Vanguard Managed Solutions

Vanguard 242D Installation Manual

Notice

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules, CISPR22 and EN55022. These limits are designed to provide reasonable protection against interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

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This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

This is a Class B product. Operation of this equipment in a residential environment may cause radio interference, in which case the user may be required to take adequate measures to correct the interference at his/her own expense.

This product was verified under test conditions that included the use of shielded DTE cable(s). A cable equipped with a ferrite bead may also have been used. Use of different cables will invalidate verification and increase the risk of causing interference to radio and TV reception.

You can obtain the proper cables from Vanguard Managed Solutions.

Telecommunications Regulations

Equipment that complies with Part 68 of the FCC rules includes a label or permanent marking on the printed circuit board that connects to the network that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (*e.g.*, 03 is a REN of 0.3).

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult a trained technician.

Equipment that meets the applicable Industry Canada Terminal Equipment Technical Specifications is conformed by the registration number. Equipment that complies with Industry rules includes a label or permanent marking on the printed circuit board that connects to the network. The abbreviation, IC, before the registration number signifies that the registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Part No. T0301, Revision A
First Release: August 2005

This manual is current for Release 6.5.P02A of Vanguard Applications Ware

Contents

Overview

Introduction

This installation describes features, hardware, specifications, and applications for the Vanguard 242D.

Note

For information on operating system software and configuration, see the *Vanguard Basic Configuration Manual* (Part Number T0113).

Audience

This manual is intended for people who install and operate the Vanguard 242D.

How to Use This Manual

The following table describes the contents of this manual:

This Chapter	*Description*
Chapter 1	Vanguard 242D hardware and software features.
Chapter 2	Description of the Vanguard 242D hardware features and components.
Chapter 3	Installing and replacing Vanguard 242D hardware including DIMM modules and motherboard.
Chapter 4	Powerup procedures and software installation.
Appendix A	Product specifications.
Appendix B	FCC and Telephone Company procedures and requirements.

Related Documentation

Introduction

This section describes related documentation and where to obtain documentation.

Other Documentation

All documentation is provided on the Vanguide CD-ROM and the VanguardMS web site. **http://www.vanguardms.com/documentation**

Documentation Kit	***Includes:***
Vanguard Applications Ware Documentation Set	• *Vanguard Applications Ware Basic Protocols* (Part Number T0106) • *IP and LAN Feature Protocols* (Part Number T0100) • *SNA Feature Protocols* (Part Number T0101) • *Serial Feature Protocols* (Part Number T0102) • *Multi-Service Feature Protocols* (Part Number T0103) • *Multimedia Feature Protocols* (Part Number T0104) • *Alarms and Reports Manual* (Part Number T0005) • *Software Installation and Coldloading Manual* (Part Number T0028)
IP and LAN Feature Documentation Set	• *IP and LAN Feature Protocols* (Part Number T0100)
SNA Feature Documentation Set	• *SNA Feature Protocols* (Part Number T0101)
Serial Feature Documentation Set	• *Serial Feature Protocols* (Part Number T0102)
Multi-Service Feature Documentation Set	• *Multi-Service Feature Protocols* (Part Number T0103)
Multimedia Feature Documentation Set	• *Multimedia Feature Protocols* (Part Number T0104)
Vanguard Applications Ware Basic Protocols Documentation Set	• *Vanguard Basic Protocols* (Part Number T0106)

Vanguide CD-ROM

The Vanguide CD-ROM contains all Vanguard documentation available at the time of release. To order a copy of the Vanguide CD-ROM, please contact a VanguardMS Representative.

VanguardMS Web Site

Check the VanguardMS web site for the latest documentation:

http://www.vanguardms.com/documentation/

Special Notices

The following notices emphasize certain information in the guide. Each serves a special purpose and is displayed in the format shown:

Nota

Note is used to emphasize any significant information.

Advertencia

Caution provides you with information that, if not followed, can result in damage to software, hardware, or data.

Warning

Warning is the most serious notice, indicating that you can be physically hurt.

Simplified Chinese

特别通告

以下通告强调指南中的某些信息。
每条信息均有一个特殊的目的并以如下格式显示:

注解

注解用于强调任何重要的信息。

切记

切记提供您这类信息，如果不遵照信息的要求，可能导致软件、硬件或数据的损坏。

警告

警告是最严重的通告，表明您的身体可能被伤害。

Danish

Særlige overskrifter

Følgende overskrifter fremhæver nogle af oplysningerne i vejledningen. De tjener hvert et specifikt formål og vises i følgende format:

Bemærk

Bemærk anvendes til at fremhæve vigtig information.

Forsigtig

Forsigtig understreger oplysninger, som, hvis de ikke bliver fulgt, kan føre til beskadigelse af software, hardware eller data.

Advarsel

Advarsel er den mest alvorlige overskrift, og tilkendegiver mulig personskade.

Dutch

Bijzondere vermeldingen

De volgende vermeldingen besteden extra aandacht aan bepaalde informatie in de handleiding. Elke vermelding heeft een eigen nut en wordt in de volgende opmaak weergegeven:

Opmerking
Een opmerking wordt gebruikt om belangrijke informatie te benadrukken.

Let op

Dit kopje geeft aan dat u de beschreven instructies moet volgen om schade aan de software, hardware of gegevens te vermijden.

Waarschuwing

Een waarschuwing is de belangrijkste vermelding. Indien u deze niet volgt, kan dit tot lichamelijke verwondingen leiden.

Finnish

Erityisilmoitukset

Seuraavat ilmoitukset korostavat tiettyjä oppaan tietoja. Kullakin on oma erikoistarkoituksensa ja ne esitetään seuraavassa muodossa:

Huomaa
Huomautusta käytetään korostamaan tärkeätä tietoa.

Vaara

Vaarailmoitus antaa tietoa, jonka huomiotta jättäminen voi johtaa ohjelmiston, laitteiston tai tietojen vahingoittumiseen.

Varoitus

Varoitus on kaikkein vakavin ilmoitus ja se kertoo mahdollisesta loukkaantumisriskistä.

French

Messages spéciaux

Les messages suivants mettent en valeur certaines informations dans le guide. Chacun d’eux remplit une fonction spéciale et est affiché dans le format indiqué :

Important
Important est utilisé pour souligner des informations critiques au sujet d’une procédure.

Mise en Garde

Une mise en garde vous fournit des informations qui, si elles ne sont pas observées, peuvent se traduire par des dommages pour le logiciel, le matériel ou les données.

Avertissement

Un avertissement constitue le message le plus sérieux, indiquant que vous pouvez subir des blessures corporelles.

German

Besondere Hinweise

Durch die folgenden Hinweise werden bestimmte Informationen in diesem Handbuch hervorgehoben. Jeder Hinweis dient einem bestimmten Zweck und wird im dargestellten Format angezeigt:

Wichtig

WICHTIG wird zur Betonung signifikanter Angaben zu Vorgehensweisen verwendet.

Vorsicht

Ein Vorsichtshinweis macht Sie darauf aufmerksam, daß Nichtbefolgung zu Software-, Hardware- oder Datenschäden führen kann.

Warnung

Eine Warnung weist Sie darauf hin, daß ernsthafte Körperverletzungsgefahr besteht.

Italian

Simboli speciali

I seguenti simboli, ciascuno con una speciale funzione, evidenziano determinate informazioni all'interno del manuale. Il formato è quello riportato qui di seguito.

Nota

Questo tipo di avvertimento viene utilizzato per evidenziare tutte le informazioni significative relative ad una procedura.

Attenzione

Questo tipo di avvertimento fornisce informazioni che, se non vengono seguite, possono provocare danni al software, all'hardware o ai dati.

Avvertenza

Questo tipo di avvertimento indica la presenza di condizioni di rischio che possono causare lesioni fisiche. Si tratta del simbolo più importante al quale prestare attenzione.

Japanese

特別表記

ガイド内では、以下の表記を使って特に注意する必要のある情報が提供されます。各表記にはそれぞれ目的があり、次の形式で表示されます。

■ 重要
　重要な情報が記述されています。

注意

記述されている内容に従わない場合、ソフトウェア、ハードウェア、またはデータが壊れる可能性があります。

警告

最も重要な情報が記述されています。身体的な障害を被る可能性があります。

Korean

일러두기

이 설명서에는 사용자에게 특정한 내용을 강조하기 위해서 다음 내용이 포함되어 있습니다.

■참고
　중요한 정보를 강조하는데 사용합니다.

주의

소프트웨어나 하드웨어, 또는 데이터를 손상시킬 수 있으므로 주의가 필요한 상황을 알립니다.

경고

사용자의 안전에 위험을 알리는 가장 심각한 수준의 경고입니다.

Norwegian

Spesielle merknader

Merknadstypene nedenfor representerer en bestemt type informasjon i håndboken. Hver merknadstype har en spesiell hensikt og vises på følgende format:

■**Merk**
　Merk brukes for å fremheve viktig informasjon.

Forsiktig

Forsiktig gir deg informasjon om situasjoner som kan føre til skade på programvare, datamaskin eller data dersom den blir fulgt.

Advarsel

Advarsel er den mest alvorlige merknaden og indikerer at du kan bli fysisk skadet.

Portuguese/ Portugal

Avisos Especiais

Os avisos que se seguem realçam certas informações neste guia. Cada um deles serve um objectivo especial e é visualizado no formato apresentado:

Nota
Nota é utilizado para realçar qualquer informação importante.

Atenção

Atenção faculta-lhe informações que, se não forem cumpridas, poderão provocar danos no software, hardware ou nos dados.

Cuidado

Cuidado constitui o aviso mais grave, o qual indica que poderá ficar fisicamente ferido.

Spanish/Spain

Notificaciones especiales

Las siguientes notificaciones ponen énfasis sobre determinada información de la guía. Todas tienen un propósito especial y se muestran con el formato siguiente:

Nota
Las notas se utilizan para destacar determinada información de importancia.

Advertencia

Las advertencias le proporcionan información que debe seguirse, si no desea que el software, el hardware o los datos puedan verse dañados.

Aviso

Los avisos son las notificaciones de carácter más importante e indican la posibilidad de daños físicos para el usuario.

Swedish

Speciella beteckningar

Följande beteckningar betonar viss information i handboken. Var och en har ett speciellt syfte och visas i formatet nedan:

OBS!
OBS! används för att betona viktig information.

Viktigt

Viktigt ger dig information som, om den inte följs, kan resultera i skada i programvara, maskinvara eller data.

Varning

Varning är den mest allvarliga beteckningen och den indikerar att du kan skadas fysiskt.

Customer Information

Customer Questions

Customers who have questions about Vanguard Managed Solutions products or services should contact your VanguardMS representative or visit this website for product, sales, support, documentation, or training information:

http://www.vanguardms.com/

Chapter 1
About the Vanguard 242D

Overview

Introduction

This chapter describes the hardware and software functions, and the target applications for the Vanguard® 242D device.

These topics are discussed:

- Vanguard 242D Description
- Features and Functionality
- Target Applications

Vanguard 242D Description

Introduction

This section describes the Vanguard 242D device.

Description

The Vanguard 242D provides increased memory and support for new applications and services to meet the growing demands of the small branch office. The 242D comes standard with two 10/100BaseT auto-sensing Ethernet ports - one of which can be used as a WAN port for direct connectivity to a DSL or Cable modem, or for LAN segmentation to separate public from private data.

The Vanguard 242D offers cost-effective integrated solutions that simultaneously support:

- Data
- Voice over IP
- Virtual Private Network (VPN)
- Broadband access
- Two 10/100BT LAN Ports

Note

The second LAN port is port 8.

The Vanguard 242D is SNMP-manageable and comes with a variety of LAN, SNA, and IP networking features.

For descriptions of the Vanguard 242D hardware components, refer to the appropriate sections in Chapter 2, Hardware Description.

Limitations

Ethernet SLAC stations are not supported on the 2nd LAN port of Vanguard® 242D.

The Vanguard 242D requires 6.5.P02A or greater software.

Features and Functionality

Introduction

This section describes the features available with your Vanguard 242D device. For descriptions of the software running on your Vanguard 242D, refer to the appropriate protocol document. These documents can be found on the VanguardMS Web site: **http://www.vanguardms/documentation/**

Standard Features

The standard Vanguard 242D provides these features:

- Low Profile enclosure with rear accessible motherboard
- Motorola MPC860P PowerPC processor
- 8 Megabytes of Non-Volatile FLASH on board
- 32 Megabytes of SDRAM DIMM
- Standard rear panel ports include:
  - One serial interface DB25 port supporting V.24, V.35, V.36, V.11/X.21 interfaces
  - One Async (RJ-45 connector) Control Terminal Port (CTP) for local and remote configuration, and management
  - Two 10/100BaseT Ethernet ports with auto-sensing
- ECC DIMM slot
- External power supply

10/100BaseT Ethernet Cable

Ports 5 and 8 are 10/100BaseT Ethernet and conform to the Fast Ethernet specification (IEE 802.3u) known as 100BaseT. This LAN standard has raised the Ethernet speed limit from 10 Megabits to 100 Megabits per second. This Ethernet port has an auto-sensing feature that allows it to determine if the connection is 10BaseT or 100BaseT and adjust its speed as required.

Control Terminal Port (CTP)

Port 4 can be used as a Control Terminal Port (CTP) for configuration, reporting, and troubleshooting the Vanguard 242D. To access the CTP, you must configure your terminal or terminal emulation software to VT100, 9600 bps, 8-bit, no parity, 1 stop bit. The CTP port can also be utilized for PPP Dial Backup in the event of a loss of signal on the primary connection.

Operating Software

The Vanguard Applications Ware software is compressed in FLASH memory and loaded into the SDRAM DIMM for operation. The Vanguard 242D supports these Applications Ware packages:

- IP^+ Applications Ware Package (includes IP, and IPX)
- SNA^+ Applications Ware Package (includes IP, and SNA)
- Multi-Service Applications Ware Package

For more information on the license upgrades available for the Vanguard 242D, refer to the *Software Release Notice*.

Software Support

The Vanguard 242D supports all the licenses in the Vanguard Applications Ware software suite.

For a detailed list of the software supported by the Vanguard 242D:

- Contact your VanguardMS representative
- Visit the VanguardMS web site: **http://www.vanguardms.com/**

Target Applications

Introduction

This section describes the various target applications for the Vanguard 242D.

These examples are shown:

- Virtual Private Network
- IP Over Frame Relay
- DSL/Cable Modem
- LAN Segmentation
- Virtual LAN (VLAN)

Virtual Private Network

Introduction

This section provides a general description of features and applications within the Vanguard Virtual Private Network (VPN).

These topics are discussed:

- Cost-effective VPN Solutions
- Hardware-based Encryption and Compression
- Standard-based Tunneling and Encryption for IP Traffic
- Multi-protocol Tunneling and Encryption
- Frame Relay and X.25 Encryption

For detailed information about a VPN, refer to your Virtual Private Network Manual (Part Number T0103-10).

What is a VPN?

A Virtual Private Network (VPN) is a network that has the appearance and many of the advantages of a dedicated link but occurs over a shared network. Using a technique called “tunneling,” packets are transmitted across a public routed network, such as the Internet or other commercially available network, in a private “tunnel” that simulates a point-to-point connection.

This approach enables network traffic from many sources to travel through separate tunnels across the same infrastructure. A VPN allows network protocols to traverse incompatible infrastructures. A VPN also enables traffic from many sources to be differentiated, so that it can be directed to specific destinations and receive specific levels of service.

Advantages of a VPN

A VPN provides following advantages:

- Cost Effectiveness
  - *Infrastructure Cost* - By using a VPN, a company need not invest money on connectivity equipment like leased lines, WAN switches etcetera. The connectivity is provided by the service provider.
  - *Operational Cost* - Costs involved with maintaining leased lines or a private WAN along with the money spent on people to maintain them can be avoided.
- Manageability
  - A VPN is more easily managed when compared to a fully private network.

Requirements of a VPN

Below are some of the requirements of a VPN:

- Connectivity
  - There needs to be network connectivity among the various corporate sites. This connectivity is typically used through the Internet.
- Security
  - Data exchanged between the various corporate sites is confidential. When data is sent over a public network it is usually encrypted. The encryption algorithm is used to prevent unauthorized viewing, intrusion, or corruption of the data.

- Address Management
  - The Addresses of the clients on each of the private sites should not be the ones used in the public domain, however, packets sent out onto the public network must have public source/destination addresses.
- Multiprotocol Support
  - The solution must be able to handle common protocols used in the corporate network.

Cost-effective VPN Solutions

Small to Medium Enterprise (SME)

The Vanguard VPN solution is ideal for SMEs that are looking to take advantage of the flexibility, global reach, security, and cost savings of Internet-based VPNs. The current Vanguard installed-base can be easily upgraded to support VPN site-to-site applications at a very competitive price point.

Hardware-based Encryption and Compression

Data Encryption and Compression

Data encryption is a very CPU intensive process and is therefore best implemented in hardware. The VanguardMS solution provides a secure hardware-based encryption. Figure 1-1 shows an example of a secure hardware-based VPN solution for a site-to-site application.

Hardware Options

The hardware option available is the Encryption DIMM which supports DES, Triple-DES (168-bit), and AES.

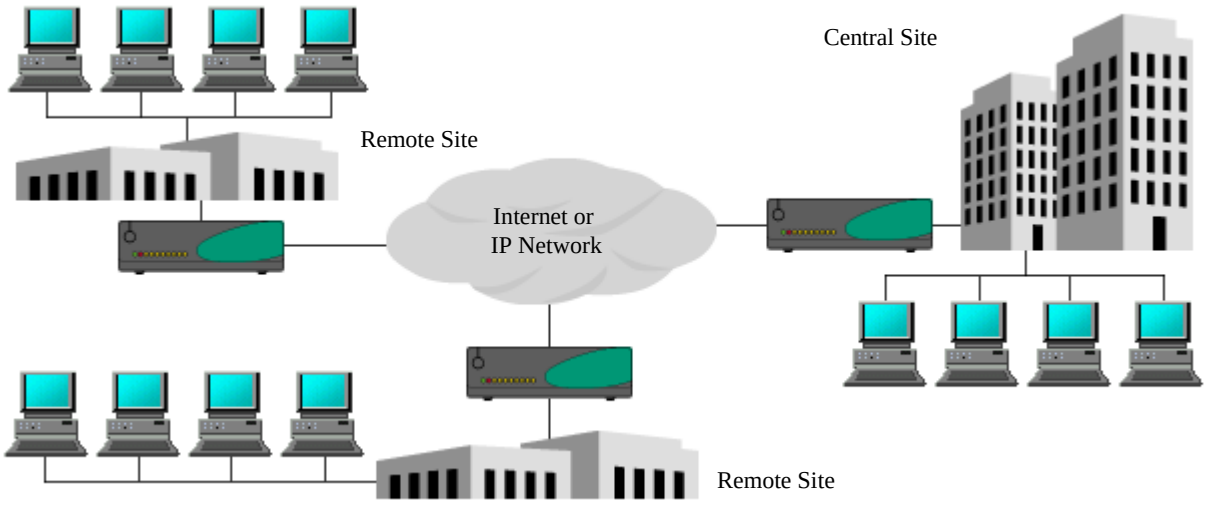

Figure 1-1. Hardware-based VPN Solution for Site-to-Site Applications.

Standard-based Tunneling and Encryption for IP Traffic

IPSec

IPSec is the predominant tunneling and security standard for IP Networks. It defines protocols required for site-to-site as well as remote access VPN implementations at layer 3 of the OSI model. Vanguard Applications Ware release 5.5 and greater supports these IPSec features:

- Authentication Header (AH) and Encapsulating Security Payload (ESP) for user authentication and encryption.
- Internet Key Exchange (IKE) using preshared keys for key management.
- Message Digest (MD5) and Secure Hashing Algorithm-1 (SHA-1) for data integrity.
- ISAKMP supports DES, Triple-DES and AES
- ESP support DES, Triple-DES and AES

Note

ISAKMP and ESP support is available with the Encryption DIMM.

Multi-protocol Tunneling and Encryption

General Router Encryption (GRE)

Whereas IPSec can only tunnel IP traffic over IP Networks, GRE tunneling is a Layer 2 protocol that can tunnel multi-protocol traffic over IP Networks. This enables the Vanguard to tunnel and encrypt IP, IPX, and other bridge data.

DES and Triple-DES (112-bit) are used as encryption algorithms and the fast and efficient SAM proprietary key exchange protocol is used for key management. Integrity Check Character (ICC) establishes data integrity when the SAM protocol is implemented.

Frame Relay and X.25 Encryption

Frame Relay and X.25 Networks

Another value-added feature in Vanguard Managed Solutions VPN implementation is the ability to either encrypt LAN traffic and transport it over Frame Relay and X.25 networks or encrypt serial legacy protocols (SNA, SDLC, SLAC, and TBOP) and transport it over an IP network. This is particularly useful in the financial industry where SNA traffic going out into the branches and ATM machines require a high level of security. This implementation also uses DES, Triple-DES (112-bit) for encryption and VanguardMS Proprietary SAM key exchange protocol to negotiate the keys.

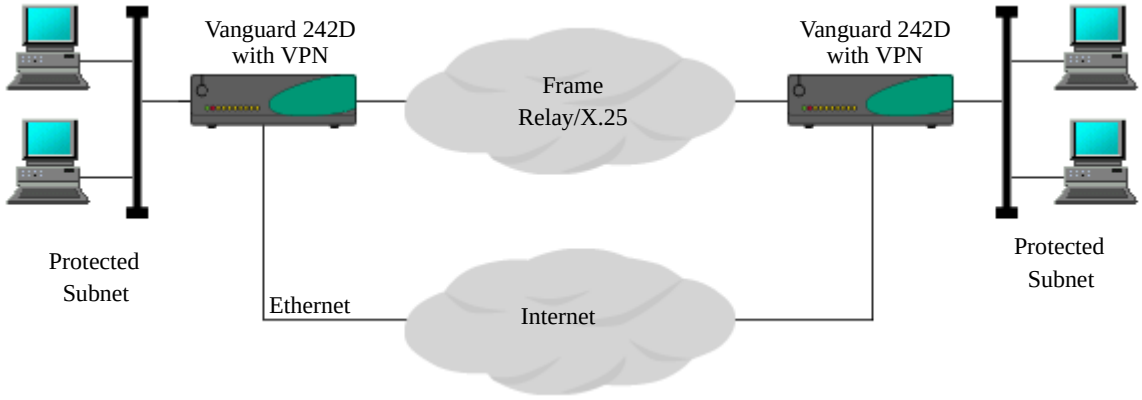

Figure 1-2. Encryption over IP, Frame Relay, and X.25 Networks

Security Features

The security features in Vanguard Applications Ware release 5.5 and greater also include Firewall functionality based on IP Packet Filtering. Access Control Lists can be configured based on a combination of source and destination addresses. IP Protocol, TCP/UDP source and destination port numbers/ranges, and interface numbers. A feature called Cypher Block Chaining prevents repeated patterns in Plaintext from appearing as repeated patterns in Cyphertext, thus making it harder for hackers to find traffic patterns.

IP Over Frame Relay

Introduction

The Vanguard 242D supports multi protocol encapsulation of IP traffic and serial protocols over Broadband IP service. As shown in Figure 1-3, a SNA cluster controller connects to a serial port on the Vanguard 242D and the Ethernet LAN connects to the 10/100BaseT Ethernet port. The Vanguard is fully interoperable with the third party routers via RFC 1490.

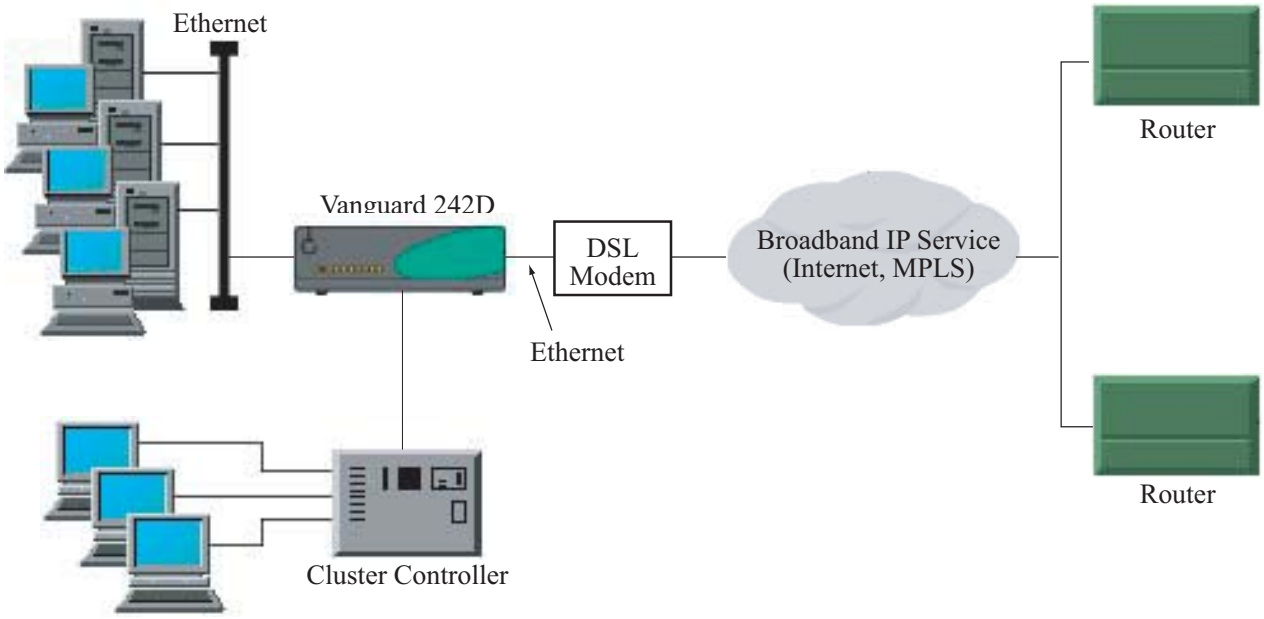

Figure 1-3. IP and Serial Protocols over Broadband IP Service

DSL/Cable Modem

Introduction

The Vanguard 242D enables connectivity to high-speed broadband services such as DSL and Cable by connecting the 10/100BaseT port on the Vanguard 242D to the Ethernet port on the DSL or Cable modem.

Cable modem speeds vary in the downstream direction. Network speeds can reach 27 Mbps., but this is an aggregate amount of bandwidth that is shared by users. Few computers will be capable of connecting at such high speeds, so a more realistic number is 1 to 3 Mbps. In the upstream direction speeds can be up to 10 Mbps. Most modem producers have selected a more optimum speed between 500 Kbps and 2.5 Mbps.

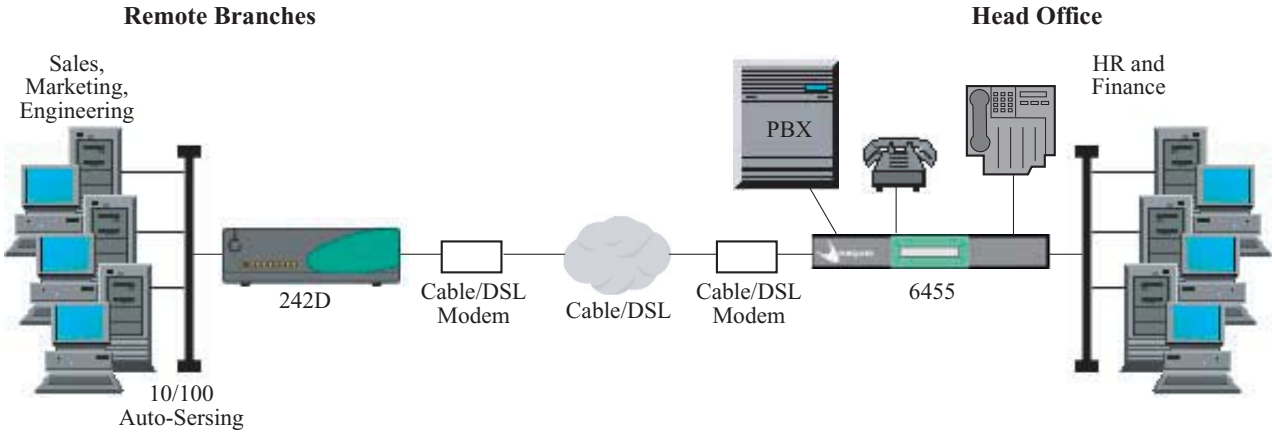

Figure 1-4. LAN Over WAN (DSL/Cable Modem)

LAN Segmentation

Introduction

Traditional LAN segmentation allows grouping users and avoiding common problem where packets are forwarded to LANs with no need for them. It allows also isolating a secure area from a public one. When separate networks are needed or if a network has reached its physical limitations, segmentation is used. Segmenting a LAN can extend the network, reduce congestion, isolate network problems, and improve security.

- Extend the Network - When the maximum physical limitations of a network has been reached, routers may be added to create new segments to allow additional hosts onto the LAN.
- Reduce Congestion - As the number of hosts on a single network increases, the bandwidth required also increases. Segmentation limits your segment to traffic intended for your users.
- Isolate network problems - By dividing the network into smaller sections you limit the amount of data and problems from other segments..
- Improve Security - By using segments a network can be isolated from outside sources.

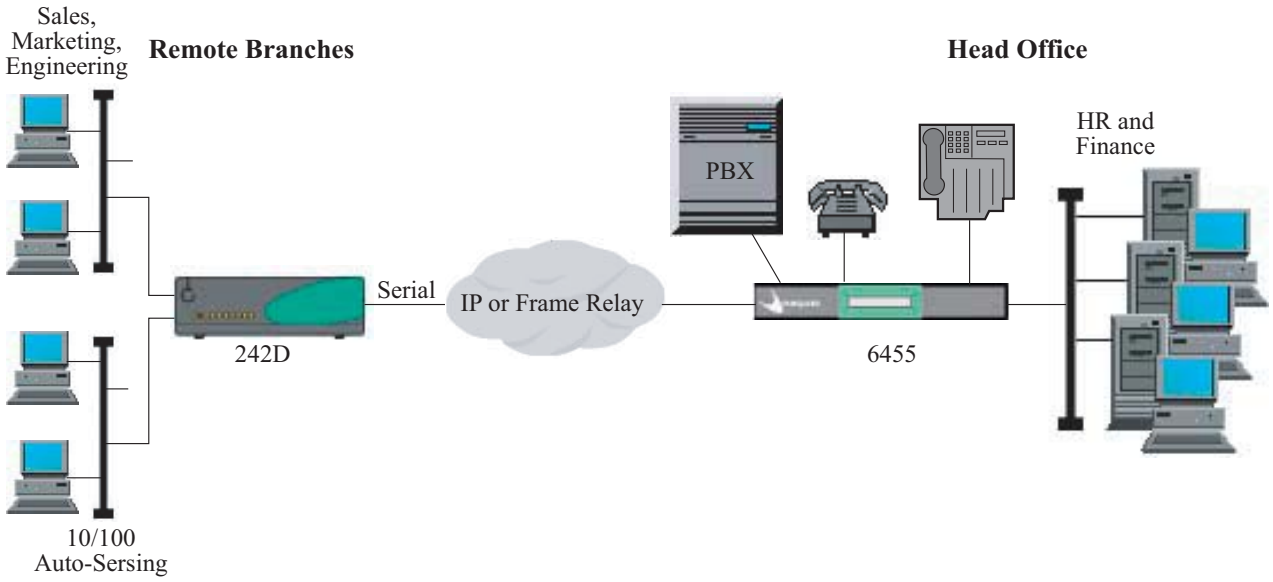

Figure 1-5. LAN Segmentation

Virtual LAN (VLAN)

VLAN

In this application Vanguard 242D is directly connected to a VLAN switch. Switches are data link-layer devices that, like bridges, enable multiple physical LAN segments to be interconnected into a single larger network. The WAN traffic consists of data destined to remote resources. There should be virtually no traffic between local devices.

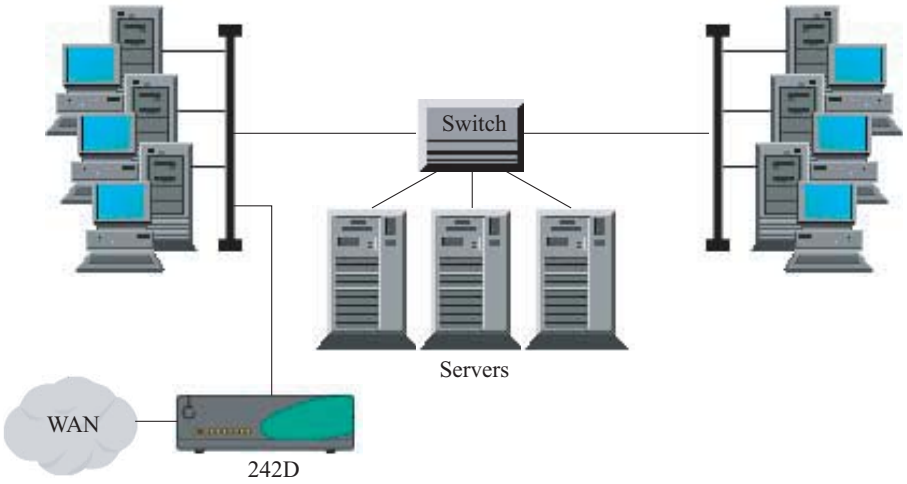

Figure 1-6. VLAN

Clocking Limitations Vanguard 242D

Limitation

Listed below are the clocking issues relating to Port 3 of the Vanguard 242D:

Vanguard 242D DCE INT --> VG6560/VG320/VG64xx EXT at 1.5 Mbps

When a Vanguard 242D Port 3 is configured as internally clocked and is connected to a 6560/320/64xx which is configured as EXT clocked, and the Vanguard 242D internal clock is configured at 1.5 Mbps, the link has clock slippage and CRC errors.
*Workaround:*Configure the VG6560/VG320/VG64xx port "Invert TX Clock" to YES.

Vanguard 242D DCE EXTLP --> VG6560 SDB2 or SDB INT

When a Vanguard 242D Port 3 is configured as EXTLP clocked and is connected to a SDB2 or SDB card in a Vanguard 6560, the link will not come up.
Workaround: Configure the Vanguard 6560 SDB2 or SDB port as INT clocked and the Vanguard 242D as EXTLP clocked. Connect the ports with crossover cable. The DIM on the Vanguard 6560 SDB2 or SDB port should be in the DCE position.
In general, configuring a DTE device as Internally clocked or a DCE device as externally clocked or EXTLP are not recommended configurations.

Chapter 2
Hardware Description

Overview

Introduction

This chapter describes the Vanguard 242D:

- Enclosure
- Motherboard

Enclosure

Introduction

This section describes the components of the Vanguard 242D enclosure.

Vanguard 242D Enclosure

The Vanguard 242D fits into a compact, low profile enclosure case that can be:

- used as a desktop standalone device
- seated on a shelf in a standard 19-inch equipment rack
- bracketed to the underside of a desktop or vertical surface

The enclosure contains the motherboard.

Front Panel

The front panel of the Vanguard 242D (see Figure 2-1) includes:

- 10 LEDs that provide node status
- Reset button

For a full description of all Front panel LEDs and reset button, refer to the "Powering On the Vanguard 242D" section in Chapter 4.

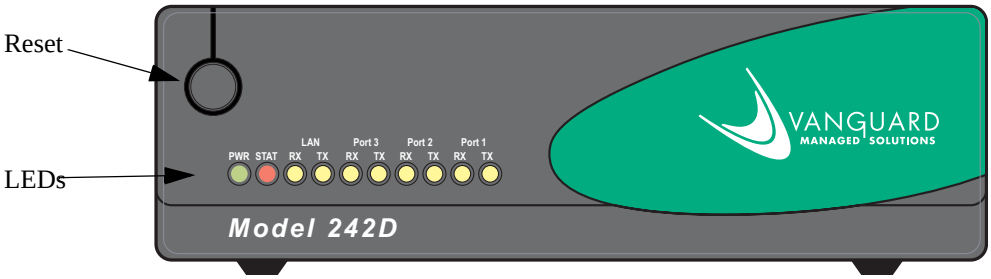

Figure 2-1. Vanguard 242D Front Panel

Rear Panel

Figure 2-2 shows a Vanguard 242D rear panel containing the following:

- One Sync/Async Universal Serial Interface port (DB-25 connector)
- One Async port (RJ-45 connector) as the CTP
- Two Ethernet ports (with 10/100BaseT connector)
- Power Supply connector

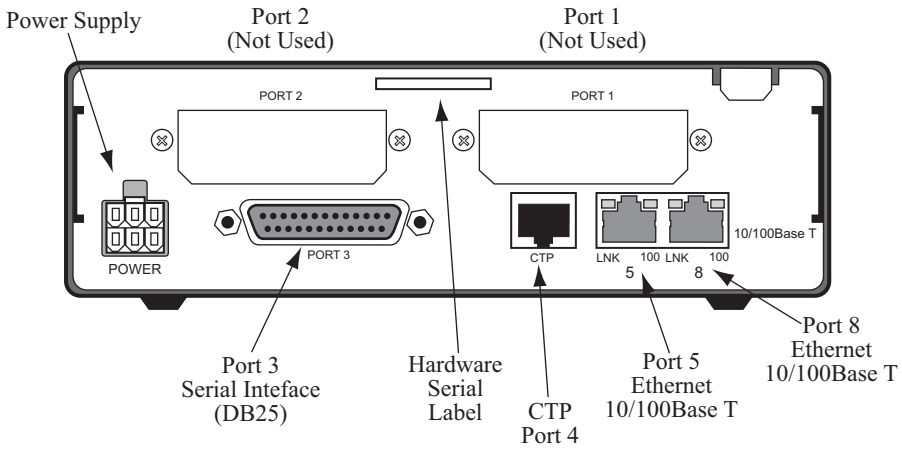

Figure 2-2. Vanguard 242D Rear Panel

Note

For information about port numbering and cabling, refer to the "Port Characteristics and Cabling" section in Chapter 3.

Caution

Do not connect Ports 4, 5 or 8 to the Public Communications Network.

Serial Number

The Hardware Serial Number indicates the version of hardware in your unit. This serial number label is located on the rear panel of the Vanguard 242D.

Refer to this serial number when contacting a Vanguard Managed Solutions Service Representative.

Motherboard

General Description

The Vanguard 242D motherboard contains 8 Megabytes of Non-Volatile FLASH on board and has 32 Megabytes of SDRAM (synchronous DRAM) on an attached DIMM.

These components are included on the motherboard:

- Connectors for:
  - A battery that provides power for the unit's real time clock
  - Two 10/100BaseT Ethernet (RJ-45connectors)
  - Control Terminal Port (RJ-45connector)
  - DB-25 Connector
  - Power Connection

Figure 2-3 shows the location of the motherboard components.

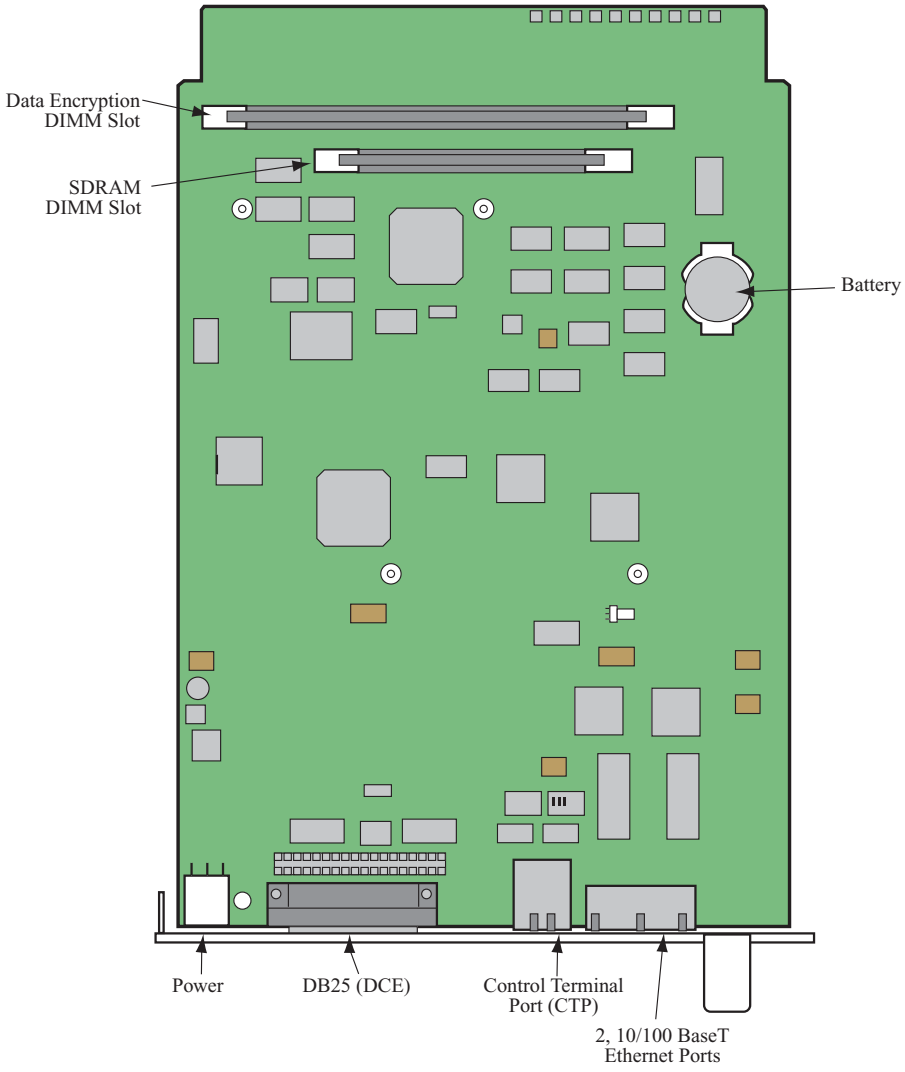

Figure 2-3. Vanguard V242D Motherboard

Access the Motherboard

To access the motherboard components you must remove the motherboard from the enclosure.

For information about removing and installing the motherboard refer to the "Accessing the Motherboard" section in Chapter 3.

For information about removing or installing motherboard components, refer to the "Modifying Your Vanguard 242D" section in Chapter 3.

Serial Interface

The Vanguard 242D supports a serial interface that is installed on the motherboard. The serial interface can be configured to function as a Digital Interface Module allowing the support of these interfaces on Port 3 only:

- V.24
- V.35
- V.36
- V.11/X.21

For information on configuring the serial interface, refer to the "Cabling the Vanguard 242D" section in Chapter 3.

The serial interface supports only DCE. It can accommodate DTE with the use of a crossover adapter cable. For information on cabling for DTE capability, refer to the "Cabling the Vanguard 242D" section in Chapter 3.

SIMMs and DIMM

The motherboard has two slots:

- SDRAM: This connector takes a standard DIMM.
- Data Encryption: This connector takes a DIMM to provide data encryption capabilities.

Caution

For information on installing or removing these components, refer to the "Adding and Removing Memory Modules" section in Chapter 3.

Chapter 3
Installation and Replacement

Overview

Introduction

This chapter describes how to install, cable, and modify your Vanguard 242D device.

This chapter provides instructions for these tasks:

- Checking Your Shipment Contents
- Installing The Vanguard 242D
- Configuring the Serial Interface
- Cabling the Vanguard 242D
- Modifying Your Vanguard 242D

Checking Your Shipment Contents

List of Contents

The Vanguard 242D is packaged in shock-absorbent packing material. Inside your shipping carton, you should find the contents shown in Figure 3-1.

Before installing the Vanguard 242D hardware, make sure these items are included in your shipment:

- Vanguard 242D Enclosure (four rubber feet on the bottom side)
- External Power Supply
- Serial interface adapter cable (optional)

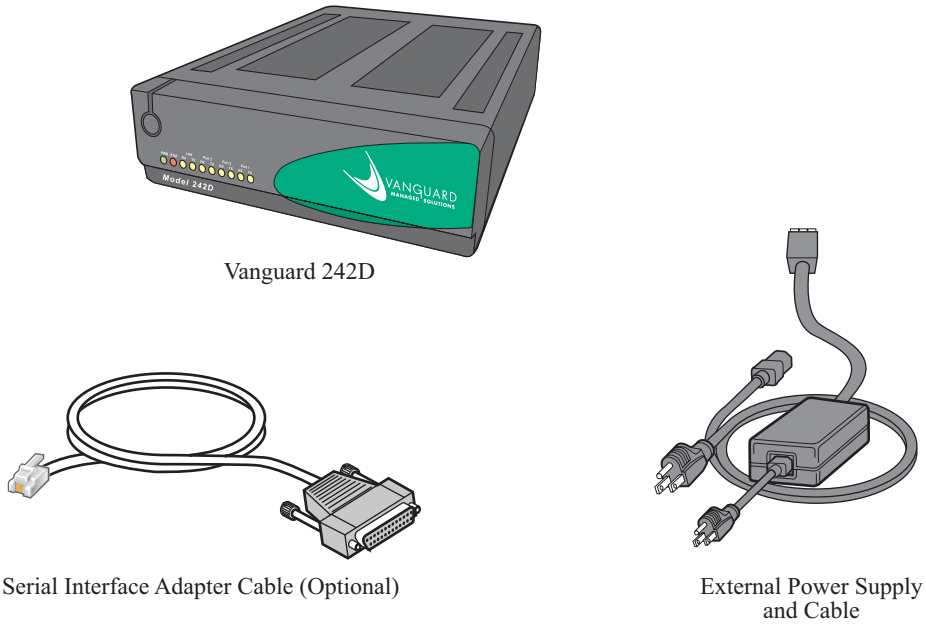

Figure 3-1. Vanguard 242D Shipment Contents

Installing The Vanguard 242D

Introduction

This section explains how to install the Vanguard 242D and includes these topics:

- Selecting and Preparing the Installation Site
- Installing Your Vanguard 242D
- Thermal Considerations
- Configuring the Serial Interface
- Port Characteristics and Cabling
- Modifying Your Vanguard 242D

After your Vanguard 242D is installed and cabled, go to the "Powering On the Vanguard 242D" section in Chapter 4" for instructions on powering-up the unit.

Selecting and Preparing the Installation Site

How to Choose a Site

Before installing your Vanguard 242D, select a site for the device. Choose a site within an appropriate distance of a power source. The selected site should be free of accumulated dust and environmental extremes.

Caution

All Vanguard products should be used in environments designed for computers and electronic equipment. In areas susceptible to lightning, take precautions to prevent damage to electronic equipment. Contact your telephone company or an electronic accessories vendor for information on lightning protection equipment. If you experience problems caused by surges from lightning, install appropriately rated surge suppressors on power and data lines connected to your Vanguard.

Mise en Garde

Tous les produits Vanguard doivent être utilisés dans des environnements conçus pour les ordinateurs et équipements électroniques. Dans les zones sujettes à la foudre, prenez soin de protéger l'équipement électronique contre tout dommage. Contactez votre compagnie de téléphone ou un vendeur d'accessoires électroniques pour de plus amples informations sur les équipements de protection contre la foudre. Si vous avez des problèmes engendrés par des surtensions dues à la foudre, installez des protections contre les surintensités appropriées sur les lignes d'alimentation et de données connectées à votre produit Vanguard.

Vorsicht

Alle Vanguard-Produkte sollten in für Computer und elektronische Geräte geeigneten Umgebungen verwendet werden. In durch Blitzschlag gefährdeten Gebieten sollten Vorsichtsmaßnahmen zum Schutz von elektronischen Geräten ergriffen werden. Informationen über Schutzeinrichtungen gegen Blitzschlaggefahr erhalten Sie von Ihrer Telefongesellschaft oder vom Einzelhandel für Elektrozubehör. Wenn Sie durch Blitzeinwirkung verursachte Spannungsstörungen feststellen, installieren Sie einen ausreichend abgesicherten Spannungsableiter an den Strom- und Datenleitungen, die mit dem Vanguard-Produkt verbunden sind.

Power Source

Depending on your application and the country in which the Vanguard 242D operates, a power source must be a grounded 100 to 240 VAC outlet.

Cable Clearance/ Air Circulation

Allow at least 12 inches (30.5 cm) in back of the unit for interfacing cable clearance and air circulation, as shown in Figure 3-2.

Caution

To avoid overheating the unit's circuitry, you should never place anything on either side of the unit, within 1 inch (2.5 cm) of the ventilation slots, or within 12 inches (30.5 cm) of the back of the unit.

Mise en Garde

Afin d'éviter toute surchauffe des circuits de l'unité, ne placez aucun objet sur l'unité à moins de 2,5 cm (1 pouce) des conduits de ventilation du panneau avant et à moins de 30,5 cm (12 pouces) de l'arrière de l'unité.

Vorsicht

Zur Vermeidung einer Überhitzung der Geräteschaltkreise sollten Sie keine Gegenstände auf dem Gerät plazieren. Zu den Entlüftungsöffnungen der Vorderabdeckung sollte ein Abstand von 2,5 cm und zur Rückseite des Gerätes von 30,5 cm eingehalten werden.

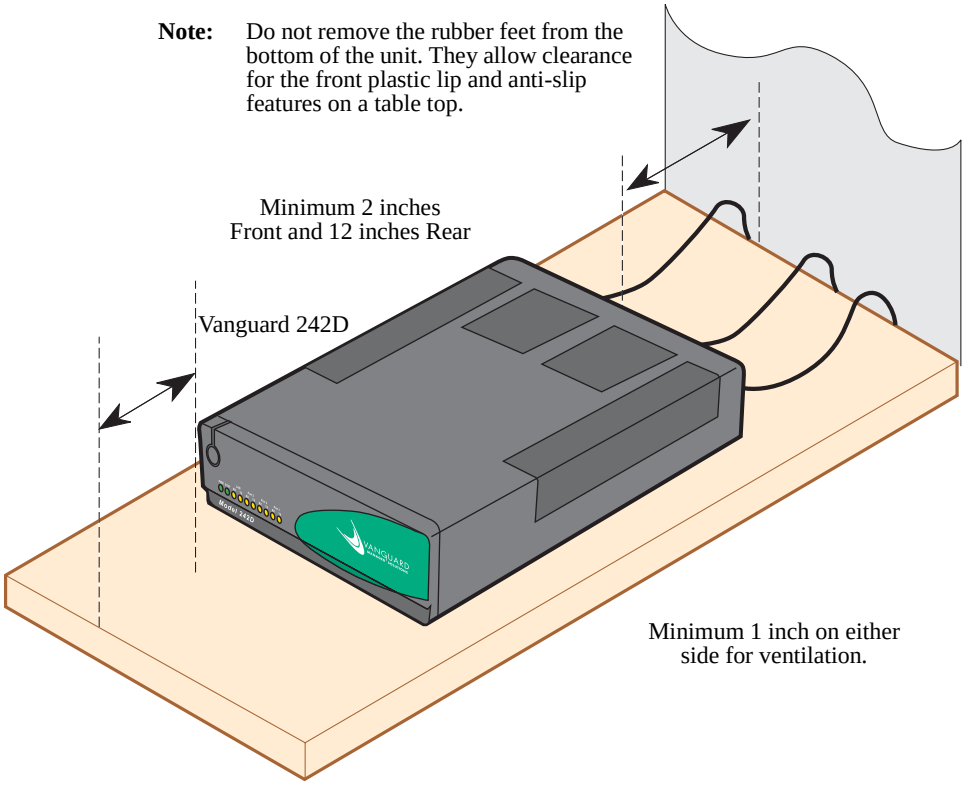

Figure 3-2. Proper Cable and Air Clearance

Caution

Do not place items weighing more than 20 pounds (9 kg) on top of a Vanguard 242D enclosure. Do not block the top vents of the unit.

Installing Your Vanguard 242D

Installation

Complete these steps to install your Vanguard 242D:

Step	*Action*
1	Unpack the Vanguard 242D, and inspect the unit to ensure you have all the components.
2	Be sure that the four rubber feet are on the bottom of the enclosure.
3	Attach the power cord and cables to the rear panel.
4	Place the enclosure in the selected site, and power unit on. Do not block the outlet vents. Refer to the "Powering On the Vanguard 242D" section in Chapter 4.
5	Ensure that the ambient temperature is within the temperature range specified in Appendix A.

Thermal Considerations

Introduction

This section explains some of the heat and temperature factors that can affect your Vanguard 242D.

Inlet Temperature

After the unit is running, check the ambient air temperature. Make sure it does not exceed the operating temperature limits specified in Appendix A.

Power Supply Shutdown

If the Vanguard 242D power supply is not properly vented, the external power supply overheats and shuts down.

Configuring the Serial Interface

Introduction

This section describes the serial interface and explains how to configure your Vanguard 242D for various communication interface types. These topics are discussed:

- Setting the Interface Type
- Setting the Interface Options

The Serial Interface

The Vanguard 242D supports a software-programmable serial interface that is integral to the motherboard. Port 3 supports the serial interface and can be configured to function as a fixed Data Interface Module, providing communication using these interface types:

- V.24
- V.35
- V.36
- X.21/V.11

Note

The serial interface supports only DCE mode but can accommodate DTE with the use of a crossover adapter cable. For information on DTE capability, refer to the "Setting the Interface Options" section on page 3-10.

The Serial Interface Parameters

The serial interface is supported in the Port Configuration menu and can be configured using the Control Terminal Port (CTP). Included in the Port Configuration menu, are two parameters that allow you to set both the communication and electrical interfaces. These parameters are:

Interface Type

This parameter allows you to set the communication interface type (physical layer protocol) on Port 3. The interface types include: V.24, V.35, V.36, and X.21/V.11.

Setting the Interface Type

Introduction

This section provides instructions for setting the Interface Type parameter.

Interface Type Parameter

Use this procedure to set the Interface Type parameter:

Step	*Action*	*Result/Description*
1	From the Control Terminal Port Main menu, select **Configure -> Port**.	The Port record appears.
2	In the Port Number parameter, type **3**, then press ENTER.	Port 3 is selected.
3	In the Port Type parameter, type **FRI**, then press ENTER	This defines Port 3 type as FRI. Supported Port Type Entries: PAD X.25 FRI TBOP TCOP ATPAD SLIP PPP
4	In the Interfaced Type, type a **?**, and then press ENTER.	The Range and Default appear: Range = V.24, V.35, V.36, X.21, NONE Default = V.24 Specify the Electrical Interface Type: V.24 - V.24 Electrical Interface Type V.35 - V.35 Electrical Interface Type V.36 - V.36 Electrical Interface Type X.21 - V.11 Electrical Interface Type NONE - Electrically disabled
5	Select an Interface Type from the menu and press ENTER.	The Interface Type is set.

Setting the Interface Options

Introduction

This section provides instruction for setting the Interface Options parameter.

V.24 Interface Type

Use this procedure to set the Interface Options parameter for V.24 interface type:

Step	*Action*	*Result/Description*
1	From the Control Terminal Port Main menu, select **Configure -> Port**.	The Port record appears.
2	In the Port Number parameter, type **3**, then press ENTER.	Port 3 is selected.
3	In the Port Type parameter, type **FRI**, then press ENTER	This defines Port 3 type as FRI. Supported Port Type Entries: PAD X.25 FRI TBOP TCOP ATPAD SLIP PPP
4	In the Interface Type parameter, type **V.24**, and then press ENTER.	The interface is set to V.24
5	In the Interface Options parameter, type a **?**, and then press ENTER.	The Range and Default appears: Range = RI, TM Default = RI Specify the Pin 22 option: RI - V.24 uses Pin 22 for Ring Indicator output signal TM - V.24 uses Pin 22 for Test Mode input signal
6	Select either **RI** or **TM** for the Interface Option.	When RI is selected, the output signal is Ring Indicator. When TM is selected, the input signal is Test Mode.

V.35/V.36, and X.21/V.11 Interface Types

Use this procedure to set the Interface Options parameter for V.35, V.36, and X.21/V.11 interface types:

Step	*Action*	*Result/Description*
1	From the Control Terminal Port Main menu, select **Configure -> Port**.	The Port record appears.
2	In the Port Number parameter, type **3**, then press ENTER.	Port 3 is selected.
3	In the Port Type parameter, type **FRI**, then press ENTER	This defines Port 3 type as FRI. Supported Port Type Entries: PAD X.25 FRI TBOP TCOP ATPAD SLIP PPP
4	In the Interface Type parameter, type one of these interfaces: **V.35, V.36, X.21** and then press ENTER.	The interface is set to the selected type.
5	In the Interface Options parameter, type a **?**, and then press ENTER.	The Range and Default appears: Range = NONE, XOVER Default = NONE Specify the cable type: NONE - V35/V.36/X.21 DCE with straight through cable XOVER - V35/V.36/X.21 DCE with crossover adapter cable
6	Select either **NONE** for straight DCE mode, or **XOVER** when using the DTE crossover adapter cable.	When NONE is selected, the serial interface is in straight DCE mode. When XOVER is selected, the serial interface is in DCE Mode using the adapter cable.

Cabling the Vanguard 242D

Introduction

This section provides information to help you cable your Vanguard 242D.

Caution

Before connecting cables to the motherboard, be sure that the screws holding the motherboard in place are tight. If the screws are loose, the motherboard could loosen under the weight of the cables and cause damage to the equipment.

Vanguard 242D Rear Panel

Figure 3-3 illustrates the rear panel of the Vanguard 242D and the locations of cables that must be connected.

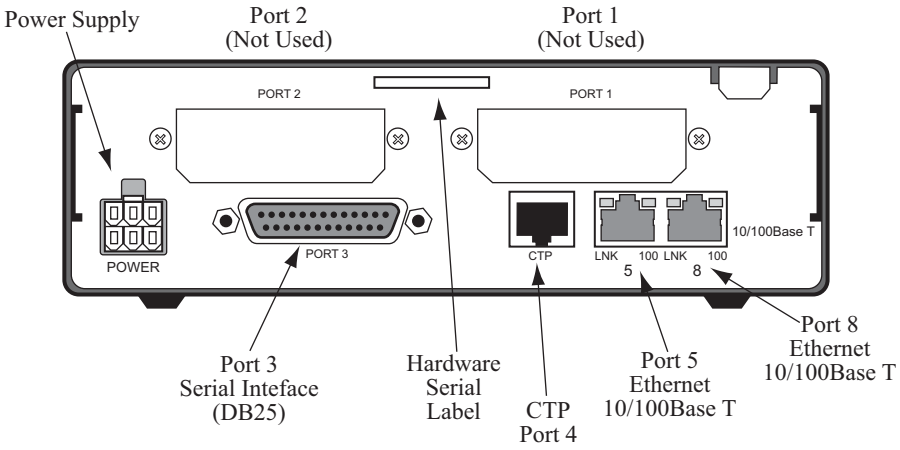

Figure 3-3. Vanguard 242D Rear Panel and Cable Connections

Port Characteristics and Cabling

Introduction

This section describes the port characteristics and cables required to connect to the Vanguard 242D.

Port Characteristics and Cable Requirements

This table lists the port characteristics, connector and cable requirements:

Port	*Connector*	*Interface*	*Cable Required (Application Specific)*	*Speed*	*DCE/DTE*
3	DB25	V.11, V.24, V.35, V.36 DIM	DB25-to-DB25 Cable	V.11, V.35 and V.36 - Max. sync speed 2 mpbs V.24 - Max. sync speed 80 kpbs, Max async speed 115.2 kbps	Selectable Adapter Cable required for DTE
4	RJ45	CTP Port	RJ45-to-DB25 CTP Cable shipped with Vanguard unit	Max. async speed 115.2 kbps	DCE
5	RJ45	10/100BaseT	10/100BaseT Adapter cable or standard UTP cable (RJ45-to-RJ45)	10/100Mbps Auto Sensing	Interface # 1
8	RJ45	10/100BaseT	10/100BaseT Adapter cable or standard UTP cable (RJ45-to-RJ45)	10/100Mbps Auto Sensing	Interface # 2

Control Terminal Port (CTP)

Port 4 Connector Pinout

Use a RJ45/DB25 cable to connect to the CTP Port and perform CTP operations such as coldloading software images into a Vanguard 242D. The Vanguard 242D defaults this port to 9.6 kbps, 8 bits, no parity, 1 stop bit. The RJ45/DB25 cable is not supplied with the unit and it must be ordered separately.

This table identifies the connector pinout for this RJ-45 connector:

RJ45 Pin	*Signal*	*Pin Connection on DB25F Adapter*
1 (not connected)	Request To Send (RTS)	4
2	DTE Ready (DTR)	20
3	Received Data (RXD)	3
4 (not connected)	Data Carrier Detect (DCD)	8
5	Signal Ground	7
6	Transmitted Data (TXD)	2
7	Data Set Ready (DSR)	6
8 (not connected)	Clear To Send (CTS)	5

Note

If you plan to use a personal computer to configure the Vanguard 242D, you may need to purchase a DB25 (male) to DB9 (female) adapter for the serial port of your personal computer. The serial ports on most personal computers require DB9 connectors. You also need to purchase one of our CTP (242D Serial Interface Adapter Cable) cables.Which is shown in Figure 3-1 on page 3-2.

The connector pins are numbered as indicated in Figure 3-4.

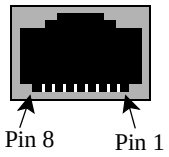

Figure 3-4. RJ45 Pinout

10/100BaseT Adapter Cable

Specifications

The 10/100BaseT cable has the following specifications:

- Cable Type: Category 5 or better
- Connectors: RJ45 to RJ45
- Color: Gray
- Part Number: 61798-01

Port 5 Connector Pinout

The 10/100BaseT Ethernet Port has a single RJ45 connector and is cabled using CAT-5 twisted pair copper cables. This table details the pin for the 10/100Base T RJ45 connector:Cabling Daughtercards:

Pin	*Signal*	*Pin*	*Signal*
1	Transmit Positive	5	Not Used
2	Transmit Negative	6	Receive Data Negative
3	Receive Data Positive	7	Not Used
4	Not Used	8	Not Used

DB25 V.24 Pinouts

Connector Pinouts

This table shows the DB25 V.24 connector pinouts for DCE/DTE mode. Required cables for DCE/DTE mode may be ordered through Vanguard Managed Solutions.

These pins are assigned double functions in the V.24 cable:

- Pin 15: Outputs TRANSMIT CLOCK if the port is configured for internal clocks.
- Pin 22: Used as the Ring Indicator output if the port is configured to emulate a dial modem. For this to work properly, the RI/TM port must be configured to RI. When the RI/TM is configured to TM, this pin acts as an input, and the TM output from the attached modem (pin 25 on the modem) comes into the Vanguard on this pin.

For more information on configuring the V.24 interface type, refer to the "Setting the Interface Type" section on page 3-9.

Port 3 Pin	*DCE Signal*	*Function/Signal Name*	*Port 3 Pin*	*DTE Signal using Crossover Adapter Cable*	*Function/Signal Name*
1	----------	PROTECTIVE GROUND	1	----------	PROTECTIVE GROUND
2	<----------	TRANSMITTED DATA	2	---------->	TRANSMITTED DATA
3	---------->	RECEIVED DATA	3	<----------	RECEIVED DATA
4	<----------	REQUEST TO SEND	4	---------->	REQUEST TO SEND
5	---------->	CLEAR TO SEND	5	<----------	CLEAR TO SEND
6	---------->	DATA SET READY	6	<----------	DATA SET READY
7	----------	SIGNAL GROUND	7	----------	SIGNAL GROUND
8	---------->	DATA CARRIER DETECT	8	<----------	DATA CARRIER DETECT
14	<----------	DATA RESTRAINT	14	---------->	DATA RESTRAINT
15	---------->	TRANSMIT CLOCK	15	<----------	TRANSMIT CLOCK
16	---------->	STANDBY INDICATOR	16	<----------	STANDBY INDICATOR
17	---------->	RECEIVE CLOCK	17	<----------	RECEIVE CLOCK
18	<----------	EXTERNAL RECEIVE CLOCK	18	---------->	EXTERNAL RECEIVE CLOCK
20	<----------	DATA TERMINAL READY	20	---------->	DATA TERMINAL READY
21	<----------	V.54 Loop 2	21	---------->	V.54 Loop 2
22	---------->	RI/TEST MODE	22	<----------	RI/TEST MODE
24	<----------	EXTERNAL TRANSMIT CLOCK	24	---------->	EXTERNAL TRANSMIT CLOCK
25	<----------	MAKE BUSY	25	---------->	MAKE BUSY

DB25 V.35/V.36 Pinouts

Connector Pinout

This table shows the DB25 V.35/V.36 connector pinouts for DCE/DTE mode. Required cables for DCE/DTE mode may be ordered through Vanguard Managed Solutions:

Port 3 Pin	*DCE Signal*	*Function/Signal Name*	*Port 3 Pin*	*DTE Signal using Crossover Adapter Cable*	*Function/Signal Name*
1	----------	PROTECTIVE GROUND	1	----------	PROTECTIVE GROUND
2	<----------	TRANSMITTED DATA-A	2	---------->	TRANSMITTED DATA-A
3	---------->	RECEIVED DATA-A	3	<----------	RECEIVED DATA-A
4	<----------	REQUEST TO SEND	4	---------->	REQUEST TO SEND
5	---------->	CLEAR TO SEND	5	<----------	CLEAR TO SEND
6	---------->	DATA SET READY	6	<----------	DATA SET READY
7	----------	SIGNAL GROUND	7	----------	SIGNAL GROUND
8	---------->	DATA CARRIER DETECT	8	<----------	DATA CARRIER DETECT
14	<----------	TRANSMITTED DATA-B	14	---------->	TRANSMITTED DATA-B
15	---------->	TRANSMITTED CLOCK-A	15	(no signal)	TRANSMITTED CLOCK-A
16	---------->	RECEIVED DATA-B	16	<----------	RECEIVED DATA-B
17	---------->	RECEIVE CLOCK-A	17	<----------	RECEIVE CLOCK-A
18	---------->	RECEIVE CLOCK-B	18	<----------	RECEIVE CLOCK-B
20	<----------	DATA TERMINAL READY	20	---------->	DATA TERMINAL READY
21	---------->	TRANSMITTED CLOCK-B	21	(no signal)	TRANSMITTED CLOCK-B
22	<----------	EXTERNAL TRANSMIT CLOCK-B	22	---------->	EXTERNAL TRANSMIT CLOCK-B
24	<----------	EXTERNAL TRANSMIT CLOCK-A	24	---------->	EXTERNAL TRANSMIT CLOCK-A
25	----------	(no connection)	25	----------	(no connection)

Note

To use DTE mode, the Interface Options parameter must be set to XOVER. For details on setting the V.35/V.36 Interface Options, see “Setting the Interface Options” section on page 3-10.

DB25 X.21/V.11 Pinouts

Connector Pinout

This table shows the DB25 X.21/V.11 connector pinouts for DCE/DTE mode. Required cables for DCE/DTE mode may be ordered through Vanguard Managed Solutions:

Port 3 Pin	*DCE Signal*	*Function/Signal Name*	*Port 3 Pin*	*DTE Signal using Crossover Adapter Cable*	*Function/Signal Name*
1	----------	PROTECTIVE GROUND	1	----------	PROTECTIVE GROUND
2	<----------	TRANSMITTED DATA-A	2	---------->	TRANSMITTED DATA-A
3	---------->	RECEIVED DATA-A	3	<----------	RECEIVED DATA-A
4	<----------	CONTROL-A	4	---------->	CONTROL-A
5	----------	(no connection)	5	----------	(no connection)
6	---------->	INDICATION-B	6	<----------	INDICATION-B
7	----------	SIGNAL GROUND	7	----------	SIGNAL GROUND
8	---------->	INDICATION-A	8	<----------	INDICATION-A
14	<----------	TRANSMITTED DATA-B	14	---------->	TRANSMITTED DATA-B
15	---------->	SIGNAL ELEMENT TIMING-A	15	----------	(no connection)
16	---------->	RECEIVED DATA-B	16	<----------	RECEIVED DATA-B
17	(no signal)	RECEIVE CLOCK-A	17	(no signal)	RECEIVE CLOCK-A
18	(no signal)	RECEIVE CLOCK-B	18	(no signal)	RECEIVE CLOCK-B
20	<----------	CONTROL-B	20	---------->	CONTROL-B
21	---------->	SIGNAL ELEMENT TIMING-B	21	----------	(no connection)
22	<----------	EXTERNAL TRANSMIT CLOCK B	22	---------->	EXTERNAL TRANSMIT CLOCK B
24	<----------	EXTERNAL TRANSMIT CLOCK A	24	---------->	EXTERNAL TRANSMIT CLOCK A
25	----------	(no connection)	25	----------	(no connection)

Note

To use DTE mode, the Interface Options parameter must be set to XOVER. For details on setting the X.21/V.11 Interface Options, see “Setting the Interface Options” section on page 3-10.

Ordering Cables

To order cables please contact a VanguardMS representative. In addition to the crossover adapter cables these cables can also be ordered:

- DB25 Male to M34 Female cable
- DB25 Male to M34 Male cable

Modifying Your Vanguard 242D

Introduction

You can modify your Vanguard 242D by adding or replacing components on the motherboard. This section explains how to make these modifications and includes the following topics:

- Accessing the Motherboard
- Installing/Removing the Lithium Battery

Accessing the Motherboard

Introduction

This section explains how to access the motherboard for the Vanguard 242D. It also identifies the location of the key motherboard components.

Before replacing DIMMs or batteries you must access the Vanguard 242D motherboard.

Accessing the Motherboard

Figure 3-5 shows how to remove and install the Vanguard 242D motherboard.

Warning

To prevent injury and damage to the equipment, power down the unit and disconnect the power cord and all network telecommunication cables before you remove or install the motherboard.

Avertissement

Pour éviter toute blessure ou endommagement de l'équipement, éteignez l'unité et déconnectez le cordon d'alimentation avant d'enlever ou d'installer la carte mère.

Warnung

Um persönliche Verletzungen und Schäden am Gerät zu verhindern, schalten Sie das Gerät ab, und ziehen Sie den Netzstecker aus, bevor Sie die Hauptplatine entfernen oder installieren.

Caution

Use care when handling and placing the motherboard on a surface. There are components on the bottom of the motherboard that can be damaged.

Mise en Garde

Soyez prudents lorsque vous manipulez la carte mère ou la placez sur une surface. Il y a des composants sur la face inférieure de la carte mère qui pourraient être endommagés.

Vorsicht

Auf der Unterseite des Motherboard befinden sich empfindliche Teile. Verfahren Sie entsprechend vorsichtig bei der Handhabung und beim Ablegen des Board.

Caution

Some components used in the 242D are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

Mise en Garde

Certains composants du 242D sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

Vorsicht

Einige im 242D verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

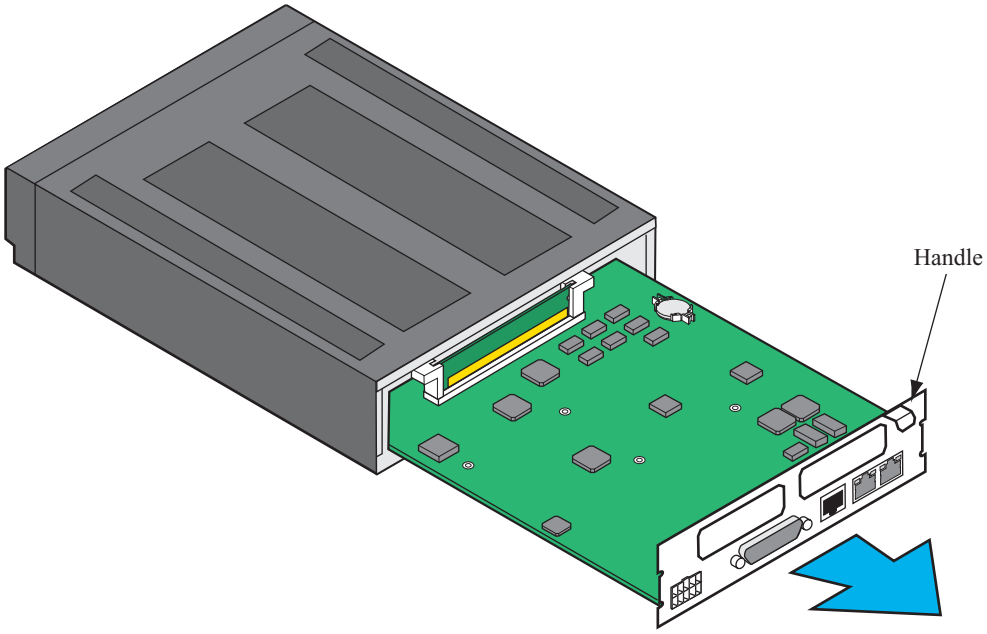

Figure 3-5. Vanguard 242D Motherboard Removal and Replacement

Procedure for Removing the Motherboard

Use the steps to remove the Vanguard 242D motherboard:

Step	Action
1	Remove the power cord and cables from the back of the unit.
2	Remove the two screws on either side of the chassis at the rear of the unit.
3	Use the handle on the right side of the rear panel to carefully slide out the motherboard.
4	Place the motherboard on a clean flat surface.

Procedure for Installing the Motherboard

Use the steps to install the Vanguard 242D motherboard:

Step	Action
1	Carefully slide the motherboard into the card guides within the opening.
2	Push the motherboard into the enclosure.
3	Power up the unit and ensure LEDs can be seen through the front panel.
4	Tighten the screws on both sides of the chassis. *Be sure the screws are snug.*
5	Reconnect the cables and power cord.

Adding and Removing Memory Modules

Introduction

The appropriatemodule (DIMMs) are installed on the motherboard at the factory. If they are not, you can install these components as necessary. This section explains how to add and remove the:

- SDRAM DIMM
- Data Encryption DIMM

For instructions on removing the motherboard, refer to the “Accessing the Motherboard” section on page 3-21.

Caution

Some components used in the 242D are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

Mise en Garde

Certains composants du 242D sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

Vorsicht

Einige im 242D verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

Adding/Removing SDRAM DIMM

Use these steps to add and remove a SDRAM DIMM:

1) Insert the DIMM into slot as shown in Figure 3-6.

2) Carefully press the DIMM into the socket.

3) Lock the DIMM into place with the locking levers.

4) To remove the DIMM, disengage the locking levers by pushing them sideward, and then lift out the DIMM.

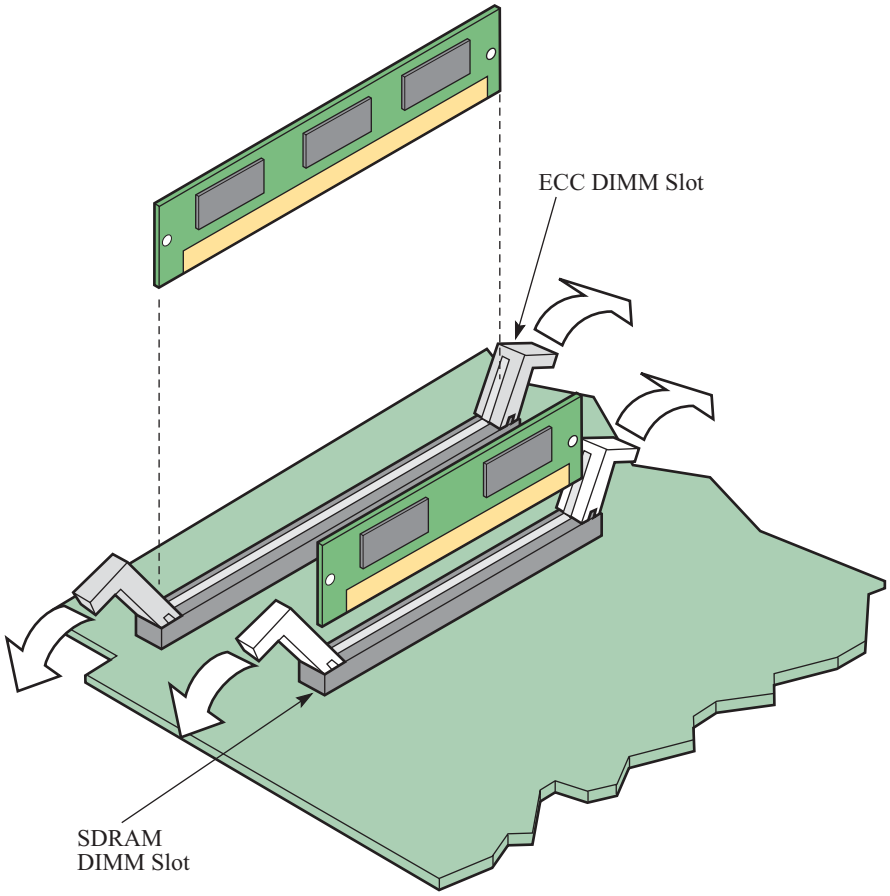

Figure 3-6. DIMM Installation/Replacement

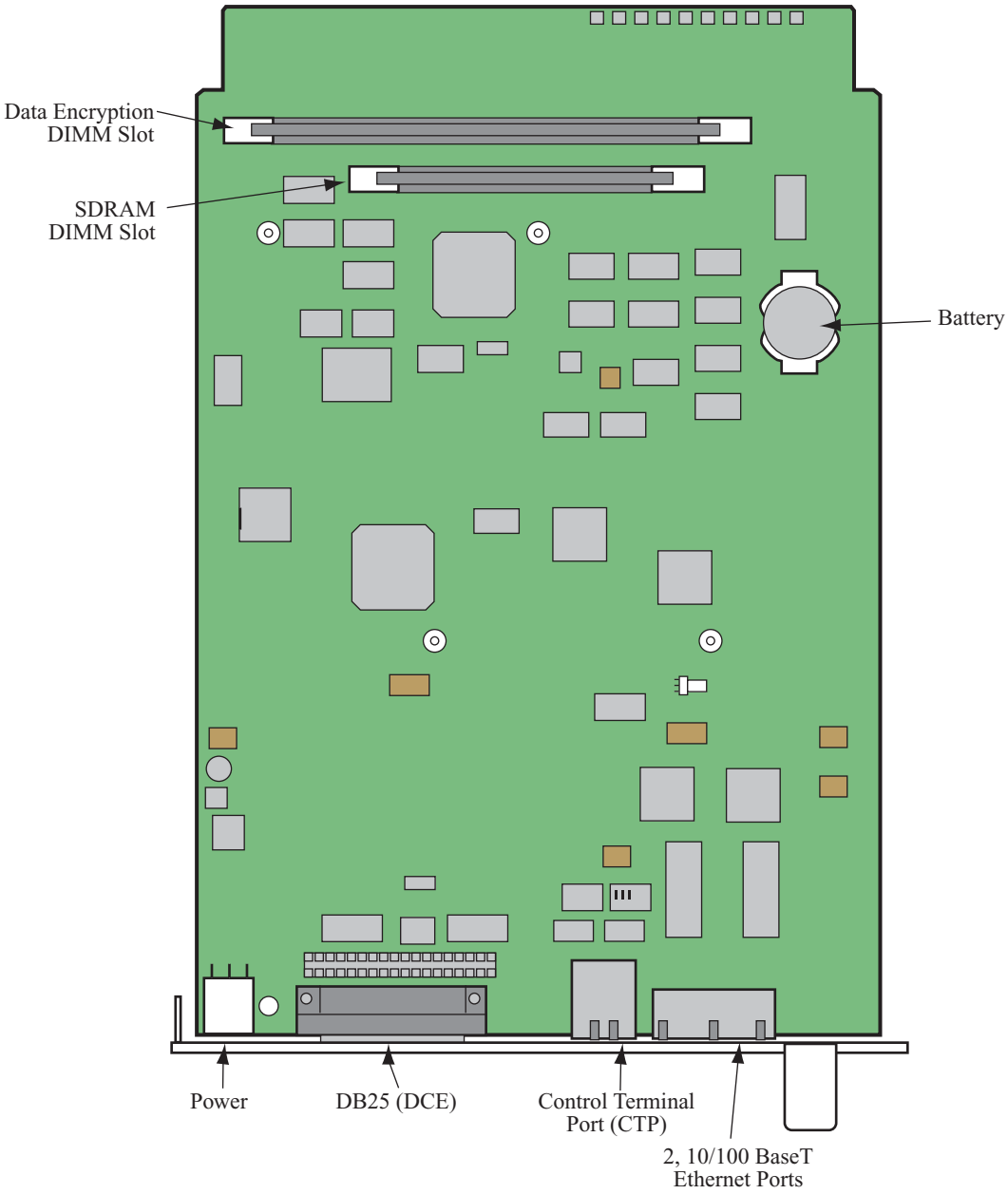

Figure 3-7. Location of Motherboard Components

SIMM and DIMM Slots

Figure 3-7 shows the locations of the DIMM slots:

- SDRAM DIMM
- Data Encryption DIMM

Installing/Removing the Lithium Battery

Introduction

This section explains how to replace the real time battery. Vanguard 242D uses a lithium battery on the motherboard to maintain the node's real-time clock. The battery is not used to store the configuration memory.

Warning

Only qualified service personnel should perform the procedure described in this section. If the battery is installed incorrectly, it could explode after the Vanguard product is powered up, damaging the unit.

Avertissement

Seules des personnes qualifiées peuvent mettre en pratique les procédures décrites dans cette section. Si la batterie n'est pas correctement installée, elle risque d'exploser après la mise en marche du produit Vanguard et d'endommager l'unité.

Warnung

Die in diesem Abschnitt aufgeführten Vorgänge sollten ausschließlich von qualifiziertem Servicepersonal durchgeführt werden. Wenn die Batterie unsachgemäß installiert wird, kann sie nach dem Einschalten des Vanguard-Produkts explodieren und das Gerät beschädigen.

Note

After installing the battery, set the Vanguard 242D's date and time. This is done via the CTP in the Update System Parameter menu.

Battery Type

Replace the lithium battery with lithium coin cell type CR2032 only. These can be obtained where watch batteries are sold.

Battery Disposal

Dispose of the battery in compliance with applicable local regulations.

Routine Battery Replacement

The lithium battery should be replaced every six years. Follow the instructions in Figure 3-8 to replace the battery.

Before Removing/ Installing the Battery

Before you remove or install the battery, you must access the Vanguard 242 motherboard as described in the "Accessing the Motherboard" section on page 3-21.

Once you can see the motherboard, locate the battery as shown in Figure 3-8.

Removing/ Installing the Battery

Figure 3-8 shows how to install and replace the battery.

To remove the battery

Using your fingers, push the retaining tabs aside and pry the battery out of the holder.

To install the battery

Place the battery in the holder with the positive (+) side up, and press down until the retaining tabs click into place.

Note: When done, replace the motherboard as explained in the "Accessing the Motherboard" section on page 3-21.

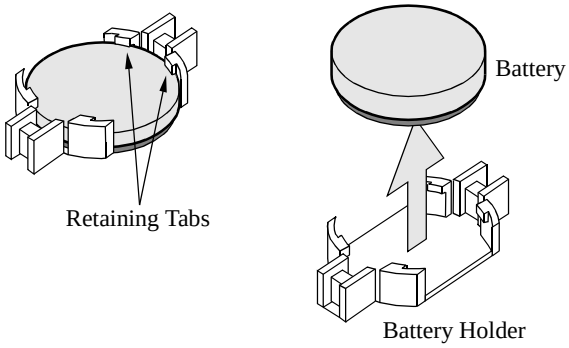

Figure 3-8. Replacing the Battery

Chapter 4
Powering Up and Loading Software

Overview

Introduction

This chapter describes:

- Powering Up Your Vanguard 242D
- Powering Off The Vanguard 242D
- Powerup Diagnostics
- Accessing the Control Terminal Port
- Obtaining and Installing Operating Software

Powering Up Your Vanguard 242D

Introduction

This section describes the sequence of events when you power up and power down the Vanguard 242D.

Powering On the Vanguard 242D

The Vanguard 242D does not have a power switch on the unit. Use these steps to power on the device:

1) Plug the DC output cable of the power supply into the power socket on the Vanguard 242D back panel.

2) Connect the power cord to the power supply outlet.

Resetting the 242D

The RESET button resets the node. Pressing the RESET button is the equivalent of a power-up operation which clears all existing calls and brings down all links.

For the location of the RESET button, refer to the "Resetting the 242D" section in Chapter 4.

Powering Off The Vanguard 242D

Warning

When powering down the unit, always unplug the power cord from the AC power outlet first (Figure 4-1). Never disconnect or reconnect the power connector from the Vanguard back panel if the power supply is still connected to the AC power outlet (Figure 4-2). Doing so can potentially damage the Vanguard unit.

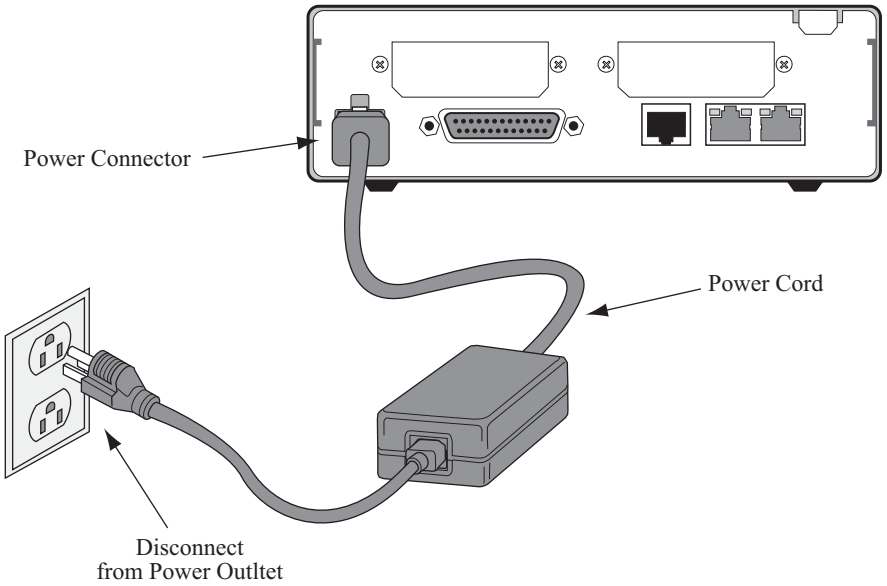

Figure 4-1. Approved Practice for Powering Down a Vanguard 242D Unit

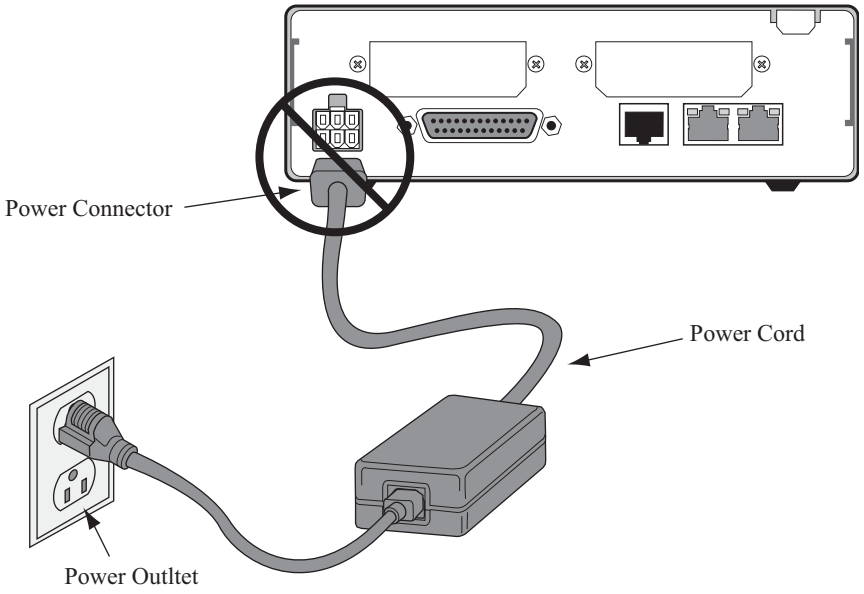

Figure 4-2. Unacceptable Practice for Powering Down or Powering Up a Vanguard 242D Unit

Warning

Hazardous voltage from the telecommunications network may be accessible on un-earthed units. Disconnect all telecommunications cables before removing the main lead from the power supply.

Des tensions dangereuses provenant des réseaux de télécommunication peuvent être présentes sur des unités qui ne sont pas reliées à la terre. Déconnectez tous les câbles de télécommunication avant de retirer le câble de secteur du bloc d'alimentation.

An nicht geerdeten Geräten können gefährliche Spannungen vom Telekommunikationsnetz anliegen. Trennen Sie alle Kabelverbindungen zum Telekommunikationsnetz, bevor Sie das Hauptnetzkabel aus der Steckdose ziehen.

Powerup Diagnostics

Introduction

This section describes diagnostics that run automatically when you power up the Vanguard 242D.

Detailed Front Panel LEDs

Figure 4-3 illustrates the detailed front panel LEDs located behind the front cover.

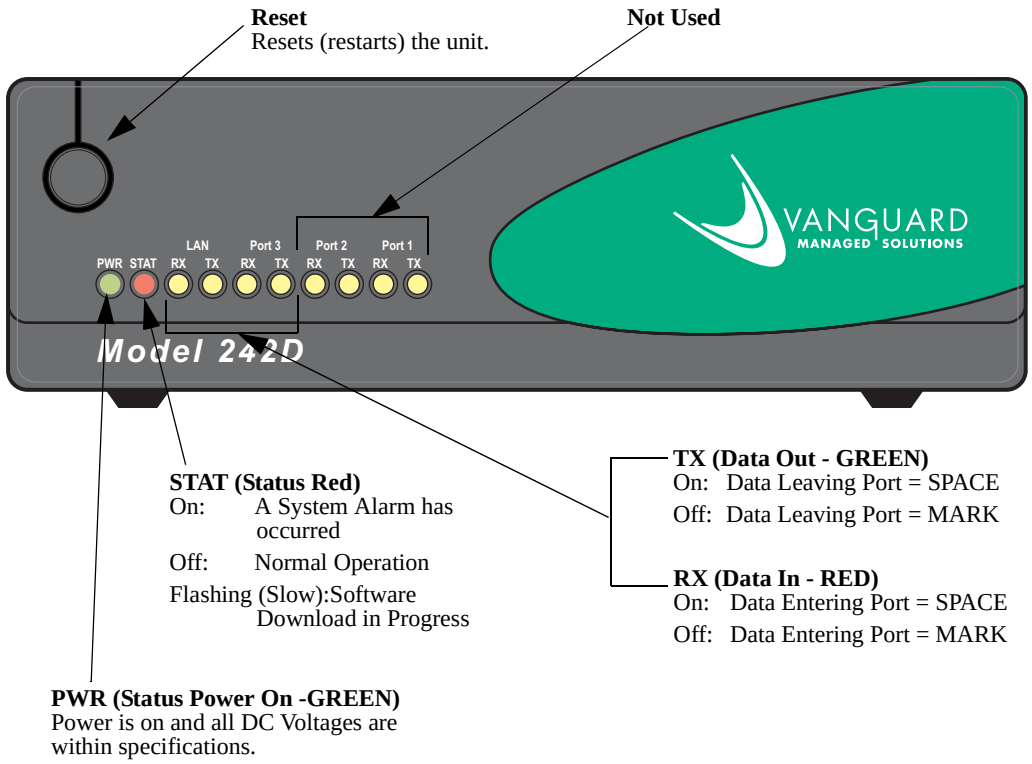

Figure 4-3. Detailed Front Panel LEDs

Power Up Sequence

When the Vanguard 242D power cord is plugged into the power supply outlet, you will see the following power up sequence:

Stage	*when...*	*...this indicates*
1	Power (PWR) LED turns on (GREEN)	Vanguard is receiving power.
2	PWR LED remains on and the Status (STAT) LED blinks (RED).	Diagnostics are starting.
3	PWR LED blinks.	Diagnostics are executed.
4	PWR LED remains on and the STAT LED blinks.	Indicates software is being downloaded from FLASH.
5	PWR LED blinks.	Software is initializing your system configuration.
6	PWR LED remains on.	Booting completed. Node is operational.

Accessing the Control Terminal Port

Introduction

Once you have powered on the Vanguard 242D, you can access the Control Terminal Port from the PC or terminal attached to the CTP port.

This section does not provide all information about accessing the CTP. For more information on accessing and using the CTP refer to the *Vanguard Basic Configuration Manual* (Part Number T0113).

Procedure

Follow these steps to access the Vanguard 242D CTP Main menu:

Note

This procedure assumes that a PC or terminal is connected to the Vanguard 242D using the CTP access cable.

Step	*Action*
1	Set your terminal, or terminal emulation software, to VT100, 9600 bps, 8 bit, no parity, 1 stop bit.
2	Type **<CR>** until either an asterisk (*) or the OK prompt appears.
3	When you see OK, type **atds0 <CR>**. When you see the asterisk (*) type **.ctp**. The CTP banner will appear. If this banner does not appear, verify that these steps have been followed correctly.
4	Type **<CR>** at the password prompt, if no password has been set.

CTP Access Using Remote Telnet

Another way to connect to the CTP, after the node is configured and operational, is to access remotely via your established IP network by telneting into the node from an IP network-based personal computer or workstation. You can create a telnet session from your PC to the target node using and IP address configured in that node.

Connect to the CTP by entering **atds0 <CR>** after the Vanguard 242D outputs the OK prompt on your Telnet terminal window.

CTP Access Using Remote X.25 or Frame Relay Network

If the Vanguard 242D is operating in an X.25 network, or if Frame Relay Annex-G is used to connect with other VanguardMS Network Access Product nodes, you can access the Vanguard CTP remotely by making a Switched Virtual Circuit (SVC) call to the node and specifying subaddress 98.

For example, assuming the remote node's node address is **0101**:

- If you are using ASYNC PAD, type **010198** at the asterisk (*) prompt, and then press **Enter**.
- If you are using AT PAD, type **atdp 010198**, and then press **Enter**.

Alternative Methods for Accessing the CTP

Introduction

This section describes alternative methods for accessing the CTP over a Frame Relay Bypass connection when:

- the terminal of the local Vanguard device does not have IP connectivity or
- cannot connect to the target device over the LAN (serial port only)
- the WAN is not using X.25 or Annex G

Using Remote Telnet

VanguardMS Vanguard devices have a built-in Telnet feature that allows to you access the CTP of other Vanguard devices. To use this feature, both the local and target devices must be configured using an IP network connection. Use these steps to access the CTP of another Vanguard device from your local node:

1) Access the local Vanguard's CTP.

2) Select the Diagnostics Menu, and then select Telnet.

3) Type any IP address that is configured in the target Vanguard.

Using SoTCP

If the target Vanguard device has been previously configured for a particular network connection using SoTCP and AT PAD, you can access the CTP using Frame Relay Bypass. Use these steps to establish an SoTCP connection to the target Vanguard's CTP using Frame Relay Bypass:

1) From the (*) prompt, type **<target node>98**
Example: Assuming the target Node is 101, type **10198** and press **Enter**.

2) At the OK prompt, type **atds0<target node>98**
Example: Assuming the target Node is 101 type **atds010198** and press **Enter**.

Note

For further detailed information, refer to the Vanguard User Manual "IP and LAN Feature Protocols, Serial Protocol over TCP (SoTCP)"

Startup CTP Screen

Figure 4-4 shows an example of the Vanguard 242D Startup Screen.

OK->atds->CONNECT

```
Connected to the Control Port
on Node "Nodename", at 25-AUG-2005 13:32:59
Vanguard 242D
Version V6.5.P02A_242D
```

Figure 4-4. Vanguard 242D Startup CTP Screen

Obtaining and Installing Operating Software

Introduction

This section briefly describes how to obtain and install the software into your Vanguard 242D device.

Note

After the software has been loaded, refer to the appropriate user documentation to configure and use the different software options.

Where to Get Operating Software

You can obtain Vanguard Applications Ware Packages that can be tailored to your specific needs.

You can obtain operating software for your Vanguard 242D from:

1) the Vanguide CD-ROM, using the following path:

\VanguardMS\Sfw_imgs\V242D

2) the WWW, using the following URL:

http://secure.vanguardms.com

Note

All software must be unlocked using the Software Unlocking Utility. Be sure that you have serial numbers for each Applications Ware package before using the unlocking utility. If you do not have serial numbers for the Applications Ware package contact your distributor, VanguardMS sales or service.

Operating Software

The operating software is compressed in FLASH and loaded into the SDRAM for execution. There are a variety of operating software feature sets available for the Vanguard 242D.

- For feature information on the operating software available for your device, refer to the Software Release Notice included on the CD-ROM.
- For information on installing the operating software, refer to the *Vanguard Software Installation and Coldloading Manual* (Part Number T0028) included on the CD-ROM.

Optional Software

The Vanguard 242D supports these Applications Ware packages:

- IP^{+} Applications Ware Package (includes IP, and IPX)
- SNA^{+} Applications Ware Package (includes IP, and SNA)
- Multi-Service Applications Ware Package

For more information on the license upgrades available for the Vanguard 242D, refer to the *Software Release Notice*.

Note

A license refers to both a legal document that allows you to use features and to the software that contains those features.

Operating Software File Formats

Operating software files located on the Vanguide CD-ROM, and on the World Wide Web, adhere to the following file naming formats:

Filename:	*Description*
XXp01.xrc	**where:** • **XX** identifies the software release number applicable to that image • **01** identifies the number of the image created for any specific software release • **xrc** identifies the file as a software image XXp01.zip is a compressed version of the file.

Appendix A
Specifications

Specifications

Introduction

This section describes the physical and environmental specifications and power requirements for the Vanguard 242D product.

Hardware

Vanguard 242D products feature the following:

- Motorola MPC860P PowerPC processor
- Two 10/100 Base T Ethernet ports
- Async (RJ-45 connector) Control Terminal Port (CTP)
- 8 Megabyte of Non-Volatile FLASH on board
- 32 Megabyte SDRAM DIMM
- ECC DIMM slot
- 1 configurable Universal Serial Interface port

Software

The Vanguard 242D supports these Applications Ware packages:

- IP^{+} Applications Ware Package (includes IP, and IPX)
- SNA^{+} Applications Ware Package (includes IP, and SNA)
- Multi-Service Applications Ware Package

For more information on the license upgrades available for the Vanguard 242D, refer to the *Software Release Notice*.

Environmental

The following environmental conditions are required:

- Operating temperature: 32° to 104°F maximum (0° to 40°C maximum)
- Storage temperature: -40° to +158°F (-40° to +70°C)
- Relative humidity: 5% to 90% (non-condensing)

Electromagnetic Compatibility

Vanguard 242D products adhere to the following:

- FCC Part 15, Class A
- CISPR 22 and EN 55022, Class A
- AS 3548, Class A
- EN 50082-1

Input Power Requirements

Vanguard 242D typically has the following input power requirements:

- 100 to 240 VAC nominal at 50/60Hz
- 50 watts input power
- Maximum input current 0.7 amps

Power Supply Description

Vanguard 242D products are powered by a switch mode power supply with 35 watts maximum output rating.

Safety

Vanguard 242D meets the following safety standards:

- EN60950
- IEC60960
- CSA C22.2 No. 950
- UL 1950

Physical

Vanguard 242D has the following measurements:

- Height: 2.6 in. (6.6 cm)
- Length: 7.7 in. (19.6 cm)
- Width: 12.2 in. (31.3 cm)
- Weight (not configured): 7.05 lb.

Appendix B
Software License and Regulatory Information

Overview

Introduction

This appendix provides information about the following:

- Product Declarations and Regulatory Information

Product Declarations and Regulatory Information

The following sections provide information about standards compliance, safety statements, and ISDN Type Approvals.

Warnings And Cautions

The following special notices apply to all equipment handling procedures in this installation guide.

Warning

Ports capable of connecting to ports on other apparatus are defined as Safety Extra Low Voltage (SELV). To conform with EN60950, ensure that these ports are only connected to ports of the same type on other apparatus.

Les ports qui sont susceptibles d'être connectés à des équipements sont désignés comme TBTS. Pour garantir la conformité à la norme EN 60950, n'interconnecte ces ports qu'avec des ports du même type sur des autres matériels.

Anschlusse, die mit anderen Geraten verbindet werden konnen, sind als SELV beschrieben. Um Konformitat mit EN 60950 zu versichern, sichern Sie es, daß diese Anschlusse nur mit den des selben Type auf anderen Geraten verbindet werden.

CE Marking

The mark in the following diagram appears on each Vanguard Series product, and the statement that follows explains its significance.

CE

Figure B-1. CE Mark

This product is CE marked to indicate compliance with the following European Directives:

- 1999/5/EC Radio & Telecom Terminal Equipment (R&TTE)
- 73/23/EEC Low Voltage Directive (Safety)
- 89/336/EEC EMC Directive

Copies of the full Declaration of Conformity are available at the following URL:

http://www.vanguardms.com/

Declarations of Conformity

English

Declaration of Conformity:

Hereby, VanguardMS declares that this Vanguard Router is in compliance with the requirement and other relevant provisions of Directive 1999/5/EC.

Danish

Konformitetserklæring:
Hermed erklærer VanguardMS, at indestående Vanguard Router er i overensstemmelse med de grundlæggende krav og de relevante punkter i direktiv 1999/5/EF.

Dutch

Verklaring van overeenstemming:

Hierbij verklaart VanguardMS dat diens Vanguard Router voldoet aan de basisvereisten en andere relevante voorwaarden van EG-richtlijn 1999/5/EG.

Finnish

Vaatimustenmukaisuusvakuutus:

VanguardMS vakuuttaa täten, että Vanguard Router on direktiivin 1999/5/EC keskeisten vaatimusten ja sen muiden tätä koskevien säännösten mukainen

French

Déclaration de conformité :

Par la présente, VanguardMS déclare que ce routeur Vanguard est conforme aux conditions essentielles et à toute autre modalité pertinente de la Directive 1999/5/CE.

German

Konformitätserklärung:

Hiermit erklärt VanguardMS, dass der Vanguard Router die grundlegenden Anforderungen und sonstige maßgebliche Bestimmungen der Richtlinie 1999/5/EG erfüllt.

Greek

Δήλωση Συμμόρφωσης:
Δια του παρόντος, η εταιρεία VanguardMS δηλώνει ότι η παρούσα συσκευή (δρομολογητής) Vanguard Router πληροί τις βασικές απαιτήσεις και άλλες βασικές προϋποθέσεις της Οδηγίας 1999/5/ΕΚ.

Italian

Dichiarazione di conformità:

Con la presente VanguardMS dichiara che il router Vanguard soddisfa i requisiti essenziali e le altre disposizioni pertinenti della direttiva 1999/5/CE.

Portuguese

Declaração de Conformidade:

Através da presente, a VanguardMS declara que este encaminhador Vanguard se encontra em conformidade com os requisitos essenciais e outras disposições relevantes da Directiva 1999/5/CE.

Spanish

Declaración de conformidad:

Por la presente declaración, VanguardMS declara que este encaminador Vanguard cumple los requisitos esenciales y otras cláusulas importantes de la directiva 1999/5/CE.

Swedish

Överensstämmelseförklaring:

VanguardMS förklarar härmed att denna Vanguardrouter överensstämmer med de väsentliga kraven och övriga relevanta stadganden i direktiv 1999/5/EG.

Notification of Canadian Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Limited Warranty

VanguardMS, LLC., warrants that the Product will conform to its then-current published specifications and will be free from defects in materials and workmanship under normal use and service for a period of **(ONE) 1 YEAR** from the date of purchase by the original end user.

During the warranty period, Vanguard Managed Solutions will at its option and at no charge either repair a defective Product (using either new or reconditioned parts) or replace it (with a new or reconditioned Product) if you return it freight prepaid to the factory or service center VanguardMS designates. If VanguardMS is unable within a reasonable time to repair or replace your item, VanguardMS may instead elect to accept return of the unit and refund to you the purchase price you paid for it. VanguardMS will pay freight costs to ship any repaired or replacement unit to you.

VANGUARDMS MAKES NO REPRESENTATION OR OTHER WARRANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED. WITHOUT LIMITING THIS PROVISION, VANGUARDMS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THE REMEDIES PROVIDED HEREIN ARE EXCLUSIVE. UNDER NO CIRCUMSTANCES WILL VANGUARD MANAGED SOLUTIONS BE LIABLE FOR LOSS OF DATA, REPROCUREMENT COSTS, LOST REVENUE OR PROFITS, OR FOR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF THEY WERE FORESEEABLE OR YOU HAVE INFORMED VANGUARD MANAGED SOLUTIONS OF THEIR POTENTIAL.

Some states do not allow the exclusion or limitation of incidental or consequential damages or exclusions of implied warranties or limitations on the duration of implied warranties, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

This warranty does not apply to any Product which has been subjected by you or a third party to (a) operating or environmental conditions in excess of VanguardMS written specifications or recommendations; (b) damage, misuse or neglect; or (c) improper installation, repair or alteration. This warranty also excludes expendable items, such as lamps, fuses, or other parts which fail from normal use. VanguardMS does not guarantee the integrity of data or warrant that the equipment will operate uninterrupted or error free.

To take advantage of this warranty, you must provide proof of purchase which indicates the date of your purchase in order to obtain warranty service.

This warranty applies only to hardware manufactured by or for VanguardMS and identified by the VanguardMS trademark, trade name or product identification logo affixed to them. For the warranty applicable to software, please refer to the Software License which accompanies the software.

Introduction

The following sections apply to U.S.A. customers only. Non-U.S.A. customers with questions or concerns regarding return procedures should contact their VanguardMS subsidiary or distributor.

Equipment Return Procedures

If you have questions about equipment return procedures, on-site service or unit exchange service call the VanguardMS Technical Support Center at (800) 544-0062 for advice and assistance.

In Case of Damage

If the equipment is damaged in transit, contact the shipper.

If you have additional concerns in case of failure, about missing parts, or to return equipment, contact your nearest VanguardMS representative.

For Locations	*Contact...*
Inside the United States	Vanguard Managed Solutions 575 West Street Mansfield, MA 02048-1193 Phone (800) 544-0062.
Outside the United States	the nearest VanguardMS distributor. For a listing of our Sales and Service Offices, visit our Web site at: **http://www.vanguardms.com/**

Expiration of Lease

To return equipment upon expiration of a lease agreement, contact the VanguardMS Customer Operations Center at (800) 544-0062 for return authorization and instructions. You will be asked to provide the following information:

- Product name and description
- Serial number
- Customer order number
- Reason for return

Factory Repair

To return equipment for factory repair, call the VanguardMS Technical Support Center at (800) 544-0062, for return authorization and instructions. When you call, you will be given a Return Material Authorization (RMA) control number. Mark this number clearly on the shipping container for ease of identification and faster service. The RMA control number provides a convenient tracking reference for both parties. Please have the following information available for each piece of equipment you return:

- Product name and description
- Serial number
- Failure symptoms

Packaging Guidelines for Equipment Return

Data communications equipment or parts that are to be returned to VanguardMS for any reason must be properly packaged to prevent damage in shipment and handling.

If the original packing material and shipping container are available, reuse these items to return equipment. If these items are not available, it is your responsibility to package the contents in a manner that protects the equipment from damage during normal shipping and handling. Responsibility for damage to equipment during transit must be resolved between you and the carrier. VanguardMS can provide you with specific packaging instructions upon request.

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