REMOTE DIAGNOSTICS INSTALLATION AND OPERATION

System 1000 Series

MANUAL REVISION HISTORY

System 1000 Series Remote Diagnostics Installation and Operation (2549257-0001)

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1 INTRODUCTION

Purpose

1.1 Remote Diagnostics (RD) for the Texas Instruments System 1000 Series minicomputers is designed to enhance the ability of TI Field Service to provide rapid problem diagnosis and resolution to customers who have a TI Service Maintenance Agreement.

When an RD customer places a service call with TI, an automated message notification system is activated that alerts TI-CARE[SM] Support Services (TSS) of the service call initiation. Within a short time, a TI engineer contacts the customer to begin investigation of the problem.

Major System Faults

1.2 In cases where a major system failure occurs that prevents system operation, the customer is instructed by the TSS engineer to place the RD access device in Remote Console mode. This action disconnects the local on-site system maintenance terminal from the system and connects the 1200-baud dial-up modem in its place. The TI engineer at the service center can then dial into the computer system using a terminal that acts as a remote system maintenance terminal.

Once the remote connection is made, the system can be rebooted from the remote system maintenance terminal to provide information relating to the system power-on self-tests, the operating system, and the remote system diagnostics.

Within a few minutes, the system fault can be isolated to a system subassembly, and the service call ticket can be updated with the outcome of the remote diagnostic analysis. This ticket update will include the failed subassembly and any special considerations that the customer representative (CR) should know prior to being dispatched on the service call.

Minor System Faults

1.3 In the event the customer perceives a system-related problem that is not conclusively due to a hardware malfunction, RD can be executed for system hardware verification. Remote hardware verification will require the system to be shut down to allow rebooting and execution of the system diagnostics.

The system administrator will be required to have all TI System V users log off the system, and perform a system shutdown to bring the operating system into the single-user state. Once this has occurred, the administrator places the RD access device into the Remote Console mode. This action allows the TI engineer to dial in to the computer, reboot the system, and run hardware verification from the remote system maintenance terminal.

Upon conclusion of the remote hardware verification, the TI engineer can recommend a course of action for the customer.

TI-CARE is a service mark of Texas Instruments Incorporated.

Major TI System V Problems

1.4 Customers who have a Software Support Agreement with TSS can also have TI System V operating system problems diagnosed and repaired via RD. Major problems require that the users log off and that the system be shut down so the TI engineer can dial in as the remote system maintenance terminal. The customer's backup tapes, original operating system tapes, and other backup information must also be available. Working closely with the customer's system administrator will allow the TI engineer to diagnose and repair a wide range of major operating system problems.

Minor TI System V Problems

1.5 Most minor TI System V problems such as updates and configurations can be diagnosed and repaired through RD without taking the computer system down. On systems covered by a TSS Software Support Agreement, the TI engineer dials in to the computer through a standard dial-up port and interacts with the system as a user, rather than as the administrator.

TI System V Security

1.6 Access to the TI System V operating system and the resident file systems on the System 1000 Series family is controlled through user IDs and passwords. When the Remote Diagnostics access device is in the Console mode, the dial-up facility is directed to a standard TI System V port. Access to the operating system through this dial-up port is controlled as with any other standard TI System V port—through user IDs and associated passwords. Further restricted access control for the standard TI System V dial-up facility can be obtained by disconnecting the phone line from the modem, or by simply ensuring that the modem is powered off.

The Remote Diagnostics access device is normally key-locked in the Console mode. Activation of the Remote Console mode requires that a key be inserted into the lock mechanism and the lock be manually switched to the Remote Console position. The key can be removed from the lock mechanism only in the Console position.

When the Remote Diagnostics access device is switched to the Remote Console mode, a dial-up terminal becomes the remote system maintenance terminal. Access to the TI System V operating system is still controlled by user IDs and associated passwords. TI recommends that the system administrator user ID (root) always have an associated password.

Prior to initiating a remote diagnostic session that will require access to the TI System V operating system, the system administrator must provide the TI representative with a password for the root user ID.

NOTE: TI recommends that the system administrator modify the password associated with the root user ID prior to and immediately following any remote diagnostic session that involves access to the TI System V operating system.

During a remote diagnostic session that involves access to the TI System V operating system, the TI representative will have access to all mass storage media installed on the System 1000 Series computer system.

Customers who have classified or sensitive data should ensure that file systems with such data are physically located on disk drives other than the system disk. Locating sensitive data on a disk other than the system disk will permit isolation of those file systems from remote access while still allowing the TI representative access to the operating system and system disk for remote maintenance and repair.

Access to classified or sensitive data can be restricted by ensuring that file systems containing classified or sensitive data are unmounted and that power is removed from the respective mass storage devices prior to allowing remote access to the system. Power must not be removed from the system disk.

A Powerful Service Tool

1.7 TI System 1000 Series Remote Diagnostics provides a powerful service tool that will help to minimize the customer's system downtime. In many cases, the system problem can be corrected in a matter of minutes from a remote location; this saves the customer downtime waiting for a CR to arrive. In cases where an on-site visit by a TI customer representative is required, RD helps ensure that the CR has the correct spare parts to efficiently implement corrective action.

2 THEORY OF OPERATION

System Types

2.1 The System 1000 Series product line includes two types of systems that Remote Diagnostics (RD) will run on:

- NuBus™ systems (System 1500)
- IBM® AT® bus-based systems, which include the Systems 1000, 1100, 1200, 1300, SP1000, and the BUSINESS-PRO™.

NOTE: Remote Diagnostics works *only* on AT-bus systems that are configured with a serial terminal as the system maintenance terminal. Remote Diagnostics *will not work* with any system that has an internal video adapter (controller) and monitor.

The rest of this manual describes the operation of Remote Diagnostics on these two system types. As each operation is described, the NuBus system version will be covered first, followed by the AT bus-based version.

Remote Diagnostics Access Device

2.2 The Remote Diagnostics access device is a mechanical switching assembly that allows for the simultaneous connection of two terminal type devices to System 1000 Series computer using an exclusive-OR logical switching function. This allows either the local system maintenance terminal or a remote console to be connected as the system maintenance terminal, but not both at the same time.

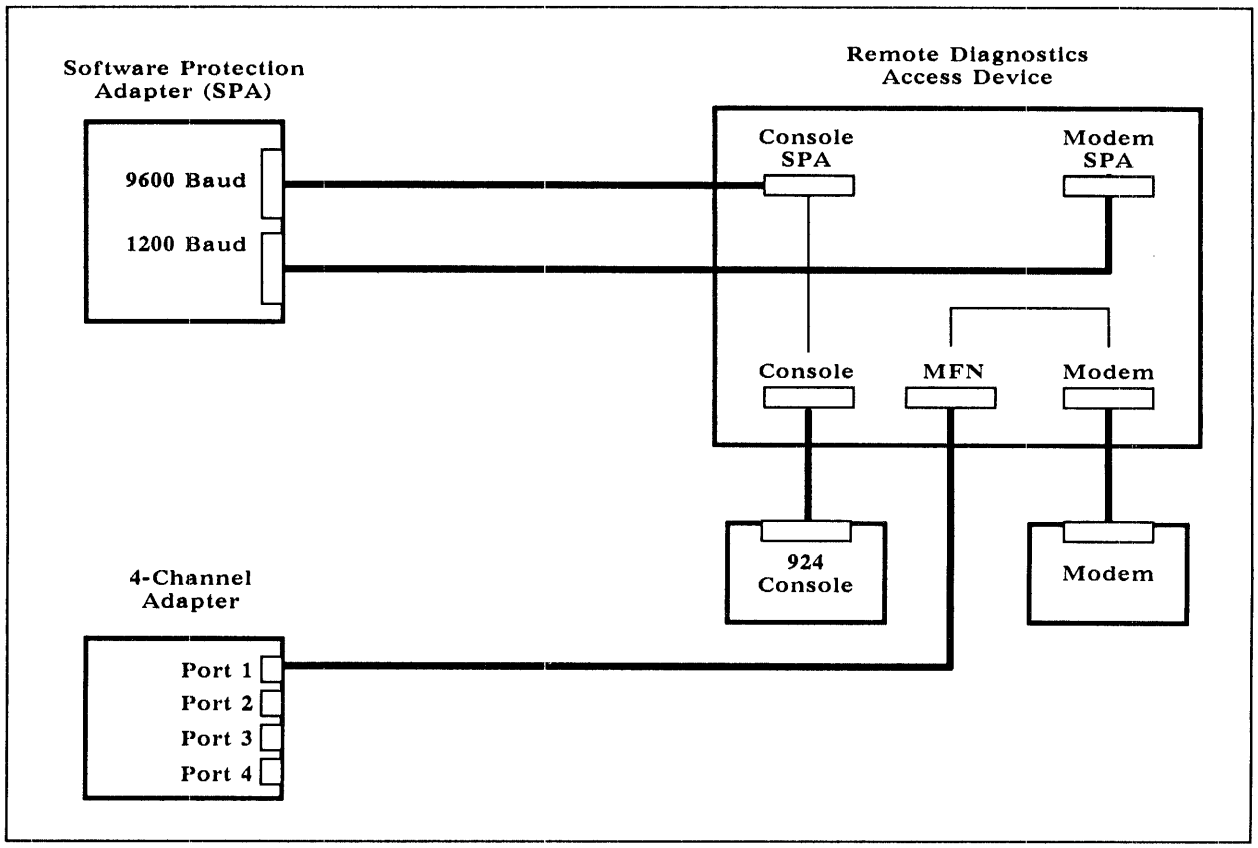
NuBus and BUSINESS-PRO are trademarks of Texas Instruments Incorporated.

IBM and AT are registered trademarks of International Business Machines Corporation.

NuBus Access Device in Console Mode

2.2.1 When the access device is in the normal Console position on a NuBus system, the 9600-baud port of the Software Protection Adapter (SPA) is routed to the Console connector on the access device, as shown in Figure 2-1. This provides the system with a connection to the local system maintenance terminal. While in the Console position, the modem connection is routed back out through the multifunction (MFN) connector of the access device. This connection provides the facilities for a standard TI System V dial-in port using a 4- or 8-channel communications option or a multifunction option installed on a communications carrier board (CCB). This capability allows the telephone line and RD modem to be used for standard dial-in communications when not in use for RD purposes.

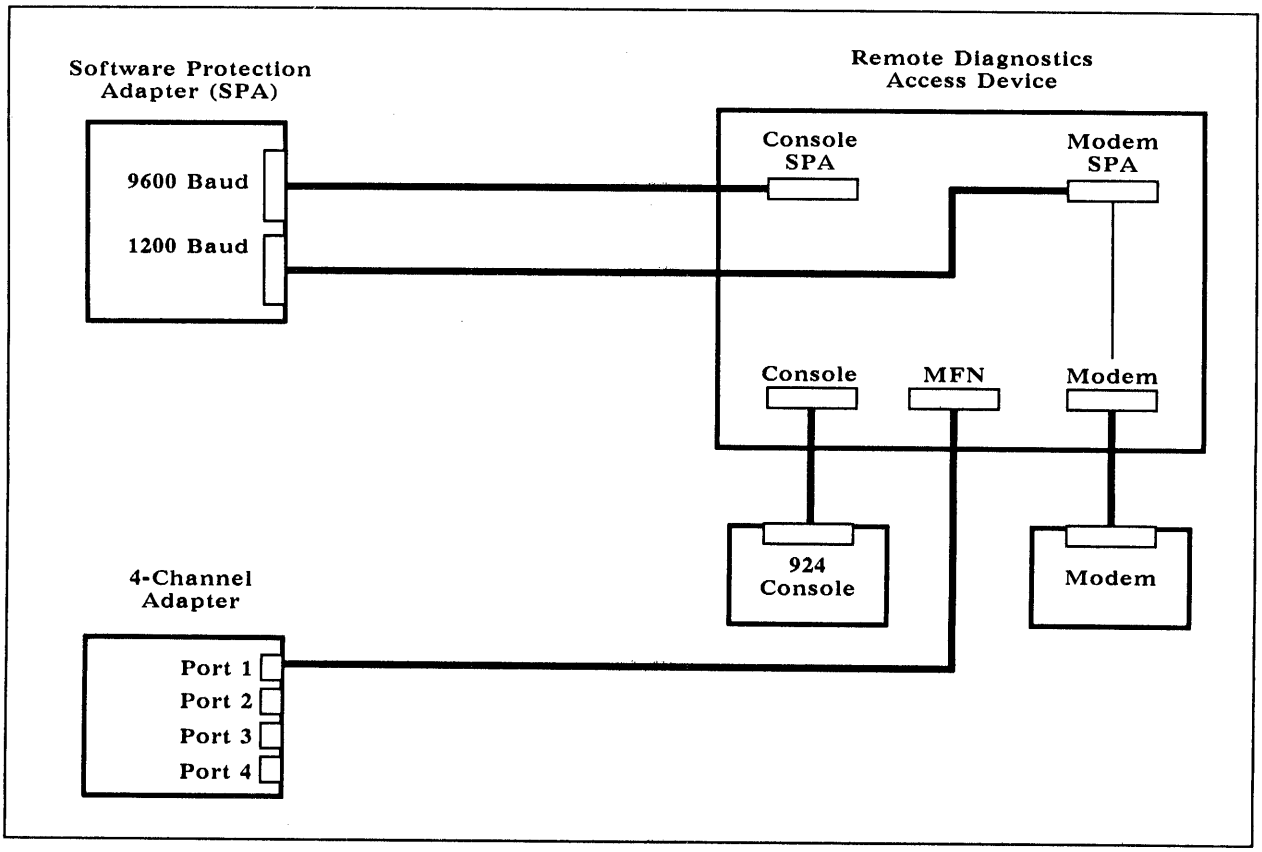
Figure 2-1 Access Device Connected to the Local Console (NuBus System)



NuBus Access Device in Remote Console Mode

2.2.2 When the access device is switched to the Remote Console position on a NuBus system, the connection between the 9600-baud port of the SPA and the MFN connector on the access device is broken. The modem connector is then routed to the 1200-baud port of the SPA (see Figure 2-2). This allows a remote system maintenance terminal to control the System 1000 Series computer as if it were the local system maintenance terminal.

Figure 2-2 Access Device Connected to the Remote Console (NuBus System)

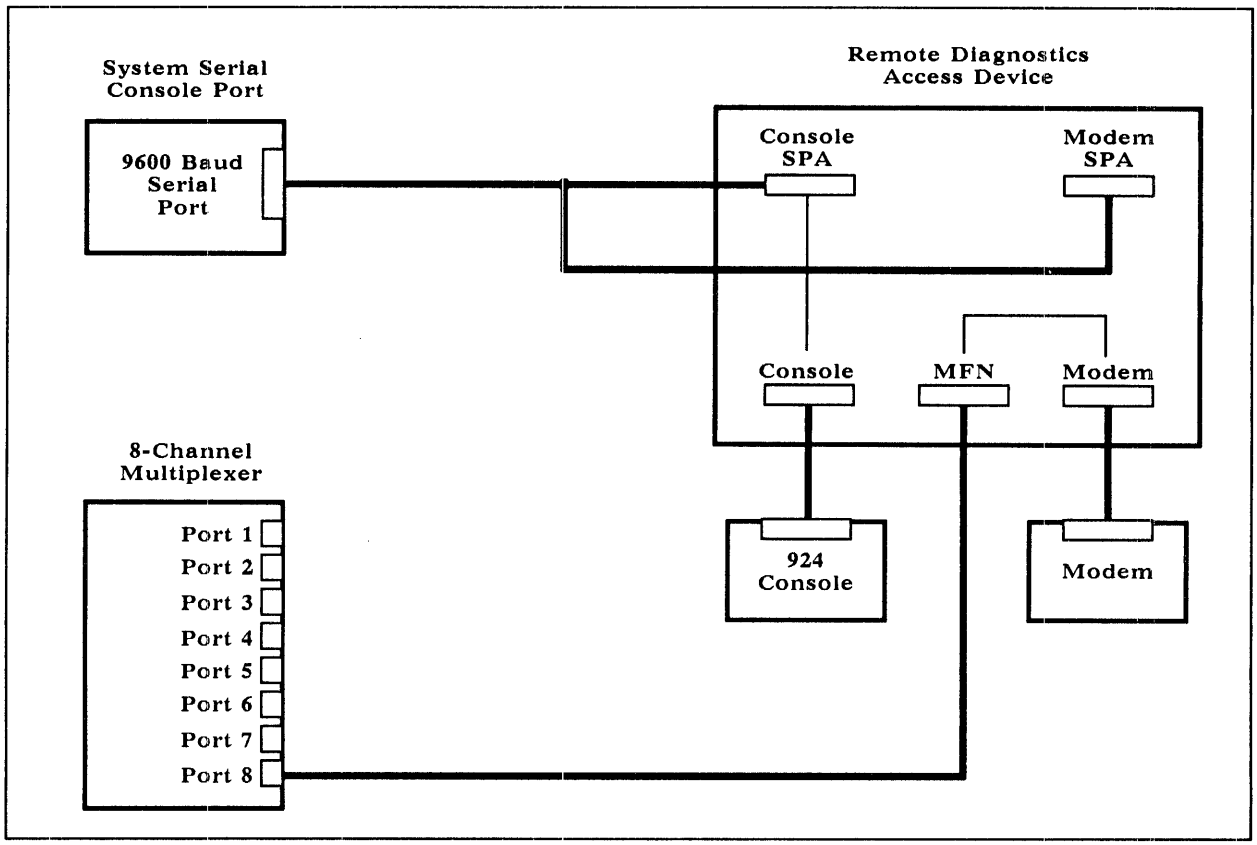


AT-Bus Access Device in Console Mode

2.2.3 When the access device is in the normal Console position on an AT bus-based system, the 9600-baud serial port is routed to the Console connector on the access device, as shown in Figure 2-3. This provides the system with a connection to the local system maintenance terminal. While in the Console position, the modem connection is routed back out through the MFN connector of the access device.

This connection provides the facilities for a standard TI System V dial-in port using either a serial communications option card or a port on the 8-channel multiplexer board. This capability allows the telephone line and RD modem to be used for standard dial-in communications when not in use for RD purposes.

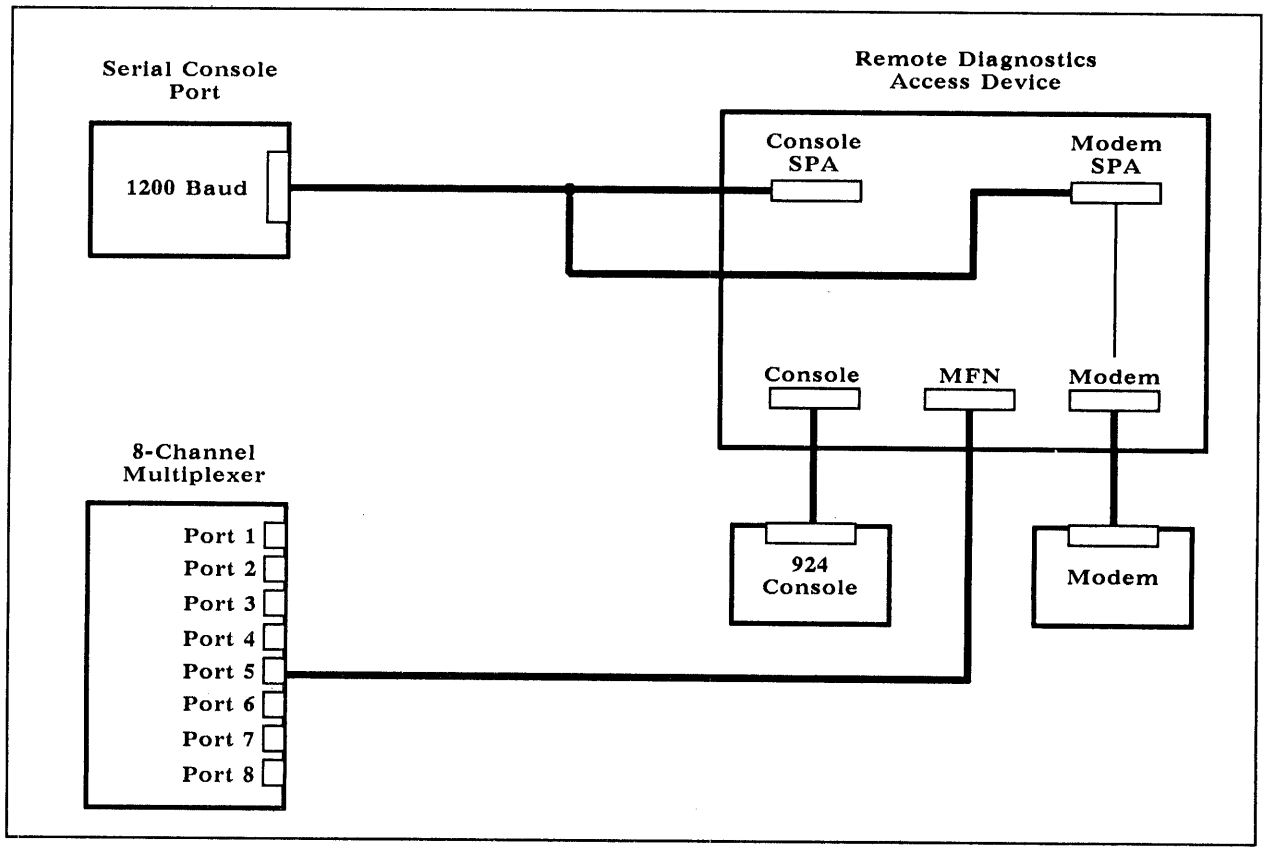
Figure 2-3 Access Device Connected to a Local Console (AT-Bus System)



AT-Bus Access Device in Remote Console Mode

2.2.4 When the access device is switched to the Remote Console position on an AT bus-based system, the connection between the serial port and the MFN connector on the access device is broken. The modem connector is then routed to the serial port (see Figure 2-4). This allows a remote system maintenance terminal to control the System 1000 Series computer as if it were the local system maintenance terminal.

Figure 2-4 Access Device Connected to a Remote Console (AT-Bus System)



Remote Diagnostics Kits

2.3 The Remote Diagnostics hardware for each of the System 1000 Series systems is available in three separate configurations. Each kit contains the Remote Diagnostics access device, cables, and an installation and operation guide. Kits are also available with the required 1200- or 2400-baud modem. Remote Diagnostics kits (without a modem) will be provided to customers who have a current Hardware Maintenance Agreement with Texas Instruments. Other customers who would like to order Remote Diagnostics should contact TI Express at 1-800-847-2787 (1-800-TI-PARTS).

System 1500 Kits:

Remote Diagnostics without modem	2552033-0001
Remote Diagnostics with TI4120 (1200-baud) modem	2552033-0002
Remote Diagnostics with TI4124 (2400-baud) modem	2552033-0003

BUSINESS-PRO Kits:

Remote Diagnostics without modem	2552037-0001
Remote Diagnostics with TI4120 modem	2552037-0002
Remote Diagnostics with TI4124 modem	2552037-0003

System 1000/1100 Kits:

Remote Diagnostics without modem	2552038-0001
Remote Diagnostics with TI4120 modem	2552038-0002
Remote Diagnostics with TI4124 modem	2552038-0003

System 1200/1300/SP1000 Kits:

Remote Diagnostics without modem	2552039-0001
Remote Diagnostics with TI4120 modem	2552039-0002
Remote Diagnostics with TI4124 modem	2552039-0003

TI Modems

2.4 The modems supplied with the RD kits are the TI 4120 (1200-baud external) and the TI 4124 (2400-baud external) modems. These are high-quality, Bell 212A-compatible and Hayes-compatible modems. TI Field Service provides service and support for both of these modems. These modems are also available as standalone units for Remote Diagnostics or other telecommunications requirements.

TI modems can be ordered separately using the following part numbers:

TI 4120, 1200-baud, external modem	2552031-0001
TI 4124, 2400-baud, external modem	2552031-0002

Generic Modems

2.5 Other modems to be used for RD purposes should be 100% Bell 212A-compatible or Hayes-compatible. It is best to use a modem that has external configuration switches (as apposed to software set-up only). The modem also must be capable of unattended auto-answer.

Any modem used for RD purposes must be able to pass a BREAK signal. Testing has shown that most low-cost clone modems do not pass a BREAK signal correctly.

Remote Diagnostics requires only a 1200-baud modem. Higher speed modems that are capable of switching to 1200 baud will also function with Remote Diagnostics.

Telephone Line Requirements

2.6 Customers who want Remote Diagnostics service should order a standard voice-grade, dial-up line from their local phone company that meets the following specifications:

- Single line (not a party line)
- Analog line (not digital)
- Touch-Tone® or rotary
- Modular connection (RJ11 connector)
- Standard telephone handset
- Wall connection within 4 feet.

System V Dial-In Facilities

2.7 As a complement to the Remote Diagnostics capabilities, the Remote Diagnostic access device also provides the facilities for one dial-in port under TI System V (when not in use for RD purposes). This capability allows shared use of the modem and phone lines as a standard dial-in port when the access device is in Console mode.

To utilize the TI System V dial-in port capability of the Remote Diagnostics access device, an asynchronous communications option must be installed on the system.

Communications Options for the NuBus Access Device

2.7.1 Either a 4-channel communications option or a 3-channel multifunction option must be installed on a CCB. The 4-channel option is designed to support up to four full-duplex asynchronous communications channels with full modem support. The 3-channel multifunction option supports one communications port (either synchronous or asynchronous), an external auto-call unit, and one parallel printer port.

An 8-channel communications option will also work in a CCB, but is considered nonstandard and therefore does not have full modem support. The CCB communications option kits are as follows:

Options	Part Number
4-channel async communications kit	2542972-0001
3-channel multifunction communications kit	2542973-0001
8-channel async communications kit	2542971-0001

Touch-Tone is a registered trademark of American Telephone & Telegraph.

Communications Options for the AT-Bus Access Device

2.7.2 The asynchronous communications options that provide serial modem support for AT-bus systems are listed below. If you wish to have the System V dial-in capabilities, one of these options must be present to interface the modem with the system.

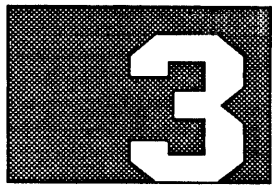
Options	Part Number
Serial/Serial/Parallel Board (SPB)* (required in the SP1000)	2552878-0001
Serial/Parallel Board (STB)* (requires an AT-compatible system)	2550955-0001
CB101 Async/Sync Comm Board (for use on BUSINESS-PRO and Systems 1000/1100/1200/1300; do not use in SP1000)	2240934-0001
CB102 Async/Sync Comm Board (for SP1000)	2240934-0002
CB811 Multiplexer Option	2547042-0001

NOTE:
* These interface boards require the use of a 9-pin to 25-pin serial port cable adapter, part number 2546443-0001.

In Case You Have Problems

2.8 If you have problems with the Remote Diagnostics hardware, please call Texas Instruments Field Service at 1-800-572-3300. Be prepared to give your system serial number when you call.

REMOTE DIAGNOSTICS INSTALLATION



Kit Contents

3.1 The following tables list the hardware contained in the applicable Remote Diagnostics kit for your system. If any items are missing, please contact TI Express at 1-800-847-2787. Have your sales order or contract number ready when you call.

Table 3-1 System 1500 Remote Diagnostics Kit Without Modem (2552033-0001)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
2	Communications cable	2303070-0002
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001

Table 3-2 System 1500 Remote Diagnostics Kit With 1200-Baud Modem (2552033-0002)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
2	Communications cable	2303070-0002
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	TI 4120 1200-baud modem	2552031-0001
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-3 System 1500 Remote Diagnostics Kit With 2400-Baud Modem (2552033-0003)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
2	Communications cable	2303070-0002
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	TI 4124 2400-baud modem	2552031-0002
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-4 BUSINESS-PRO Remote Diagnostics Kit Without Modem (2552037-0001)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	BUSINESS-PRO Remote Diagnostics diskette	2541082-0004
1	XENIX® Remote Access Driver diskette	2541082-0001

Table 3-5 BUSINESS-PRO Remote Diagnostics Kit With 1200-Baud Modem (2552037-0002)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	BUSINESS-PRO Remote Diagnostics diskette	2541082-0004
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4120 1200-baud modem	2552031-0001
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-6 BUSINESS-PRO Remote Diagnostics Kit With 2400-Baud Modem (2552037-0003)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	BUSINESS-PRO Remote Diagnostics diskette	2541082-0004
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4124 2400-baud modem	2552031-0002
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

XENIX is a registered trademark of Microsoft Corporation.

Table 3-7 Systems 1000/1100 Remote Diagnostics Kit Without Modem (2552038-0001)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1000/1100 Remote Diagnostics diskette	2541082-0003
1	XENIX Remote Access Driver diskette	2541082-0001

Table 3-8 Systems 1000/1100 Remote Diagnostics Kit With 1200-Baud Modem (2552038-0002)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1000/1100 Remote Diagnostics diskette	2541082-0003
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4120 1200-baud modem	2552031-0001
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-9 Systems 1000/1100 Remote Diagnostics Kit With 2400-Baud Modem (2552038-0003)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1000/1100 Remote Diagnostics diskette	2541082-0003
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4124 2400-baud modem	2552031-0002
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-10 Systems 1200/1300/SP1000 Remote Diagnostics Kit Without Modem (2552039-0001)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1200/1300/SP1000 Remote Diagnostics diskette	2541082-0002
1	XENIX Remote Access Driver diskette	2541082-0001

Table 3-11 Systems 1200/1300/SP1000 Remote Diagnostics Kit With 1200-Baud Modem (2552039-0002)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1200/1300/SP1000 Remote Diagnostics diskette	2541082-0002
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4120 1200-baud modem	2552031-0001
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Table 3-12 Systems 1200/1300/SP1000 Remote Diagnostics Kit With 2400-Baud Modem (2552039-0003)

Quantity	Description	TI Part Number
1	System 1000 Series Remote Diagnostics Access Device	2552030-0001
2	Modem cable	2532883-0001
1	"Y" cable	2552040-0001
1	*System 1000 Series Remote Diagnostics Installation and Operation* manual	2549257-0001
1	Systems 1200/1300/SP1000 Remote Diagnostics diskette	2541082-0002
1	XENIX Remote Access Driver diskette	2541082-0001
1	TI 4124 2400-baud modem	2552031-0002
1	Telephone cord	2211801-0001
1	Modem transformer	2552028-0001

Cabling Information

3.2 Figures 3-1 through 3-4 provide cabling diagrams for the various systems supported by Remote Diagnostics.

Figure 3-1 System 1500 Cabling Diagram — 4-Channel Communications Option

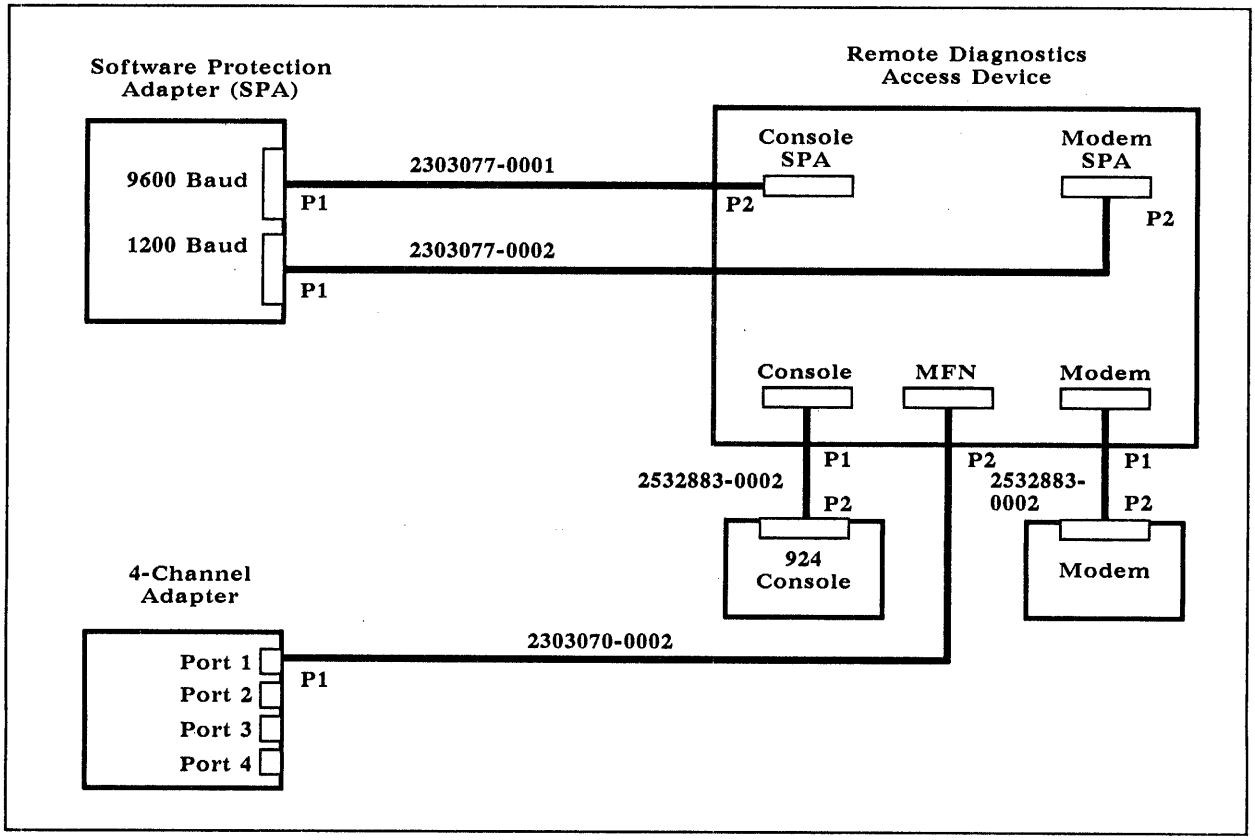


Figure 3-2 System 1500 Cabling Diagram — 3-Channel Multifunction Option

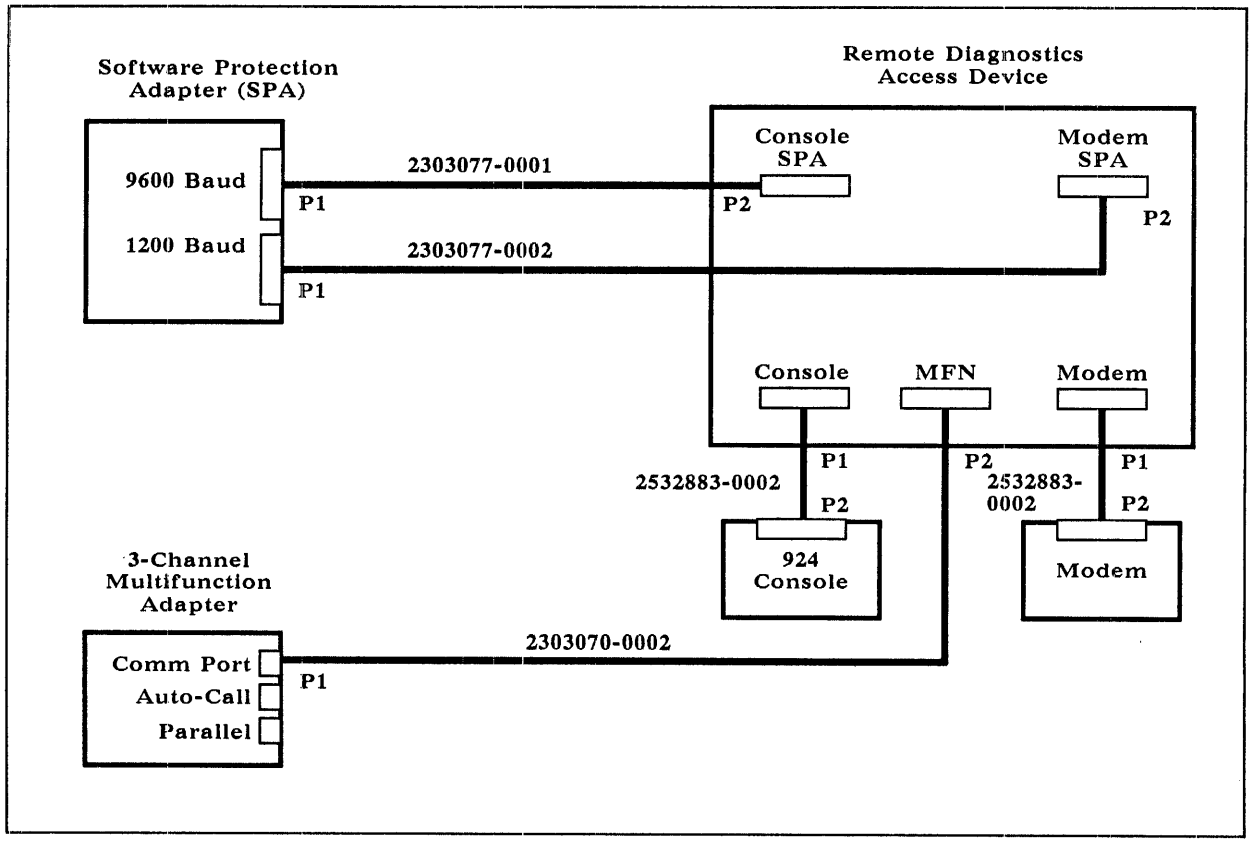


Figure 3-3 System 1500 Cabling Diagram — Nonstandard Configuration

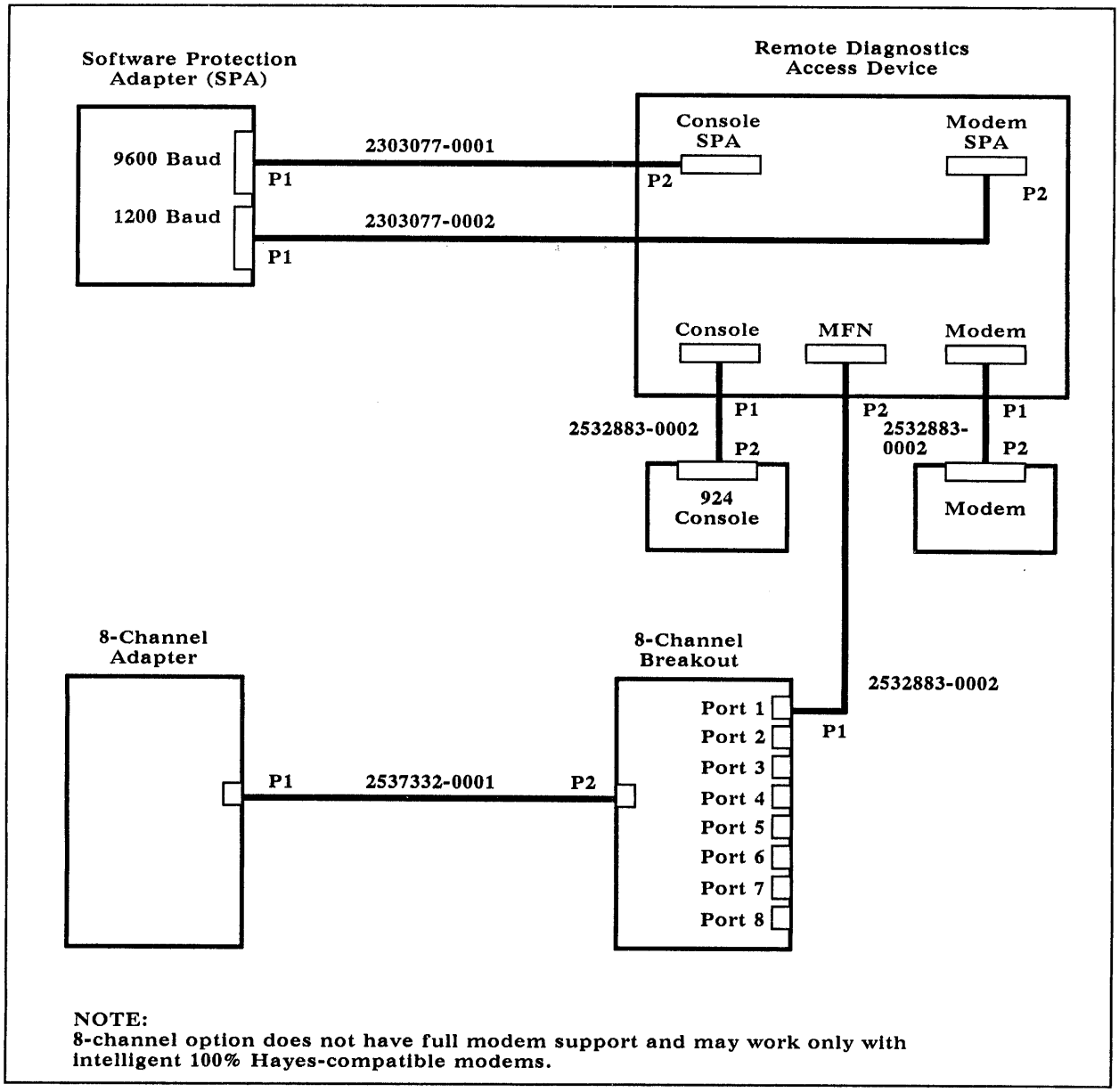
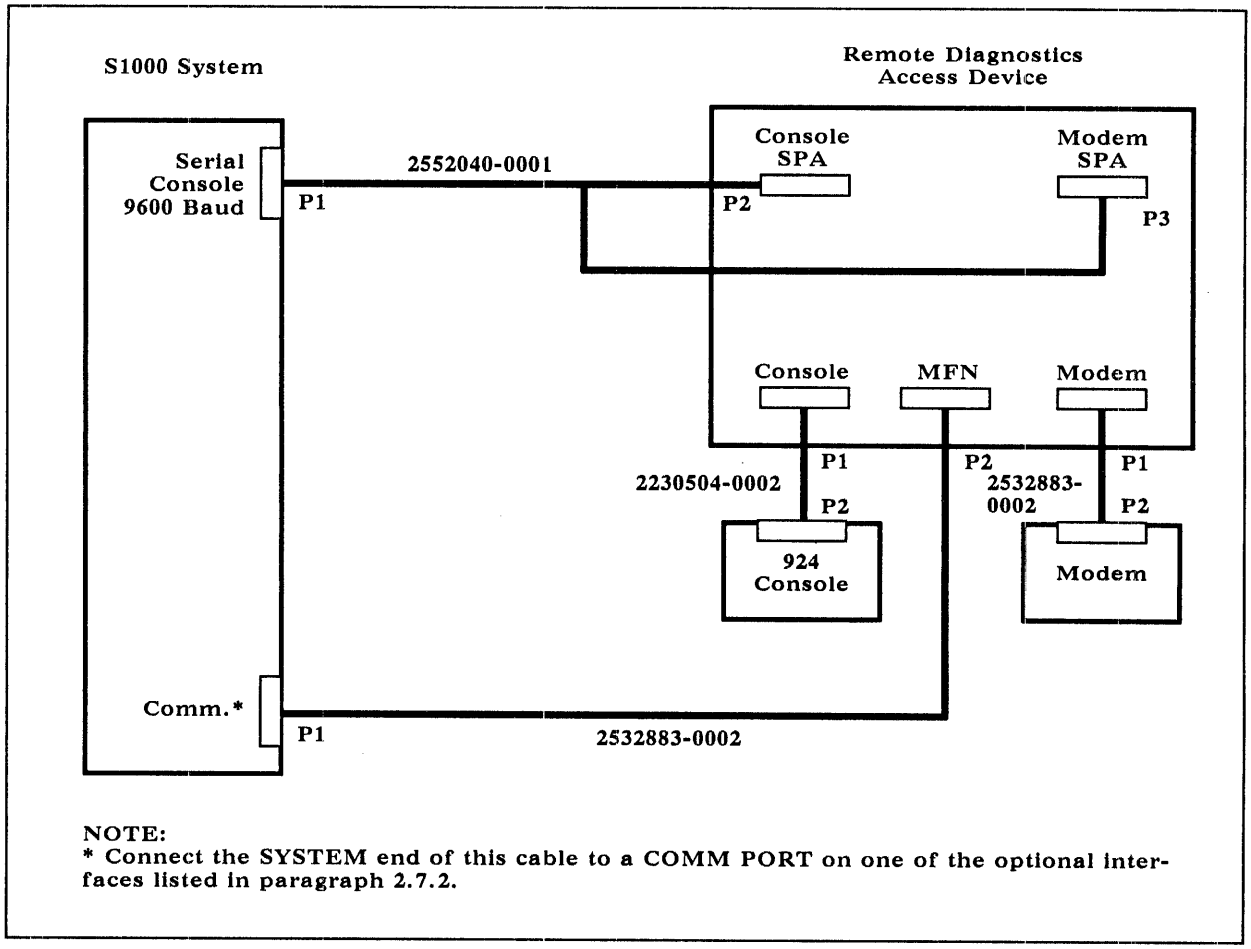


Figure 3-4 IBM AT Bus-Based Systems Cabling Diagram



Modem Setup

3.3 Tables 3-13 through 3-15 show the switch settings for modems used on the System 1000 Series.

Table 3-13 TI 4120, 1200-Baud External Modem

Switch	Switch Functions ON	OFF	Setting
1	Ignore DTR	Monitor DTR	ON
2	DIGIT status messages	WORD status messages	OFF
3	STATUS messages	NO STATUS messages	OFF
4	DISABLE ECHO	ENABLE ECHO	ON
5	DO NOT Answer	AUTO answer	OFF
6	DCD always TRUE	Monitor DCD	OFF
7	Multiline Phone	Single Line Phone	OFF
8	ENABLE Commands	DISABLE Commands	OFF
9	Voice Insert ENABLED	Voice Insert DISABLED	OFF

Table 3-14 TI 4124, 2400-Baud External Modem

Switch	Switch Functions ON	OFF	Setting
1	Auto Answer	Do Not Answer	ON
2	Monitor DTR	Ignore DTR	OFF
3	Monitor DCD	DCD always TRUE	ON
4	DISABLE commands	ENABLE commands	ON
5	DISABLE command ECHO	ENABLE command ECHO	ON
6	NO STATUS messages	STATUS messages returned	ON
7	DIGIT status messages	WORD status messages	ON
8	Reserved		OFF*
9	Reserved		OFF*
10	Reserved		OFF*

NOTE:
* Must be OFF.

Table 3-15 Hayes 1200-Baud Modem

Switch	Switch Functions ON	OFF	Setting
1	Monitor DTR	Ignore DTR	OFF
2	WORD Status messages	DIGIT Status messages	ON
3	NO Status messages	Status messages returned	ON
4	ENABLE Command Echo	DISABLE Command Echo	OFF
5	Auto Answer	Do Not Answer	ON
6	Monitor DCD	DCD always TRUE	ON
7	Single Line Phone	Multiline Phone	ON
8	DISABLE Commands	ENABLE Commands	ON
9	Modem Type (Bell)	Modem Type (CCITT)	ON*
10	CMD State (DTR 1–0)	Reset Modem (DTR 1–0)	ON*

NOTE:
* Older Hayes 1200-baud modems may not have switches 9 and 10.

Hayes 2400-Baud External Modem

3.4 The Hayes 2400-baud external modem does not have external switches. All modem control is accomplished through the Hayes AT command set. To configure a Hayes 2400-baud external modem, the modem must be first connected to a terminal device for initial setup; then the setup must be saved in the modem's nonvolatile RAM for auto-configuration at power-up.

The following AT commands will set up a Hayes 2400-baud external modem for use under Remote Diagnostics and store the setup parameters in nonvolatile RAM for initialization at power-up. Type all AT commands in capital letters; then press the ENTER or RETURN key after each command.

Command	Function
AT&F	Set default factory configuration
ATS0=1&W	Enable Auto Answer — 1st ring
AT&C1&S1&W	Detect Carrier — Actual DSR level
ATE0&W	Disable Command Echo
ATQ1&W	Disable Result Codes
AT&Y	Store in PROFILE 0, retrieve on power-up.

NOTE: The last command with &W that is entered and stored determines the speed at which the modem initially answers an incoming call. For example, if a command is entered and stored at 1200 baud, the modem will attempt to answer at 300 and 1200 baud, but not at 2400 baud. If the modem is to be used at 2400 baud, then all commands should be entered at 2400 baud.

Generic Modem Setup

3.5 The following table should be used as a guide to set up any modem other than the ones mentioned here. Refer to the modem user's guide for specific information on the modem setup procedures.

Modem Operation Mode	Desired Setting
DTR Status Detection	Ignore DTR
Result codes	DISABLED
Result code type	Word
Command Echo	DISABLED
Auto Answer	Enabled (Answer on first ring)
Carrier Status Detection	Detect carrier
Phone jack type	RJ-11 (standard modular jacks)
Command Recognition	DISABLED
Modem Type	Bell 212A
Modem Reset	Command mode on DTR 1–0

System Maintenance Terminal Setup

3.5.1 Tables 3-16 and 3-17 provide information for setting up the system maintenance terminal for use with a 924 terminal either in TI-924 mode or in 931 emulation mode, or with a 931 terminal.

Table 3-16 **System Setup for System 1500 (NuBus Systems)**

Setup/Configuration	Value
924 Terminal:	
Display	Jump Scroll
General	TI931 Mode ASCII No Keyboard Protection No New Line
Comm	Transmit = 9600 Receive = Transmit No XOFF 7 Bit, Odd parity 1 Stop Bit EIA Port, Data Leads Only
931 Terminal:	
Comm	9600 Baud Odd Parity FDPX EIA port DC1/DC3 - Off

Table 3-17 **System Setup for AT-Bus Systems**

Setup/Configuration	Value
924 Terminal:	
Display	Jump Scroll
General	TI924 Mode, 7- or 8-bit controls ASCII No Keyboard Protection No New Line
Comm	Transmit = 9600 Receive = Transmit XOFF at 128 8 Bits, No parity 1 Stop Bit EIA Port, Data Leads Only

Remote Maintenance Terminal Setup and Operation

3.5.2 Tables 3-18 through 3-20 provide information for setting up and operating the remote system maintenance terminal and its modem.

Table 3-18 **Remote Diagnostics Terminal Setup for System 1500 (NuBus Systems)**

Setup/Configuration	Value
924 Terminal:	
Display	Jump Scroll
General	TI931 Mode ASCII No New Line
Comm	Transmit = 1200 Receive = Transmit No XOFF 7 Bits, Odd parity 1 Stop Bit EIA Port, Data Leads Only
931 Terminal:	
Comm	1200 Baud FDPX DC1/DC3 Off Odd Parity EIA Port

Table 3-19 **Remote Diagnostics Terminal Setup for AT-Bus Systems**

Setup/Configuration	Value
924 Terminal:	
Display	Jump Scroll
General	TI924 Mode ASCII No New Line
Comm	Transmit = 1200 Receive = Transmit XOFF at 128 8 Bits, No parity 1 Stop Bit EIA Port, Modem Control

Table 3-20 **Remote Diagnostics Modem Setup**

Switch	TI4120	TI4124	Hayes 1200
1	OFF	*	UP
2	OFF	ON	UP
3	ON	ON	DOWN
4	OFF	OFF	UP
5	*	OFF	*
6	OFF	OFF	UP
7	OFF	OFF	UP
8	ON	OFF	DOWN
9	*	OFF	UP
10	N/A	OFF	UP

NOTE:
* Setting does not matter.

Hayes 2400-Baud Modem Setup

3.5.2.1 Use the following AT commands to set up the Hayes 2400-baud external modem for TI 924 and 931 terminals:

AT&F	Set to factory configuration
AT&C1	Detect Actual Carrier

Remote Modem Operation

3.5.2.2 Use the following commands to set up the Remote Diagnostics modem to initiate calls:

Command	Meaning	Modem Action
AT	Attention	Displays OK.
ATDT9,xxxyyyzzzz	AT = Attention D = Dial T = Tone 9 = Outside line , = Wait 2 seconds xxx = Area code yyyzzzz = Phone #	Dials the number.
+++	No line activity for 3 seconds	Resets to command state.
ATH	AT = Attention H = Hang up	Hangs up.

NOTE: During XENIX boot on the remote system maintenance terminal, a few lines of garbage text may be displayed until the kernel is fully booted. This is caused by the boot sequence which uses 9600 baud briefly during the kernel load.

Installation and Checkout for NuBus Systems

3.6 After installing Remote Diagnostics on a NuBus system, use the following procedure checklist to verify that the Remote Diagnostics is set up properly.

1. The Remote Diagnostics access device, modem, and all cables should be installed on the system. Pay particular attention to the orientation of the cables; P1 and P2 should be on the correct ends (refer to Figures 3-1 through 3-4).

2. Verify the switch settings and the auto-answer capability of the RD modem by connecting the modem to the telephone jack and dialing the RD phone number from another phone. An audible answer tone should be heard when the modem answers the phone.

3. With the access device in the Console position, power up the system and verify interaction with the system test boot master (STBM) and TI System V in single-user mode. Do not bring the system to multiuser mode.

4. Customers installing their own equipment should place a service call with the TI Field Service Communication Center at 1-800-572-3300 and request Remote Diagnostics installation verification. You will need to provide the following information:

   - Contact name
   - System serial number
   - Customer name
   - Customer phone number
   - RD phone number

   Texas Instruments CRs performing the installation should call the CR Hotline to request Remote Diagnostics installation verification. You will need to provide the following information:

   - Employee number
   - Ticket number
   - System serial number
   - Customer name
   - Customer contact
   - Customer phone number
   - RD phone number

5. A TI engineer will call the customer telephone number to determine readiness for checkout and to obtain a super-user user ID and password (if appropriate).

6. The access device should be placed in the Remote Console position. The TI Engineer will then attempt to establish connection to the System 1500 and remotely reboot the system. After initial RD checkout, the call will be terminated.

7. After the RD session has terminated, the access device should then be placed in the Console position and the system brought into multiuser mode. This will allow the TI engineer to test the standard dial-in port access.

8. At the conclusion of the RD verification, the user ID and password that was provided to the TI engineer should be modified or deleted. This will prevent unauthorized access to the customer's system.

Installation and Checkout for AT-Bus Systems

3.7 After installing Remote Diagnostics on an AT-bus system, use the following procedure checklist to verify that the Remote Diagnostics is set up properly.

1. On AT-bus systems using XENIX, the Remote Diagnostics Access Driver files must be installed first. In single-user mode, insert the XENIX Remote Diagnostic Access Diskette into drive A. Type in the command `install` and follow the instructions that appear on the screen. The system will install the necessary files and notify you when it is safe to power off. Then, remove the installation diskette before rebooting.

2. The Remote Diagnostics access device, modem, and all cables should be installed on the system. Pay particular attention to the orientation of the cables; P1 and P2 should be on the correct ends (refer to Figures 3-1 through 3-4).

3. Verify the switch settings and the auto-answer capability of the RD modem by connecting the modem to the telephone jack and dialing the RD phone number from another phone. An audible answer-tone should be heard when the modem answers the phone.

4. With the remote access device in the Console position, power up the system and verify completion of the system self-test and TI System V boot in single-user mode. Do not bring the system to multiuser mode.

5. Customers installing their own equipment should place a service call with TI Field Service at 1-800-572-3300 and request Remote Diagnostics installation verification. You will need to provide the following information:

   - Contact name
   - System serial number
   - Customer name
   - Customer phone number
   - RD phone number

Texas Instruments CRs performing the installation should call the CR Hotline to request Remote Diagnostics installation verification. You will need to provide the following information:

- Employee number
- Ticket number
- System serial number
- Customer name
- Customer contact
- Customer phone number
- RD phone number

6. A TI engineer will call the customer telephone number to determine readiness for checkout and to obtain a super-user user ID and password (if appropriate).

7. The user must enter the command `remotediag` and follow the directions on the console screen. Then, place the access device in the Remote Console position. The TI engineer will then attempt to connect to the System 1000 Series system and reboot from the remote terminal.

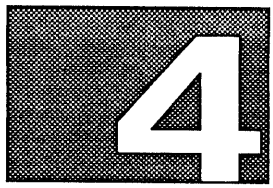
   After initial RD checkout, the session will be terminated. This is accomplished by the TI engineer entering the command `endremote`. This will terminate the session under XENIX.

   To run diagnostics, the system administrator must then insert the Remote Diagnostics diskette before the engineer reboots from the remote site.

8. After the RD session has terminated, the access device should then be placed in the Console position and the system brought into multiuser mode. This will allow the TI engineer to test the standard dial-in port access.

9. At the conclusion of the RD verification, the user ID and password that was provided to the TI engineer should be modified or deleted. This will prevent unauthorized access to the customer's system.

REMOTE OPERATIONS



Introduction

4.1 Remote Diagnostics requires a number of remote interactions with system operations to perform a diagnostic session. These system operations include self-test, diagnostics, logon, and boot. This section describes how to perform these interactions with both the NuBus system operations (which in each case are described first) and the AT-bus system operations (described immediately after).

Remote Interaction With NuBus Systems

4.2 On NuBus systems, Remote Diagnostics requires interaction with the self-test utility, which is called the system test boot master (STBM), and the diagnostic software, which is called the General Diagnostic Operating System (GDOS). The following paragraphs describe these operations.

System Test Boot Master

4.2.1 The System 1500 (NuBus) system design includes a feature known as the system test boot master, or STBM. This is a program contained in firmware on the System 1500 processor board(s). At the time of power-up or boot sequence, each intelligent processor and controller in the System 1500 chassis initiates a power-on self-test, or POST. The processor in the lowest chassis slot that successfully passes POST becomes the STBM. The STBM processor then reports the POST status of itself and all other processors and controllers to the system maintenance terminal and displays a Load menu. The Load menu allows several selections:

- (D)efault Boot — Boots default load band (normally TI System V)
- (M)enu Boot — Boots selected load bands
- (R)etest — Re-executes the POST
- (E)xtended — Executes the extended self-tests on each slot
- (N)amed — Boots a named load band
- ! — Loops extended self-tests on all slots
- @ — Loops extended self-tests on a specific slot
- G — Boots GDOS (General Diagnostic Operating System)

For system-chassis-related hardware problems, the TI engineer performing the remote diagnosis utilizes the STBM, POST, and the extended self-test to identify a failed processor or controller in the system chassis. For other types of hardware problems, the engineer utilizes GDOS to diagnose the system.

General Diagnostic Operating System (GDOS)

4.2.2 GDOS is provided on the system disk of all System 1500 systems shipped from TI. The GDOS diagnostic band must be available to the remote system maintenance terminal on all systems that will participate in Remote Diagnostics.

Remote Interaction With AT-Bus Systems

4.3 Each AT-bus System 1000 Series system has an internal self-test. Self-test failures for these systems are reported in ways that require the presence of an operator.

On BUSINESS-PRO and Systems 1000, 1100, 1200, and 1300, the self-test status is reported by LED indicator lights on the back of the system. Power-up self-test errors also are reported to the parallel printer.

For the SP1000 system, an audible tone is sounded at the successful completion of self-test.

For system-chassis-related hardware problems, the TI engineer will need the help of the system administrator to read the self-test indicators for diagnosis of system board failures. For other types of hardware problems, the engineer will need the help of the system administrator to load the Remote Diagnostics diskette for system diagnosis.

The Remote Diagnostics diskette, provided with the RD kit, has been modified to boot to a remote 1200-baud console terminal.

For hardware problems outside the system self-test (such as mass storage failures), the TI engineer will utilize the remote diagnostics as the primary means of fault isolation. In certain situations, it will be necessary for the engineer to interact with the customer's system administrator to perform local tasks such as loading diskettes and scratch tapes to perform diagnostics.

Remote Logon to TI System V for NuBus Systems

4.4 When the access device is in the Console position, the modem dial-up circuit is redirected to a standard TI System V communications port. To obtain access to the customer's system via TI System V, a user ID and password must be obtained from the customer's system administrator. The system administrator should change the user ID (or at least the password) at the conclusion of each remote TI support session. This will reduce the chance of unauthorized connection to the customer's system.

When logged in through a standard TI System V port, the TI engineer should have super-user privileges within the system. This will allow the TI engineer to identify and correct a majority of system-software-related problems, with the local assistance of the customer's system administrator.

In some cases, it may be necessary to have remote access to the TI System V operating systems from the remote system maintenance terminal. To accomplish this, the system administrator performs a system shutdown, brings the system to single-user mode, and switches the access device to the Remote Console position.

The TI engineer then logs into the system as a remote system maintenance terminal. In order to reboot and initialize TI System V, the customer's system administrator must provide the system user ID (assumed to be root) and the associated password. This capability will allow the TI engineer to perform

system software maintenance in the TI System V single-user mode. This procedure may be necessary when performing repairs on file systems and system data structures.

Remote Logon to TI System V for AT-Bus Systems

4.5 When the access device is in the Console position, the modem dial-up circuit is redirected to a standard TI System V communications port. To obtain access to the customer's system via TI System V, a user ID and password must be obtained from the customer's system administrator. The system administrator should change the user ID (or at least the password) at the conclusion of each remote TI support session. This will reduce the chance of unauthorized connection to the customer's system.

When logged in through a standard TI System V port, the TI engineer should have super-user privileges within the system. This will allow the TI engineer to identify and correct a majority of system-software-related problems, with the local assistance of the customer's system administrator.

In some cases, it may be necessary to have remote access to the TI System V operating system from the remote system maintenance terminal. To accomplish this, the system administrator performs a system shutdown, brings the system to single-user mode, enters the `remotediag` command on the system, and then switches the access device to the Remote Console position.

The TI engineer then logs into the system as a remote system maintenance terminal. To reboot and initialize TI System V, the customer's system administrator must provide the system user ID (assumed to be root) and the associated password. This capability will allow the TI engineer to perform system software maintenance in the TI System V single-user mode. This procedure may be necessary when performing repairs on file systems and system data structures.

NOTE: Customers who have sensitive or government classified data on the system should unmount those file systems and turn the power switch off to the particular mass storage device prior to providing the TI engineer access to the system. The system disk must be available for TI diagnostic use at all times and therefore should not contain any sensitive or government classified information.

Remote System Boot — NuBus Systems

4.6 To reboot the System 1500 from a remote 924 terminal in 931 mode, use the following procedure:

1. The system must first be in single-user mode.

2. On a 924 terminal, hold down the SHIFT key and then press the BREAK key once to enter the ROM debugger. Then, press the SHIFT-BREAK key combination three more times in succession to invoke a system reboot.

   On a 931 terminal, use the ALT and Blank Grey keys in this procedure instead of the SHIFT and BREAK keys. The SHIFT-BREAK key combination on a PC running 931 Emulator terminates the emulator software.

The system will then respond with a reset message and will display the S1500> prompt.

3. Enter BT and press RETURN.

   The system reboot will begin.

Remote System Boot — AT-Bus Systems

4.7 The TI engineer can log on to the system dial-up port to view XENIX operation as a user on the system. To perform remote console operations the XENIX Remote Diagnostics access driver must be installed from the installation diskette.

To allow logon as remote system maintenance terminal, the system administrator must enter the `remotediag` command. This reconfigures the serial console port as a 1200-baud port. Following the instructions on the screen, the system will direct the administrator to wait for the SHUTDOWN message, and then switch into Remote Console mode. This provides a remote XENIX system maintenance terminal for software repairs.

The TI engineer can terminate XENIX at any time by entering the command `endremote`. This will change the console back to original configuration and shutdown the XENIX system.

The administrator can install the Remote Diagnostics diskette for the system to boot into the remote diagnostics. The remote console will act as the system maintenance terminal. This will enable the use of diagnostics for remote hardware diagnosis.

To terminate the diagnostic session, the engineer can enter the DOS command `warmboot`. This will automatically reboot the system. When the system begins to reboot (signaled by a beep), the diagnostics diskette must be removed to reboot into XENIX, or can be left in to restart the diagnostics.

Remote Diagnostics Limitations

4.8 Remote Diagnostics does have some limitations from a diagnosis perspective. The most obvious limitation is the inability of the TI remote system administrator to touch and hear the equipment. For this reason, the TI engineer must rely on the local system administrator for information about tangible and intangible system indicators.

Also, when performing diagnosis on mass storage devices such as tape drives and disks, the TI engineer will have to rely on the system administrator to ensure that these devices are powered up and online, as well as load the media.

Hardware problems with data communications, Network Terminal Concentrators, and networked terminals and printers do not lend themselves to remote diagnosis. On the other hand, software problems associated with these devices can be diagnosed and repaired from a remote location.

Caveats

4.9 The Remote Diagnostics access device should never be switched from the Console to the Remote Console position while the system is in the multi-user mode of TI System V. Doing this will put the system maintenance terminal onto the modem and phone line, allowing anybody complete access to the system if they dial the RD number. The possession of the RD access device key should be maintained by one person; in most cases this will be the system administrator.

Interaction with the operating system or diagnostics must be performed with care. If keyboard entry gets too far ahead of the display screen, the system may lock up. If this occurs, rebooting the system will allow the remote terminal to regain control of the system.

Suggestions

4.9.1 If you have any comments or suggestions about Remote Diagnostics, please send them to the following address:

Texas Instruments Incorporated
Remote Diagnostics Center
P.O. Box 2909 M/S 2212
Austin, TX 78769

Remote Diagnostics Installation and Operation
Customer Response

Your comments and suggestions
help us improve our products.

Your computer type_____ Date_____

Your name_____

Company name/department_____

Telephone ( )_____ Address_____

City_____ State_____ Zip_____

ABOUT YOUR SYSTEM. . .

Size of memory (RAM)_____ Type of display_____

Other options _____

_____

Check if you have:

☐ One diskette drive ☐ Two diskette drives ☐ Winchester disk

YOUR RESPONSE CONCERNS. . .

☐ Software TI Part No._____

☐ Manual Version No._____

Did you run diagnostics? ☐ Yes ☐ No Serial No. (if any)_____

Error code or message_____

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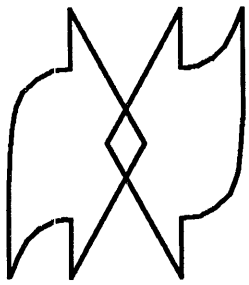

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