

KPCMCIARS422/485S
Single-Channel
PCMCIA Asynchronous Adapter
User's Manual

Contains Operating and Programming Information

KEITHLEY

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KPCMCIA-RS422/485S
Single-Channel PCMCIA
Asynchronous Adapter
User's Manual

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Manual Print History

The print history shown below lists the printing dates of all Revisions and Addenda created for this manual. The Revision Level letter increases alphabetically as the manual undergoes subsequent updates. Addenda, which are released between Revisions, contain important change information that the user should incorporate immediately into the manual. Addenda are numbered sequentially. When a new Revision is created, all Addenda associated with the previous Revision of the manual are incorporated into the new Revision of the manual. Each new Revision includes a revised copy of this print history page.

Revision A (Document Number 98932)	July 1997
Revision B (Document Number 98932)	December 1997
Revision C (Document Number 98932)	September 1999

Safety Precautions

The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with non-hazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read the operating information carefully before using the product.

The types of product users are:

Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the manual. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, and perform safe installations and repairs of products. Only properly trained service personnel may perform installation and service procedures.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present. **A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.**

Users of this product must be protected from electric shock at all times. The responsible body must ensure that users are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product users in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 volts, **no conductive part of the circuit may be exposed.**

As described in the International Electrotechnical Commission (IEC) Standard IEC 664, digital multimeter measuring circuits (e.g., Keithley Models 175A, 199, 2000, 2001, 2002, and 2010) are Installation Category II. All other instruments' signal terminals are Installation Category I and must not be connected to mains.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, make sure the line cord is connected to a properly grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.


The instrument and accessories must be used in accordance with its specifications and operating instructions or the safety of the equipment may be impaired.


Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.


When fuses are used in a product, replace with same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as safety earth ground connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

If a  screw is present, connect it to safety earth ground using the wire recommended in the user documentation.

The  symbol on an instrument indicates that the user should refer to the operating instructions located in the manual.

The  symbol on an instrument shows that it can source or measure 1000 volts or more, including the combined effect of normal and common mode voltages. Use standard safety precautions to avoid personal contact with these voltages.

The **WARNING** heading in a manual explains dangers that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in a manual explains hazards that could damage the instrument. Such damage may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits, including the power transformer, test leads, and input jacks, must be purchased from Keithley Instruments. Standard fuses, with applicable national safety approvals, may be used if the rating and type are the same. Other components that are not safety related may be purchased from other suppliers as long as they are equivalent to the original component. (Note that selected parts should be purchased only through Keithley Instruments to maintain accuracy and functionality of the product.) If you are unsure about the applicability of a replacement component, call a Keithley Instruments office for information.

To clean an instrument, use a damp cloth or mild, water based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

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1 Introduction

Getting started

The KPCMCIA-RS422/485S is a single-channel RS422/RS485 asynchronous serial adapter for systems equipped with PCMCIA Type II and/or Type III expansion sockets. The KPCMCIA-RS422/485S is a PCMCIA Type II (5mm) card and is PCMCIA PC card standard specification 2.1 compliant.

The KPCMCIA-RS422/485S's serial port is implemented using a 16C550 Universal Asynchronous Receiver/Transmitter (UART), which is the recommended communications interface for multitasking environments and for applications involving high data transfer rates.

The KPCMCIA-RS422/485S may be configured to operate in either the full-duplex or half-duplex mode; RTS (request to send) or DTR (data terminal ready) may be used to enable the output drivers, or the KPCMCIA-RS422/485S may be configured so the output drivers are always enabled. Another option provided in the KPCMCIA-RS422/485S is RTS-CTS modem control handshaking. This handshake may be enabled or disabled when the KPCMCIA-RS422/485S is configured. See Section 5 for more information.

Technical support

Before returning any equipment for repair, call Keithley Instruments, Inc., for technical support at:

1-888-KEITHLEY
Monday - Friday, 8:00 a.m. - 5:00 p.m., Eastern Time

An applications engineer will help you diagnose and resolve your problem over the telephone.

If a telephone resolution is not possible, the applications engineer will issue you a Return Material Authorization (RMA) number and ask you to return the equipment. Include the RMA number with any documentation regarding the equipment.

When returning equipment for repair, include the following information:

- Your name, address, and telephone number.
- The invoice or order number and date of equipment purchase.
- A description of the problem or its symptoms.
- The RMA number on the outside of the package.

Repackage the equipment using the original anti-static wrapping, if possible, and handle it with ground protection. Ship the equipment to:

ATTN: RMA # _____
Repair Department
Keithley Instruments, Inc.
28775 Aurora Road
Cleveland, OH 44139

Telephone 1-888-KEITHLEY
FAX (440) 248-6168

NOTES *If you are submitting your equipment for repair under warranty, you must include the invoice number and date of purchase.*

To enable Keithley Instruments, Inc., to respond as quickly as possible, you must include the RMA number on the outside of the package.

2 Installation

To ease the configuration of the KPCMCIARS422/485S, a Windows 95 INF configuration file is included. This configuration file supports the RTS-CTS modem control handshaking option and the RS422/485 output driver enable option for full- and half-duplex operation.

Hardware installation

To physically install the KPCMCIARS422/485S PC card, insert the card into an available Type II KPCMCIAsocket.

Software setup

Refer to your DriverLINX documentation for a detailed description of the software installation and setup procedures.

3

Hardware Information

Auxiliary channel configuration

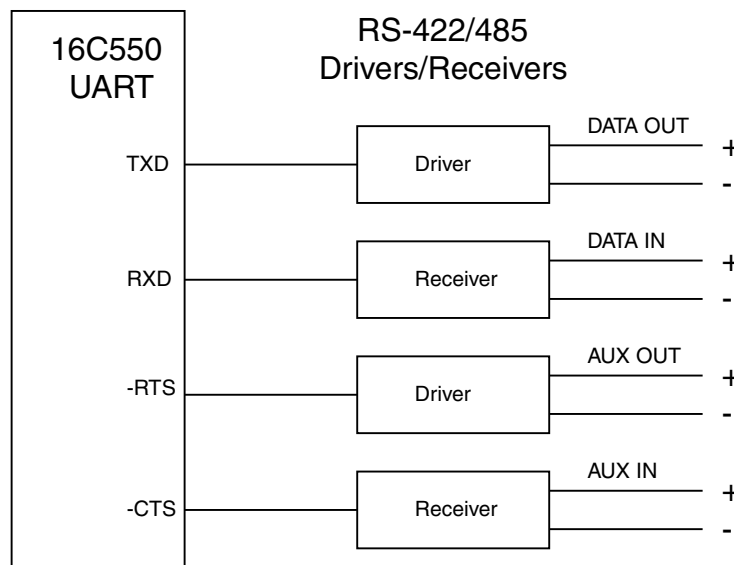
An auxiliary channel allows for handshaking between the KPCMCIA-RS422/485 port and a peripheral device. Two auxiliary channel configurations are possible:

- RTS-CTS handshaking enabled
- Handshaking disabled

Auxiliary channel: RTS-CTS handshaking enabled

RTS-CTS handshaking can be enabled so RTS (request to send) is the auxiliary output signal on AUX OUT+ (pin 1) and AUX OUT- (pin 6). Similarly, CTS (clear to send) is the auxiliary input signal on AUX IN+ (pin 5) and AUX IN- (pin 9). This configuration is shown in Figure 3-1.

Figure 3-1
Auxiliary channel RTS-CTS handshaking

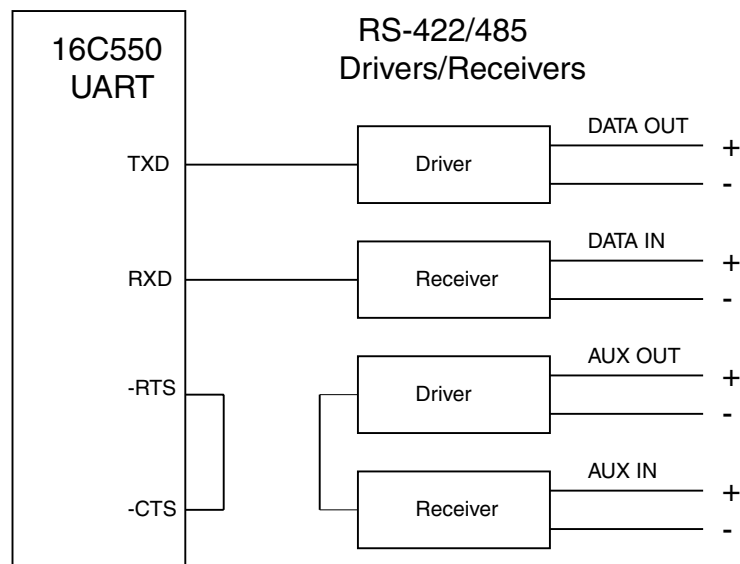


Auxiliary channel: handshaking disabled

The KPCMCIA-RS422/485 ports can be configured so RTS-CTS handshaking is disabled, which is the default configuration. In this configuration, RTS and CTS from the 16C550 UART loop back to each other. In addition, the auxiliary output and input signals loop back to each other. This configuration is shown in Figure 3-2.

Figure 3-2

Auxiliary channel handshaking disabled

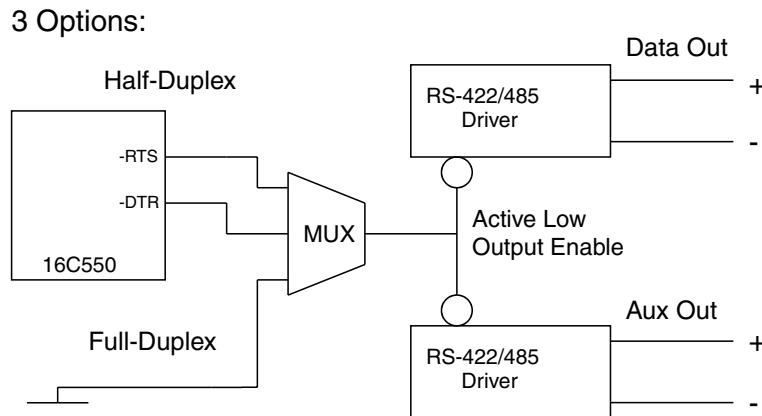


Half-duplex operation

The KPCMCIA-RS422/485S ports can be configured for either full-duplex or half-duplex operation. By default, the RS422/485 ports are configured for full-duplex operation with the RS422/485 output drivers always enabled.

In half-duplex mode, the RS422/485 transmitter can be enabled and disabled via the RTS or DTR (data terminal ready) signal. Both RTS and DTR are controlled through the modem control register of the 16C550. Refer to Figure 3-3.

Figure 3-3
RS422/485 driver enable options



NOTE: One of these three options must be selected via software configuration. Full-duplex operation is the default mode.

If RTS is selected as the signal to enable the output drivers, setting bit 1 of the modem control register (to logic 1) enables the output drivers and clearing bit 1 of the modem control register (to logic 0) forces the outputs into a high impedance state.

Similarly, if DTR is chosen as the signal to enable the output drivers, setting bit 0 of the modem control register (to logic 1) enables the output drivers and clearing bit 0 of the modem control register (to logic 0) forces the outputs into a high impedance state.

Selecting half-duplex mode depends on the configuration software and/or the operating system used. Each ultimately controls the half-duplex mode by accessing the PCMCIA configuration register on the KPCMCIA-RS422/485S.

CAUTION *When operating in half-duplex mode, disable the transmitter output drivers before they receive any information. Failure to do so will result in the two output drivers being connected together which may cause damage to the adapter, the computer, and/or the peripheral equipment.*

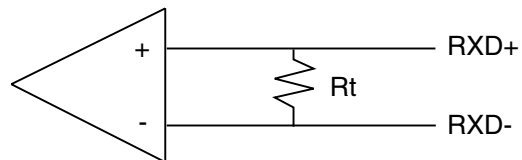
Termination resistors

No termination resistors are provided on the KPCMCIA-RS422/485S ports. Both output and input signals are connected only to the external connector. Any termination that is required must be added externally. Refer to Figure 3-4.

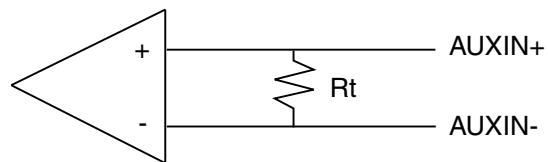
Figure 3-4

RS422/485 termination

RS-422/485 Receiver



RS-422/485 Receiver



Recommended Termination Resistor Values

RS-422
100 ohm 1/2W resistor

RS-485
60 ohms total resistance
(120 ohms at each end)

4

External Connections

The adapter cable included with the KPCMCIARS422/485S converts the 9-pin PCMCIA output connector into a standard D-9 female data terminal equipment (DTE) connector, as shown in Figures 4-1 and 4-2. A male to female gender changer is provided.

Figure 4-1
KPCMCIARS422/485S adapter cable

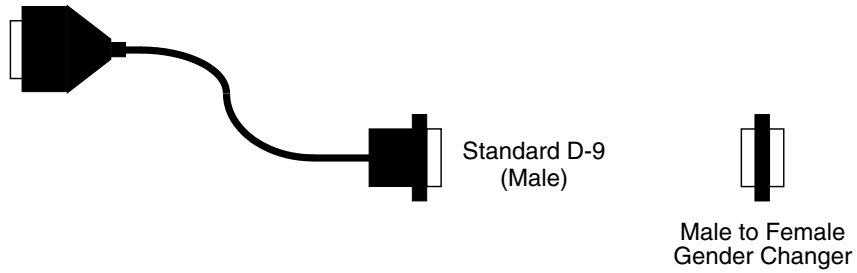
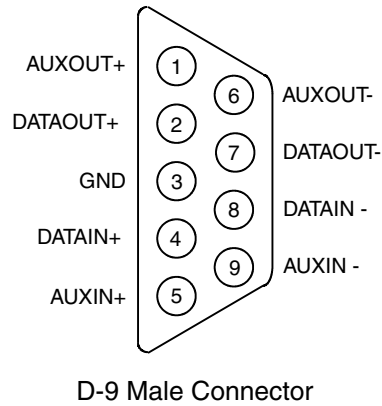


Figure 4-2
RS422/485 signal assignment



A Specifications

Bus interface	PCMCIA PC card standard 2.1 compliant
Physical dimensions	Type II PCMCIA card (5mm)
Maximum baud rate	120K
Power requirements	+5V 8.85mA (typical) 14.14mA (maximum)
Connector	Adapter to standard female

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