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MODEL COM422/485A

USER MANUAL

FILE: MCOM422-485A.Cb

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Chapter 1: Introduction

The COM422/485A card is 5.025" long (128 mm) and can be installed in IBM PC/XT/AT or compatible computers. The card can be used for either RS422 or RS485 serial communications. (The RS485 specification allows multiple transmitters and receivers to communicate over a two-wire "party line" bus.)

Type16550 buffered UARTs are used as the Asynchronous Communication Element (ACE). These include 16-byte transmit/receive FIFO buffers to protect against data overrun in multitasking operating systems. The card is 100 percent backward compatible when the card address is set as either COM1, 2, 3, or COM4. However, use of the COM422/485A card is not restricted to those I/O addresses. Continuous address selection is available anywhere within the I/O address range 000 to 3F8 hex (on 8 byte boundaries).

A crystal oscillator is located on the card. This oscillator permits precise selection of baud rate from 50 to 115,200. By jumper selection, baud rates up to 460,800 are available. Baud rate is program selected and rates available are listed in a table in the Programming section of this manual.

The transceiver used, type 75176, is capable of driving extremely long communication lines at high baud rates. It is capable of driving up to 60mA on balanced lines and receiving inputs as low as 200mV differential signal superimposed on common mode noise of maximum -7V/+12V. In case of communication conflict, the transceivers feature thermal shutdown.

In RS485 applications, the driver must be enabled and disabled as needed allowing all cards to share a two-wire or four-wire cable. The COM422/485A controls the driver automatically. With automatic control, the driver is enabled when data are ready to be transmitted. The driver remains enabled for the transmission time of one additional character after data transfer is complete and then is disabled. The receiver is normally enabled but is disabled during transmissions and then re-enabled after transmission is completed. The card automatically adjusts its timing to the baud rate of the data.

For increased noise immunity, the communication lines are loaded at the receiver and biased at the transmitter. If you have a card model COM422/485A(T), then optional transzorbs have been added to the I/O lines to increase noise immunity and protect against transients.

Specification

- Multipoint: Compatible with RS422 and RS485 specifications. Up to 32 drivers and receivers allowed on line. Serial communications ACE used is type NS16550 with 16 byte FIFO buffer. Transceivers used are type 75176.

- Common Mode Voltage: -7V to +12V.
- Receiver Input Sensitivity: +/- 200mV, differential input. Thermal shutdown protection.
- Output Drive Capability: +/- 60 mA max., differential. Thermal shutdown protection.
- Tranzorbs: Optional Tranzorbs can be added to I/O lines for additional protection (Option T).
- Baud Rate: 50 to 460,800 baud. Crystal oscillator provided.
- Address: Eight bytes, continuously mappable within I/O address range 000 to 3F8 hex.
- Power Required: +5VDC at 400 mA typical.
- Size: 5.025" long (128 mm) and 1.925" seated height (49 mm).

Environmental

- Operating Temperature Range: 0 °C. to +60° C
- Storage Temperature Range: -50 °C. to +120° C
- Humidity: 5% to 95%, non-condensing.

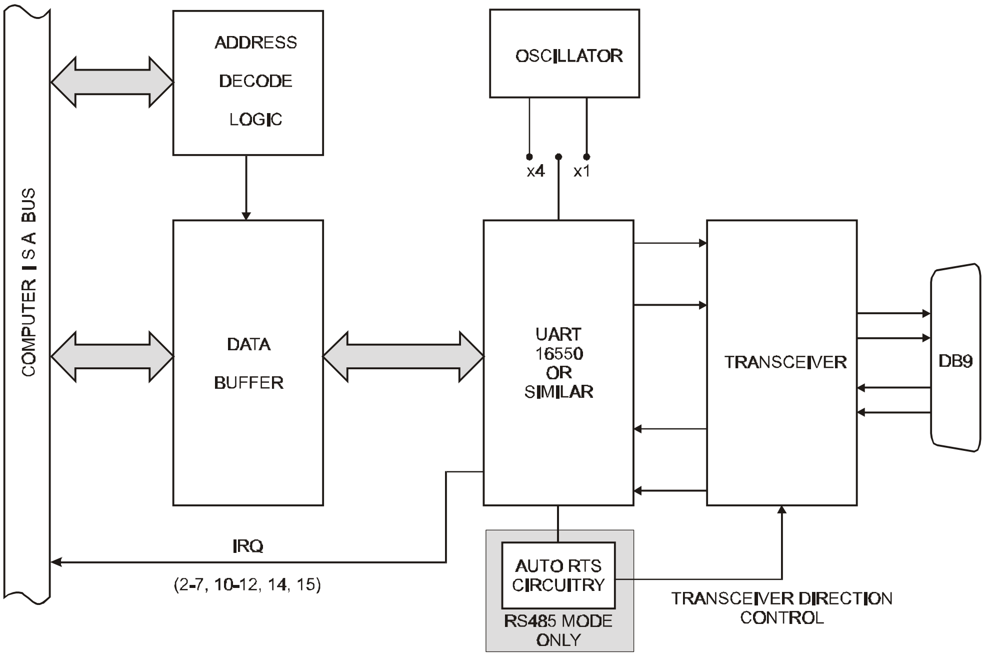


Figure 1-1: COM422/485A Block Diagram

Chapter 2: Installation

The software provided with this card is contained on either one CD or multiple diskettes and must be installed onto your hard disk prior to use. To do this, perform the following steps as appropriate for your software format and operating system. Substitute the appropriate drive letter for your CD-ROM or disk drive where you see d: or a: respectively in the examples below.

CD Installation

DOS/WIN3.x

1. Place the CD into your CD-ROM drive.
2. Type D:Enter to change the active drive to the CD-ROM drive.
3. Type INSTALLEnter to run the install program.
4. Follow the on-screen prompts to install the software for this card.

WIN95/98/NT

1. Place the CD into your CD-ROM drive.
2. The CD should automatically run the install program after 30 seconds. If the install program does not run, click START | RUN and type d:install, click OK or press Enter.
3. Follow the on-screen prompts to install the software for this card.

3.5-Inch Diskette Installation

As with any software package, you should make backup copies for everyday use and store your original master diskettes in a safe location. The easiest way to make a backup copy is to use the DOS DISKCOPY utility.

In a single-drive system, the command is:

```
DISKCOPY  A:  A:Enter
```

You will need to swap disks as requested by the system.
In a two-disk system, the command is:

```
DISKCOPY  A:  B:Enter
```

This will copy the contents of the master disk in drive A to the backup disk in drive B.

To copy the files on the master diskette to your hard disk, perform the following steps.

1. Place the master diskette into a floppy drive.
2. Change the active drive to the drive that has the diskette installed. For example, if the diskette is in drive A, type A : Enter.
3. Type I N S T A L L Enter and follow the on-screen prompts.

Directories Created on the Hard Disk

The installation process will create several directories on your hard disk. If you accept the installation defaults, the following structure will exist.

[CARDNAME]

Root or base directory containing the SETUP.EXE setup program used to help you configure jumpers and calibrate the card.

DOS\PSAMPLES:	A subdirectory of [CARDNAME] that contains Pascal samples.
DOS\CSAMPLES:	A subdirectory of [CARDNAME] that contains "C" samples.
Win32\language:	Subdirectories containing samples for Win95/98 and NT.

WinRisc.exe

A Windows dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem.

ACCES32

This directory contains the Windows 95/98/NT driver used to provide access to the hardware registers when writing 32-bit Windows software. Several samples are provided in a variety of languages to demonstrate how to use this driver. The DLL provides four functions (InPortB, OutPortB, InPort, and OutPort) to access the hardware.

This directory also contains the device driver for Windows NT, ACCESNT.SYS. This device driver provides register-level hardware access in Windows NT. Two methods of using the driver are available, through ACCES32.DLL (recommended) and through the DeviceIOControl handles provided by ACCESNT.SYS (slightly faster).

SAMPLES

Samples for using ACCES32.DLL are provided in this directory. Using this DLL not only makes the hardware programming easier (MUCH easier), but also one source file can be used for both Windows 95/98 and WindowsNT. One executable can run under both operating systems and still have full access to the hardware registers. The DLL is used exactly like any other DLL, so it is compatible with any language capable of using 32-bit DLLs. Consult the manuals provided with your language's compiler for information on using DLLs in your specific environment.

VBACCES

This directory contains sixteen-bit DLL drivers for use with VisualBASIC 3.0 and Windows 3.1 only. These drivers provide four functions, similar to the ACCES32.DLL. However, this DLL is only compatible with 16-bit executables. Migration from 16-bit to 32-bit is simplified because of the similarity between VBACCES and ACCES32.

PCI

This directory contains PCI-bus specific programs and information. If you are not using a PCI card, this directory will not be installed.

SOURCE

A utility program is provided with source code you can use to determine allocated resources at run-time from your own programs in DOS.

PCIFind.exe

A utility for DOS and Windows to determine what base addresses and IRQs are allocated to installed PCI cards. This program runs two versions, depending on the operating system. Windows 95/98/NT displays a GUI interface, and modifies the registry. When run from DOS or Windows3.x, a text interface is used. For information about the format of the registry key, consult the card-specific samples provided with the hardware. In Windows NT, NTioPCI.SYS runs each time the computer is booted, thereby refreshing the registry as PCI hardware is added or removed. In Windows 95/98/NT PCIFind.EXE places itself in the boot-sequence of the OS to refresh the registry on each power-up.

This program also provides some COM configuration when used with PCI COM ports. Specifically, it will configure compatible COM cards for IRQ sharing and multiple port issues.

WIN32IRQ

This directory provides a generic interface for IRQ handling in Windows 95/98/NT. Source code is provided for the driver, greatly simplifying the creation of custom drivers for specific needs. Samples are provided to demonstrate the use of the generic driver. Note that the use of IRQs in near-real-time data acquisition programs requires multi-threaded application programming techniques and must be considered an intermediate to advanced programming topic. Delphi, C++ Builder, and Visual C++ samples are provided.

Findbase.exe

DOS utility to determine an available base address for ISA bus , non-Plug-n-Play cards. Run this program once, before the hardware is installed in the computer, to determine an available address to give the card. Once the address has been determined, run the setup program provided with the hardware to see instructions on setting the address switch and various option selections.

Poly.exe

A generic utility to convert a table of data into an nth order polynomial. Useful for calculating linearization polynomial coefficients for thermocouples and other non-linear sensors.

Risc.bat

A batch file demonstrating the command line parameters of RISCTerm.exe.

RISCTerm.exe

A dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem. RISCTerm stands for Really Incredibly Simple Communications TERMinal.

Installing the Card

The COM422/485A card can be installed in either a long or a short slot of an IBM PC/AT or compatible computer. Before installing the card, carefully read Chapter 3, Option Selection and Chapter 4, Address Selection of this manual and configure the card according to your need. Use the FINDBASE program provided with the card to select a base address for the card. Use the SETUP program to select other options.

Be especially careful with address selection. If the addresses of two installed functions overlap, your computer will behave unpredictably.

To Install the Card

1. Turn off computer power.
2. Remove the computer cover.
3. Remove the blank mounting bracket.
4. Install jumpers for selected options. See Option Selection.
5. Select the base address on the card. See Address Selection.
6. Install the card in an I/O expansion slot. *Important: Make sure that the card mounting bracket is properly screwed into place and that there is a positive chassis ground.*
7. Install the I/O cable.
8. Inspect for proper fit of the card and cable and tighten screws.
9. Replace the computer cover.

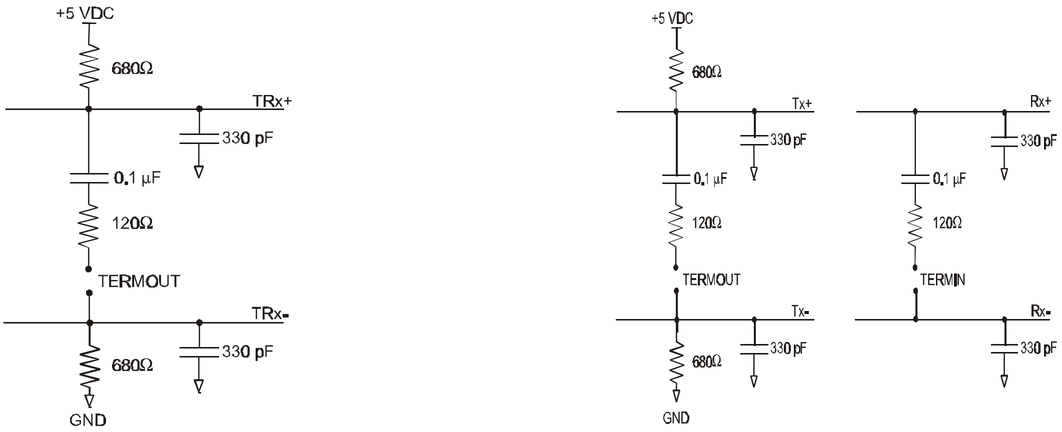
To ensure that there is minimum susceptibility to EMI and minimum radiation, it is important that the card's mounting bracket be connected to chassis ground. Also, proper anti-EMI cabling techniques (cable shield connected to chassis ground at the I/O connector, twisted-pair wiring, and, in extreme cases, ferrite level of EMI protection) must be used for input/output wiring. CE-marked versions of COM422/485A meet the requirements if EN50081-1:1992 (Emissions), EN50082-1:1992, and EN60950:1992 (Safety).

Chapter 3: Option Selection

Refer to Figure 3-2, Option Selection Map when reading this section of the manual. Card operation is determined by jumper installation as described in the following paragraphs.

Terminations and Bias

A transmission line should be terminated at the receiving end in its characteristic impedance. Installing a jumper at the location labeled TERMIN applies a 120Ω load across the input for RS422 mode. Installing a jumper at the location labeled TERMOUT applies a 120Ω load across the transmit/receive input/output for RS485 operation.



Two-Wire Connection

Four-Wire Connection

Figure 3-1: Simplified Schematic - Two-Wire and Four-Wire Connections

In RS485 operations, where there are multiple terminals, only the RS485 ports at each end of the network should have terminating resistors as described above. (See Appendix A, Application Considerations.) Also, for RS485 operation, there must be a bias on the Tx+ and Tx- lines to ensure a known "zero" state when none of the devices is transmitting. This card provides that bias.

422/485

With this jumper in the 422 position four-wire Full-Duplex transmission is enabled. In the 485 position transmission is limited to two-wire Half-Duplex.

Baud Rate

The X1/X4 jumper selects either the standard 1.8432 Mhz clock or 7.3728 Mhz clock source for the UART. The X4 position provides capability for baud rates up to 460.800 KHz.

Interrupts

Interrupt levels IRQ2 through IRQ7, IRQ10 through IRQ12, IRQ14, and IRQ15 are available. Select the desired level by installing a jumper in one of the locations marked IRQ2 through IRQ15.

Full or Half-Duplex

Full-Duplex allows simultaneous bi-directional communications. Half-Duplex allows bi-directional transmit and receiver communication but only one direction at a time, and is required for RS485 communications. Proper selection depends on the wire connections used to connect the two serial ports. The following table shows how two serial communication cards would be interconnected for the various modes. Tx designates the transmit wires and Rx designates the receive wires.

Communication Modes and Cabling Options

Mode			Cable	
			Card A	Card B
Simplex	2-wire Receive Only	Rx-	1	3
		Rx+	9	2
Simplex	2-wire Transmit Only	Tx+	2	9
		Tx-	3	1
Half-Duplex	2-wire	TRx+	2	2
		TRx-	3	3
Full-Duplex	4-wire	Tx+	2	9
		Tx-	3	1
		Rx-	1	3
		Rx+	9	2

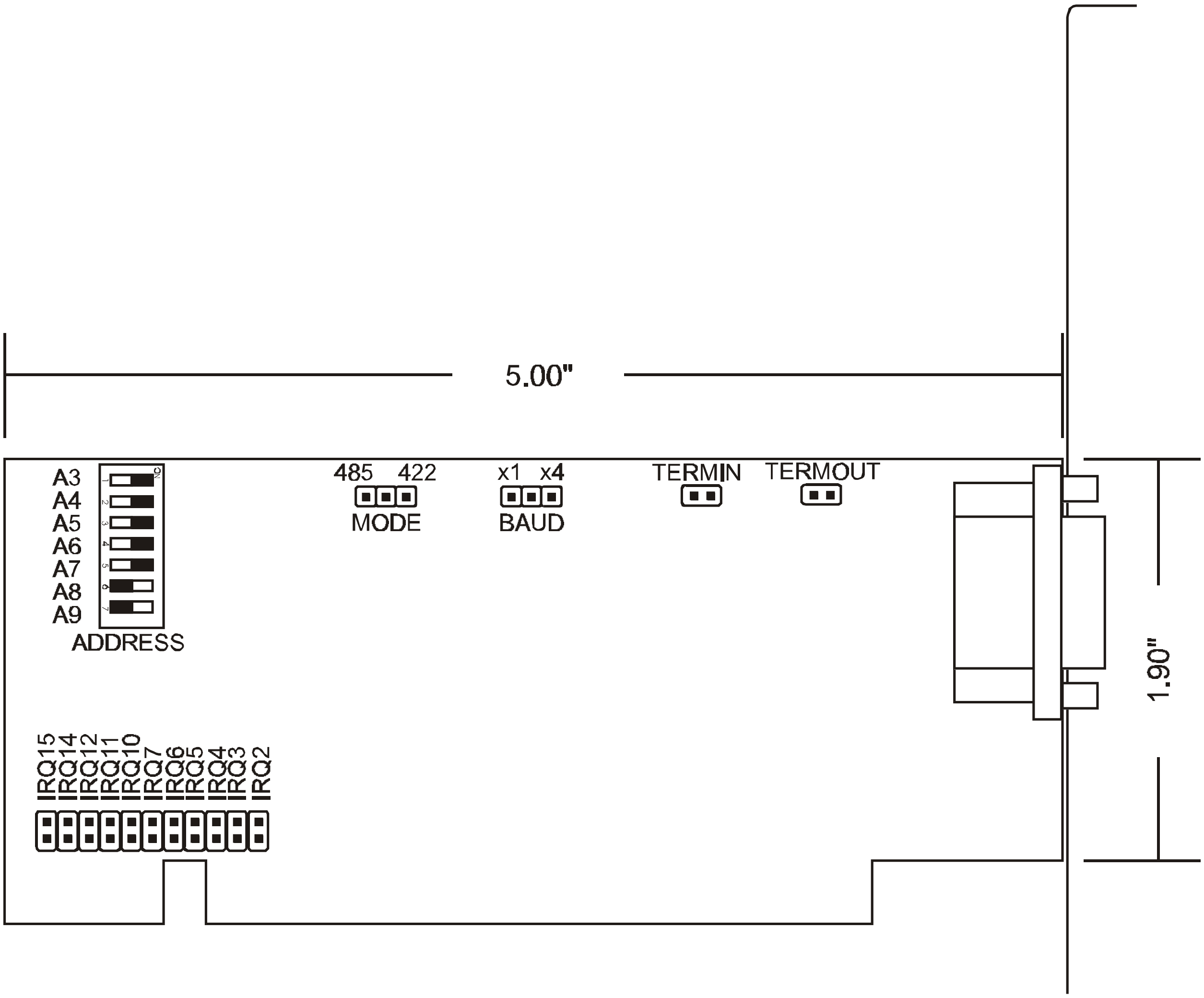


Figure 3-2: COM422/485A Option Selection Map

Chapter 4: Address Selection

The COM422/485A Serial Communications card base address can be selected anywhere within an I/O address range 100-3FF hex (on an 8 byte boundary) in ATs (except 1F0 through 1F8) providing that the address does not overlap with other functions. If in doubt, refer to the table below for a list of standard address assignments. (Note: The primary and secondary binary synchronous communication ports are supported by the Operating System.) The base address locator program FINDBASE provided will assist you to select a base address that will avoid any problem.

Hex Range	Usage
000-01F	DMA Controller 1
020-03F	INT Controller 1, Master
040-05F	Timer
060-06F	8042 (Keyboard)
070-07F	Real Time Clock, NMI Mask
080-09F	DMA Page Register
0A0-0BF	INT Controller 2
0C0-0DF	DMA Controller 2
0F0	Clear Math Coprocessor Busy
0F1	Reset Coprocessor
0F8-0FF	Arithmetic Processor
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Asynchronous Comm'n (Secondary)
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC or Binary Synchronous Comm'n 2
3A0-3AF	Binary Synchronous Comm'n 1
3B0-3BF	Monochrome Display/Printer
3C0-3CE	Local Area Network
3D0-3DF	Color/Graphic Monitor
3F0-3F7	Floppy Diskette Controller
3F8-3FF	Asynchronous Comm'n (Primary)

Table 4-1: Standard Address Assignments for 286/386/486 Computers

Address Setup switches are marked A3-A9. In order to configure the desired address, assign "0" to all Address Setup switches turned OFF and assign "1" to all Address Setup switches turned ON. These 1's and 0's are a binary representation of the base address. This binary number is then converted to a hexadecimal number.

Switch Label	A9	A8	A7	A6	A5	A4	A3
Addr. Line Controlled	A9	A8	A7	A6	A5	A4	A3

For example, as illustrated in the following table, switch selection corresponds to binary 10 1101 1xxx (or hex 2D8). The "xxx" represents address lines A2, A1, and A0 which are used on the card to select registers within the UART. See Chapter 5, Programming in this manual.

Switch Label	A9	A8	A7	A6	A5	A4	A3
Setup	OFF	ON	OFF	OFF	ON	OFF	OFF
Binary	1	0	1	1	0	1	1
Conversion Factor	2	1	8	4	2	1	8
Hex Representation	2		D				8

Review the Address Selection Table carefully before selecting the card address. If the addresses of two installed functions overlap your computer will behave unpredictably.

Chapter 5: Programming

Sample Programs

There are sample programs provided with the COM422/485A card in C, Pascal, QuickBASIC, and several Windows languages. DOS samples are located in the DOS directory and Windows samples are located in the WIN32 directory.

Windows Programming

The COM422/485A card installs into Windows as COM ports. Thus the Windows standard API functions can be used. In particular:

- CreateFile() and CloseHandle() for opening and closing a port.
- SetupComm(), SetCommTimeouts(), GetCommState(), and SetCommState() to set and change a port's settings.
- ReadFile() and WriteFile() for accessing a port.

See the documentation for your chosen language for details.

Under DOS, the process is very different. The remainder of this chapter describes DOS programming.

Initialization

Initializing the chip requires knowledge of the UART's register set. The first step is to set the baud rate divisor. You do this by first setting the DLAB (Divisor Latch Access Bit) high. This bit is located at Base Address +3, Bit 7. In C, the call would look like:

```
outportb(BASEADDR +3,0x80);
```

You then load the divisor into Base Address +0 (lower byte) and Base Address +1 (higher byte). The following equation defines the relationship between baud rate and divisor:

desired baud rate = (crystal frequency) / (16 * divisor)

When the BAUD jumper is in the X1 position, the UART clock frequency is 1.8432MHz. When the jumper is in the X4 position, the clock frequency is 7.3728 MHz. The following table lists popular divisor frequencies. Note that there are two columns to consider depending on the position of the BAUD jumper.

Baud Rate	Divisor X1	Divisor X4	Notes	Max. Diff'l. Cable Length*
460800	N/A	1		
230400	N/A	2		
153600	N/A	3		
115200	1	4		375 ft.
57600	2	8		660 ft.
38400	3	12		920 ft.
28800	4	16		1165 ft.
19200	6	24		1620 ft.
14400	8	32		2050 ft.
9600	12	48	Most commonly used in industry	4000 ft.
4800	24	96		4000 ft.
2400	48	192		4000 ft.
1200	96	384		4000 ft.

*These are theoretical maximums based on typical conditions and good quality cables.

Table 5-1: Baud Rate Divisors

In C, the code to set the chip to 9600 baud is:

```
outportb(BASEADDR, 0x0C);
outportb(BASEADDR +1,0);
```

The second step in initializing the UART is to set the Line Control Register at Base Address +3. This register defines word length, stop bits, parity, and the DLAB.

Bits 0 and 1 control word length and allow word lengths from 5 to 8 bits. Bit settings are extracted by subtracting 5 from the desired word length.

Bit 2 determines the number of stop bits. There can be either one or two stop bits. If Bit 2 is set to 0, there will be one stop bit. If Bit 2 is set to 1, there will be two stop bits.

Bits 3 through 6 control parity and break enable. They are not commonly used for communications and should be set to 0's.

Bit 7 is the DLAB. It must be set to 0 after the divisor is loaded or else there will be no communications.

The C command to set the UART for an 8-bit word, no parity, and one stop bit is:

```
outportb(BASEADDR +3, 0x03)
```

The third step of the initialization sequence is to set the modem control register at Base Address +4. This register controls functions on some cards. Bit 1 is the Request to Send (RTS) control bit. This bit should be left low until transmission time. Bits 2 and 3 are user-designated outputs. Bit 2 may be ignored on this card. Bit 3 is used to enable interrupts and should be set high if an interrupt-driven receiver is to be used.

The final initialization step is to flush the receiver buffers. You do this with two Reads from the receiver buffer at Base Address +0. When this is done, the UART is ready to use.

Reception

Reception can be handled in two ways: polling and interrupt-driven. When polling, reception is accomplished by constantly reading the Line Status Register at Base Address +5. Bit 0 of this register is set high whenever data are available to be read from the chip. A simple polling loop must continuously check this bit and read in data when it becomes available. Polling is not effective at very high data rates because the program cannot do anything else when it is polling or data could be missed. The following is a code fragment that implements a polling loop and uses a value of zero as an end-of-transmission marker:

```
do
{
  while (!(inportb(BASEADDR +5) & 1));    /*Wait until data ready*/
  data[i++]=inportb(BASEADDR);
}
while (data[i]!=0);    /*Reads the line until null character rec'd*/
```

Interrupt-driven communications should be used whenever possible and is required for high data speeds. Writing an interrupt-driven receiver is not much more complex than writing a polled receiver. However, care should be taken when installing or removing your interrupt handler because there is a danger of servicing the wrong interrupt, or disabling the wrong interrupt, or even turning interrupts off for too long.

The handler would first read the Interrupt Identification Register at Base Address +2. If the interrupt is for Received Data Available, the handler then reads the data. If no interrupt is pending, control exits the routine. As sample handler, written in C, is as follows:

```
do
{
  readback = inportb(BASEADDR +2);
  if(readback & 4) //*Readback will be set to 4 if data are  available*/
  data[i++]=inportb(BASEADDR);
}
while(readback!=1);
outportb(0x20,0x20);     /*Write EOI to 8259 Interrupt Controller*/
return;
```

The preceding examples accept only a single character as input. The code would need to be modified to handle larger data structures.

Transmission

RS485 transmission is simple to implement. First, the RTS line should be set high by writing a 1 to Bit 1 of the modem control register at Base Address +4. The RTS line is used to toggle the transceiver from receive mode to transmit mode and vice versa. It is not carried out on the line in RS485 and not used for handshaking. The CTS line is not used in RS485 and should always be enabled.

After the above are done, the card is ready to send data. To transmit a string of data, the transmitter must first check Bit 5 of the Line Status Register at Base Address +5. That bit is the transmitter-holding-register-empty flag. If it is high, the transmitter has sent the data. The process of checking the bit until it goes high followed by a write is repeated until no data remains. After all data has been transmitted, the RTS bit should be reset by writing a 0 to Bit 1 of the modem control register .

The following C code fragment demonstrates this process:

```
outportb(BASEADDR +4, inportb(BASEADDR +4)|0x02); /*Set RTS bit without altering states
of other bits*/
while(*data)  /*While there is data to send*/
{
  while(!(inportb(BASEADDR +5)&0x20));                /*Wait until transmitter is empty*/
  outportb(BASEADDR,*data);
  data++;
}
outportb(BASEADDR +4, inportb(BASEADDR +4)&0xFD;
/*Reset RTS bit without altering states of other bits*/
```

Chapter 6: Connector Pin Assignments

The popular 9-pin D subminiature connector is used for interfacing to communication lines. The connector is equipped with 4-40 threaded standoffs (female screw lock) to provide strain relief. We recommend using vinyl-jacketed, multiple twisted-pair cable.

Pin No.	Assignment
1	Receive Line - (RX-)
2	Transmit Line + (TX+)
3	Transmit Line - (TX-)
4	
5	Signal Ground
6	
7	
8	
9	Receive Line + (RX+)

Table 6-1: Connector Pin Assignments

Appendix A: Application Considerations

Introduction

Working with RS422 and RS485 devices is not much different from working with standard RS232 serial devices and these two standards overcome deficiencies in the RS232 standard. First, the cable length between two RS232 devices must be short; less than 50 feet at 9600 baud. Second, many RS232 errors are the result of noise induced on the cables. The RS422 standard permits cable lengths up to 5000 feet and, because it operates in the differential mode, it is more immune to induced noise.

Connections between two RS422 devices (with CTS ignored) should be as follows:

Device #1		**Device #2**	
Signal	Pin No.	Signal	Pin No.
Gnd	5	Gnd	5
TX^+	2	RX^+	9
TX^-	3	RX^-	1
RX^+	9	TX^+	2
RX^-	1	TX^-	3

Table A-1: Connections Between Two RS422 Devices

A third deficiency of RS232 is that more than two devices cannot share the same cable. This is also true for RS422 but RS485 offers all the benefits of RS422 plus allows up to 32 devices to share the same twisted pairs. An exception to the foregoing is that multiple RS422 devices can share a single cable if only one will talk and the others will all receive.

Balanced Differential Signals

The reason that RS422 and RS485 devices can drive longer lines with more noise immunity than RS232 devices is that a balanced differential drive method is used. In a balanced differential system, the voltage produced by the driver appears across a pair of wires. A balanced line driver will produce a differential voltage from ±2 to ±6 volts across its output terminals. A balanced line driver can also have an input "enable" signal that connects the driver to its output terminals. If the "enable signal is OFF, the driver is disconnected from the transmission line. This disconnected or disabled condition is usually referred to as the "tristate" condition and represents a high impedance. RS485 drivers must have this control capability. RS422 drivers may have this control but it is not always required.

A balanced differential line receiver senses the voltage state of the transmission line across the two signal input lines. If the differential input voltage is greater than +200 mV, the receiver will provide a specific logic state on its output. If the differential voltage input is less than -200 mV, the receiver will provide the opposite logic state on its output. A differential voltage of ±6V allows for voltage attenuation that can occur on long transmission cables.

A maximum common mode voltage rating of ±7V provides good noise immunity from voltages induced on the twisted pair lines. The signal ground line connection is necessary in order to keep the common mode voltage within that range. The circuit may operate without the ground connection but may not be reliable.

Parameter	**Conditions**	**Min.**	**Max.**
Driver Output Voltage (unloaded)		4V	6V
		-4V	-6V
Driver Output Voltage (loaded)	LD and LDGND	2V	
	jumpers in	-2V	
Driver Output Resistance			50Ω
Driver Output Short-Circuit Current			±150 mA
Driver Output Rise Time			10% unit interval
Receiver Sensitivity			±200 mV
Receiver Common Mode Voltage			±7V
Receiver Input Resistance			4KΩ

Table A-2: RS422 Specification Summary

To prevent signal reflections in the cable and to improve noise rejection in both the RS422 and RS485 mode, the receiver end of the cable should be terminated with a resistance equal to the characteristic impedance of the cable. (An exception to this is the case where the line is driven by an RS422 driver that is never "tristated" or disconnected from the line. In this case, the driver provides a low internal impedance that terminates the line at that end.)

Note

You do not have to add a terminator resistor to your cables when you use the COM422/485A card. Termination resistors for the RX+ and RX- lines are provided on the card and are placed in the circuit when you install the TERMIN and TERMOUT jumpers. (See Chapter 3, Option Selection in this manual.)

RS485 Data Transmission

The RS485 Standard allows a balanced transmission line to be shared in a party-line mode. As many as 32 driver/receiver pairs can share a two-wire party line network. Many characteristics of the drivers and receivers are the same as in the RS422 Standard. One difference is that the common mode voltage limit is extended and is +12V to -7V. Since any driver can be disconnected (or tristated) from the line, it must withstand this common mode voltage range while in the tristate condition.

The following illustration shows a typical multidrop or party line network. Note that the transmission line is terminated on both ends of the line but not at drop points in the middle of the line.

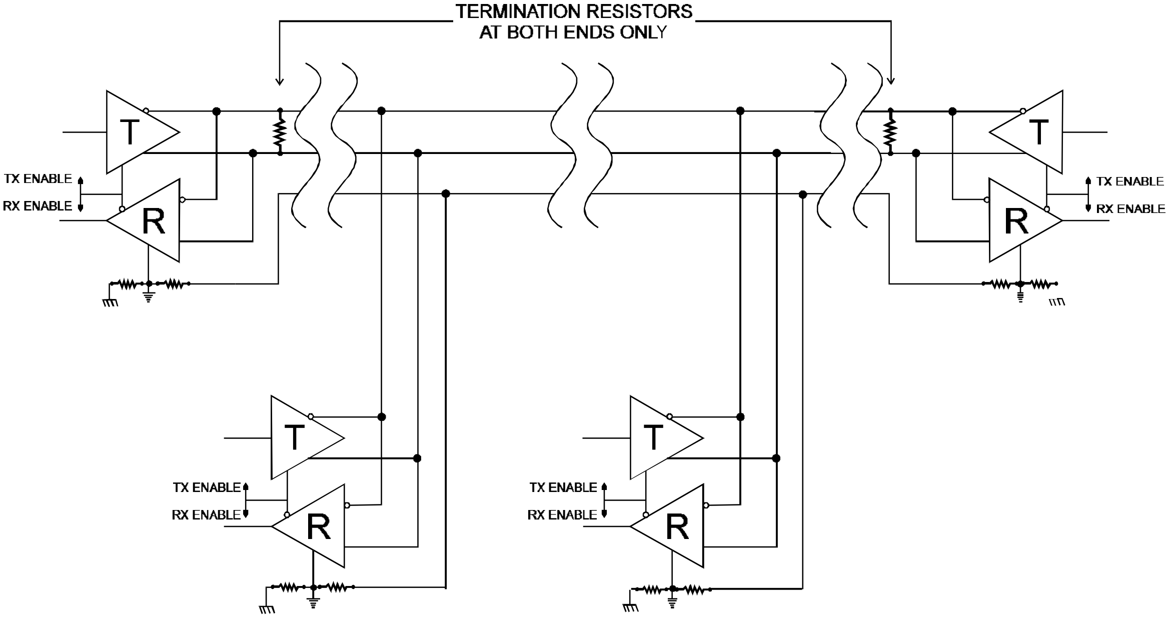


Figure A-1: Typical RS485 Two-Wire Multidrop Network

RS485 Four-Wire Multidrop Network

An RS485 network can also be connected in a four-wire mode. In a four-wire network it's necessary that one node be a master node and all others be slaves. The network is connected so that the master communicates to all slaves and all slaves communicate only with the master. This has advantages in equipment that uses mixed protocol communications. Since the slave nodes never listen to another slave's response to the master, a slave node cannot reply incorrectly.

Customer Comments

If you experience any problems with this manual or just want to give us some feedback, please email us at: ***manuals@accesioproducts.com.***. Please detail any errors you find and include your mailing address so that we can send you any manual updates.

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