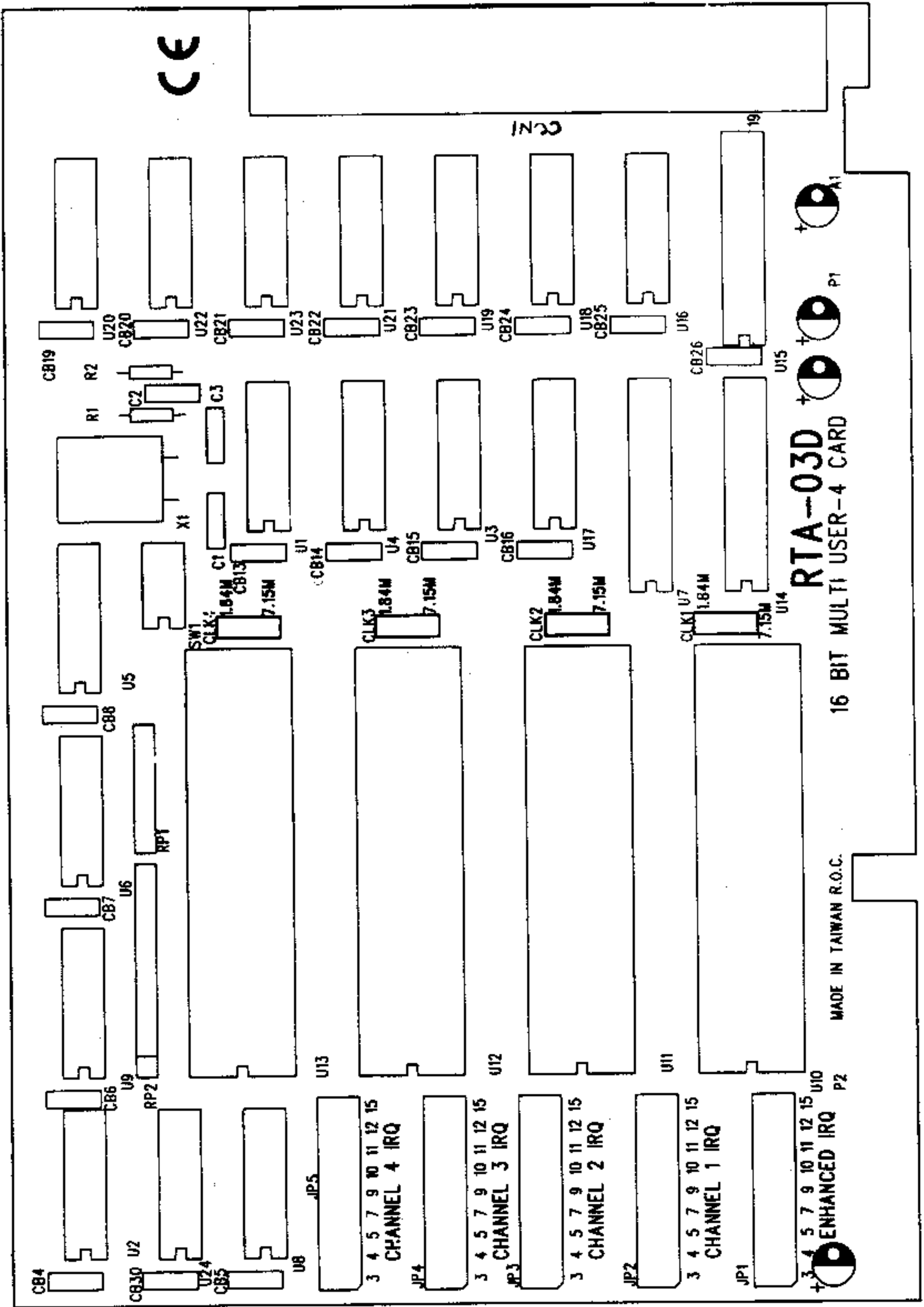
TABLE 3-1 I/O ADDRESS SELECTIONS – ENHANCED MODE

SW1	SW2	SW3	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	VECTOR
ON	ON	ON	3F8-3FF	2F8-2FF	2B0-2B7	2B8-2BE	:2BF
ON	ON	OFF	3F8-3FF	2F8-2FF	1B0-1B7	1B8-1BE	:1BF
ON	OFF	ON	2A0-2A7	2A8-2AF	2B0-2B7	2B8-2BE	:2BF
ON	OFF	OFF	1A0-1A7	1A8-1AF	1B0-1B7	1B8-1BE	:1BF

TABLE 3-2 I/O ADDRESS SELECTIONS – COMPATIBLE MODE

SW1	SW2	SW3	CHANNEL 1	CHANNEL 2	CHANNEL 3	CHANNEL 4	VECTOR
OFF	ON	ON	3F8-3FF	2F8-2FF	3E8-3EF	2E8-2EF	
OFF	ON	OFF	2F8-2FF	3E8-3EF	2E8-2EF	3E0-3E7	
OFF	OFF	ON	3E8-3EF	2E8-2EF	3E0-3E7	2E0-2E7	
OFF	OFF	OFF	3E0-3E7	2E0-2E7	260-267	268-26F	

TABLE 3-3 RTA-03D ADAPTER LAYOUT



5.

3.2 INTERRUPT RESPONSE

INTERRUPT OPERATION OF THE RTA-03D ADAPTER CAN BE CONFIGURED FOR COM1-COM8 COMPATIBILITY OR ALL INTERRUPTS MAY BE ROUTED THROUGH A SINGLE INTERRUPT LINE.

IN COMPATIBLE MODE CHANNELS 1, 2, 3, AND 4, THE INTERRUPT LINE SELECT BY JP2, JP3, JP4, JP5. IN ENHANCED MODE (SW2=ON) CHANNELS 1 AND 2 AUTOMATICALLY GENERATE INTERRUPTS ON IRQ4 AND IRQ3. NO JUMPERS SETTING IS REQUIRED. INTERRUPTS FOR CHANNELS 3 & 4 ARE FUNNELED THROUGH ANOTHER SINGLE INTERRUPT LINE WHICH YOU CAN SELECT BY SETTING ONE OF THE JP1 JUMPER. THE FACTORY DEFAULT CONFIGURATION HAS JP1 SET TO IRQ5. IN ENHANCED MODE (SW2 = OFF) ONLY ONE IRQ LINE CAN BE ENABLED AT A TIME. THE STANDARD XENIX SOFTWARE DRIVERS SUPPLIED WITH THIS PRODUCT REQUIRE THE USE OF INTERRUPT 5. OTHER DEVICE MAY SHARE INTERRUPT 5 IF DESIRED.

NOTE:

INTERRUPT 9 ONLY USE TO IBM PC, PC/XT AS IRQ 2. IF THE COMPUTER IS HIGHER (LIKE AT, 286, 386, 486) DON'T USE IT TO ANY PURPOSE.

3.3 COMMUNICATIONS IN INTERFACE

THE COMMUNICATIONS INTERFACE FOLLOW THE EIA RS-232C STANDARD SIGNALS FROM THE DB37 CONNECTOR ON THE ADAPTER INTO FOUR STANDARD DB25 CONNECTORS. THESE DB25 CONNECTORS WILL BE ATTACHED TO YOUR SERIAL DEVICES.

SECTION 4 INSTALLATION

- 4.1 POWER MUST ALWAYS BE SWITCHED OFF WHEN REMOVING OR INSERTING THE RTA-03D CARD OR CONNECTING OR DISCONNECTING THE CABLES.
- 4.2 REMOVE THE COVER OF THE COMPUTER.
- 4.3 THE RTA-03D ADAPTER MODES, I/O ADDRESS AND INTERRUPTS MUST BE SELECTED BEFORE INSERT THE ADAPTER TO THE COMPUTER. IF YOU NEED TO CHANGE THE MODES, ADDRESS, AND IRQ, PLEASE REFER TO SECTION 3.
- 4.4 USE A SCREW DRIVER TO REMOVE THE SCREW THAT SECURES THE EXPANSION SLOT COVER. SAVE THE SCREW FOR INSTALLATION OF THE INTERFACE CARD.
- 4.5 CHECK CONNECT CABLES IS FULLY CONNECTED.

NOTE 1: CLK 1 - CLK4 OFFER TO CHANNEL1 - CHANNEL4 OPERATE CLOCK SELECT (1.84/7.15 MHZ) FOR 16C550 & 16C650 CHIPS.

NOTE 2: CUSTOMIZE BAUD RATES CAN BE ACHIEVED BY SELECTING PROPER DIVISOR VALUES FOR MSB AND LSB OF BAUD RATE GENERATOR (16C650).

BAUD RATE GENERATOR PROGRAMMING TABLE (7.372 MHZ CLOCK):

BAUD RATE MCR BIT-7=1	BAUD RATE MCR BIT-7=0	16XCLOCK DIVISOR "Decimal"
50	200	2304
75	300	1536
150	600	768
300	1200	384
600	2400	192
1200	4800	96
2400	9600	48
4800	19.2k	24
7200	28.8k	16
9600	38.4k	12
19.2k	76.8k	6
38.4k	153.6k	3
57.6k	230.4k	2
115.2k	460.8k	1

APPENDIX A CABLE CONFIGURATION

APPENDIX A CONTAINS INFORMATION FOR YOUR USE IF YOU ARE CONSTRUCTING A SPECIAL CABLE FOR YOUR DEVICES. THE FOLLOWING FIGURES AND TABLES ARE INCLUDED:

- * FIGURE A-1 ILLUSTRATES THE PIN LOCATIONS FOR THE DB37 AND DB25 CONNECTORS.
- * TABLE A-1 LISTS THE SIGNAL ASSIGNMENTS FOR A DB25 CONNECTOR.
- * FIGURE A-2 PRESENTS THE RECOMMENDED METHOD OF INTERFACING THE RTA-03D ADAPTER TO OTHER DATA TERMINAL EQUIPMENT (DTE) DEVICES SUCH AS PRINTERS OR TERMINALS (DTE TO DTE CONNECTION).
- * TABLE A-2 LISTS THE SIGNAL ASSIGNMENTS FOR A DB37 CONNECTOR.
- * TABLE A-3 PROVIDES THE PIN ASSIGNMENTS FOR CREATING A CABLE CONNECTION BETWEEN THE DB37 CONNECTOR ON THE BC CARD AND FOUR DB25 CONNECTORS ON YOUR DATA COMMUNICATIONS EQUIPMENT (DCE) DEVICES.

**FIGURE A-2, RECOMMENDED DTE-TO-DTE CONNECTION
(NULL MODEM).**

CABLE CONFIGURATION

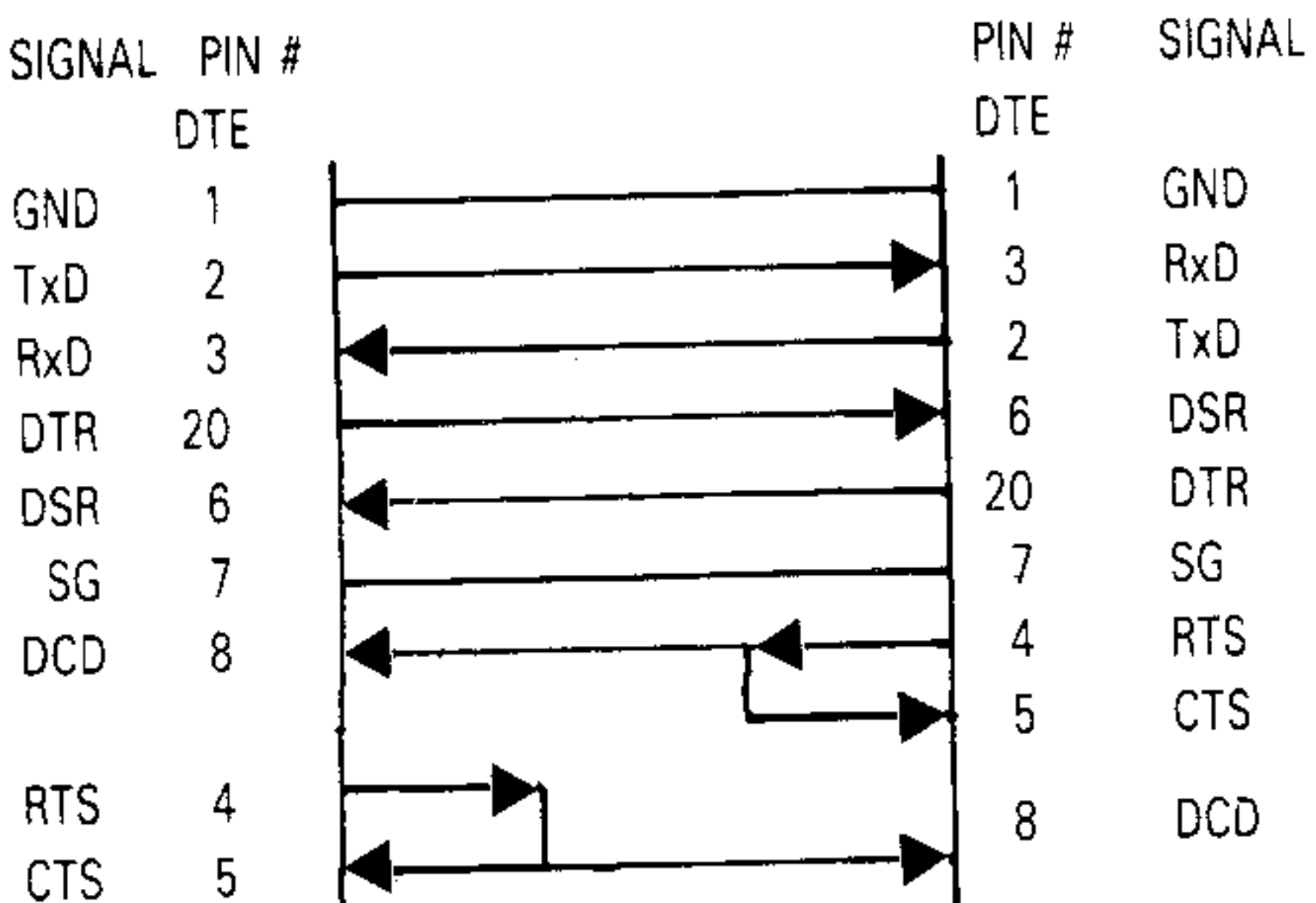
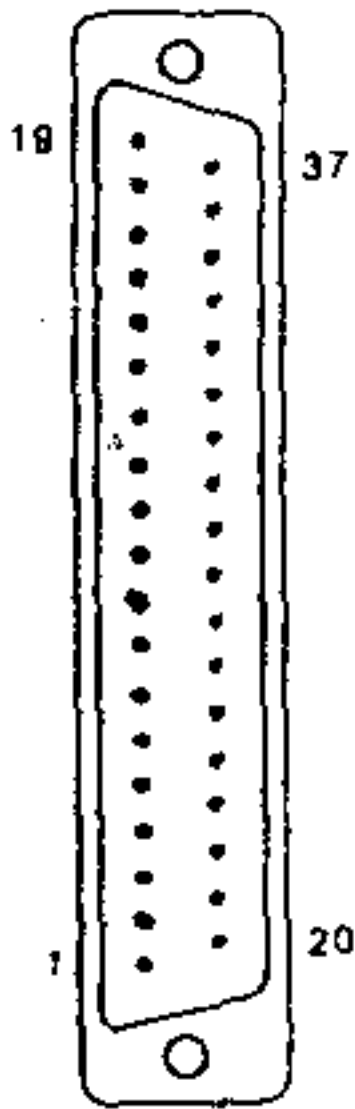
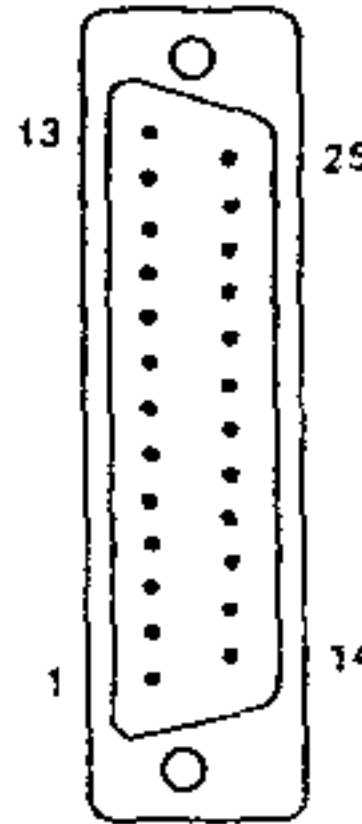


FIGURE A-1, PIN LOCATIONS FOR MALE CONNECTORS.

**37-PIN D-SHELL
CONNECTOR**



**25-PIN D-SHELL
CONNECTOR**



**TABLE A-1, DB25 CONNECTOR SIGNAL ASSIGNMENT
FOR SERIAL PORT INTERFACE (DTE).**

DB25 PIN #	SIGNAL NAME	RS-232C NAME	SIGNAL DIRECTION
1	CHASSIS GROUND (GND)	AA	COMMON
2	TRANSMIT DATA (TxD)	BA	OUTPUT
3	RECEIVE DATA (RxD)	BB	INPUT
4	REQUEST TO SEND (RTS)	CA	OUTPUT
5	CLEAR TO SEND (CTS)	CB	INPUT
6	DATA SET READY (DSR)	CC	INPUT
7	SIGNAL GROUND (SG)	AB	COMMON
8	DATA CARRIER DETECT (DCD)*	CF	INPUT
20	DATA TERMINAL READY (DTR)	CD	OUTPUT
22	RING INDICATOR (RI)	CE	INPUT

* DATA CARRIER DETECT (DCD) IS ALSO KNOWN AS RECEIVED LINE SIGNAL DETECTOR (RLSD).

**TABLE A-2, DB37 CONNECTOR SIGNAL ASSIGNMENT
FOR SERIAL PORT INTERFACE.**

DB37 PIN #	CHANNEL	SIGNAL NAME	RS-232C NAME
1	—	NO CONNECT	—
2	3	DATA CARRIER DETECT (DCD)*	CF
3	3	SIGNAL GROUND	BB
4	3	CLEAR TO SEND (CTS)	CB
5	3	RECEIVE DATA (RxD)	BB
6	4	RING INDICATOR (RI)	CE
7	4	DATA TERMINAL READY (DTR)	CD
8	4	DATA SET READY (DSR)	CC
9	4	REQUEST TO SEND (RTS)	CA
10	4	TRANSMIT DATA (TxD)	BA
11	2	DATA CARRIER DETECT (DCD)*	CF
12	2	SIGNAL GROUND	AB
13	2	CLEAR TO SEND (CTS)	CB
14	2	RECEIVE DATA (RxD)	BB
15	1	RING INDICATOR (RI)	CE
16	1	DATA TERMINAL READY (DTR)	CD
17	1	DATA SET READY (DSR)	CC
18	1	REQUEST TO SEND (RTS)	CA
19	1	TRANSMIT DATA (TxD)	BA
20	3	RING INDICATOR (RI)	CE
21	3	DATA TERMINAL READY (DTR)	CD
22	3	DATA SET READY (DSR)	CC
23	3	REQUEST TO SEND (RTS)	CA
24	3	TRANSMIT DATA (TxD)	BA
25	4	DATA CARRIER DETECT (DCD)*	CF
26	4	SIGNAL GROUND	AB
27	4	CLEAR TO SEND (CTS)	CB
28	4	RECEIVE DATA (RxD)	BB
29	2	RING INDICATOR (RI)	CE
30	2	DATA TERMINAL READY (DTR)	CD
31	2	DATA SET READY (DSR)	CC
32	2	REQUEST TO SEND (RTS)	CA
33	2	TRANSMIT DATA (TxD)	BA
34	1	DATA CARRIER DETECT (DCD)*	CF
35	1	SIGNAL GROUND	AB
36	1	CLEAR TO SEND (CTS)	CB
37	1	RECEIVE DATA (RxD)	BB

DATA CARRIER DETECT (DCD) IS ALSO KNOWN AS RECEIVED LINE SIGNAL DETECTOR (RLSD).

TABLE A-3, CABLE CONNECTION PIN ASSIGNMENT FOR CONNECTING TO FOUR DCE DEVICES (MODEM CONNECTION).

DB37 Pin #	DB25 Connectors Pin #			
	Chan. 1	Chan. 2	Chan. 3	Chan. 4
1				
2			8	
3			7	
4			5	
5			3	
6				22
7				20
8				6
9				4
10				2
11		8		
12		7		
13		5		
14		3		
15	22			
16	20			
17	6			
18	4			
19	2			
20			22	
21			20	
22			6	
23			4	
24			2	
25				8
26				7
27				5
28				3
29		22		
30		20		
31		6		
32		4		
33		2		
34	8			
35	7			
36	5			
37	3			

APPENDIX B

INTERRUPT RESPONSE (ENHANCED MODE)

IN SW1, 2, 3 SET LOCATION FOR ON, THE INTERRUPT SERVICE ROUTINE DETERMINES WHICH OF THE TWO CHANNELS (CHANNEL 3 OR 4) IS CREATING THE INTERRUPT BY READING THE INTERRUPT VECTOR AT ADDRESS: 2BF (OR: 1BF IF SW3 IS OFF). REFER TO TABLE B-1 FOR ILLUSTRATION. WHEN A DATA BIT IS SET TO 0, THE CORRESPONDING CHANNEL IS CREATING AN INTERRUPT. WHEN THE BIT IS SET TO 1, THERE IS NO INTERRUPT.

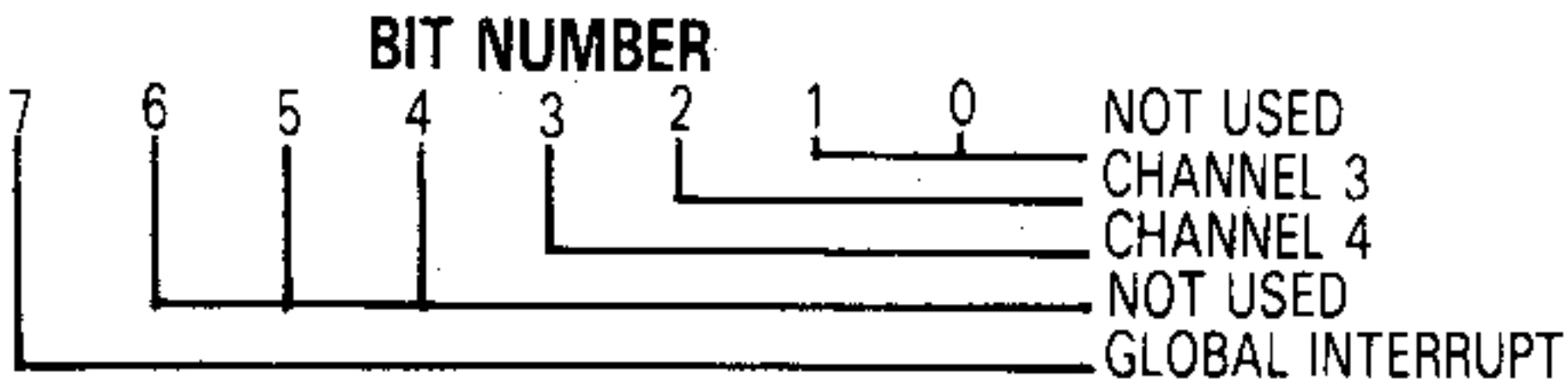


TABLE B-1 INTERRUPT VECTOR FOR CHANNEL 3 & 4

IN SW1, 2, 3 IS SETTING - ON OFF ON MODE, ALL FOUR INTERRUPTS FROM THE RTA-03D ADAPTER ARE FUNNELED THROUGH A SINGLE INTERRUPT LINE TO THE PC. THE INTERRUPT SERVICE ROUTINE DETERMINES WHICH OF THE FOUR CHANNELS IS CREATING THE INTERRUPT BY READING THE INTERRUPT VECTOR AT ADDRESS :2BF (OR :1BF IF SW3 IS OFF). REFER TO TABLE B-2 FOR ILLUSTRATION. WHEN A DATA BIT IS SET TO 0, THE CORRESPONDING CHANNEL IS CREATING AN INTERRUPT. WHEN THE BIT IS SET TO 1, THERE IS NO INTERRUPT.

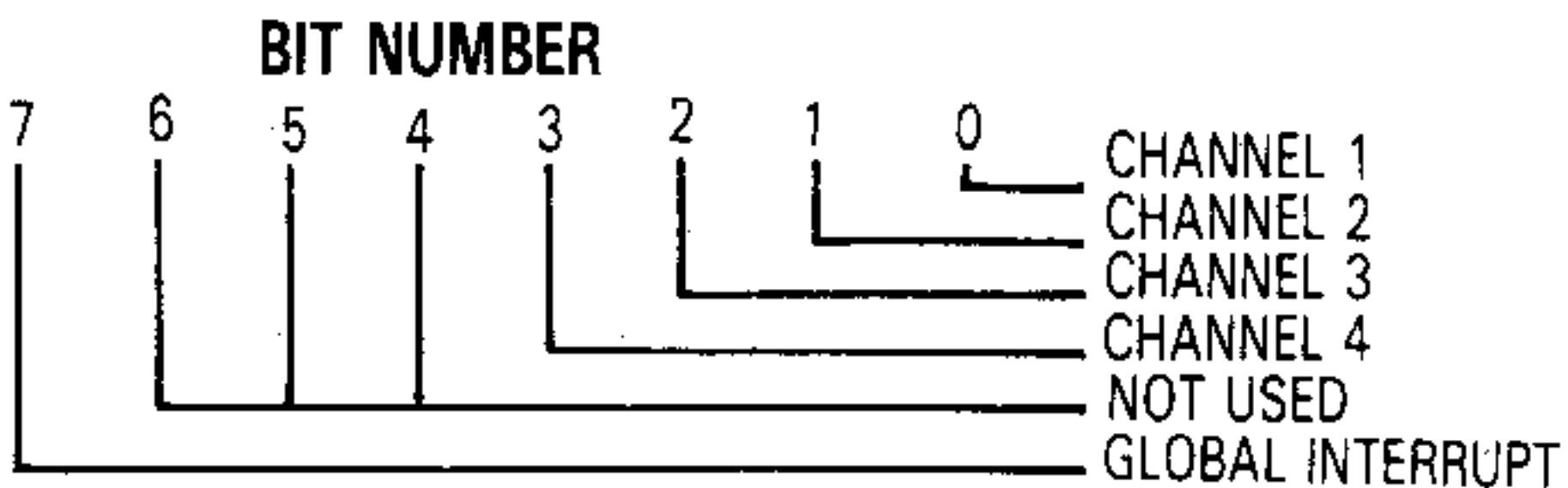


TABLE B-1 INTERRUPT VECTOR FOR CHANNEL 1, 2, 3 & 4

THE GLOBAL INTERRUPT IS USED TO ENABLE OR DISABLE ALL FOUR CHANNELS IN XENIX MODE BY WRITING A LOGIC 1 (TO ENABLE) OR 0 (TO DISABLE) INTO THE SCRATCH REGISTER ADDRESS 7. ALTERNATIVELY, EACH CHANNEL CAN BE KE ABLED OR DISABLED SEPARATELY BY PROGRAMMING THE OUT1 SIGNAL IN THE ACE. IN XENIX MODE, WHEN THE OUT1 SIGNAL IS ENABLED, THE OUT2 SIGNAL MUST BE DISABLED, AND WHEN THE OUT1 SIGNAL IS DISABLED, THE OUT2 SIGNAL MUST BE ENABLED.

REMARK

AN I/O WRITE COMMAND TO ADDRESS :2BF OR :1BF MUST BE PERFORMED AFTER EACH RESET OR POWER-UP TO ENABLE INTERRUPTS FROM THE CHANNELS NOT CONFIGURED AS COM1 OR COM2.

APPENDIX C HARDWARE INTERRUPT LIST

IRQ 0	TIMER OUTPUT 0
IRQ 1	KEYBOARD (OUTPUT BUFFER FULL)
IRQ 2	INTERRUPT FROM CTLR 2
IRQ 3	SERIAL PORT 2
IRQ 4	SERIAL PORT 1
IRQ 5	PARALLEL PORT 2
IRQ 6	DISKETTE CONTROLLER
IRQ 7	PARALLEL PORT 1
IRQ 8	REALTIME CLOCK INTERRUPT
IRQ 9	SOFTWARE REDIRECTED TO INT 0 AH (IRQ 2)
IRQ 10	RESERVED
IRQ 11	RESERVED
IRQ 12	RESERVED
IRQ 13	COPROCESSOR
IRQ 14	FIXED DISK CONTROLLER
IRQ 15	RESERVED

APPENDIX D SCO XENIX V2.21 AND HIGHER

THIS INSTALLATION PROCEDURE ASSUMES THE SCO XENIX V2.21 (OR UP) OPERATING SYSTEM AND HARDWARE SETTING HAS BEEN INSTALLED

1. INSTALL THE RAT03D ADAPTER, BOOT THE SCO XENIX V2.21 SYSTEM AND ENTER SYSTEM MAINTENANCE MODE.
2. WHEN YOU ARE IN THE SYSTEM MAINTENANCE MODE, ENTER:

`/etc/mkdev serial`

3. THIS INVOKE SERINIT, WHICH BEGINS WITH THE FOLLOWING DISPLAY:

YOU WOULD LIKE TO INSTALL A:

1. 1 PORT CARD
2. 2 PORT CARD
3. 4 PORT CARD
4. 5 PORT CARD
5. 8 PORT CARD

SELECT AN OPTION OR ENTER 'Q' TO QUIT

ENTER NUMBER 3 AND PRESS RETURN KEY, THE PROGRAM WILL RESPOND WITH THE FOLLOWING MENU:

THE CARD IS CONFIGURED AS:

1. COM 1
2. COM 2
3. COM 3
4. COM 4

SELECT AN OPTION OR ENTER 'H' FOR HELP OR 'Q' TO QUIT:

IF YOU SELECT 'H', A TABLE IS DISPLAYED CONTAINING PORT, CARD TYPES, I/O AND STATUS ADDRESSES.

ENTER APPROPRIATE NUMBER AND PRESS RETURN KEY. AFTER ACCEPTING THE SELECTED PORT, SERINIT WILL DISPLAY MESSAGES INDICATING THE NEW PORTS THAT HAVE BEEN CONFIGURED AND THEIR MODEM CONTROL COUNTERPARTS. FOR EXAMPLE, tty2a AND tty2A REFER TO THE SAME SERIAL PORT, BUT TTY2A HAS MODEM CONTROL, WHEREAS tty2a REFER TO THE SAME PORT WITHOUT MODEM CONTROL. DO NOT ATTEMPT TO ACCESS BOTH THE MODEM CONTROL AND NON-MODEM CONTROL PORTS OF THE SAME SERIAL LINE SIMULTANEOUSLY.

4. ENABLE EACH SERIAL PORTS BY USING THE 'enable' COMMAND. PLEASE TYPE:

enable ttyla

enable ttylb

enable ttylc

enable ttyld

5. CONNECT EACH TERMINAL TO DB25CONNETCOR.