INDUSTRIAL COMPUTER SOURCE®

Model UCOMM422 Series
Product Manual

MANUAL NUMBER : 00750-120-1A

INDUSTRIAL COMPUTER SOURCE®

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FOREWARD

This product manual provides information to install, operate and or program the referenced product(s) manufactured or distributed by Industrial Computer Source. The following pages contain information regarding the warranty and repair policies.

Technical assistance is available at: **1-800-480-0044**.

Manual Errors, Omissions and Bugs: A "Bug Sheet" is included as the last page of this manual. Please use the "Bug Sheet" if you experience any problems with the manual that requires correction.

Guarantee

A thirty day money-back guarantee is provided on all **standard** products sold. **Special order products** are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement only. Extended Warranty available. Consult factory.*

Refunds

In order to receive refund on a product purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods, and the product must be returned complete (meaning all manuals, software, cables, etc.) within 30 days of receipt and in as-new and resalable condition. The **Return Procedure** must be followed to assure prompt refund.

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Product returned *after* 30 days, and *before* 90 days, of the purchase will be subject to a **minimum** 20% restocking charge and any charges for damaged or missing parts.

Products not returned within 90 days of purchase, or products which are not in as-new and re-saleable condition, are not eligible for credit return and will be returned to the customer.

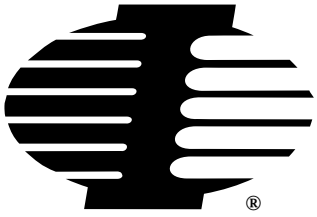
Limited Warranty

One-year limited warranty on all products sold with the exception of the "Performance Series" I/O products, which are warranted to the original purchaser for as long as they own the product, subject to all other conditions below, including those regarding neglect, misuse and acts of God. Within one year of purchase, Industrial Computer Source will repair or replace, at our option, any defective product. At any time after one year, we will repair or replace, at our option, any defective "Performance Series" I/O product sold. This does not include products damaged in shipment, or damaged through customer neglect or misuse. Industrial Computer Source will service the warranty for all standard catalog products for the first year from the date of shipment. After the first year, for products not manufactured by Industrial Computer Source, the remainder of the manufacturer's warranty, if any, will be serviced by the manufacturer directly.

The **Return Procedure** must be followed to assure repair or replacement. Industrial Computer Source will normally return your replacement or repaired item via UPS Blue. *Overnight delivery or delivery via other carriers is available at additional charge.*

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Industrial Computer Source or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Industrial Computer Source or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the owners' manual.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Industrial Computer Source reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.



Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by Industrial Computer Source.

Return Procedure

For any Limited Warranty or Guarantee return, please contact Industrial Computer Source's Customer Service at **1-800-480-0044** and obtain a Return Material Authorization (RMA) Number. All product(s) returned to Industrial Computer Source for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing date of purchase.

> To reduce risk of damage, returns of product must be in an Industrial Computer Source shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Industrial Computer Source Customer Service at a nominal cost.

Limitation of Liability

In no event shall Industrial Computer Source be liable for any defect in hardware or software or loss or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Industrial Computer Source liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Industrial Computer Source or its authorized agent.

Some *Sales Items* and *Customized Systems* are **not** subject to the guarantee and limited warranty. However, in these instances any deviations will be disclosed prior to sales and noted in the original invoice. ***Industrial Computer Source reserves the right to refuse returns or credits on software or special order items.***

Advisories

Three types of advisories are used throughout the manual to stress important points or warn of potential hazards to the user or the system. They are the Note, the Caution, and the Warning. Following is an example of each type of advisory:

Note: The note is used to present special instruction, or to provide extra information which may help to simplify the use of the product.

CAUTION!

A Caution is used to alert you to a situation which if ignored may cause injury or damage equipment.

WARNING!

A Warning is used to alert you of a situation which if ignored will cause serious injury.

Cautions and Warnings are accented with triangular symbols. The exclamation symbol is used in all cautions and warnings to help alert you to the important instructions. The lightning flash symbol is used on the left hand side of a caution or a warning if the advisory relates to the presence of voltage which may be of sufficient magnitude to cause electrical shock.

Use caution when servicing any electrical component. We have tried to identify the areas which may pose a Caution or Warning condition in this manual; however, Industrial Computer Source does not claim to have covered all situations which might require the use of a Caution or Warning.

You must refer to the documentation for any component you install into a computer system to insure proper precautions and procedures are followed.

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Current Revision 1A

May 1997

Chapter 1: Introduction

Overview

The Model **UCOMM422** provides the PC with four additional RS-422/485 serial ports for terminals, modems, printers, etc.

The unique feature of the **UCOMM422** is the ability to be RS-485 compatible without the need for special software or drivers. This ability is especially useful in Windows, Windows NT, and OS/2 environments where the lower level I/O control is abstracted from the application program. This ability means that the user can effectively use the **UCOMM422** in a RS-485 application with existing (i.e. standard RS-232) software drivers.

Factory Default Settings

The **UCOMM422** factory default settings are as follows:

Port #	Base Address	IRQ	Electrical Specification
Port 1	2E0	3	RS-422
Port 2	2E8	3	RS-422
Port 3	2F0	3	RS-422
Port 4	2F8	3	RS-422

To install the **UCOMM422** using factory default settings, refer to Installation on page 11.

For your reference, record installed **UCOMM422** settings below:

Port #	Base Address	IRQ	Electrical Specification
Port 1			
Port 2			
Port 3			
Port 4			

How to remain CE Compliant

This device complies with CE Directives 72/23/EEC and EMC 89/336/EEC. CE compliance is based on the interaction of all the components of a system. Any modifications made to the equipment may affect the CE compliance and must be approved in writing by Industrial Computer Source. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to claim CE compliance.

The Models UCOMM422 Series are designed to be CE Compliant when used in an CE compliant chassis. Maintaining CE Compliance also requires proper cabling and termination techniques. The user is advised to follow proper cabling techniques from sensor to interface to ensure a complete CE Compliant system. Industrial Computer Source does not offer engineering services for designing cabling or termination systems. Although Industrial Computer Source offers accessory cables and termination panels, it is the user's responsibility to ensure they are installed with proper shielding to maintain CE Compliance.

Chapter 2: Card Setup

The **UCOMM422** contains several jumper straps which must be set for proper operation.

Address Selection

Each port on the **UCOMM422** occupies eight consecutive I/O locations. A DIP-switch is used to set the base address for these locations.

The first addressing scheme allows the **UCOMM422** to select the addresses for its ports from a table of available address combinations.

The following table shows the addressing combinations available. If different address combinations are required, Technical Support about a custom PAL option.

Switch6	Switch7	Switch8	Port 1	Port 2	Port 3	Port 4
On	On	Off	3F8	2F8	3E8	2E8
On	Off	On	2F8	3E8	2E8	2E0
On	Off	Off	3E8	2E8	280	288
Off	On	On	500	508	510	518
Off	On	Off	580	588	590	598
Off	Off	On	1500	1508	1510	1518
Off	Off	Off	3220	3228	4220	4228
On	On	On	Addresses set up by switches 4 - 8			

Table 2-1: Available Address Combinations

Note: Each COM: port in the system should have a unique address. Typically COM1: - COM4: addresses are 3F8, 2F8, 3E8 and 2E8 Hex.

Refer to Appendix A for common address contentions.

The second mode of address selection provides the compatibility mode. In this mode the DIP-switch sets the base address and the adapter occupies 32 consecutive I/O locations. The following table illustrates the location of each port and its relationship to the other ports.

Note: For switches 1 - 5 to become active, switches 6, 7 & 8 must be set in the **'On'** or **'Up'** position.

	Switch Settings				
Address lines →	**A9**	**A8**	**A7**	**A6**	**A5**
Address Selected	**1**	**2**	**3**	**4**	**5**
280-29F	Off	On	Off	On	On
2A0-2BF	Off	On	Off	On	Off
380-39F	Off	Off	Off	On	On
1A0-1BF	On	Off	Off	On	Off
2E0-2FF	Off	On	Off	Off	Off

Table 2-2: Address Selection Table

The following illustration shows the correlation between the DIP-switch setting and the address bits used to determine the base address. In the example below, address 2E0 is selected as a base. Address 2E0 in binary is XX 10 111X XXXX where X = a non-selectable address bit.

Port #	Connector Location	Address	Example (Base=2E0)
1	1	Base+0	2E0-2E7
2	2	Base+8	2E8-2EF
3	3	Base+16	2F0-2F7
4	4	Base+24	2F8-2FF

Table 2-3: Port to Connector Table

Jumper Selections

For ease of configuration, the headers are grouped by port. Port one headers have a ‘J1’ prefix, Port two headers have the ‘J2’ prefix, etc. For example, the header that controls the Port one IRQ selection is J1B, the header that controls the Port 2 IRQ selection is J2B. The silk-screen also provides information for configuring the adapter without the use of the manual. This is particularly useful in field re-configuration.

IRQ Selection

Headers J1B through J4B select the interrupt request for each serial port. If COM1: is selected, the corresponding jumper must be on the IRQ4 setting. If COM2: is selected, the corresponding jumper must be on IRQ3.

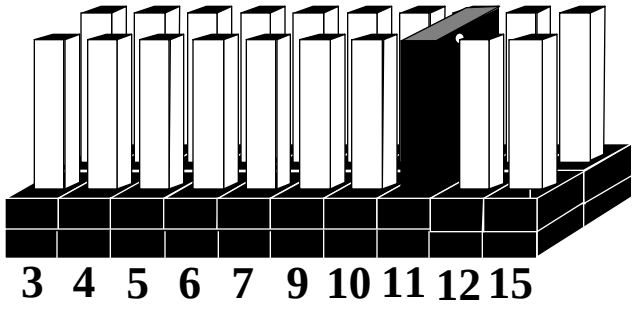

Figure 2-1: Headers J1B – J4B, IRQ Selection

Note: Most communications software applications default COM3: to IRQ4 and COM4: to IRQ3. This requires the sharing of interrupts between COM1: and COM3:, and between COM2: and COM4:.While this is the default, it is not always the preferred setting. Check your software configuration instructions to determine the most appropriate IRQ selection.

Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ setting and setting the appropriate selections at J1A through J4A. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper.

Interrupt Modes

Headers J1A through J4A select the interrupt modes for each port. Each port must be set in the correct mode to insure proper operation.

'**N**' indicates the (**N**)ormal, single interrupt per port mode. '**S**' Indicates the (**S**)hared interrupt mode, which allows more than one port to access a single IRQ. '**M**' indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts.

Figure 2-2: Header J1A, Normal IRQ Mode

Set the jumpers to '**S**' for shared interrupt mode on all blocks sharing an IRQ except one. Set that port block for '**M**'. This provides the pull-down resistor circuit that makes sharing IRQs possible. If you are using more than one **UCOMM422** or a compatible adapter in a bus you should only have one port set to '**M**'. The following example shows two ports sharing a single IRQ.

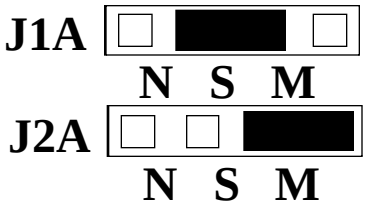

Figure 2-3: Header J1A & J2A, Shared IRQ Mode

Set the jumper to '**S**' if you are using more than one **UCOMM422** in a bus or to completely remove the pull-down resistor for hardware compatibility. Setting the adapter in this configuration when it is not accompanied by a pull-down resistor will prevent the ports from triggering an interrupt.

RS-485 Enable Modes

RS-485 is ideal for multi-drop or network environments. RS-485 requires a tri-state driver (not dual-state) that will allow the electrical presence of the driver to be removed from the line. The driver is in a tri-state or high impedance condition when this occurs. Only one driver may be active at a time and the other driver(s) must be tri-stated. The output modem control signal **R**equest **T**o **S**end (RTS) is typically used to control the state of the driver. Some communication software packages refer to RS-485 as RTS enable or RTS block mode transfer.

One of the unique features of the **UCOMM422** is the ability to be RS-485 compatible without the need for special software or drivers. This ability is especially useful in Windows, Windows NT, and OS/2 environments where the lower level I/O control is abstracted from the application program. This ability means that the user can effectively use the **UCOMM422** in a RS-485 application with existing (i.e. standard RS-232) software drivers.

Headers J1D through J4D are used to control the RS-485 mode functions for the driver circuit. The selections are ‘RTS’ enable (silk-screen ‘RT’) or ‘Auto’ enable (silk-screen ‘AT’). The ‘Auto’ enable feature automatically enables/disables the RS-485 interface. The ‘RTS’ mode uses the ‘RTS’ modem control signal to enable the RS-485 interface and provides backward compatibility with existing software products.

Position 3 (silk-screen ‘NE’) of J1D through J4D is used to control the RS-485 enable/disable functions for the receiver circuit and determine the state of the RS-422/485 driver. The RS-485 ‘Echo’ is the result of connecting the receiver inputs to the transmitter outputs. Every time a character is transmitted; it is also received. This can be beneficial if the software can handle echoing (i.e. using received characters to throttle the transmitter) or it can confuse the system if the software does not. To select the ‘No Echo’ mode select silk-screen position ‘NE’.

For RS-422/530/449 compatibility remove the jumpers at J1D through J4D.

Examples on the following pages describe all of the valid settings for J1D - J4D.

Interface Mode Examples J1D – J4D

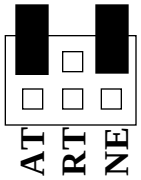

Figure 2-4: Headers J1D- J4D, RS-422

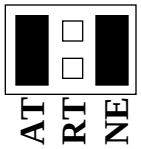

Figure 2-5: Headers J1D- J4D, RS-485 ‘Auto’ Enabled, with ‘No Echo’

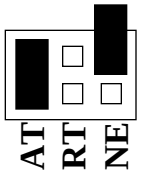

Figure 2-6: Headers J1D- J4D, RS-485 ‘Auto’ Enabled, with ‘Echo’

Interface Mode Examples J1D – J4D (continued)

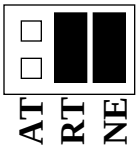

Figure 2-7: Headers J1D- J4D, RS-485 'RTS' Enabled, with 'No Echo'

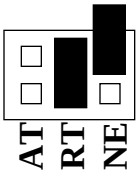

Figure 2-8: Headers J1D- J4D, RS-485 'RTS' Enabled, with 'Echo'

Line Termination

Typically, each end of the RS-485 bus must have line terminating resistors (RS-422 terminates at the receive end only). A 120 ohm resistor is across each RS-530/422/485 input in addition to a 1K ohm pull-up/pull-down combination that bias the receiver inputs. Headers J1E through J4E allow the user to customize this interface to their specific requirements. Each jumper position corresponds to a specific portion of the interface. If multiple **UCOMM422** adapters are configured in a RS-485 network, only the boards on each end should have jumpers T, P & P **ON.** Refer to the following table for each position's operation:

Name	Function
P	Adds or removes the 1K ohm pull-down resistor in the RS-422/RS-485 receiver circuit (Receive data only).
P	Adds or removes the 1K ohm pull-up resistor in the RS-422/RS-485 receiver circuit (Receive data only).
T	Adds or removes the 120 ohm termination.
L	Connects the TX- to RX- for RS-485 two wire operation.
L	Connects the TX+ to RX+ for RS-485 two wire operation.

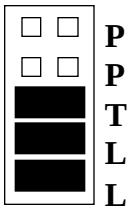

Figure 2-9: Headers J1E - J4E, Line Termination

Clock Modes

The **UCOMM422** employs a unique clocking option that allows the end user to select from divide by 4, divide by 2 and divide by 1 clocking modes. These modes are selected at Headers J1C through J4C.

To select the Baud rates commonly associated with COM: ports (i.e. 2400, 4800, 9600, 19.2, … 115.2K Bps) place the jumper in the divide by 4 mode (silk-screen DIV4).

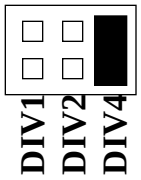

Figure 2-10: Clocking Mode 'Divide By 4'

To double these rates up to a maximum rate for 230.4K bps place the jumper in the divide by 2 (silk-screen DIV2) position.

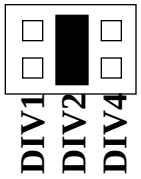

Figure 2-11: Clocking Mode 'Divide By 2'

To select the maximum data rate (460.8K bps) place the jumper in the divide by 1 (silk-screen DIV1) position.

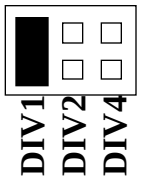

Figure 2-12: Clocking Mode 'Divide By 1'

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Chapter 3: Installation

The **UCOMM422** can be installed in any of the PC expansion slots. The **UCOMM422** contains several jumper straps for each port which must be set for proper operation.

1. Turn off PC power. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available slot and remove the blank metal slot cover.
4. Gently insert the **UCOMM422** into the slot. Make sure that the adapter is seated properly.
5. Replace the screw.
6. Replace the cover.
7. Connect the power cord.

Installation is complete.

Operating System Installation

Windows 3.x (including WFW 3.11)

Please refer to the /WINDOWS/WIN3.1X sub-directory on the Serial Utilities Diskette for help files and current information on the installation of the **UCOMM422** in this operating environment.

Windows 95

Please refer to the /WINDOWS/95 sub-directory on the Serial Utilities Diskette for help files and current information on the installation of the **UCOMM422** in this operating system.

Windows NT Installation

Please refer to the /WINDOWS/NT sub-directory on the Serial Utilities Diskette for help files and current information on the installation of the **UCOMM422** in this operating system.

OS/2

Please refer to the /OS2 sub-directory on the Serial Utilities Diskette for application notes on the installation of the **UCOMM422** in this operating system.

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Chapter 4: Technical Description

The **UCOMM422** utilizes the 16550 UART. This chip features programmable baud rate, data format, interrupt control and a 16 byte input and output FIFO. Also available as options are the Startech 16C650 and the Texas Instruments 16C750 UARTs, that provide deeper FIFOs (32 bytes) and enhanced clocking features.

Features

- Automatic RS-485 driver enable/disable allows card to appear to be RS-232 requiring no additional drivers
- 'PAL' option allows for unique OEM address selection
- 'Shareable' IRQs allow more than one port to share a single IRQ
- IRQs 2/9-7, 10, 11, 12, 15 supported
- 16550 buffered UARTs Standard
- 16 Bit address decode allows for easier integration
- Speeds up to 460.8 K bps available
- Multiple clocking modes insuring compatibility with existing software products

Modem Control Signal Considerations

Some software packages require the use of the modem handshake signals such as RTS or CTS. Refer to your application software manual to determine the requirements for modem control signals. If no requirements are mentioned, a safe configuration is to tie RTS to CTS. This configuration will typically satisfy the modem control signal requirements for most communications software.

Connector Pin Assignments

DB-25 Pin Assignments

Signal	Name	Pin #	Mode
GND	Ground	5	
TX +	Transmit Data Positive	4	Output
TX-	Transmit Data Negative	3	Output
RTS+	Request To Send Positive	6	Output
RTS-	Request To Send Negative	7	Output
RX+	Receive Data Positive	1	Input
RX-	Receive Data Negative	2	Input
CTS+	Clear To Send Positive	9	Input
CTS-	Clear To Send Negative	8	Input

DB-37 Connector Pin Assignments

Port #	1	2	3	4
GND	33	14	24	5
TX-	35	12	26	3
RTS-	17	30	8	21
TX+	34	13	25	4
RX-	36	11	27	2
CTS-	16	31	7	22
RTS+	18	29	9	20
RX+	37	10	28	1
CTS+	15	32	6	23

Chapter 5: Specifications

Environmental Specifications

Temperature Range

Operating:
0º to 50º C
(32º to 122º F)

Storage
-20º to 70º C
(-4º to 158º F)

Humidity Range

Operating:	10 to 90% R.H. Non-Condensing
Storage:	10 to 90% R.H. Non-Condensing

Manufacturing

- IPC 610-A Class-III standards are adhered to with a 0.1 visual A.Q.L. and 100% Functional Testing.
- All Sealevel Systems Printed Circuit boards are built to U.L. 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Power Consumption

Supply line:	+5 VDC
Rating:	750 mA

Mean Time Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Physical Dimensions

Board length:	8.0 inches	(20.32 cm)
Board Height including Goldfingers:	4.2 inches	(10.66 cm)
Board Height excluding Goldfingers:	3.9 inches	(9.91 cm)

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Appendix A: Troubleshooting

A Serial Utility Diskette is supplied with the adapter and will be used in the troubleshooting procedures. By using this diskette and following these simple steps, most common problems can be eliminated without the need to call Technical Support.

1. Identify all I/O adapters currently installed in your system. This includes your on-board serial ports, controller cards, sound cards etc. The I/O addresses used by these adapters, as well as the IRQ (if any) should be identified.
2. Configure your adapter so that there is no conflict with currently installed adapters. No two adapters can occupy the same I/O address.
3. Make sure the adapter is using a unique IRQ. While the Sealevel Systems adapter does allow the sharing of IRQs, many other adapters (i.e. SCSI adapters & on-board serial ports) do not. The IRQ is typically selected via an on-board header block. Refer to the section on Card Setup for help in choosing an I/O address and IRQ.
4. Make sure the adapter is securely installed in a motherboard slot.
5. Use the supplied diskette and User Manual to verify that the adapter is configured correctly. The supplied diskette contains a diagnostic program 'SSD' that will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use. Refer to the 'README' file on the supplied diskette for detailed instructions on using 'SSD'.
6. The following are known I/O conflicts:

    - The 278 and 378 settings may conflict with your printer I/O adapter.
    - 3B0 cannot be used if a Monochrome adapter is installed.
    - 3F8-3FF is typically reserved for COM1:
    - 2F8-2FF is typically reserved for COM2:
    - 3E8-3EF is typically reserved for COM3:
    - 2E8-2EF is typically reserved for COM4:

7. Please refer to your included diskette for any post production manual updates and application specific information.
8. Always use the diagnostic software when Troubleshooting a problem. This will eliminate the software issue from the equation.

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Appendix B: Electrical Interface

RS-422

The RS-422 specification defines the electrical characteristics of balanced voltage digital interface circuits. RS-422 is a differential interface that defines voltage levels and driver/receiver electrical specifications. On a differential interface, logic levels are defined by the difference in voltage between a pair of outputs or inputs. In contrast, a single ended interface, for example RS-232, defines the logic levels as the difference in voltage between a single signal and a common ground connection. Differential interfaces are typically more immune to noise or voltage spikes that may occur on the communication lines. Differential interfaces also have greater drive capabilities that allow for longer cable lengths. RS-422 is rated up to 10 Megabits per second and can have cabling 4000 feet long. RS-422 also defines driver and receiver electrical characteristics that will allow 1 driver and up to 32 receivers on the line at once. RS-422 signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

RS-485

RS-485 is backwardly compatible with RS-422; however, it is optimized for partyline or multi-drop applications. The output of the RS-422/485 driver is capable of being **Active** (enabled) or **Tri-State** (disabled). This capability allows multiple ports to be connected in a multi-drop bus and selectively polled. RS-485 allows cable lengths up to 4000 feet and data rates up to 10 Megabits per second. The signal levels for RS-485 are the same as those defined by RS-422. RS-485 has electrical characteristics that allow for 32 drivers and 32 receivers to be connected to one line. This interface is ideal for multi-drop or network environments. RS-485 tri-state driver (not dual-state) will allow the electrical presence of the driver to be removed from the line. Only one driver may be active at a time and the other driver(s) must be tri-stated. RS-485 can be cabled in two ways, two wire and four wire mode. Two wire mode does not allow for full duplex communication, and requires that data be transferred in only one direction at a time. For half-duplex operation, the two transmit pins should be connected to the two receive pins (Tx+ to Rx+ and Tx- to Rx-). Four wire mode allows full duplex data transfers. RS-485 does not define a connector pin-out or a set of modem control signals. RS-485 does not define a physical connector.

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Appendix C: Asynchronous Communications

Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver that assembles the bits back into a character. Data rate, error checking, handshaking, and character framing (start/stop bits) are pre-defined and must correspond at both the transmitting and receiving ends.

Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. Character boundaries for asynchronous communications are defined by a starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8). The end of the character is defined by the transmission of a pre-defined number of stop bits (usual 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits.

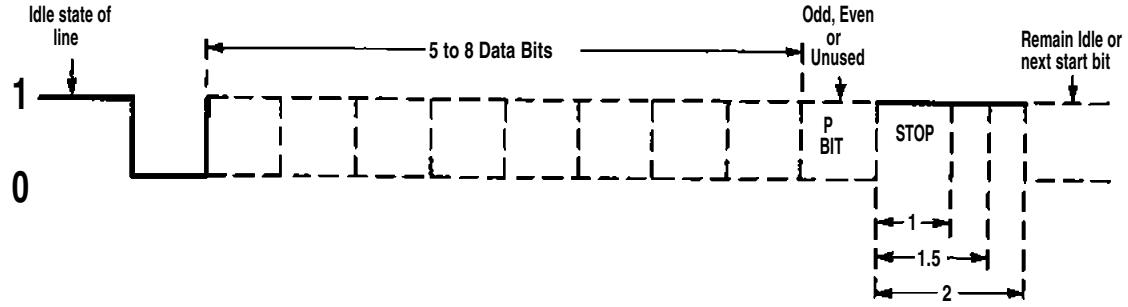

Figure C-1: Asynchronous Communications Bit Diagram

This special bit is called the parity bit. Parity is a simple method of determining if a data bit has been lost or corrupted during transmission. There are several methods for implementing a parity check to guard against data corruption. Common methods are called (E)ven Parity or (O)dd Parity. Sometimes parity is not used to detect errors on the data stream. This is refereed to as (N)o parity. Because each bit in asynchronous communications is sent consecutively, it is easy to generalize asynchronous communications by stating that each character is wrapped (framed) by pre-defined bits to mark the beginning and end of the serial transmission of the character. The data rate and communication parameters for asynchronous communications have to be the same at both the transmitting and receiving ends. The communication parameters are baud rate, parity, number of data bits per character, and stop bits (i.e. 9600,N,8,1)

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Appendix D: Compliance Notices

Federal Communications Commission Statement

FCC - This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in such case the user will be required to correct the interference at his own expense.

EMC Directive Statement

Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) issued by the European Commission.

To obey these directives, the following European standards must be met:

- **EN55022 Class A** - "Limits and methods of measurement of radio interference characteristics of information technology equipment"
- **EN50082-1** - "Electromagnetic compatibility - Generic immunity standard"
- Part 1 : Residential, commercial and light industry
- **EN60950 (IEC950)** - "Safety of information technology equipment, including electrical business equipment"

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Declaration of Conformity

INDUSTRIAL COMPUTER SOURCE®

9950 Barnes Canyon Road
San Diego, CA 92121-2720
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Industrial Computer Source declares under its own and full responsibility that the following products are compliant with the protection requirements of the 89/336/EEC and 73/23/EEC directives.

Only specific models listed on this declaration and labeled with the CE logo are CE compliant.

UCOMM422/4A	**UCOMM422/4A650**	**UCOMM422/4A750**
UCOMM422/4N	**UCOMM422/4N650**	**UCOMM422/4N750**

Conformity is accomplished by meeting the requirements of the following European harmonized standards:

EN 50081-1:1992 Emissions, Generic Requirements.
-EN 55022 Measurement of radio interference characteristics of information technology equipment.

EN 50082-2:1995 Immunity, Generic Requirements.
-EN 61000-4-2 Immunity to Electrostatic Discharge.
-ENV 50140 Immunity for radiated RF electromagnetic fields.

EN 50082-1:1992 Immunity, Generic Requirements.
-IEC 801-3:1984 Immunity for radiated electromagnetic fields.
-IEC 801-4:1988 Immunity for AC and I/O lines, fast transient common mode.
-IEC 65A/77B Immunity for AC lines, transients, common, and differential mode.

EN 60950:1992 Safety of Information Technology Equipment.

Information supporting this declaration is contained in the applicable Technical Construction file available from:

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May 23, 1997
San Diego, CA

Mr. Steven R. Peltier
President & Chief Executive Officer

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