USB22 Series

ARCNET® Network Interface Modules with USB Interface

INSTALLATION GUIDE

INTRODUCTION

The USB22 Series of ARCNET Network Interface Modules (NIMs) links Universal Serial Bus (USB) computers with the ARCNET Local Area Network (LAN). USB has become popular for connecting desktop or laptop computers to peripherals because of its very high-speed interface (up to 480 Mbps) and its convenience of a powered exterior interface with no need to open the computer.

Each USB22 includes a COM20022 ARCNET controller that can support data rates up to 10 Mbps and a microcontroller to transfer data between the ARCNET and either USB 2.0 or USB 1.1 devices. The NIM is powered from a computer USB port or a USB hub. Models exist for the most popular ARCNET physical layers. A USB cable is also provided.

NOTE: The USB22 Series of NIMs are for users who are willing and able to modify their application-layer software. Some OEM companies have modified their software to work with the USB22. If your application is not provided by one of these companies, you cannot use the USB22 — ***unless you rewrite your application software*** or hire a software engineer to do it. (See the **SOFTWARE** section of this installation guide for information about the ***Software Developer Kit***.) If USB22-compliant software is provided by your OEM and you encounter installation difficulties, you should contact your OEM for resolution of your issue — because Contemporary Controls has no knowledge of the OEM software.

CONTEMPORARY CONTROLS®

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Disclaimer

Contemporary Control Systems, Inc. reserves the right to make changes in the specifications of the product described within this manual at any time without notice and without obligation of Contemporary Control Systems, Inc. to notify any person of such revision or change.

SPECIFICATIONS

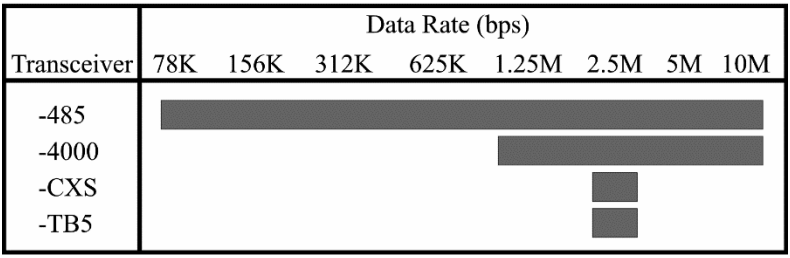
Electrical

Current demand: 400 mA (max)

Environmental

Operating temperature: 0°C to +60°C
Storage temperature: –40°C to +85°C
Humidity: 10% to 95%, non-condensing

ARCNET Data Rates



Shipping Weight

1 lb. (.45 kg)

Compatibility

ANSI/ATA 878.1
USB 1.1 and USB 2.0

Regulatory Compliance

CE Mark, RoHS
CFR 47, Part 15 Class A

LED Indicators

ARCNET Activity — green
USB — green

RJ-45 Connector Pin Assignments

	4000	485	TB5
4	Line	Line –	Line –
5	Line	Line +	Line +

(All other pins are unused.)

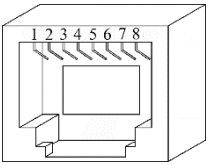


Figure 1 — RJ-45 Connector

Screw Terminal Pin Assignments

	4000	485
1	Line	Line –
2	Shield	Shield
3	Line	Line +

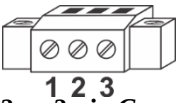


Figure 2 — 3-pin Connector

Mechanical *(The case dimensions shown below are valid for all models.)*

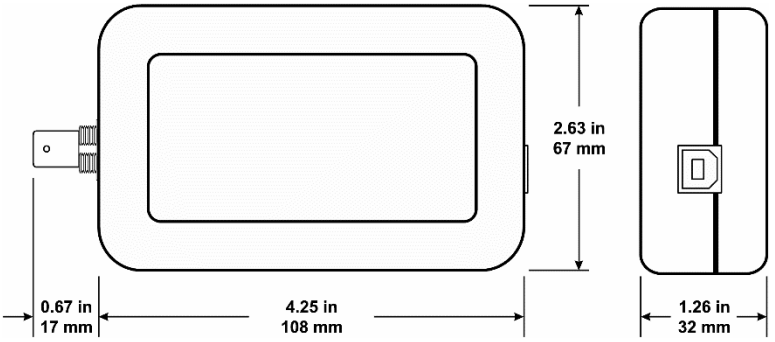


Figure 3 — USB22-CXB Dimensions

ELECTROMAGNETIC COMPATIBILITY

All USB22 models comply with Class A radiated and conducted emissions as defined by EN55022 and CFR 47, Part 15. This equipment is intended for use in non-residential areas.

Warning

This is a Class A product as defined in EN55022. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

INSTALLATION

SOFTWARE (Windows® 2000/XP/Vista/7)

When a USB cable first connects the NIM to a PC and you are prompted for a driver, follow the instructions that appear when you click on the ***Software Developer Kit*** link at the following URL:

www.ccontrols.com/support/usb22.htm

INDICATOR LIGHTS

ARCNET: This will flash green in response to any ARCNET activity.

USB: This LED glows green so long as a valid active USB connection exists to an attached computer.

FIELD CONNECTIONS

The USB22 is available in four models that vary by transceiver type for connecting to an ARCNET LAN via a certain kind of cable. Each model's transceiver is identified by the suffix (-4000, -485, -CXB or -TB5) separated from the main number by a hyphen.

-CXB Coaxial Bus

Generally two types of coaxial cables are used with ARCNET**:** RG-62/u and RG-59/u. RG-62/u is recommended because it matches the 93-ohm -CXB impedance and can thus achieve the maximum 1000-foot segment distance. Although RG-59/u does not match the -CXB impedance (it is 75-ohm cable), it will still work, but the segment length may be limited. Never attach coax cable directly to the USB22-CXB; always use the provided BNC "T" connector. The "T" connector allows the coaxial bus to continue as shown with device A in *Figure 4*. Apply the provided 93-ohm BNC terminator to the "T" if the USB22 terminates the coax in an end-of-line situation as shown with device B in *Figure 4*.

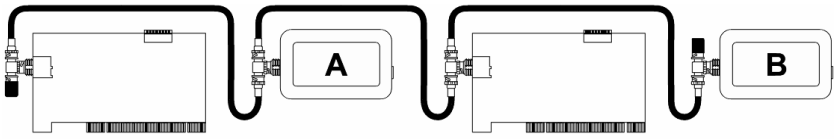


Figure 4 — Possible Connections for the USB22-CXB

-TB5 Twisted-pair Bus

The -TB5 transceiver accommodates twisted-pair cabling via a pair of RJ-45 jacks which allow the unit to be daisy-chained at any location on the bus segment. Usually IBM type 3 unshielded twisted-pair cable (UTP) is used, but shielded cable (STP) can also be used to provide continuous shielding between devices.

When the USB22-TB5 is located at the end of a bus segment, apply the provided 100-ohm terminator to the empty RJ-45 jack to match the cable impedance.

-485 DC-Coupled EIA-485

Two models support DC-coupled EIA-485 segments. The USB22-485 provides dual RJ-45 jacks and the USB22-485/S3 offers a 3-pin screw terminal. Each segment can be up to 900 feet of IBM type 3 (or better) STP or UTP cable while supporting up to 17 nodes. Make sure the phase integrity of the wiring remains consistent throughout the network. All phase A signals on NIMs and hubs must connect together. The same applies to phase B. Refer to *Figures 1* and *2* for connector wiring.

Termination

If the NIM is located at the end of a segment, apply 100 ohms of termination. For the USB22-485, insert a terminator in its empty RJ-45 jack. For the USB22-485/S3, attach a resistor to its 3-pin connector.

Bias

Bias must also be applied to the network to prevent the differential receivers from assuming invalid logic states when the signal line is floated. Bias is provided on the USB22-485 by a set of 806-ohm pull-up and pull-down resistors.

Ground

All devices on the segment should be referenced to the same ground potential to achieve the common mode voltage (+/–7 Vdc) required for the EIA-485 specification. A ground connection is not provided by the NIM. It is assumed adequate grounding is supplied by the existing equipment. Refer to the existing equipment user manual for a discussion of grounding requirements.

-4000 AC-Coupled EIA-485

The AC-coupled EIA-485 transceiver offers advantages over the DC-coupled version. No bias adjustments are needed and wiring polarity is unimportant. Much higher common mode voltage levels can be achieved with AC coupling because the transformer coupling has a breakdown rating of 1000 VDC.

However, AC-coupling also has disadvantages. AC-coupled segments are shorter (700 feet max) and are limited to 13 nodes compared to 17 for DC-coupling. Also, AC-coupled transceivers operate only at 1.25, 2.5, 5.0 and 10 Mbps, whereas DC-coupled transceivers function over all standard data rates.

Two models support AC-coupled EIA-485 segments. The USB22-4000 provides dual RJ-45 jacks, whereas the USB22-4000/S3 offers a 3-pin screw terminal.

Cabling rules are similar to those for DC-coupled NIMs. Wire nodes in a daisy-chain fashion. Refer to *Figures 1* and *2* for connector pin assignments. Termination should only be applied to devices located at the two ends of the segment. Do not mix AC-coupled and DC-coupled devices on the same segment; however, bridging the two technologies is possible with active hubs that have appropriate transceivers.

NEED MORE HELP INSTALLING THIS PRODUCT?

Technical support documents and software are freely downloadable from:

www.ccontrols.com/support/usb22.htm

When contacting our offices by telephone, ask for Technical Support.

WARRANTY

Contemporary Controls (CC) warrants this product to the original purchaser for two years from the product shipping date. Product returned to CC for repair is warranted for one year from the date the repaired product is shipped back to the purchaser or for the remainder of the original warranty period, whichever is longer.

If the product fails to operate in compliance with its specification during the warranty period, CC will, at its option, repair or replace the product at no charge. The customer is, however, responsible for shipping the product; CC assumes no responsibility for the product until it is received.

CC's limited warranty covers products only as delivered and does not cover repair of products that have been damaged by abuse, accident, disaster, misuse, or incorrect installation. User modification may void the warranty if the product is damaged by the modification, in which case this warranty does not cover repair or replacement.

This warranty in no way warrants suitability of the product for any specific application. IN NO EVENT WILL CC BE LIABLE FOR ANY DAMAGES INCLUDING LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT EVEN IF CC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY PARTY OTHER THAN THE PURCHASER.

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RETURNING PRODUCTS FOR REPAIR

Return the product to its purchase site using the instructions at this URL:

www.ccontrols.com/rma.htm

DECLARATION OF CONFORMITY

Additional compliance documentation can be found on our website.

January 2014