Model D9494 DAVIC QPSK Demodulator

Installation and Operation Guide

Please Read

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

Notices

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Contents

Safety Precautions

Read, Retain, and Follow These Instructions

Carefully read all safety and operating instructions before operating this product. Follow all operating instructions that accompany this product. Retain the instructions for future use. Give particular attention to all safety precautions.

Warning and Caution Icons

WARNING:

Avoid personal injury and product damage! Do not proceed beyond any icon until you fully understand the indicated conditions.

The following icons alert you to important information about the safe operation of this product:

You will find this icon in the literature that accompanies this product. This icon indicates important operating or maintenance instructions.

You may find this icon affixed to this product and in this document to alert you of electrical safety hazards. On this product, this icon indicates a live terminal; the arrowhead points to the terminal device.

You may find this icon affixed to this product. This icon indicates a protective earth terminal.

You may find this icon affixed to this product. This icon indicates excessive or dangerous heat.

You may find this symbol affixed to this product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation and an LED that transmits intensity-modulated light.

Heed All Warnings

Adhere to all warnings on the product and in the operating instructions.

Avoid Electric Shock

Follow the instructions in this warning.

WARNING:

To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing to qualified service personnel.

Servicing

WARNING:

Avoid electric shock! Opening or removing the cover may expose you to dangerous voltages.

Do not open the cover of this product and attempt service unless instructed to do so in the operating instructions. Refer all servicing to qualified personnel only.

Cleaning, Water, Moisture, Open Flame

To protect this product against damage from moisture and open flames, do the following:

- Before cleaning, unplug this product from the AC outlet. Do *not* use liquid or aerosol cleaners. Use a dry cloth for cleaning.
- Do not expose this product to moisture.
- Do not place this product on a wet surface or spill liquids on or near this product.
- Do not place or use candles or other open flames near or on this product.

Ventilation

To protect this product against damage from overheating, do the following:

- This product has openings for ventilation to protect it from overheating. To ensure product reliability, do not block or cover these openings.
- Do not open this product unless otherwise instructed to do so.
- Do not push objects through openings in the product or enclosure.

Placement

To protect this product against damage from breakage, do the following:

- Place this product close enough to a mains AC outlet to accommodate the length of the product power cord.
- Route all power supply cords so that people cannot walk on, or place objects on, or lean objects against them. This can pinch or damage the cords. Pay particular attention to cords at plugs, outlets, and the points where the cords exit the product.
- Make sure the mounting surface or rack is stable and can support the size and weight of this product.

WARNING:

Avoid personal injury and damage to this product! An unstable surface may cause this product to fall.

When moving a cart that contains this product, check for any of the following possible hazards:

- Move the cart slowly and carefully. If the cart does not move easily, this condition may indicate obstructions or cables that you may need to disconnect before moving this cart to another location.
- Avoid quick stops and starts when moving the cart.
- Check for uneven floor surfaces such as cracks or cables and cords.

WARNING:

Avoid personal injury and damage to this product! Move any appliance and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart to overturn.

Fuse

When replacing a fuse, heed the following warnings.

WARNING:

Avoid electric shock! Always disconnect all power cables before you change a fuse.

WARNING:

Avoid product damage! Always use a fuse that has the correct type and rating. The correct type and rating are indicated on this product.

Grounding This Product (U.S.A. and Canada Only)

Safety Plugs

If this product is equipped with either a three-prong (grounding pin) safety plug or a two-prong (polarized) safety plug, do not defeat the safety purpose of the polarized or grounding-type plug. Follow these safety guidelines to properly ground this product:

- For a 3-prong plug (consists of two blades and a third grounding prong), insert the plug into a grounded mains, 3-prong outlet.

  Note: This plug fits only one way. The grounding prong is provided for your safety. If you are unable to insert this plug fully into the outlet, contact your electrician to replace your obsolete outlet.

- For a 2-prong plug (consists of one wide blade and one narrow blade), insert the plug into a polarized mains, 2-prong outlet in which one socket is wider than the other.

Note: If you are unable to insert this plug fully into the outlet, try reversing the plug. The wide blade is provided for your safety. If the plug still fails to fit, contact an electrician to replace your obsolete outlet.

Grounding Terminal

If this product is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to an earth ground, such as an equipment rack that is grounded.

20050727 Headend/Rack

FCC Compliance

Where this equipment is subject to U.S.A. FCC and/or Industry Canada rules, the following statements apply.

United States FCC Compliance

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against such interference when this equipment is operated in a commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

Canada EMI Regulation

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la class A est conforme à la norme NMB-003 du Canada.

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About This Guide

Introduction

This guide describes the Model D9494-1 100-240 VAC Digital Audio-Visual Council (DAVIC) Quadrature Phase-Shift Keying (QPSK) Demodulator and the D9494-2 48 VDC DAVIC QPSK Demodulator. This guide provides installation, operation, and troubleshooting procedures (including routine maintenance), as well as technical specifications.

Note: In this guide the DAVIC QPSK demodulator and the DAVIC QPSK modulator will be referred to, respectively, as the QPSK demodulator and the QPSK modulator.

Purpose

This guide provides a detailed specifications and component description for the QPSK demodulator. After reading this guide, you will be able to successfully install, operate, and troubleshoot the QPSK demodulator. In addition, you will be able to perform routine maintenance which will aid in trouble-free operation. This guide also includes a detailed specifications appendix and component descriptions.

Audience

This guide is written for Digital Broadband Delivery System (DBDS) system administrators, Digital Network Control System (DNCS) operators, call center personnel, and system operators who are responsible for installing and operating the QPSK demodulator. These individuals should have extensive working experience with cable communications equipment.

What's New?

For an overview of the features of and the rationale for building the Model D9494 QPSK demodulator, refer to *Introducing the New Model D9494 QPSK Demodulator* (part number 4022034).

Document Version

This is the second release of this guide.

1

Introducing the DAVIC QPSK Demodulator

Introduction

This chapter describes how the QPSK demodulator functions, and how the QPSK demodulator and the DAVIC QPSK modulator function together within the DBDS. This chapter also includes illustrations and descriptions of the QPSK demodulator front and back panel components.

Note: In this guide the DAVIC QPSK demodulator and the DAVIC QPSK modulator will be referred to, respectively, as the QPSK demodulator and the QPSK modulator.

In This Chapter

System Overview

Introduction

The QPSK demodulator is an integral component of our DBDS. The QPSK demodulator works with QPSK modulators and Digital Home Communication Terminals (DHCTs) to provide a forward signaling and reverse communications path for interactive two-way video and data services.

The Modulating/Demodulating Process

The QPSK modulator initiates and controls configuration and setup through the QPSK forward path. The QPSK modulator splits messages into Asynchronous Transfer Mode (ATM) cells, formats the messages in DAVIC-compliant frames, adds QPSK modulation, and then transmits the messages to the DHCT at a rate of 1.544 Mbps. After the DHCTs are configured, all control and status information travels through the QPSK forward path, while all video and audio sources are carried by high-bandwidth Quadrature Amplitude Modulation (QAM) channels to the DHCT.

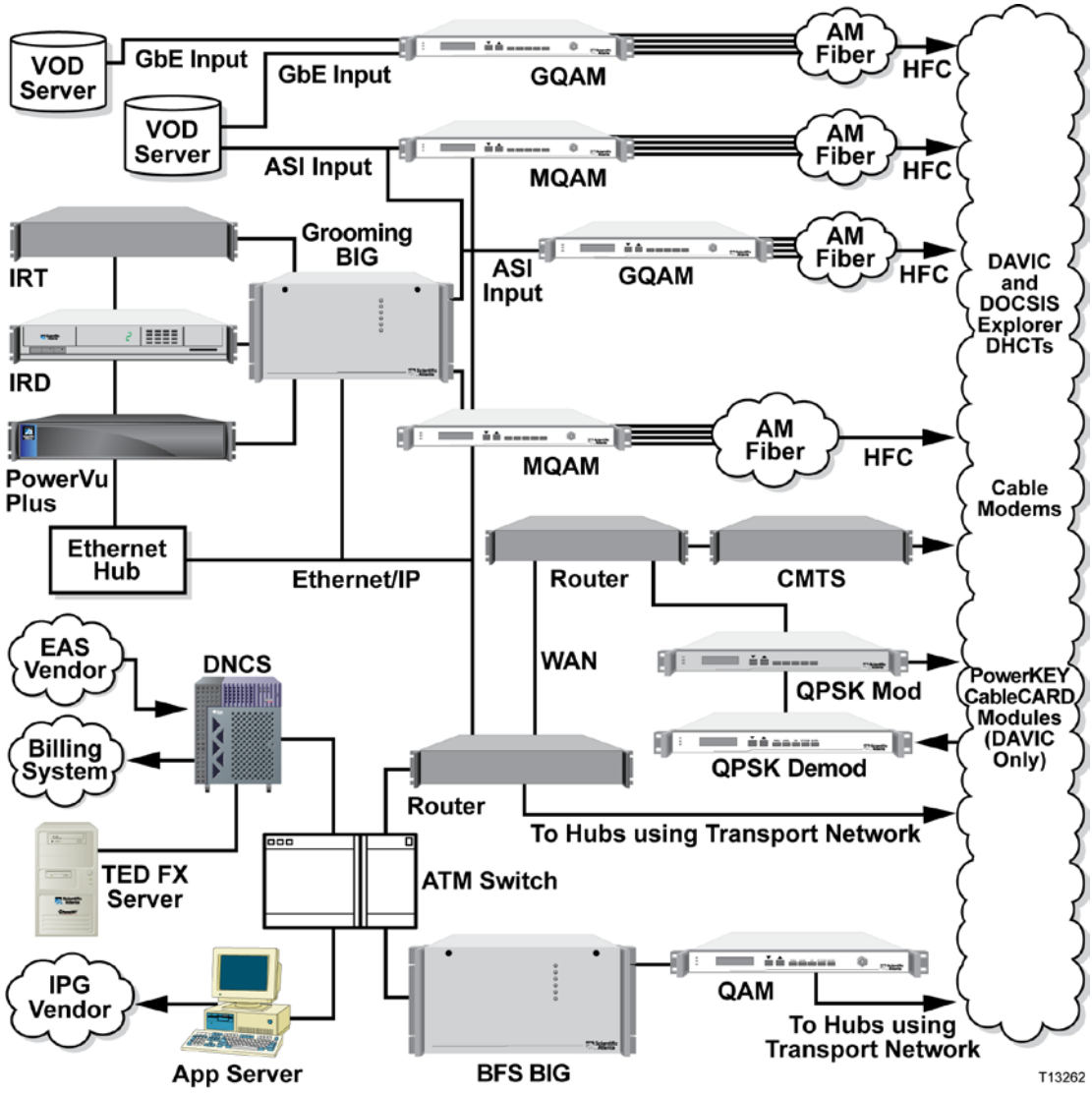
The QPSK demodulator receives the messages that originate from a DHCT, such as a request for a service, on a 1.544 Mbps reverse-path channel. The QPSK demodulator demodulates the incoming QPSK signal, performs error correction on the detected data, and transmits the message as an ATM packet to the QPSK modulator through an ATM-25 interface that operates at 25.6 Mbps and uses RJ-45 connectors.

You can connect up to eight QPSK demodulators to one QPSK modulator, so the maximum sustained input rate to a modulator will be eight times the 1.544 Mbps rate, or approximately 12.4 Mbps to the DAVIC router function of the QPSK modulator.

The QPSK modulator receives the ATM cells and uses the slot number information inserted by the QPSK demodulator in the ATM cells, along with the demodulator port number (for example, reverse channel number) to create a “success feedback” word to acknowledge or confirm receipt to the DHCT. These words generate the “acknowledge bits.” The DHCT needs these bits to determine whether its cell was received successfully. ATM cells from the demodulators are routed to the main memory of the modulator, where complete messages are reassembled. The modulator processes these reassembled messages as a part of its Media Access Control (MAC) functions. The QPSK modulator serves as a DAVIC Router by implementing the DAVIC MAC functions, and by communicating signaling and status information back to the DNCS through an Ethernet/IP connection.

Diagram of Major DBDS Components

The following diagram shows the major components of the DBDS. The QPSK demodulators are normally in hubs and work in conjunction with QPSK modulators. Up to eight demodulators can be connected to each modulator.



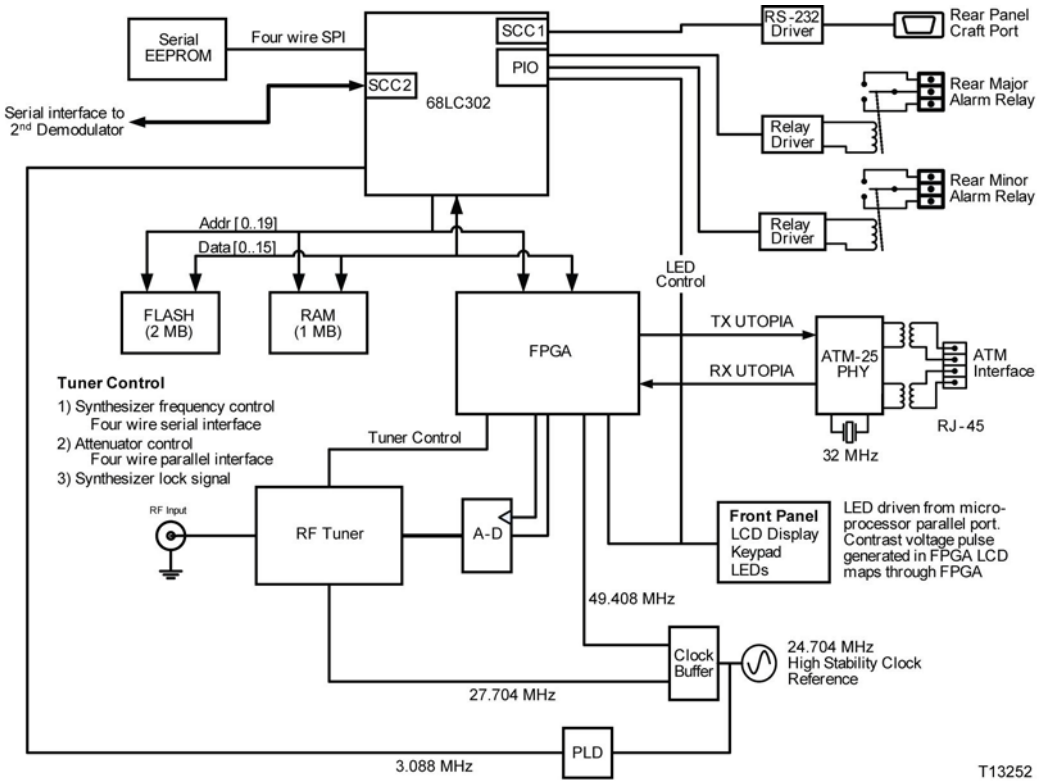
Major Stages and Descriptions

Note: The following table describes the operational stages of the QPSK demodulator.

Stage	Description
RF IN	The QPSK demodulator receives a QPSK reverse burst carrier signal from the DHCT by way of the hybrid fiber coax (HFC) CATV plant through its Radio Frequency (RF) input port in the range of 5 to 42 MHz.
Tuner	The burst carriers are low pass filtered and sent to an active variable attenuator. This attenuator is set in 8 dB steps as shown in the following list: ■ Range 1 = 0 dB ■ Range 2 = 8 dB ■ Range 3 = 16 dB ■ Range 4 = 24 dB The mixer upconverts the RF signal to 92.5 MHz IF. The 92.5 MHz IF signal is amplified by tuned IF amplifiers. A 92.5 MHz SAW filter is in the middle of the IF gain stages for filtering the desired channel. It is then sampled by an analog-to-digital converter (ADC).
Field-Programmable Gate Array (FPGA)	**1** The FPGA takes the sampled data from the ADC and makes the final frequency conversion to complex baseband. **2** The signal is then filtered, derandomized, and Reed-Solomon decoded. **3** After a complete set-top packet has been received and decoded, it is sent to the ATM-25 interface. **4** The ATM-25 interface sends the data to the QPSK modulator through the connection on the back panel.
Microprocessor	**1** Controls the LCD display and monitors the front panel keypad assembly through the FPGA. **2** Provides a connection to the craft port on the back panel. **3** Controls the back panel alarm relays and the front panel alarm LEDs. **4** Controls the FPGA through a memory-mapped interface. **5** Communicates with the QPSK modulator through the FPGA and the ATM-25 interface.

Internal Components

The following illustration identifies the internal components and processes of the QPSK demodulator.



The QPSK Demodulator and the QPSK Modulator

Introduction

This section describes how the QPSK demodulator and the QPSK modulator receive and transfer data. The following table and illustration show this process.

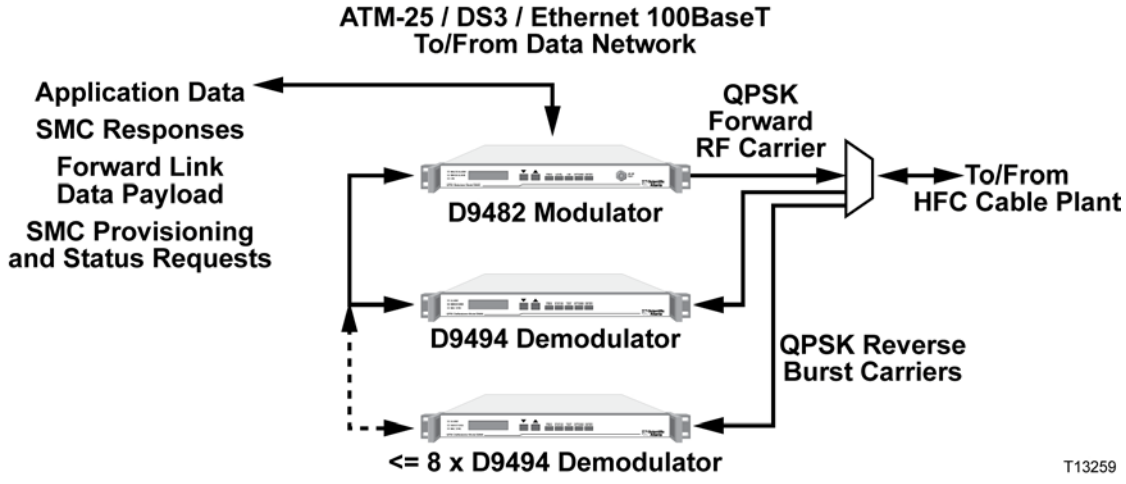
Communication Path

The QPSK demodulator and QPSK modulator combine to create a DAVIC-compliant headend QPSK signaling hub. The following table illustrates this process.

From	To	Data
QPSK demodulator	QPSK modulator	■ Status monitoring and control (SMC) responses ■ Application data ■ MAC status data ■ MAC calibration requests
QPSK modulator	QPSK demodulator	■ Embedded 3 ms reference ■ SMC provisioning data ■ SMC status requests

Communication Diagram

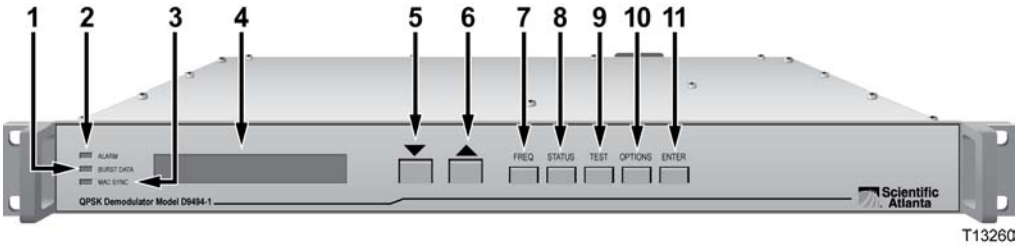
The following diagram illustrates the QPSK communication path.



Front Panel Overview

Front Panel Components

The following illustration shows the front panel components of the QPSK demodulator. The following table describes the labeled areas.



Description of Components

The following table contains the front panel alarm and component descriptions that correspond to each number in the preceding labeled diagram of the QPSK demodulator front panel.

Item	Component	Description
1	BURST DATA indicator (yellow)	Illuminates during data transfers between the IF board and the digital interface and control board
2	ALARM indicator (red)	Illuminates for any alarm. Refer to ***Troubleshoot Alarms*** (on page 45) for additional help
3	MAC SYNC indicator (green)	Illuminates as long as the reference clock and frame synchronization are received from the QPSK modulator
4	LCD alphanumeric display	Displays information and menus for front panel keys
5		Allows you to scroll down through various menu selections
6		Allows you to scroll up through various menu selections
7		Allows you to adjust the receiver input frequency. The range is 5 to 42 MHz in 0.250 MHz increments
8		Allows you to obtain unit operating status. This includes software and firmware revision levels, RF input frequency, message bit error rate, CPU usage, and RSSI status

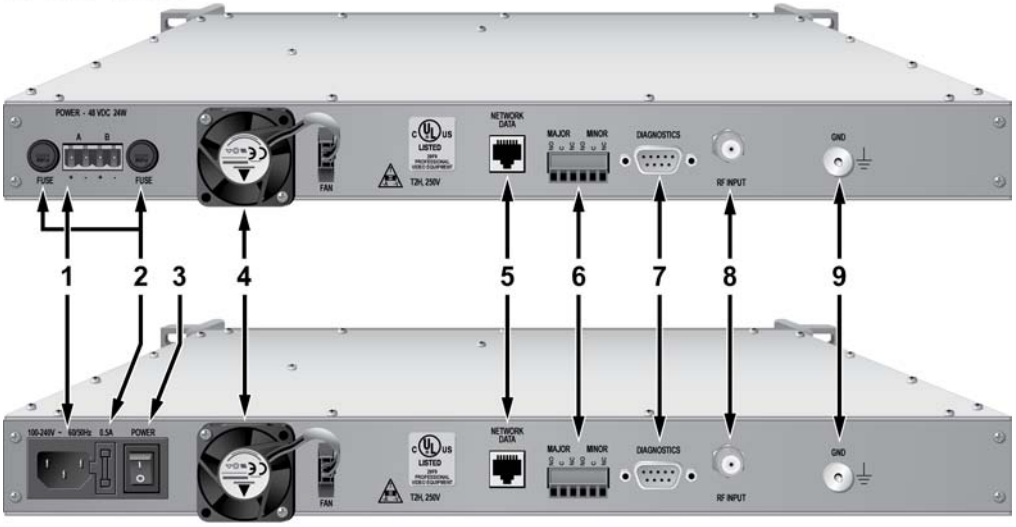
Item	Component	Description
9		Allows you to access various test functions, including Front panel, LCD display, Diag port, ATM-25, RAM, and ROM
10		Allows you to select various options, including LCD contrast, RF input level range, node/neighborhood ID (12-character ASCII), unit reload/restart, and diagnostic port baud rate
11		Allows you to save configuration changes to nonvolatile memory, and to start and stop diagnostic tests

Back Panel Overview

Back Panel Components

The following illustrations show the back panel components of both the 48 VDC and the 100-240 VAC QPSK demodulator. The following table describes the labeled areas.

48 VDC Model



100-240 VAC Model

T13362

Description of Components

The following table describes the back panel components. Each item in the table corresponds to the appropriate number in the preceding labeled diagram of the QPSK demodulator back panels.

Item	Component	Description
1	Power Inlet	■ Screw-cage clamp plug and jack on the 48 VDC model ■ 3-Prong male socket on the 100-240 VAC model
2	Fuse Holder	■ 2.0 A Slo-Blo, 250 V fuse on the 48 VDC model (2) ■ 2.0 A Slo-Blo, 250 V fuse on the 100-240 VAC model
3	Power Switch (100-240 VAC Model only)	On/off rocker type power switch
4	Cooling Fan	Removes heat from the chassis

Item	Component	Description
5	Network Data	ATM-25 connection for sharing data with the QPSK modulator
6	Alarm Relays	Screw-cage clamp plug and jack accesses alarm relay connections
7	Diagnostics	Standard DB-9 RS-232 connector to be used by service engineers only
8	RF Input	75 Ω RG-59 coaxial cable connects to the HFC combining network
9	GND	Ground screw for grounding the unit

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Installing the DAVIC QPSK Demodulator

Introduction

This chapter provides procedures for installing the QPSK demodulator into a rack and for connecting the QPSK demodulator to other DBDS components. For detailed instructions on how to provision the QPSK demodulator on the DNCS, refer to the *DNCS Online Help* for your system release.

Important: The QPSK demodulator must be installed in the system headend before you can perform any calibration or provisioning.

Note: Refer to Appendix A for additional technical specifications and requirements to help you install and configure the QPSK demodulator on your system.

In This Chapter

Installation Prerequisites

Introduction

This section describes the rack, power, and operating temperature requirements for the QPSK demodulator.

Rack Requirements

The QPSK demodulator fits into a standard rack mount type: EIA RS-310.

CAUTION:

When installing the QPSK demodulator into a rack, be careful not to tangle or strain interconnecting cables.

In order to allow for proper ventilation and cooling, do not stack more than eight demodulators consecutively in the rack.

Power Requirements

The QPSK demodulator requires a power source with the following specifications.

Item	Specification
Voltage	■ 48 VDC model: -42 to -56.7 VDC ■ 100-240 VAC model: 90 to 264 VAC **WARNING:** **Avoid damaging the QPSK demodulator and creating a possible fire hazard! Do not connect the QPSK demodulator to an incorrect power source.**
Power	< 24W
Connector Specifications	■ 48 VDC model: Four position screw-cage clamp plug (supplied with unit), with mating jack on unit. Recommended wire AWG is 12 maximum, 18 minimum ■ 100-240 VAC model: 3-prong male socket
Line frequency	47 to 63 Hz ± 5%

Fuse Requirements

You can easily replace the fuse on the QPSK demodulator. Keep spare fuses readily available for the following QPSK demodulators:

- The 48 VDC QPSK demodulator uses a 2.0 A 250 V Slo-Blo power fuse.
- The 100-240 VAC QPSK demodulator uses a 2.0 A 250 V Slo-Blo power fuse.

Note: For information on replacing fuses, go to ***Routine Maintenance*** (on page 40).

Operating Temperature

The operating temperature of this equipment is 0 to 50°C (32 to 122°F).

CAUTION:

- **Avoid damage to this product! Your warranty is void if you operate this product above or below the maximums specified operating temperature.**
- **Avoid damage to this product! Your warranty is void if you install this product without proper ventilation.**

To help maintain the operating temperature in the acceptable range:

- Place the equipment in an air-conditioned environment
- Keep cooling vents obstruction-free

  Note: The intake vents are on the side panel and the exhaust vent is on the back panel.
- Maintain a cool temperature in your headends and hubs where you use QPSK demodulators

Unpack and Inspect the QPSK Demodulator

Introduction

This section provides the procedures for unpacking and inspecting the QPSK demodulator.

Carrier's Responsibility

We inspect and carefully pack all products before shipment. The carrier is responsible for safe shipping and delivery. Do not return products damaged in transit to us. If there are any missing parts or damage to the product, refer to ***Return Products for Repair*** (on page **Error! Bookmark not defined.**).

Note: Retain all boxes for future equipment shipping needs. They have been designed for use with this equipment.

Unpacking and Inspecting Procedure

Follow these steps to unpack and inspect the QPSK demodulator.

1. Review the Safety Precautions.
2. Inspect the shipping carton for visible damage.
3. Open the shipping carton.
4. Remove all packing material.
5. Inspect the product for visible damage.
6. Inspect the box or product for loose items that may indicate concealed damage.
7. Inspect for missing parts using the packing slip as a guide.

Install the DAVIC QPSK Demodulator Into a Rack

Introduction

This section describes the rack requirements, and the procedure for installing the QPSK demodulator into a rack.

Rack Requirements

The QPSK demodulator dimensions are 1.75 in. H x 19.00 in. W x 16.5 in. D. The QPSK demodulator fits into a type EIA RS-310 rack mount type.

CAUTION:

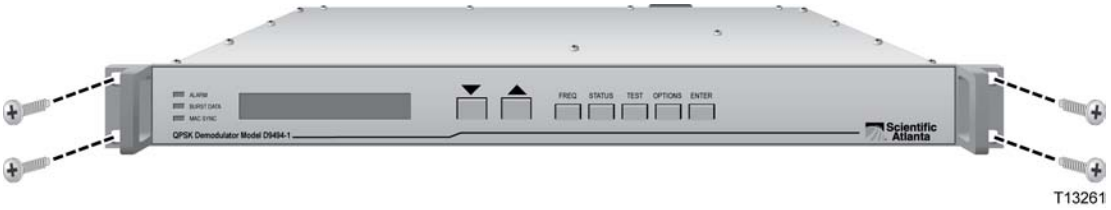
- **Do not to tangle or strain interconnecting cables.**
- **Be sure to install additional support**

Installing the QPSK Demodulator into a Rack

CAUTION:

In order to allow for proper ventilation and cooling, do not stack more than eight demodulators consecutively in the rack.

1. Install angle support brackets part numbers 734845 and 734846.
2. Place the QPSK demodulator in the rack.
3. Insert a mounting screw through each of the four bezel mounting holes on the front panel of the QPSK demodulator and then into the rack.



4. Firmly tighten each mounting screw.

   Important: When you use the supplied angle support brackets, you can install the QPSK demodulators above or below each other in the rack. These support brackets provide additional support and allow correct air circulation through the unit and to compensate for the additional weight of wire connectors and cabling.

Connect the Network Data Port

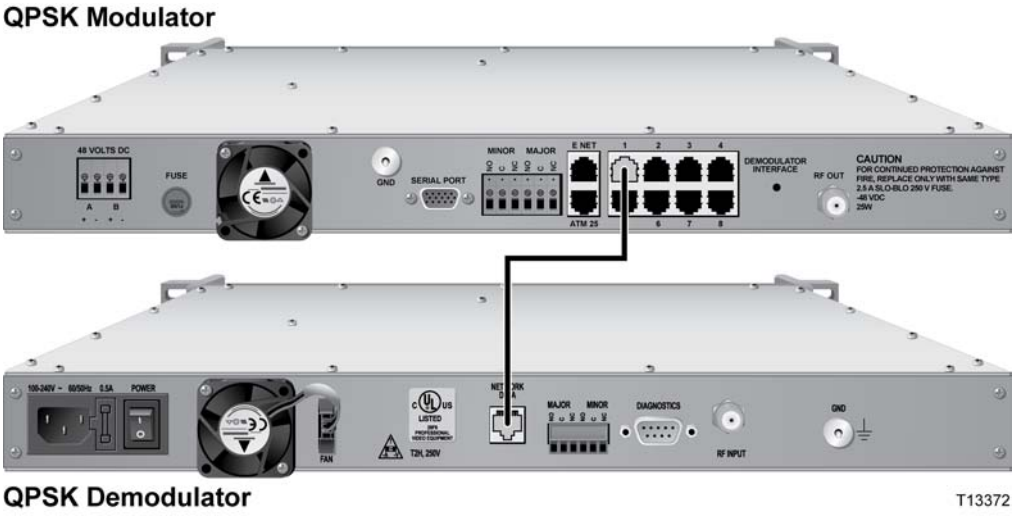
Introduction

The Network Data port on the QPSK demodulator provides two-way data flow with the QPSK modulator. This two-way data includes SMC responses, application data, MAC Status, and SMC provisioning requests. This section describes the procedure for connecting the network data port. Use a single, shielded, CAT-5 Ethernet interconnect cable to connect the Network Data ATM-25 port on the QPSK demodulator to the Demodulator Interface on the QPSK modulator.

Note: The demodulator interface on the QPSK modulator is designed to connect to up to eight QPSK demodulators.

QPSK Demodulator and QPSK Modulator Connections

The following illustration shows an example of a QPSK demodulator to QPSK modulator connection.



Connect Power Sources

This section contains instructions for connecting the DC and AC power sources to the QPSK demodulator.

Connecting an Earth Ground

Complete the following steps to connect an earth ground to either the DC or AC versions of the QPSK demodulator.

CAUTION:

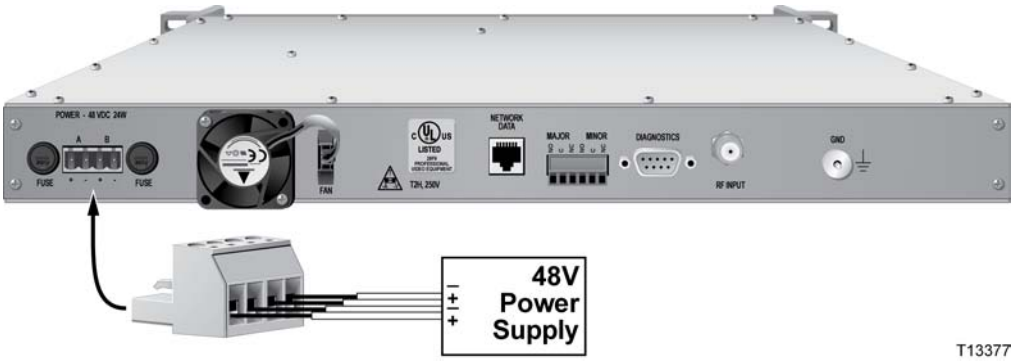
The 48 VDC QPSK demodulator must be connected to an earth ground.

1. Place a ground wire onto the ground lug (marked **GND**) on back of the QPSK demodulator; then, use your fingers to tighten the ground lug to secure the ground wire.
2. Connect the other end of the ground wire to the rack or earth ground.

Connecting a DC Power Source

Complete the following steps to connect a DC power source to the 48 VDC QPSK demodulator.

1. Verify that the DC power source is set to the **Off** position.
2. Insert the wires from the DC power source into the screw-cage clamp plug. Use a small flat-blade screwdriver to tighten the screws at the top of the screw-cage clamp plug to secure the wires. Then insert the plug into the mating jack on the back panel of the 48 VDC QPSK demodulator.



3. Keep the DC power source set to the **Off** position until you are ready to power on the demodulator.

Connecting an AC Power Source

Complete the following steps to connect an AC power source to the 100-240 VAC QPSK demodulator.

1. Verify that the power switch on the back panel is placed in the **Off** position.
2. Connect the power cord to the AC power inlet on the back panel of the 100-240 VAC QPSK demodulator.
3. Connect the other end of the power cord to an AC electrical outlet.
4. Keep the power switch in the **Off** position until you are ready to power on the device.

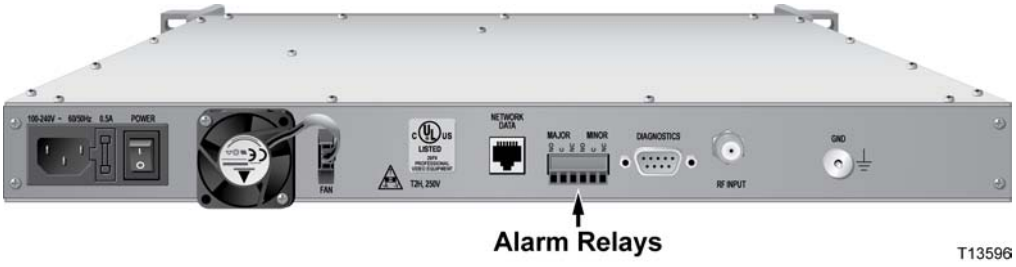
Connect the Alarm Relays (Optional)

Introduction

The QPSK demodulator includes alarm relay connections, labeled MAJOR and MINOR, for connecting visual or audible alarm indicators. The relays provide both normally open (NO) and normally closed (NC) connections. This section describes the procedure for connecting the alarm relays.

Location of Alarm Relay Connections

The following illustration shows the location of the alarm relay connections.



Connecting the Alarm Relays (Optional)

1. If connected, disconnect the power wires from the power supply, or power off the unit.

   WARNING:

   Avoid electric shock when disconnecting the power supply. Only a qualified electrician should disconnect the power supply.

2. Determine whether the indicator *trips* (activates) on an open or closed circuit (usually the external alarm has this information).
   - A simple indicator (for example, an alarm based on a battery and beeper) would trip on a closed circuit (use the NO and COM terminals)
   - A more complex indicator (for example, a commercial alarm system) would trip on an open circuit (use the NC and COM terminals)

   Note: The alarm connections power base ratio is 2 A at 50 V.

3. The alarm connector uses a screw-cage clamp plug with mating jack on the demodulator. The plug accepts wire from 16 to 28 AWG.
4. Insert an indicator wire into the NO, the NC, or the COM terminals on the screw-cage clamp plug (see step 2 for determining which terminals to use).

   Note: Make sure the screw-cage clamp closes on the bare wire, not on the insulation.

5 Use a small slotted screwdriver to tighten the screw-cage clamp screws.

6 Repeat steps 4 and 5 for additional connections, as needed.

7 Connect the power to the power supply, or power on the unit.

Connect the Diagnostics Port (Optional)

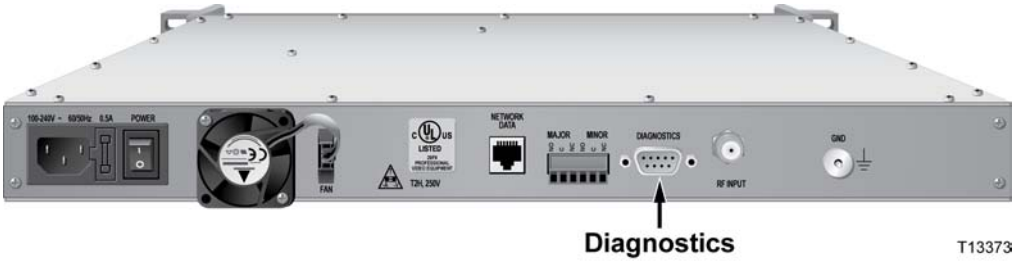
Introduction

The diagnostics port on the QPSK demodulator is a standard DB-9 RS-232 connector. Use the diagnostic port to connect the QPSK demodulator to a diagnostic PC. This section describes the procedure for connecting the diagnostics port.

Important: This port is for diagnostic use and is not designed to be connected for normal operation.

Location of the Diagnostics Port

The following illustration shows the location of the Diagnostics port.



Connecting the Diagnostics Port (Optional)

1. Connect the male end of a DB-9 data cable to the Diagnostics (craft) port on the back of the QPSK demodulator.

   Note: The cable connection is straight through.

2. Connect the other end of a DB-9 data cable to an available serial port on the diagnostic PC.

   Note: To maintain signal clarity and strength, do not use a ribbon cable longer than 50 ft.

3. Power on the PC and activate a ProComm or HyperTerminal window using the following modem connection settings:

   - 19200 baud
   - 1 stop bit
   - No parity
   - 8 data bits
   - No flow control

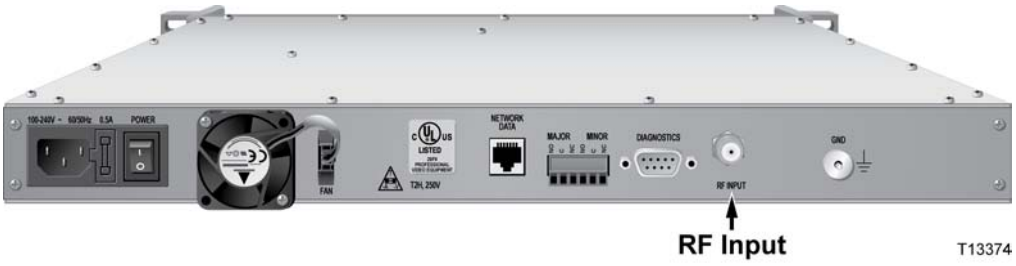
Connect the RF Input Port

Introduction

The RF Input port connects the QPSK demodulator to the HFC network and to DHCTs using 75 Ω RG-59 coaxial cable. This section describes the procedure for connecting the RF Input port.

Location of the RF Input Port

The following illustration shows the location of the RF Input port.



Connecting the RF Input Port

1. Locate the RF Input port on the back panel of the QPSK demodulator.
2. Connect one end of a 75 Ω RG-59 coaxial cable to the RF Input port.
3. Connect the other end of the 75 Ω RG-59 coaxial cable to a RF signal splitter in the distribution plant (headend).

Provision the QPSK Demodulator on the DNCS

After you have installed and connected the QPSK demodulator, you must provision the QPSK demodulator on the DNCS. For detailed instructions on how to provision the QPSK demodulator on the DNCS, refer to the *DNCS Online Help* for your system release.

Power On the QPSK Demodulator

After you have installed, connected, and provisioned the QPSK demodulator, power on the demodulator. The QPSK modulator manages the QPSK demodulator, and will provision the demodulator after it is powered on.

For additional details on software installation, refer to the *QPSK Demodulator Software Install/Upgrade Guide* (part number 4022031).

3

Operating the DAVIC QPSK Demodulator

Introduction

This chapter describes the screens and menus that display in the LCD on the front panel of the QPSK demodulator. This chapter also provides procedures for viewing and changing QPSK demodulator settings using the front panel keys and the various menus.

Important: Actual menu settings may differ slightly from the examples presented in this guide.

In This Chapter

Reading the Default Status Screen

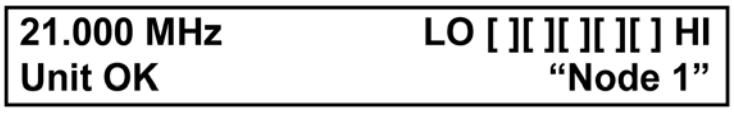
Introduction

This section describes the Default Status screen. The QPSK demodulator displays the Default Status screen after one of the following events occurs:

- The power-on self-test sequence is complete.
- The ENTER key is pressed.
- A minute elapses after a key has been pressed (except when in the TEST menu).

Default Status Screen Information

The following is an example of the Default Status screen.



The following table describes the information displayed on the preceding example of a Default Status screen.

Display	**Function**
21.000 MHz	Configured input frequency
LO [][][][][] HI	Configured input range
Unit OK	Summary status (if an alarm condition occurs, the alarm condition messages will show here instead of Unit OK)
Node 1	User-defined node identifier of assigned neighborhood

Using the Front Panel Keys to Change Configuration Settings

Introduction

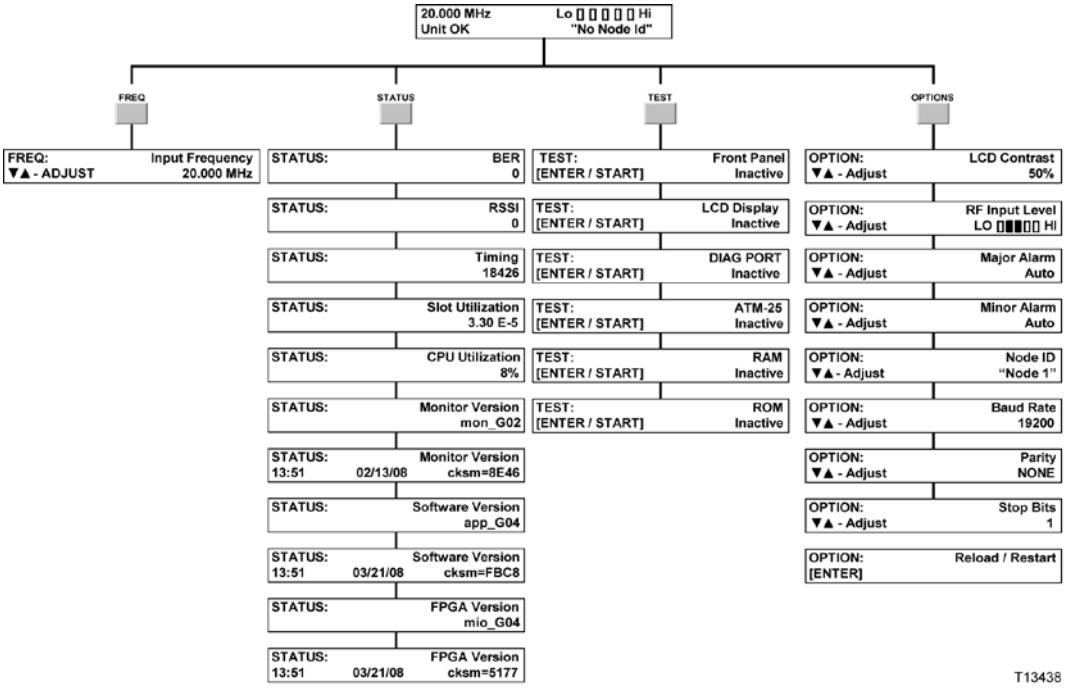
The front panel of the QPSK demodulator includes an alphanumeric LCD screen and three status indicator lights. Four keys on the front panel allow you to change QPSK demodulator parameters. You can access other menus and screens by pressing the front panel keys labeled FREQ, STATUS, TEST, and OPTIONS.

Diagram of the Front Panel Menu Structure

The following diagram illustrates the QPSK demodulator menu structure.

Notes:

- The settings shown on this menu are examples, not recommended settings.
- All interactive menus display ADJUST, TOGGLE, or ENTER.



Accessing the QPSK Demodulator Features

You can access other menus and screens by pressing the following front panel keys: FREQ, STATUS, OPTIONS, and TEST. You can use the ENTER key to store and save any changes to the configuration settings. This section provides instructions for using these keys.

System Control

In normal operation, all configuration of the QPSK demodulator is performed from the DNCS and the QPSK modulator. Front panel adjustments are not required.

Important: The DNCS overrides many of the configuration changes made using the front panel keys if the QPSK demodulator is reset.

The ENTER Key

Use the ENTER key to store any changes to the configuration settings. The ENTER key also controls status tests.

Important: If the ENTER key has been pressed, or if no front panel buttons are pressed after one minute has elapsed, the demodulator displays the Default Status screen.

Note: The one-minute timeout does not apply to the TEST menus.

Front Panel Indicators

The following indicators are located on the left side of the front panel:

- ALARM (red): Illuminates for any alarm. For more information, refer to ***Troubleshoot Alarms*** (on page 45).
- BURST DATA (yellow): Illuminates during data transfers between the IF board and the digital interface and control board.
- MAC SYNC (green): Illuminates as long as a reference clock and frame synchronization are received from the QPSK modulator.

Note: During normal operation, the MAC SYNC and BURST DATA indicators illuminate. However, the ALARM indicator does not illuminate during normal operation, and only illuminates when an alarm condition exists.

Self-Test Failure Indication

If the QPSK demodulator fails any power-on self-test (POST), the ALARM LED illuminates, and the LCD screen displays an alarm message.

Using the FREQ Key Menu

Introduction

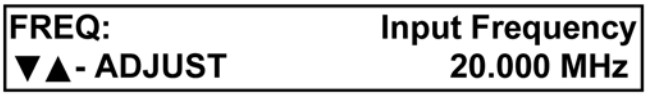
Pressing the **FREQ** key allows you to access the input frequency menu from which you can change the input frequency.

Setting the Input Frequency

Important: The DNCS overrides any changes made to the input frequency using the front panel keys if the QPSK demodulator is reset.

Follow these steps to change the input frequency.

1 Press the **FREQ** key on the front panel of the QPSK demodulator. The Input Frequency screen appears.



2 Press the Up or Down Arrow keys to increase or decrease the input frequency in 0.250 MHz increments.

Note: The QPSK demodulator supports a frequency range from 5 to 42 MHz.

3 Press **ENTER** to save changes to nonvolatile memory and return to the Default Status screen.

Using the STATUS Key Menus

Introduction

Pressing the **STATUS** key allows you to display QPSK demodulator operating status.

STATUS: BER 0	Displays the message Bit Error Rate (BER) only when receiving burst data
STATUS: RSSI 0	Displays the relative measurement of received signal strength (RSSI)
STATUS: Timing 18426	Displays the arrival time value of the last burst packet received
STATUS: Slot Utilization 3.30 E-5	Displays the percentage of burst traffic currently going through the component
STATUS: CPU Utilization 8%	Displays the percentage of the microprocessor usage
STATUS: Monitor Version mon_G02	Displays the current monitor software version
STATUS: 13:51 02/13/08 Monitor Version cksm=8E46	Displays the time and date of the current monitor software version and its checksum
STATUS: Software Version app_G04	Displays the software version
STATUS: 13:51 03/21/08 Software Version cksm=FBC8	Displays the time and date of the current software version and its checksum (verifies that software image is not corrupted)
STATUS: FPGA Version mio_G04	Displays the current Master (Mstr) Input/Output (I/O) software version
STATUS: 13:51 03/21/08 FPGA Version cksm=5177	Displays the time and date of the current master I/O software version and its checksum

Using the TEST Key Menus

Introduction

The **TEST** key allows you to access the TEST menus. You can start and stop tests by pressing the **ENTER** key.

TEST: Front Panel [ENTER / START] Inactive	Provides an interactive test of the buttons on the front panel
TEST: LCD Display [ENTER / START] Inactive	Tests the LCD display
TEST: DIAG PORT [ENTER / START] Inactive	Tests the integrity of the diagnostic port on the digital board
TEST: ATM-25 [ENTER / START] Inactive	Tests the integrity of the ATM-25 port
TEST: RAM [ENTER / START] Inactive	Tests the integrity of the RAM on the CPU board
TEST: ROM [ENTER / START] Inactive	Tests the integrity of the ROM on the CPU board

Important: If the test generates an alarm, refer to ***Troubleshoot Alarms*** (on page 45).

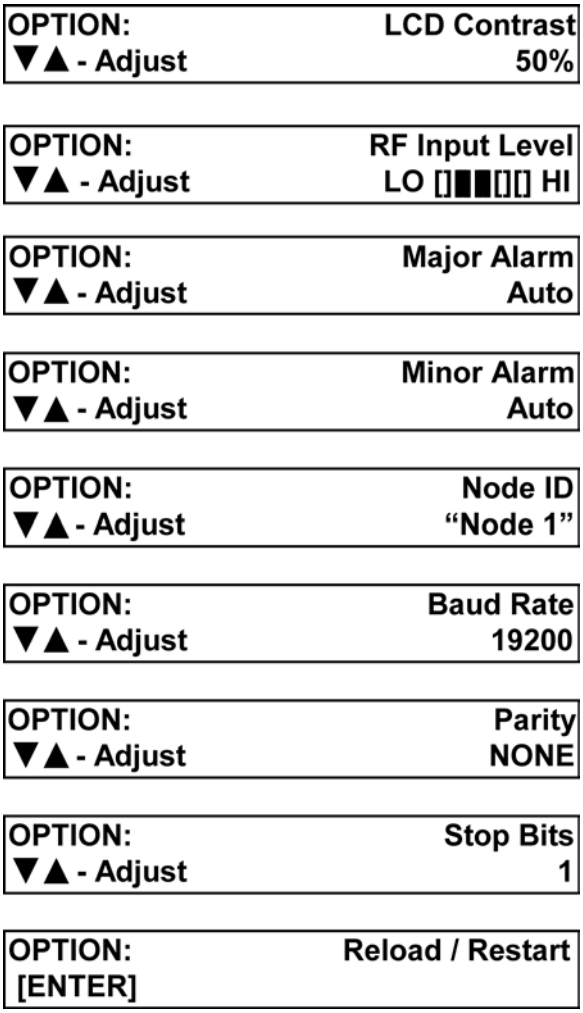
Using the OPTIONS Key Menus

Introduction

The **OPTIONS** key allows you to access the OPTIONS menus. Use the arrow keys to adjust settings.

Reading the OPTIONS Key Menus

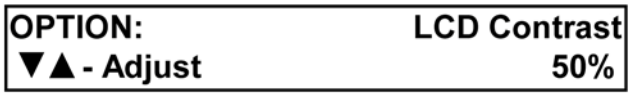
The following diagrams illustrate sequence of screens that appear when you press the OPTIONS key repeatedly. Detailed instructions for changing these settings follow next in this section.



Changing the LCD Contrast Screen

Follow these steps to change the LCD contrast of the front panel display screen on the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator. The LCD contrast screen appears.



2 Press the Up or Down Arrow keys to increase or decrease the contrast from 0% to 100% in 5% increments.

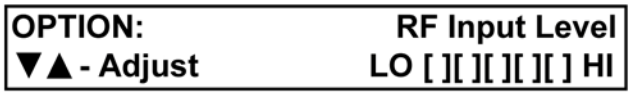
3 Press **ENTER** to save changes to nonvolatile memory and return to the Default Status screen.

Changing the RF Input Level

Important: The DNCS overrides any changes made to the RF input level using the front panel keys if the QPSK demodulator is reset.

Follow these steps to change the RF Input Level range on the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator two times. The RF Input Level screen appears.



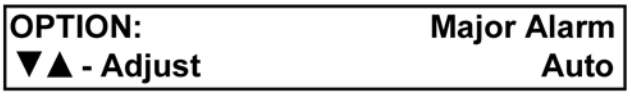
2 Press the Up or Down Arrow keys to increase or decrease the RF Input Level.

3 Press **ENTER** to save changes to nonvolatile memory and return to the Default Status screen.

Changing the Major Alarm

Follow these steps to arm or disarm the Major Alarm setting on the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator three times. The Major Alarm screen appears.



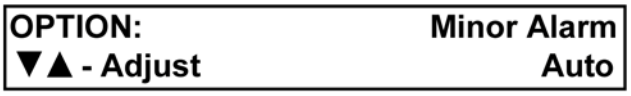
2 Press the Up or Down Arrow keys to choose one of the following Major Alarm arming options:

- AUTO
- ON
- OFF

Changing the Minor Alarm

Follow these steps to arm or disarm the Minor Alarm setting on the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator four times. The Minor Alarm screen appears.



2 Press the Up or Down Arrow keys to choose one of the following Minor Alarm arming options:

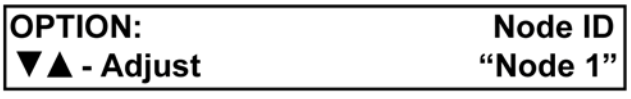
- AUTO
- ON
- OFF

Changing the Node ID

Important: The DNCS overrides any changes made to the node ID using the front panel keys if the QPSK demodulator is reset.

Follow these steps to change the Node Identification (ID) on the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator five times. The Node ID screen appears.



2 Press the Up or Down Arrow keys to choose an ASCII character for the space the cursor is on.

3 Press **ENTER** to move the cursor to the next letter.

Note: You can write up to a 12-character ASCII description.

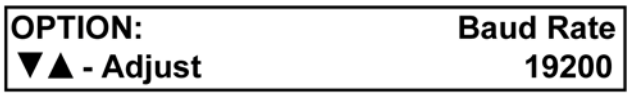
4 Press **ENTER** several times to move the cursor past the end of the Node ID string and to save the changes in nonvolatile memory.

Changing the Baud Rate

The baud rate is the number of events, or signal changes, that occur in one second. For example, a baud rate of 300 means that 300 bits are transmitted each second (abbreviated 300 bps). However, at higher baud rates (over 1200), it is possible to encode more than one bit in each electrical charge. A baud rate of 4,800 may allow 9,600 bits to be sent each second by encoding 2 bits per event.

Follow these steps to change the diagnostic port baud rate.

1 Press **OPTIONS** on the front panel of the QPSK demodulator six times. The Baud Rate screen appears.



2 Press the Up or Down arrow keys to choose one of the following baud rates:

- 1200
- 2400
- 4800
- 9600
- 19200
- 38400

3 Press **ENTER** to save the changes to nonvolatile memory and return to the Default Status screen.

Important: Changing this setting affects the content of the procedure ***Connecting the Diagnostics Port (Optional)*** (on page 21).

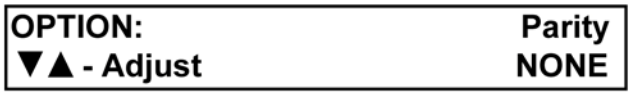
Changing the Parity Sense

Parity checking refers to the use of parity bits to check the accuracy of transmitted data. When parity checking is used, data bits are set so that all bytes have either an odd number or an even number of set bits.

Note: The sender and receiver must both agree to use parity checking and agree on whether parity is to be odd or even. If the sending and receiving elements are not configured with the same parity sense, communication will be impossible.

Follow these steps to change the diagnostic port Parity sense.

1 Press the **OPTIONS** key on the front panel of the QPSK demodulator seven times. The Parity screen appears.



2 Press the Up or Down Arrow keys to choose one of the following parity sense:

- **EVEN PARITY—**This is the most common form of parity. If the number of set bits is even, choosing even parity sets the parity bit to 0. If the number of set bits is odd, choose even parity sets the parity bit to 1.
- **ODD PARITY—**If the number of set bits is even, choosing odd parity sets the parity bit to 1. If the number of set bits is odd, choosing odd parity sets the parity bit to 0.
- **NONE—**When you choose none, the QPSK demodulator will not perform parity checking.

3 Press **ENTER** to save the changes to nonvolatile memory and return to the Default Status screen.

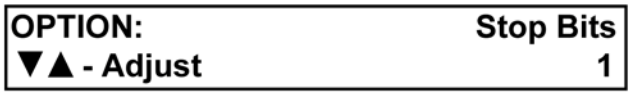
Important: Changing this setting affects the content of the procedure ***Connecting the Diagnostics Port (Optional)*** (on page 21).

Changing the Stop Bits

In asynchronous communications, a bit indicates that a byte has just been transmitted. Every byte of data is preceded by a start bit and followed by a stop bit.

Follow these steps to change the value of the diagnostic port stop bits.

1 Press **OPTIONS** on the front panel of the QPSK demodulator eight times. The Stop Bits screen appears.



2 Press the Up or Down Arrow keys to choose one of the following stop bit values:

- 1
- 2

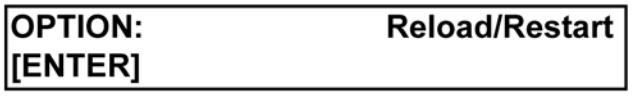
3 Press **ENTER** to save the changes to nonvolatile memory and return to the Default Status screen.

Important: Changing this setting affects the content of the procedure ***Connecting the Diagnostics Port (Optional)*** (on page 21).

Reload/Restart

Follow these steps to reload or restart the QPSK demodulator.

1 Press **OPTIONS** on the front panel of the QPSK demodulator nine times. The Reload/Restart screen appears.



2 Press **ENTER** to reload or restart the QPSK demodulator.

4

Troubleshooting the DAVIC QPSK Demodulator

Introduction

This chapter provides routine maintenance information, general troubleshooting guidelines, and explanations of major, minor, and status alarm conditions. This chapter also includes instructions for assessing alarm conditions. An alarm troubleshooting table, arranged alphabetically according to an alarm's front panel LCD message, is included along with additional information for resolving alarm conditions.

In This Chapter

Routine Maintenance

Introduction

Performing routine maintenance ensures proper functionality of the QPSK demodulator and helps in trouble-free operation. This section describes important maintenance procedures.

WARNING:

Only qualified personnel should attempt maintenance and service of the QPSK demodulator.

Quarterly Visual Inspection

The QPSK demodulator can operate unattended for extended periods of time. If the QPSK demodulator is operating normally, do not remove the cover, the cards, or make any adjustments. However, do conduct a visual inspection at least once every four months.

Important: Only qualified personnel should attempt maintenance and service of the QPSK demodulator.

Check the following items during a visual inspection:

- **Cables and connectors**—Make sure that all cables are connected properly and that all retaining screws are tight. Inspect cables for stress and chafing.
- **Cover and back panel**—If necessary, clean the cover and back panel with a soft cloth dampened with a mild detergent solution.
- **Cooling fan and intakes**—Check the cooling fan on the back panel and the intake vents on the side panel for excessive lint or dust buildup. Remove the lint and dust from the fan and the intake vents using a damp cloth or a small hand vacuum.

Fuse Requirements

Each QPSK demodulator contains at least one power fuse. We recommend that you keep the following spare fuses readily available:

- The 48 VDC QPSK demodulator uses two 2.0 A 250 V Slo-Blo power fuses.
- The 100-240 VAC QPSK demodulator uses a 2.0 A 250 V Slo-Blo power fuse.

For instructions on replacing fuses, go to ***Replacing Fuses*** (on page 41).

Replacing Fuses

Replacing Fuses for the 48 VDC QPSK Demodulator

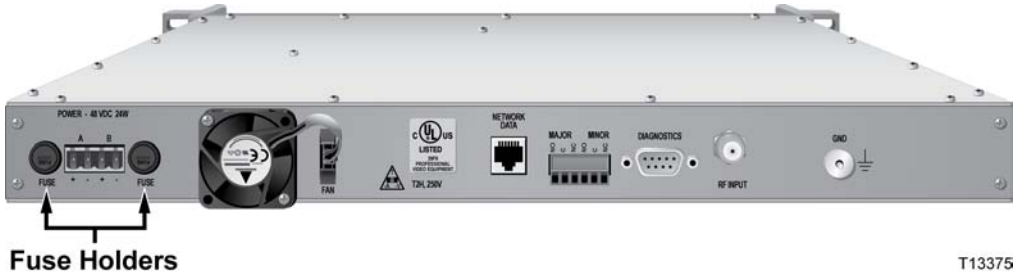
Follow these steps to change the 2.0 A 250 V fuse on the 48 VDC model.

Note: The 48 VDC model of the D9494 QPSK demodulator contains two (2) fuse holders. We recommend that you change *both* fuses at the same time.

WARNINGS:

- **Avoid electric shock! Disconnect the power on this product before you remove the fuse.**
- **Avoid electric shock and damage to this product! Replace the fuse only with a fuse that is the correct type and rating.**

1. Disconnect the power wires.
2. Locate the fuse holders on the left side of the back panel.



3. Loosen one fuse holder by using a small, flat-blade screwdriver to turn the fuse holder counter-clockwise.
4. Pull the fuse holder from the back panel.
5. Remove the fuse and replace it with a new one.
6. Reinsert the fuse holder into the back panel.
7. Tighten the fuse holder by using a small, flat-blade screwdriver to turn the fuse holder clockwise.
8. Repeat steps 3 through 7 to replace the other fuse. Then go to step 9.
9. Reconnect the power wires.

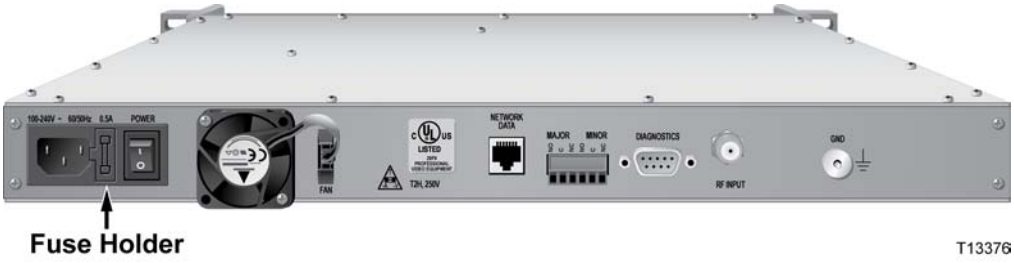
Replacing Fuses for the 100-240 VAC QPSK Demodulator

Follow these steps to replace the 2.0 A 250 V fuse on the 100-240 VAC model.

WARNINGS:

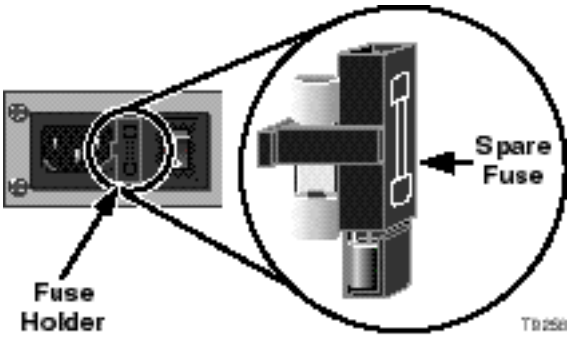
- **Avoid electric shock! Disconnect the power on this product before you remove the fuse.**
- **Avoid electric shock and damage to this product! Replace the fuse only with a fuse that is the correct type and rating.**

1. Power off the unit.
2. Locate the fuse holder located between the power cord inlet and the Power switch on the left side of the back panel.



Note: You can keep a spare fuse in the hidden compartment of the fuse holder. This spare fuse should be retained as a backup. If you use the spare fuse, you should replace it with a new one.

3. Using a small flat-blade screwdriver, gently pry out the fuse holder.



4. Remove the blown fuse and replace it with a new one.
5. Insert the fuse holder tightly into its place.
6. Reconnect the power cord.
7. Power on the unit.

Replacing the Fan

This section provides instructions for obtaining and replacing the cooling fan unit on the QPSK demodulator.

Notes:

- Replace the fan unit only with a genuine replacement fan unit. The part number for the replacement fan unit is **4016501**. The part number for the replacement fan kit is **4017943**. Contact the representative who handles your account to obtain replacement fans.
- You must power off the demodulator in order to replace the cooling fan.

Complete these steps to replace the cooling fan on the back panel of the QPSK demodulator.

1. Power off the QPSK demodulator.
2. On the back panel of the QPSK demodulator, unplug the fan from the connection.
3. Remove the retaining screws using a Phillips screwdriver and set the non-functioning fan and screws aside.

   Note: Be sure not to drop or misplace the screws. You will need them to replace the fan.
4. Attach the replacement fan to the back panel using the same screws you removed previously making sure that you orient the fan so that the airflow blows outward.

   Note: Be sure to use a torque of approximately 4-6 in.-lb.
5. Plug the replacement fan into the power connection provided on the back panel.
6. Power on the QPSK demodulator.
7. Verify that the replacement fan is operating correctly. If the replacement fan does not operate correctly, contact Cisco Services for assistance.

General Troubleshooting Guidelines

Introduction

This section describes major, minor, and status alarms. In addition, this section explains how to access and read the alarms that display on the front panel LCD of the QPSK demodulator. If the QPSK demodulator indicates an alarm, check for false alarms, check the power supply, and/or follow the guidelines for troubleshooting major and minor alarms.

False Alarms

A false alarm may occur when an external alarm indicator is wired backwards. The sensor is wired to the NC terminal when it should be wired to the NO terminal, or vice versa. If the QPSK demodulator has power and the MAJOR ALARM LED is off, make sure the terminal wiring is correct.

Checking AC Power

Follow these steps to determine whether a power problem is causing a power alarm.

WARNING:

Only qualified personnel should attempt maintenance and service of the demodulator.

1. Verify that the power wires and/or power cords are firmly connected in the QPSK demodulator and at the power outlet. Replace/reconnect the power wires or cords if necessary.
2. Verify sure that the outlet is supplying the proper voltage.
3. Check the fuse in the back of the QPSK demodulator.
4. If the QPSK demodulator still indicates a power alarm, the internal power supply may be defective.

   Note: Refer to ***Troubleshoot Alarms*** (on page 45) for a list of major and minor alarms.

Troubleshoot Alarms

List of Alarms

When there is an alarm condition on the QPSK demodulator, the front panel display indicates which alarm condition is active. An alarm message displays on the second line of the display. If several alarms occur concurrently, only the most severe alarm displays.

The following table shows LCD screen displays for alarms.

Note: If none of the suggested check and correct procedures are effective in troubleshooting the alarm, contact Cisco Services:

- From within North America 1-800-283-2636 (toll-free)
- From outside North America +1-770-903-6900 (direct)

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO [][][][][] HI "ATM link fail"	The ATM connection between the QPSK demodulator and the QPSK modulator is not operating correctly.	■ Check the ATM network to verify that all cables are connected correctly and that there are no defective cables. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ Reset the QPSK demodulator. ■ If the error continues to occur, contact Cisco e Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "ATM-25 Error"	The boot monitor detected an error with the ATM link during initialization.	■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the error continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Burst Rcvr Error"	The burst receiver is not operating properly. The failure is detected after the demodulator has been provisioned and burst data is being received.	■ Reset the QPSK demodulator. ■ If the error continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Data Lost (CPU Busy)"	The demodulator is having a CPU overload in which it cannot keep up with the processing demands due to external activities.	■ Reset the QPSK demodulator. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "Data Lost (No Buffer)"	The demodulator is having a software overload in which buffers are not currently available for normal system data transfer operations.	■ Reset the QPSK demodulator. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Data Lost (Queue Full)"	The queue input and queue output processing has become unbalanced, or there is a network overflow caused by a large number of DHCTs rebooting following a power outage.	■ Contact your video service provider and report the alarm. ■ Reset the QPSK demodulator. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Data Updated (EEPROM)"	The system either repaired corrupt data stored in EEPROM in the QPSK demodulator, or the system updated the data to match a new software release.	■ Reset the QPSK demodulator. ■ If the error continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "Diag Port Lbk Error"	The boot monitor detected an error with the Diagnostic port (craft port) internal loopback device.	■ Reset the QPSK demodulator. ■ If the error continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Frame Sync Error"	The QPSK demodulator is not receiving the synchronization message from the QPSK modulator every 3 seconds.	■ Verify that the ATM link between the QPSK modulator and QPSK demodulator is operating correctly. ■ If the link cannot be verified, run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "LO1 Not Locked"	The first stage of the tuner is not locked to its reference frequency.	■ Reset the QPSK demodulator. ■ If the alarm continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "Master I/O Error"	Programming flash memory failed due to a hardware error, or data stored in the flash memory master I/O area in the QPSK demodulator is corrupt.	■ Reset the QPSK demodulator. ■ If the alarm continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO [][][][][] HI "Modem Comm Error"	The demodulator and modulator are not communicating properly due to AAL5 errors and ATM errors.	■ Check the ATM network to verify that all cables are connected correctly and that there are no defective cables. Also tighten any loose cables connections and replace any defective cables. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ Reset the QPSK demodulator. ■ If the alarm continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "No Reference Clock"	The encoded synchronization clock over the ATM link between the QPSK modulator and the QPSK demodulator is not occurring at the proper rate, or the synchronization clock is not present.	■ Verify that the ATM link between the QPSK modulator and QPSK demodulator is operating correctly. ■ If the link cannot be verified, run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ Reset the QPSK demodulator. ■ If the alarm continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "Not Connected"	A cable is loose, disconnected, or defective.	Check for loose connections or defective cables, tighten any loose cable connections, and replace any defective cables.
	There is no power to the QPSK demodulator.	Check the power supply and verify that it is operation and that the unit is plugged in and powered on.
	The QPSK demodulator has failed or is failing.	■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO ▯▯▯▯▯ HI "Not Provisioned"	The QPSK demodulator did not receive provisioning data within 20 seconds after being powered on and cannot communicate with the qpskManager process on the DNCS.	■ Wait at least 1 minute for the alarm to clear. ■ Verify that the qpskManager process is running on the DNCS. ■ Run the Doctor Report on the DNCS. ■ Troubleshoot the network connectivity issues or indications of loss of services that are identified in the Doctor Report. ■ If the alarm continues to occur, contact Cisco Services.
5.000 MHz LO ▯▯▯▯▯ HI "RAM Test Error"	A read/write error or hardware failure occurred.	■ Reset the QPSK demodulator. ■ If the alarm continues to occur, contact SciCare Services.
5.000 MHz LO ▯▯▯▯▯ HI "ROM Checksum Error"	At least one region in FLASH memory did not pass a checksum test, corrupt data is present, or the flash memory devices in the QPSK demodulator failed.	Contact Cisco Services.

Front Panel Display	Probable Cause	Check and Correct
5.000 MHz LO [][][][][] HI "User Activity Detected"	The demodulator detected user activity on either the front panel or the diagnostic port. This alarm is a status/informational alarm and does not report an error.	**1** Verify what settings were changed. **2** Are all services functioning correctly? – If **yes**, no further action is required. – If **no**, go to step 3. **3** Restore the settings to the previous configuration. **4** Reset the QPSK demodulator. **5** If the alarm continues to occur, contact Cisco Services.

5

Customer Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.

A

Specifications

Introduction

This appendix contains technical and operating specifications to help you ensure the proper function and compatibility of the QPSK demodulator within your system.

In This Appendix

Electrical Specifications

Introduction

This section provides the power requirements necessary for operating the QPSK demodulator.

Power Requirements

The following table lists the power specifications for the QPSK demodulator.

Specification	Parameter
Voltage	■ 48 VDC model: -42 to -56.7 VDC ■ 100-240 VAC model: 90 to 264 VAC
Input Power	< 24W

Fan Connector

Specification	Parameter
Contact Current Rating	3 amps
Termination Resistance	15 mΩ
Insulation Resistance	5,000 mΩ
Dielectric Withstanding Voltage	600 V
Number of Rows	Single
Centerline, Matrix	2.54 mm (.100 in.)

Alarm Interface

The following table lists the alarm specifications for the QPSK demodulator.

Specification	Parameter
Connector	6-position screw-cage clamp plug (supplied with unit) and jack
Bare-wire Gauge	16-28 AWG
Contact Rating	> 1A @ 100-240 VAC (switched)
Contact Type	1 form C (NC, NO) contacts

RF Environment

The following table lists the various RF specifications and ranges for the QPSK demodulator.

Specification	Parameter
Tuner Frequency Range	5.00 to 42.00 MHz
Tuning Step Size	250 kHz
Tuner Input Range	-13 to +3 dBmV (range 1) -5 to +11 dBmV (range 2) +3 to +19 dBmV (range 3) +11 to +27 dBmV (range 4)
Tuner Input Impedance	75 Ω
Tuner Input Return Loss	> 12 dB
Tuner Conversion Gain	32 ± 2.5 dB @ range 1
Tuner Channel Gain Flatness	< 1.0 dB pk-pk
Tuner Channel Group Delay	< 200 nsec pk-pk
Tuner Output Third Order Intercept	> 67 dBmV
Tuner Composite Phase Noise	< -80 dBc/Hz @10 kHz offset
Tuner Noise Figure	< 14 dB @ range 1
Tuner LO Leakage at Input	< -15 dBmV (range 1)
Maximum Co-channel, Single-tone Interferer	< -16 dBc for BER < = 1 x 10^{-8}
Maximum Total Adjacent, Similar QPSK, Carrier Power for BER <= 1 x 10^{-8}	< +14 dBc at nominal carrier input level (no in-band noise)
Maximum Input Power, 5-42 MHz	> 35 dBmV (range 4) over specified tuner frequency range
Tuner Output Frequency	44.004 MHz nominal

Signaling/Modulation

The following table lists signaling/modulation specifications for the QPSK demodulator.

Specification	Parameter
Modulation Type	Differentially encoded QPSK
Filtering	Square root, raised cosine, alpha=.3
Channel Spacing	1 MHz

Specification	Parameter		
Data Rate	1.544 Mbps (nominal)		
Max. Cell Rate (exclusive TDMA)	3,000 ATM cells per second		
Burst Packet Length	59 octets (472 bits)		
Burst Packet Preamble	4 octets, defined as CC CC CC 0D		
Payload Datagram Description	ATM cell; AAL-5 compliant		
Scrambling	PRBS-6; generator 1 + x^5 + x^6 Synchronized to first bit after 4 octet preamble		
Scrambling Seed	0x3F (all ones)		
Data Formatting	Differentially encoded, per:		
	A	**B**	**Phase change**
	0	0	none
	0	1	+90 deg
	1	1	+180 deg
	1	0	-90 deg
Forward Error Correction	Shortened Reed-Solomon (59,53), T=3		
Detection Type	Differential phasor demodulation of interpolated quadrature samples		
Burst Alignment	Preamble detection, followed by unique word correlation		
Bit Error Rate (BER)	Better than 1×10^{-8} @ 18 dB E_b/N_0		
Burst Noise Immunity	No lost cells for noise bursts up to -60 dBc/Hz, of duration 1 µsec in any 350 µsec period		

Baseband Interface

The following table lists the Baseband interface specifications for the QPSK demodulator.

Specification	Parameter
Type	ATM-25 port; RJ-45 physical connect
Maximum Rate	25.6 Mbps
Connection Architecture	Star (from D9482, to multiple D9492s)
Datagram Paradigm	ATM cells w/AAL5

Diagnostic Port

The following table lists the specifications and connections for the diagnostic port of the QPSK demodulator.

Specification	Parameter
Connector	Subminiature DB-9
Conductors	3: TxD, RxD, gnd
Data Rate	Variable, from 1,200 bps to 38,400 bps
Framing	8 data, no parity, 1 stop (8N1)
Messaging	ASCII text; full duplex

Other Specifications

Rack Specifications

The following table lists the rack specifications for the QPSK demodulator.

Specification	Parameter
Height	1.75 in.
Width	19.00 in.
Depth	16.5 in.
Rack Mount Type	EIA RS-310

Operating Humidity

Operating humidity limits are 0 to 95%, non-condensing.

Operating Temperature

The operating temperature of this equipment is 0 to 50°C (32 to 122°F).

CAUTION:

Avoid damage to this product! Your warranty is void if you operate this product above the maximum specified operating temperature.

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