

OWNER'S MANUAL

TRAN•X[®] COMM-422 SERIAL
COMMUNICATIONS CARD

BayTech publication #U140EXXX

Thank you for selecting the BayTech Tran-x COMM-422 Serial Communications Card.

The data provided in this Owner's Manual explains the various ways you can operate your unit and configure it to your computer system. We suggest that you read this manual carefully before attempting to install the Tran-x and that you place special emphasis on correct cabling and configuration. If you have any problems with your installation, please contact a BayTech applications engineer for assistance toll-free at 800-523-2702.

BayTech also manufactures data communications devices that provide port sharing and expansion, networking, port contention, buffered and non-buffered printer sharing; modems and multiplexers. If you would like information on any of these models, please contact BayTech Customer Service. A brief description of other BayTech products is included in the back of this owner's manual.

We welcome any comments you may have about our products and hope you will continue to look to BayTech for your data communications needs.

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1. GENERAL INFORMATION

The BayTech Tran-x COMM-422 is a high speed serial bidirectional communications card that allows a PC to send and receive data at speeds up to 230,400 bps and distances up to 1000 feet. The COMM-422 is typically used to interface to other BayTech products that support EIA-422 serial interface such as LaserShare, Tran-x, Data Exchange Systems, and Data Acquisition and Control models. The COMM-422 may interface to any device that supports EIA-422 serial interface.

2. SPECIFICATIONS

INTERFACE: Asynchronous, EIA-422, 0 to 5 volt differential (TX+, TX-, RX+, RX-).

FACTORY POWER-UP DEFAULT CONFIGURATION:

COM Assignment: COM1.
Interrupt Assignment: IRQ4.
180 ohm Terminating Resistor: Installed.
Clock Speed: 1.8432 MHz (PC standard).

USER-PROGRAMMABLE CONFIGURATIONS:

The following parameters are configured via jumper location:

COM Assignment: COM1, COM2, COM3, or COM4.
Interrupt Assignment: IRQ3 or IRQ4.
180 ohm Terminating Resistor: Installed or not installed.
Clock Speed: 1.8432 MHz (PC standard) or 3.6864 MHz (BTA high speed).

The following parameters are configured via the DOS **MODE** command or the BayTech **S.MODE** command for IBM compatible PCs:

Baud rate: 50*, 75*, 110, 135*, 150, 300, 600, 1200, 2400, 4800, 9600, 19200*, 38400*, 57600*, 115200*, or 230400+ bps.

* - baud rate supported by S.MODE only using 1.8432 MHz clock speed.

+ - baud rate supported by S.MODE only using 3.6864 MHz clock speed.

Word size: 5, 6, 7, or 8 bits.

Parity: Even, odd, none, mark, or space.

Stop bits: 1, 1-1/2, or 2.

CONNECTORS: RJ-45 (8-wire) modular connector which will also accept an RJ-11 (4-wire) connector.

MOUNTING: Plugs into either half or full expansion slot in the PC.

BUFFER SIZE: 16 character FIFO Tx and 16 character FIFO Rx.

WARRANTY: One year on parts and labor.

3. INSTALLATION

4. PHYSICAL INSTALLATION

The COMM-422 installs directly into an 8-bit or 8/16-bit I/O expansion slot inside an IBM PC/XT/AT or compatible computer.

You will need the following equipment to install the COMM-422 inside your PC: A phillips-head screwdriver, a flat blade screwdriver, a container to place loose screws, and a large work area (i.e., desk top or table top)

1. Determine if you have any other I/O cards that address either COM1, COM2, COM3, or COM4. There should be no physical address conflicts.
2. **IMPORTANT:** Remove power from your computer by setting the on-off switch to Off and unplug the power cord from the AC outlet.
3. Disconnect all external devices such as the keyboard, terminal screen, printer(s), mouse, etc.. Make sure that power to all external devices has been removed. Move the external devices to another location so that they are out of your way.
4. Remove the cover as follows:
 - Make sure the cover is unlocked. On some systems the keylock switch mechanically locks the cover. You should check whether the keylock switch is in the UNLOCK position. Otherwise, you will need to use your security key to unlock it.
 - Locate and remove the cover mounting screws from the back of the chassis using a phillips screwdriver (see *Figure 1*). Put the screws in your container for safe keeping.

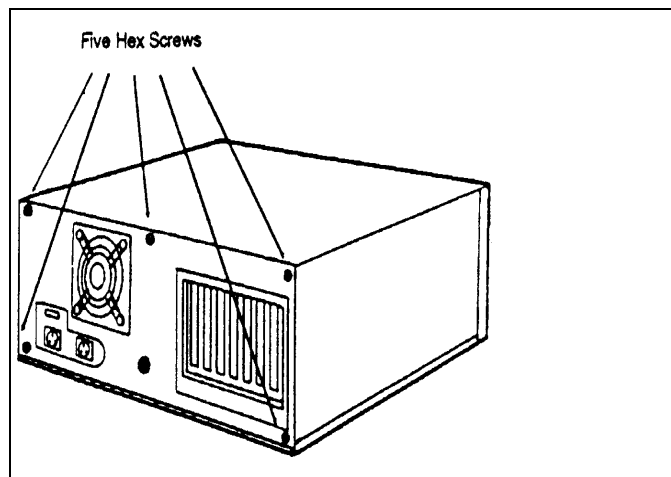


Figure 1: PC Cover Mounting Screws

- To remove the cover, grasp the chassis in both hands and slide it forward (see *Figure 2*). If you experience any resistance, verify that the edge of the chassis is not caught on any of the internal ribbon cables.

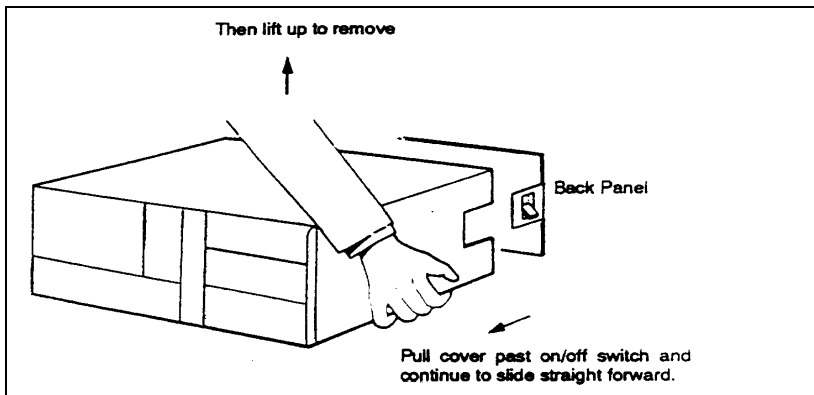


Figure 3: PC Chassis

- *Figure 3* shows a typical example of the inside of an IBM compatible PC.

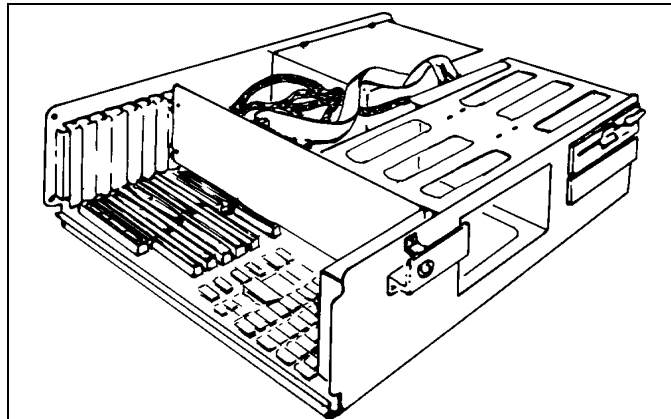


Figure 3: PC Internal Hardware

5. Since adding I/O boards to your computer will affect the original configuration, you may need to change a jumper or switch setting on the system board. Please refer to the system I/O board reference manual for the correct setting. Set the proper jumper or switch if necessary.
6. You will need to choose an expansion slot. An expansion slot is a long, narrow connector on the upper left corner of the system board. There are two kinds of expansion slots on the system board: a 16-bit (full) expansion slot and an 8-bit (short) expansion slot. The COMM-422 uses only 8 bits, but will install into either kind of expansion slot.
7. **CAUTION:** Circuit boards are very sensitive to static electricity. One shock can permanently damage delicate electronic components. To rid your body of any static electricity build-up, you should touch your system chassis before touching any printed circuit boards.

NOTE: When handling a circuit board, you should avoid touching the soldered side of the board. Remember to always hold the board by its edges or by its metal mounting bracket.
8. Configure the COMM-422 to communicate with the appropriate COM port. This is done via jumper *JP1* located on the card (see *Appendix A* for location of *JP1*).

NOTE: Use the information in this step only to set *JP1*. Do not physically install the card until Step 11.

JP1 has eight pin positions to install a 2-position jumper. The two pins closest to the *JP1* marking shown in *Appendix A* are used for COM1 (default). The next two pins are used to assign the COMM-422 as COM2, the next two pins as COM3, and the last two pins as COM4. Install the 2-position jumper in the desired COM port location.

9. Select the appropriate interrupt, IRQ3 or IRQ4. This is done by installing a 2-position jumper in jumper location *JP2* (see *Appendix A*). *JP2* has three pin positions for installation of this jumper. The middle pin is a common pin. The pin closest to the diagonal edge of the COMM-422 is used for IRQ3 and the pin furthest from the diagonal edge is used for IRQ4 (default). Verify that the interrupt selection does not conflict with that of other installed cards.
10. Jumper location *JP5* is used to install a 180 ohm terminating resistor between the RX+ and RX- for long cable distances. BayTech installs this jumper from the factory. If you do not want the terminating resistor installed, simply remove this jumper.
11. Jumper location *JP6* is used to select the PC standard clock speed (1.8432 MHz - default) or BTA high speed (3.6864 MHz). The BTA high speed selection is required to get a baud rate of 230400 bps. *JP6* has three pin positions to install a 2-position jumper. The center pin is a common pin. Standard PC clock speed is selected by installing the 2-position jumper to connect the center pin and the top pin as referenced in *Appendix A*. BTA high clock speed is selected by installing the jumper to connect the center pin and the bottom pin.
12. Install the COMM-422 as follows:
 - a. Remove the screw holding the slot cover to the back of the chassis behind the slot you have chosen. Put the screw in a safe place. You will need it later. Remove the slot cover.

CAUTION: If you drop this screw or any screw into the chassis, you must locate the screw and remove it before applying power. If there are any loose screws in the chassis when power is applied, you may cause a short circuit and subsequently damage the system.

- b. Place the COMM-422 in the slot, slide it down until the bus connector on the card enters the slot connector. Press carefully on the top edge of the card until it is completely seated in the slot connector (see *Figure 4*).

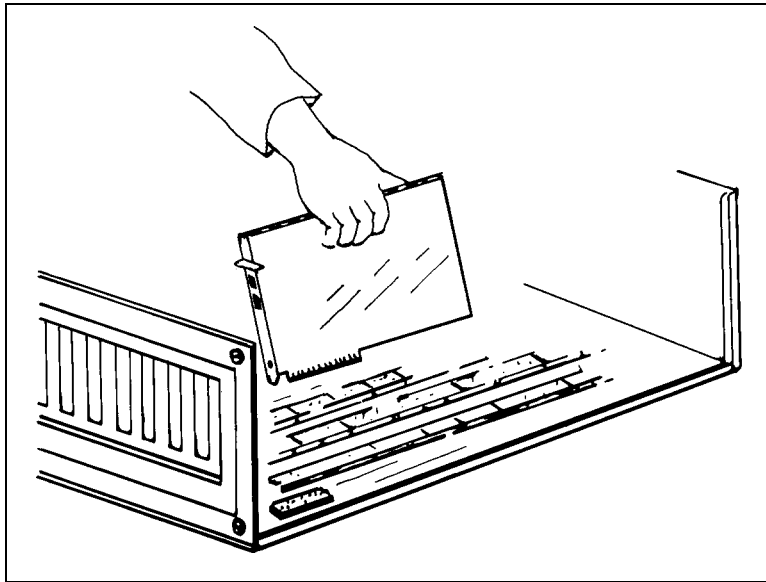


Figure 4: PC Card Slot

- c. Insert your slot cover screw into the top of the mounting bracket of the COMM-422 and then tighten the screw.
 - d. Make sure all other add-on cards and cables are still connected properly.
12. Once the COMM-422 has been installed, you may replace the chassis cover and tighten the cover mounting screws.
 13. Reconnect all external peripherals to the system.

CAUTION: Make sure your computer is powered down and unplugged when cabling the COMM-422 to any external device such as a the Tran-x SP-01 or SP-02, LaserShare, the M Series DES units, or M Series DAC units.

3.2 COMM-422 COMPUTER SETUP

Once the COMM-422 has been installed, you must configure the serial parameters for the serial port. This may be done by using the DOS MODE command. The MODE command has the following syntax: **MODE COMm: baud,parity,data,stop,retry** where m = 1 to 4.

The MODE command supports the following baud rates: 110 (11), 150 (15), 300 (30), 600 (60), 1200 (12), 2400 (24), 4800 (48), 9600 (96), and 19200 (19) bps. 19200 is only supported on later versions of MS-DOS. The mode command also supports even (E), odd (O), mark (M), space (S), or no (N) parity; 5, 6, 7, or 8 data bits; and 1, 1.5, or 2 stop bits. The retry parameter specifies the retry action to take if a time-out error occurs when MODE attempts to output to a serial device. Refer to the DOS HELP command for more information on the retry parameter.

BayTech supplies a program on the software utility diskette that will allow the COMM-422 to communicate at speeds greater than 19200 bps. This program is called SMODE.EXE and has the same syntax as the MODE command except there is no "retry" parameter. You should obtain the SMODE.EXE file from the supplied software utility diskette.

SMODE supports the following baud rates: 50, 75, 110, 135, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps. These rates may be doubled by setting the clock speed jumper to BTA high speed (3.6864 MHz, see *Section 3.1*). Therefore, the maximum speed supported by the COMM-422 is 230400 bps which is achieved by setting the clock speed jumper to BTA high speed and using SMODE at 115200 bps. SMODE supports the same parity, data bits, and stop bits as the DOS MODE command.

You may wish to add the **SMODE** command to your AUTOEXEC.BAT file. See your DOS manual for instructions on editing your AUTOEXEC.BAT file.

3.3 DATA FLOW CONTROL

When the COMM-422 is transmitting data and the receiving device is unable to receive data, the COMM-422 will expect to detect reversed voltage on the appropriate input handshake lines (HSI- low and HSI+ high). When the receiving device becomes ready to receive data again, the COMM-422 will expect to detect normal voltage on the appropriate input handshake lines (HSI- high and HSI+ low).

4. CABLING

The COMM-422 has an RJ-45 receptacle for external cabling. The external cable should have an RJ-45 plug for 8-wire operation or an RJ-11 plug for 4-wire operation. *Figure 5* and *Figure 6* are drawings of the RJ-45 receptacle and plug and the pin number assignments.

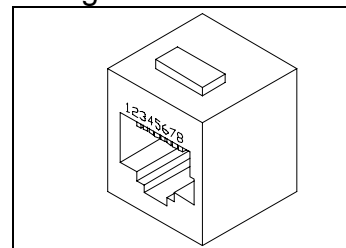


Figure 5: RJ-45 Receptacle

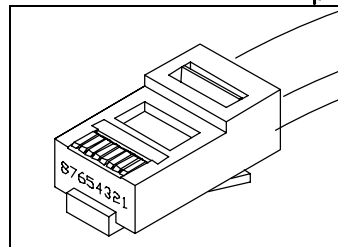


Figure 6: RJ-45 Plug

The RJ-45 connector uses the following signals for communications:

COMM-422 RJ-45 PIN-OUT INFORMATION			
PIN	SIGNAL	DIRECTION	DESCRIPTION
1	HSO	Output	Handshake Out, enable/disable the receiving of characters
2	GND	----	Signal Ground
3	TX+	Output	Transmit Data (+)
4	TX-	Output	Transmit Data (-)
5	RX-	Input	Receive Data (-)
6	RX+	Input	Receive Data (+)
7	GND	----	Signal Ground
8	HSI	Input	Handshake In, enable/disable the transmitting of characters

4.1 8-WIRE CABLING

The cable required to connect the COMM-422 to an EIA-422 device using 8-wire cabling should have TX+ wired to RX+ (and vice versa), TX- wired to RX- (and vice versa), HSO wired to HSI (and vice versa), and have the signal grounds connected (see *Figure 7*).

COMM-422 (EIA-422, 8-wire) RJ-45	Equipment Connections
1 HSO	HSI
2 GND	GND
3 TX+	RX+
4 TX-	RX-
5 RX-	TX-
6 RX+	TX+
7 GND	GND
8 HSI	HSO

Figure 7: COMM-422 8-wire Connection

If you are connecting another BayTech device to the COMM-422 using 8-wire operation, crossed RJ-45 cables are required. See the cable diagram below.

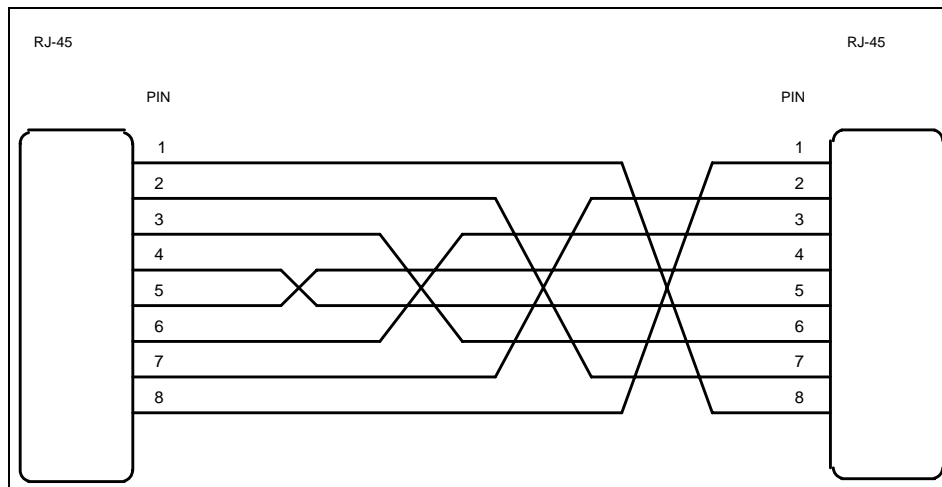


Figure 7: Crossed RJ-45 Cable
 BayTech Part No. RJ08X010 (10 feet)

Once you have connected your cables, if you experience any problems communicating with your COMM-422, please see *Appendix B* (Troubleshooting).

4.2 4-WIRE CABLING

The cable required to connect the COMM-422 to an EIA-422 device using 4-wire cabling should have TX+ wired to RX+ (and vice versa), and TX- wired to RX- (and vice versa). See *Figure 8* below.

COMM-422 (EIA-422, 4-wire) RJ-45	Equipment Connections
3 TX+	RX+
4 TX-	RX-
5 RX-	TX-
6 RX+	TX+

Figure 8: COMM-422 8-wire Connection

If you are connecting another BayTech device to your local the COMM-422 using 4-wire operation, crossed RJ-11 cables are required. See the cable diagram below.

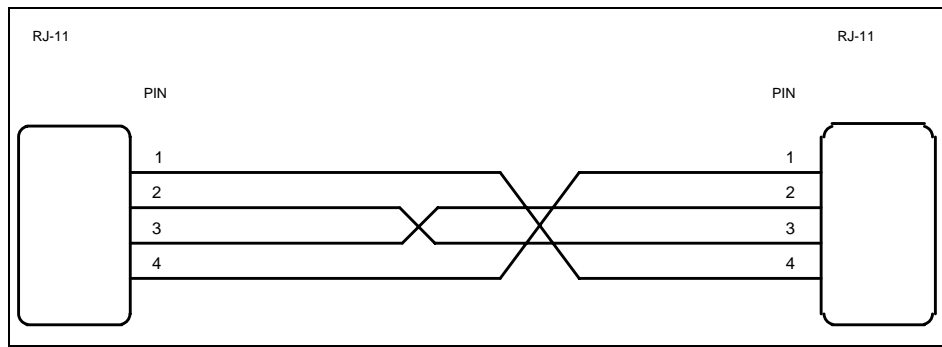


Figure 8: Crossed RJ-11 Cable
 BayTech Part No. RJ04X010 (10 feet)

IMPORTANT: When using 4-wire cabling, the computer's application software and the receiving device should support XON/XOFF handshaking to ensure proper data flow control.

Once you have connected your cables, if you experience any problems communicating with your COMM-422, please see *Appendix B* (Troubleshooting).

5. MAINTENANCE

Since there are no adjustments and no moving parts in a COMM-422 unit, preventative maintenance is unnecessary.

6. RETURNING UNITS TO THE FACTORY

If you find it necessary to return your unit for warranty work or repair, please call BayTech at 1-800-523-2702 to obtain a Return Authorization number.

IMPORTANT: BayTech cannot accept warranty or no-charge returns without this number.

If you need to repack your unit for shipping, please choose a heavy cardboard box for packing. Surround your unit with sufficient insulation (a minimum of 2-inches) to withstand the rigors of transport. Be sure to seal the box securely with strapping or packing tape. Masking tape or cellophane tape is not recommended.

Please write the Return Authorization number on the outside of the shipping box and return the unit to:

**Bay Technical Associates, Inc.
P.O. Box 387, 200 N. Second Street
Bay Saint Louis, MS 39520 U.S.A.**

7. TECHNICAL SUPPORT

In the event that you have problems with the COMM-422, you may call applications engineer to assist you from 7 am to 6 pm (CST or CDT), Monday through Friday and/or refer to the Troubleshooting Guide (see *Appendix B*).

When you call BayTech Tech Support, please have the following information available to help the applications engineers answer your questions more accurately and quickly:

1. Identify what kind of cabling you are using (4-wire or 8-wire).
2. Identify any special equipment you are using (for example, in-line spoolers, networks, software drivers, etc.).
3. Identify what cables you are using, what the lengths of the cables are, and who sold you the cables.
4. Identify the software packages you are using.

Always call BayTech before dismantling your equipment or before returning the COMM-422 unit to BayTech for repair.

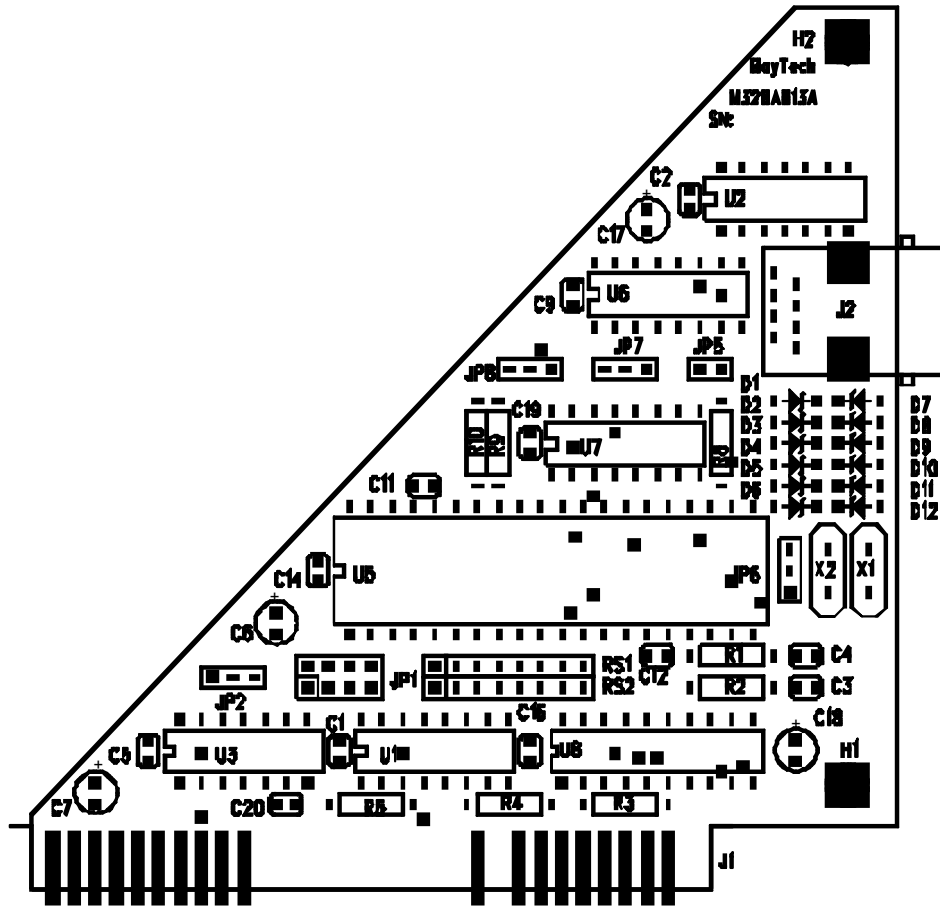
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Phone: 228/467-8231 or 800/523-2702
Web Site www.baytechdcd.com
Fax: 228-467-4551**

8. FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFACE STATEMENT*

NOTE: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this manual may cause interference to radio communications. The equipment has been type tested and found to comply within the limits for a Class A digital device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

The user may not under any circumstances other than specified in the manual, under installation and maintenance sections, attempt any service, adjustments, or repairs on this unit. It must be returned to the factory or authorized service agency for all such work.

APPENDIX A MECHANICAL LAYOUTS



APPENDIX B

TROUBLESHOOTING

Please check this troubleshooting guide before calling BayTech Tech Support.

PROBLEM	SYMPTOM	CAUSE	SOLUTION
No data sent to receiving device	Printer, M24SII, or LaserShare give no indication that data is being received (e.g. READY or FORM FEED LED of an HP Laserjet printer does not flash or illuminate, no LEDs on the M24SII illuminate, etc.).	Cable	Verify that you are using the correct cable to connect the COMM-422 to the receiving device (see <i>Section 4</i>).
		Serial parameter mismatch	Verify that the serial parameters (baud rate, word size, etc.) of the COMM-422 match those of the remote device (see <i>Section 3.2</i>).
		Incorrect syntax in MODE or SMODE command	Verify the MODE or SMODE command's parameters match the physical COM assignment of the COMM-422 (see <i>Section 3.1</i> and <i>Section 3.2</i>).
		Computer directing output to wrong COM port	Verify that your computer directs its output to the appropriate COM port. This is typically done in your various application packages.
Prints Garbage	Missing Characters	No data flow control	If using XON/XOFF flow control, verify that the receiving device supports XON/XOFF and make sure XON/XOFF flow control is supported by the application software. If using hardware flow control, make sure the proper data flow control lines are connected in the cable (see <i>Section 4</i>).
	Random Garbage Characters.	Serial port configuration	Verify the serial parameters (baud rate, word size, etc.) of the two connected devices match. The serial parameters of the COMM-422 are set via the MODE or SMODE command (see <i>Section 3.2</i>).

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