

# *Badger OmniRemote*<sup>TM</sup>

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**SAM Installation Manual**

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**08/09/99**

**Badger Technology, Inc.  
1423 South Milpitas Boulevard  
Milpitas, California 95035-6828**

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# *Manual Overview*

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# 1

## Chapter Summary

**In this Chapter** The following topics are covered in this chapter:

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<b>Topic</b>	<b>See Page</b>
About this Manual	1-2
Using this Manual	1-3
Technical Support	1-5

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# About this Manual

**Purpose** This manual covers hook-up and installation of the OmniRemote™ Serial Alarm Module (SAM). It is organized into task-based topics, each with a step-by-step description of how to perform the task.

**Topics Covered** The topics covered in this manual are as follows:

Topic	Page
Manual Overview	
About this Manual	1-2
Using this Manual	1-3
Technical Support	1-5
Instrument Overview	
About the OmniRemote	2-2
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## Using this Manual

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**Who Should Use this Manual** This manual is designed for the technician installing the OmniRemote Shelf. Knowledge of electrical and mechanical connectivity is required.

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**User Attention Words** Five user attention words appear throughout this manual. Each word implies a particular level of observation or action as follows:

**Note** This word is used to call attention to information.

**IMPORTANT** This word calls attention to information that is necessary for correct use of the kit or instrument.

**CAUTION** This word informs the user that damage to the instrument could occur if the user does not comply with the information. It also indicates a potentially hazardous situation that could result in minor or moderate injury to the user.

**! WARNING !** This word informs the user that serious physical injury or illness to the user or other persons could occur if these required precautions are not taken.

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**Typographical Conventions** The following typographical conventions are used in this manual:

- ◆ **Bold:** indicates literal values that you type or select. For example, press **Enter** indicates that you should press the enter/return key.
- ◆ ***Bold italic:*** indicates a variable value that you supply. For example, ***file name*** indicates that you enter a file name of your choice.
- ◆ `Courier font:` indicates the computer response.

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**CDROM** The OmniRemote manuals are provided as Adobe Acrobat® pxx dxx files (pdfs) on the CDROM included with your OmniRemote purchase. You may print as many manuals as you require for your use. Copyright regulations are in effect for distribution or resale to other companies not directly involved with the installation of your OmniRemote.

**Note** The Adobe Acrobat Reader program can be used with most computer operating systems. The program can be downloaded from the Internet through the Adobe Systems Incorporated web site: [www.adobe.com](http://www.adobe.com).

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**If You Need More Information**

<b>If you need information on...</b>	<b>See the...</b>	<b>Part Number</b>
Installing the OmniRemote Shelf,	<i>Shelf Installation Manual</i>	Badger: D47-20525-xx
Installing the Bistate Analog Module (BAM),	<i>BAM Installation Manual</i>	Badger: D47-20233-xx
Installing the Router Access Module-Dual Port (RAM-DP),		
Installing the Router Access Module-Single Port (RAM-SP),		
Running the OmniRemote software,	<i>DAD Provisioner's Manual</i>	Badger: D47-20544-xx
	<i>DAD/BAM Application Notes</i>	Badger: AP01-20933-xx
	<i>Other DAD Application Notes</i>	See your Sales Representative.
The OmniRemote product overview and specifications,	<i>OmniRemote 2020 Brochure</i>	See your Sales Representative.



## Technical Support

**How to Reach Us** If you have questions or encounter problems while installing the OmniRemote, you can reach us as follows:

<b>Telephone</b>	1-408-957-8600
<b>Facsimile</b>	1-408-957-8601
<b>Mailing address</b>	Badger Technology, Inc. 1423 South Milpitas Boulevard Milpitas, CA 95035-6828
<b>World Wide Web:</b>	<a href="http://www.badger.com">http://www.badger.com</a>  <b>Note</b> We encourage you to visit our web site for answers to frequently asked questions (FAQs) and to learn more about our products.

**Hours for Telephone Technical Support** Telephone technical support is available at the following times.

<b>Days</b>	<b>Hours</b>
Monday through Friday	8:00 a.m. to 5:00 p.m., Pacific Time

**Manual Corrections** If you have comments, corrections, or suggestions regarding this manual, you can reach us as follows:

<b>E-mail</b>	<a href="mailto:techpubs@badger.com">techpubs@badger.com</a>
<b>Facsimile</b>	1-408-957-8601  Attn: Badger Technology Manual Publications
<b>Mailing address</b>	Badger Technology Manual Publications 1423 South Milpitas Boulevard Milpitas, CA 95035-6828

# *Instrument Overview*

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# 2

## Chapter Summary

**In this Chapter** The following topics are covered in this chapter:

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<b>Topic</b>	<b>See Page</b>
About the OmniRemote	2-2
Hardware Component Overview	2-4
Ordering Hardware Components and Accessories	2-7

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## About the OmniRemote

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**OmniRemote Overview** The OmniRemote™ instrument is a universal, remote-site gateway. It performs:

- ◆ Environmental monitoring
- ◆ Multi-vendor telecommunications equipment monitoring
- ◆ Alarm management
- ◆ Protocol mediation
- ◆ Local Area Network (LAN) to Wide Area Network (WAN) remote access routing

The OmniRemote SAM provides a single communications path to all of your remote site network elements and environmental equipment. It eliminates multiple costly communications channels to each remote site by sharing bandwidth on a single channel. This channel can be modified to meet your needs, from a simple, low-cost , 9600-baud dial-up phone line to a dedicated 10BaseT Ethernet integrated to your WAN and corporate Intranet.

Network traffic can be significantly reduced by configuring SAM active message filters to eliminate redundant or status-only messages (such as those normally produced by TL1 devices). Protocol translation between different network elements and the Network Management System (NMS) has been caused by the rapid introduction of new technologies and legacy devices. The SAM provides these mediation services to offload processing from the NMS and reduce programming costs. Unlike traditional terminal services, communications bandwidth is conserved and central NMS processing reduced, thus providing the most scalable solution.

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**Hardware Components** The OmniRemote has several hardware components:

- ◆ OmniRemote Shelf with Data Ports
- ◆ OmniRemote Shelf with 10BaseT Hub
- ◆ Bistate Analog Module (BAM)
- ◆ Serial Alarm Module (SAM)
- ◆ Router Access Module, Dual Port (RAM-DP)
- ◆ Router Access Module, Single Port (RAM-SP)

These hardware components can be combined in various configurations to suit your needs.

**Note** For a brief description of each of these components, see "Hardware Component Overview" on page 2-4.

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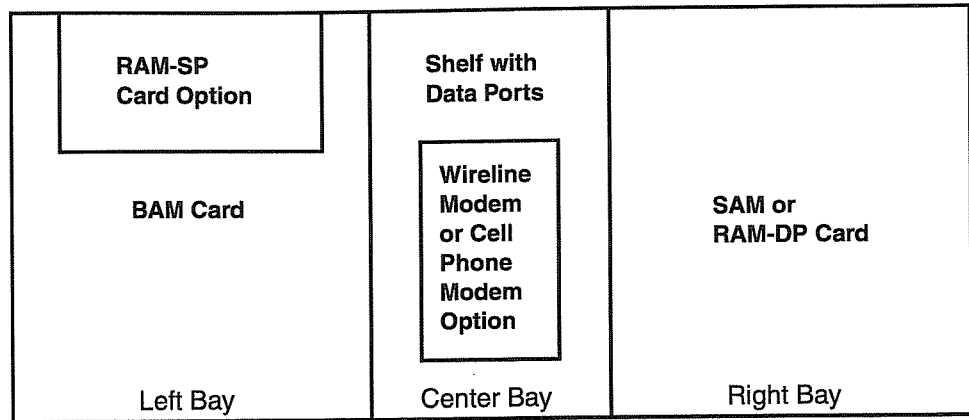
**Chassis Configuration**

The OmniRemote chassis requires only 1 RU height (1.75 inches) in a 19-inch mounting rack.

The chassis has left and right bays to hold the BAM, SAM, RAM-DP, or RAM-SP. A 3.5-inch center bay holds the power supply and other shared communication functions. The center bay card determines the OmniRemote Shelf configuration, which is one of the following:

- ◆ OmniRemote Shelf with Data Ports
- ◆ OmniRemote Shelf with 10BaseT Hub

The diagram below shows an example of a fully featured chassis configuration.



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**Software**

The BAM, SAM, RAM-DP, and RAM-SP cards each support a microprocessor. The BAM and SAM cards can be downloaded via software.

The SAM uses Badger's Data Acquisition Device (DAD) software to collect serial and IP Ethernet alarm reports from the BAM and other network elements. The DAD software can operate on other platforms (*e.g.*, PC, Sun Workstation) or reside on a SAM installed in the OmniRemote. This allows you to filter and process alarm messages centrally, regionally, or from a remote site.

The DAD software can be extended for custom applications using a scripting language. With this scripting language, Badger can create new network element interfaces for your serial ports, identify their processing components, and route output to the specified destination port (*e.g.*, Network Operations Center [NOC]).

The BAM software collects voltage contact closures and values that result in serial alarm outputs.

The BAM and SAM are easily configured and downloaded using the DAD Control application. This JAVA-based application operates on any network PC running the Microsoft® Windows application (WIN95 or later versions).

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## Hardware Component Overview

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**Shelf with Data Ports** The OmniRemote Shelf with Data Ports uses a Master Communications Interface (MCI) card in the center bay to provide power to the other modules in the chassis.

The MCI card supports the following communication options:

- ◆ Two bridged, asynchronous (RS-232 or RS-422) ports
- ◆ One synchronous (RS-422) V.35 port (e.g., T1 channel bank DSU/CSU) for a high-speed digital carrier
- ◆ Wireline phone modem
- ◆ Cell phone modem

This shelf can be configured with any combination of BAM, SAM, or RAM-SP in the chassis bays. When configured with a SAM, it also supports an Ethernet interface to the NOC.

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**Shelf with 10BaseT Hub** The OmniRemote Shelf with 10BaseT Hub uses a built-in Ethernet 10BaseT Hub card in the center bay to provide power to the other modules in the chassis and to support a remote-site LAN. Six twisted-pair connections to your site equipment or PCs eliminate a separate hub.

This shelf can be configured with any combination of BAM, SAM, RAM-DP, or RAM-SP in the chassis bays.

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**BAM-64** The Bistate Analog Module (BAM) addresses a wide range of both public and private network supervisory applications. It is a flexible, field-expandable system that meets a variety of needs in many fields, such as telcos, pipeline, transportation, private networks, and water and electric utilities.

The BAM-64 supports 64 bistate inputs, 12 analog inputs, and 4 control outputs. The BAM-64 monitors discrete alarm conditions (contact closures, TTL, and voltage measurements) and provides remote control (relay contacts). Alarms are time-tagged, transient changes are filtered, and analog inputs have applied upper and lower thresholds.

Typical BAM-64 alarm reports include:

- ◆ Battery and station power
  - ◆ Security sensor
  - ◆ Various environmental measurements (e.g., temperature, humidity)
  - ◆ Communications equipment
-

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**SAM-10** The Serial Alarm Module (SAM-10) supports 10 serial ports and an Ethernet port for monitoring network elements. The SAM-10 monitors serial alarms and provides remote control (terminal cut-through to equipment) and protocol mediation.

Using the DAD software, the SAM-10 can be configured to receive autonomous messages or to actively poll network elements to determine their status. Received messages are parsed, filtered, translated, and buffered for immediate or later transmission. Log components may be configured between processing flow components to trace the message path.

Primary communications to the NMS can use the router WAN interface or dedicated or dial-up serial links on the MCI card. A point-to-point (PPP) protocol is recommended for serial communications over a WAN or a dial-up phone line to ensure integrity and transparency of the data.

Typical SAM-10 alarm reports include:

- ◆ TL1-based network elements
- ◆ Private Branch Exchanges (PBXs)
- ◆ Switches and cross-connects
- ◆ Intelligent remote communications equipment
- ◆ Badger BAMs

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**RAM-DP** The Router Access Module-Dual Port (RAM-DP) is a flexible Ethernet bridge/router that may be configured to provide one LAN port and 1–2 WAN ports.

The RAM-DP supports the following:

- ◆ Leased lines on one to two physical WAN ports, interfacing to a high-speed digital carrier (*e.g.*, DSU/CSU)
  - ◆ ISDN for 1–2 Basic Rate Interface (BRI) B channels
  - ◆ Frame relay for 1–40 Permanent Virtual Circuits (PVC) across 1–2 physical WAN ports
  - ◆ WAN interfaces: ISDN/U, RS-422, V.24, V.35, X.21
  - ◆ One 10BaseT LAN interface
-

---

**RAM-SP** The Router Access Module-Single Port (RAM-SP) is especially suited for geographically dispersed sites. It is a flexible Ethernet bridge/router that can be configured to provide one LAN port and one WAN port.

The RAM-SP supports the following:

- ◆ A leased line on one physical WAN port, interfacing to a high-speed digital carrier (*e.g.*, DSU/CSU)
- ◆ ISDN for one BRI B channel
- ◆ Frame relay for 1–20 PVC across one physical WAN port
- ◆ Two WAN interfaces: V.35 (DB25), ISDN/U (RJ45)
- ◆ One LAN interface: Ethernet 10BaseT (supports six IP addresses)

**Note** The RAM-SP can share a bay with the BAM-64.

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## Ordering Hardware Components and Accessories

**Overview** Your OmniRemote has been custom-built. It should be shipped with all necessary hardware components and accessories. However, if you wish to upgrade your instrument, the hardware components and accessories listed below are for use with the OmniRemote.

**Ordering** Order hardware components and accessories from Badger Technology, Inc. by part number. See the table below.

Hardware Components and Accessories	Part Number
OmniRemote Shelf with Data Ports	M01-20230-01
Dial-up modem for the MCI card (28.8 Kbps)	A04-20231-01
Dial-up cell phone modem for the MCI card (9.6 Kbps)	P971000235
OmniRemote Shelf with 10BaseT Hub	M01-20235-02
Bistate Analog Module (BAM-64)	A04-20233-01
BAM-64 50-pin cable: 10 feet, SCSI I to SCSI II (telco C50)	PK45-20405-01
BAM-64 50-pin cable: 25 feet, SCSI I to SCSI II (telco C50)	PK45-20405-02
Serial Alarm Module (SAM-10)	A04-20228-01
SAM-10 RS-530 cable: 10 feet, DB-25, for RS-530 port to RS-530 DCE device	PK45-20410-01
Router Access Module, Dual Port (RAM-DP)	A04-20240-01
RAM -DP RS-530 cable: 10 feet, DB-25, for V.35 WAN to RS-530 DCE device	PK45-20408-01
RAM -DP WAN slots:	
V.35 card, DB-25	A04-20241-01
V.24/RS-232 card, DB-25	A04-20242-01
RS-422 card, DB-25	A04-20243-01
X.21 card, DB-25	A04-20244-01
ISDN/U card, RJ-45 (built-in NTI unit)	A04-20246-01
56K DSU/CSU card, RJ-48S	A04-20247-01
64K DSU/CSU card, RJ-48S	A04-20248-01
Router Access Module, Single Port (RAM-SP)	A04-20240-02
RAM -SP RS-530 cable: 10 feet, DB-25, for V.35 WAN to RS-530 DCE device	PK45-20409-01



# *SAM Hook-Up*

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# 3

## Chapter Summary

**In this Chapter** The following topics are covered in this chapter:

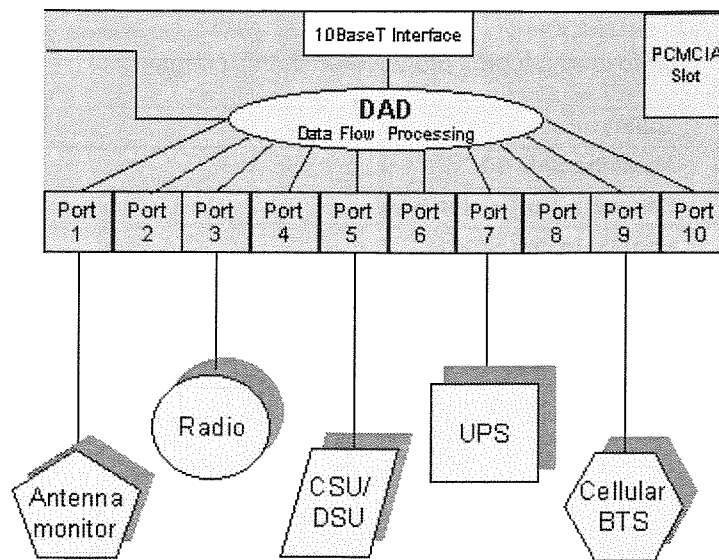
<b>Topic</b>	<b>See Page</b>
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Before Hooking Up the SAM	3-7
Hooking Up the SAM	3-8
Pin Designations	3-11
What Next?	3-12

## About the SAM-10

**How the SAM-10 Works** The Serial Alarm Module (SAM) -10 is an intelligent, programmable, terminal server with 10 serial data ports. As a terminal server, it can be configured to:

- ◆ Receive and transmit data from multiple serial data ports (connected to other network elements)
- ◆ Multiplex the data
- ◆ Communicate the data to a central site over a single channel

When the SAM-10 is configured with the Data Port Shelf, two additional serial ports, Channel A and Channel B, are also available.



The SAM-10 uses Badger's Data Acquisition Device (DAD) software to collect serial alarm reports from the other network elements. The DAD software translates alarm and command data between the network elements and the Network Management System (NMS).

The SAM-10 operates with a Motorola 32-bit PowerPC MPC860 RISC microprocessor with 32 MB of DRAM and 16 MB of file flash storage. It incorporates an embedded POSIX-compliant operating system. This processing power is intended to remotely filter, translate, and collect network element messages for your NMS.

The SAM-10 incorporates a real-time clock with a 1-second resolution with Y2K compliance. The real-time clock serves as the source to time- and date-stamp all messages received from the network elements.

**About the Software** Running the DAD Control application on your PC allows you to configure the SAM-10. The flow construction operation permits connection of processing components (objects) and setting of their properties. This defines such things as:

- ◆ The type of data entering an external port
- ◆ How the data should be translated and filtered
- ◆ How the data should be mapped to NMS alarm reports
- ◆ Where the data should be logged
- ◆ When applicable, how network elements are provisioned and downloaded (*e.g.*, the Bistate Analog Module [BAM])

The DAD software can be extended for custom applications. Badger can quickly customize processing scripts to your network elements. New scripts are easily downloaded to your remote SAM-10 sites, where you may connect these processing components into a flow and set their properties.

**About the 10 Serial Data Ports** Ten serial data ports are available on the rear panel of the SAM-10 for connection to other network elements. The configuration options are shown below.

Ports	Configuration
1–10	Asynchronous RS-232
1–6	Asynchronous RS-422
1–2	Synchronous RS-422

**About the TTL Serial Data Ports** The SAM-10 has three internal TTL serial data ports for use with the Data Port Shelf:

- ◆ Channel A
- ◆ Channel B
- ◆ One spare port

The port configuration options are shown below.

Port	Configuration
Channel A	<ul style="list-style-type: none"> <li>◆ Asynchronous RS-232</li> <li>◆ Asynchronous RS-422</li> <li>◆ Synchronous RS-422</li> </ul> <p><b>Note</b> The Synchronous RS-422 mode can be used by the SAM-10 for a high-speed digital interface.</p>
Channel B	<ul style="list-style-type: none"> <li>◆ Internal wireline modem</li> <li>◆ Internal wireless cell phone modem</li> <li>◆ For the Data Port Shelf only, a Craft port (connection to the Craft port deactivates the Channel B modem operation until disconnect)</li> </ul> <p><b>Note</b> In a configuration with both a SAM and a BAM, the SAM has control of the Channel B modem.</p>
Spare	<ul style="list-style-type: none"> <li>◆ Connects a BAM located in the opposite bay of the same chassis.</li> </ul> <p><b>Note</b> Additional daisy-chained BAMs may be connected externally on Channel A or on a SAM serial data port.</p>

The Channel A and B connectors are internal to the chassis and attached to the Master Communications Interface (MCI) card. The internal connectors are TTL-compatible only and cannot be used for any other purposes. Channels A and B can be shared with the other OmniRemote bay module when the SAM-10 is configured with a Data Port Shelf. Internal DTR and DSR signaling between bay modules controls access on a first-come, first-used basis.

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**Port Specifications** The table below lists the port specifications.

<b>Ports 1–10</b>	The maximum sustained data rate is 19.2 Kbps.
<b>MCI card Channel A and Channel B ports</b>	The maximum sustained data rate is 56 Kbps. With a wireline modem, it is 33.6 Kbps; with a wireless cell phone modem, it is 9.6 Kbps.
<b>Spare port</b>	The maximum sustained data rate is 19.2 Kbps. The spare port requires a TTL-level connector.
<b>10BaseT Hub port</b>	Complies with IEEE 802.3 requirements.
<b>Note</b> All external serial data ports incorporate ESD/transient protection and meet European Community requirements. The ESD protections is $\pm 15$ kV, Human Body Model.	

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**Re-configuring the SAM** The SAM is configured in the factory according to your specifications. See the OmniRemote Data Port Shelf label on the top of your OmniRemote to see how your SAM is configured.

If you wish to re-configure the SAM, see Appendix B.

---

**About the Battery** The SAM-10 card holds a 3.6-V, 1/2 AA, lithium battery. The battery provides power to the static RAM and real-time clock in the event of power loss. This saves the time and SAM configuration settings, thus avoiding re-configuration.

The expected battery life is 5–10 years, assuming normal power-on operations. This may vary depending on your environment.

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**About the Front Panel** The front panel is illustrated in the figure below. See the table that follows for a description of each item on the front panel.

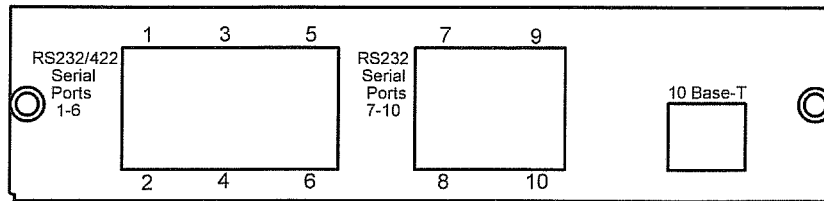
Need diagram.

SAM: Front Panel Items

Item	Description
Serial data ports 1–10 LEDs (green)	<ul style="list-style-type: none"><li>◆ A blinking LED indicates receive activity for a serial data port (1–10).</li><li>◆ A steady on or off LED indicates no receive activity.</li></ul> <p><b>Note</b> The receive pin of the rear panel RJ45 connector is floating. The corresponding front panel LED may be on or off by default.</p>
ETHERNET RX LED (green)	<ul style="list-style-type: none"><li>◆ A blinking LED indicates messages are being received via the Ethernet.</li><li>◆ A steady on or off LED indicates no activity</li></ul>
ETHERNET TX LED (green)	<ul style="list-style-type: none"><li>◆ A blinking LED indicates messages are being transmitted via the Ethernet.</li><li>◆ A steady on or off LED indicates no activity</li></ul>
READY LED (green)	When lit, indicates the SAM is powered on.
LAMP TEST button	LAMP TEST: Used to test whether or not the front panel LEDs are working.
RESET switch	Used to reset the SAM.  <b>IMPORTANT</b> Do not reset the SAM unless you are instructed to do so by Badger Technical Support.

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**About the Rear Panel** The rear panel is illustrated in the figure below. See the table that follows for a description of each item on the rear panel.



#### SAM: Rear Panel Items

Item	Description
Serial data ports 1–2 (RJ45 connector)	Connects equipment to the SAM in one of three modes: <ul style="list-style-type: none"> <li>◆ Asynchronous RS-232</li> <li>◆ Asynchronous RS-422</li> <li>◆ Synchronous RS-422</li> </ul>
Serial data ports 4–6 (RJ45 connector)	Connects equipment to the SAM in one of two modes: <ul style="list-style-type: none"> <li>◆ Asynchronous RS-232</li> <li>◆ Asynchronous RS-422</li> </ul>
Serial data ports 7–10 (RJ45 connector)	Connects equipment to the SAM in one mode: <ul style="list-style-type: none"> <li>◆ Asynchronous RS-232</li> </ul>
10BaseT port (RJ45 connector)	Connects to a local 10BaseT Hub

**Note** Internal jumpers set in the factory determine the external serial data port electrical interface.

## Before Hooking Up the SAM

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**Overview** Your OmniRemote™ has been custom-built and is shipped to you fully assembled. Before you hook up the SAM, you must:

- ◆ Review all safety information. See Chapter 2, “Safety Information,” of the *Shelf Installation Manual*.
- ◆ Gather the required tools/equipment.

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**Tools/Equipment Required** You will need the following tools and equipment to hook up the SAM:

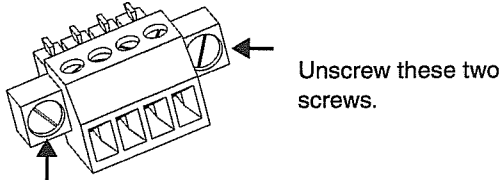
- ◆ Small flathead screwdriver
  - ◆ 16- to 22-gauge, solid or stranded insulated wire
  - ◆ 3/32” slotted screwdriver
  - ◆ Up to 10 RJ45 connectors
  - ◆ One connector for each network element, as required by that device
  - ◆ CAT 5 cable or 8-wire flat cable
  - ◆ Commercial 10BaseT RJ45 connector and cable assembly
-

# Hooking Up the SAM

**Overview** To hook up the SAM, you must perform the following steps:

- ◆ Connect the power.
- ◆ Test the SAM LEDs.
- ◆ Make the external communication connections.
- ◆ Test the serial data ports.

**Connecting the Power** If the OmniRemote is not already powered on, perform the steps below.  
To connect the power:

Step	Action
1	Use a small flathead screwdriver to remove the male part of the power connector from the rear panel of the OmniRemote.  
2	If the power connector is not already wired, use 16- to 22-gauge, solid or stranded insulated wire to connect the Battery power (#2) and Battery return (#3) ports on the power connector to your power source.  Use a 3/32" slotted screwdriver to tighten the flathead terminal screws.
3	Use a small flathead screwdriver to screw the power connector back on the rear panel of the OmniRemote.
4	Continue with "Testing the SAM LEDs" below.

## Testing the SAM LEDs

To test the SAM LEDs:

Step	Action
1	Press LAMP TEST once.  All of the SAM LEDs should illuminate: <ul style="list-style-type: none"> <li>◆ Serial data ports 1–10 (green)</li> <li>◆ ETHERNET RX (green)</li> <li>◆ ETHERNET TX (green)</li> <li>◆ READY (green)</li> </ul>
2	<b>IMPORTANT</b> If any of the SAM LEDs do not illuminate during the Lamp Test, contact Technical Support. See "Technical Support" on page 1-5.
3	Continue with "Making the External Communication Connections" on page 3-9.



## Making the External Communication Connections

To make the external communication connections for the SAM:

Step	Action
1	Make sure the power connector is disconnected (see step 1 of "Connecting the Power" on page 3-8).  <b>IMPORTANT</b> Disconnecting the power connector ensures the power will be turned off while you make all required communication connections.
2	Connect RJ45 connectors into serial data ports 1–10, as appropriate. See "Pin Designations" on page 3-11 for the exact pin designations.
3	If you are using the 10BaseT hub, connect an RJ45 connector into the 10BaseT port.
4	Power on the OmniRemote (see steps 2 and 3 of "Connecting the Power" on page 3-8).
5	Use the DAD Control application and the DAD software to provision and download the SAM. Refer to the <i>DAD Provisioner's Manual</i> .
6	Continue with "Testing the Serial Data Ports" on page 3-10.

The following connections should have already been made during the shelf installation process:

- ◆ The Data Port Shelf DB25 serial interface (Channel A)

and/or

- ◆ The RJ12 phone interface (Channel B)

---

## Testing the Serial Data Ports

To test the serial data ports:

Step	Action
1	Connect each end of an RJ45 serial cable to any two SAM ports that you wish to test.  <b>Note</b> A null modem is required between the cable and one of the SAM ports.
2	Run the DAD Control application for the PC; connect and log onto this SAM. Refer to the <i>DAD Provisioner's Manual</i> for detailed instructions.
3	Select the flow construct display and create a TESTIO input/output service for the two ports that you are testing. Enable each TESTIO.
4	Create a TESTLOG connected to each TESTIO. Observe data being received in the log. Observe the corresponding serial port LEDs blinking.
5	Repeat this procedure as required for additional serial data port testing.
6	<b>IMPORTANT</b> Remember to delete all TESTIO and TESTLOG components before provisioning your SAM.

---

## Pin Designations

**RJ45 Ports 1–10** Each of the 10 serial data ports provide the following DCE signals on their RJ45 connectors:

Signal	Direction		RJ45 Pin
	Asynchronous RS-232	Asynchronous and Synchronous RS-422	
Txd	Out	—	4
Rxd	In	—	5
RTS/Sync. Clock –	Out	In	1
CTS/Sync. Clock/Sync. Clock +	In	In	8
DTR	Out	—	2
DSR	In	—	7
Ground	Ground	Ground	3, 6
TX+	—	Out	4
TX–	—	Out	2
RX+	—	In	5
RX–	—	In	7

## What Next?

### Complete Installation Procedures

The table below lists the procedures required to completely install an OmniRemote. You have just completed Procedure No. 2. See the table for instructions on what to do next.

No.	Procedure	What Next?
1	Install the OmniRemote Shelf into the rack, connect the power, and connect the primary host communications.	You have completed this procedure. See Procedure No. 2 below.
2	Hook-up the OmniRemote SAM.	You have completed this procedure. See Procedure No. 3 below.
3	<b>Optional</b> Hook-up the OmniRemote BAM, RAM-DP, or RAM-SP.	Refer to the following, as appropriate: ◆ <i>BAM Installation Manual</i> ◆ <i>RAM-DP Installation Manual</i> ◆ <i>RAM-SP Installation Manual</i>
4	Provision the BAM and/or SAM configuration variables.	Refer to the following, as appropriate: ◆ <i>DAD Provisioner's Manual</i> ◆ <i>DAD/BAM Application Notes</i> ◆ <i>Other DAD Application Notes</i>

# *Troubleshooting*

---

# A

## Appendix Summary

**In this Chapter** The following topics are covered in this chapter:

---

<b>Topic</b>	<b>See Page</b>
Observations	A-2
Replacing the Lithium Battery	A-3

---

# Observations

**Observations Table** Use this table if you are having problems hooking up the SAM.

TBD

Observation	Possible Cause	Recommended Action
?	The lithium battery is dead.	Replace the battery. See "Replacing the Lithium Battery" on page A-3.

## Replacing the Lithium Battery

**Overview** To replace the lithium battery, you must perform the following steps:

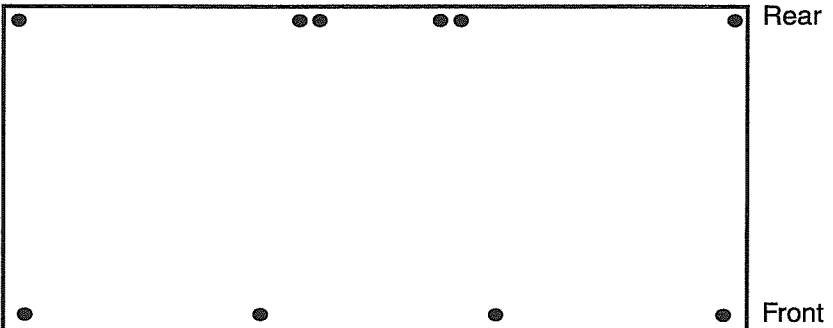
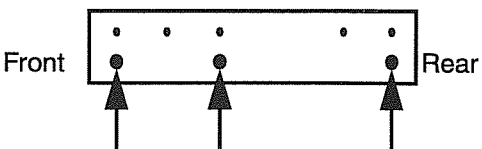
- ◆ Remove the chassis cover.
- ◆ Replace the battery.

**! WARNING !** Wear a grounding wrist strap while performing these procedures.

**Note** Removal of the lithium battery destroys the date/time setting and the DAD permanent log files. Contact Technical Support if you require backup of your log files (see "Technical Support" on page 1-5). After power-on of the OmniRemote™, you must run the DAD Control GUI to reset the date/time setting.

### Removing the Chassis Cover

To remove the chassis cover:

Step	Action
1	<p>Make sure all of your external communications and power cables are labeled, then disconnect all of these cables from the OmniRemote.</p> <p><b>Note</b> You will need a small flathead screwdriver to remove the flathead terminal screws.</p>
2	<p>Unscrew the two mounting brackets from the mounting rack. Remove the OmniRemote from the mounting rack and place it on a workbench.</p>
3	<p>Use a #2 Phillips screwdriver to:</p> <p>a. Remove all 10 screws from the top of the chassis cover.</p>  <p>b. Remove the bottom three screws on each side of the chassis cover.</p> 
4	<p>Remove the chassis cover and set it aside.</p>
5	<p>Continue with "Replacing the Battery" on page A-4.</p>

## Replacing the Battery

To replace the lithium battery:

Step	Action
1	Cut the battery tiedown and remove the old lithium battery.
2	Insert the new lithium battery into the battery holder. <b>Note</b> Align the positive and negative battery ends according to the labels on the battery holder.
3	Replace the OmniRemote's chassis cover. Use a #2 Phillips screwdriver to: a. Re-insert all 10 screws on the top of the chassis cover. b. Re-insert the bottom three screws on each side of the chassis cover.
4	Place the OmniRemote back in the mounting rack and screw on the mounting brackets.
5	Reconnect all of your external communications and power cables. See Chapter 3, "SAM Hook-Up," for instructions on making the external connections for the SAM.
6	Dispose of the old lithium battery according to the proper hazardous waste procedures.



# *Installing a SAM*

---

# B

## Appendix Summary

**In this Appendix** The following topics are covered in this appendix:

---

<b>Topic</b>	<b>See Page</b>
Before Installing a SAM	B-2
Installing a SAM	B-3
SAM Jumper and Dipswitch Settings	B-7

---

## Before Installing a SAM

---

**Overview** You may wish to customize your OmniRemote™ by installing a Serial Alarm Module (SAM). Before continuing with these procedures, you must:

- ◆ Review all safety information. See Chapter 2, "Safety Information," of the *Shelf Installation Manual*.
- ◆ Gather the required tools/equipment.

---

**Tools/Equipment Required** You will need the following tools and equipment to perform these procedures:

- ◆ Grounding wrist strap
  - ◆ Small flathead screwdriver
  - ◆ An appropriate screwdriver for the four screws holding the mounting brackets to your mounting rack
  - ◆ #2 Phillips screwdriver
  - ◆ Four #6 panhead screws (provided in the SAM kit)
  - ◆ Four #256 (1/4-inch) panhead screws (provided in the SAM kit)
-

# Installing a SAM

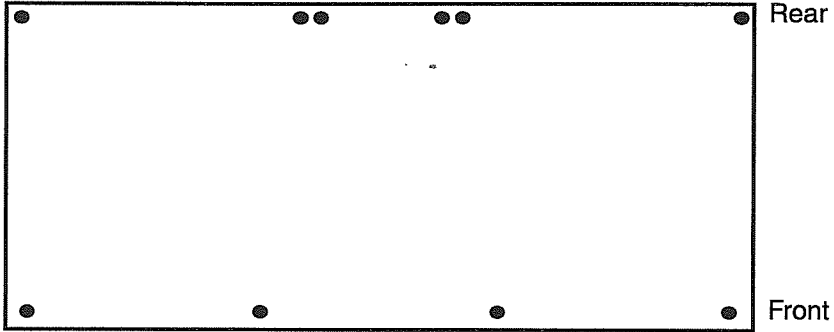
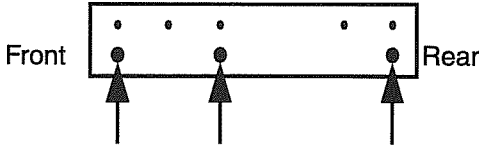
**Overview** To install a SAM, you must perform the following steps:

- ◆ Remove the chassis cover.
- ◆ Disassemble the OmniRemote.
- ◆ Connect a SAM.
- ◆ Re-assemble the OmniRemote.

**! WARNING !** Wear a grounding wrist strap while performing these procedures.

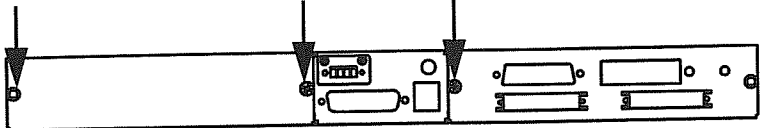
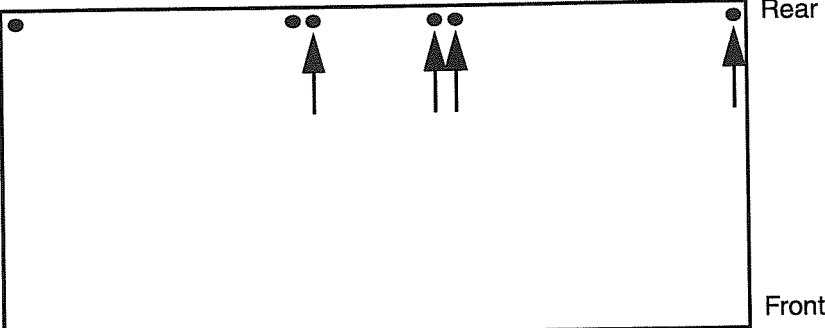
## Removing the Chassis Cover

To remove the chassis cover:

Step	Action
1	<p>Make sure all of your external communications and power cables are labeled, then disconnect all of these cables from the OmniRemote.</p> <p><b>Note</b> You will need a small flathead screwdriver to remove the flathead terminal screws.</p>
2	<p>Unscrew the two mounting brackets from the mounting rack. Remove the OmniRemote from the mounting rack and place it on a workbench.</p>
3	<p>Use a #2 Phillips screwdriver to:</p> <p>a. Remove all 10 screws from the top of the chassis cover.</p>  <p>b. Remove the bottom three screws on each side of the chassis cover.</p> 
4	<p>Remove the side mounting brackets.</p> <p>You may not have to do this. I think you can remove the chassis cover and leave the mounting brackets in place.</p>
5	<p>Remove the chassis cover and set it aside.</p>
6	<p>Continue with "Disassembling the OmniRemote" on page B-4.</p>

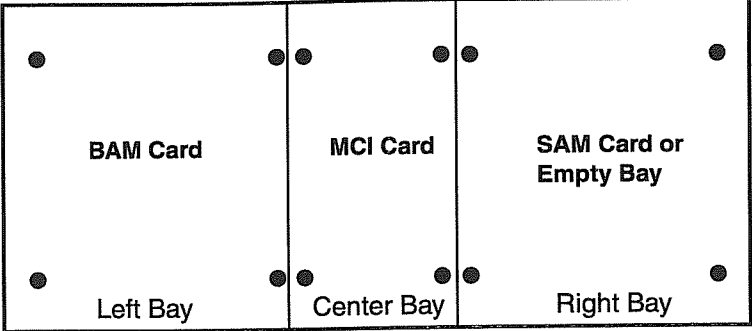
**Disassembling the OmniRemote**

To disassemble the OmniRemote:

Step	Action
1	<p>Use a #2 Phillips screwdriver to remove:</p> <ul style="list-style-type: none"> <li>◆ Two screws on either side of the MCI card rear panel face</li> <li>◆ One screw on the empty bay rear panel face</li> </ul> 
2	<p>Use a #2 Phillips screwdriver to remove:</p> <ul style="list-style-type: none"> <li>◆ Two screws from the MCI card rear panel bottom</li> <li>◆ Two screws from the empty bay rear panel bottom</li> </ul> 
3	Remove the empty bay rear panel.
4	<p>Remove the MCI card rear panel and set it aside.</p> <p><b>IMPORTANT</b> Leave the MCI card in place. Do not disconnect any cables from the MCI card.</p>
5	Continue with "Connecting a SAM" on page B-5.

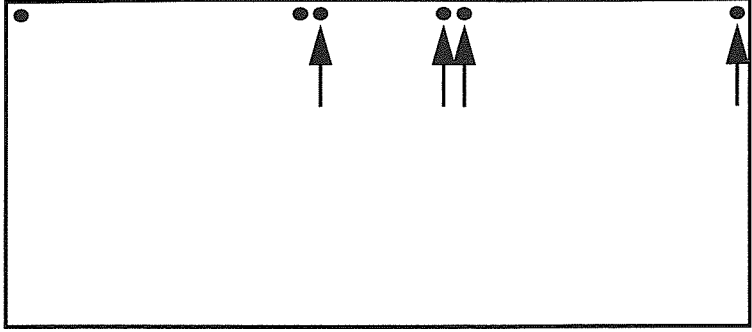
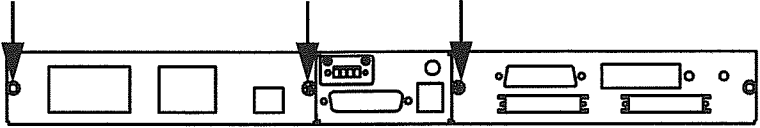
## Connecting a SAM

To connect a SAM:

<p><b>1</b></p>	<p>Insert the SAM card in the empty bay, placing the holes in the SAM card over the standoffs in the chassis. Use a #2 Phillips screwdriver to insert four #6 panhead screws into the standoffs.</p> <div style="text-align: center;">  </div> <p><b>Note</b> The BAM is usually installed in the left bay and the SAM is usually installed in the right bay (when the front of the OmniRemote is facing you).</p>															
<p><b>2</b></p>	<p>Verify the SAM jumper settings and correct them if necessary. See "SAM Jumper and Dipswitch Settings" on page B-7.</p>															
<p><b>3</b></p>	<p>Connect the white power cable harness from the SAM to the MCI card.</p> <table border="1" data-bbox="613 919 1471 1100"> <thead> <tr> <th>If the...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>SAM card is in the right bay,</td> <td>the white cable goes from the J2 serial port on the SAM to the J4 serial port on the MCI card.</td> </tr> <tr> <td>SAM card is in the left bay,</td> <td>the white cable goes from the J4 serial port on the SAM to the J2 serial port on the MCI card.</td> </tr> </tbody> </table>	If the...	Then...	SAM card is in the right bay,	the white cable goes from the J2 serial port on the SAM to the J4 serial port on the MCI card.	SAM card is in the left bay,	the white cable goes from the J4 serial port on the SAM to the J2 serial port on the MCI card.									
If the...	Then...															
SAM card is in the right bay,	the white cable goes from the J2 serial port on the SAM to the J4 serial port on the MCI card.															
SAM card is in the left bay,	the white cable goes from the J4 serial port on the SAM to the J2 serial port on the MCI card.															
<p><b>4</b></p>	<p>Connect the communications cable from the SAM to the MCI card and, if applicable, to the BAM.</p> <table border="1" data-bbox="613 1205 1471 1642"> <thead> <tr> <th>If the...</th> <th>And you...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>SAM card is in the right bay</td> <td>do not have a BAM card,</td> <td>the blue ribbon cable goes from the J1 serial port on the SAM to the J10 serial port on the MCI card.</td> </tr> <tr> <td>SAM card is in the right bay</td> <td>do have a BAM card,</td> <td>the blue Y-cable goes from the J9 serial port on the SAM to the J1 serial port on the BAM.</td> </tr> <tr> <td>SAM card is in the left bay</td> <td>do not have a BAM,</td> <td>the blue ribbon cable goes from the J6 serial port on the SAM to the J9 serial port on the MCI card.</td> </tr> <tr> <td>SAM card is in the left bay</td> <td>do have a BAM,</td> <td>the blue Y-cable goes from the J9 serial port on the SAM to the J6 serial port on the BAM.</td> </tr> </tbody> </table> <p><b>Note</b> The red edge of the ribbon cable always faces the front of the chassis.</p>	If the...	And you...	Then...	SAM card is in the right bay	do not have a BAM card,	the blue ribbon cable goes from the J1 serial port on the SAM to the J10 serial port on the MCI card.	SAM card is in the right bay	do have a BAM card,	the blue Y-cable goes from the J9 serial port on the SAM to the J1 serial port on the BAM.	SAM card is in the left bay	do not have a BAM,	the blue ribbon cable goes from the J6 serial port on the SAM to the J9 serial port on the MCI card.	SAM card is in the left bay	do have a BAM,	the blue Y-cable goes from the J9 serial port on the SAM to the J6 serial port on the BAM.
If the...	And you...	Then...														
SAM card is in the right bay	do not have a BAM card,	the blue ribbon cable goes from the J1 serial port on the SAM to the J10 serial port on the MCI card.														
SAM card is in the right bay	do have a BAM card,	the blue Y-cable goes from the J9 serial port on the SAM to the J1 serial port on the BAM.														
SAM card is in the left bay	do not have a BAM,	the blue ribbon cable goes from the J6 serial port on the SAM to the J9 serial port on the MCI card.														
SAM card is in the left bay	do have a BAM,	the blue Y-cable goes from the J9 serial port on the SAM to the J6 serial port on the BAM.														
<p><b>5</b></p>	<p>Continue with "Re-assembling the OmniRemote" on page B-6.</p>															

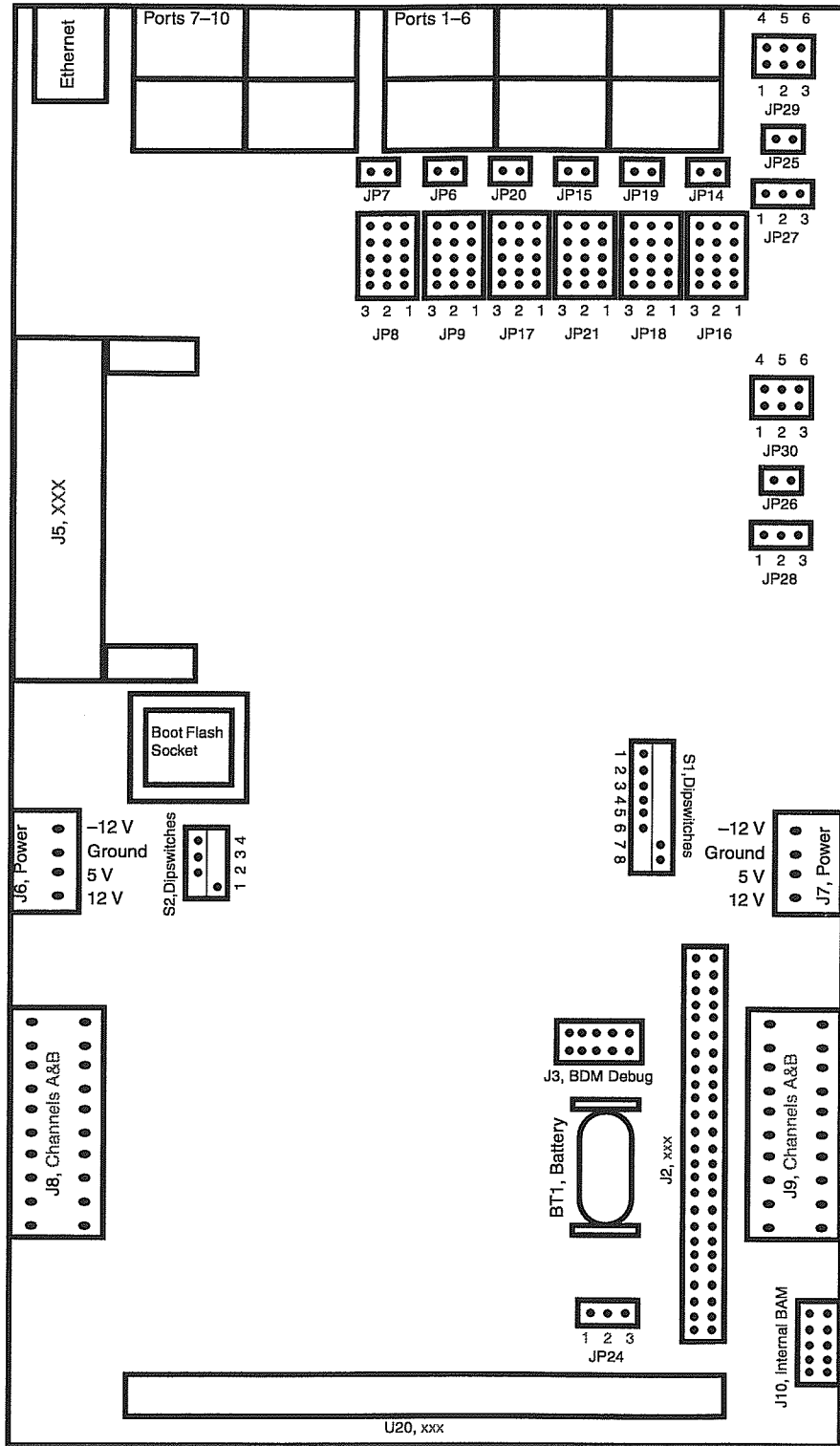
## Re-assembling the OmniRemote

To re-assemble the OmniRemote:

<p><b>1</b></p>	<p>Use a #2 Phillips screwdriver to attach:</p> <ul style="list-style-type: none"> <li>◆ Two screws to the MCI card rear panel bottom</li> <li>◆ Two screws to the SAM card rear panel bottom</li> </ul> 
<p><b>2</b></p>	<p>Use a #2 Phillips screwdriver to attach:</p> <ul style="list-style-type: none"> <li>◆ Two screws to either side of the MCI card rear panel face</li> <li>◆ One screw to the SAM rear panel face</li> </ul> 
<p><b>3</b></p>	<p>Replace the OmniRemote's chassis cover. Use a #2 Phillips screwdriver to:</p> <ol style="list-style-type: none"> <li>a. Re-insert all 10 screws on the top of the chassis cover.</li> <li>b. Re-insert the bottom three screws on each side of the chassis cover.</li> </ol>
<p><b>4</b></p>	<p>Re-attach the side mounting brackets.</p> <p>You may not have to do this. I think you can remove the chassis cover and leave the mounting brackets in place.</p>
<p><b>5</b></p>	<p>Place the OmniRemote back in the mounting rack and screw on the mounting brackets.</p>
<p><b>6</b></p>	<p>Reconnect all of your external communications and power cables. See Chapter 3, "SAM Hook-Up," for instructions on making the external connections for the SAM.</p>
<p><b>7</b></p>	<p>The front panel Lexan may need to be replaced. The Lexan can be difficult to remove and factory service may be required. Contact Technical Support; see "Technical Support" on page 1-5.</p>

# SAM Jumper and Dipswitch Settings

## SAM Card Diagram



**RS-232 Jumper Selection**

Port	Jumper	Pin		
		3	2	1
5	JP8	●	●	●
6	JP9	●	●	●
3	JP17	●	●	●
4	JP21	●	●	●
1	JP18	●	●	●
2	JP16	●	●	●

**RS-422 Jumper Selection**

Port	Jumper	Pin		
		3	2	1
5	JP8	●	●	●
6	JP9	●	●	●
3	JP17	●	●	●
4	JP21	●	●	●
1	JP18	●	●	●
2	JP16	●	●	●

**Termination**

If any of the following ports are at the end of the communication line, they must be terminated or line noise will result.

Port	Jumper	Pin	
		1	2
5	JP7		
6	JP6		
3	JP20		
4	JP15		
1	JP19		
2	JP14		



---

**Dipswitches** The dipswitch settings for normal operation are shown below.

**S1 Dipswitches**

Dipswitch	OFF	ON
1	●	
2	●	
3	●	
4	●	
5	●	
6	●	
7		●
8		●

**S2 Dipswitches**

Dipswitch	ON	OFF
4	Unused	
3		
2		
1		
		●

**RS-422 Ports 1 and 2 Jumpers**

Ports 1 and 2 provide limited Synchronous RS-422 connections for:

- ◆ TX
- ◆ RX
- ◆ Clock

If you require full RS-422 connections, use the Channel A port on the MCI card.

For the Synchronous RS-422 clock, the Port 1 and Port 2 jumpers are set as shown below.

**Port 1 Jumpers**

Jumper	Pin		
	4	5	6
JP30	●	●	●
	●	●	●
	1	2	3
	1	2	
JP26*			
	1	2	3
JP28	●	●	●

\* JP26 is the Synchronous RS-422 clock termination.

**Port 2 Jumpers**

Jumper	Pin		
	4	5	6
JP29	●	●	●
	●	●	●
	1	2	3
	1	2	
JP25*			
	1	2	3
JP27	●	●	●

\* JP25 is the Synchronous RS-422 clock termination.

Correct?

**RS-232 Ports 1 and 2  
Jumpers**

Should this section be included? If so, please correct.

**Port 1 Jumpers**

Jumper	Pin		
	4	5	6
JP30			
	1	2	3
	1	2	
JP26			
	1	2	3
JP28			

**Port 2 Jumpers**

Jumper	Pin		
	4	5	6
JP29			
	1	2	3
	1	2	
JP25			
	1	2	3
JP27			

# *Software*

# C

---

## Appendix Summary

**In this Appendix** The following topics are covered in this appendix:

<b>Topic</b>	<b>See Page</b>
Before You Begin	C-2
Downloading the DAD Software	C-3
Burning the Flash Boot Monitor Code	C-4

TBD

---

## Before You Begin

---

**Overview** Anything here?

- ◆ Downloading the Data Acquisition Device (DAD) software
- ◆ Burning the Flash Boot Monitor code

---

**Tools/Equipment Required** To download the DAD software, you will need the following:

- ◆
- ◆

To burn the Flash Boot Monitor code, you will need the following:

- ◆
  - ◆
  - ◆
-

# Downloading the DAD Software

Overview TBD

## Downloading the DAD Software

To download the DAD software:

Step	Action
1	
2	
3	
4	
5	
6	
7	
8	

# Burning the Flash Boot Monitor Code

**Overview** Copied this section from the BAM manual. Needs to be changed for the SAM.

## Burning the Flash Boot Monitor Code

**Note** Refer to the diagram on page C-xx to see the SAM card in xx mode.

To burn the Flash Boot Monitor code:

Step	Action
1	Connect the programmer board to J7 on the BAM card.
2	Change the jumper settings to the Flash Program mode: <ul style="list-style-type: none"><li>◆ JP6 is 1–2.</li><li>◆ JP7 is 2–3.</li></ul>
3	Start the HiFLASH program. Select <b>Quick Flash</b> , then <b>MCU model H8/3048FI</b> , and set the following: <ul style="list-style-type: none"><li>◆ Clock frequency range: <math>\geq 16</math> MHz</li><li>◆ Data rate: <b>9600</b></li></ul> <b>HS0008EASFIH/I?</b>
4	Select the file <b>Bam_sw.mot</b> and set the following: <ul style="list-style-type: none"><li>◆ Address offset: <b>H'0</b></li><li>◆ Lowest address: <b>H'0</b></li><li>◆ Highest address: <b>H'1FFFF</b></li></ul>
5	Press <b>S2</b> (start/stop button) on the programmer board.
6	Click <b>Next</b> to start burning the code.
7	When you have finished, change the jumper settings to the normal operating mode: <ul style="list-style-type: none"><li>◆ JP6 is 2–3.</li><li>◆ JP7 is 1–2.</li></ul>

Badger Technology, Inc.  
1423 South Milpitas Boulevard  
Milpitas, California 95035-6828