

NORTEL MAGELLAN



Passport 4400
Supplement for R2.0.4

Release Name: PR2000040
Software Release Date: August 17, 1998
Previous Release: R2.0.4
Version: SSUP load, PR2000040
Distribution: General Availability

©1998 Nortel Micom

All rights reserved

*Magellan is a trademark of Northern Telecom
Printed in Canada

TABLE OF CONTENTS

INTRODUCTION	9
DOCUMENTATION	9
UPGRADING FROM RELEASE R1.X TO RELEASE R2.0	10
SERVICES INTERWORKING NETWORK ARCHITECTURE	10
Release 1.X Network Architecture	10
Release 2.0.X Network Architecture	10
NMS AND PASSPORT SOFTWARE COMPATIBILITY	11
REQUIRED HARDWARE RELEASE LEVELS	12
SOFTWARE INSTALLATION PROCEDURE	13
FEATURES	15
SOFTWARE PACKAGES	15
PASSPORT 4400 FEATURES	15
Services Interworking with Passport	15
WAN Link Interfaces	15
Frame Relay and HTDS Access Interfaces	16
ISDN Main Link and Dial Backup	16
HTDS Transparent Data Service	16
Network Management	16
Legacy Data Module	16
Code and Configuration Rollback	16
Frame Relay DCE	17
Voice Interfaces	17
FAX Demodulation	17
Ethernet LAN and Routing	17
RELEASE CONSIDERATIONS	19
GENERAL CONSIDERATIONS	19
Network Requirements	19
Installation/Deployment	20
Passport 4400 WAN link Connection to Passport	20
Configuring End-to-End Management IP Connectivity	21
Management Connectivity Physical Components	21
Management Connectivity Logical Components	22
Configuring Branch Passport 4400s	22
Configuring the Passport ILS User Core Router (UCR)	23
Branch LAN Routing Physical Components	23
Branch LAN Routing Logical Components	23
Configuring Voice Services	24
End-to-End Management IP Connectivity Configuration Example	25

Passport Components Definition:.....	27
Passport 4400 Configuration:	28
Release R1.X to Release R2.0.4 Network Migration.....	29
PANL Frame Relay Tunneling Physical Components	30
PANL Frame Relay Tunneling Logical Components	30
16MB DRAM Installation Instruction	31
Runtime TFTP Software Download	33
TFTP Download Server Setup.....	33
Boot Menu Software Installation	33
Passport 4400 Link Frame Size Value.....	35
PANL Frame Relay Tunneling	35
Voice Call Transfer Priority	35
Passport 4400 Voice over Passport ATM Trunks.....	36
Passport Trunk Transmit Queue Starvation.....	36
Traffic Prioritization.....	36
Command Line Interface (CLI)	36
PC based NetTool.....	37
Statistics/Accounting	37
WAN Link Physical Interface.....	38
WAN Link Cable Maximum Length.....	38
WAN Link High Speed Clocking	38
Speech Activity Detection.....	38
Incorrect Power Failure Trap	38
TAM/EAM Unsupported Ports Configurable	38
NETWORK MANAGEMENT CONSIDERATIONS.....	39
NMS Connectivity to Passport 4400	39
ENGINEERING CONSIDERATIONS.....	40
Passport ILS Core Router Fanout	40
Maximum Voice Channels per Passport 4400.....	40
Bandwidth and Throughput Required per Voice SPVC	40
SOFTWARE UPDATE ITEMS	41
ITEMS RESOLVED IN THE R2.0.4.....	41

List of Tables

TABLE 1 HARDWARE LIST 12

List of Figures

FIGURE 1	END-TO-END MANAGEMENT IP CONNECTIVITY EXAMPLE	26
FIGURE 2	BACK VIEW OF PASSPORT 4400	32
FIGURE 3	TOP VIEW OF PASSPORT 4400	33

Chapter 1

Introduction

This document provides information for the Passport 4400 software release package for the R2.0.4 (PR2000040) software level, available to all customers.

Please refer to Chapter 2 for details on the current status of various features and enhancements.

Documentation

The following relevant Passport 4400 documents are available on the Nortel Micom World Wide Web at URL <http://199.30.19.9/Engineers/ISO/projects/mpa/a02a/manuals/nav.html> and Passport NTPs are available on the Nortel Magellan World Wide Web at URL <http://47.208.136.61/ntp/> and should be referenced in the order listed:

NTP 241-7001-210, Magellan Passport Access Network Link User Guide
NTP 800-1952-20, Passport 4400 Operators Manual
NTP 241-7001-803, Passport IP Routing User Guide
NTP 241-7001-804, Passport IPX Routing User Guide
NTP 241-7001-802, Passport Frame Relay DTE Access User Guide
NTP 241-7001-300, Passport Frame Relay UNI User Guide
NTP 800-1951-20, Passport 4400 Hardware Installation Manual
NTP 800-1950-20, Passport 4400 CLI Reference
NTP 241-7001-410, Passport Voice Networking User Guide
NTP 241-7001-180, Passport Remote Server Agent User Guide
NTP 241-6001-106, NMS Magellan Access Configuration Server Installation
and Administration Guide
NTP 800-1943-20, Passport 4400 Analog Voice Modules User Guide
NTP 800-1944-20, Passport 4400 T1/E1 and Digital Voice Manual
NTP 241-7001-340, Passport Frame Relay ISDN Switched Access User
Guide

These NTP documents are orderable items, which are available on CD-ROM media also containing Passport 4400 software and MIBS. This documentation can then be installed on a workstation and accessed on-line.

Upgrading from Release R1.X to Release R2.0

From a configuration data standpoint, a R1.X to R2.0 migration path is not supported. Installation of R2.0 boot and application software on a Passport 4400 running R1.X boot and application software requires a cold reset which will restore the configuration data to factory default settings.

Also, a number of R1.X functions and network architecture elements are no longer supported, and the R2.0.4 services interworking networking architecture is such that there are a number of deployment pre-requisites and considerations. Please refer to Chapter 3 for deployment recommendations.

Services Interworking Network Architecture

Release 1.X Network Architecture

R1.X Passport 4400 branch-to-branch services were considered overlay. The Passport network provided the Frame Relay UNI SVC service, and when used in conjunction with the FRUNI Multi-Media Traffic Classes (MMTC) feature, different classes of service could be signaled across the WAN, for various types of traffic, e.g. Voice, LAN, HTDS, Frame Relay.

In Release 1.X, the Passport 4400 units in the network could be configured to perform dedicated functions such as:

- Network Management Core Router (NMCR) (provides management IP connectivity between NMS workstations and Passport 4400 branches.)
- User Core Router (UCR) (provides branch LAN routing function.)
- Network Address Server (NAS) (provides voice DN to DNA translation services.)

Release 2.0.X Network Architecture

In this release, the Magellan Passport Access Network Link (PANL) uses its own proprietary frame relay based protocol to accommodate the signaling, transport and traffic management requirements for Passport 4400. The Passport Frame Relay UNI MMTC capability remains a requirement. The PANL Switched Permanent Virtual Circuit (SPVC) now provides service interworking capabilities between the Passport network and the Passport 4400 branches, and makes use of the Passport Frame Relay Multiple Egress Emission Priorities. PANL supports multiple link types, including leased line, ISDN (main link or backup), and Frame Relay. For more information please read NTP 241-7001-210, *Magellan Passport Access Network Link User Guide*.

In this release, the R1.X Network Management Core Router, User Core Router, and Network Address Server functions are now provided by the Passport network as follows:

- Passport ILS now provides Network Management and User Core Router functions. SPVCs originating from Passport 4400 branches are terminated on the Passport Frame Relay UNI service, which coexists and must be logically associated with the Passport ILS Frame Relay DTE service. Please refer to NTP 241-7001-803, *Passport IP Routing Guide*, NTP 241-7001-802, *Passport Frame Relay DTE User Guide*, NTP 241-7001-300, *Passport Frame Relay UNI User Guide*.
- The Passport Voice Networking Call Server (VNCS) is a database that supplies routing information required during voice call establishment, and interacts with the Remote Server Agent (RSA), which can reside anywhere in the network, and is an entry point for access to the VNCS. As all DN to DNA translations are dynamic, the manual cache entry capability supported in R1.X is not supported in this release. Although Passport 4400 and Passport Voice interworking is not supported in this release, the above elements are required for Passport 4400 voice overlay as well. Please refer to NTP 241-7001-410, *Passport Voice Networking User Guide*, and NTP 241-7001-180, *Passport Remote Server Agent User Guide*.

Please refer to Chapter 3 for R2.0.4 deployment recommendations.

NMS and Passport Software Compatibility

The following table provides the current Passport 4400 product release levels and reflects the minimum NMS and Passport software levels required for compatibility.

4400	R2.0.4 (PR2000040) Image R2.0.4 (BT2000026) Boot
NMS	10.7
Passport	P4.2.6 (BD02S6D)

NMS functionality to support this release of Passport 4400 software is available at this time. It includes NMS Surveillance and Configuration capabilities. Please reference the NTP 241-6001-106, *NMS Magellan Access Configuration Server Installation and Administration Guide* for further detailed information. Passport Release P4.2.6 provides support for Passport 4400 Release 2.0.4. Please refer to the appropriate Passport release supplement for further information.

Required Hardware Release Levels

All Passport 4400 cards are required to be of the following Card Codes and Revision Levels to use any of the Passport 4400 R2.0.4 features.

Card Name	Card Code	Release
Passport 4400 Ethernet Base Module	NTAU01AA	10
WAN Serial Interface Module	NTAU03AA	05
Turbo Universal Voice Module, Dual Channel	NTAU50AA	02
Enhanced E&M Voice I/F Module	NTAY09AA	03
Enhanced FXO Voice I/F Module	NTAY11AA	03
Enhanced FXO-European Voice I/F Module	NTLN23AA	01
Enhanced FXS Voice I/F Module	NTAY12AA	01
T1 Module - Dual Port	NTAY14AA	05
E1 Module - Dual Port	NTAY16AA	06
Digital Voice Expansion - 12 Channel	NTAY18AA	02
Digital Voice Module - Single	NTAU60AA	01
Clear Voice Module - Single Channel	NTAU61AA	02
Clear Voice Module (European) - Single Channel	NTLN21AA	--
Clear Voice Module - Dual Channel	NTAU62AA	02
Clear Voice Module (European) - Dual Channel	NTLN22AA	--
T1 CSU/DSU	NTAU04AA	04
56 K CSU/DSU	NTAU02AA	05
ISDN U Interface Module	NTAU05AA	05
ISDN S/T Interface Module	NTAU06AA	05
4-Port Serial Expansion	NTAU83AA	04
8-Port Serial Expansion	NTAU74AA	04

Table 1 Hardware List

Software Installation Procedure

Passports 4400s are shipped from the factory with the current software version and associated boot code installed. The Passport 4400 application software, boot code, and latest MIB files in the formats below are available on CD as an orderable item. Installation is accomplished via funtime download procedure (requires TFTP server) described in NTP 800-1952-20, Passport 4400 Operations Manual, or the boot menu procedure (requires FTP server) described in Chapter 3.

- bt2000026.bld (Passport 4400 boot rom code)
- PR2000040.bld (Passport 4400 application code)
- PR2000040.tar (Passport 4400 application code for mibs)
- RS2000040.ps and .pdf (Passport 4400 Supplement for R2.0.4)

The Passport 4400 Application software, a single file supplied in a 'bld' format, consists of six executable images.

Ethernet Base Module code that runs on the 68040 processor
DSP code for CVM modules
DSP code for TUVVM modules
DVM code for the DVMs installed on the TAM, EAM and DVEM cards
TAM code for the 80186 CPU on the TAM card
EAM code for the 80186 CPU on the EAM card

Chapter 2

Features

Software Packages

The following software applications are included in this Release:

Ethernet Base Module Boot Code: bt2000026.bld
Application Software: PR2000040.bld
Clear Voice Module (CVM) DSP Code: 2261.xaK
Turbo Universal Voice Module (TUVM) Code: 2263.xaK
Digital Voice Module (DVM) Code: 2262.xaK
T1 Digital Voice Module (TAM): 909-2268-DX4
E1 Digital Voice Module (EAM): 909-2269-MX2

Passport 4400 Features

This section describes features and interfaces cards introduced by Passport 4400 software release, R2.0.4.

Services Interworking with Passport

The Magellan Passport Access Network Link (PANL) service supports interworking of Passport 4400 LAN, Frame Relay, and Voice services with Passport LAN Frame Relay and Voice services. LAN and Frame Relay Interworking is made possible through Switched Permanent Virtual Circuit (SPVC) Support, and A-bit handling. Please refer to Chapter 1 for additional information.

WAN Link Interfaces

- Integrated ISDN Terminal Adapter (U and S/T versions)
- T1/56K Integrated CSU/DSU
- Base Module (Serial Interface) Port 2

Frame Relay and HTDS Access Interfaces

- 4-Port Serial Expansion Card
- 8-Port Serial Expansion Card
- Base Module Port 1

ISDN Main Link and Dial Backup

The Magellan Passport Access Network Link (PANL) can operate over ISDN full time as the primary WAN connection, or as backup, active only upon main link failure.

HTDS Transparent Data Service

The HDLC Transparent Data Service provides end to end connectivity for HDLC based applications. This permits the tunneling of legacy protocols over the WAN. Two operational modes are supported, cut-through and store-and-forward.

Network Management

NMS configuration and surveillance modes of operation are supported with version 10.7. You no longer have to depend on the Command Line Interface (CLI) for all configuration and software download functionality. All future references to NMS in this document refer to the management workstation upon which the NMS applications are installed. Please refer to the NTP 241-6001-106, *NMS Magellan Access Configuration Server Installation and Administration Guide* for further details.

Legacy Data Module

The Legacy Data Module provides end to end connectivity for asynchronous, X.25 LAPB, SNA and Token Ring applications. At the time of this release, LDM services are not supported.

Code and Configuration Rollback

Code and Configuration Rollback allows users to make temporary changes that will be in effect for a 5-minute time period following an activation. Unless committed, the Passport 4400 will automatically revert back to last operating application code and/or configuration.

Frame Relay DCE

The Frame Relay DCE feature enables Frame Relay DTE connectivity between 4400 via the Passport wide area network (WAN). The Frame Relay DCE physical interface is provided via port 1 (residing on the Ethernet Base Module) on the rear panel, or serial expansion interface module. Interfaces types V.11/X.21, V.35, RS-232, and V.36 are available by using the appropriate cable type. Supported link management interfaces (LMI) include DTE CCITT (ITU) Q933 Annex A, ANSI T1.617D (Annex D), Rev 1 and None.

Voice Interfaces

The following voice interfaces are supported:

- Enhanced E&M type I, II, V
- Enhanced FXO
- Enhanced FXS
- T1
- E1

FAX Demodulation

- Group 3

Ethernet LAN and Routing

- IP (RIP v1)
- IPX (RIP v1)
- Transparent Bridging (IEEE 802.1)

Chapter 3

Release Considerations

This chapter highlights considerations relevant to this release of Passport 4400 software.

General Considerations

Network Requirements

For first time deployment of Passport 4400 R2.0.4 in an existing Passport network, there are a number of prerequisites to installation. Release R1.X to R2.0 network migration is discussed later in this chapter. Please refer to the documentation references provided in Chapter 1 for more information. Below is a high level description of Passport 4400 deployment elements.

Deployment Planning

Considerations include engineering, network addressing, fan-out, link types, link speeds, redundancy, access service.

Passport ILS Network Management Core Router (NMCR)

Deployment considerations include proximity and connectivity to NMS platforms, redundancy, addressing.

Voice Elements Deployment

For voice services, the location and quantity of Passport network elements such as RSA must be determined. As well, VNCS must be configured in the network to support voice call setup. The DNA provided when configuring the Passport 4400 RSI must reside on the RSA on Passport

Passport PM2 Function Processor

All Passport FP's which will provide the PANL service, and terminate Passport 4400 Switched Permanent Virtual Circuits (SPVC's) must be upgraded to PM2.

Passport Network Migration

The Passport network must be migrated to Passport Release level P4.2.6 or greater to support PANL and other elements necessary for Passport 4400 deployment and services interworking.

NMS Platform Deployment

The NMS platform must be installed, and configured to support the TFTP server function for software download, and telnet access to Passport 4400 via TCP/IP. Please refer to the NMS Release Notes for further details.

Installation/Deployment

Passport 4400 WAN link Connection to Passport

Within the Passport network, PANL must be configured on Passport V.35, V.11, DS1, E1, DS1C, E1C Function Processors supporting Passport 4400 WAN links. The minimum Passport Release level required for Passport 4400 connectivity is P4.2.6. In addition to the PANL service, the frame relay multi-media traffic class' service must also be configured on FP's to which Passport 4400's are to be connected. Consult NTP 241-7001-210, Magellan Passport Access Network Link User Guide for further information.

If the Passport 4400 is co-located with Passport, either cable NTAU30AA (V.35 50-pin to DB-15 male) or NTAU26AA (V.11 50-Pin to DB-15 male) can be used to connect the PASSPORT 4400 WAN link directly to the Passport fan-out panel. If the PASSPORT 4400 is remote, the Telco must provide a facility with the appropriate V.35 or V.11 interface. In that case, cable NTAU20AA (50-pin to V.35 Male Winchester), or NTAU26AA (50-pin to DB-15 male) could be used. When the Passport 4400 WAN link cable is used in conjunction with a shielded extension cable to facilities or a co-located Passport fan-out panel, the maximum supported combined cable length is 50 feet.

Passport 4400 Remote Site Installation and Initial Configuration

Passport 4400 units shipped from the factory are pre-loaded with R2.0.4 or later boot code and application software. The factory default configuration must be modified at the installation site to suit site and network requirements via the local operator console. Elements such as DNA prefix, node ID, customer ID, PANL attributes, SPVC to the FRUNI DNA on the Passport ILS NMCR must be configured on-site using CLI or the PC based NetTool. Once management IP connectivity has been achieved, further remote configuration is then possible.

Once the installed Passport 4400 is remotely accessible, if software is to be upgraded to a later version, a runtime TFTP download can be initiated via the local Command Line Interface (CLI). The software distribution function can be remotely initiated at the NMS workstation using the NMS configuration graphical user interface.

As an alternative to on-site configuration, the Passport 4400 units could be shipped from a customer marshalling site, after being pre-configured with site specific addresses, and installed cards. Consult NTP 800-1952-20, Passport 4400 Operators Manual for further information.

Configuring End-to-End Management IP Connectivity

Prior to installation of the first Passport 4400 in a network, configuration of the Passport ILS NMCR, and the installation of a network management workstation (NMS) platform and TFTP server is a prerequisite. The NMCR function accomplished in previous releases by a dedicated Passport 4400 is no longer supported.

End-to-end management connectivity to branch Passport 4400s is achieved via the combination of a physical connection to the Magellan Passport Access Network Link (PANL) service running on the Passport Function Processor (FP) to which the branch 4400 is connected, the SPVC to the Passport Frame Relay UNI service provided by the Passport ILS NMCR, and the logical associations between these key elements. More information is provided below. Key physical and logical elements of management connectivity can be summarized as follows:

Management Connectivity Physical Components

- Passport 4400 R2.0.4 WAN link connection to Passport PM2 function processor supporting the PANL service.
- Passport Release P4.2.6 or greater backbone network (unless public frame relay tunneling option described later in this section is used).
- Passport ILS Network Management Core Router (NMCR), equipped with function processors for FRUNI, FRDTE and Ethernet IP services.
- Sun workstation to provide TFTP server for software download, telnet connectivity for access to branch Passport 4400 Command Line Interface (CLI) and site of Magellan Network Management System (NMS) software installation.

Management Connectivity Logical Components

- Switched Permanent Virtual Circuit (SPVC) from Passport 4400 virtual port 4 to the Passport ILS NMCR FRUNI service.
- Static Route from Passport 4400 virtual port 4 to the management IP LAN subnet connected to a Passport Ethernet port.
- RIP interface associated with the Passport ILS NMCR FRDTE IP Protocol Port.
- Passport ILS NMCR FRUNI DLCI with Direct Call to Passport 4400 remote prefixDNA and DLCI.
- Passport FRUNI to FRDTE virtual (or physical) hairpin connection.
- Static Route definition on the NMS workstation, associating the Passport 4400 branch management IP address assignments with the correct workstation LAN interface.

SPVCs are configured to originate from each branch Passport 4400, and terminate on a Passport Frame Relay DCE (FRUNI) Data Link connection Identifier (DLCI) resident on the Passport ILS NMCR. A physical or virtual Frame Relay hairpin is required on the Passport ILS NMCR to associate the Passport ILS FRDTE interface with the FRUNI service which terminates the SPVCs from the Passport 4400 branches. A distinct IP subnet is required for the FRDTE interface. It is recommended that the Passport ILS FRDTE protocol port be configured for passive rip with silence flag enabled.

An Ethernet interface on the Passport ILS NMCR, or elsewhere in the network, is either connected to the same customer management LAN segment as the NMS workstation(s), or directly to an Ethernet interface on an NMS workstation. The management subnet must reside on a subnet distinct from the FRDTE subnet supporting SPVCs to branch Passport 4400s. It is recommended that RIP with silence flag be enabled on the Passport ILS protocol port supporting connectivity to the management subnet. The NMS workstation must have static route(s) configured to ensure that Passport 4400 destination IP addresses are associated with the correct workstation Ethernet port. This is particularly important in cases where the workstation is equipped with multiple Ethernet interfaces.

Configuring Branch Passport 4400's

After the NMCR is operational, branch Passport 4400s running factory default software can subsequently be installed and configured for NMS management, an unique name, and a pointer to the SNMP host workstation(s) (to which traps will be directed to). All branch 4400s supported by a Passport ILS NMCR share a common logical subnet on virtual port 4, that is, each branch Passport 4400 must have an IP address within the management subnet configured on virtual port 4 with

an SPVC to the NMCR FRUNI DNA defined. It is strongly recommended that for network management traffic, IP routing with passive RIP be configured on the branch Passport 4400 virtual port 4, with a static route to the management subnet. Static routes are recommended to reduce broadcast traffic in the network. Inverse ARP on interface 4 is also recommended. For additional information, consult NTP 800-1952-20, Passport 4400 Operators Manual.

Configuring the Passport ILS User Core Router (UCR)

The Passport ILS User Core Router (UCR) is used to route and concentrate user LAN traffic (IP and IPX) between branch Passport 4400s. The UCR function accomplished in previous releases by a dedicated Passport 4400 is no longer supported.

Prior to implementing branch LAN services on Passport 4400s in a network, configuration of the Passport ILS UCR is a prerequisite. Branch LAN routing between branch Passport 4400s is achieved via the combination of a physical connection to the PANL service running on the Passport Function Processor (FP) to which the branch 4400 is connected, the SPVC to the Passport Frame Relay UNI service provided by the Passport ILS UCR, and the logical associations between these key elements, which include:

Branch LAN Routing Physical Components

- Passport 4400 R2.0.4 WAN link connection to Passport PM2 function processor supporting the PANL service.
- Passport Release P4.2.6 or greater backbone network (unless public frame relay tunneling option described later in this section is used).
- Passport ILS User Core Router (UCR), equipped with function processors for FRUNI, FRDTE

Branch LAN Routing Logical Components

- Switched Permanent Virtual Circuit (SPVC) from Passport 4400 virtual port 2 (or other virtual port if using traffic management capabilities to implement IP prioritization) to the Passport ILS NMCR FRUNI service..
- Passport ILS UCR FRUNI DLCI with Direct Call to Passport 4400 remote prefixDNA and DLCI.
- Passport FRUNI to FRDTE virtual (or physical) hairpin connection.

The configuration of Passport ILS as UCR versus NMCR is very similar, except that the Passport ILS remote groups must be provisioned below the FRDTE component and associated with multiple protocol ports and IP subnets (one per branch Passport 4400). In other words, the number of IP subnets and/or IPX network numbers are equal to the number of Passport 4400's with interconnected LAN's. Also, a Passport ILS Ethernet FP is not a UCR requirement unless the UCR is also the means of corporate LAN or server access. On the branch Passport 4400, virtual port 2 is configured with an IP address with RIP enabled.

Switched Permanent Virtual Circuits (SPVC's) are configured to originate from each branch Passport 4400 virtual port 2, and terminate on a Passport Frame Relay DCE (FRUNI) Data Link Connection Identifier (DLCI) resident on the Passport ILS UCR. A physical or virtual Frame Relay hairpin is required on the Passport ILS NMCR to associate the Passport ILS FRDTE interface with the FRUNI service which terminates the SPVC's from the Passport 4400 branches. A distinct IP subnet is required for the FRDTE interface. It is recommended that the Passport ILS FRDTE protocol port be configured for passive rip with silence flag enabled.

If LAN services are not implemented at branch locations, the Passport ILS UCR is not required. For additional information, Consult NTP 800-1952-20, Passport 4400 Operators Manual.

Configuring Voice Services

The Network Address Server (NAS) function provided in Release 1.X is no longer supported. The Passport Voice Networking Call Server (VNCS) is a database that supplies routing information required during voice call establishment, and interacts with the Passport Remote Server Agent (RSA), which can reside anywhere in the network, and is an entry point for access to the VNCS. The Passport 4400 requires RSI, and an MSM Profile. Although Passport 4400 and Passport Voice interworking is not supported in this release, the above elements are required for Passport 4400 to Passport 4400 voice overlay's as well. Please refer to NTP 241-7001-410, Passport Voice Networking User Guide, and NTP 241-7001-180, Passport Remote Server Agent User Guide.

End-to-End Management IP Connectivity Configuration Example

In this example, for the purposes of simplification, Passport PANL and Passport ILS services are provided by a single Passport. No LAN routing protocols are implemented (the Passport with PANL Service providing WAN link connectivity to 4400 and the Passport ILS providing NMCR functions could be separate as well, with RIP, OSPF and export policies implemented). The management subnet 10.10.10.0 has been assigned for both Passport 4400s, and the ILS FRDTE protocol port for WAN management purposes. The subnet 10.10.11.0 has been assigned to the ILS Ethernet protocol port.

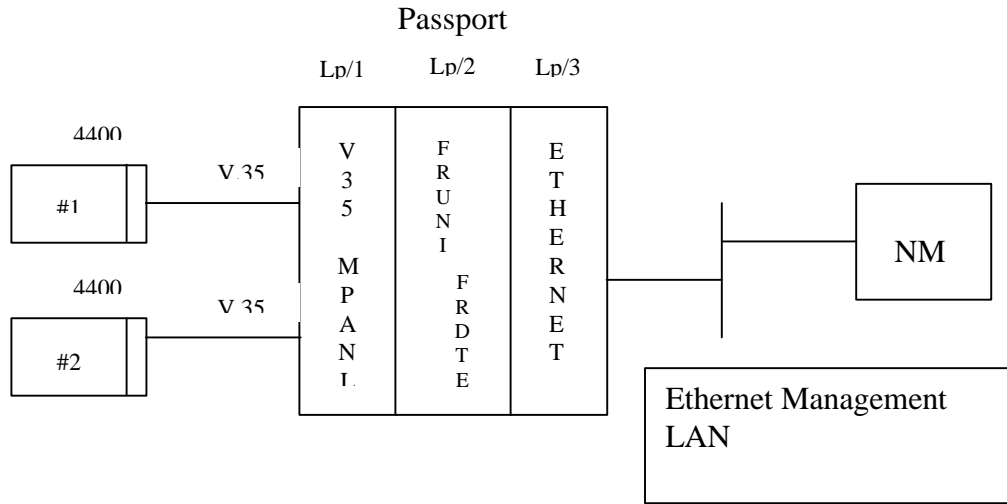


Figure 1 End-to-End Management IP Connectivity Example

Passport Software Configuration Definition:

```
>set sw avl base_BD02S3D, wanDte_BD02S3D, ip_BD02S3D,
  frameRelay_BD02S3D, networking_BD02S3D

>add sw lpt/CP
>set sw lpt/CP featureList callServer
>set lp/0 LogicalProcessorType sw lpt/CP

>add sw lpt/mpanl
>set sw lpt/mpanl featureList mpaNetworkLink, frameRelayUniPvcSvc
>set sh card/1 cardtype v35
>add lp/1
>set lp/1 maincard sh card/1
>set lp/1 LogicalProcessorType sw lpt/mpanl

>add sw lpt/framerelayhairpin
>set sw lpt/framerelayhairpin featureList frameRelayDTE, frameRelayUni,
  frsVirtualFramer, ip
>set shelf card/2 cardType v35
>add lp/2
>set lp/2 maincard sh card/2
>set lp/2 LogicalProcessorType sw lpt/framerelayhairpin

>add sw lpt/lan
>set sw lpt/lan featureList ip
```

```
>set shelf card/3 cardType 6pEth10BaseT
>add lp/3
>set lp/3 maincard sh card/3
>set lp/3 LogicalProcessorType sw lpt/lan

>ch prov
>act prov
>conf prov
```

Passport Components Definition:

```
>add CR
>add CR npi/x121
>add CR npi/X121 dna/302102
>set CR npi/X121 dna/302102 moduleId 1789

>add mpanl/1
>add lp/1 v35/0
>add mpanl/1 framer
>set mpanl/1 framer interfaceName lp/1 v35/0
>add mpanl/2
>add lp/1 v35/1
>add mpanl/2 framer
>set mpanl/2 framer interfaceName lp/1 v35/1

>add fruni/1
>set fruni/1 dna dna 30210217890200
>del fruni/1 framer
>add fruni/1 vframer
>set fruni/1 vframer lp lp/2
>add fruni/1dpci/100
>add fruni/1dpci/200
>set fruni/1 dpci/100 dc remoteDlci 16
>set fruni/1 dpci/200 dc remoteDlci 16
>set fruni/1 dpci/100 dc type permanentSlave
>set fruni/1 dpci/200 dc type permanentSlave
>set fruni/1 dpci/100 dc remoteDna 30210217895101
>set fruni/1 dpci/200 dc remoteDna 30210217896101

>add vr/1
>add vr/1 ip
>add vr/1 pp/NMCR
>add vr/1 pp/NMCR ippport
>add vr/1 pp/NMCR ippport ipLogicalinterface/10.10.10.3
```

```
>set vr/1 pp/NMCR ippport ipLogicalinterface/10.10.10.3 broadcast
  10.10.10.255, netmask 255.255.255.0
>add frdte/1
>set frdte/1 acceptundefinedlci disabled
>del frdte/1 framer
>add frdte/1 vframer
>set frdte/1 vframer lp lp/2, vof fruni/1 vframer
>add frdte/1 staticDlci/100
>add frdte/1 staticDlci/200
>set frdte/1 rg/1 linkToFrDteDlci frdte/1 stdlci/100, frdte/1 stdlci/200
>set vr/1 pp/NMCR LinkToMedia frdte/1 rg/1
>add vr/1 pp/NMS
>add vr/1 pp/NMS ippport
>add vr/1 pp/NMS ippport iplogicalinterface/10.10.11.2
>set vr/1 pp/NMS ippport iplogicalinterface/10.10.11.2 broadcast
  10.10.11.255 netmask 255.255.255.0
>add lan/1
>add lp/3 enet/0
>set lan/1 framer interface lp/3 enet/0
>set lan/1 linkToProtocolPort vr/1 pp/NMS

>ch prov
>act prov
>conf prov
>save prov
>commit prov
```

Passport 4400 Configuration:

Define the Passport 4400 #1 prefixDNA and NodeId. The prefixDNA is used during call setup:

```
>def msm profile nodeId 5
  where 5 is the <nodeid> chosen for the two Passport 4400s in this
  example
```

In this example the dna defined adheres to the following addressing convention:

```
<dnic 4 digits>
<rid 2 digits>
<mid 4 digits>
<nodeId 1 digit>
```

```
>def msm pro dn "[x.121]30210217895"
```

Setup the routing information:

```
>add ip add en 4 nn.nn.nn.nn nn.nn.nn.nn nn.nn.nn.nn
>def ip ba pa da 4 fr
>def ip in 4 ip en
>def ip invarp 4 ip en
>add ip route 10.10.10.0 4 2 10.10.11.2 255.255.255.0
```

Setup the SPVC call originating from ifIndex 4:

```
>add fr port spvc 4 100 30210217890200 master createAndGo
>sa con up
>res sys cur res
```

Restart the 4400 and ensure that the PANL link comes up and that the 4400 registers its dna_prefix for that Passport.

```
>d -p npi/x121 dna/*
```

Display the PANL SignalingMpanl component to ensure 4400 has exchanged its profile ID:

```
> d mpanl/x sigm
> d mpanl/x PrefixDna/*
```

Repeat for Passport 4400 #2, using a NodeId value of 6, and a DLCI value of 200.

Release R1.X to Release R2.0.4 Network Migration

Passport 4400 Release R1.X configuration data is not forward compatible. As a result, in order to upgrade to R2.0 from previous R1.X releases, once new boot code and application software has been downloaded to the alternate code bank and committed, a cold reset is required. This will restore the Passport 4400 to factory default settings.

Once the unit has been restored to factory default settings, as a minimum, new configuration data to establish management IP connectivity through the Passport ILS Network Management Core Router (NMCR) is required. Once this has been accomplished, user services can optionally be remotely configured.

To minimize the requirement for synchronized cutover of the Passport 4400 and the Passport Function Processor (FP) providing PANL service, the PANL over Frame Relay option can be used in conjunction with a Frame Relay Tunneling to PANL hairpin. This would facilitate branch by branch cutover, and allows for fallback capability as Passport Frame Relay Switched Virtual Circuits (SVCs) on the edge Passport and Permanent Virtual Circuits (PVCs) to the FR to PANL hairpin can coexist on a single Frame Relay UNI Function Processor port. Only the PANL service at the hairpin location would require a PM2 FP. For following is more information specific to the Passport:

PANL Frame Relay Tunneling Physical Components

- Passport 4400 R2.0.4 WAN link connection to Passport PM1 or PM2 Function Processor supporting the FRUNI service.
- Passport equipped with Release P4.2.6 or greater, and PM2 Function Processor at the PANL to FRUNI hairpin location.
- Passport ILS Network Management Core Router (NMCR), equipped with function processors for FRUNI, FRDTE

PANL Frame Relay Tunneling Logical Components

- Permanent Virtual Circuit (PVC) from Passport port supporting WAN link connection to branch Passport 4400 to FRUNI service at hairpin location.
- Passport ILS UCR FRUNI DLCI with Direct Call to Passport 4400 remote prefixDNA and DLCI.
- Passport FRUNI to FRDTE virtual (or physical) hairpin connection.

The edge Passport Frame Relay UNI FP does not require an immediate PM2 upgrade. In this scenario, the following R2.0.4 deployment sequence in an existing R1.X network is possible:

- 1 Plan Network Cutover (engineering, addressing, fanout, link speeds, redundancy)
- 2 Passport ILS Network Management Core Router (NMCR) deployment
- 3 Voice Elements deployment (RSA, VNCS)
- 4 PANL PM2 FP deployment at FR to PANL hairpin site
- 5 Passport network migration to P4.2.6 or greater

- 6 Passport Frame Relay PVC configuration (from existing edge passport FRUNI SVC service FP to FR to PANL hairpin)
- 7 Download Passport 4400 boot code and application software.
- 8 Commit Passport 4400 R2.0.4 application code bank and cold reset the unit.
- 9 On site, enter the Passport 4400 base configuration, (Identity, IP addresses, SPVC to Passport ILS Core Router)
- 10 Migrate the edge Passport FP's to PM2 selected ports to PANL to support branch/edge passport cutover from Frame Relay Tunneling to PANL hairpin to PANL service on edge Passport.

16MB DRAM Installation Instruction

This instruction sheet is intended to guide you through the installation procedure for the 16 Megabyte DRAM SIMM (A0662646) into the Passport 4400 Ethernet Base Module (NTAU01AA).

STEP	INSTRUCTION
1	Disable and/or disconnect power source (AC or DC) to unit
2	Remove four (4) each cover screws [two (2) on each side] from unit
3	From the unit backside, slide cover back then lift cover off unit and put aside.
4	Remove screws affixing Expansion Module rear panels and Blank panels to chassis (if no Expansion modules are present, go to Step 6).
5	Remove plastic retainer(s) (see Figure 1) from chassis by lifting up then pulling out (Redundant units will require loosening front panel L'brackets in order to remove top retainer). Carefully lift Expansion Module up and out (avoid excessive bending). Repeat this step until Base Module is uncovered.
6	Gently push J6 Connector Locking Flanges (see Figure 1 and 2) outward and remove existing (8 Megabyte) DRAM SIMM .
7	Install 16 Megabyte DRAM SIMM into J6 Connector
8	Re-install E21 and E23 (Bank Depth) Jumpers into 4M position (see Figure 2 for location). Both E21 and E23 have two jumpers each.
9	Re-assemble unit in reverse order from Step 5 (i.e. re-install Expansion Modules and plastic retainers, tighten L'brackets if unit is Redundant, fasten rear and blank panels using screws, re-install unit cover and fasten to chassis sides using screws and reconnect and/or enable power source.

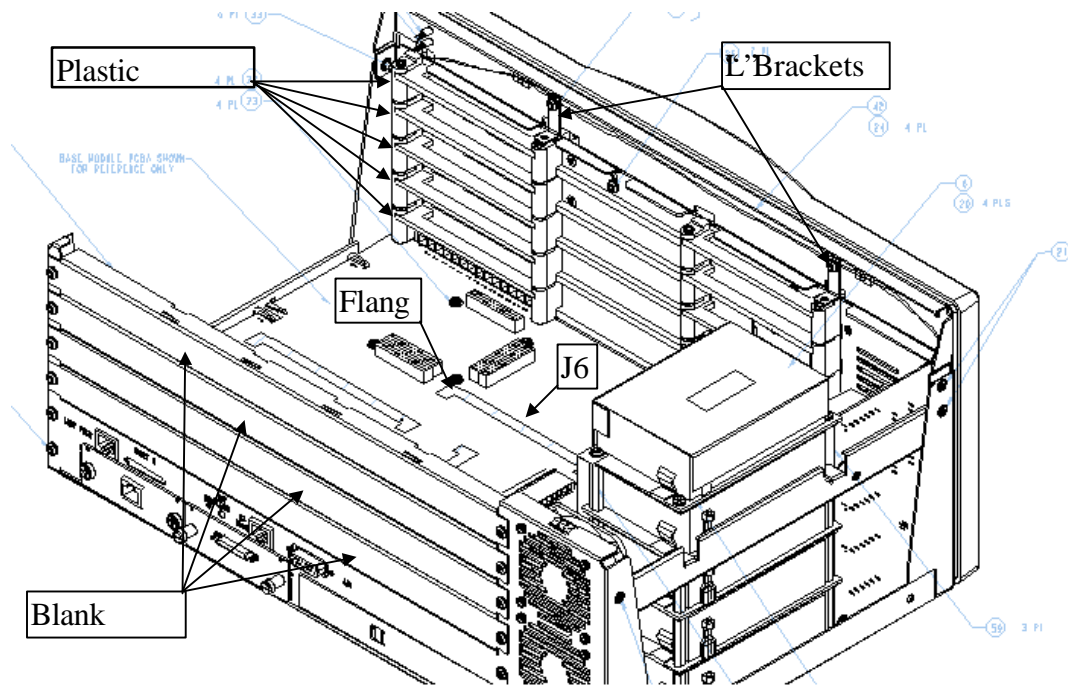


Figure 2 Back View of Passport 4400

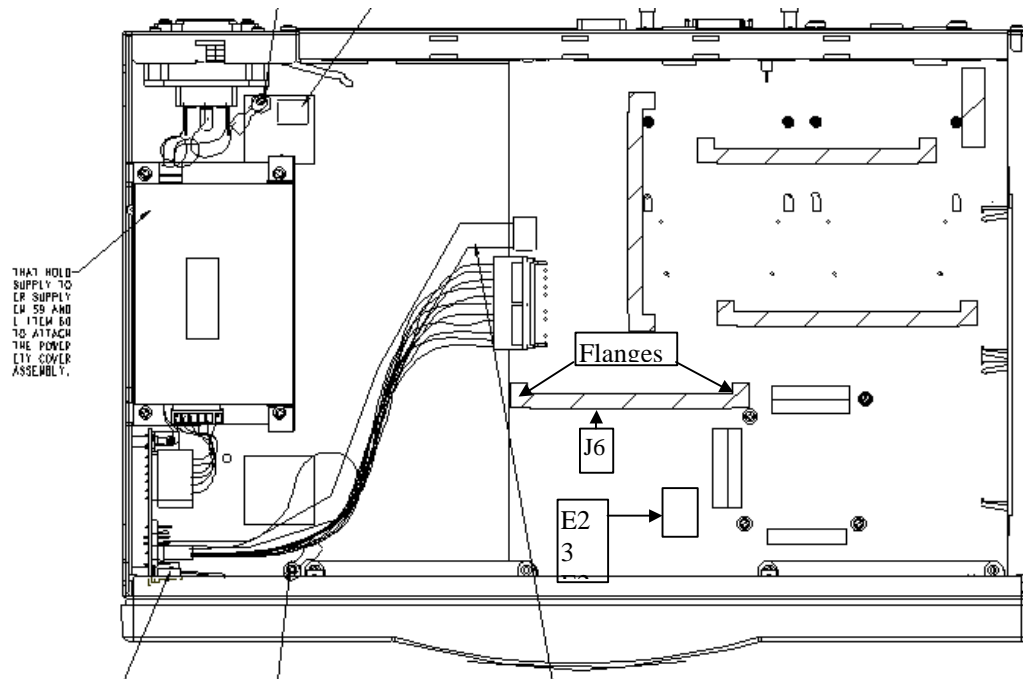


Figure 3 Top View of Passport 4400

Runtime TFTP Software Download

Software Download is part of the future Passport 4400 network management functionality, but can also be initiated from the Passport 4400 Command Line Interface (CLI). Installation is part of the standard Passport 4400 remote site installation and initial configuration process. Runtime TFTP software download requires TFTP configuration on the workstation, and a properly configured Passport ILS Network Management Core Router to provide management IP connectivity to Branch Passport 4400s.

TFTP Download Server Setup

The download server is a TFTP daemon running on an NMS or other workstation. It must be configured to run in secure mode, and be provided with the name of the directory where the software resides. This directory should not contain anything other than the software for download, as everything in it is available to any user on the network who knows how to use TFTP. TFTP does not provide any password protection of the data. (for information on the TFTP server see [fran tftp](#)) To set up the TFTP server, do the following:

- 1 Login as root, and edit the `/etc/inetd.conf` file.
- 2 Find the line that starts with `#tftp dgram` and remove the comment character (`#`) from the beginning of the line.
- 3 Then change the directory specifier at the end of the line from `/tftpboot` to `/opt/MagellanPASSPORT 4400/software`.
- 4 Reboot the workstation after saving the changes.

Note: If the line is already uncommented, it means the workstation is already serving as a TFTP server. You will either need to find another workstation, or use the directory already specified. If you choose to use the directory already specified, the files used by the other system must not conflict with the naming conventions for Magellan PASSPORT 4400 Software. We recommend using a different workstation to reduce the chance of conflicts.

Boot Menu Software Installation

The Passport 4400 is equipped with a Boot Menu and is intended for use only by Nortel manufacturing or customer support personnel for debugging purposes. An example of debug FTP software installation via the boot menu is provided below. A TFTP server is

not required on the download host, however an FTP daemon or process must be available, since the file transfer uses FTP.

The target Passport 4400 and software distribution site must be connected to the same LAN subnet. Information shown within square brackets represents the boot menu defaults. Entering the information followed by a carriage return makes changes to the information within brackets (shown immediately after brackets). In cases where there is no information shown after the square brackets, then this information is not mandatory for software installation. Note that if a LAN gateway does NOT exist between the software distribution site and the target PASSPORT 4400, a period (.) is required after the gateway address' prompt.

Installation

1. View Current Software Status
 2. Install New Software
 3. Install New Bootrom
 4. Enter Debug Menu
 5. Exit (Autoboot)
-

selection -> [1] 2

Install New Software Image

Bank 2 has been selected.

.host name -> [wc]
.host address -> [198.48.9.34] 131.147.140.33
.file name -> [/tmp/oscar/mpa.bld]
/opt/Magellan/software/pr111001/pr111001.bld
.target name -> [mpa]
.target address -> [198.48.9.20:FFFFFF00] 131.147.140.34
.gateway address -> [] .
.user login -> [atlas] myuserid
.user password -> [atlas] mypassword

Network Parameters

boot device : qu
processor number : 0
host name : wc
file name : /opt/MagellanMPA/software/pr111001/pr111001.bld
inet on ethernet (e) : 131.147.140.34:fffffe0
host inet (h) : 131.147.140.33
user (u) : myuserid

```
ftp password (pw) : mypassword
flags (f)         : 0x0
target name (tn)  : mpa
Proceed with S/W installation? [yes]
```

Passport 4400 Link Frame Size Value

The link level frame size is configurable on the Passport 4400. The frame size chosen on the Passport 4400 should take into account the physical link speed, or, if tunneling through a public frame relay network, the Traffic Information Rate (TIR) used on the Passport PANL service should be considered. The default link level frame size on the Passport 4400 is 80 bytes, which is acceptable for a 64kbps link. A simple rule to follow is to increase the link frame size by 80 bytes for each 64kbps increment of bandwidth on the link. For example, use 160 bytes for a 128kbps link speed, 240 bytes for a 192kbps link speed and so on. Failure to set the frame size properly may cause poor throughput performance (if set too small), or voice quality degradation (if set too large).

PANL Frame Relay Tunneling

When operating in a tunneled configuration the 4400 may experience voice quality degradation if the Passport 4400 link level Traffic Information Rate (TIR) is set to be less than the physical link speed. For example, consider the case where the link speed is 2 Mbps, with one voice call up, and one FR DCE call using a CIR of 64 Kbps. The Passport 4400 link level TIR is set to 64kbps. If the FR DCE port sends a full 64 Kbps to the link, it will be transmitted at the line rate (i.e. at 2Mbps) in one burst lasting approx. 31 ms. This will block the voice samples from being transmitted and cause the samples to be queued until one second has passed, while the TIR mechanism allows more transmissions to occur. In order to prevent degradation of voice quality from occurring, it is recommended that the Passport 4400 link level TIR always be set to the same value as the link physical speed when operating in tunneled mode. When configuring the Passport PANL service for frame relay tunneling mode, this issue does not occur. In other words there is no requirement that the Passport PANL TIR be set to be the same as the WAN link speed.

Voice Call Transfer Priority

Voice calls may have a lower discard priority that is less than data calls. The discard priority that is signaled by the 4400 at call setup time is provisionable via VNCS. It is possible to set the Transfer Priority for a voice call to be less than 11. This is not recommended since the voice traffic may encounter unacceptable levels of delay which may cause severe voice quality degradation.

Passport 4400 Voice over Passport ATM Trunks

As per the Passport frame relay SVC multimedia traffic class feature, transfer priority 11 (TP11) is used for SVCs carrying Passport 4400 voice traffic across the Passport WAN. This Routing Class of Service (RCOS) is NOT maintained if the voice call traverses a Passport ATM trunk. The voice call is established, however at the ATM trunk egress points, the data will become more sensitive to delay and delay variance in the rest of the Passport network..

Passport Trunk Transmit Queue Starvation

As Passport 4400 voice traffic traverses the Passport network backbone, it uses the highest priority interrupting trunk transmit queue (transfer priority 11) a capability provided by the Passport MMTTC feature, which is a mandatory prerequisite to Passport 4400 deployment. In situations in which interrupting traffic offered to the network greatly exceeds capacity, it is possible that trunk transmit queue starvation of traffic in lower queues can occur impacting frame relay LMI and routing table control messages. This situation could cause trunk and LMI failure, resulting in traffic re-routing, potentially further compounding the situation. A number of Passports traffic management robustness enhancements are being introduced in phases, beginning in Passport Release P4.2.

Traffic Prioritization

The transfer priority of the each of the following types of connections is configurable via operator command on the 4400. The discard priority is signaled during call setup is configurable on the 4400 via operator command.

- LAN overlay connection (e.g. from one 4400 to another 4400 for LAN data).
- LAN interworking connection (e.g. from 4400 to Passport ILS for LAN data).
- A frame relay (or HTDS) connection (e.g. for a FR DTE connected to the 4400 FR DCE port that sets up a call to a second 4400 FR DCE port).

The total number of voice calls on a link is controlled by the Voice Call Admission Control (CAC) on the 4400. The CAC works by reserving bandwidth for each voice call, until the maximum amount of bandwidth reserved for voice calls is used up. The maximum amount is set via provisioning.

Command Line Interface (CLI)

The CLI was originally intended for use as an initial Passport 4400 commissioning tool, prior to Network Management connectivity being established.

CLI is an alternative to the NMS configuration and surveillance, the preferred method. As such, alarm indications or extensive semantic checks are not provided. SET commands

entered at the CLI will dynamically affect modified attributes. ADD and DEFINE commands typically change the attributes only upon reset.

PC based NetTool

NetTool
Version 1.0 for Passport 4400
Copyright 1998 by NORTEL/Micom
06/22/98

NetTool will provide Nortel and Micom installation personnel a simple and convenient method of provisioning a new or replacement of Passport 4400 at the customer site. NetTool will quickly allow installers to perform the minimal provision and check the results to ensure that the NMS can successfully complete the provisioning from the Network Management Center.

Features:

- Supported platforms: Windows 95 and Windows NT 4.0
- Supported COM ports: 1,2,3,4
- Supported communication parameters: 9600, 8, N, 1
- Support for all four Passport 4400 link types: Serial, ISDN (dial-up, leased lines), T1 CSU, and 56K CSU
- Enhanced faster display
- Terminal Emulator is included for additional viewing and provisioning capabilities
- Automatic primary link hardware detection. Upon login, the user will be presented with the menu for the correct hardware installed for the primary link
- Ability to set the Passport 4400 to factory default configuration
- Ability to save or restore provisioning to/from a file.

Statistics/Accounting

At this time, the Passport 4400 does not gather or spool statistics that can be used for network engineering purposes and problem analysis. Spooled Passport frame relay statistics can be gathered using the Magellan Data Provider (MDP) application available as part of Magellan NMS software when it becomes available.

WAN Link Physical Interface

The WAN interface can only function on physical port 2, which is the first PCMCIA (WAN Serial Interface Module) interface on the Passport 4400 rear panel, the integral CSU/DSU or the ISDN S/T and U interface.

WAN Link Cable Maximum Length

The WAN link cable between Passport 4400 and Passport, when used in conjunction with shielded extension cables, to facilities or Passport function processors must not exceed a combined length of 50 feet.

WAN Link High Speed Clocking

For high speed V.35 WAN link connections to Passport V.35 function processors, it is recommended that the Passport PANL interface port be configured for DTE clock source. This attribute can be observed by issuing the Passport command `show run | grep Lp/<LP> V35/<Port>`. This is NOT required or applicable to V.11 WAN link connections to Passport V.11 function processors.

Speech Activity Detection

The Speech Activity Detection feature, (SAD) is enabled by default but can be disabled using the Command Line Interface (CLI) in this release. It is strongly recommended that SAD remain enabled for Passport 4400 to Passport 4400 voice services, as engineering impacts include increased link and CPU utilization.

Incorrect Power Failure Trap

In the factory, power supplies are balanced to support the specific module configuration. If voice modules are removed from a chassis, with only the Ethernet Base Module remaining, a jumper setting is required and a power supply harness must be removed to eliminate an erroneous power failure condition, which will be reported to the NMS. For additional information, consult NTP 800-1951-20, *Hardware Installation Guide*.

TAM/EAM Unsupported Ports Configurable

In this release, although the TAM/EAM digital voice cards are equipped with two ports, only the DSX-1 port is supported for connection to a PBX. Network connections are not supported. The unsupported port option is displayed in CLI, under the commands `show run | grep line;` although the port is unsupported.

Network Management Considerations

NMS Connectivity to Passport 4400

NMS workstation physical connectivity for the purpose of managing both Passport 6400 and Passport 4400 can either be distinct and separate or via a single Frame Relay interface. As the primary means of NMS connectivity for Passport 6400, is a Frame Relay connection. It is possible to manage both the Passport 4400 and the Passport 6400 with the existing physical connection to a Passport FRUNI interface with existing PVC's to the IPIFR component on Passports in the network. A new PVC can be configured from this FRUNI to another FRUNI on a Passport ILS node providing a Passport 4400 Network Management Core Router (NMCR) function via virtual hairpin to the Passport ILS FRDTE service. Since SUN frame relay does not respond to inverse arp requests through the Frame Relay Interface, an arp host entry with PVC association on the Passport ILS NMCR is required. Since Passport 4400 static arp entries can't be mapped to PVCs as they can be with Passport, two subnets are required. IP connectivity to a Passport ILS Network Management Core Router supporting branch Passport 4400's is established via IP, through IP addresses assigned to the NMS workstation and Passport 4400 IfTable Index 4. Typically a WAN subnet is logically separated from end customer IP address space, and is used strictly for NMS connectivity (hence management traffic) purposes. If there is a requirement for the NMS workstation to be connected to a corporate LAN, and also directly to a Passport 4400 NMCR via a separate IP subnet, then multiple Ethernet interfaces are a workstation requirement.

NMS workstation connectivity for the purposes of managing Passports is distinct and separate from Passport 4400, and is typically achieved via IP over X.25 or IP over Frame Relay. This requires X.25 or Frame Relay software to be installed and operational on the NMS workstation.

Engineering Considerations

Following is an overview of Passport 4400 engineering considerations.

A properly engineered Passport network is required for WAN transport of Passport 4400 traffic. Taking into account considerations such as the number of branches, traffic classes, routing, trunk load versus bandwidth available, other traffic types in the network, link speeds, fanout, discard priority, rate enforcement, rate adaptation, services per function processor, and redundancy.

Passport ILS Core Router Fanout

A number of factors determines the number of branches which can be supported by the Passport ILS NMCR, including the service mix on the Passport ILS NMCR FP running the FRUNI service, whether the FP is PM1 or PM2. Please consult Passport Engineering guidelines for further information.

Maximum Voice Channels per Passport 4400

The maximum number of combined simultaneous digital and analog voice channels supported on a single Passport 4400, with SAD enabled, is 30.

Bandwidth and Throughput Required per Voice SPVC

Each SPVC carrying voice traffic requires 10.4 Kbps. The frame consists of 20 bytes of voice payload + 6 bytes overhead = 26 bytes. Each voice channel will require 40 pps throughput.

Chapter 3

Software Update Items

This chapter highlights fixes that have been introduced in this Release.

Items Resolved in the R2.0.4

The following table provides a list of the Problems fixed in R2.0.4.

Item	Title	SR#
1	Calls dialed from MVP to Passport 4400 didnt produce ring back tone with MVP/4400 internetworking.	60002045
2	Retry count for Japan's ISDN exceeded 2 counts within a 3 minute period.	60002048
3	Passport 4400 software does not recognize LDM module during diagnostics check when power is applied.	30005427
4	DTMF tone detector/generator failed to regenerate input digit string when sequence of numbers is greater than 30 digits.	60033222
5	The DLCI range extends from 16 to 991. DLCI's can be provisioned beyond this range.	10163552
6	With Passport 4400 connected to T1/E1 voice circuit and voice provisioning is as follows: Dvmsignalling R2Q and CallprogressTone, when call is initiated from PBX, DVM does not provide dial tone and DVM channel resets after approximately 10 seconds.	60059900
7	Can't provision greater than 116 FR SW maps on the Passport 4400.	60057220