

**MINDSET**

# RS-232-C Module Operation Guide

Personal  
Computer  
System

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### **LIMITED WARRANTY**

Mindset Corporation ("Mindset") warrants the product it manufactures for a period of 90 days from the date of purchase. During the warranty period, Mindset at its option will repair or replace components that prove to be defective at no charge provided the product is returned to an authorized Mindset dealer.

This warranty does not apply if, in the opinion of Mindset, the product has been damaged by accident, misuse, misapplication, or as a result of service or modification by other than an authorized Mindset dealer.

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## **FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT**

### **INSTRUCTIONS TO USER**

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna.

Relocate the computer with respect to the receiver.

Move the computer away from the receiver.

Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

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# Section 1

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## Introduction

The Mindset™ RS-232-C Module enables you to link your Mindset Personal Computer to any RS-232-C serial-communications device for a variety of applications.

The RS-232-C Module is a single-width, input/output (I/O) module that you insert into the System Unit or Expansion Unit. It contains the necessary timing, control, and interface logic to link your Mindset Personal Computer to standard RS-232-C serial-communications devices such as printers, plotters, and other computers.

This Operation Guide instructs you on the applications and use of the Mindset RS-232-C Module. For convenience, place this guide under the OPTIONS tab of your Mindset Personal Computer System Operation Guide.

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### What Is Serial Communications?

Devices that can send or receive information are classified as either serial or parallel depending on how they exchange coded information with your computer.

In serial communications, the computer sends and receives characters one bit at a time. A character is usually 9 or 10 bits long in the serial format. Serial communication is ideal for use over a telephone system because it requires only one wire.

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In parallel communications, the computer sends and receives all the bits of a character simultaneously. Parallel communication can be faster than serial communication, but it requires more wires and therefore cannot be used with a telephone system. Another Mindset module, the Printer Interface Module, is designed for parallel communication.

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## How to Use this Guide

Including this introduction, this Operation Guide consists of four sections and an appendix.

Section 2, "Applications", lists the ways you can use the RS-232-C Module to expand your system.

Section 3, "Installation", refers you to the proper procedures for installing and removing the RS-232-C Module. This section also includes instructions for attaching a serial device cable.

Section 4, "Solving Problems", gives you information to help you diagnose problems which may occur during operation.

The appendix includes physical, electrical, and data communications specifications as well as the serial I/O connector diagram.

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## Other Mindset Guides

Your Mindset Personal Computer comes with an operation guide to acquaint you with your system and its operation. For your reference, the guide includes a glossary of useful computer terminology.

In addition to the RS-232-C Module, Mindset offers a number of other options for expanding your system. Each option comes with its own operation guide to show you how to use that option with your Mindset Personal Computer.

## Section 2

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# Applications

The RS-232-C Module links your Mindset Personal Computer to devices that use the RS-232-C serial interface standard.

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### Linking to Printers

Printers receive coded information from your computer and express the information as characters on paper. You then have a "hard copy" of information contained in your computer.

Printers can have either a serial or parallel interface. The Mindset RS-232-C Module provides a serial interface which meets the Electronics Industry of America (EIA) RS-232-C interface specifications. (To link your system to a parallel printer, see the operation guide included with the Mindset Printer Interface Module.)

A serial device cable connects the RS-232-C Module to a printer with an RS-232-C serial interface. Your dealer can help you choose the correct printer and device cable for your needs.

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### Linking to Plotters

A plotter is a device that uses one or more pens to draw graphic images on paper. Sometimes called an X-Y plotter, this unit can draw continuous lines as well as alphanumeric characters.

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Some programs which produce graphic displays can use a plotter to create hard-copy graphic output. You can use the Mindset RS-232-C Module to attach a plotter with a serial interface to your system.

Plotters which use an RS-232-C interface receive information in character form just like a printer, but they interpret the characters as commands for drawing lines. The program you select to operate a plotter must be designed for your plotter. Also, you need a serial device cable to connect the RS-232-C Module to the plotter.

Consult your dealer for the right plotter, software, and device cable for your needs.

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## Communicating with Other Computers

The RS-232-C Module enables you to link your Mindset Personal Computer to other computers. You can then transfer and receive information from other sources.

If two computers are in the same room, you can connect them directly together using the RS-232-C Module and an RS-232-C device cable. If the computers are more than 25 feet apart, you need a separate device called a modem. You can also use a Mindset Modem Module.

A modem takes the signals from your computer and converts them into tones that can be transferred over telephone lines. A modem at the other end of the phone line converts these tones back to signals understood by the receiving computer.

The Mindset Modem Modules combine the functions of the RS-232-C interface and an external modem. In addition, Mindset offers telecommunications software that provides many convenient features.

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## Communicating with More Than One Device

You can link your Mindset Personal Computer to more than one external device at a time. For example, you may want to insert I/O modules which enable you to attach both a serial and a parallel printer.

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When you insert the Mindset Printer Interface Module to connect a parallel printer, place it in a module port with a lower number than the port you use for the RS-232-C module. (See the operation guide included with the Printer Interface Module for a description of the module.)

Note: The PRT SCN key normally sends the screen information to the Printer Interface Module in the lowest-numbered port. However, if you have an Expansion Unit and MS™-DOS as part of your system, you can use the MS-DOS MODE command to reassign the output to the port for the RS-232-C module. Then you can use the PRT SCN key to print the contents of the screen on a serial printer.



## Section 3

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# Installation

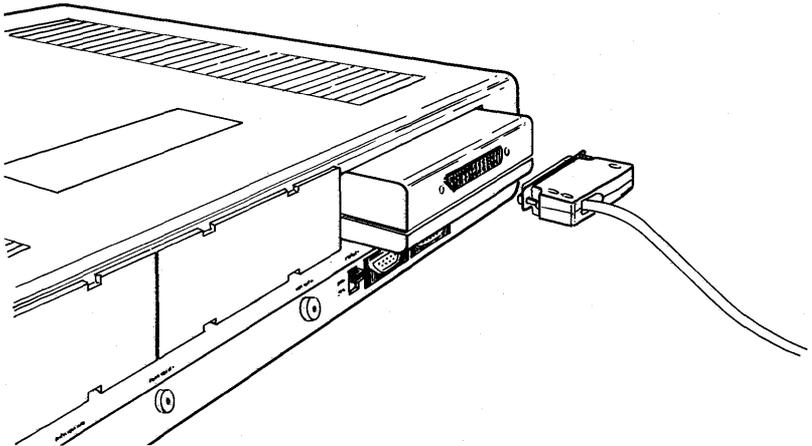
Modules are easy to insert and remove. Refer to Section 7, "Enhancing Your System", in the Mindset Personal Computer System Operation Guide for these simple installation instructions.

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### Attaching the Serial Device Cable

To attach a cable from a serial device, follow these three steps:

1. Attach the D-shaped connector of the device cable to the connector on the rear of the RS-232-C Module (see Figure 3-1).



*Figure 3-1: Attaching the serial device cable*

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2. Attach the other end of the device cable to the printer, plotter, modem, or other serial-interface device.
  3. Turn on the system.

**Note:** Your dealer can supply you with the proper cable for the serial device that you choose, including any necessary adapters.

## Section 4

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# Solving Problems

You can perform the following troubleshooting procedures when information won't transmit through the RS-232-C Module. The operation guide supplied with your printer, plotter, or modem should also include troubleshooting techniques. If you still have problems after trying all these procedures, contact your dealer for assistance.

1. Check that the RS-232-C Module is pushed all the way into the module port.
2. Ensure that the cable connecting the RS-232-C Module to the printer or plotter is a serial device cable.
3. Make sure that the serial device cable connections are secure.
4. Check that the system is on and that the System Unit is plugged into a working power outlet.
5. Make sure that the printer or plotter is turned on and plugged into a working power outlet.

Note: Do not plug the printer or plotter into a switched outlet. A switched outlet could be inadvertently turned off.

6. Ensure that you have set the correct communications parameters.



# Appendix

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# Specifications

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## Physical Characteristics

Width	4.1 inches
Length	3.1 inches
Height	1.1 inches
Weight	Approximately 4.0 ounces

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## Electrical Specifications

Output signal levels	$\pm$ 12 volts DC
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## Data Communications

Data format	Asynchronous serial communications
Modem-control operation	Full duplex, double-buffered transmitter, automatic break detection and handling
Error detection	Parity, overrun, and framing
Data transmission speed	50 to 9600 bits per second

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## Connector Diagram

The following diagram identifies the pin assignments on the serial I/O connector.

Figure A-1 identifies the pin assignments on the serial I/O connector:

<b>Pin</b>	<b>Signal</b>
2	Transmitted data (data output)
3	Received data (data input)
4	Request to send (RTS) (output)
5	Clear to send (CTS) (input)
6	Data set ready (DSR) (input)
7	Signal ground (tied to chassis at printer)
8	Carrier detect (CDET) (input)
20	Data terminal ready (DTR) (output)
22	Ring indicator (RI) (input)