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Form 473-010131

Description

Part Number	Descrption
AC422AT	ISA Bus Serial Port RS422/485, Non-Isolated

The AC422AT is a non-isolated RS-422/485 adapter card that plugs directly into the IBM PC bus. The AC422AT is transient-protected, features bi-directional handshake lines for RTS and CTS, and can drive up to 100 devices on a multidrop network. The AC422AT can be jumpered for operation as COM1, COM2, COM3, or COM4 and offers full hardware and software compatibility with IBM PC, XT, and compatible computers.

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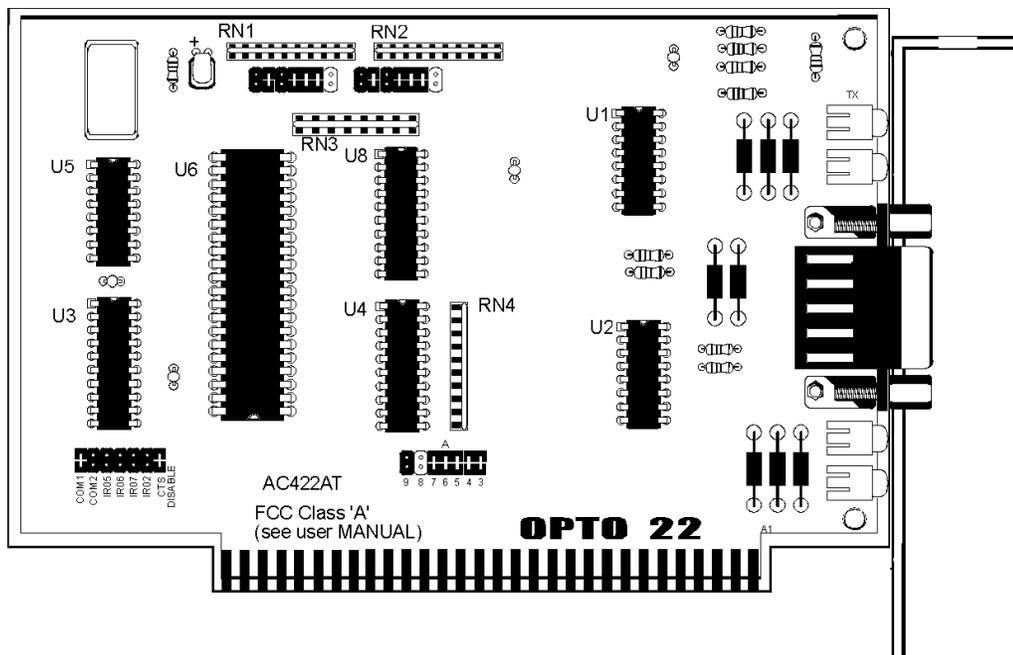
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Specifications GENERAL

Interface Specifications

Power Requirements	250 mA at 5 VDC 150 mA at 12 VDC 150 mA at 12 VDC
Operating Temperature Range	0° C to 60° C 95% relative humidity, non-condensing
Interface	RS-422/485 (9-pin, D-shell female connector)
Baud Rate	up to 38,400 baud
Distance	up to 5,000 feet
Communications	full duplex over two twisted pairs and a ground additional twisted pairs for RTS and CTS
Indicators	transmit, receive, RTS, and CTS

Dimensional Drawing

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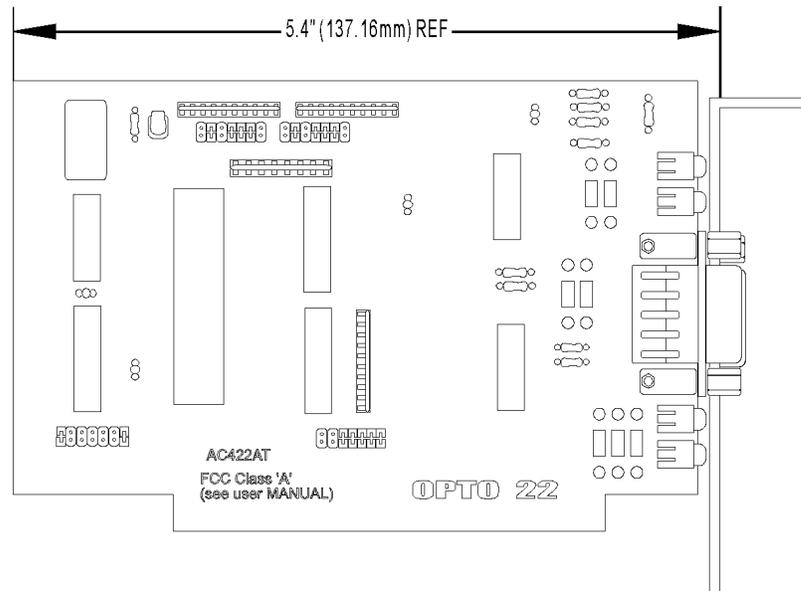
Jumper Installation

CONFIGURING FOR THE AC422AT

Before installing your adapter card, configure your board by selecting the appropriate address, interrupt, and communications jumpers.

These adapter cards can be configured as COM1 through COM4. Select which COM port is to be used based on the current configurations of the COM ports in the host PC. Refer to the following diagrams for jumper settings for the various COM ports.

AC24AT and AC422AT	Address	IRQ	Group A Jumpers Installed	IRQ Jumpers
COM1	3F8 Hex	4	NONE	COM1
COM2	2F8 Hex	3	8	COM2
COM3	348 Hex	2	4, 5, 7	IRQ2
COM4	340 Hex	5	3, 4, 5, 7	IRA5

COMPATIBILITY

The AC422AT use the same UART used in the AT model computers.

The RS-422/485 adapter cards are seen by the computer as a standard serial port and will pass the IBM Advanced Diagnostics program if a loop-back connector is used.

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Jumper Installation (cont.)

COMMUNICATION JUMPERS

Installing jumpers B2 and B4 connects 220 ohm terminating resistors from positive (+) to negative (-) on the transmitter (to Optomux) and receiver (from Optomux), respectively. In a normal OPTOMUX network these jumpers should both be installed.

Installing jumpers C2 and C4 connects 200 ohm terminating resistors for positive (+) to negative (-) on the RTS and CTS, respectively. In a normal network these jumpers should both be installed.

Note: If multiple host computers are used, jumpers B2, B4, C2, and C4 should only be installed on the adapter card which is physically at the end of the serial network cable.

Jumper B7 controls the enabling of the RS-422/485 driver. With the jumper removed, the driver is always enabled. With the jumper installed, the enabling is under the control of the RTS output on the UART. When the RTS is active, the driver will be enabled. When RTS is inactive, the driver is disabled.

If jumper B7 is installed, jumpers B1 and B3 must also be installed. These jumpers passively pull the transmit lines (to OPTOMUX) to the inactive state.

If the adapter card is operating with a multidrop OPTOMUX network, jumpers B5 and B6 must be installed. These jumpers passively pull the receive (from OPTOMUX) to the inactive state. Also, C5 and C6 must be installed to passively pull the CTS to the inactive state.

Jumper C7 controls the enabling of the RS-422/485 driver. With the jumper installed, the enabling is under the control of the CTS input from the RS-422/485 connection. Jumpers B7 and C7 should never be installed at the same time.

The CTS jumper should always be installed on the adapter card when the RTS/CTS handshake lines are NOT being used. With earlier revision adapter cards which do not hae a CTS jumper, the RTS outputs must be looped back to the CTS inputs. This is done by connecting the RTS positive (+) pin to the CTS positive (+) pin, and the RTS negative (-) pin to the CTS negative (-) pin using a suitable jumper wire soldered on the 9-pin connector on the adapter end of the cable.

The 2-wire jumper switches the card from 4-wire to 2-wire mode. A jumper out, which is the factory default, sets the card into 4-wire mode. A jumper installed sets the card into 2-wire mode.

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INTERFACES
TRADITIONAL
PC ADAPTER CARDS

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Jumper Installation (cont.)

ADDRESS JUMPERS

On the RS-422/485 adapter card, there are seven jumpers labeled A3 through A9. These jumpers are used for selecting the base address of the adapter card.

The IBM personal computers only use 10 address lines (A0 through A9) for addressing I/O boards. The UART chip on the adapter card uses the lower three address lines (A0 through A2) directly. This leaves seven address lines (A3 through A9) for decoding the base address of the adapter card.

The adapter card compares the address lines A3 through A9 on the bus with the address jumpers A3 through A9. When the address lines match the jumper lines, the adapter card is selected.

When a jumper is present, the jumper value is low (zero). When a jumper is not present, the jumper value is high (one).

With no address jumpers present, the adapter card will be selected from address 3F8 to 3FF hex (addressed as COM1).

You can set the adapter card for a particular base address as follows:

First, write the desired base address as a three-digit, hexadecimal number. The number must be less than 3FF and have a zero or an eight as the last digit. Also, the number must be chosen so as not to conflict with the base address of any other installed cards in the computer.

Second, translate the number to binary and discard the first two zeros and the last three zeros.

Finally, install a jumper in each location corresponding to a zero. The most significant bit corresponds to A9, and the least significant to A3. For example:

Address	Binary	Discard Ends
2	0010	10
F	1111	1111
8	10	1

Install jumpers at A8, remove A3 through A7, and A9.

Note: If you address the adapter card for an address other than COM1 or COM2, you will need to provide your own interface and initialization routines. The IBM PC or PC/AT Technical Reference Manual has a good section on the operation f the UART and a listing of the code used in the BIOS to access the communications ports.

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Jumper Installation (cont.)

INTERRUPT JUMPERS

If you need to select a specific interrupt line for your software, jumpers for interrupt request lines IRQ2 and IRQ5 through IRQ7 are provided in addition to the COM1 (IRQ4) and COM2 (IRQ3) jumpers. IBM PC BASIC uses interrupt driven communications, and therefore requires that the COM1 (or COM2) interrupt jumpers be installed when doing communications using COM1 (or COM2) from BASIC.

GROUP B AND C JUMPERS

The tables below show the normal jumper arrangement for jumper positions B1 through B8 and C1 through C7. This arrangement is suitable if the adaper card is being used to communicate with an OPTOMUX network. For other possible configurations, refer to figure 1.

Group B Jumpers

:	X	:	X	X	X	:	:
1	2	3	4	5	6	7	8

Group C Jumpers

:	X	:	X	X	X	:
1	2	3	4	5	6	7

X = Jumper Installed
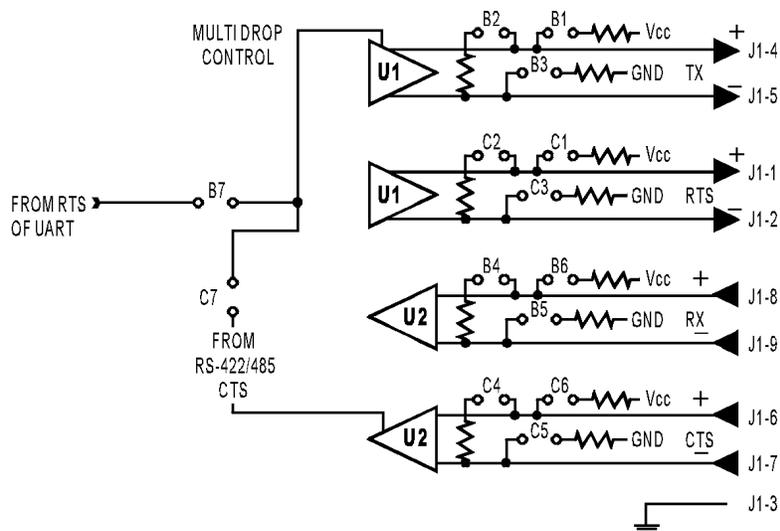**: = Jumper not Installed**

FIGURE 1 - GROUP B AND C JUMPER SCHEMATIC

Products

Opto 22 produces a broad array of reliable, flexible hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications.

SNAP Ethernet Systems

Based on the Internet Protocol (IP), SNAP Ethernet systems offer flexibility in their network connectivity and in the software applications they work with. The physical network may be a wired Ethernet network, a cellular wireless network, or a modem. A wide variety of software applications can exchange data with SNAP Ethernet systems, including:

- Opto 22's own ioProject™ suite of control and HMI software
- Manufacturing resource planning (MRP), enterprise management, and other enterprise systems
- Human-machine interfaces (HMIs)
- Databases
- Email systems
- OPC client software
- Custom applications
- Modbus/TCP software and hardware.

SNAP Ethernet system hardware consists of controllers and I/O units. Controllers provide central control and data distribution. I/O units provide local connection to sensors and equipment.

SNAP OEM Systems

Opto 22 SNAP OEM I/O systems are highly configurable, programmable processors intended for OEMs, IT professionals, and others who need to use custom software with Opto 22 SNAP I/O modules.

Linux® applications running on these systems can read and write to analog, simple digital, and serial I/O points on SNAP I/O modules using easily implemented file-based operations. Applications can be developed using several common development tools and environments, including C or C++, Java, and shell scripts.

M2M Systems

Machine-to-machine (M2M) systems connect your business computer systems to the machines, devices, and environments you want to monitor, control, or collect data from. M2M systems often use wireless cellular communications to link remote facilities to central systems over the Internet, or to provide monitoring and control capability via a cellular phone.

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Opto 22's ioProject and FactoryFloor® software suites provide full-featured and cost-effective control, HMI, and OPC software to power your Opto 22 hardware. These software applications help you develop control automation solutions, build easy-to-use operator interfaces, and expand your manufacturing systems' connectivity.

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In delivering hardware and software solutions for worldwide device management and control, Opto 22 retains the highest commitment to quality. We do no statistical testing; each product is made in the U.S.A. and is tested twice before leaving our 160,000 square-foot manufacturing facility in Temecula, California. That's why we can guarantee solid-state relays and optically-isolated I/O modules *for life*.

Product Support

Opto 22's Product Support Group offers comprehensive technical support for Opto 22 products. The staff of support engineers represents years of training and experience, and can assist with a variety of project implementation questions. Product support is available in English and Spanish from Monday through Friday, 7 a.m. to 5 p.m. PST.

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- www.opto22.com
- nvio.opto22.com
- www.internetio.com (live Internet I/O demo)

Other Resources

- OptoInfo CDs
- Custom integration and development
- Hands-on customer training classes.

About Opto 22

Opto 22 manufactures and develops hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's input/output and control systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, and electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel.

Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability.