Quad E1 Voice Processor User Manual

Software Versions LE-5.06.01 and QE-5.06.12

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Ditech™ Networks

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Documents

Ditech documentation is organized so that all users can understand the system components and perform tasks for Ditech's voice enhancement devices. Both paper documents and online help systems are provided. For related information, refer to the complete set of documentation in the table below.

Ditech's Documentation

Document Number	Document Title
Quad Voice Processor	
250-0300-21	Quad T1 Voice Processor User Manual
250-0300-20	Quad E1 Voice Processor User Manual
251-0300-20	Quad E1 Voice Processor Release Notes
Shelf Assembly Options with Quad Voice Processors	
250-1853-00	High Density Shelf Assembly Installation Manual
Communications Software	
250-0250-00	WinMAP Software Manual
250-0252-00	WinMAP-4sa Software Manual
Element Management Software	
250-1252-50	NetConsul EMS Software Manual
250-1252-40	NetConsul CST Software Manual for Broadband Voice Processors

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Ditech may respond via email to ask follow-up questions. Thank you for your help in the improvement of Ditech's documentation.

Document Revision History

The table below lists the revision history for this manual.

Document Revision History

Version	Date	Software	Change Description
A	January 2004	QE-5.01.01	Updated for AEC, ALC, EVI, and data G.164 and H.223 Circuit Switched Video detection features and parameters.
B	March 2004	QE-5.01.02	Software version QE-5.01.02 has been discontinued.
C	July 2004	QE-5.02.01	Administrative revision.
D	July 2004	QE-5.02.01	Updated Comfort Noise Generation (CNG), voice quality enhancement and hybrid echo cancellation features and parameters.
E	October 2004	QE-5.03.01	The new scheme of features/applications adds the features Dynamic Level Control (DLC), Dynamic Noise Compensation (DNC), Post-Processor (PP), and Dual-Tone Multi-Frequency (DTMF).
F	August 2005	QE-5.04.01	• FAS framing format no longer supported. • New feature: Music Detector • Revisions to ALC, HEC, AEC, ANC, EVI, DLC, TDR • Added feature package information.
F1	October 2005	QE-5.04.02	Updated Release Notes and alarm information.
F2	December 2005	QE-5.04.03	Updated Release Notes, figures, feature package sections, and Support appendix.
F3	June 2006	QE-5.04.04	Updated Release Notes and feature package sections.
G	April 2007	QE-5.06.08	Added Experience Intelligence™ voice quality measurements. Updated feature package configurations. SETSYS command parameter “Is Expected” replaces OFCALM command. 1-Screen displays hybrid echo measurements. Support for iDEN technology.
G1	May 2007	QE-5.06.10	Updated Release Notes and 1-Screen™ channel status conditions.
G2	October 2007	QE-5.06.12	Updated Release Notes, HECMETER command description, and VADPP setting conditions. Also added NBF command in Maintenance chapter.
G3	December 2007	LE-5.06.01 and QE-5.06.12	Updated feature package support and added support for signature detection.

Document Conventions

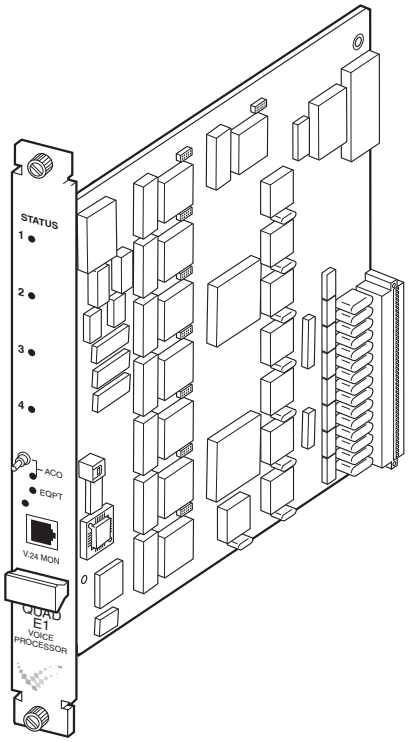
The following symbols and terms are used in this document:

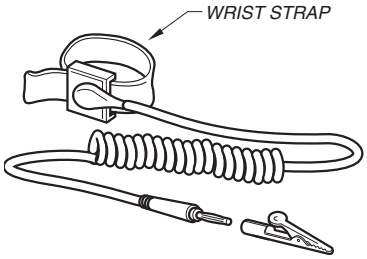
Document Conventions

Type	Description
	**Warning**. The caution sign indicates a warning.
	**Go To**. The hand shows you where to find more information about a particular topic.
	**Note**. The notepad emphasizes additional information that may be of interest.
■ List	Bullets are used in a list of items when the sequence of the items is not important.
1. List	Numbered steps are used in a list of items when the sequence of the items is important.
Acronyms	Acronyms are defined when they first appear in the document. They are also defined in the Acronym List at the end of this manual.
bold	Directory names, project names, disk drive names, file names, file name extensions, and software utility names are shown in bold. Example: **c:** drive and **.exe** file.
Bold & Capitalized	Window titles, button names, and diskette names are shown in bold, with initial capital letters. Example: **Save As** window, **Start** button, and **Install** diskette.
Bold & Italicized	Manual titles are shown in bold italics with initial capital letters. Example: ***Network Operations Manual***.
BOLD & ALL CAPS	Command names are shown in bold, uppercase. Example: the **DATE** and **TIME** commands.
Capitalized	Keyboard keys, user-editable application window fields, and menu names are shown with initial capital letters. Example: Delete key, Enter key, and the Options menu.
"Capitalized in Quotation Marks"	Subheadings within a manual section are enclosed in quotation marks. In manuals, titles of help topics are also shown in quotation marks.
`courier`	Anything that is typed exactly as it appears on screen is shown in Courier. Example: The system responds with: `Changing Date Format from mm/dd/yyyy to mm/dd/yyyy`
`courier bold`	In machine syntax, bold courier font may be used to distinguish a command from the command prompt or other variables. Example: `1-8>`**`DATEF`**`<CR>`
Italics Capitalized	Help Categories, chapter titles in manuals, application note names, checkbox options, and options in dialog boxes are shown in italics with initial capital letters. Example: Chapter 4, *Command Set,* in the ***Quad Voice Processor Manual.***
`<italics in brackets>`	Variables are enclosed in angle brackets (< >) and shown in italics. Example: <*filename*>.lod file.
Mouse Button 1	Left mouse button.
Mouse Button 2	Right button on a two-button mouse, or middle and right buttons on a three-button mouse.
Point To	Indicates that the mouse should be moved so that the pointer is over the specified item.
Press	Indicates that the mouse button or keyboard key should be held down.
Select	Indicates that text and/or objects, or an option must be highlighted with a key combination or the mouse. Selection does not start an action. Example: Select the file, then choose **Delete** from the Edit menu.
Trademarks	Ditech Networks trademarked products and services are marked with the trademark symbol (for example, WinMAP™) when they first appear in the chapter.

ESD Safety

For safe operation of the QVP, follow all electrostatic discharge safety procedures. Use an ESD grounding strap or similar device when handling the QVP card.





ESD CAUTION: *ESD SENSITIVE EQUIPMENT. HANDLE CARDS WITH CARE. USE A WRIST STRAP OR OTHER ESD PROTECTION DEVICES AND OBSERVE PROPER GROUNDING PRECAUTIONS.*

Quad E1 Voice Processor Card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1.1 Overview

Ditech's Quad Voice Processor (QVP) provides voice processing and echo cancellation to telecommunications carriers and enterprises. The QVP E1 is a backplane-mounted circuit card able to process four E1s. The QVP E400 has a total of four digital signal processors (DSPs) per card. The QVP E800 has a total of eight DSPs per card, for extra processing power. The High Density 80sa shelf assembly supports up to 20 QVP cards for a maximum of 80 E1 lines. The smaller 4sa shelf assembly holds one card for a maximum of four E1s.

The QVP software supports installation, testing, provisioning, maintaining, and troubleshooting for the card. This chapter provides the introductory information to operate the QVP.

- Voice quality enhancement features – Section 1.2 on page 4
- Voice processing features – Section 1.3 on page 11
- User interfaces – Section 1.6 on page 13
- Experience Intelligence™ (EXi) voice quality monitoring features – Section 1.2.6 on page 5

The QVP offers a front-end interface, system operations control, and alarm processing. V.24 ports provide user access for provisioning and performance monitoring on a per-channel basis. The QVP is designed to meet the ITU's emerging G.160 standard for Voice Enhancement Devices (VEDs), and to comply with its future changes and additions.

Ditech's VQA™ technology enables service providers to selectively use features to optimize voice quality performance in their networks. The QVP offers software-selectable features for voice enhancement, capacity enhancement, and Hybrid Echo Cancellation (HEC) in CDMA, GSM (A-Interface), 3G Wireless, Conference Bridge, and IP Gateway environments. Available features depend on the particular active feature package that has been licensed. The following are some of the main voice quality enhancement features available in feature packages:

- Automatic Level Control (ALC) detects high/low voice levels and automatically subtracts/adds voice energy to adjust voice to a user-selectable value.
- Acoustic Echo Control (AEC) detects acoustic echo and renders it inaudible.
- Adaptive Noise Cancellation (ANC) detects and reduces background noise.
- Dynamic Level Control (DLC) adjusts volume to bring voice to a user-selectable listening level, without amplifying noise.
- Dynamic Noise Compensation (DNC) adjusts the speech spectral characteristics to compensate for a noisy environment.
- Enhanced Voice Intelligibility (EVI) improves the perception of voice quality in noisy environments without distorting or amplifying the signal.
- Dual-Tone Multi-Frequency (DTMF) Transparency disables voice quality enhancement processing during tone frame.
- Hybrid Echo Cancellation (HEC) optimizes voice quality in hybrid applications.

- Music Detector (MD) detects the presence of a music ringback tone and bypasses voice processing during ringback so that the music reaches all parties undistorted.

For details about voice quality enhancement, see Section 1.2 on page 4. For details on available feature packages, see Section 4.9.8, “FPKG Command”, on page 50.

1.1.1 Standard Features

- Software upgradable during continuous service
- CLI and WinMap™ GUI for local provisioning and monitoring
- Optional NetConsul™ GUI for multisite provisioning and monitoring
- 1-Screen™ monitoring display for ongoing status of all channels per E1
- Metallic bypass relays on Ditech shelves that maintain E1 continuity during card removal or failure
- Common communication accessibility for multiple-shelf configurations
- One faceplate and two backplane V.24 ports for provisioning and performance monitoring with selectable:
  - Baud rates (300, 600, 1200, 2400, 4800, 9600, and 19200)
  - Parity (8-N-1or 7-E-1)
  - Echo (ON or OFF)
  - LF/CR translation
- Security timeouts
  - Command abort after a 5-minute idle time between keystrokes
  - Settable, automatic logoff after a 30-minute idle time between keystrokes
- Performance monitoring in 15-minute and 24-hour intervals
- Local, distant, AIS, multiframe, and distant multiframe alarm monitoring

1.1.2 Front Panel Features

- LED indicators for power/logon, ACO, facility and equipment alarms
- Alarm cutoff button
- V.24 port

1.1.3 Software-Selectable Features

- Voice quality enhancement
  - Software-selectable features for voice enhancement, echo cancellation and more
- Experience Intelligence™ capabilities
  - Monitoring and voice quality statistics collection with EXi technology
- Configurable signaling formats (depending upon signaling configuration)
  - CAS
  - CCS
  - Q.50 (AB/CD)

Note The QVP E1 does not support C5 signaling mode.

- 64Kbps clear channel capability
- Inactivity timeout range from 60 to 3000 seconds
- Idle Code Detection
- Selectable date and time formats
- Office alarm reporting disable (LED alarm indication can also be disabled)

1.1.4 Diagnostic Features

- Ditech's Experience Intelligence™ solutions provide voice quality statistics
- 1-Screen display provides simultaneous live monitoring for 31 channels
- Facility statistics monitor voice quality performance
- NetConsul reports real-time alarms
- Continuous, non-disruptive self-testing
- Extensive E1 performance monitoring
- E1 alarm history that displays date, time, and rack location
- Bypass functions for E1 lines and channels
- Loopback for Tail and/or Long Haul (uplink and/or downlink) sides per E1 line or per channel
- Digital Milliwatt test signal generation in the Send and Receive directions

1.1.5 Common Shelf Assembly

The QVP cards are typically mounted in a Ditech High Density 80sa shelf assembly that can accommodate up to 20 QVP cards (80 E1 voice processors). Depending on type, the shelf is 250 or 375mm high (10 or 15 U), providing the highest packing density of any voice processor shelf assembly. Ditech also offers the 4sa shelf assembly housing a single QVP card that is 44mm high or 1.8 U. Refer to Chapter A, *QVP Specifications, on page 173* for more information about QVP specifications.

Go To Also see the ***High Density Shelf Assembly Installation Manual*** and the ***4sa Shelf Assembly Installation Manual*** listed on page v.

1.2 Voice Quality Enhancement

Voice quality is increasingly important as networks become more complex through the deployment of wireless, wireline, satellite, and voice-over-packet technologies. Ditech's VQA voice quality enhancement technology and the QVP provide innovative solutions for improving the end-user listening experience on voice networks. As more calls occur in noisy environments through a greater variety of handsets and headsets, speech quality improvement becomes essential to ensuring customer satisfaction.

Voice quality is optimized for all voice network technologies, including CDMA, TDMA, and GSM architectures using Enhanced Full Rate, Full Rate, Adaptive Multi-Rate, or Half-Rate codecs. VQA technology provides solutions for background noise reduction, speech enhancement, background noise compensation, acoustic and hybrid echo control, network voice level adjustment, and voice network monitoring. These features are designed for compliance with ITU-T standards G.160, G.164, G.165, G.168-2002, and G.169. Ditech's voice quality enhancement solution allows carriers to significantly improve, measure, and manage voice quality in their networks. To configure voice quality enhancement features, see section 5.4, "STATUS Commands," on page 67 and section 7.4, "SETUP Commands," on page 100.

1.2.1 Background Noise Reduction

Of particular concern to wireless callers is the ability to carry out conversations in noisy environments. Ditech's Adaptive Noise Cancellation (ANC) features high-precision noise reduction algorithms that remove noise components. These algorithms effectively suppress noise by up to 21dB to improve the perceived quality of a call, resulting in greater customer satisfaction and increased subscriber call time. Configurable comfort noise avoids quiet-line problems when noise is attenuated and listeners may mistake the near-silence for a dropped call. Refer to page 76 for information about configuring ANC.

1.2.2 Speech Enhancement and Background Noise Compensation

Another technology for improving the perception of voice quality in noisy environments is Ditech's Enhanced Voice Intelligibility (EVI). Without distorting or amplifying the signal, it emphasizes certain "speech formants" in a manner that allows the user to more easily distinguish and understand a voice in loud ambient environments. Fixed EVI Mode sharpens speech regardless of background noise levels, while Adaptive EVI Mode improves speech intelligibility in relationship to the background noise. Refer to page 77 for information about configuring EVI.

In addition, Ditech provides an Adaptive Listener Enhancement (ALE) feature, which detects high background noise on the speaker's side of a call and boosts the received voice energy by up to 9dB, increasing the ability to hear the speech. Refer to page 73 for information about ALE.

1.2.3 Acoustic Echo Control

Ditech's Acoustic Echo Control (AEC) specifically addresses the echo non-linearities that are common in wireless networks due to inadequate acoustic isolation in poorly designed handsets and the use of handsfree kits. AEC attenuates a wide range of echo variances using algorithms based on talker energy levels, bulk delay, and Weighted Acoustic Echo Path Loss (WAEPL) to effectively eliminate acoustic echo, significantly improving quality as perceived by the talker. Refer to page 75 for information about AEC and to page 114 for information about how WAEPL is used in call performance statistics.

1.2.4 Hybrid Echo Cancellation

Hybrid Echo Cancellation (HEC) cancels the echo caused by the hybrid in wireline networks. Traditional echo in a telecommunication circuit is caused by the conversion point, also known a the hybrid, between the 4-wire and 2-wire transmission facilities. The hybrid connects the 4-wire carrier facility to the 2-wire access line in a switched network. The energy transfer across the 4-wire-to-2-wire connection is not perfectly coupled and causes a reflection of energy, heard as echo.

Signal amplitude and transmission path characteristics affect perception of the echo. Hybrid echo cancellation detects and compensates for signal amplitude and transmission path characteristics. The set of transmission path characteristics is known as round-trip delay. Refer to page 72 for more information about HEC.

For hybrid applications, Echo Return Loss (ERL), Echo Return Loss Enhancement (ERLE), and Maximum Tail Delay are measured and shown in 1-Screen status mode. For details, refer to section 9.2, “Voice Quality Statistics,” on page 111 and to section 9.6.6, “1-Screen Commands,” on page 153.

1.2.5 Network Voice Level Adjustment

When voice calls are routed between networks of different service providers, the volume level of the talker is often too high or too low for comfortable listening. This effect is especially common with wireless and international calls. Ditech's Automatic Level Control (ALC) technology dynamically detects level imbalances and automatically adds or subtracts volume to bring the voice to a specified target level.

In environments where only high voice levels are a problem, Ditech provides High Level Compensation (HLC) technology, which automatically attenuates high voice levels to a comfortable level. Low Level Compensation (LLC) automatically amplifies low voices without using attenuation. In environments where the voice level discrepancy is consistent, a Fixed Gain setting can be used to raise or lower voice levels by a pre-defined amount set by the service provider. Adaptive Gain (ALE) applies an algorithm-based increment to the signal based on background noise in the listener’s environment.

For additional options with speech signal and background noise issues, Dynamic Level Control (DLC) and Dynamic Noise Compensation (DNC) work as an alternative to Adaptive Level Control (ALC). DLC employs intelligent multi-band gain adaptation that does not amplify noise components, so that it can improve the speech signal-to-noise ratio (SNR) and ensure low distortion. DNC can adjust the level of perceived speech volume on the listener’s side in response to the level of ambient noise on the sender’s side.

Refer to page 73 for information about ALC and page 74 for information about DLC. For information on speech and SNR call performance statistics, refer to section 9.3.5, “DISCS Command,” on page 125.

1.2.6 Voice Network Monitoring

A real-time view of a network's voice quality performance is required to manage network status and troubleshoot customer issues. Ditech offers a number of software applications to measure and report voice quality and related channel performance on a per-DS0 basis, helping deliver superior voice quality across the network. For more information, see Section 5.6, “1-Screen”, on page 90.

1.2.6.1 Experience Intelligence™ (EXi) Capabilities

EXi's voice quality monitoring software features were developed to provide voice quality monitoring and reporting. Refer to Chapter 9, *Monitoring and EXi Capabilities,* on page 111 for details about call statistics reports.

1.2.7 Music Ringback Tone Detection

In place of playing the standard ringback tone, many carriers are offering music ringback tones. When Music Detector (MD) is enabled, music is expected and voice processing does not begin until the call is answered. Refer to page 80 for information about music ringback.

1.2.8 Voice Quality Feature Directions and Availability

Voice quality enhancement features can operate in uplink or downlink directions, or can operate bidirectionally (see Section 4.9.8.2, "Feature Directions", on page 55). Depending on which QVP feature package is active, a specific set of voice quality enhancement features is available.

1.2.8.1 Feature Packages for QVP E400 and E800 Systems

The QVP E400 system supports feature package 10 (“E400 VQA”). Table 1-1 identifies which individual features are supported within feature package 10, as well as their respective directions (if applicable).

Table 1-1 QVP E400 Features

Feature/Capability	Feature Package 10
Acoustic Echo Control (AEC)	Bidi
Adaptive Noise Cancellation (ANC)	Bidi
Automatic Level Control (ALC)	Bidi
Circuit Switched Video (3G CSV)	N
Discontinuous Transmission (DTX)	N
Dynamic Level Control (DLC)	N
Dynamic Noise Compensation (DNC)	N
Enhanced Voice Intelligibility (EVI)	Uni*
Experience Intelligence™ (EXi)	Y
High Speed Circuit Switched Data (HSCSD)	Y
Hybrid Echo Cancellation (HEC)	DL
HEC Meter (hybrid echo statistics)	N
Music Ringback Detection (MD)	Y
Signature Detection (SDT)	Y
Tandem Free Operation (TFO)	Y*
Tone Disabler (TDR)	Y
Voice Activity Detector Post-Processor (VADPP)	Bidi

Availability:
Y = Yes
N = No

Directions:
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* If TFO is enabled, EVI is not available. If TFO is disabled, Unidirectional EVI is available. Conversely, if EVI is enabled, TFO cannot be enabled.

Table 1-2 lists supported feature packages with EXi for the QVP E800 system, and shows their individual features with respective directions and/or availability. Table 1-3 on page 9 lists supported feature packages without EXi for the QVP E800 system, and also shows their individual features with respective directions and/or availability.

Table 1-2 QVP E800 Feature Packages with EXi Capabilities

Feature/Capability	Feature Packages with EXi Capabilities (QVP E800)											
	17	**20**	**21**	**22**	**25**	**28 ‡**	**29**	**30**	**31**	**32**	**33**	**34**
Acoustic Echo Control (AEC)	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Adaptive Noise Cancellation (ANC)	Bidi	DL	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Automatic Level Control (ALC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Circuit Switched Video (3G CSV)	N	N	N	N	N	Y	N	N	N	Y	Y	N
Discontinuous Transmission (DTX)	Bidi	N	N	N	N	N	N	N	N	N	N	N
Dynamic Level Control (DLC)	Bidi	Bidi	Bidi	N	N	N	N	N	N	N	N	Bidi
Dynamic Noise Compensation (DNC)	N	UL	DL	N	N	N	N	N	N	N	N	DL
Enhanced Voice Intelligibility (EVI)	Bidi	Uni	Uni	Uni	Uni	Uni †	Uni †	Bidi	Bidi	Bidi	Bidi	Bidi
High Speed Circuit Switched Data (HSCSD)	N	N	N	N	N	Y	Y	N	Y	N	N	Y
Hybrid Echo Cancellation (HEC)	N	DL	N	DL	DL	DL	DL	DL	N	N	DL	N
HEC Meter (hybrid echo statistics)	Y*	Y	Y**	Y	Y**	Y*	Y*	Y*	Y*	Y*	Y*	Y*
Music Ringback Detection (MD)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tandem Free Operation (TFO)	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
Tone Disabler (TDR)	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Voice Activity Detector Post-Processor (VADPP)	Bidi	DL	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi

Availability:
Y = Yes
N = No

Directions:
UL = Uplink
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* Requires disabling Downlink ANC.
** Requires disabling Uplink ANC.
† If TFO is enabled, Unidirectional EVI (only) is available.
If TFO is disabled, Bidirectional EVI is available.
‡ Feature package 28 includes the Signature Detection (SDT) feature.

Table 1-3 QVP E800 Feature Packages without EXi Capabilities

Feature/Capability	Feature Packages without EXi Capabilities (QVP E800)					
	12	**14**	**18**	**19**	**24**	**26**
Acoustic Echo Control (AEC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Adaptive Noise Cancellation (ANC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Automatic Level Control (ALC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Circuit Switched Video (3G CSV)	N	N	Y	Y	N	N
Discontinuous Transmission (DTX)	N	N	N	N	N	N
Dynamic Level Control (DLC)	N	N	N	N	Bidi	N
Dynamic Noise Compensation (DNC)	N	N	N	N	DL	N
Enhanced Voice Intelligibility (EVI)	Bidi	Uni †	Bidi	Bidi	Bidi	Bidi
High Speed Circuit Switched Data (HSCSD)	Y	Y	N	N	Y	N
Hybrid Echo Cancellation (HEC)	N	DL	N	DL	N	DL
HEC Meter (hybrid echo statistics)	Y*	Y*	Y*	Y*	Y*	Y*
Music Ringback Detection (MD)	Y	Y	Y	Y	Y	Y
Tandem Free Operation (TFO)	Y	Y	Y	Y	Y	N
Tone Disabler (TDR)	Y	Y	Y	Y	N	Y
Voice Activity Detector Post-Processor (VADPP)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi

Availability:
Y = Yes
N = No

Directions:
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* Requires disabling Downlink ANC.
† If TFO is enabled, Unidirectional EVI (only) is available.
If TFO is disabled, Bidirectional EVI is available.

The QVP E400 system supports feature package 10 (“E400 VQA”). The QVP E800 system supports all the feature package names listed in Table 1-4.

Table 1-4 QVP E800 Feature Package Names

Feature Package	Name
12	GSM Capacity Enhancement, no EXi
14	GSM Capacity Enhancement with HEC, no EXi
17	CDMA Capacity Enhancement
18	3G Wireless VQA, no EXi
19	3G Wireless VQA with HEC, no EXi
20	Conference Bridge VQA with HEC
21	IP Gateway VQA
22	IP Gateway VQA with HEC
24	GSM VQA, no EXi
25	PSTN/Mobile VQA
26	iDEN VQA with HEC, no EXi
28	GSM VQA with HEC
29	GSM Capacity Enhancement with HEC
30	iDEN VQA with HEC
31	GSM Capacity Enhancement
32	3G Wireless VQA
33	3G Wireless VQA with HEC
34	GSM VQA

1.3 Voice Processing Signaling and Bypass

1.3.1 Pulse Code Modulation (PCM) Interface

The PCM interface of a QVP provides PCM frame alignment in the Send and Receive directions. This interface meets ITU-T recommendations G.703, G.704, and G.711 for encoding/decoding and framing format, as well as G.823 jitter tolerance.

Line driving and receiving, data and clock recovery, and jitter attenuation of the PCM data streams are accomplished through the PCM interface circuitry. Output synchronization is achieved through an integral Phase-Lock Loop (PLL).

Output synchronization is achieved through an integral Phase-Lock Loop (PLL). This recovery scheme allows for through-timing (normal) by synchronizing each output to its own input (Figure 1-1).

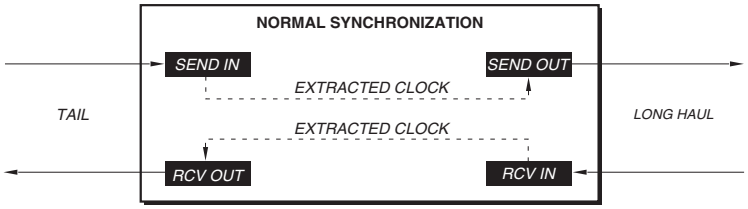


Figure 1-1 Normal Synchronization

1.3.2 Signaling

The QVP supports several signaling types. For systems using CCS, QVP monitors the channel for idle codes to determine whether the channel is busy or on-hook. Hybrid echo cancellation and voice processing are bypassed when a channel is on-hook. For channels provisioned for CCS, the idle codes are monitored to declare the idle (on-hook) state of the DS0.

For systems using CAS, the A, B, C, and D bit conditions are monitored to determine activity status.

Q.50(AB) and Q.50(CD) are also supported. Like CAS, the A and B, or C and D bit conditions are monitored. These settings are used with circuit multiplication equipment (CME).

1.3.3 Idle Code Detection

Idle code detection is used only on channels provisioned for CCS signaling. While in CCS mode, a channel is monitored for the provisioned idle code patterns to determine whether it is active or idle (on-hook). The QVP declares a channel idle when the idle code pattern and direction requirements are met. The idle code timing is configurable (Section 6.9, “IDLTIMING Command”, on page 96).

1.3.4 Data G.164 and Circuit Switched Video (H.223 Video) Detection

The QVP detects disabling tones for data G.164 and H.223 video. Voice processing is disabled upon detection of a tone that meets ITU Recommendation G.164, including low speed data calls at bit rates between 300bps and 7200bps, as well as Group III fax calls (e.g., credit card verifications). The QVP detects the end of the call according to re-enable mode and signaling.

When enabled, Circuit Switched Video (CSV) allows the QVP to recognize in-band 3G-324M video stream on per-circuit basis using two protocols: Level 1 (Annex A/H.223) protocol for low error-prone wireless channels and Level 2 (Annex B, C, D/H.223) protocol for moderate or highly error-prone wireless channels.

Tone Disabler (TDR) detects disabling tones sent by data modems and responds to them per G.168 standards.

To configure data G.164 and H.223 video detection features as well as data modem tone responses, refer to Section 7.4, “SETUP Commands”, on page 100.

1.4 QVP Card and System Features

1.4.1 Controller

The controller provides overall control and monitoring of the QVP’s operation, including DSP performance, memory diagnostics, overall system diagnostics, software download, and user interaction through the front panel and all V.24 serial ports. If any internal faults are detected, the controller bypasses the voice processing system and activates the appropriate alarm indicators.

1.4.1.1 Performance Monitoring

The QVP continuously performs an internal non-disruptive self-test to detect faults. The self-test checks the DSP engines for sanity and verifies program memory and portions of RAM where the provisioning information is stored.

If a DSP engine fails the self-test, the E1 line changes the system bypass mode, the QVP declares an equipment alarm condition, and the **STATUS** LED for the E1 line is red. In the case of a program memory failure, the QVP card declares an equipment alarm condition while continuing to operate.

1.4.1.2 Memory

Non-volatile memory stores all system and channel operating parameters. Initially these are provisioned with factory (default) settings. These factory settings can subsequently be changed by the user. In the event of power loss, all settings—whether factory default or those settings subsequently set by the user—are retained in this memory space and restored to the system upon powerup.

Flash memory provides storage locations for two system software loads which are referred to as plane 0 and plane 1, or the active and inactive planes. At any given time, plane 0 contains either the active or inactive software load and plane 1 contains the other load. The active plane software controls the QVP’s operation.

A software upgrade can be loaded over the V.24 ports to the inactive plane—without interrupting operation of the active plane software. The inactive plane can then be activated using the **CUTOVER** command. If necessary, the original software can be re-activated using the **REVERT** command. Refer to section 8.2, “Software Upgrades,” on page 107 for more information.

1.5 Alarm Handling

Each QVP card provides local alarms and visual fault indicators. The QVP identifies office, equipment, and facility alarms.

Front panel LEDs indicate the type and severity of the alarms occurring on the card. Equipment alarm lights signal problems with E1 lines, FPGA failure, bootup failure, and failure of battery A or B.

The QVP front panel also provides an **ACO** push button for enabling the alarm cutoff function. The **ACO** button can initiate a lamp test, which momentarily lights all front panel LEDs.

Office alarms, using dry contact relays, can be connected to the shelf backplane to detect office bay, aisle, and shelf alarms.

Facility alarms include:

- AIS–When the signal path changes or is disrupted, the QVP generates an AIS (Alarm Indication Signal) burst so that downstream equipment can reframe. An AIS burst is sent in response to a system bypass, metallic bypass, or receive data path condition.
- CRC4–CRC4 bit sequence from the Tail (Receive In) and Long Haul (Send In) directions, insert a CRC4, and return E-bits if CRC4 errors are detected.
- Excessive Bit Error Rate
- Loss of Signal
- Multi-frame alignment errors
- Distant Alarms signaling problems with upstream equipment

Refer to section 5.5, “Alarms,” on page 84 for a list of Equipment and Facility alarms.

1.6 User Interfaces

The QVP has three V.24 serial port communication interfaces providing user access to the command set as well as a path for software upgrades during normal operation. Simplified remote management eliminates the time and expense of performing costly onsite configuration, maintenance, and upgrades. Remote provisioning, control, and monitoring of the QVP is easy and efficient with Ditech’s WinMAP software application or the NetConsul GUI.

WinMAP and NetConsul provide device communication through a graphical user interface. With WinMAP the command line interface for the QVP can be accessed through terminal emulation, known as TTY mode, over the fixed network. Other access modes are available in WinMAP. Multisite monitoring and communication can be performed with the NetConsul GUI.

Go To To use WinMAP, see the appropriate WinMAP software manual listed on page v. To use NetConsul, see the appropriate software manual listed on page v.


Notes

2.1 Overview

This chapter provides a high level review of the components of a shelf assembly. In this chapter, we assume the rack and shelves have been installed.

Due to the individual needs and expectations of each customer, every deployment of the High Density shelves and QVP cards is different. For technical assistance planning the deployment and installing the equipment, contact Ditech Customer Service at support@ditechnetworks.com or 1-800-770-0117.

Ditech's High Density 80sa shelf offers maximum density and flexibility, allowing in-service upgradability through an embedded software design. A rack assembly contains one or more High Density shelves. Each shelf contains QVP cards that perform voice processing.

Space and environmental requirements are determined for each rack assembly as a unit that is fully populated with shelves, Active Air Deflector (AAD) fan assemblies, QVP cards, and faceplates covering any empty card slots. The rack assembly's physical dimensions vary with the type of common rack. Most 200mm common racks have about 43 U of usable capacity.

The maximum operational temperatures is 40° Celsius in humidity of up to 90%.

Ditech's low density 4sa shelf assembly can be table mounted, rack mounted, or wall mounted. Up to 15 shelves can be daisy-chained via the V.24 ports.

Refer to the ***High Density Shelf Assembly Installation Manual*** and the ***4sa Shelf Assembly Installation Manual*** referenced on page v for complete installation instructions.

2.2 Shelf Assembly Types

Ditech's High Density 80sa shelf assembly includes a backplane, connector panel, and other components specific to the customer application. The shelf assembly types and compatible card types are listed in Table 2-1.

Table 2-1 High Density Shelf Assemblies

Shelf Assembly	Description	Card Type
Wire Wrap (80sa-ww)	Quad Wire Wrap rear-access shelf assembly (960 Wire Wrap pins)	E1 120Ω balanced
Telco (80sa-tc)	Quad Telco rear-access shelf assembly (16 Amphenol connectors)	E1 120Ω balanced
BNC Rear Access (80sar-bnc)	Quad BNC rear-access shelf assembly (320 coaxial connectors)	E1 75Ω unbalanced

A 6-shelf configuration is available for Telco and Wire Wrap rack assemblies. For information, refer to the ***High Density Shelf Assembly Installation Manual*** listed on page v.

A low density 4sa shelf assembly holding one QVP card is also available (Table 2-2). The two available configurations are listed in Table 2-2.

Table 2-2 Low Density 4sa Shelf Assemblies

Shelf Assembly	Description	Card Type
4sa Wire Wrap	RJ-48C/wire wrap shelf	E1 120Ω balanced
4sa BNC	BNC shelf	E1 75Ω unbalanced

The 4sa shelf assembly is shown in (Figure 2-1).

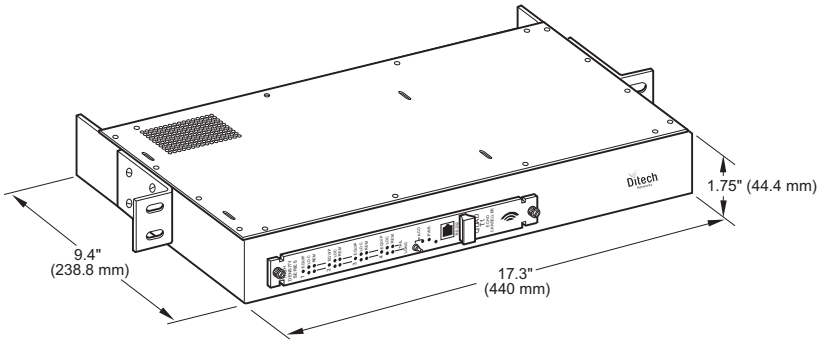


Figure 2-1 A 4sa Shelf Assembly

The 4sa shelf is rack-mountable or can be placed on a tabletop. For more information about the 4sa shelf assembly, refer to the ***4sa Shelf Assembly Installation Manual*** listed on page v.

2.3 Common Rack Assembly

Ditech's High Density 80sa shelves can be installed as full racks or as custom rack assemblies (less than fully populated). For a custom rack assembly with fewer shelves than a typical rack assembly, an AAD fan assembly must be mounted under each shelf. All empty card slots must be covered with faceplates.

For all rack assemblies, there must be 1 U of space below the bottom shelf in the rack for cooling. There must be 1 U of space above any shelf that is placed underneath non-Ditech equipment because it does not use the Ditech AAD fan assembly.

A rack assembly is typically housed in a common rack, a grounded frame supporting the shelves and fan assemblies. Three common rack types are used most often:

- ANSI/EIA, 7-foot (43 U), 19" wide
- ANSI/EIA, 7-foot (43 U), 23" wide
- ETSI, 2000mm (80 U), 600mm wide

The height dimension shows the mounting height aperture.

Depending on the rack type, the mounting ear placement and the necessity for extenders varies. Table 2-3 displays the BNC rack assembly components and their dimensions.

Table 2-3 Components in a Typical Rack Assembly

Component	Comment[1]
Fuse Panel	The 44 H x 432 W x 298mm D fuse panel resides at the top of the rack assembly. There is 1 U of space between the fuse panel and the top shelf for cooling.
Shelf (BNC)	Each 375 H x 440 W x 340mm D shelf contains 20 cards. Card types vary. Below the bottom shelf, there is 1 U of space for cooling.
AAD	A 59 H x 440 W x 310mm D AAD fan assembly between shelves is required for regulatory compliance. The AAD contains 4 fans, an internal exhaust deflector, and an air filter.

1. The width specifications do not include ear mounts for the common racks.

As an example, Figure 2-2 displays a common rack containing no shelves.

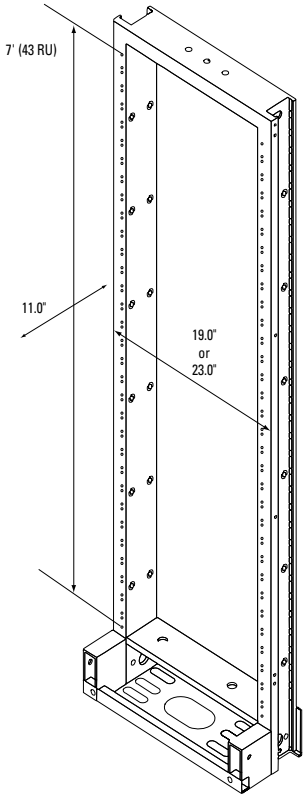


Figure 2-2 Empty Common Rack

2.3.1 BNC Rack Assemblies

The BNC rack assembly contains up to four High Density shelves, 80 QVP cards, four AAD fan assemblies, the fuse panel, and faceplates covering any empty card slots. Figure 2-3 shows the BNC rack assembly.

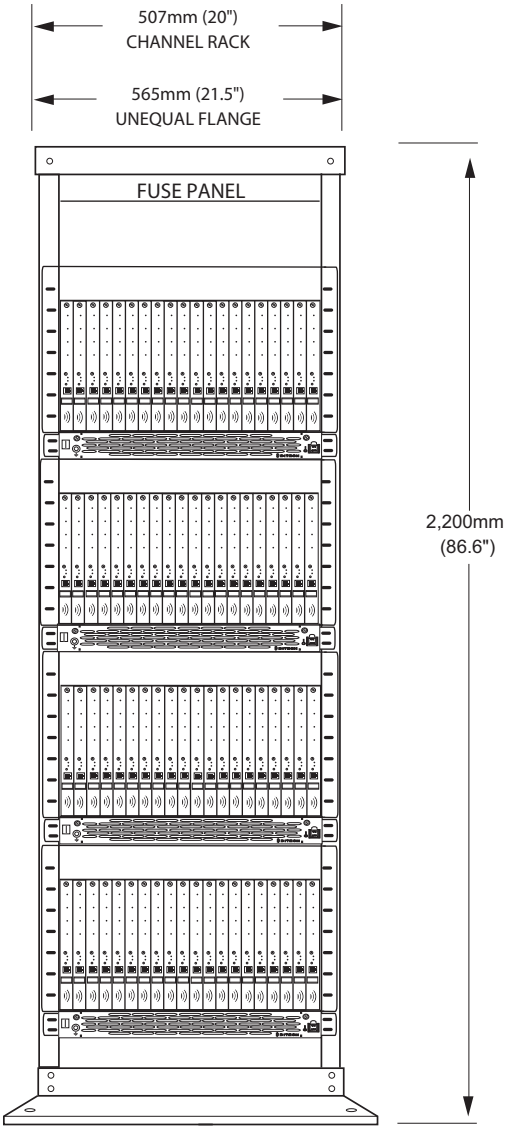


Figure 2-3 BNC Rack Assembly

2.3.2 Wire Wrap Rack Assemblies

Up to six Wire Wrap shelf assemblies can be mounted in a typical 7-foot rack (Figure 2-4). Each shelf can have up to 20 QVP cards. The 4-fan AAD is placed below each shelf in a 4-shelf, 5-shelf, or partially populated rack assembly. In a 6-shelf rack assembly, the AAD is placed below each of the top four shelves.

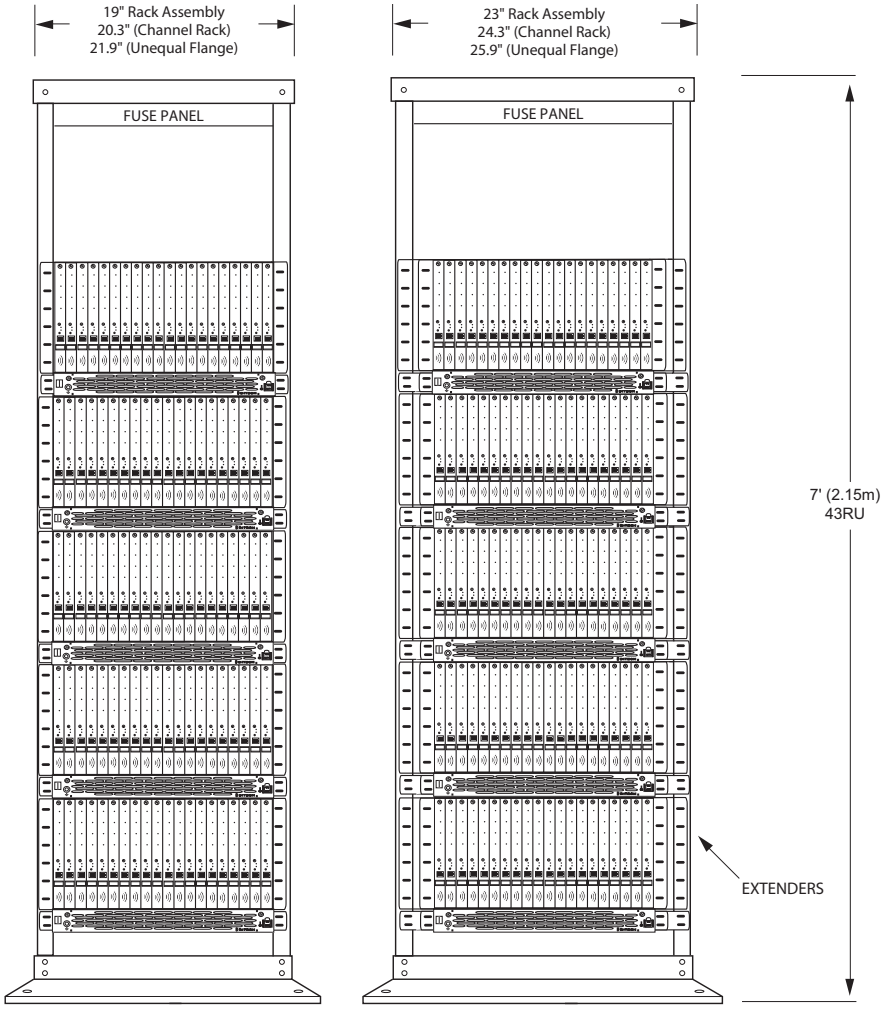


Figure 2-4 Typical Wire Wrap Shelf Assemblies

2.4 Components

A high level overview of the typical components in a rack assembly is presented below. For details about each, refer to the appropriate shelf assembly installation manual listed on page v.

2.4.1 Mounting Brackets

Use mounting brackets (ear mounts) to attach each shelf and fan assembly onto the frame of the 7-foot common rack. In a 19" common rack, only ear mounts are needed. An ETSI or a common rack requires extender brackets.

2.4.2 Fuse Panel

The fuse panel, typically placed at the top in the rack assembly, provides power connections for the High Density shelves and AAD fan assemblies. Most fuse panels also provide fuse alarm LEDs for each connection.

2.4.3 AAD Fan Assembly

The Active Air Deflector (AAD) fan assembly is installed between shelves for cooling. The fan assembly forces air through the shelf. Fans provide an estimated maximum temperature through the chassis at 15° Celsius above ambient. Fan speed is determined automatically in relation to the input voltage.

The 4-fan AAD is placed below each upper shelf in the rack assembly. The AAD provides an inlet grille, metal guides for an air filter, an internal exhaust deflector, an exhaust grille, a warning LED, an ESD connector (banana jack), front access fuses, and a control board to support the electronics.

2.4.4 Power and Grounding

Each AAD fan assembly must be connected to the frame ground on the common rack. Each AAD is connected to the adjacent frame steel using a 14-gauge or better ground wire.

Each shelf chassis has two frame grounds on the side of the shelf. The frame grounds are heavy duty dual hole lugs that fit over 0.25" (6.4mm) diameter threaded studs at 0.625" (15.8mm). Resistance as measured between the frame ground and the facility ground directly should be 0Ω.

Unshielded power cables can be a major source of EMI/EMC. All unterminated leads and unshielded lines can act as antennas under the presence of RF emitting devices. Under some circumstances, powerful RF flux densities may have an adverse influence on system performance if allowed an entry path through these antennae. To protect against EMI/EMC interference, Ditech strongly recommends the use of shielded power and signal cables. Ditech recommends grounding the shield at the QVP end. Do not ground both ends of the cable.

For power, the AAD connects to the fuse panel, which is typically placed at the top in the rack assembly. Most fuse panels also provide fuse alarm LEDs for each connection. The redundant A and B power connectors are located at the back of the AAD (Figure 2-5).

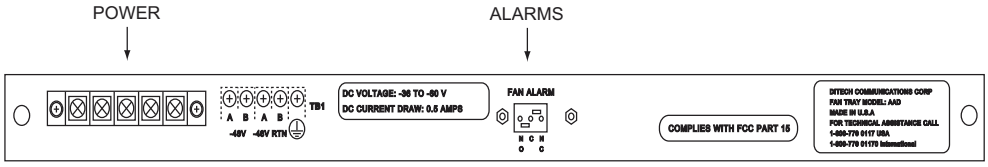


Figure 2-5 AAD Connectors

Each AAD also has front access fuses. The required fuse is 125V/1.5A.

2.4.5 Warning LEDs, Equipment Alarms, and Office Alarms

For office alarm connections, the High Density shelf provides Wire Wrap stake pins at the backplane for the urgent (MAJ), deferred (MIN), and equipment (SVC) alarms.

Wire Wrap dry contacts for normally open (NO), normally closed (NC), and common (COM) alarms are provided on the back of the AAD. When the fan tray is operating normally, the COM and NC contacts are closed. When the fan tray is alarmed, the COM and NO contacts are closed.

An alarm triggers if a fan stops, even if the other fans continue operating. The High Density shelves should never be operated without an AAD for more than an hour without an external cooling fan. Replacement AADs should be kept on hand.

The AAD fan assembly provides an Equipment Alarm in the form of a warning LED on the front panel. A red light indicates that the fan assembly is not operating properly. A green light indicates that the fan assembly is operational, while no light indicates that it is not powered (see Figure 2-13 on page 28).

2.4.6 Air Filter

A reusable foam air filter rests in the metal guides in each AAD fan assembly. The air filter removes particles in circulated air that may harm electronic devices. In order to maintain the proper air flow across the cards, the air filter must be cleaned on a regular basis. At a minimum, the filter should be inspected and cleaned once every 90 days. The removal and cleaning of the air filter does not affect live traffic. Replacement air filters should be kept on hand. Refer to shelf assembly installation manual (refer to list on page v) for ordering and replacement information.

2.4.7 The Backplane

The High Density shelf has a backplane that connects the cards within a shelf, reducing the need for cabling and minimizing floor space and power consumption. The backplane provides high-speed data paths between cards, a path for external timing inputs, and power to the cards.

Power connections for the A and B batteries, battery returns, and chassis frame grounds are made to a common terminal block that provides fused output to each card in the shelf.

2.5 Network Orientation

The network orientation is shown for the QVP cards in typical wireline (Figure 2-6) and wireless (Figure 2-7) systems.

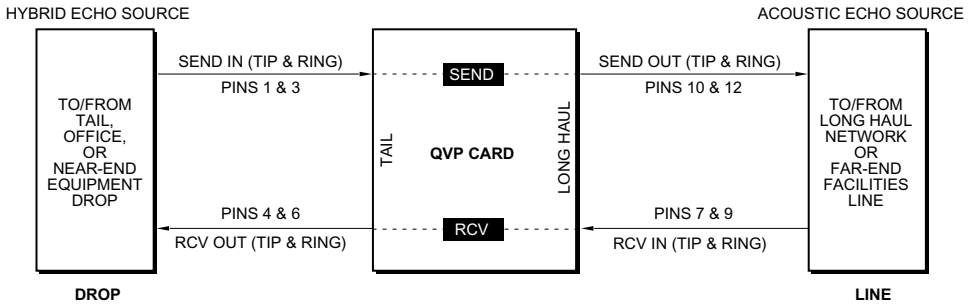


Figure 2-6 Typical Wireline Network Orientation

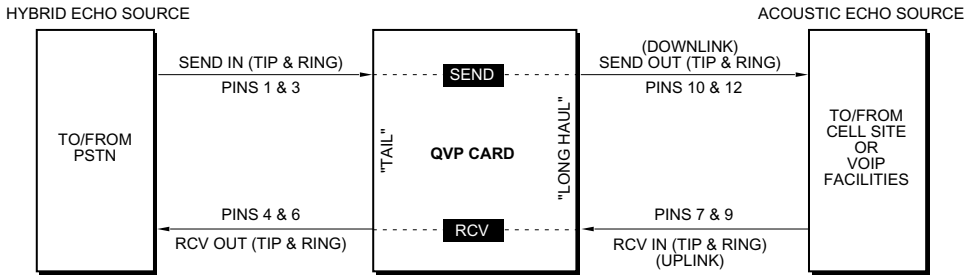


Figure 2-7 Typical Wireless or VoIP Network Orientation

2.6 Cabling

2.6.1 Serial Ports

Multiple shelves can be connected through the backplane serial port. An example is shown in Figure 2-8.

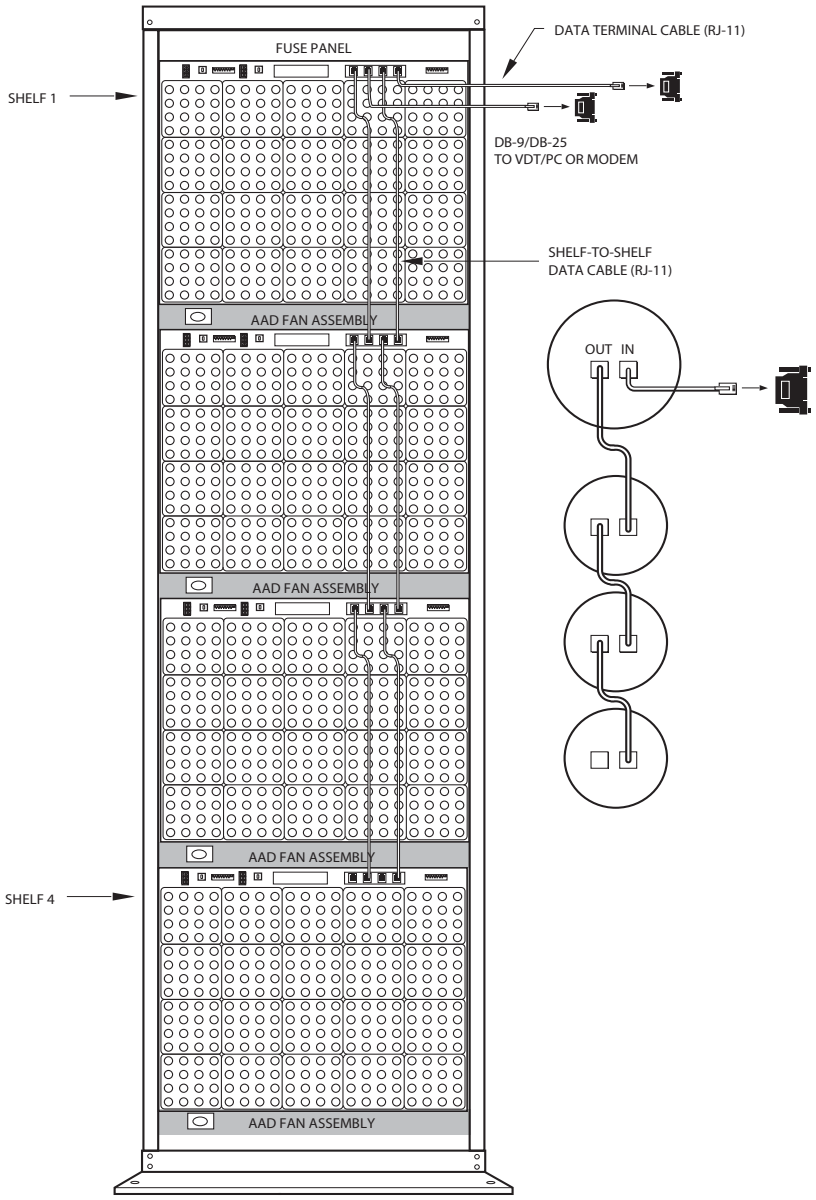


Figure 2-8 Serial Port Connections (BNC Shelf)

Also see Chapter 3, *Serial Port Configuration,* on page 29.

2.6.2 Signal Cabling

Cabling may have been installed in one of several ways:

- Cables route to the side and up for draping into overhead cable trays.
- Cables route to the side and down for draping into floor cable trays.
- Cables route to the side for draping into side cable mounts on the common rack.

As an example, Figure 2-9 shows cables routed to the side and up.

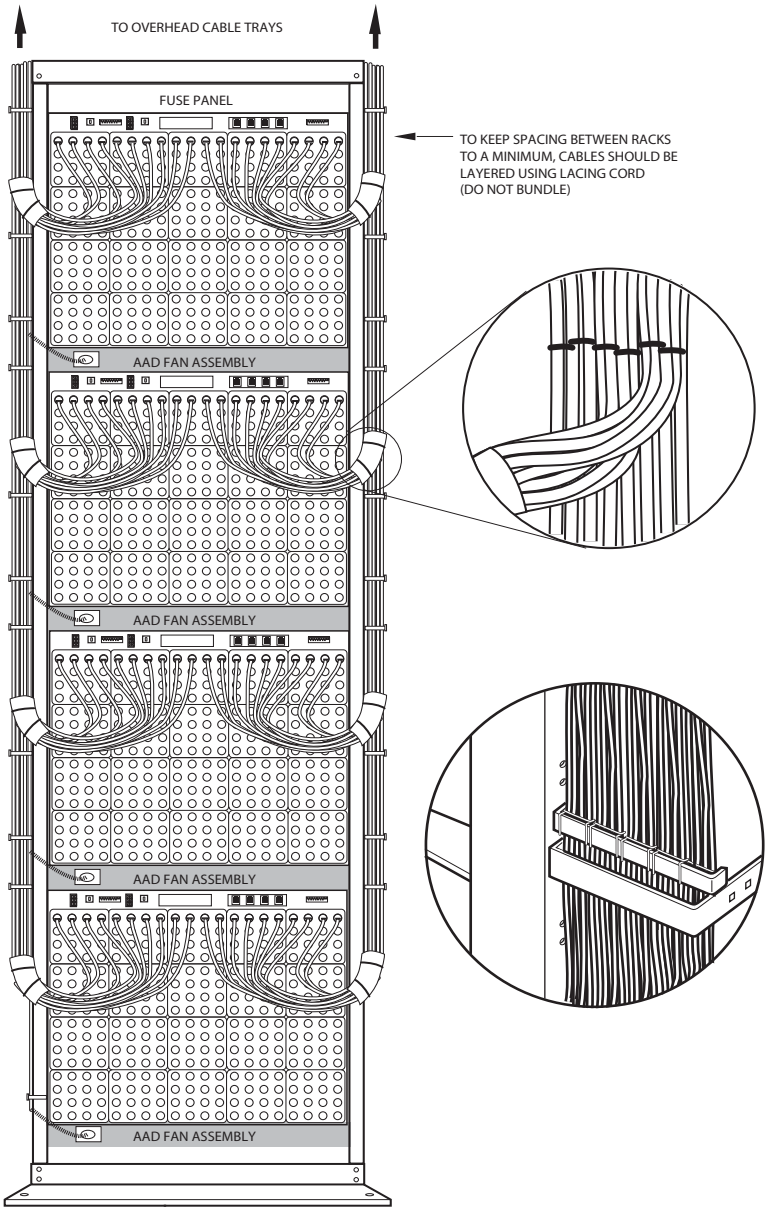


Figure 2-9 Cable Routing to the Side and Up into Overhead Cable Trays

2.7 Card Installation

2.7.1 Shelf Addressing

Each daisy-chained shelf must be set to a unique address by using the shelf identification switch (S1) as shown in Figure 2-10. Set this switch before inserting any cards.

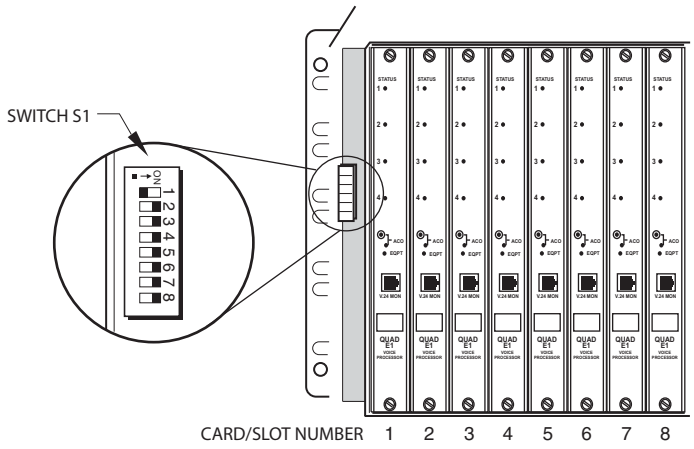


Figure 2-10 Shelf Identification Switch

The switch is located on the extreme left in the shelf. Set each binary shelf address according to the selections shown in Table 2-4. The rack assembly can contain up to 6 shelves, so 6 binary shelf addresses are required. This switch can accept binary shelf addresses from 01 to 99.

Table 2-4 Address Selection Using Switch S1

Binary Value	S1 Positions							
	1	2	4	8	16	32	64	128
Address	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
01	OFF	ON	ON	ON	ON	ON	ON	ON
02	ON	OFF	ON	ON	ON	ON	ON	ON
03	OFF	OFF	ON	ON	ON	ON	ON	ON
04	ON	ON	OFF	ON	ON	ON	ON	ON
05	OFF	ON	OFF	ON	ON	ON	ON	ON
06	ON	OFF	OFF	ON	ON	ON	ON	ON

Most commands require that you indicate the shelf, slot, line, and channel for which the command is directed. Shelves are numbered from the top down and are numbered 1 to 99. Slots, or cards, are numbered from left to right and are numbered 1 to 20. Lines are number 1 to 4. Channels are numbered 1 to 31 (Figure 2-11).

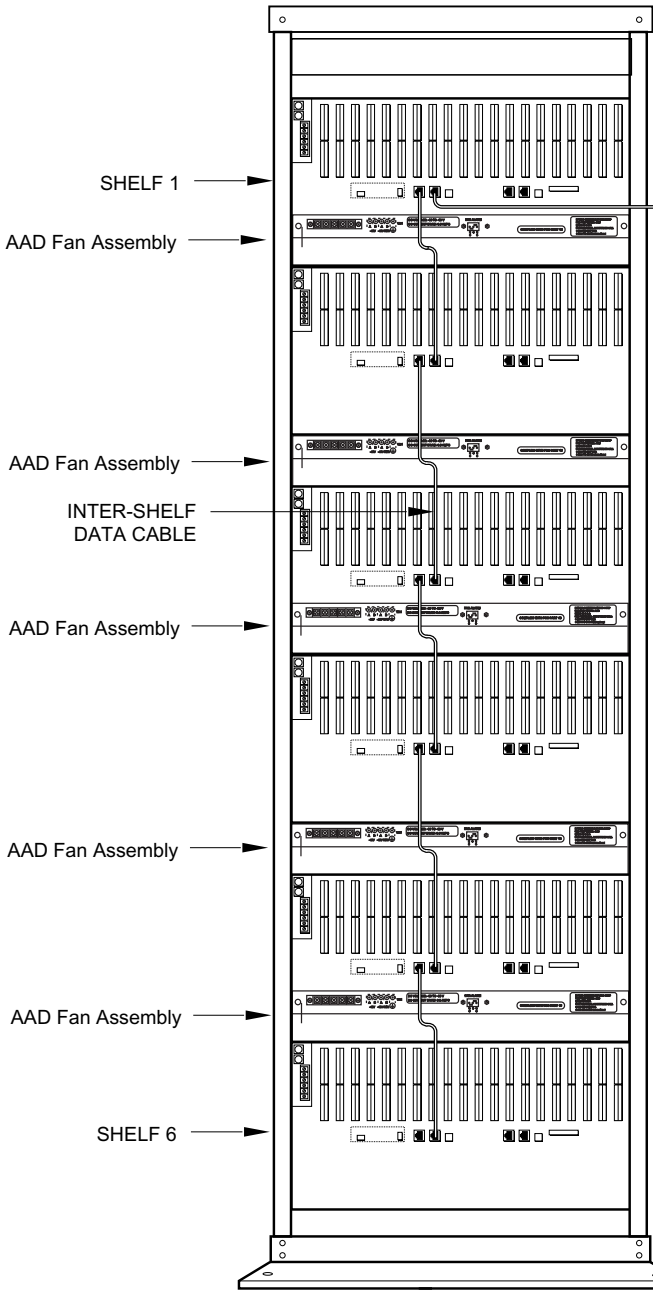


Figure 2-11 Shelf and Slot Numbering

A QVP card reads its shelf ID from the physical shelf identification switch setting it is given when it is installed (see “Shelf Addressing” on page 25). This shelf ID is read when the card is powered up, and all commands addressed to it must use this ID.

2.7.2 Inserting the Cards

Up to 20 QVP cards can reside in a High Density shelf (Figure 2-12).

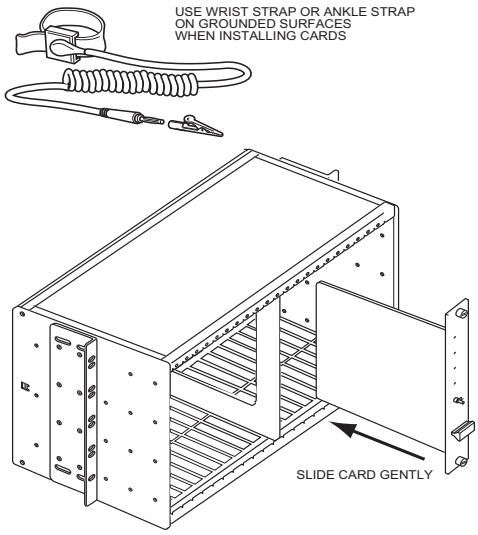


Figure 2-12 Card Installation

Cards should have been installed during the initial installation. To replace or install another QVP card, follow the procedure in Table 2-5 and refer to the appropriate shelf installation manual listed on page v.

Table 2-5 Card Installation Procedure

Step	Procedure
1	Observe all guidelines for protection from electrostatic discharge. Wear an ESD wrist strap or other protection.
2	Inspect the card carefully. Ensure that no pins or connectors are bent.
3	Carefully align the top and bottom edges of the card with the correct card slot in the shelf.
4	Slowly slide the card straight into the card slot. Do not bend, twist, or force the card.
5	When the card is properly inserted, push firmly to make the connection with the backplane.
6	Secure the card in the shelf by tightening the thumb screws. Do not cross thread thumb screws.
7	Observe the card's initial self-test as its LEDs flash for about one minute. Verify that there are no alarms indicated (for front panel LED information, see Chapter 10 on page 161).
8	Secure faceplates over any empty card slots. Faceplates are required to protect the cards from dust as well as to ensure proper air flow and cooling in the shelf,

2.7.3 Connecting the Cards

A cable channel is provided for securing the signal cables to the shelf and routing them to their panel connectors. A removable rear cover panel provides access to the panel. E1 bypass relays ensure signal integrity if a card is removed. For more information, see Section 10.3.5, “Metallic Bypass”, on page 167.

For E1 transmit and receive cable termination information, refer to the appropriate installation manual as listed on page v.

Setup and maintenance for the QVP are easy to perform. Once the card is installed and operating, routine calibration and maintenance are not required. For more information about alarms, testing, troubleshooting, and upgrading software, see Chapter 10 on page 161.

The QVP monitors facility and equipment failures, and performs a continuous diagnostic self-test without obstruction to traffic. Front panel LEDs provide a quick way to assess the health of the QVP and its E1 lines. LEDs indicate equipment alarms. Detailed alarm information is available through the command line interface. The front panel also provides an Alarm Cutoff button and a serial port (Figure 2-13).

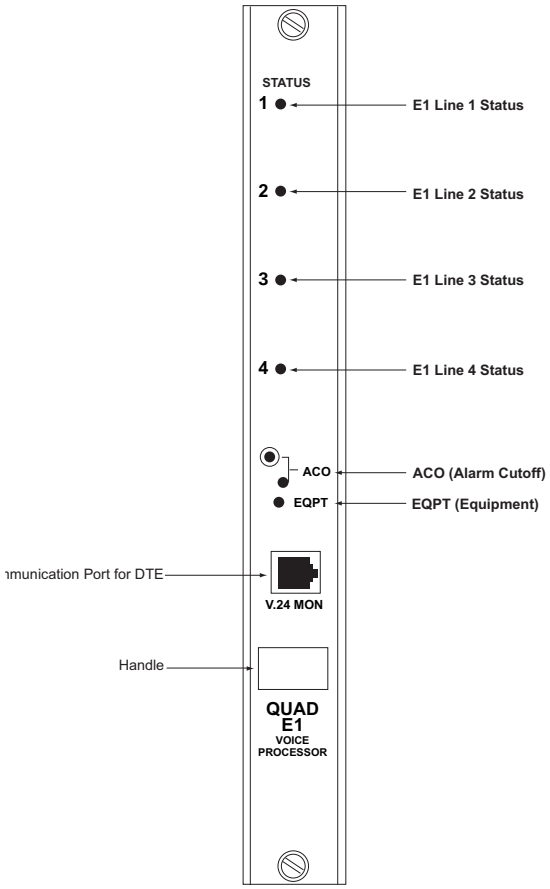


Figure 2-13 QVP Front Panel

Also see the IS EXPECTED parameter on page 65 for information about the impact of setting a card to Not Expected. The front panel LED for the line will be turned off when a card is Not Expected.

3.1 Overview

The QVP has three V.24 serial port communication interfaces: one on the front panel, providing local maintenance access to the card on which it resides, and two through the backplane, supporting the maintenance and control communications to all cards in the shelf. The two backplane connections are referred to as the maintenance and control ports. This chapter primarily discusses the ports found on the backplane.

The maintenance and control ports (Figure 3-3 on page 32) of the shelf assembly provide user access to the command set, as well as a path for software upgrades during normal operation. Activating the front panel serial port disables access to the card through the shelf backplane maintenance port.

Warning Before attempting to access the card through the shelf backplane maintenance port, it is important to log off properly and unplug from the front panel interface. Maintenance port access can remain disabled as long as the cable is plugged into the front panel, even after issuing a **LOGOFF** command.

3.2 Shelf Connectivity

One or more shelves can be networked to allow centralized monitoring and provisioning. The control port (Figure 3-3) is used to communicate with NetConsul™ or WinMAP™, and provides user access to the command set, as well as a path for software upgrades. Connect a serial cable from the control port on the backplane of each shelf to the terminal server (Figure 3-1).

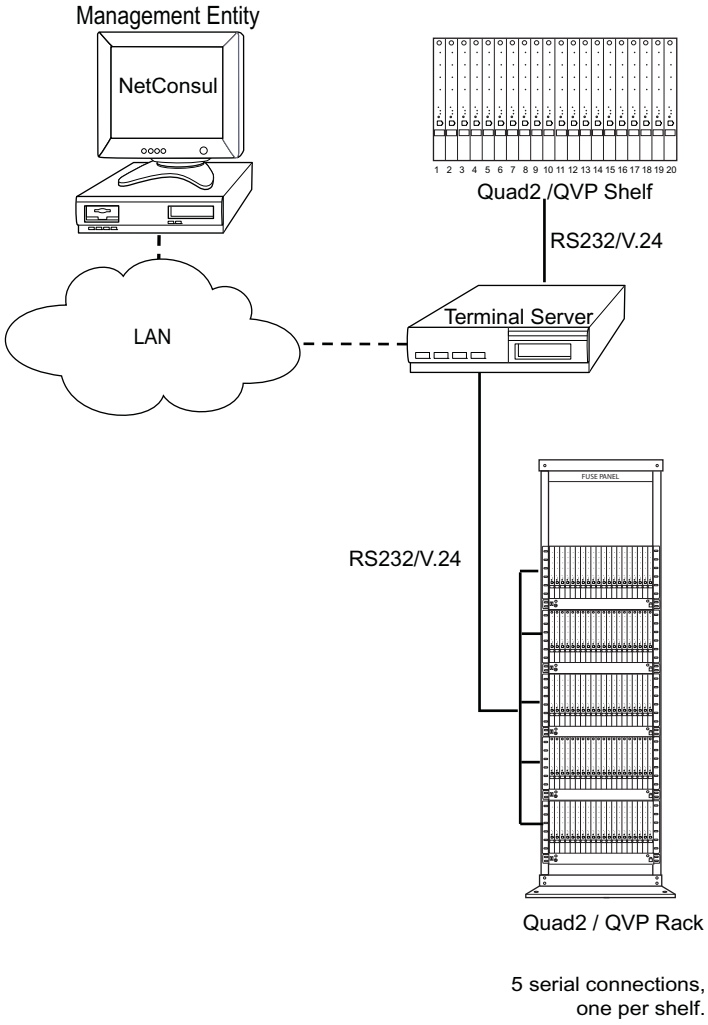


Figure 3-1 Example of Terminal Server Connected to QVP and LAN

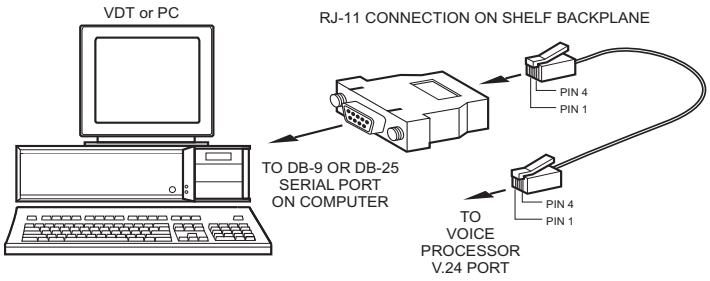
Connect all shelves to a terminal server through each device's serial control port (V.24). Each High Density 80SA shelf must have an independent port connection to the terminal server. Do not daisy-chain shelves together and then connect to the terminal server. Connect the terminal server to the LAN. The QVP equipment is accessible through the IP address of the terminal server.

3.2.1 DTE Configuration

Each serial port requires an RJ-11 interface cable. The interface is configured as Data Communications Equipment (DCE), allowing direct connection to any standard Data Terminal Equipment (DTE). The DTE equipment can be a standard terminal, such as a VT100, or a PC running terminal emulation software, such as HyperTerminal.

Note 1-Screen mode provides a real-time overview of the status, steady patterns, and actual gain settings for all channels. An ANSI-compatible terminal is required. Some communications software permits reconfiguration to make the terminal ANSI-compatible.

The DTE configuration is shown below (Figure 3-2).



SIGNAL	VDT/PC (DTE) DB-9 PIN NO.	VDT/PC (DTE) DB-25 PIN NO.	CABLE WIRING	RJ-11 PIN NO.
RxD	2	3	←	3
TxD	3	2	→	2
DTR	4	20	→	
DSR	6	6	←	
RTS	7	4	→	
CTS	8	5	←	
GND	5	7	⏚	1, 4
CD	1	8		
RI	9	22		

NOTE:
SWITCHES S1 AND S2 MUST BE SET TO DCE.

HIGH DENSITY SHELF

RJ-11 PINOUT CONVERSION

6-WIRE
(AS VIEWED FROM
PLUG END)

RJ-11 (PIN NO. MARKED ON 8 PIN BODY)	PINOUT CONVERSION (PIN DESIGNATION AS USED IN THIS MANUAL)
1	NU
2	1
3	2
4	3
5	4
6	NU

NU = NOT USED

NOTE:
THE RJ-11 IS A 6-PIN VERSION, BUT ONLY PINS 2 THROUGH 5 ARE USED TO MATCH THE STANDARD 4-PIN, RJ-11 CONFIGURATION.

Figure 3-2 DTE Serial Port Connection

3.2.2 Port Numbering

The port numbers of the QVP shelf are as follows:

- port 0 = Control port
- port 1 = Maintenance port

Figure 3-3 shows the Maintenance and Control ports on the back of the QVP.

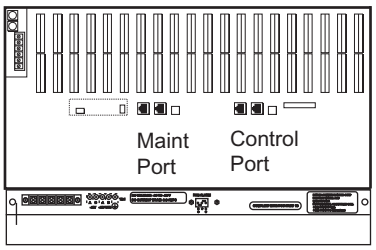


Figure 3-3 View of Maintenance and Control Ports

To communicate to a terminal server, set the DCE/DTE (Data Communications Equipment/Data Terminal Emulation) switch on the back of the QVP system to DCE.

3.2.3 Terminal Server Equipment

To communicate with one or more QVP shelves using NetConsul, a terminal server is required to connect to the LAN. As there are many types of terminal servers, Ditech cannot provide exact settings; however, the following guidelines are offered.

The terminal server must be in a full duplex, modem-like mode. Configure the serial port for DTE. The required configuration for the data terminal equipment is listed below (Table 3-1).

Table 3-1 Required DTE Settings

Setting	Values [default]
Speed	19200, [9600], 4800, 2400, 1200, 600 or 300baud
Data Bits	8 with no parity, [7 with even parity]
Stop Bits	1
Parity	None, [Even]
Flow Control	[None]
Duplex	Full

Note that although the default Speed is 9600 baud, the terminal server can be connected at 19200. The speed set on the terminal server (and laptop, ProComm, etc.) must match the speed set on the equipment shelf.

3.3 Serial Port Configuration

Commands in this chapter are used to set configuration values for the V.24 serial ports. For information about logging on, logging off, help with commands, and general commands, refer to Chapter 4 on page 45.

Serial port commands include:

To display the current parameter value, type the command without parameters.

3.3.1 BAUD Command

The **BAUD** command sets the baud rate for the serial port. This command can be broadcast to all cards so that the baud rate is the same across the system. Use the silent logon mode (Section 4.6, “Broadcasting Commands”, on page 40) to broadcast a baud setting.

The **BAUD** command syntax is as follows:

```
BAUD <rate, port #> | displays or sets the baud rate for the specified port
rate = 19200, 9600, 4800, 2400, 1200, 600, 300
port #: 0 = CONTR (Control), 1 = MAINT (Maintenance)
```

The **BAUD** command displays the current speed and parity settings for both backplane ports:

```
1-2,4-2>BAUD
```

The QVP responds with the following data:

```
CONTR Port: 9600, 8-N-1
MAINT Port: 9600, 8-N-1
```

The baud rate on one port can be changed while communicating with the other. When the maintenance port is in use, the control port can be set. To set the control port to 19200, type the following command:

```
1-2,4-2>BAUD 19200 0
```

The QVP responds:

```
Changing baud rate on CONTR port to 19200... Done
```

Note The maintenance port baud rate, though it can be changed, always returns to 9600 baud when the card is reset. The control port baud rate retains its value prior to the reset.

3.3.2 PARITY Command

The **PARITY** command sets parity for the serial port. This command can be broadcast to all cards so that the parity is the same across the system. Use the silent logon mode (Section 4.6, “Broadcasting Commands”, on page 40) to broadcast a parity setting.

The **PARITY** command syntax is as follows:

```
PARITY <parity, port #> | displays and sets the parity
parity: 8-N-1 = 8 data bits, no parity, 1 stop bit; 7-E-1 = 7 data bits,
even parity, 1 stop bit; port number: 0 = CONTR (Control), 1 = MAINT
(Maintenance)
```

The **PARITY** command selects the serial port’s parity. If the port number parameter is omitted, the port that issued the command is assumed.

When typed without parameters, the **PARITY** command displays the current speed and parity settings of both ports:

```
1-2,4-2>PARITY
CONTR Port: 9600, 8-N-1
MAINT Port: 9600, 8-N-1
```

When 7-E-1 parity is selected, the QVP generates even parity, so the terminal equipment does not encounter parity errors. The QVP itself ignores the parity bit when receiving data and does not report parity errors.

The parity setting on one port can be changed while communicating with the other. When the control port is in use, the maintenance port can be set. To set the parity of the maintenance port to 7-E-1, type the following command:

```
1-2,4-2>PARITY 7-E-1 1
```

The QVP responds:

```
Changing parity on CONTR port to 7-E-1... Done
```

3.3.3 ECHO Command

The **ECHO** command allows the QVP to work with various terminals. Set ECHO as required by the data communications equipment being used with the rack. ECHO settings control a DTE’s display of locally generated characters. When ECHO is enabled, all keystrokes are displayed.

When typed without parameters, the **ECHO** command displays the parameters of both the control and maintenance ports.

The **ECHO** command syntax is as follows:

```
ECHO <0 or 1, port #> | enables/disables character echo from the serial port
0 or 1: 0 = disable, 1 = enable; port number: 0 = CONTR (Control), 1 = MAINT
(Maintenance)
```

The **ECHO** command enables/disables echoing characters received from the serial port. Along with the **LFCR** command, it allows the QVP to work with different terminals. When typed without parameters, the **ECHO** command displays the parameters of both the control and maintenance ports.

```
CONTR Port: 19200, 8-N-1, Echo On, LF translated into LF-CR
MAINT Port: 19200, 8-N-1, Echo Off, LF translated into LF-CR
```

To display the echo settings, type the command:

```
1-2,4-2>ECHO
```

The QVP responds:

```
CONTR Port: 9600, 7-E-1, Echo On, LF translated into LF-CR
MAINT Port: 19200, 7-E-1, Echo On, LF translated into LF-CR
           <baud>, <#data bits-Even/No Parity-stop bits>, <LFCR>
```

To disable character echo from the maintenance port, type the command:

```
1-2,4-2>ECHO 0 1
```

The QVP responds:

```
CONTR Port: 9600, 7-E-1, Echo On, LF translated into LF-CR
MAINT Port: 19200, 7-E-1, Echo Off, LF translated into LF-CR
```

Note If the port number is omitted, the port that issued the command is assumed.

3.3.4 LFCR Command

The **LFCR** command allows the QVP to work with various terminals. Set LFCR as required by the data communications equipment being used with the rack. LFCR specifies whether a linefeed character should be sent after each carriage return character. The **LFCR** command forces the QVP to translate Line Feed (LF) characters into the pair, Line Feed - Carriage Return (LF-CR). When used in conjunction with the **ECHO** command, the **LFCR** command allows the QVP to work with different terminals.

When typed without parameters, the **LFCR** command displays the parameters of both the control and maintenance ports.

```
CONTR Port: 19200, 8-N-1, Echo On, LF translated into LF-CR
MAINT Port: 19200, 8-N-1, Echo Off, LF translated into LF-CR
```

The **LFCR** command syntax is as follows:

LFCR <0 or 1, port #> | enables the character translation from LF to LFCR
0 or 1: 0 = disable, 1 = enable; port number: 0 = CONTR (Control), 1 = MAINT (Maintenance)

To display the settings, type the command:

```
1-2,4-2>LFCR
```

The QVP responds:

```
CONTR Port: 9600, 7-E-1, Echo On, LF translated into LF-CR
MAINT Port: 19200, 7-E-1, Echo On, LF translated into LF-CR
```

To disable translation from the control port, type the command:

```
1-2,4-2>LFCR 0 0
```

The QVP responds:

```
CONTR Port: 9600, 7-E-1, Echo On, LF not translated into LF-CR
MAINT Port: 19200, 7-E-1, Echo On, LF translated into LF-CR
```

Note If the port number is omitted, the port that issued the command is assumed.

3.3.5 INACT Command

The **INACT** command sets or displays the inactivity timeout period for the current port. Inactivity timeout is the time between the last keystroke and automatic logoff. The timeout provides security by shutting down an inactive session. The inactivity timeout can be set, in seconds, for any time between one and 30 minutes.

The **INACT** command syntax is as follows:

```
INACT | displays and sets the automatic inactivity timeout period
timeout = 60 to 3000 seconds, or 0 (zero) for no timeout
```

To display the current inactivity timeout, type:

```
1-4,3-6>INACT
```

The QVP responds:

```
Current Inactivity Timeout: 60 sec.
```

To set the inactivity timeout to 120 seconds, type:

```
1-4,3-6>INACT 120
```

The QVP responds:

```
Inactivity Timeout changed to 120 seconds.
```

Warning Setting the inactivity timeout period to zero means that no inactivity timeout is in effect, and the QVP stays in the logon state indefinitely, until a card reset or operator intervention.

4.1 Overview

General commands assist in the navigation and configuration of the QVP cards and ports. A list of all commands is found in Table 4-1 on page 41.

The following commands are discussed in this chapter:

The serial ports, cards, and channels can be configured and the system can be monitored using any of the following tools:

- CLI (local card access)
- WinMAP™ software application (enterprise-wide)
- NetConsul™ software application/graphical user interface
  - Direct Access (similar to CLI, but enterprise-wide)

Each tool has different capabilities. For more information, see the appropriate software manual listed on page v. The WinMAP and NetConsul applications cannot both be active at the same time.

For the examples and discussion within this chapter, the CLI tool is described.

See Chapter 3, *Serial Port Configuration,* on page 29 for information about setting terminal emulation (**ECHO** and **LFCR** commands). In order to log on and issue commands, the correct terminal settings must be in place.

4.2 Logging On

To access a card, log on either through the front panel V.24 serial port or through the backplane serial ports. Activating the front panel serial port disables access to the card through the shelf backplane maintenance port. Be sure to log off when you complete your work.

4.2.1 Logging On at the Front Panel Port

To access one specific card through the card's front panel, plug in a connector at the card's front panel serial port and press <Enter>. If the user is plugged into the first card in the first shelf, the QVP responds with the system prompt:

```
1-1,1-1>
```

The system prompt appears after any character is typed. Line 1 and channel 1 appear by default when logging on. The syntax of the system prompt is as follows:

```
<Shelf>-<Slot>,<Line>-<Channel>
Shelf = 1 to 99, Slot = 1 to 20, Line = 1 to 4, Channel = 1 to
```

When a user is logged on to a QVP card, the **EQPT** LED on the front panel flashes green. At the prompt, the user can choose a line and channel by typing a command such as **SELECT**, **LINE**, or **CHAN**. To use these commands, see Chapter 6 on page 91 and Chapter 7 on page 99.

Warning Before attempting to access the card through the shelf backplane maintenance port, it is important to log off properly and unplug from the front panel interface. Maintenance port access can remain disabled as long as the cable is plugged into the front panel, even after issuing a **LOGOFF** command.

4.2.2 Logging On at the Backplane Communications Port

To access all cards in the node, use one of the two backplane communications ports. If a card is not accessible, first check that its front panel maintenance port is not in use.

When using the backplane serial port to connect through a high density shelf assembly, the user sends the @ command to log on and specifies the card with which to communicate:

```
@<Shelf #>-<Slot #>
<Shelf #> = 1 to 99, <Slot #> = 1 to 20
```

For example, to log on to the card in shelf 1, slot 4, type:

```
@1-4
```

Characters do not echo until logon is complete and the **EQPT** LED on the front panel flashes green. Once logon is complete, the system prompt appears, appending the line and channel that were accessed at the previous logon to the shelf and slot entered during this logon.

For example, if the most recent connection to the card was to line 3, channel 8, the prompt shows the following:

```
1-4,3-8>
<Shelf>-<Slot>,<Line>-<Channel>
```

At the prompt, the user can choose a line and channel by typing a command such as **SELECT**, **LINE**, or **CHAN**. To use these commands, see Chapter 6 on page 91 and Chapter 7 on page 99.

4.2.3 Logging On to a Different QVP

The logon command can be used to access a different QVP card. To log on to a different card, type its shelf and slot numbers at the system prompt. For example, to log on to the card in shelf 1, slot 2, type the new logon at the prompt.

```
1-4,3-8>@1-2
```

The command is not echoed. After the @ character is typed, the current QVP's **EQPT** LED stops flashing and shows steady green. Once the command executes, the **EQPT** LED on the new card starts flashing green, and the new system prompt appears. The new prompt reflects the new shelf and card numbers along with the channel selection retained from a previous logon:

```
1-2,3-8>
```

Automatic logoff from the prior card occurs when the user logs on to a different QVP.

4.3 Logging Off

4.3.1 Logoff at the Front Panel Port

To terminate the connection to the front panel serial port, type:

```
LOGOFF
```

or

```
@0
```

When logoff is complete, the **EQPT** LED shows steady green, and the system prompt does not print. After logoff, unplug the cable from the front panel.

Warning Before attempting to access the card through the shelf backplane maintenance port, it is important to log off properly and unplug from the front panel interface. Maintenance port access can remain disabled as long as the cable is plugged into the front panel, even after issuing a **LOGOFF** command.

4.3.2 Logging Off at the Backplane

To terminate the connection to a backplane serial port, type:

```
@0
```

or

```
LOGOFF
```

The **@0** command is preferred because it also cancels all silent logon connections (Section 4.6.1 on page 40). After logoff is complete, the **EQPT** LED shows steady green, and the system prompt does not print.

4.4 Automatic Timeout

A user connection to a QVP is automatically terminated after a specified period of inactivity has expired. The default timeout is a 30-minute delay between the last keystroke and automatic logoff. To change the default setting of the automatic timeout, use the **INACT** command (Section 3.3.5 on page 36).

4.5 Checking for Logon Connections

To identify all cards that have any logon connection, issue a broadcast **LAMP** command (Section 10.3.4 on page 167). When a **LAMP** command is received by a card with a connection, the **EQPT** LED flashes green for two seconds.

4.6 Broadcasting Commands

4.6.1 Silent Logon

All QVPs can be accessed simultaneously using silent logon mode.When in silent logon mode, all QVPs accept a subset of the user commands but send no response. The purpose of the silent logon mode is to allow multiple cards to simultaneously receive the same command (that is, the commands are broadcast). The commands that can be broadcast to multiple QVPs are indicated in Table 4-1.

To perform a silent logon, type an **S** after the @ and before the shelf number. For example, to log on to card 4 on shelf 1 in silent logon mode, type:

```
@S1-4
```

The QVP sends no response. Commands are not echoed while in silent logon mode. Local echo mode can be turned on in order to see commands while in silent logon mode. To log on to all cards in silent logon mode, type:

```
@$
```

In silent logon mode, logoff applies to all cards; logoff from an individual card is not available. To log off the cards in silent logon mode, type:

```
@0
```

When a card is in silent logon mode, the **EQPT** LED flashes green.

4.7 Overview of Commands

Commands can be used to set up the system, configure a card, check software versions, clear alarms, and more. Table 4-1 identifies the applicable sections in this manual where the commands are discussed.

Note Availability and support of QVP user commands depend upon your particular QVP system and software load.

Table 4-1 Command Overview

GENERAL		
DATE	Set current date. Refer to Section 4.9.1 on page 46.	Can also be broadcast
TIME	Set current time. Refer to Section 4.9.3 on page 47.	Can also be broadcast
HELP	Displays the command set. Refer to Section 4.8 on page 45.	
LOGOFF	Logoff the serial port. Refer to Section 4.3 on page 39.	
ACO	Alarm cutoff, as if pushing the ACO button. Refer to Section 4.9.6 on page 49.	Can also be broadcast
RACK	Set a rack name. Refer to Section 4.9.4 on page 47.	Can also be broadcast
CLRALL	Clear all history buffers and counters. Refer to Section 4.9.7 on page 49.	Can also be broadcast
DATEF	Set date format. Refer to Section 4.9.1 on page 46.	Can also be broadcast
CKTID	Display or set a circuit identification. Refer to Section 4.9.5 on page 48.	
FPKG	Displays and activates feature packages. Refer to Section 4.9.8 on page 50.	
STATUS		
VER	Display the software and hardware versions. Refer to Section 5.2 on page 63.	
SYSTEM	Display provisioning status of card and lines. Refer to Section 5.3 on page 64.	
STATUS	Display channel status. Refer to Section 5.4 on page 67.	
DISALH	Display alarm history. Refer to Section 5.5.3 on page 90.	
CLRALH	Clear the alarm history buffer. Refer to Section 5.5.3 on page 90.	Can also be broadcast

Table 4-1 Command Overview (Continued)

1SC	1-Screen display mode. Refer to Section 5.6 on page 90.	
+	Advance one increment (for certain commands, only). Refer to Section 5.7 on page 90.	
-	Backup one increment (for certain commands, only). Refer to Section 5.7 on page 90.	
AL	Displays alarm status for the channel. Refer to Section 5.5.1 on page 84.	
SYSTEM SETUP		
SELECT	Specify a line and channel. Refer to Section 6.2.1 on page 91.	
LINE	Specify a line. Refer to Section 6.3 on page 91.	
SETSYS	Display the system provisioning screen. Refer to Section 6.4.1 on page 92.	
SETALL	Restore provisioning using data from SAVEDFLT profile. Refer to Section 6.5 on page 93.	
SCOPY	Copy the provisioning from one line to another. Refer to Section 6.6 on page 94.	
SYSBP	Set bypass mode on line. Refer to Section 6.7.1 on page 95.	
SAVEDFLT	Save customer provisioning values. Refer to Section 4.11.4 on page 62 and Section 6.8 on page 96.	
IDLTIMING	Displays and sets idle code detection values. Refer to Section 4.11.5 on page 62 and Section 6.9 on page 96.	
CHANNEL SETUP		
SELECT	Specify a line and channel. Refer to Section 7.2 on page 99.	
CHAN	Specify a channel. Refer to Section 7.3 on page 100.	
SETUP	Displays and sets channel provisioning Refer to Section 7.4 on page 100.	
SETALL	Restore line and channel provisioning. Refer to Section 7.5 on page 104.	
COPY	Copy provisioning from one channel to another. Refer to Section 7.6 on page 104.	
BYPASS	Set bypass mode on channel. Refer to Section 7.7 on page 105.	

Table 4-1 Command Overview (Continued)

++	Advance one increment (for certain commands, only). Refer to Section 7.8 on page 106.	
- -	Backup one increment (for certain commands, only). Refer to Section 7.8 on page 106.	
VERSION CONTROL		
CUTOVER	Upgrade to a new level of software. Refer to Section 8.2.3 on page 109.	
REVERT	Return to a previous software level. Refer to Section 8.2.4 on page 109.	
SERIAL PORTS		
BAUD	Set baud rate of serial ports. Refer to Section 3.3.1 on page 33.	Can also be broadcast
PARITY	Set parity of serial ports. Refer to Section 3.3.2 on page 34.	Can also be broadcast
ECHO	Set character echo for terminal configuration. Refer to Section 3.3.3 on page 34.	
LFCR	Set line feed for terminal configuration. Refer to Section 3.3.4 on page 35.	
INACT	Set the inactivity period for security logoff. Refer to Section 3.3.5 on page 36.	
MONITORING		
HECMETER	Turn hybrid echo cancellation monitoring on so that call statistics are collected. Refer to Section 6.10 on page 97.	
SETCS	Set the parameters of call statistics. Refer to Section 9.3.1 on page 115.	
STATCS	Display the parameter setting for call statistics. Section 9.3.2 on page 123	
ALLCS	Comma-separated output of call statistics data. Section 9.3.3 on page 124	
DISCS	Display various call statistics. Section 9.3.5 on page 125	
CLRCS	Clear call statistics. Section 9.3.4 on page 124	
PM	Display performance monitoring data. Refer to Section 9.4.1 on page 148.	
CLRPM	Clear performance monitoring history. Refer to Section 9.5 on page 150.	
1SC	1-Screen display mode. Refer to Section 9.6.1 on page 151.	

Table 4-1 Command Overview (Continued)

MAINTENANCE		
DMW	Used for channel testing–Digital MilliWatt signal. Refer to Section 10.3.1 on page 165.	
SYSLB	Sets system (line) loopback. Refer to Section 10.3.2 on page 165.	
CHANLB	Sets channel loopback. Refer to Section 10.3.3 on page 167.	
BSETALL	Restore all E1 provisioning to user defaults. Refer to Section 10.5 on page 169.	Can also be broadcast
HHOLD	Freeze/release the H-Register on a selected channel. Refer to Section 10.7 on page 170.	
HCLR	Clear H-register of the current (or given) channel. Refer to Section 10.8 on page 170.	
LAMP	Identify cards with a logon connection (lamp test). Refer to Section 10.3.4 on page 167.	Can also be broadcast
METBP	Sets metallic bypass. Refer to Section 10.3.5 on page 167.	
CUSTCODE	Assign a custom provisioning profile to a line. Refer to Section 4.11.2 on page 60 and Section 10.4.1 on page 169.	
OFCALM	Set office alarm mode. Refer to Section 10.2.1 on page 162.	Obsolete as of version QE-5.06.08. Use **SETSYS** parameter IS EXPECTED
RDP	Set the RDP data path. Refer to Section 10.9 on page 171.	
BSAVEDFLT	Save all provisioning as user defaults. Refer to Section 10.6 on page 170.	
NBF	Display or provision Narrow Band Filter setting. Refer to Section 10.10 on page 171.	

4.8 Accessing Help

The **HELP** command displays the command set. Commands are organized into nine categories. To view the set of commands, type:

```
5-1,1-1>HELP
```

The QVP responds:

```
GENE-          SYSTEM    CHANNEL VERSION  SERIAL  MONI-    MAINTE-
RAL     STATUS SETUP     SETUP   CONTROL  PORTS   TORING   NANCE
------  ------ ------    ------- -------  ------  -----    -------
DATE    VER    SELECT    SELECT  CUTOVER  BAUD    1SC      DMW
TIME    SYSTEM LINE      CHAN    REVERT   PARITY  PM       SYSLB
HELP    STATUS SETSYS    SETUP            ECHO    CLRPM    CHANLB
LOGOFF  DISALH SETALL    SETALL           LFCR    DISCS    BSETALL
ACO     CLRALH SCOPY     COPY             INACT   CLRCS    HHOLD
RACK    1SC    SYSBP     BYPASS                   SETCS    HCLR
CLRALL  +      SAVEDFLT  ++                       STATCS   LAMP
DATEF   -      IDLTIMING --                       ALLCS    METBP
CKTID   AL                                        HECMETER CUSTCODE
FPKG                                                       OFCALM
                                                           RDP
                                                           BSAVEDFLT
                                                           NBF
```

Note Availability and support of the displayed user commands depend upon your particular QVP system and software load.

Type "<***command***> **?**" to see the syntax of a specific command. For example, to see the definition and parameters of the **DATE** command, type:

```
5-1,1-1>DATE ?
```

The **DATE** command syntax is displayed:

```
DATE - Display date and time, Set date

Syntax: DATE [mm/dd/yyyy]
     (use DATEF to select the date format)
```

4.9 General Commands

4.9.1 DATE Command

The **DATE** command displays the date/time stamp or sets the system date. This command can be broadcast to all cards so that the date is the same across the system. Use the silent logon mode to broadcast a date setting (see "Broadcasting Commands" on page 40).

The **DATE** command syntax is as follows:

```
DATE <dd/mm/yyyy, mm/dd/yyyy> | displays the stamp or sets the system date
dd = 2-digit day, mm = 2-digit month, yyyy = 4-digit year
```

To display the date, type the command in the CLI.

```
1-1,1-1>DATE
```

The system displays the current date, time, and date format.

```
01/25/2007 15:41:08( Date Format: mm/dd/yyyy )
```

This command format requires a 2-digit month, 2-digit day, and 4-digit year. To set the system date to May 26, 2007, type:

```
1-1,1-1>DATE 05/26/2007
```

The date and time are displayed as follows:

```
05/26/2007 17:30:42( Date Format: mm/dd/yyyy )
```

4.9.2 Date Format Command

The **DATEF** command displays and sets the display format of the current date. This command can be broadcast to all cards so that the format of the date is the same across the system. Use the silent logon mode to broadcast a date format setting (see "Broadcasting Commands" on page 40).

The **DATEF** command syntax is as follows:

```
DATEF <DM, MD> | displays or sets the format of the date display
DM = dd/mm/yyyy, MD = mm/dd/yyyy
```

To display the current format, type the **DATEF** command without any parameters.

```
1-1,1-1>DATEF
```

To type the date format, use the **DATEF** command followed by DM (day/month) or MD (month/day). For example, to change the format from *mm/dd/yyyy* to *dd/mm/yyyy*, type:

```
1-1,1-1>DATEF DM
```

The system responds:

```
Changing Date Format from mm/dd/yyyy to dd/mm/yyyy.
```

4.9.3 Time Command

The **TIME** command displays the time stamp or allows the time to be set. This command can be broadcast to all cards so that the time is the same across the system. Use the silent logon mode to broadcast a time setting (see "Broadcasting Commands" on page 40).

The **TIME** command syntax is as follows:

```
TIME <hh:mm:ss> | displays the stamp or sets the system time
hh = 2-digit hour from 01 to 24, mm = 2-digit minute, ss = 2-digit second
```

To display the time, type the command in the CLI.

```
1-1,1-1>TIME
```

The time is displayed as follows:

```
01/25/2007 09:30:00
```
(Date Format: *mm/dd/yyyy*)

The **TIME** command requires the 24-hour clock format, in which the morning hours, 12:00 A.M. to 11:59 A.M., are represented by 00:00 to 11:59 and the afternoon/evening/night hours, 12:00 P.M. to 11:59 P.M., are represented by 12:00 to 23:59.

To set the time to 2:45 P.M., type the following:

```
1-1,1-1>TIME 14:45:00
```

The time is displayed as follows:

```
01/25/2007 14:45:00
```
(Date Format: *mm/dd/yyyy*)

When using NetConsul EMS, QVP time can be automatically synchronized to NetConsul Server local time. Refer to the ***NetConsul EMS Software Manual*** for more information.

4.9.4 Rack Command

The **RACK** command displays or sets the rack name. Racks hold physical shelves of cards. A rack name can consist of up to 16 alphanumeric characters, not including @, #, or ~ (tilde). The rack name appears in report and screen headers.

The **RACK** command syntax is as follows:

```
RACK <rack name> | displays, clears, or sets the rack name
rack name = up to 16 alphanumeric characters, - to clear
```

To display the rack name, type:

```
1-1,1-1>RACK
```

The rack name is displayed:

```
RACK: MOUNTAIN VIEW
```

To set the rack name to Sunnyvale, type:

```
1-1,1-1>RACK SUNNYVALE
```

The new rack name is displayed:

```
RACK: SUNNYVALE
```

To clear the rack name, type the command followed by a space and a - (hyphen):

```
1-1,1-1>RACK -
```

The display indicates that the rack name has not been set:

```
RACK: ---NOT SET---
```

4.9.5 Circuit Identification Command

The **CKTID** command is used to set or clear an E1 line circuit identification or to display the Circuit IDs of the lines on a QVP. The Circuit ID appears in banners for line-related commands such as **SYSTEM**, **STATUS**, and **1SC**. Up to 40 alphanumeric characters are allocated for each Circuit ID. Do not use @, #, or ~ (tilde).

The **CKTID** command syntax is as follows:

```
CKTID <line #> <ID> | displays or sets the line's Circuit ID
ID = up to 40 alphanumeric characters (not @, # or ~), - to clear
```

To display the Circuit IDs of one E1 line, type the command, **CKTID**, the line number, and term, ID:

```
1-1,1-1>CKTID 1 ID
```

To display the Circuit IDs of all E1 lines on the QVP, simply type the command as follows:

```
1-1,1-1>CKTID
```

The Circuit IDs are displayed:

```
E1 1 : LINE1
E1 2 : LINE2
E1 3 : LINE3
E1 4 : LINE4
```

If the Circuit ID has not been set, the display indicates the following:

```
E1 1 : ---NOT SET---
```

To set a Circuit ID, type the command **CKTID**, followed by a line number, and the term ID:

```
1-1,1-1>CKTID 1 IncomingLongDistE1
```

The new Circuit ID is displayed:

```
New Circuit ID:
E1 1 : IncomingLongDistE1
```

To clear a Circuit ID, type the command **CKTID**, followed by a line number, and a hyphen:

```
1-1,1-1>CKTID 1 -
```

After clearing a Circuit ID, the display indicates that the Circuit ID has not been set:

```
New Circuit ID:
E1 1 : ---NOT SET---
```

4.9.6 Alarm Cutoff Command

The **ACO** (Alarm Cutoff) command releases the alarm relays and illuminates the **ACO** LED, just as if the QVP's front panel **ACO** button had been pressed. The **ACO** LED automatically turns off when alarms are cleared or when a new alarm is detected. This command can be broadcast to all cards by using the silent logon (see "Broadcasting Commands" on page 40).

The **ACO** command also initiates a lamp test, which lights all front panel LEDs for a moment. A lamp test can also be initiated with the **LAMP** command (Section 10.3.4 on page 167).

The **ACO** command syntax is as follows:

```
ACO | releases the alarm relays and performs a lamp test
```

4.9.7 Clear All Command

The **CLRALL** command can be used to simultaneously clear the call and data counters, performance monitoring history, and alarm history for the QVP. For performance monitoring information, refer to Chapter 9 on page 111. For alarm history details, see Section 5.5.3 on page 90.

The **CLRALL** command syntax is as follows:

```
CLRALL <PM, ALH, ALL> | clears the specified history
PM = Performance monitoring parameter history, ALH = Alarm history, ALL =
PM + ALH
```

4.9.8 FPKG Command

The QVP must have an active *feature package* to operate. Feature packages are individual software modules that enable specific QVP features and capabilities when properly licensed. QVP software loads can support multiple feature packages (Figure 4-1).

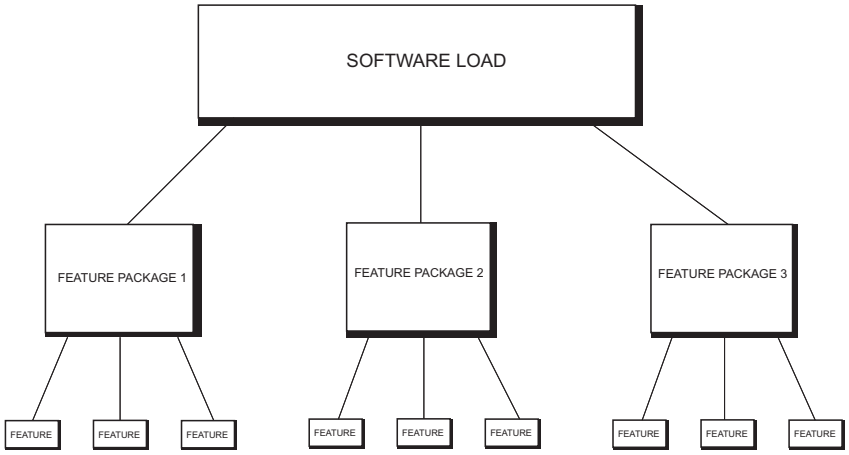


Figure 4-1 Feature Package Relationship Schematic

Note If a feature (capability) is not part of an active feature package, feature-specific commands and/or provisioning are removed from the user interface.

All feature packages contain features (for example AEC, ALC, and ANC) that operate either bidirectionally or unidirectionally. Bidirectional features can be enabled in both uplink and downlink directions. Unidirectional features are available in either an uplink or downlink direction.

Depending upon which feature package is active, a specific set of features is available with its own particular directions. Table 4-2, Table 4-3, and Table 4-4 list the individual features for each feature package with their respective directions and/or availability.

4.9.8.1 FPKG Command Syntax

The **FPKG** command is used to view or activate feature packages. The **FPKG** command syntax is as follows:

```
FPKG         - show active feature package (FP)
FPKG SET <k> - set the specified FP
FPKG LIC <k> - license the specified FP
FPKG ALL     - show supported FPs
FPKG ALL L   - show supported or licensed FPs
FPKG ALL I   - show supported FPs, inactive plane
FPKG UNLIC <k> - remove license for the specified FP
FPKG UNLIC ALL - remove licenses for all FPs except the Active FP
```

Note The **FPKG UNLIC** command is currently supported only on the QVP E400 system.

The following sections describe feature package commands and procedures:

- Displaying the active feature package – Section 4.9.8.1.1 on page 51
- Displaying all feature packages – Section 4.9.8.1.2 on page 52
- Activating a feature package – Section 4.9.8.1.3 on page 53
- Displaying feature packages on the inactive plane – Section 4.9.8.1.4 on page 53
- Displaying licensed feature packages – Section 4.9.8.1.5 on page 54
- Licensing a feature package – Section 4.9.8.1.6 on page 54
- Unlicensing a feature package – Section 4.9.8.1.7 on page 54

4.9.8.1.1 Displaying the Active Feature Package

Entering the **FPKG** command without any parameters displays the QVP's *active* feature package and the required number of DSPs (DIMMs) to run the software load. A brief description of the feature package is also provided.

The following example shows the output for feature package number 28, which supports GSM VQA with HEC. Additionally, 8 DSPs (DIMMS) are required by the software load and feature package.

To view the active feature package, type:

```
1-20,1-1>FPKG
```

The QVP responds:

```
Active Feature Package: 28, "GSM Voice Quality Assurance with HEC", 8 DSP
required
```

4.9.8.1.2 Displaying All Feature Packages

The **FPKG ALL** command displays all feature packages supported by the current software load (by feature package number), the required number of DSPs (DIMMs) for each feature package, the license status, and a brief description. The word “Active” appears next to the currently active feature package.

To view all feature packages, type:

```
1-20,1-1>FPKG ALL
```

The **FPKG ALL** command output reflects the feature packages supported by your particular QVP system and software load.

For the E400 system, the QVP responds similar to the following:

```
Supported Feature Packages:
--------------------------------------------------------------------------------
Feature      DSPs     Licensed      Description
Package    required
--------------------------------------------------------------------------------
 10(Active)   4         Yes         E400 VQA
```

For the E800 system, the QVP responds similar to the following:

```
Supported Feature Packages:
--------------------------------------------------------------------------------
Feature      DSPs     Licensed      Description
Package    required
--------------------------------------------------------------------------------
 12           8         Yes         GSM Capacity Enhancement, no EXi
 14           8         Yes         GSM Capacity Enhancement with HEC, no EXi
 17           8         Yes         CDMA Capacity Enhancement
 18           8         Yes         3G Wireless VQA, no EXi
 19           8         Yes         3G Wireless VQA with HEC, no EXi
 20           8         Yes         Conf Bridge VQA with HEC
 21           8         Yes         IP Gateway VQA
 22           8         Yes         IP Gateway VQA with HEC
 24           8         Yes         GSM Voice Quality Assurance, no EXi
 25           8         Yes         PSTN/Mobile Voice Quality Assurance
 26           8         Yes         iDEN VQA with HEC, no EXi
 28(Active)   8         Yes         GSM Voice Quality Assurance with HEC
 29           8         Yes         GSM Capacity Enhancement with HEC
 30           8         Yes         iDEN VQA with HEC
 31           8         Yes         GSM Capacity Enhancement
 32           8         Yes         3G Wireless VQA
 33           8         Yes         3G Wireless VQA with HEC
 34           8         Yes         GSM Voice Quality Assurance
```

4.9.8.1.3 Activating a Feature Package

A feature package must be activated to operate on a QVP card. To activate a feature package, the following requirements must be met:

- The current software load supports the feature package.
- The feature package has a license.

Note A feature package can be licensed but not supported by the current software load. In this case, the feature package may be available for a possible future software upgrade. Alternatively, a feature package may neither be supported by the current software load nor licensed due to feature package obsolescence.

If the above requirements are met, the **FPKG SET** command is used to activate a feature package. For example, to activate feature package 25, type:

```
5-1,4-5>FPKG SET 25
```

The QVP responds:

```
Ready to set Feature Package 25 Active.
Card will be RESET, and may need RE-PROVISIONING!
Proceed ? - Y/[N]:
```

If the feature package is supported by the active software load but does not yet have a license, the **FPKG SET** command prompts for a HEX key license. If the HEX key is unknown, contact Ditech Customer Service to activate the feature package:

```
Please enter 4-digit HEX key, followed by CR (CtrlC aborts): 3A1A
Ready to set Feature Package 25 Active.
Card will be RESET, and may need RE-PROVISIONING!
Proceed ? - Y/[N]:
```

Note If an incorrect HEX key is entered three times in succession, the **FPKG SET** command will be locked for 15 minutes, or until the card is reset.

If the feature package is *not* supported by the active software load or is obsolete, the **FPKG SET** command responds as follows:

```
5-1,4-5>FPKG SET 47
Feature Package 47 not supported
```

Note Each license key is valid for a single card and a single feature package.

4.9.8.1.4 Displaying Feature Packages on Inactive Plane

The **FPKG ALL I** command displays all feature packages supported by the software load on the inactive plane, the required number of DSPs (DIMMs) for each feature package, the license status, and a brief description of the feature package. Use the **FPKG ALL I** command to view the capabilities of a software load prior to performing an upgrade.

4.9.8.1.5 Displaying Licensed Feature Packages

The **FPKG ALL L** command displays all the supported feature packages that can be licensed for both the QVP E400 and E800 systems, and provides the current licensing status for each feature package. This command also displays the required number of DSPs (DIMMs) and a description for each feature package, as well as whether each feature package is supported by the current software load and hardware.

4.9.8.1.6 Licensing a Feature Package

A user can license a feature package that is either supported or not supported by the current software load for possible future use. This is done using the **FPKG LIC** command. The **FPKG LIC** command creates a license without changing the active feature package. A license key is required to run this command. If the license key is unknown, contact Ditech Customer Service.

For example, to create a license for feature package 25 (for future use), type:

```
5-1,4-5>FPKG LIC 25
```

The QVP responds:

```
Please enter 4-digit HEX key, followed by CR (CtrlC aborts): 3A1A
Done
```

Note If an incorrect HEX key is entered three times in succession, the **FPKG LIC** command will be locked for 15 minutes, or until the card is reset.

4.9.8.1.7 Unlicensing a Feature Package

Note The **FPKG UNLIC** command is currently supported only on the QVP E400 system.

A user can unlicense a feature package that is currently licensed on the card. The **FPKG UNLIC <k>** command removes the license key from a specified feature package, while the **FPKG UNLIC ALL** command removes license keys from *all* feature packages (except the currently-active feature package).

The currently-active feature package cannot be unlicensed.

As an example of this command, type the following to remove the license key from feature package 7:

```
2-20,1-1>FPKG UNLIC 7
```

The QVP responds:

```
Removing license for FP #7
   Are you sure? - Y/[N]: Y
Done
```

4.9.8.2 Feature Directions

Feature package features can operate in the following directions:

- Uplink (UL), Downlink (DL), or both Uplink and Downlink
- Unidirectional (Uni) or Bidirectional (Bidi)

4.9.8.2.1 Uplink and Downlink Directions

Ditech's voice quality enhancement technology can operate in the uplink, downlink, or both uplink and downlink directions. The uplink direction is from the Receive In (RCV IN) side to the Receive Out (RCV OUT) side of the QVP shelf, and the downlink direction is from the Send In side to the Send Out side of the QVP shelf.

Figure 4-2 displays a schematic of uplink and downlink directions within a network between a wireless subscriber and a wireline subscriber. Hybrid Echo Cancellation operates on the Send or Tail side. Acoustic Echo Control (AEC), Adaptive Level Control (ALC), and Adaptive Noise Cancellation (ANC) are examples of features that operate in both directions.

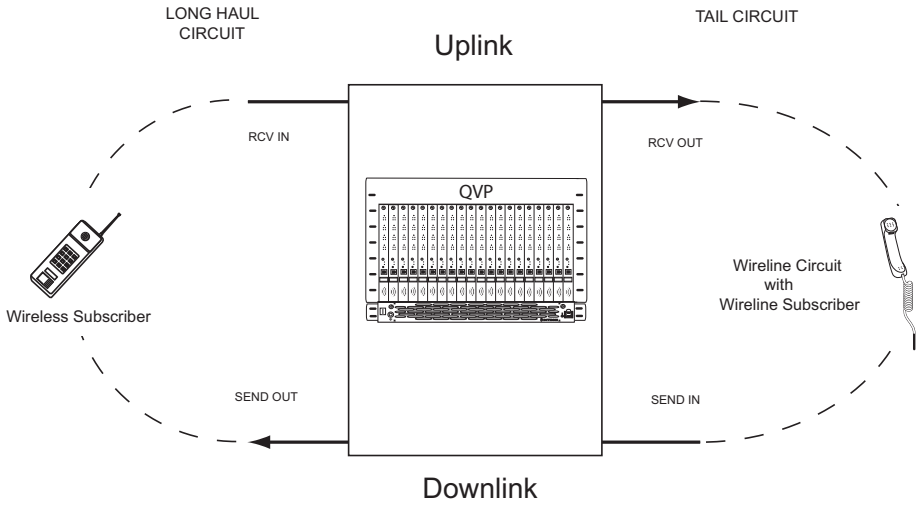


Figure 4-2 Uplink and Downlink Directions

4.9.8.2.2 Bidirectional or Unidirectional Features

All QVP feature packages contain features (for example, AEC, ALC, and ANC) that operate either bidirectionally or unidirectionally. Bidirectional features can be enabled in both uplink and downlink directions. Unidirectional features are only available in either the uplink or downlink directions (not user selectable).

4.9.8.3 Feature Directions and Availability

Voice quality enhancement features can operate in uplink or downlink directions, or can operate bidirectionally. Depending on which QVP feature package is active, a specific set of voice quality enhancement features is available, with or without EXi capabilities.

4.9.8.3.1 Feature Packages for QVP E400 and E800 Systems

The QVP E400 system supports feature package 10 (“E400 VQA”). Table 4-2 identifies which individual features are supported within feature package 10, as well as their respective directions (if applicable).

Table 4-2 QVP E400 Features

Feature/Capability	Feature Package 10
Acoustic Echo Control (AEC)	Bidi
Adaptive Noise Cancellation (ANC)	Bidi
Automatic Level Control (ALC)	Bidi
Circuit Switched Video (3G CSV)	N
Discontinuous Transmission (DTX)	N
Dynamic Level Control (DLC)	N
Dynamic Noise Compensation (DNC)	N
Enhanced Voice Intelligibility (EVI)	Uni*
Experience Intelligence™ (EXi)	Y
High Speed Circuit Switched Data (HSCSD)	Y
Hybrid Echo Cancellation (HEC)	DL
HEC Meter (hybrid echo statistics)	N
Music Ringback Detection (MD)	Y
Signature Detection (SDT)	Y
Tandem Free Operation (TFO)	Y*
Tone Disabler (TDR)	Y
Voice Activity Detector Post-Processor (VADPP)	Bidi

Availability:
Y = Yes
N = No

Directions:
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* If TFO is enabled, EVI is not available. If TFO is disabled, Unidirectional EVI is available. Conversely, if EVI is enabled, TFO cannot be enabled.

Table 4-3 lists supported feature packages with EXi for the QVP E800 system, and shows their individual features with respective directions and/or availability. Table 4-4 on page 58 lists supported feature packages without EXi for the QVP E800 system, and also shows their individual features with respective directions and/or availability.

Table 4-3 QVP E800 Feature Packages with EXi Capabilities

Feature/Capability	Feature Packages with EXi Capabilities (QVP E800)											
	17	**20**	**21**	**22**	**25**	**28 ‡**	**29**	**30**	**31**	**32**	**33**	**34**
Acoustic Echo Control (AEC)	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Adaptive Noise Cancellation (ANC)	Bidi	DL	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Automatic Level Control (ALC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Circuit Switched Video (3G CSV)	N	N	N	N	N	Y	N	N	N	Y	Y	N
Discontinuous Transmission (DTX)	Bidi	N	N	N	N	N	N	N	N	N	N	N
Dynamic Level Control (DLC)	Bidi	Bidi	Bidi	N	N	N	N	N	N	N	N	Bidi
Dynamic Noise Compensation (DNC)	N	UL	DL	N	N	N	N	N	N	N	N	DL
Enhanced Voice Intelligibility (EVI)	Bidi	Uni	Uni	Uni	Uni	Uni †	Uni †	Bidi	Bidi	Bidi	Bidi	Bidi
High Speed Circuit Switched Data (HSCSD)	N	N	N	N	N	Y	Y	N	Y	N	N	Y
Hybrid Echo Cancellation (HEC)	N	DL	N	DL	DL	DL	DL	DL	N	N	DL	N
HEC Meter (hybrid echo statistics)	Y*	Y	Y**	Y	Y**	Y*	Y*	Y*	Y*	Y*	Y*	Y*
Music Ringback Detection (MD)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tandem Free Operation (TFO)	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y
Tone Disabler (TDR)	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Voice Activity Detector Post-Processor (VADPP)	Bidi	DL	Bidi	DL	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi

Availability:
Y = Yes
N = No

Directions:
UL = Uplink
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* Requires disabling Downlink ANC.
** Requires disabling Uplink ANC.
† If TFO is enabled, Unidirectional EVI (only) is available.
If TFO is disabled, Bidirectional EVI is available.
‡ Feature package 28 includes the Signature Detection (SDT) feature.

Table 4-4 QVP E800 Feature Packages without EXi Capabilities

Feature/Capability	Feature Packages without EXi Capabilities (QVP E800)					
	12	**14**	**18**	**19**	**24**	**26**
Acoustic Echo Control (AEC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Adaptive Noise Cancellation (ANC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Automatic Level Control (ALC)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi
Circuit Switched Video (3G CSV)	N	N	Y	Y	N	N
Discontinuous Transmission (DTX)	N	N	N	N	N	N
Dynamic Level Control (DLC)	N	N	N	N	Bidi	N
Dynamic Noise Compensation (DNC)	N	N	N	N	DL	N
Enhanced Voice Intelligibility (EVI)	Bidi	Uni †	Bidi	Bidi	Bidi	Bidi
High Speed Circuit Switched Data (HSCSD)	Y	Y	N	N	Y	N
Hybrid Echo Cancellation (HEC)	N	DL	N	DL	N	DL
HEC Meter (hybrid echo statistics)	Y*	Y*	Y*	Y*	Y*	Y*
Music Ringback Detection (MD)	Y	Y	Y	Y	Y	Y
Tandem Free Operation (TFO)	Y	Y	Y	Y	Y	N
Tone Disabler (TDR)	Y	Y	Y	Y	N	Y
Voice Activity Detector Post-Processor (VADPP)	Bidi	Bidi	Bidi	Bidi	Bidi	Bidi

Availability:
Y = Yes
N = No

Directions:
DL = Downlink
Bidi = Bidirectional (both Uplink and Downlink)
Uni = Unidirectional (either Uplink or Downlink)

Notes:
* Requires disabling Downlink ANC.
† If TFO is enabled, Unidirectional EVI (only) is available.
If TFO is disabled, Bidirectional EVI is available.

The QVP E400 system supports feature package 10 (“E400 VQA”). The QVP E800 system supports all the feature package names listed in Table 4-5.

Table 4-5 QVP E800 Feature Package Names

Feature Package	Name
12	GSM Capacity Enhancement, no EXi
14	GSM Capacity Enhancement with HEC, no EXi
17	CDMA Capacity Enhancement
18	3G Wireless VQA, no EXi
19	3G Wireless VQA with HEC, no EXi
20	Conference Bridge VQA with HEC
21	IP Gateway VQA
22	IP Gateway VQA with HEC
24	GSM VQA, no EXi
25	PSTN/Mobile VQA
26	iDEN VQA with HEC, no EXi
28	GSM VQA with HEC
29	GSM Capacity Enhancement with HEC
30	iDEN VQA with HEC
31	GSM Capacity Enhancement
32	3G Wireless VQA
33	3G Wireless VQA with HEC
34	GSM VQA

4.10 Shortcuts

Several keyboard shortcuts are available, including:

- Repeat the last command
- Display the last command for editing

4.10.1 Repeat Last Command

Pressing Ctrl+E repeats the last successful command from the system prompt.

4.10.2 Edit Last Command

Pressing Ctrl+R or Ctrl+P displays the previous command. The Backspace key can be used to edit the displayed command. Press <Enter> to accept the command. Commands typed improperly result in the following response:

```
No Such Command
```

4.11 Initial Provisioning

4.11.1 General Provisioning Procedure

For normal operation, the QVP must be provisioned. Several provisioning operations are available:

- Restore the factory default settings with the **SETALL FACTORY** command (Section 4.11.3 on page 61 and Section 6.5 on page 93)
- Review settings with the **SYSTEM** and **STATUS** commands (Section 5.3 on page 64 and Section 5.4 on page 67)
- Customize settings (if necessary) with the **SETSYS** and **SETUP** commands (Section 6.4 on page 92 and Section 7.4 on page 100)
- Save the user default settings with the **SAVEDFLT** command (Section 4.11.4 on page 62 and Section 6.8 on page 96)
- Restore the user default settings with the **SETALL** command (Section 6.5 on page 93)

All provisioning commands can be performed on a per-line basis. Some commands can be performed on the system as a whole (for example, saving user defaults and restoring factory defaults). The general provisioning procedure recommended by Ditech is described in Table 4-6.

Table 4-6 General Provisioning Procedure

Step	Description	Comment
1	Restore provisioning to the factory default settings. If pre-service testing has not been performed, it is unnecessary to restore factory defaults, since they have not been altered.	Section 4.11.3 on page 61
2	Customize settings (if necessary) using the **SETSYS** and **SETUP** commands for system or channel provisioning.	For lines, see Section 6.4 on page 92. For channels, see Section 7.4 on page 100.
3	Save provisioning as the user default settings.	Section 4.11.4 on page 62

To provision multiple lines identically, customize one line and use the **SCOPY** command to copy its provisioning to the other lines.

4.11.2 Custom Code

Each QVP shipped by Ditech is configured with a set of provisioning profiles. Each profile has an assigned custom code number. Each E1 line on the card has one of these profiles assigned as its factory default. These assignments can be changed using the **CUSTCODE** command (Section 10.4.1 on page 169). The **SETALL FACTORY** command can be used to restore the assigned profile to the E1 line and to the user default profile.

A user can independently provision the E1 line with specific requirements and save this profile as the user default. If a mistake is made while provisioning, typing the **SETALL** command restores the previous user default settings. Entering the **SETALL FACTORY** command restores the original factory default settings, or the factory default settings as determined by the **CUSTCODE** command.

Warning Do not provision a QVP with an unknown custom code configuration.

4.11.3 Restore Factory Defaults

Use the **SETALL FACTORY** command to restore the factory default settings to the current E1 line or to all E1s. The factory default settings are tested for consistency and are carefully selected to be as close as possible to specific customer requirements. The factory default profile contains a set of line (system) parameters and a set of channel parameters. After restoring the factory defaults, all channels within one E1 line are identically provisioned:

```
5-1,1-1>SETALL FACTORY
Provisioning E1 1 with factory profiles per custom codes:
E1 1 - 17
Bypass and Framing settings overwritten
   Are you sure? - Y/[N]: Y
Done E1 1
```

The **SETALL FACTORY ALL** command restores all E1 default profiles to their respective custom codes, which can be different for each E1:

```
5-1,1-1>SETALL FACTORY ALL
Provisioning All E1s with factory profiles per custom codes:
E1 1 - 17
E1 2 - 17
E1 3 - 17
E1 4 - 17
Bypass and Framing settings overwritten
   Are you sure? - Y/[N]: Y

Done E1 1
Done E1 2
Done E1 3
Done E1 4
```

In the system response, the profile number indicates the custom code assignment corresponding to the E1 line's factory default. As discussed above, custom codes are assigned at the factory in agreement with the customer, but can be changed using the **CUSTCODE** command (Section 10.4.1 on page 169).

Note The restored factory default profile is also saved as the user default.

Examine the provisioning with the **SYSTEM** and **STATUS** commands (Section 5.3 on page 64 and Section 5.4 on page 67). If the factory default settings satisfy your requirements, provisioning of the QVP is complete. If reprovisioning is needed, refer to the **SETSYS** and **SETUP** commands in Section 6.4 on page 92 and Section 7.4 on page 100.

4.11.4 Save User Default Profile

The **SAVEDFLT** command saves the current configuration as the user default profile. Unlike the factory default profile, the user default contains data for all the channels separately. The main purpose in creating a user default is to retain the individual changes made while provisioning the cards. User default profiles can be restored using the **SETALL** command. Issuing the **SETALL** command without the **FACTORY** parameter (Section 4.11.3, “Restore Factory Defaults”, on page 61) restores the user default previously created with the **SAVEDFLT** command.

To save provisioning of the current E1 line, type:

```
1-8,1-1>SAVEDFLT
E1 1 provisioning saved as user default
```

To save provisioning of the four E1 lines, type:

```
1-8,1-1>SAVEDFLT ALL
E1 1 provisioning saved as user default
E1 2 provisioning saved as user default
E1 3 provisioning saved as user default
E1 4 provisioning saved as user default
```

4.11.5 Set Idle Timing

```
IDLTIMING | displays the idle code timing for all E1 lines
IDLTIMING <PST, NPS, CC> | sets the idle code timing for the current E1 line
IDLTIMING <PST, NPS, CC> A | sets the idle code timing for all E1 lines
PST = 20ms increments up to 5100ms; minimum time to detect idle code
NPS = 20ms increments up to 5100ms; minimum time to detect no idle code
CC = 20ms increments up to 5100ms; call counter hangover time
```

The **IDLTIMING** command displays and sets the time constants used in idle code detection and call counter incrementing. For call counter purposes, idle timing determines the lower bound of the call duration in order to avoid counting ringback tones as individual calls. Any transition shorter than this interval is not to be considered a call.

To view the idle timing settings, type:

```
1-8,1-1>IDLTIMING
```

The QVP responds:

```
E1 1: IDLTIMING  100 180 2560
E1 2: IDLTIMING  100 180 2560
E1 3: IDLTIMING  100 180 2560
E1 4: IDLTIMING  100 180 2560
```

To set the idle timing detection to 200ms for the current E1 line, type:

```
1-8,1-1>IDLTIMING 200 180 2560
```

To set the idle timing detection to 200ms for all E1 lines, type:

```
1-8,1-1>IDLTIMING 200 180 2560 A
```

To configure the idle code detection and patterns, use the **SETUP** command (Section 7.4 on page 100).

5.1 Overview

Status commands display information about system hardware, software version numbers, system or channel facility alarms, provisioning, channel call activity, and call performance. In the command line interface and 1-Screen displays, characters are not case-sensitive.

Status commands include:

5.2 VERsion Command

5.2.1 Displaying the Software Version

The **VER** command displays the hardware and software versions of the selected QVP card along with the active feature package. The syntax of the **VER** command is as follows:

```
VER | displays the release data for the current software load
```

The feature package is the version of Ditech voice processing software resident on the card. In addition, the active and inactive (standby) planes are shown. At the bottom of the output is DSP (Digital Signal Processor) load data. An example of the **VER** command and output follows.

```
1-2,1-1>VER

* DITECH QVP-E1  ********** V E R S I O N ********** 08/21/2007 12:59:59 **
RACK: PVLAB             PORT: Maint. Shelf 1, Slot 2

   PLANE 0 VERSION:  QE-5.h6.11  17Aug2007  - Active
   HDWARE REVISION:  1.0  -  S/N QDEVD2200113
   BOOT    VERSION:  B4.02  05Sep2003
   PLANE 1 VERSION:  QE-5.g6.11  08Aug2007,   valid, inactive
   Date Format:  mm/dd/yyyy

   DSP Version B6.39      EC LIB Version 9.16.7
   Active Feature Package: 28, "GSM Voice Quality Assurance with HEC", 8 DSP
required
   8 DSP installed
```

Note Also see Chapter 8, *Version Control,* on page 107 for information about upgrading software.

Note If the QVP's inactive plane contains no code, the version field of the inactive plane may contain a string of question marks, or the string "Not Loaded". This situation is normal and does not prevent the QVP from normal operation.

5.3 SYSTEM Command

5.3.1 System Status and Provisioning

The **SYSTEM** command displays the provisioning settings of the QVP and lines. Provisioning information includes the possible settings, with the current active setting enclosed in square brackets ([ ]). If alarms are active on the system, facility alarm data is also displayed for both the SND and RCV directions.

The **SYSTEM** command syntax is as follows:

```
SYSTEM | displays the status and provisioning for the QVP and lines
```

The following example displays the **SYSTEM** command on a system with alarms in an active state. Command output shows AIS alarms on both the input and output of the Send and Receive sides. In this example, the facility alarms cause the system to be marked unavailable. For details on facility alarms, see Table 5-7 and Table 5-8 on page 89.

```
5-1,1-1>SYSTEM

* DITECH QVP-E1  **** S Y S T E M   S T A T U S ***** 07/26/2007 16:53:31 **
CIRCUIT ID: XXXX PORT: Maint. Shelf 5, Slot 1, E1 1

FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                              0
  RCV  (FROM FAR END TO TAIL):     LOS                              0
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS

IS EXPECTED - NO, [YES]
SEND AIS BURST ON SIGNAL PATH CHANGE - NO,[YES]
RETURN DISTANT ALARM ON LOCAL ALARM - [NO],YES
SYSTEM BYPASS - [OUT],IN
CRC4 ENABLE - [OUT], IN
SIGNALING - CAS,C5,[CCS],Q50(TS16)
IN SERVICE CHANNELS - [30],31  (CH 31 IS BYPASSED)
NARROW BAND FILTER - OUT,[IN]
SYSTEM LOOPBACK - [NONE],TAIL,LONG HAUL
```

Table 5-1 describes the parameters that can be set for QVP system provisioning. To configure the QVP system, see Section 6.4, “SETSYS Command”, on page 92.

Table 5-1 QVP System Parameters

Parameter	Definition
Is Expected	The “Is Expected” parameter determines whether or not facility failures contribute to visual and audible alarm indications. During testing and occasionally during normal operation, some E1 lines need to be taken out of service. The service provider may not want to receive facility alarms on these unused lines. By setting the E1 to “Is Expected = No”, facility and equipment alarms, including metallic bypass and system bypass, are treated as follows: • Not reported to NetConsul • Not shown on the front panel LEDs • Alarm relays are disabled The corresponding E1LED on the front panel is turned off.
Send AIS Burst on Signal Path Change No, Yes	When this function is enabled, the QVP generates an AIS (Alarm Indication Signal) burst from 10 to 20ms when the signal path changes or is disrupted so that downstream equipment can reframe. An AIS burst is sent in response to the following changes: • System Bypass–SYSBP IN or SYSBP OUT (both directions) • Metallic Bypass–METBP OUT (both directions) • Receive Data Path–RDP IN/OUT (Receive direction only).
Return Distant Alarm on Local Alarm No, Yes	When this function is enabled, the QVP voice processor generates a Distant (Remote) alarm signal back towards the Local alarm. Otherwise, the card only detects and passes the Distant alarm signal generated by the terminal equipment. Settings: Yes–Enables Distant alarm signal generation within the module. No–Detects and passes the Distant alarm signal but does not generate it.
System Bypass Out, In	This parameter can set a bypass on the E1 line such that no voice processing occurs (framing and retransmission continue). Settings: Out–Allows voice processing on all 31 channels, unless a channel has been individually bypassed using the BYPASS or SETUP command. In–Bypasses all 31 channels, regardless of individual channel settings. No echo cancellation or voice quality enhancement is performed on the channels.
CRC4 Enable Out, In	When this parameter is enabled, the QVP card checks for CRC4 bit sequence from the Tail (Receive In) and Long Haul (Send In) directions, inserts a CRC4, and returns E-bits if CRC4 errors are detected. Settings: Out–No checking or insertion of CRC4. In - Checks CRC4 at Receive In and Send In and inserts CRC4 and E-bits at Receive Out and Send Out.

Table 5-1 QVP System Parameters (Continued)

Parameter	Definition
Signaling CAS, CCS, Q50 (TS16)	CCS mode monitors the channel for idle codes to determine whether the channel is busy or on-hook. Hybrid echo cancellation and voice processing are bypassed when a channel is on-hook. CAS mode monitors the A, B, C, and D bit conditions for determining activity status. Q.50(AB) and Q.50(CD) settings are, like CAS, modes for determining activity status by monitoring the A and B, or C and D bit conditions, respectively. These settings are used with circuit multiplication equipment (CME). **Note**: The QVP E1 does not support C5 signaling mode.
	TS16 Control Comes From: Rcv, Send, Both This parameter sets how the Send and Receive directions are used to monitor Time Slot 16 to establish whether the channel is busy or idle (on-hook). Settings: Rcv – The channel is declared on-hook when the TS16 status bits in the Receive direction meet the set idle conditions. Send – The channel is declared on-hook when the TS16 status bits in the Send direction meet the set idle conditions. Both – The channel is declared on-hook when the TS16 status bits in both directions meet the set idle conditions. The TS16 direction can be provisioned when selecting the CAS or Q50 settings.
	Idle On: A Low, A High, B Low, B High, C Low, C High, D Low, D High This setting determines on-hook activity status of the A, B, C, or D bit conditions. This setting can be provisioned when CAS is selected.
	Q50 EC Bypass: AB High, CD High This setting determines activity status of AB and CD combination bit conditions. This setting can be provisioned when Q50 is selected.
In Service Channels 30, 31	For the current E1, this parameter sets the number of available channels at 30, bypassing channel 31. This provision is available if CCS signaling is selected.
Narrow Band Filter Out, In	This parameter sets the Tone Disabler bandwidth to detect 2100 Hz only (In), or to also detect legacy modem answer tones (Out).
System Loopback None, Tail, Long Haul	In loopback mode, the signals are sent back on the side received (with framing and retransmission). Loopback occurs outside the voice processing circuitry and is intended to remove the QVP from the circuit (see Section 10.3.2 on page 165). Note: Either loopback condition (Tail or Long Haul) interrupts service on all channels. Settings: None–No loopback (default). Tail–Sets the loopback on the Tail side (Send In to Receive Out). Sends an AIS on Send Out. Long Haul–Sets the loopback on the Long Haul side (Receive In to Send Out). Sends an AIS on Receive Out. When any loopback mode is enabled on a line, its STATUS LED flashes yellow.

The QVP's timing mode has been configured for normal synchronization, or through-timing, and cannot be changed. Internal clock recovery provides timing for the Receive direction (Long Haul to Tail) from the Receive In port and for the Send direction (Tail to Long Haul) from the Send In port.

Note Long Haul and Tail timing modes change to normal synchronization when the QVP card software is from version QE-5.04.03 or lesser to QE-5.04.04 or greater and cut over. These former timing modes cannot be restored by reverting to a previous software version.

5.4 STATUS Commands

5.4.1 Displaying Channel Status

The **STATUS** command is used to query the status of a particular channel. The following command syntax shows the available parameters.

```
Syntax: STATUS [chn] - display status of the channel (default - current one)
       STATUS D     - status of the current channel with detailed provisioning
        STATUS DP    - with detailed provisioning and a page break
        STATUS S     - status part only, no provisioning
        STATUS HEC|MD|ALC|ANC|AEC|EVI|SDT|SIG - details of specific modules
```

Note The **SDT** command argument is currently supported only on the QVP E400 system.

5.4.1.1 The STATUS Command

The **STATUS** command displays a snapshot of the following:

- A banner that shows the circuit ID, port, shelf, slot, E1 line number, and channel number. The banner also displays the date and time.
- Alarm information for the current E1 line.
- Signaling information and channel status (Table 5-3 on page 82).
- Provisioning information.

To display the data about the current channel, type the command:

```
1-2,1-1>STATUS
```

The QVP responds:

```
* DITECH QVP-E1  *** C H A N N E L   S T A T U S **** 10/05/2007 14:45:13 **
CIRCUIT ID: --- NOT SET ---  PORT: Maint. Shelf 2, Slot 20, E1 1, Channel 1

NO FACILITY ALARMS
Office Alarm Reporting DISABLED for E1 lines:  -  2  3  4
LEDs DISABLED for E1 lines:                    -  2  3  4
SYSTEM IS OPERATIONAL

CHANNEL STATUS : ON HOOK DISABLE

                    Uplink(RCV)      Downlink(SEND)
ALC gain:                0                  0
Steady patterns:        D4                 D4


EC - OUT,[IN]
Uplink(RCV) ALC - OUT,[IN]
Downlink(SEND) ALC - OUT,[IN]
Uplink(RCV) AEC - OUT,[IN]
```

```
Downlink(SEND) AEC - [OUT],IN
Uplink(RCV) ANC - OUT,[IN]
Downlink(SEND) ANC - OUT,[IN]
Uplink(RCV) EVI - [OUT],IN
Downlink(SEND) EVI - [OUT],IN
DTMF TRANSPARENCY - [OUT],IN
TONE DISABLER - [OUT],IN
TFO - [OUT],IN
HSCSD - OUT,[IN]
Uplink(RCV) IDLE CODE DETECTION - OUT,[IN]
Downlink(SEND) IDLE CODE DETECTION - OUT,[IN]
IDLE CODE DIRECTION - [AUTO],BOTH,EITHER
MUSIC DETECTOR - [OUT],IN
TANDEM DETECTION - [OUT],IN
MUSIC SIGNATURE DETECTION - [OUT],UPLINK,DOWNLINK,BOTH
CHANNEL BYPASS - [OUT],IN
CHANNEL LOOPBACK - [OUT],IN
```

To display the status of a channel other than the current one, type the command and the channel number. For example:

```
1-1,1-1>STATUS 12
```

To display the status of the next or previous channel, type **+** (plus) or **–** (minus):

```
1-1,1-1> +
1-1,1-1> -
```

An explanation of channel provisioning parameters is provided in Table 5-2 on page 72. For an explanation of how to change channel provisioning, refer to the **SETUP** command in Section 7.4 on page 100.

5.4.1.2 Status with Signaling Information (STATUS S Command)

The **STATUS S** command displays all the basic status information (with no provisioning) and adds signaling information for the channel and its modules. Signaling information can include the following:

- ALC Gain - Actual gain/loss
- Steady Patterns - Actual patterns detected or "**–**" if no pattern is detected
- TFO State - "SYNC" if TFO link has been found and the IS_DOOR is open on the channel; "TRANS" if the channel is in Tandem-Free Operation mode; or "**–**" if no TFO link is found
- HSCSD State - "DATA" if the channel is bypassed due to the HSCSD pattern or frame, or "–" if there is no reason for this channel to go to bypass
- Tone Disabler displaying "G164" for data mode, or "--" for voice mode
- Video Stream displaying "VL1" for H.223 Level 1 video, "VL2" for H.223 Level 2 video, or "--" for no video

Note If a module is disabled, the display reads "Module Out."

To display the signaling information, type the command:

```
1-2,1-1>STATUS S
```

The QVP responds:

```
* DITECH QVP-E1  *** C H A N N E L   S T A T U S **** 10/05/2007 14:48:58 **
CIRCUIT ID: --- NOT SET ---  PORT: Maint. Shelf 2, Slot 20, E1 1, Channel 1

NO FACILITY ALARMS
Office Alarm Reporting DISABLED for E1 lines:  -  2  3  4
LEDs DISABLED for E1 lines:                    -  2  3  4
SYSTEM IS OPERATIONAL

CHANNEL STATUS : ON HOOK DISABLE

                    Uplink(RCV)        Downlink(SEND)
ALC gain:                0                   0
Steady patterns:        D4                  D4
TFO state:           Module Out          Module Out
HSCSD state:             --                  --
TONE DISABLER:       Module Out
```

5.4.1.3 Status with Provisioning Information (STATUS D Command)

The **STATUS D** command displays the channel status with facility alarms, equipment alarms, and the current parameter settings. **STATUS DP** is an alternate of the command, and provides page breaks.

An example of the **STATUS D** command follows:

```
2-20,1-1>STATUS D

* DITECH QVP-E1  *** C H A N N E L   S T A T U S **** 10/05/2007 14:49:32 **
CIRCUIT ID: --- NOT SET ---  PORT: Maint. Shelf 2, Slot 20, E1 1, Channel 1

NO FACILITY ALARMS
Office Alarm Reporting DISABLED for E1 lines:  -  2  3  4
LEDs DISABLED for E1 lines:                    -  2  3  4
SYSTEM IS OPERATIONAL

CHANNEL STATUS : ON HOOK DISABLE

                    Uplink(RCV)      Downlink(SEND)
ALC gain:                0                  0
Steady patterns:        D4                 D4


EC - OUT,[IN]
 MAXIMUM TAIL LENGTH - 24,32,48,64,96,128,160,[192]
 WORST ERL EXPECTED (dB) - [6],3,0
 RESIDUAL ECHO CONTROL - OUT,NLP ONLY,[WITH NOISE MATCH]
 DATA DISABLE - OUT,G164,[G165]
Uplink(RCV) ALC - OUT,[IN]
  Uplink(RCV) ALC MODE - HLC,ALC,[ALE+ALC],FIXED GAIN,ADAPTIVE
GAIN,LLC,LLC+ALE
  Uplink(RCV) ALC STYLE - [NORMAL],AGGRESSIVE
  Uplink(RCV) ALC TARGET LEVEL(-3 to -24 dBm0) - [-3]
  Uplink(RCV) ALE OFFSET (-7 to 8) - [0]
Downlink(SEND) ALC - OUT,[IN]
  Downlink(SEND) ALC MODE - HLC,ALC,ALE+ALC,[FIXED GAIN],ADAPTIVE
GAIN,LLC,LLC+ALE
  Downlink(SEND) FIXED GAIN (-12 to 12 dB) - [0]
Uplink(RCV) AEC - OUT,[IN]
  Uplink(RCV) BULK DELAY - [FIXED],DYNAMIC
  Uplink(RCV) FIXED BULK DELAY (0-400 ms; multiples of 20) - [180]
  Uplink(RCV) WAEPL (dB) - 15,[18],27,30,33,36,39,42,45
  Uplink(RCV) COMFORT NOISE - [OUT],IN
Downlink(SEND) AEC - [OUT],IN
  Downlink(SEND) BULK DELAY - [FIXED],DYNAMIC
  Downlink(SEND) FIXED BULK DELAY (0-400 ms; multiples of 20) - [180]
  Downlink(SEND) WAEPL (dB) - 15,[18],27,30,33,36,39,42,45
  Downlink(SEND) COMFORT NOISE - [OUT],IN
Uplink(RCV) ANC - OUT,[IN]
  Uplink(RCV) ANC MODE - [FIXED],ADAPTIVE
  Uplink MAX NOISE CANCELLATION (dB) - 21,18,15,[12],9,6
  Uplink(RCV) NOISE FLOOR - OUT,-43,[-49],-55
  Uplink(RCV) VADPP - OUT,[IN]
  Uplink(RCV) Unvoiced Noise Sensitivity - [LOW],HIGH
  Uplink(RCV) Voiced Noise Sensitivity - [LOW],HIGH
```

```
  Uplink(RCV) FRAME LOSS HANDLING - OUT,[STANDARD],HIGH
Downlink(SEND) ANC - OUT,[IN]
  Downlink(SEND) ANC MODE - [FIXED],ADAPTIVE
  Downlink MAX NOISE CANCELLATION (dB) - 21,18,15,[12],9,6
  Downlink(SEND) NOISE FLOOR - OUT,-43,[-49],-55
  Downlink(SEND) VADPP - OUT,[IN]
  Downlink(SEND) Unvoiced Noise Sensitivity - [LOW],HIGH
  Downlink(SEND) Voiced Noise Sensitivity - [LOW],HIGH
  Downlink(SEND) FRAME LOSS HANDLING - OUT,[STANDARD],HIGH
Uplink(RCV) EVI - [OUT],IN
  Uplink(RCV) EVI MODE - FIXED,[ADAPTIVE]
  Uplink(RCV) EVI UV BOOST - [OUT],IN
  Uplink(RCV) EVI CONTRIBUTION - FULL,AGGRESSIVE,[STANDARD],MILD
  Uplink(RCV) EVI LOW BIT RATE - [OUT],IN
  Uplink(RCV) EVI OFFSET (-7 to 8) - [0]
Downlink(SEND) EVI - [OUT],IN
  Downlink(SEND) EVI MODE - FIXED,[ADAPTIVE]
  Downlink(SEND) EVI UV BOOST - OUT,[IN]
  Downlink(SEND) EVI CONTRIBUTION - [FULL],AGGRESSIVE,STANDARD,MILD
  Downlink(SEND) EVI LOW BIT RATE - [OUT],IN
  Downlink(SEND) EVI OFFSET (-7 to 8) - [0]
DTMF TRANSPARENCY - [OUT],IN
TONE DISABLER - [OUT],IN
  Re-enable condition - [LOW ENERGY],END OF CALL
TFO - [OUT],IN
HSCSD - OUT,[IN]
  MAXIMUM AIUR (kbit/sec) - [9.6],14.4,32
  SPEECH-TO-DATA HANGOVER (0-255 ms) - [60]
  DATA-TO-SPEECH HANGOVER (0-255 ms) - [60]
Uplink(RCV) IDLE CODE DETECTION - OUT,[IN]
  Uplink IDLE CODE PATTERN #1 - [54]
  Uplink IDLE CODE PATTERN #2 - [D4]
  Uplink IDLE CODE MASK - [FF]
Downlink(SEND) IDLE CODE DETECTION - OUT,[IN]
  Downlink IDLE CODE PATTERN #1 - [54]
  Downlink IDLE CODE PATTERN #2 - [D4]
  Downlink IDLE CODE MASK - [FF]
IDLE CODE DIRECTION - [AUTO],BOTH,EITHER
MUSIC DETECTOR - [OUT],IN
  MD mode - [DEFAULT],WITH TONE,NO TONE
  MD HANGOVER (0-25500 ms; multiples of 100) - [100]
  MD TIMEOUT (1-255 sec) - [30]
  MD OFFSET TIME (0-1500 ms; multiples of 100) - [100]
  MD NET DEPLOYMENT - [GSM A-INTERFACE],NON-GSM A-INTERFACE
TANDEM DETECTION - [OUT],IN
MUSIC SIGNATURE DETECTION - [OUT],UPLINK,DOWNLINK,BOTH
CHANNEL BYPASS - [OUT],IN
CHANNEL LOOPBACK - [OUT],IN
```

Table 5-2 defines each channel parameter. To provision the channels, see Section 7.4.1 on page 100.

Table 5-2 Channel Provisioning Parameters

Parameter	Definitions and Details
EC (HEC) Out, In, Details	Hybrid Echo Cancellation (HEC) optimizes voice quality in hybrid applications where echo is caused by the conversion point between the 4-wire and 2-wire transmission facilities. The hybrid connects the 4-wire carrier facility to the 2-wire access line in a switched network. The energy transfer across the 4-wire to 2-wire connection is not perfectly coupled and causes a reflection of energy, referred to as echo. Hybrid Echo Cancellation cancels trans-hybrid echo on the Downlink. Settings: Out–EC is disabled. In–EC is enabled. Details–Allows you to set the options shown below.
	Maximum Tail Length: 24, 32, 48, 64, 96, 128, 160, 192ms Tail length refers to the round-trip delay of the Tail circuit: the approximate amount of time it takes a signal from the Receive Out (Rcv Out) port to return, as echo, to the Send In (Transmit In) port.
	Worst ERL Expected: 6, 3, 0dB The QVP cancels hybrid echo on circuits with 0dB Echo Return Loss (ERL), meaning the echo is as strong as the original signal. This “worst case” situation is normally only encountered during testing. The Worst ERL Expected parameter allows the QVP to ignore echoes stronger than what is expected from the hybrid in the circuit. A setting of 6dB is typical, but on circuits with strong echo, the 3dB setting may be required. To cancel the echo, the echo canceller setting should be lower than the actual measured ERL. The 0db setting is usually only used during testing.
	Residual Echo Control: Out, NLP Only, With Noise Match This parameter controls the non-linear processing (NLP) and noise matching circuits. NLP operates after the hybrid echo cancellation algorithm runs to reduce residual echoes to inaudible levels. Noise Match reinserts background or comfort noise during non-linear processing so the circuit does not sound dead. Settings: Out–Disables non-linear processing. NLP Only–Enables non-linear processing (NLP). With Noise Match–Enables non-linear processing and inserts comfort noise during periods of non-linear processing. Noise Match does not interfere with the use of AEC Comfort Noise.
	Data Disable: Out, G.164, G.165 This parameter determines how the QVP detects and responds to disabling tones sent by data modems. The disabling scheme meets G.168 standards. See also the Tone Disabler parameter to disable voice processing. NOTE: Ditech Customer Service offers assistance and instructions for G.168 testing for a QVP system. Contact Ditech Customer Service for information about the recommended G.168 test equipment, how to connect a QVP system to this test equipment, and instructions for performing a G.168 test. Settings: Out–The card does not respond to disabling tones sent by data modems. G.164–The QVP bypasses the channel entirely (disables echo cancellation and Residual Echo Control) when a 2100Hz tone (G.164- or G.165-type) is detected. G.165–The QVP bypasses the channel (disables echo cancellation and Residual Echo Control) when a phase-reversed 2100Hz tone (specified in ITU G.165) is detected. When a standard 2100Hz tone is detected, Residual Echo Control is disabled and echo cancellation remains enabled.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
Level Control Adaptive, Dynamic	This parameter provides a choice between Automatic Level Control (ALC) and Dynamic Level Control (DLC) / Dynamic Noise Compensation (DNC) level controls. Adaptive – Enables ALC features and disables DLC/DNC. Dynamic – Enables DLC/DNC features and disables ALC. ALC is G.169 compliant. DLC, an alternative to ALC, is not intended to be G.169 compliant, as it addresses speech signal and background noise issues differently. **Configuration Rules** Note that ALC and DLC/DNC are mutually exclusive and do not appear together in the command line interface (CLI).
ALC Out, In, Details (Uplink, Downlink)	Automatic Level Control (ALC) adjusts the signal level to approach a provisioned target level. ALC can adjust the signal level according to fixed gains or environmental noise conditions, depending on the provisioned mode. ALC Style can also be set. Settings: Out–ALC is disabled. In–ALC is enabled. Details – Allows you to set the options below.
	ALC Mode: HLC, ALC, ALE+ALC, Fixed Gain, Adaptive Gain, LLC, ALE+LLC. Settings: HLC High Level Compensation (HLC) automatically attenuates high voice levels to a comfortable level. This setting is similar to the ALC setting with a target and no gain permitted. This setting should be used when gain is not required on the circuit, but problems with high talker power need to be addressed. HLC attenuates the voice level by a maximum of 6dB. ALC A target level from -3 to -24dBm0 can be independently selected for each channel and direction. Signals above or below the target level are gradually adjusted until the target level is met or the ALC amplification limit of 15dB is reached. Signals below -30dBm0 are considered either noise or acoustic echo, and are not amplified by ALC. (See ALC Target Level.) ALE + ALC Sets both Adaptive Listener Enhancement (ALE) and Automatic Level Control (ALC). ALE+ALC automatically raises the ALC Target Level in one direction in response to noise measured in the other direction. ALE+ALC adds a maximum combined gain of 15dB, useful when calls are placed to or from noisy environments. (See ALC Target Level.) Fixed Gain Fixed Gain/Loss (FGL) can be used to raise or lower voice levels by a predefined amount. FGL can be set independently for each direction. The fixed gain (or loss) can be set from -12 to +12dB in 1dB increments. Adaptive Gain Adaptive Gain provides the Adaptive Listener Enhancement (ALE) feature. ALE automatically raises the voice volume in one direction in response to noise measured in the other direction. ALE applies a maximum 9dB gain. This feature is useful when calls are placed in noisy environments. Adaptive Gain uses the signal as a reference and does not apply an absolute target.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
ALC (continued)	LLC Low Level Compensation (LLC) automatically amplifies low voice levels to a target level. This setting is similar to the ALC setting but with no attenuation applied. LLC amplifies the voice level by a maximum of 15dB. This setting should be used when there are only low power talker problems to be addressed and high level talker is not an issue. ALE+LLC Sets both Adaptive Listener Enhancement (ALE) and Low Level Compensation (LLC). ALE+LLC adapts the ALC target level in response to noise detected on the listener side. ALE+LLC adds a maximum combined gain of 15dB.
	ALC Style: Normal, Aggressive For all ALC Modes except Fixed Gain and Adaptive Gain, this option sets the increment/decrement step size, and therefore, the effective adaptation speed of the level control.
	ALC Target Level (-3 to -24dBm0) A target level can be independently selected for each channel and direction. The ALC Target Level applies to the following ALC Modes: ALC, HLC, ALE+ALC, and LLC+ALE.
	ALE Offset (-7 to 8) The send ALE Offset and receive ALE Offset parameters are only available when ALE (adaptive gain) is selected (including Adaptive Gain, ALC+ ALE or LLC+ ALE). This setting applies an offset (send and/or receive) to the Noise Level threshold used by ALE. For example, a -7 offset results in ALE triggering at a Noise Level (listener side) lower than the threshold used by ALE without the offset.
DLC Out, In, Details (Uplink, Downlink)	Dynamic Level Control (DLC) detects level imbalances and automatically adjusts volume to bring voice to a comfortable listening level, ensuring low distortion and no clipping of the speech signal. Through a provisioned target level and an intelligent multi-band gain adaptation method, DLC further enhances the speech signal-to-noise ratio (SNR). DLC boosts speech content level and maintains noise level, making speech easy to hear. Settings: Out–DLC is disabled. In–DLC is enabled. Details–Allows you to set the options below. **Configuration Rules** The feature groups DLC/DNC and ALC are mutually exclusive. While ALC is G.169 compliant, DLC is not. To use DLC, set the Level Control to Dynamic (see page 73).
	DLC Mode: Normal, HLC, LLC Receive DLC Mode and Send DLC Mode can be configured for Normal, LLC (Low Level Compensation), or HLC (High Level Compensation), or Fixed. Normal mode amplifies the speech or attenuates the signal as needed. High Level Compensation (HLC) automatically attenuates high voice levels to a comfortable level but does not amplify the speech. Low Level Compensation (LLC) automatically amplifies low voice levels to a target level with no attenuation applied. If Fixed, the DLC Gain is provisioned in dB (see below).
	DLC Level: +3+Nominal, Nominal, or -3+Nominal The default is Nominal. Typically, -15dBm0 is nominal. Nominal is approximately -15dBm0, with variations of +/-2dB, depending on perceptual listening comfort. +3+Nominal adds 3dB to the target level and -3+Nominal subtracts 3dB from the target level.
	DLC Gain: -12, -9, -6, -3, +3, +6, +9, +12 dB A predetermined fixed gain value can be set for DLC Mode.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
DNC Out, In	Dynamic Noise Compensation (DNC) addresses the problem of compensating for the speech signal in a constantly noisy environment. The DNC module tries to provide perceptually equal loudness of sound regardless of environmental conditions. DNC achieves this task by adjusting the level of speech signal according to the level and spectral contents of the ambient noise. Settings: Out–DNC is disabled. In–DNC is enabled. **Configuration Rules** The feature groups DLC/DNC and ALC are mutually exclusive. While ALC is G.169 compliant, DLC is not. To use DNC, set the Level Control to Dynamic see page 73).
AEC Out, In, Details (Uplink, Downlink)	Acoustic Echo Control (AEC) suppresses non-linear, non-stationary echo generated by handsets with poor acoustic isolation. AEC can also provide spectrally matched comfort noise to improve the listener's experience. Settings: Out–AEC is disabled. In–AEC is enabled. Details–Allows you to set the options below.
	Bulk Delay: Fixed, Dynamic Bulk Delay corresponds to the round-trip delay in the part of the circuit that is permanent; for example, a GSM wireless delay of approximately 160ms. If Fixed, Bulk Delay is provisioned in multiples of 20 up to a maximum value of 400ms. If Dynamic, Bulk Delay automatically adapts to the channel conditions, from 0 to 400ms on a per call, per channel basis.
	WAEPL: 15, 18, 27, 30, 33, 36, 39, 42, 45dB Weighted Acoustic Echo Path Loss (WAEPL) sets the maximum strength of acoustic echo to process. Signals at a loss less than this setting are considered double-talk and are not canceled. This value is the echo loss, so lower numerical settings allow the suppression of stronger echo signals.
	Comfort Noise: Out, In Comfort Noise is background noise kept at a low, non-intrusive level that is reinserted into the signal so the circuit does not sound dead. This feature adds comfort noise during periods when acoustic echo is being suppressed.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
ANC Out, In, Details (Uplink, Downlink)	Adaptive Noise Cancellation (ANC) reduces background noise without suppressing voice volume to improve the quality of mobile calls. ANC features high-precision noise reduction algorithms and uses Perceptual Multiband Spectral Processing (PMSP) to reduce background noise. Settings: Out–ANC is disabled. In–ANC is enabled. Details–Allows you to set the options below.
	ANC Mode: Fixed, Adaptive ANC Mode determines the type of target level the ANC module applies to the signal. In Fixed mode, ANC applies a fixed maximum target level of noise cancellation (6 to 21dB) as set in Maximum Noise Cancellation. In Adaptive mode, ANC does not apply a fixed noise cancellation level, but rather applies an adaptive noise cancellation level based on the signal's Signal-to-Noise Ratio (SNR) and the configuration of the Max SNR Level setting.
	Maximum Noise Cancellation: 21, 18, 15, 12, 9, 6dB ANC can effectively reduce noise by up to 21dB to improve the call quality. ANC does not reduce noise by more than the value of this setting. Used with Fixed ANC Mode only. There are parameters for both Send Max Noise Cancellation and Receive Max Noise Cancellation.
	Maximum SNR Level: 18, 24, 30, 36dB This setting defines the maximum Signal-to-Noise Ratio (SNR) to be achieved. Used with Adaptive ANC Mode only.
	Noise Floor: Out, -43, -49, -55dBm0 Noise Floor preserves a minimal amount of noise to avoid the quiet-line problem of listeners mistaking the near-silence for a dropped call. There are parameters for both Send Noise Floor and Receive Noise Floor. ANC Noise Floor does not interfere with the use of AEC Comfort Noise (see page 75) and HEC Residual Echo Control Noise Match (see page 72).
	DTX: Out, In Discontinuous Transmission (DTX) modifies the noise signal level and shape to help a network Voice Activity Detector (VAD) identify it as noise. The network VOCODER sends a DTX identifier and stops transmission until new speech is received.
	VADPP: Out, In Voice Activity Detector Post-Processor (VADPP) improves voice calls when wind and other high-distortion noise interfere with voice quality. VADPP can be enabled or disabled. If VADPP is provisioned to In, two additional parameter options are provided: • Unvoiced Noise Sensitivity – Low, High When set to High, the likelihood of detection of wind noise increases, so that it can be cancelled by ANC. • Voiced Noise Sensitivity – Low, High When set to High, the likelihood of detection of honking noise increases, so that it can be cancelled by ANC. **Note**: The Unvoiced/Voiced Noise Sensitivity options can only be set to High when ANC and VADPP are enabled (In) for both uplink and downlink directions in applicable feature packages.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
ANC (continued)	Frame Loss Handling: Out, Standard, High When enabled, Frame Loss Handling maintains the current estimate of the noise spectrum when frame loss occurs, especially during noisy speech. Frame Loss Handling provides for optimal ANC re-convergence times after recovery from frame loss conditions. With the Out setting, the noise estimation is reset during the frame loss period. With the Standard setting, the noise estimation process is frozen during the frame loss period. Only a percentage of the silence frame contributes to the noise estimation, and the estimate of the percentage of the contribution increases with time. With the High setting, the noise estimation process is frozen during the frame loss period and the noise is not re-estimated.
EVI Out, In, Details (Uplink, Downlink)	Enhanced Voice Intelligibility (EVI) improves the perception of voice quality in noisy environments without distorting or amplifying the signal, emphasizing certain s*peech formants* in a manner that allows the listener to more easily distinguish and understand a voice in loud ambient environments. Out disables EVI, and In enables EVI.
	EVI Mode: Fixed, Adaptive When enabled, EVI acts on the Receive signal, using a voice processing algorithm based on speech formants to improve the voice intelligibility inherent in the signal. Fixed EVI Mode sharpens speech regardless of background noise levels, while Adaptive EVI Mode improves speech intelligibility in relationship to the background noise.
	EVI UV Boost: Out, In EVI Unvoiced (UV) Boost amplifies the unvoiced portions of the speech, making it more intelligible, especially when the input speech (Receive signal) is clean.
	EVI Contribution: Full, Aggressive, Standard, Mild EVI Contribution controls the effect of EVI on the Receive signal using a weighted sum of the original Receive signal and the EVI processed signal. When EVI Contribution is set to Full, EVI processed speech is 100% of the sum. At Aggressive, EVI processed speech is 75% of the sum. At Standard, EVI is 50%, and at Mild, EVI is 25%.
	EVI Low Bit Rate: Out, In To correct the speech distortion caused by low bit codecs, enable the Low Bit Rate parameter in either the Send or Receive direction. The default is In.
	EVI Offset: -7 to 8 The EVI Offset feature is only activated when Adaptive EVI Mode is selected. This setting applies an offset to the Noise Level threshold used to trigger Adaptive EVI Mode. The default is 0.
DTMF Transparency Out, In	Dual-Tone Multi-Frequency (DTMF) Transparency allows the transparent passing of DTMF tones, disabling voice quality enhancement features while a DTMF tone is detected. Settings: Out – Disables detection of DTMF tones. In – DTMF tones are detected and passed through without processing.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
Tone Disabler Out, In, Details	Tone Disabler (TDR) determines whether the QVP disables voice processing in response to disabling tones sent by data modems. If HEC is used, see also the HEC Data Disable parameter to disable echo cancellation. Settings: Out–The QVP does not disable voice processing in response to disabling tones sent by modems. In–The QVP disables voice processing when any 2100Hz tone is detected (G.164 behavior). See options below. Details – Allows you to set the options below.
	Re-Enable Condition: Low Energy, End of Call This parameter determines when voice processing is re-enabled after it has been disabled by tones sent by modems. Settings: Low Energy – Re-enable occurs when the Receive energy level is below –36dBm0 or when signaling indicates that the call terminates. End of Call – Re-enable occurs only when signaling indicates that the call terminates.
Video Detector CSV (H.223 Video) Out, In	When enabled, Circuit Switched Video (CSV) detection allows the QVP to recognize in-band 3G-324M video stream on a per circuit basis using two protocols: Level 1 (Annex A/H.223) protocol for low error-prone wireless channels, and Level 2 (Annex B, C, D/H.223) protocol for moderate or highly error-prone wireless channels. Voice processing and echo cancellation are bypassed while the video stream is being sent. Out disables, and In enables.
TFO Out, In	The Tandem-Free Operation (TFO) feature allows the transparent passing of Inband Signaling (IS) messages between Transcoder/Rate Adapter Units (TRAU) or Base Station Controllers (BSC) in a wireless network. The TFO feature detects the TFO call requests and acknowledgements. When a TFO call is established, voice processing and echo cancellation are bypassed. The QVP tracks the TFO Keep Open Indication pattern, and when the pattern has not been present for 1 second, voice processing and echo cancellation resume. Out disables the detection of bypass requests. In enables the detection of bypass requests.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
HSCSD Out, In, Details	In the GSM A-Interface, High Speed Circuit Switched Data (HSCSD) detection checks the 64Kbps PCM samples for specific data call patterns. The data rate is adapted to 64Kbps through the addition of “1” at the unused bits. As the data rate is usually less than 32Kbps, the 8-bit PCM samples end with “F”. The feature detects both cases and ignores any fixed pattern between the idle code and the data call. When 36 continuous PCM samples contain the pattern, echo cancellation is bypassed. If robbed-bit signaling information is present, use the Ignore Robbed Signaling Bits parameter to allow HSCSD determination to be based on all but the Least Significant Bit (LSB) of the 8-bit idle code. Out – Disables HSCSD detection. In – Enables HSCSD detection. Details – Allows you to set the options below.
	Maximum AIUR: 9.6, 14.4, 32Kbps The Maximum Air Interface User Rate (AIUR) is the maximum user rate between Mobile Termination and the Inter Working Function (IWF). For transparent services, it is the maximum possible AIUR, not including padding. For non-transparent services, it is the maximum possible AIUR.
	Speech-to-Data Hangover: 0 - 255ms The amount of time in milliseconds (0 to 255) that the QVP should wait before entering bypass after detecting a pattern that indicates voice processing is to be bypassed.
	Data-to-Speech Hangover: 0 - 255ms The amount of time in milliseconds (0 to 255) that the QVP should wait before exiting bypass after detecting a pattern that indicates voice processing is required.
Idle Code Patterns None, 54, 55, 54 or D4, 55 or D5, Custom (Uplink, Downlink)	This provision is only available when CCS signaling is selected. This provision sets the bit pattern to be monitored for detection of idle code used in CCS mode to establish if the channel is busy or on-hook. The values are as follows: None, 54, 55, 54 or D4, 55 or D5, Custom If Custom is selected, then the Idle Code Pattern 1, Idle Code Pattern 2, and Idle Code Mask parameters can be provisioned: Uplink Idle Code Pattern #1: 0-FF Downlink Idle Code Pattern #1: 0-FF Uplink Idle Code Pattern #2: 0-FF Downlink Idle Code Pattern #2: 0-FF If only one pattern is to be used, provision this setting the same as Idle Code Pattern #1. Uplink Idle Code Mask: 0-FF Downlink Idle Code Mask: 0-FF Sets the bits to be processed when detecting the idle code. The value is typically set to FF (all bits).

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
Idle Code Direction Auto, Both, Either	This provision is only valid on channels where CCS signaling is selected and the Idle Code Detection is enabled in both directions. It sets the direction to be monitored to detect the idle code and establish whether the channel is busy or on-hook. Auto – Comprises the functionality of Both and Either settings. When set to Auto, the circuit transitions to off-hook only when both Send and Receive channels are not idle, and the circuit transitions to on-hook only when both channels are idle. Both – The channel is declared on-hook when one direction carries a pattern defined by Idle Code Detection and the other direction carries any steady pattern, tone, or idle code. Either – The channel is declared on-hook when either direction carries a pattern defined by Idle Code Detection.
Music Detector Out, In, Details	Music Ringback Detection disables voice quality enhancement software (except HEC and AEC) when music ringback is detected at the beginning of a call. Music Detector is only available if Idle Code Direction is set to Auto or Either. Out – Music Ringback Detection is disabled. In – Music Ringback Detection is enabled. Details – Allows you to set the options below.
	MD Mode: Default, With Tone, No Tone Music Ringback can be played with an overlaid traditional ringback tone or played alone. Depending upon the settings in your system, select from the following options available for MD Mode: With Tone should be selected if the traditional ringback tone is overlaid with music and one clear ringback tone is transmitted before the music starts. Note that if this mode is selected, and the music does not contain a traditional ringback overlaid, the music will not be detected and voice quality enhancement processing begins. No Tone should be selected if no traditional ringback tone is included with the music ringback tone. Default should be selected if the deployment is either unknown or a mix of With Tone and No Tone. The Music Detection module attempts to detect music in either case.
	MD Hangover: 0 - 25500ms If no music ringback is detected for a time greater than the configured Hangover time, then voice quality enhancement processing begins.
	Timeout: 1 - 255 seconds Timeout is used to decide when to trigger voice quality enhancement processing. When the Timeout counter expires, voice quality enhancement processing becomes active, even if music is detected. The Timeout should be configured to the maximum expected duration of the ringback tone. Note that if the presence of music ringback is ruled out, voice processing becomes active, even if the Timeout has not yet expired.
	MD Offset Time: 0 - 1500ms The Offset Time is the minimum time that one direction must remain idle and the other non-idle for determination of the direction in which ringback music is present. Once this condition is satisfied, the Music Detector decides that music is present in the direction that remained in an idle condition longer.
	MD Net Deployment: GSM A-Interface, Non-GSM A-Interface When a GSM A-interface is deployed, the Music Detector does not look for music ringback in either direction once the two directions have transitioned from idle to non-idle within the MD Offset Time. This is because it is assumed that idle/non-idle transition is due to call handoff when music was not detected.

Table 5-2 Channel Provisioning Parameters (Continued)

Parameter	Definitions and Details
Tandem Detection[1] Out, In	When enabled (In), Tandem Detection mode inserts a continuous and inaudible low frequency signature (20Hz tone) in the uplink direction. In the downlink direction, complete Voice Quality Assurance (VQA) processing and HEC are disabled when the signature tone is detected. To receive the benefit of this feature, the Tandem Detection mode should be enabled in both QVP systems comprising the tandem call, and VQA should be present in tandem within the same call.
Music Signature Detection[2] Out, Uplink, Downlink, Both	When enabled with the Downlink setting, Music Signature Detection mode detects music received in the downlink direction that has been modified to include an embedded inaudible low frequency signature (20Hz tone). This causes VQA and HEC processing to be bypassed in the downlink direction, so music is passed with no distortion. VQA processing resumes in the downlink direction as soon as the signature tone disappears. VQA processing in the uplink direction is not affected by the music signature detection. When enabled with the Uplink setting, Music Signature Detection mode detects music received in the uplink direction that has been modified to include an embedded inaudible low frequency signature (20Hz tone). This causes VQA processing to be bypassed in the uplink direction, so music is passed with no distortion. VQA processing resumes in the uplink direction as soon as the signature tone disappears. VQA and HEC processing in the downlink direction are not affected by the music signature detection. When enabled with the Both setting, Music Signature Detection mode detects music received in the downlink or uplink direction that has been modified to include an embedded inaudible low frequency signature (20Hz tone). This causes VQA and HEC processing to be bypassed in the direction where the signature tone is detected, so music is passed with no distortion. VQA processing resumes in that direction as soon as the signature tone disappears.
Channel Bypass Out, In	When a channel is in bypass, no voice processing or echo cancellation occurs. When set to In, channel data pass through unchanged. Out–Enables voice processing and echo cancellation. In–Disables voice processing and echo cancellation.
Channel Loopback Out, In	In loopback mode, the signals are sent back on the side received. Out–Enables voice processing. In–Disables voice processing. **Note**: A loopback condition interrupts service in both directions.
Ignore Robbed Signaling Bits Out, In	This parameter is only valid on channels where CCS signaling is selected. It determines whether to account for possible robbed-bit signaling (CAS) information in the frame when determining idle codes. Out– All 8 bits of data are used when determining idle codes. In– The Least Significant Bit of the 8-bit data is ignored when determining idle codes.

1. Provisioning for Tandem Detection is currently supported only on QVP E400 systems.
2. Provisioning for Music Signature Detection is currently supported only on QVP E400 systems.

5.4.2 Channel Status Conditions

Table 5-3 lists the possible channel status conditions displayed by the **STATUS** command (Section 5.4.1.1 on page 67). In 1-Screen™ mode, the status codes appear on the Chan Status line of the data screens (Section 9.6.1 on page 151).

Table 5-3 Channel Status Conditions

Chan Status in 1-Screen	Description of Condition	Channel Status as Displayed by STATUS Command
**	Channel is in bypass due to of a problem related to the incoming PCM stream (E1 or DSP problem detected).	ERROR BYPASSED or ENGINE OUT OF SYNC
AL	Facility alarm - E1 alarm condition present in the Send or Receive path.	FACILITY ALARM
BD	Digital Milliwatt is generated in both the Receive Out and Sent Out directions.	DMW ROUT AND SOUT
BP	Channel is bypassed (set for clear channel).	BYPASSED
BS	Steady pattern—other than idle code—is detected in both directions.	BOTH DIR STEADY PATTERN DETECTED
DA	Channel data disable feature is set to IN, and a dial-up data call is in progress. In G.164 mode, this occurs for any data calls. In G.165 mode, this appears for G.165 data calls only.	DATA TONE DISABLE
DV	Echo cancellation diverged during call.	DIVERGED
EA	Equipment alarm.	EQUIPMENT ALARM
EL	Enhanced Low Frequency Data - Channel set for G.165 data tone disabler.	ENHANCED LOW FREQUENCY DATA
EN	Voice processing for the channel is active. 1-Screen detects and reports EN status when a steady pattern is detected.	ENABLED
4W	Measured ERL is >42dB and appearing to be a 4-wire termination. No detectable echo.	4-WIRE TAIL CIRCUIT
HH	The HHOLD feature for that channel is set to IN, indicating the H-register is “frozen.” During normal operation, this feature is set to OUT.	H REGISTER FROZEN
HK	Channel is on-hook (idle), and cancellation is inactive.	ON HOOK DISABLED
HSC	HSCSD mode.	BYPASSED - HSCSD
LB	Either Tail or Long Haul side is in Loopback mode.	LOOPBACK
MB	E1 line is in Metallic Bypass.	SYSTEM IN METALLIC BYPASS
MN	System is in Monitor Mode, and system bypass is IN.	SYSTEM BYPASSED - MONITOR MODE
MRB	Music ringback.	MUSIC RINGBACK
RD	Digital Milliwatt is generated in the Receive Out direction.	DMW ROUT
RNG	A tone (ring) is detected while the channel is on-hook. When an idle code defining the channel's on-hook state is replaced by a ring, there is no reason to start voice processing, so the DSP holds the channel in on-hook state without an idle code.	ON HOOK, RING DETECTED

Table 5-3 Channel Status Conditions (Continued)

Chan Status in 1-Screen	Description of Condition	Channel Status as Displayed by STATUS Command
RS	Steady pattern—other than idle code— is detected in the Receive direction.	RCV DIR STEADY PATTERN DETECTED
SB	System Bypass is IN.	SYSTEM BYPASSED
SD	Digital Milliwatt is generated in the Send Out direction.	DMW SOUT
SDT	Low frequency signature (20Hz) tone detected.	TANDEM / MUSIC SIGNATURE DETECTION
SLB	System in Loopback.	SYSTEM IN LOOPBACK
TDB	G.164 Tone disable.	TONE DISABLER BYPASS
TFO	Bypass due to TFO.	BYPASSED - TFO
VL1	Video stream detected: Level 1 (Annex A/H.223) protocol for low error-prone wireless channels.	VIDEO STREAM LEVEL 1
VL2	Video stream detected: Level 2 (Annex B, C, D/H.223) protocol for moderate or highly error-prone wireless channels.	VIDEO STREAM LEVEL 2
XS	Steady pattern—other than idle code—is detected in the transmit direction.	SND DIR STEADY PATTERN DETECTED

5.5 Alarms

5.5.1 Alarm Status

The **AL** command displays the alarm status for a selected line or lines. The **AL** command syntax is as follows:

```
AL <Line #, ALL> | displays alarm status
Line number = 1-4, ALL = all lines
```

To display the alarm status for Line 1, type:

```
4-1,1-1>AL 1
```

If there are alarms, the QVP responds accordingly. For example:

```
E1  1
FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                           UNAV
  RCV  (FROM FAR END TO TAIL):     LOS                           UNAV
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS
```

To display the alarm status for all lines, type:

```
4-1,1-1>AL ALL
```

The QVP responds by listing the alarm information for each line:

```
E1  1
FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                           UNAV
  RCV  (FROM FAR END TO TAIL):     LOS                           UNAV
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS
E1  2
FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                           UNAV
  RCV  (FROM FAR END TO TAIL):     LOS                           UNAV
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS
E1  3
FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                           UNAV
  RCV  (FROM FAR END TO TAIL):     LOS                           UNAV
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS
E1  4
FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                           UNAV
  RCV  (FROM FAR END TO TAIL):     LOS                           UNAV
SYSTEM IS UNAVAILABLE DUE TO FACILITY ALARMS
```

Alarm status is also displayed with the **SYSTEM** and **STATUS** commands.

5.5.2 Alarm Tables

Table 5-4, Table 5-5, and Table 5-6 provide the equipment alarm definitions. Table 5-7 and Table 5-8 provide facility alarm definitions for the QVP. For additional troubleshooting information, also refer to Chapter 10, *Maintenance,* on page 161.

Note When alarms are viewed in NetConsul™, Urgent alarms are reported with a severity of MAJOR and Deferred alarms are reported as MINOR.

Table 5-4 QVP Equipment Alarms — SEVERITY = URGENT

Alarm ID/Alarm String	Severity	Description / Maintenance Action
ADMIN / Admin	Urgent	Administrative bootup failure.
		Login to the card and issue the **VER** command. Refer to the failure analysis information found in Table 5-5.
BOOT / Bootup Failure	Urgent	Bootup failure
		Login to the card and issue the **VER** command. Refer to the failure analysis information found in Table 5-5.
CPLD / CPLD Failure	Urgent	CPLD Failure. CPLD Load failed.
		Major hardware failure. Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
DSP_0 or DSP_1 / DSP 0 Failure or DSP 1 Failure	Urgent	DSP (Digital Signal Processor) failure.
		Major hardware failure. Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
RTC / Real-time Clock Failure	Urgent	Real-Time Clock failure.
		Major hardware failure. Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.

When a bootup failure is reported in an Urgent Equipment alarm, further analysis can be performed by using Table 5-5.

Table 5-5 QVP Bootup Failure Analysis

If VER Command returns the following:	Maintenance Action
FRAMER(S) INITIALIZATION FAILED	Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
UNKNOWN IMPEDANCE READING	Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
UNKNOWN FLASH TYPE	Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
CANNOT GET DSP BUILD INFO	Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
DSP FAILED TO START	Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
SOFTWARE LOAD INCONSISTENT WITH HARDWARE	Unless the software was loaded to the card with a non-public procedure, this must be a hardware problem. Reseat the card. If condition persists, the card should be replaced. Contact Ditech Customer Service.
NOT ENOUGH DSP TO SUPPORT FEATURE PACKAGE (N # DSPs are required; N # DSPs installed)	The Active Feature Package cannot run on this hardware. From the CLI, issue the **FPKG** command to check available Feature Packages. Contact Ditech Customer Service with this information.
FEATURE PACKAGE NOT SUPPORTED	The Active Feature Package is not supported by this software. From the CLI, issue the **FPKG** command to check available Feature Packages. Contact Ditech Customer Service with this information.
FEATURE PACKAGE NOT SET	From the CLI, issue the **FPKG** command to check available Feature Packages. Contact Ditech Customer Service with this information.

Table 5-6 QVP Equipment Alarms — SEVERITY = DEFERRED

Alarm ID / Alarm String	Severity	Maintenance Action
SLB / System Loop Back	Deferred	The QVP card is in loopback mode.
		Check to see whether network maintenance or testing is in process. If maintenance or testing is in process, wait until session is complete. If maintenance or testing is not in process, release the System Loopback condition by using the NetConsul GUI or the command line interface. While logged into the card that caused the alarm, issue the **SYSLB NONE** command.
MPB / Metallic Bypass	Deferred	Card is in Metallic Bypass state.
		Check to see whether network maintenance or testing is in process. If maintenance or testing is in process, wait until session is complete. If maintenance or testing is not in process, release the Metallic Bypass condition by using the NetConsul GUI or the command line interface. While logged into the card that caused the alarm, issue the **METBP OUT** command. The card should return to service.
SBP / System Bypass	Deferred	E1 line is being manually bypassed.
		Check to see whether network maintenance or testing is in process. If maintenance or testing is in process, wait until session is complete. If maintenance or testing is not in process, release the System Bypass condition by using the NetConsul GUI or the command line interface. While logged into the card that caused the alarm, issue the **SETSYS** command and select SYSTEM BYPASS OUT.
BATT_A or BATT_B / Battery A Failure or Battery B Failure	Deferred	Battery A or B failed.
		Check to see whether network maintenance or testing is in process. If maintenance or testing is in process, wait until session is complete. If maintenance or testing is not in process, an on-site check is required. Check for blown fuses. Check to see whether a breaker is set at the power distribution panel and equipment shelf.

Table 5-7 QVP Facility Alarms — SEVERITY = URGENT

Alarm ID / Alarm String	Severity	Description / Maintenance Action
RCV_BER / RCV:BER	Urgent	Excessive Bit Error Rate > 5.0 E-4.
		Check for network outage or transmission issues at BSC side.
RCV_BPV / RCV:BPV	Urgent	Bipolar Violation.
		Check for network outage or transmission issues at BSC side.
RCV_LFA / RCV:LFA	Urgent	Loss of Frame Alignment.
		Check for network outage or transmission issues at BSC side.
RCV_CRC4LA / RCV:CRC4LA	Urgent	Cyclic Redundancy Check 4. Loss of CRC4 multiframe or excessive CRC-4 Error Rate > 915 per second. CRC4LA indicates Local Alarm.
		Check for network outage or transmission issues at BSC side.
RCV_CLOS / RCV:CLOS	Urgent	Loss of Signal.
		Check for network outage or transmission issues at BSC side.
RCV_MFA / RCV:MFA	Urgent	Loss of Multiframe Alignment (CAS signaling only).
		Check for network outage or transmission issues at BSC side.
SND_BER / SND:BERk	Urgent	Excessive Bit Error Rate > 5.0 E-4.
		Check for network outage or transmission issues at MSC side.
SND_BPV / SND:BPV	Urgent	Bipolar Violation.
		Check for network outage or transmission issues at MSC side.
SND_LFA / SND:LFA	Urgent	Loss of Frame Alignment.
		Check for network outage or transmission issues at MSC side.
SND_CRC4LA / SND:CRC4LA	Urgent	Cyclic Redundancy Check 4. Loss of CRC4 multiframe or excessive CRC-4 Error Rate > 915 per second. CRC4LA indicates Local Alarm.
		Check for network outage or transmission issues at MSC side.
SND_CLOS / SND:CLOS	Urgent	Loss of Signal.
		Check for network outage or transmission issues at MSC side.
SND_MFA / SND:MFA	Urgent	Loss of Multiframe Alignment (CAS signaling only).
		Check for network outage or transmission issues at MSC side.

Table 5-8 QVP Facility Alarms — SEVERITY = DEFERRED

Alarm ID / Alarm String	Severity	Description / Maintenance Action
RCV_MFAIIS / RCV:MFAIIS	Deferred	Multiframe Alarm Indication Signal (CAS signaling only). Timeslot 16 AIS.
		Check for network outage or transmission issues at BSC side.
RCV_AIS / RCV:AIS	Deferred	Alarm Indication Signal (AIS).
		Check for network outage or transmission issues at BSC side.
RCV_DMFA / RCV:DMFA	Deferred	Loss of Distant Multiframe Alignment (CAS signaling only). Timeslot 16 AIS.
		Check for network outage or transmission issues at BSC side.
RCV_DA / RCV:DA	Deferred	Distant Alarm. There is a problem with upstream equipment. The DA alarm can be issued along with a DMFA, MRA-AIS, or MFA alarm.
		Check for network outage or transmission issues at BSC side.
SND_MFAIIS / SND:MFAIIS	Deferred	Multiframe Alarm Indication Signal (CAS signaling only). Timeslot 16 AIS.
		Check for network outage or transmission issues at MSC side.
SND_AIS / SND:AIS	Deferred	Alarm Indication Signal (AIS).
		Check for network outage or transmission issues at MSC side.
SND_DMFA / SND:DMFA	Deferred	Loss of Distant Multiframe Alignment (CAS signaling only). Timeslot 16 AIS.
		Check for network outage or transmission issues at MSC side.
SND_DA / SND:DA	Deferred	Distant Alarm. There is a problem with upstream equipment. The DA alarm can be issued along with a DMFA, MRA-AIS, or MFA alarm.
		Check for network outage or transmission issues at MSC side.

5.5.3 Alarm History

The **CLRALH** command clears the alarm history information stored in non-volatile memory. The **DISALH** command displays alarm history information. Facility alarms, as well as other events (for example, engine reloading and system reset) are time-stamped and saved in the non-volatile memory. The information is sorted by date and time, starting with the most recent event.

The **DISALH** and **CLRALH** command syntax is as follows:

```
DISALH | displays the alarm history
CLRALH | clears the alarm history
```

To display the alarm history, type:

```
1-1,4-1>DISALH
```

QVP responds:

```
* DITECH QVP-E1 *** A L A R M   H I S T O R Y *** 01/25/2007 10:53:02 **
RACK: MOUNTAIN VIEW     PORT: Maint. Shelf 1, Slot 1

01/24/2007 15:15:17   Code 28: TL URG ALARM (LOS), E1 4 SET
01/24/2007 15:15:17   Code 27: LH URG ALARM (LOS), E1 4 SET
01/24/2007 15:15:17   Code 28: TL URG ALARM (LOS), E1 3 SET
01/24/2007 15:15:17   Code 27: LH URG ALARM (LOS), E1 3 SET
01/24/2007 15:15:17   Code 28: TL URG ALARM (LOS), E1 2 SET
01/24/2007 15:15:17   Code 27: LH URG ALARM (LOS), E1 2 SET
01/24/2007 15:15:16   Code 42: TL DEF ALARM (DA), E1 1 CLR
01/24/2007 15:15:16   Code 41: LH DEF ALARM (DA), E1 1 CLR
Press Q to quit or any other key to continue
```

Note The alarm history does not include DSP or battery failures.

5.6 1-Screen

The **1SC** (1-Screen™) command provides a real-time overview of the status, steady patterns, and actual gain for all the channels of the selected line. The 1-Screen output is continually updated, and can display either Reflectometry™ data or hybrid echo measurement data. See Section 9.6.1, “1-Screen Channel Provisioning”, on page 151 for details about the **1SC** command.

Note 1-Screen channel provisioning requires an ANSI-compatible terminal.

5.7 Forward and Back

Use the **+** (plus) command to go forward and the **–** (minus) command to go back.

```
+ | displays the next channel’s status
- | displays the previous channel’s status
```

6.1 Overview

The QVP System Setup commands are used to provision the QVP's E1 lines. System setup commands are implemented on a line level.

Commands include:

SELECT	Section 6.2.1
LINE	Section 6.3.1
SETSYS	Section 6.4 on page 92
SETALL	Section 6.5 on page 93
SCOPY	Section 6.6 on page 94
SYSBP	Section 6.7 on page 95
SAVEDFLT	Section 6.8 on page 96
IDLTIMING	Section 6.9 on page 96
HECMETER	Section 6.10 on page 97

Note In the command line interface and 1-Screen™ displays, characters are not case-sensitive.

6.2 SELECT Command

6.2.1 Selecting the Line and Channel

With the prompt at a shelf and slot number, a line number and channel number on the current card can be specified with the **SELECT** command. For details, see Section 7.2.1 on page 99.

6.3 LINE Command

6.3.1 Selecting Only the Line

For the current shelf, card, and channel, the line number alone can be changed.

The **LINE** command syntax is as follows:

```
LINE <line #> | selects an E1 line on the current card
line # = 1 to 4
```

For example, to select line 3, channel 7, type:

```
1-1,4-7>LINE 3
```

The QVP responds with the new line in the following manner:

```
Selected: E1 3, Channel 7
1-1,3-7>
```

6.4 SETSYS Command

6.4.1 Setting System Provisioning

The **SETSYS** command enables provisioning for the current E1 line. Refer to Table 5-2 on page 72 for parameter definitions.

The **SETSYS** Command syntax is as follows:

```
SETSYS | Set parameters of the current E1 line
```

To provision the current E1 line, type:

```
1-2,1-1>SETSYS

* DITECH QVP-E1  ******* SYSTEM PROVISIONING ****** 08/07/2007 12:43:11 **
CIRCUIT ID: Simon  PORT: Maint. Shelf 1, Slot 2, E1 1
                Enter choice; ^C aborts, '-<CR>' backs up

USE DEFAULT SETTINGS - [NO],YES :

IS EXPECTED - NO,[YES] :

SEND AIS BURST ON SIGNAL PATH CHANGE - NO,[YES] :

RETURN DISTANT ALARM ON LOCAL ALARM - [NO],YES :

SYSTEM BYPASS - OUT,[IN] :

CRC4 ENABLE - [OUT],IN :

SIGNALING - CAS,C5,[CCS],Q50(TS16) :

IN SERVICE CHANNELS - [30],31 :

NARROW BAND FILTER - OUT,[IN] :

SYSTEM LOOPBACK - [NONE],TAIL,LONG HAUL :

OK TO USE - NO,[YES] :


Provisioned.


WANT STATUS - [NO],YES :
```

Note The QVP E1 does not support C5 signaling mode.

To move from the System Provisioning screen to the System Status screen, select Yes at the Want Status prompt.

In software version QE-5.04.04 and greater, the Timing Mode parameter has been removed. The QVP's timing mode has been configured for normal synchronization, or through-timing, and cannot be changed. Internal clock recovery provides timing for the Receive direction (Long Haul to Tail) from the Receive In port and for the Send direction (Tail to Long Haul) from the Send In port.

Note Long Haul and Tail timing modes change to normal synchronization when the QVP card software is upgraded from version QE-5.04.03 or lesser to QE-5.04.04 or greater and cut over. These former timing modes cannot be restored by reverting to a previous software version.

6.5 SETALL Command

6.5.1 Restore Provisioning

The **SETALL** system command restores all provisioning for the currently selected voice processor from either the user default profile or the factory default profile. The user default profile is the profile that was previously saved with the **SAVEDFLT** command.

The **SETALL** command syntax is as follows:

```
SETALL [<N>|FACTORY] [NOBF] [ALL] | Restores default provisioning (system
and channels)
<N>      - default profile to use
FACTORY  - use factory profile per custom codes
ALL      - apply to all E1s, otherwise to the current E1
NOBF     - do not overwrite Framing, Is Expected, Bypass, and CRC4 settings
```

To restore the user default provisioning to the current E1, type:

```
5-1,4-5>SETALL
Provisioning E1 2 with User Default settings
Bypass, Is Expected, and Framing settings overwritten
   Are you sure? - Y/[N]:
```

To restore the user default provisioning to all E1s, type:

```
5-1,4-5>SETALL ALL
Provisioning All E1s with User Default settings
Bypass, Is Expected, and Framing settings overwritten
   Are you sure? - Y/[N]:
```

When a specific profile number is provided, the lines are provisioned for that particular factory default profile, and the corresponding custom code is set to profile *N*. For example, to set factory default profile 5 for the current E1, type:

```
5-1,4-5>SETALL 5
Provisioning E1 2 with factory profile 5
Bypass, Is Expected, and Framing settings overwritten
   Are you sure? - Y/[N]:
```

To set factory default profile number 5 for all E1s, type:

```
5-1,4-5>SETALL 5 ALL
Provisioning All E1s with factory profile 5
Bypass, Is Expected, and Framing settings overwritten
   Are you sure? - Y/[N]:
```

If the factory default profile number does not exist or is obsolete, the following message is displayed:

```
5-1,4-5>SETALL 15
Invalid Profile#
```

The **SETALL FACTORY** command restores the default profile per custom codes, which can be different for each E1 line. For details, see Section 4.11.3 on page 61.

The **NOBF** option for the **SETALL** command enables you to run the **SETALL** commands while preserving the bypass and CRC4 settings of the lines and channels.

The **NOBF** option is particularly useful when some channels are being bypassed at a time when there is a need to restore original default provisioning. Using the **SETALL** command would normally require those channels to be placed in bypass mode again. Using the **NOBF** option preserves the existing bypasses. To restore provisioning to all E1s with the **NOBF** option, type:

```
5-1,4-5>SETALL NOBF ALL
Provisioning All E1s with User Default settings
Bypass and Framing settings not overwritten
   Are you sure? - Y/[N]:
```

The **BSETALL** maintenance command restores all provisioning for all QVP E1 lines from either the user default profile or the factory default profile. For details, see Section 10.5 on page 169.

6.6 SCOPY Command

6.6.1 Copying Line Provisioning

The **SCOPY** command copies the provisioning of one E1 line to another E1 line on the same QVP, or to all lines on the same QVP. The **SCOPY** command copies both the line and channel settings.

The **SCOPY** command syntax is as follows:

```
Syntax: SCOPY [NOBF] <source> <target1> [<target2> [<target3>]]
    or: SCOPY [NOBF] <source> ALL
  Copies system and channel provisioning from source E1 (1, 2, 3, or 4)
  to target E1(s) (1, 2, 3, 4, or all three other than source)
NOBF option does not overwrite Framing,
System and Metallic Bypasses and CRC4 settings
```

To copy the provisioning from line 1 to line 4, type:

```
1-2,4-2>SCOPY 1 4
```

In this example, the current line is 4 and the command is to copy from line 1 to the current line, 4.

The QVP responds:

```
Copying from 1 to 4
Done
```

To copy the provisioning from line 1 to all other lines, type:

```
1-2,4-2>SCOPY 1 ALL
```

The QVP responds:

```
Copying from 1 to 2
Copying from 1 to 3
Copying from 1 to 4
Done
```

The **NOBF** option for the **SCOPY** command enables you to run the **SCOPY** commands while preserving the bypass and CRC4 settings of the lines and channels.

For example, to copy the provisioning from line 2 to all other lines while preserving the existing bypasses, type:

```
2-2,1-1>SCOPY NOBF 2 ALL
```

The QVP responds:

```
Copying from 2 to 1
Copying from 2 to 3
Copying from 2 to 4
Done
```


6.7 SYSBP Command

6.7.1 Putting the Line in Bypass Mode

The **SYSBP** (System Bypass) command directly sets the E1 bypass function. When IN is selected, all channels for the currently accessed E1 line are bypassed and no voice processing occurs (Figure 6-1). Calls continue to be processed.

The **SYSBP** command syntax is as follows:

```
SYSBP <IN, OUT> | enables system bypass on the E1 line
IN = enabled, OUT = disabled
```

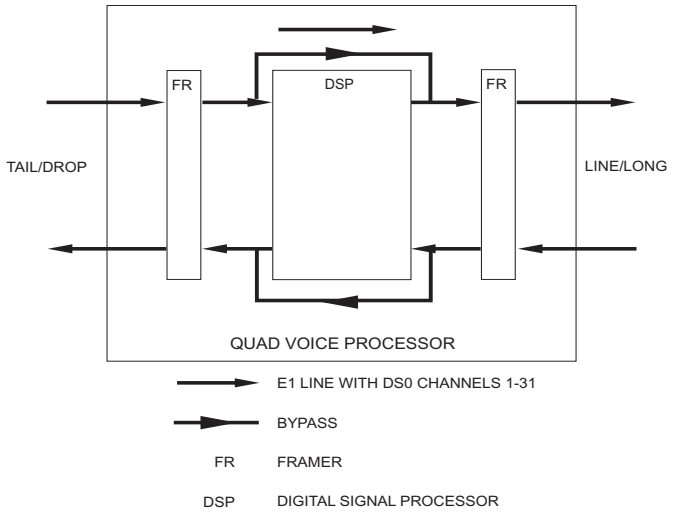


Figure 6-1 System Bypass within the Voice Processor

Note When a QVP line is in system bypass mode, the corresponding **STATUS** LED flashes yellow.

To place the E1 into bypass mode, type:

```
1-2,4-2>SYSBP IN
```

When the line is in system bypass mode, voice processing does not occur, but monitoring continues. This information can be displayed in 1-Screen™ mode. For details, see Section 9.6 on page 151.

6.8 SAVEDFLT Command

6.8.1 Saving Custom Provisioning

The **SAVEDFLT** command saves the current line and channel provisioning as the user default profile. Default profiles prevent the loss of custom changes made while provisioning cards. See the **SETALL** command (Section 6.5 on page 93) for information about restoring provisioning from the user default settings.

The **SAVEDFLT** command syntax is as follows:

```
SAVEDFLT <ALL> | saves the current provisioning as the user default profile
ALL = saves provisioning on all lines and channels
```

To save the provisioning of the current E1 to the user default settings, type:

```
1-8,1-1>SAVEDFLT
```

To save the provisioning of all E1 lines, type:

```
1-8,1-1>SAVEDFLT ALL
```

The system responds with the following information:

```
E1 1 provisioning saved as user default
E1 2 provisioning saved as user default
E1 3 provisioning saved as user default
E1 4 provisioning saved as user default
```

The **BSAVEDFLT** maintenance command saves the custom changes from all lines and channels. For more information, see Section 10.6 on page 170.

6.9 IDLTIMING Command

6.9.1 Set Idle Timing

The **IDLTIMING** command displays and sets the time constants used in idle code detection and call counter incrementation. For call counter purposes, idle timing determines the lower bound of the call duration in order to avoid counting ringback tones as individual calls. Any transition shorter than this interval is not be considered a call.

The **IDLTIMING** command syntax is as follows:

```
IDLTIMING | displays the idle code timing for all E1 lines
IDLTIMING <PST, NPS, CC> | sets the idle code timing for the current E1 line
IDLTIMING <PST, NPS, CC> A | sets the idle code timing for all E1 lines
[A] sets the idle code timing for all E1 lines
PST = 20ms increments up to 5100ms; minimum time to detect idle code
present
NPS = 20ms increments up to 5100ms; minimum time to detect idle code
not present
CC = 20ms increments up to 5100ms; call counter hangover time
```

To view the idle timing settings, type:

```
1-8,1-1>IDLTIMING
```

The QVP responds:

```
E1 1: IDLTIMING  100 180 2560
E1 2: IDLTIMING  100 180 2560
E1 3: IDLTIMING  100 180 2560
E1 4: IDLTIMING  100 180 2560
```

To set the idle timing detection to 200ms for the current E1 line, type:

```
1-8,1-1>IDLTIMING 200 180 2560
```

To set the idle timing detection to 200ms for all E1 lines, type:

```
1-8,1-1>IDLTIMING 200 180 2560 A
```

To configure the idle code detection and patterns, use the **SETUP** command (Section 7.4 on page 100).

6.10 HECMETER Command

The **HECMETER** command enables or disables hybrid echo monitoring functionality. Hybrid echo call statistics are only available if HEC Meter is enabled.

Note The **HECMETER** command is not supported in feature package 10.

The **HECMETER** command and output are as follows:

```
1-2,1-1>HECMETER

HECMETER - OUT,[IN]
Warning: When HECMETER is IN, Downlink ANC is disabled, and
                 Uplink Voiced/Unvoiced Noise Sensitivity
                 are set to LOW (on all DS0s).
         When HECMETER is OUT, Downlink ANC and Voiced/Unvoiced
                 Noise Sensitivity are provisionable
```

HEC Meter cannot be enabled simultaneously with bidirectional Adaptive Noise Cancellation (ANC) when using the following feature packages: 12, 14, 17, 18, 19, 21, 24, 25, 26, 28, 29, 30, 31, 32, 33, and 34.

In these cases, if HEC Meter is enabled (“In”) with the **HECMETER** command, one direction of ANC is then disabled. In addition, the Voice Activity Detector Post-Processor (VADPP) settings for Unvoiced Noise Sensitivity and Voiced Noise Sensitivity are fixed to “Low,” and cannot be provisioned to “High.”

However, if HEC Meter is disabled (“Out”), the bidirectional ANC feature is available for provisioning. When ANC and VADPP are enabled in both uplink and downlink directions, the VADPP Noise Sensitivity settings may be provisioned as either “High” or “Low.”

For details about ANC and VADPP, see Table 5-2 on page 72.

For details about hybrid echo monitoring and voice quality monitoring commands, see Chapter 9, *Monitoring and EXi Capabilities,* on page 111.


Notes

7.1 Overview

The channel setup commands allow access to and provisioning of the currently selected channel. In the command line interface and 1-Screen™ displays, characters are not case-sensitive. Commands include:

7.2 SELECT Command

7.2.1 Select a Line and Channel

After the user logs on to the QVP, the **SELECT** command can be used to select a line and channel. After the command executes, the prompt changes to reflect the newly selected line and channel.

```
SELECT <line #>-<channel #> | selects a line and channel on the card
line # = 1 to 4, channel # = 1 to 31
```

For example, to select line 4, channel 5, type:

```
1-1,2-3>SELECT 4-5
```

The QVP responds with the new selection and prompt:

```
Selected: E1 4, Channel 5
1-1,4-5>
```

The first part of the prompt remains unchanged, indicating the card in shelf 1, slot 1.

7.3 CHAN Command

7.3.1 Select a Channel

The **CHAN** command selects a channel on the currently selected line.

```
CHAN <channel #>| selects a new channel
channel # = 1 to N
```

To select channel 7, type:

```
2-1,4-5>CHAN 7
```

The QVP responds with the new selection and prompt:

```
Selected: E1 4, Channel 7
2-1,4-7>
```

The shelf, slot, and line numbers remain the same.

7.4 SETUP Commands

7.4.1 Channel Provisioning

The **SETUP** command displays the Channel Provisioning screen, where channel provisioning can be changed. The **SETUP** command plus a command argument (other than a channel number) shows the provisioning associated with that particular argument. As an example, for QVP E400 systems, the **SETUP SDT** command prompts for provisioning of both the Tandem Detection and Music Signature Detection parameters. The **SETUP** command with no command argument shows all settings for the current channel.

```
SETUP [HEC|TDR|MD|ALC|ANC|AEC|EVI|SIG|SDT|VQA|chn#]
```

Note The **SDT** command argument is currently supported only on the QVP E400 system.

To provision channel settings, type:

```
5-1,2-1>SETUP 1
```

Several of the parameters have a “Details” option that exposes additional settings to the user. These settings can be displayed by simply entering “D” where applicable.

The following example shows the **SETUP** command for the current channel (if no channel number is typed, the currently-selected channel is used).

Note If a feature does not appear for configuration, use the **VER** command to check the QVP’s supported hardware, software, and active feature package.

```
1-3,1-1>SETUP

* DITECH QVP-E1  ******* CHANNEL PROVISIONING ******* 10/12/2007 11:06:24
**
CIRCUIT ID: Lab 1  PORT: Maint. Shelf 1, Slot 3, E1 1, Channel 1
                Enter choice; ^C aborts, '-<CR>' backs up


Uplink(RCV) ALC - OUT,[IN],DETAILS : D

  Uplink(RCV) ALC MODE - [HLC],ALC,ALE+ALC,FIXED GAIN,ADAPTIVE
```

```
GAIN,LLC,LLC+ALE :

  Uplink(RCV) ALC STYLE - [NORMAL],AGGRESSIVE :

  Uplink(RCV) ALC TARGET LEVEL(-3 to -24 dBm0) - [-15] :

Uplink(RCV) ALC - OUT,[IN],DETAILS :

Downlink(SEND) ALC - OUT,[IN],DETAILS : D

  Downlink(SEND) ALC MODE - HLC,ALC,[ALE+ALC],FIXED GAIN,ADAPTIVE
GAIN,LLC,LLC+ALE :

  Downlink(SEND) ALC STYLE - [NORMAL],AGGRESSIVE :

  Downlink(SEND) ALC TARGET LEVEL(-3 to -24 dBm0) - [-15] :

  Downlink(SEND) ALE OFFSET (-7 to 8) - [0] :

Downlink(SEND) ALC - OUT,[IN],DETAILS :

Uplink(RCV) AEC - OUT,[IN],DETAILS : D

  Uplink(RCV) BULK DELAY - [FIXED],DYNAMIC :

  Uplink(RCV) FIXED BULK DELAY (0-400 ms; multiples of 20) - [180] :

  Uplink(RCV) WAEPL (dB) - 15,[18],27,30,33,36,39,42,45 :

  Uplink(RCV) COMFORT NOISE - [OUT],IN :

Uplink(RCV) AEC - OUT,[IN],DETAILS :

Downlink(SEND) AEC - [OUT],IN,DETAILS : D

  Downlink(SEND) BULK DELAY - [FIXED],DYNAMIC :

  Downlink(SEND) FIXED BULK DELAY (0-400 ms; multiples of 20) - [180] :

  Downlink(SEND) WAEPL (dB) - 15,[18],27,30,33,36,39,42,45 :

  Downlink(SEND) COMFORT NOISE - [OUT],IN :

Downlink(SEND) AEC - [OUT],IN,DETAILS :

Uplink(RCV) ANC - [OUT],IN,DETAILS : D

  Uplink(RCV) ANC MODE - [FIXED],ADAPTIVE :

  Uplink MAX NOISE CANCELLATION (dB) - [21],18,15,12,9,6 :

  Uplink(RCV) NOISE FLOOR - [OUT],-43,-49,-55 :

  Uplink(RCV) VADPP - [OUT],IN :

  Uplink(RCV) FRAME LOSS HANDLING - [OUT],STANDARD,HIGH :
```

```
Uplink(RCV) ANC - [OUT],IN,DETAILS :

Downlink(SEND) ANC - [OUT],IN,DETAILS : D

  Downlink(SEND) ANC MODE - [FIXED],ADAPTIVE :

  Downlink MAX NOISE CANCELLATION (dB) - [21],18,15,12,9,6 :

  Downlink(SEND) NOISE FLOOR - [OUT],-43,-49,-55 :

  Downlink(SEND) VADPP - [OUT],IN :

  Downlink(SEND) FRAME LOSS HANDLING - [OUT],STANDARD,HIGH :

Downlink(SEND) ANC - [OUT],IN,DETAILS :

Uplink(RCV) EVI - [OUT],IN,DETAILS : D

  Uplink(RCV) EVI MODE - [FIXED],ADAPTIVE :

  Uplink(RCV) EVI UV BOOST - [OUT],IN :

  Uplink(RCV) EVI CONTRIBUTION - FULL,AGGRESSIVE,[STANDARD],MILD :

  Uplink(RCV) EVI LOW BIT RATE - [OUT],IN :

Uplink(RCV) EVI - [OUT],IN,DETAILS :

Downlink(SEND) EVI - [OUT],IN,DETAILS : D

  Downlink(SEND) EVI MODE - [FIXED],ADAPTIVE :

  Downlink(SEND) EVI UV BOOST - [OUT],IN :

  Downlink(SEND) EVI CONTRIBUTION - FULL,AGGRESSIVE,[STANDARD],MILD :

  Downlink(SEND) EVI LOW BIT RATE - [OUT],IN :

Downlink(SEND) EVI - [OUT],IN,DETAILS :

DTMF TRANSPARENCY - [OUT],IN :

TONE DISABLER - [OUT],IN,DETAILS : D

  Re-enable condition - [LOW ENERGY],END OF CALL :

TONE DISABLER - [OUT],IN,DETAILS :

TFO - [OUT],IN :

HSCSD - OUT,[IN],DETAILS : D

  MAXIMUM AIUR (kbit/sec) - [9.6],14.4,32 :

  SPEECH-TO-DATA HANGOVER (0-255 ms) - [60] :
```

```
  DATA-TO-SPEECH HANGOVER (0-255 ms) - [60] :

HSCSD - OUT,[IN],DETAILS :

Uplink(RCV) IDLE CODE DETECTION - OUT,[IN],DETAILS : D

  Uplink IDLE CODE PATTERN #1 - [54] :

  Uplink IDLE CODE PATTERN #2 - [55] :

  Uplink IDLE CODE MASK - [FF] :

Uplink(RCV) IDLE CODE DETECTION - OUT,[IN],DETAILS :

Downlink(SEND) IDLE CODE DETECTION - OUT,[IN],DETAILS : D

  Downlink IDLE CODE PATTERN #1 - [54] :

  Downlink IDLE CODE PATTERN #2 - [55] :

  Downlink IDLE CODE MASK - [FF] :

Downlink(SEND) IDLE CODE DETECTION - OUT,[IN],DETAILS :

IDLE CODE DIRECTION - [AUTO],BOTH,EITHER :

MUSIC DETECTOR - [OUT],IN,DETAILS : D

  MD mode - [DEFAULT],WITH TONE,NO TONE :

  MD HANGOVER (0-25500 ms; multiples of 100) - [100] :

  MD TIMEOUT (1-255 sec) - [30] :

  MD OFFSET TIME (0-1500 ms; multiples of 100) - [100] :

  MD NET DEPLOYMENT - [GSM A-INTERFACE],NON-GSM A-INTERFACE :

MUSIC DETECTOR - [OUT],IN,DETAILS :

TANDEM DETECTION - [OUT],IN :

MUSIC SIGNATURE DETECTION - [OUT],UPLINK,DOWNLINK,BOTH :

CHANNEL BYPASS - OUT,[IN] :

CHANNEL LOOPBACK - [OUT],IN :

OK TO USE - NO,[YES] :
```

To configure voice quality enhancement features, use the individual voice quality enhancement options or the **VQA** option.

Note For definitions and details about each channel parameter, see Section 5.4, "STATUS Commands", on page 67.

7.5 SETALL Command

7.5.1 Restore Line and Channel Provisioning

The **SETALL** command restores all provisioning for the currently selected voice processor from either the user default profile or the factory default profile. The user default profile is the profile that was previously saved with the **SAVEDFLT** command.

For details and examples of the **SETALL** command, see Section 6.5 on page 93.

7.6 COPY Command

7.6.1 Copy Channel Provisioning

The **COPY** command copies the provisioning of one channel to one or more other channels on the currently selected E1 line.

The syntax of the **COPY** command is as follows:

```
COPY [NOBF] <n> <m>    - copy provisioning from channel <n> to channel <m>
COPY [NOBF] <n> ALL    - copy provisioning from channel <n> to
                         all channels on this E1
COPY [NOBF] <n> <m>-<k>  - copy from channel <n> to all channels in the
                         range <m> to <k><n>,<m>,<k> - 1-30
NOBF option does not overwrite Channel Bypass settings
```

To copy channel 1 settings to channel 5, type:

```
1-2,4-2>COPY 1 5
E1 4: Channel 1 copied to 5.
```

If all remaining channels are to be copied, type:

```
1-2,4-2>COPY 1 ALL
```

The associated E1 responds by listing each channel-to-channel copy, as follows:

```
E1 4: Channel 1 copied to 2.
E1 4: Channel 1 copied to 3.
...
E1 4: Channel 1 copied to .
```

Consecutive groups of channels can also be copied by using ranges. Use a dash (-) to separate contiguous channels:

```
1-2,4-2>COPY 1 3-7 10 15-19 23
```

In this example, the settings for channel 1 are copied to channels 3 through 7, 10, 15 through 19, and 23. The QVP lists the channels as they are provisioned.

The **NOBF** option for the **COPY** command enables you to run the **COPY** commands while preserving the bypass settings of the channels.

For example, to copy the provisioning from channel 1 to channel 3 while preserving the existing bypasses, type:

```
2-2,1-1>COPY NOBF 1 3
```

The QVP responds:

```
E1 1: Channel 1 copied to 3.
```

7.7 Channel BYPASS Command

7.7.1 Enabling and Disabling Channel Bypass

The **BYPASS** command enables and disables channel bypass.

The syntax of the channel **BYPASS** command is as follows:

```
BYPASS <OUT, IN> | Put current channel in/out of bypass (clear-channel) or
display the bypass status
OUT = disabled, IN = enabled
```

To set the current channel to Bypass In mode, type:

```
1-2,4-2>BYPASS IN
```

The QVP responds:

```
E1 4, CHANNEL 2 :
CHANNEL BYPASS - [OUT], IN
*** changed to ***
CHANNEL BYPASS - OUT, [IN]
```

When set to IN, no voice processing occurs on the selected channel (Figure 7-1). The bypass is implemented in the DSP software. The bypass is a full 64Kbps, which is useful for clear channel applications.

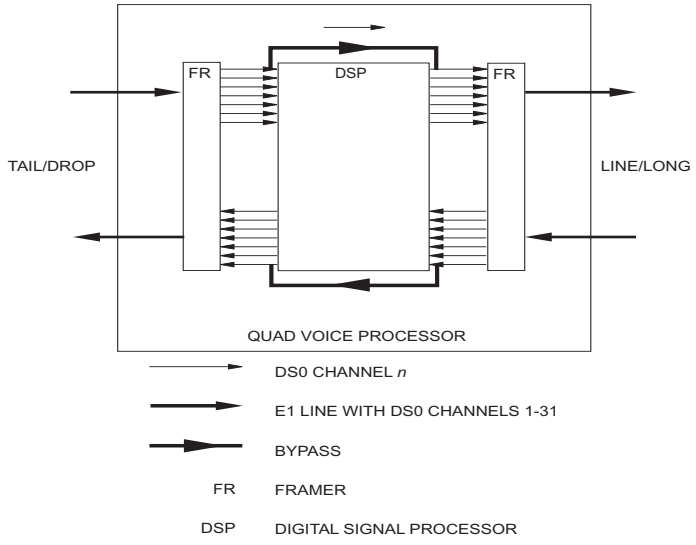


Figure 7-1 Channel Bypass

7.8 Forward and Back

```
++ | displays the next channel's status
-- | displays the previous channel's status
```

Use the **++** (plus) command to go forward to the next channel, and use the **– –**(minus) command to go back to the previous channel.

8.1 Overview

The version control commands update or replace the software on the QVP card. These commands are used to either activate a new software load or reactivate an older software load.

Commands include:

8.2 Software Upgrades

A significant feature of the high density product series is the ease with which QVP software can be upgraded while the voice processors are in service. During this process, new software uploads into the inactive plane, where it is stored. After upload, the software is ready for activation at any time. The QVP then contains two software loads:

- Active load (the currently running software)
- Inactive load (the new software; not in use until a successful cutover)

To upload new software, logon to the QVP and transfer the new software (provided by Ditech) to the card. See Section 8.2.2.

Terminal software, such as ProComm or HyperTerminal, can also be used for the upgrade process. With ProComm, the default protocol must be changed from BINARY to ASCII. With HyperTerminal, there are two options: SEND FILE (binary only) and SEND TEXT FILE (ASCII). Make sure that SEND TEXT FILE is selected in HyperTerminal. Failure to set the correct protocol in these third-party applications (ProComm and HyperTerminal) results in a file transfer failure.

Warning Exercise caution when using the **CUTOVER** and **REVERT** commands, as live traffic may be affected.

In software version QE-5.04.04 and greater, the Timing Mode parameter has been removed. The QVP's timing mode has been configured for normal synchronization, or through-timing, and cannot be changed. Internal clock recovery provides timing for the Receive direction (Long Haul to Tail) from the Receive In port and for the Send direction (Tail to Long Haul) from the Send In port.

Note Long Haul and Tail timing modes change to normal synchronization when the QVP card software is upgraded from version QE-5.04.03 or lesser to QE-5.04.04 or greater and cut over. These former timing modes cannot be restored by reverting to a previous software version.

8.2.1 Software Version

The **VER** command displays hardware and software versions of the selected QVP. The syntax of the **VER** command is as follows:

```
VER | displays the release data for the current software load
```

Also see section 5.2, “VERsion Command,” on page 63 for more information about the **VER** command.

8.2.2 Upgrade to New Software

```
UPLOAD or LOAD | displays software upgrade instructions
```

The commands **UPLOAD** and **LOAD**, with or without the ? (question mark) indicating a request for command information, provide the software upgrade instructions.

```
1-2,2-1>UPLOAD ?
```

The QVP responds:

```
You do not need to type the UPLOAD command.
To upload new software, just send the LOD file provided by DITECH
```

To upgrade to new software, send the LOD file provided by Ditech to the QVP. Once started, the upload is automatically processed. At the recommended speed of 9600baud, a typical upload takes approximately 20 minutes.

When the file transfer is complete, the result is reported on the screen. The following is an example of a message indicating a successful upload:

```
SUCCESS: 959 pages 7672 records are written to plane 0
```

The number of pages and records indicated varies with the software version. The plane number alternates between 0 and 1, depending on which is currently inactive.

If an error is detected, the QVP aborts the upload, the yellow LEDs stop counting, and an error message displays. The following is an example of a failed upload message:

```
LOAD FAILED, Code 54, Load Timeout, Page 0, Record 0
```

Note In most cases, an aborted upload is the result of a communications error on the serial line. Try the upload again. If the problem persists, contact Ditech Customer Service at support@ditechnetworks.com or 1-800-770-0117.

8.2.3 Cutover to New Software

When a new version of software has been loaded, the card continues to run the old software version until a **CUTOVER** command is issued. If the **CUTOVER** command is successful, the QVP validates the new load and activates the software.

Cutover occurs only on cards that have previously undergone an upload or revert process. The process checks the version timestamp in the active and inactive planes before proceeding. The syntax for the **CUTOVER** command is as follows:

```
CUTOVER | initiates the new software as the active plane
```

The CUTOVER command and the response are displayed below:

```
1-2,1-4>CUTOVER

Cutover from  QE-5.05.04 12Jul2006 to  QE-5.06.02 12Dec2006
   Are you sure? - Y/[N]: Y
 Executing.  The card will be reset.
 Please wait about 30 seconds, then login again
```

The QVP verifies that the load in the inactive plane is valid and available, and requests confirmation of the version number and date.

Type **Y** to start the process (typing any other key aborts the command). Cutover occurs in approximately 30 seconds (the same time as a card reset). During this time the four E1 lines are held in metallic bypass. Diagnostics are in place to prevent a faulty load from being activated. After cutover, log on again.

8.2.4 Revert to Previous Software

The **REVERT** command reverses a previous **CUTOVER** command, returning the QVP to the previous software version. Only cards that have gone through the cutover process can revert. The syntax of the **REVERT** command is as follows:

```
REVERT | reactivates the older software load and makes it the active plane
```

To initiate the **REVERT** command, type the following:

```
1-2,1-4>REVERT
```

The QVP verifies that the load on the inactive plane is valid and ready, and then asks for confirmation:

```
Revert from  QE-5.06.02 12Dec2006 to  QE-5.05.04 12Jul2006
   Are you sure? - Y/[N]: Y
 Executing.  The card will be reset.
 Please wait about 30 seconds, then login again
```

Type **Y** to start the revert process (typing any other key aborts the command). The revert occurs in approximately 30 seconds (the same time as a card reset). During this time the four E1 lines are held in metallic bypass. After the revert, log on again.

Note If the upgrade and bootup are unsuccessful, contact Ditech Customer Service at support@ditechnetworks.com or 1-800-770-0117.


Notes

9.1 Overview

This chapter discusses Ditech's Experience Intelligence™ (EXi) monitoring statistics commands. Three types of monitoring commands are available, as shown in Table 9-1.

Table 9-1 Monitoring Command Types

Command Type	Command	For Further Information
EXi monitoring commands – commands that display voice quality call statistics.	**SETCS**	Section 9.3.1 on page 115
	STATCS	Section 9.3.2 on page 123
	ALLCS	Section 9.3.3 on page 124
	DISCS	Section 9.3.5 on page 125
	CLRCS	Section 9.3.4 on page 124
Facility Statistics Commands – commands that record and display line data.	**PM**	Section 9.4.1 on page 148
	CLRPM	Section 9.5 on page 150
Channel Statistics Commands – commands that record and display channel data.	**1SC**	Section 9.6 on page 151

9.2 Voice Quality Statistics

9.2.1 Statistics Overview

EXi voice quality statistics provide the monitoring and reporting capabilities for the following:

- Hybrid Echo Tail Delay
- Acoustic Echo Tail Delay
- Echo Path Loss (EPL)
- Enhanced Echo Path Loss (EEPL)
- Weighted Acoustic Echo Path Loss (WAEPL)
- Echo Objection Rate (EOR) per ITU-T G.131
- Signal-to-Noise Ratio (SNR)
- Speech and noise levels
- Transmission rating (R-factor) and Mean Opinion Score (MOS) measurements
- Call activity counters that reflect contributions from VQA™ technology

EXi technology measures noise, echo, and audio level impairments and then calculates their effect on call quality and speech performance. EXi technology complements and extends hybrid and acoustic echo monitoring and reporting by including additional capabilities for EOR, speech levels, noise levels, SNR, R-factor measurements, and MOS measurements.

Note R-factor and MOS statistics are not available in feature packages 12, 14, 18, 19, 24, and 26. In addition, NetConsul™ EXi Collector and EXi Reporter are not supported for these feature packages.

9.2.2 Voice Quality Statistics for Hybrid and Acoustic Echo

Call statistics functionality monitors for hybrid echo and displays measurements for Hybrid Echo Cancellation (HEC) on the Tail side from 0ms to a configured Tail range setting. Statistics are also monitored and displayed for acoustic echo on the Tail and Long Haul sides from 0ms to 400ms.

Echo Advisor functionality monitors for uncancelled hybrid echo. On the Tail side, echo can be monitored from the configured tail setting up to 400ms. On the Long Haul side, echo can be monitored from 0ms to 400ms. All circuits are sampled with the need to pre-configured the sampled circuits.

Note Hybrid echo statistics and Echo Advisor statistics are not supported in feature package 10.

Statistics are collected in 24-hour bins (current) and moved to historical 24-hour statistic bins (history) at midnight. Reports are stored for seven days.

If the system date is changed, the next report generation time is set for the following midnight, and all the collection bins cleared. The data in the next report will show the message “The data collection period was shorter than 24 hours.”

The maximum number of calls counted for the voice quality statistics is 65535. Once the number of OFF HOOKS exceeds 65535, calls are discarded.

HEC Meter must be enabled for hybrid echo statistics to be collected (see Section 9.2.2.1).

9.2.2.1 HECMETER Command

HEC Meter must be enabled in order for hybrid echo statistics to be gathered. Refer to Section 6.10 on page 97 for information about the **HECMETER** command.

Note The **HECMETER** command is not supported in feature package 10.

HEC Meter cannot be enabled simultaneously with bidirectional Adaptive Noise Cancellation (ANC) when using the following feature packages: 12, 14, 17, 18, 19, 21, 24, 25, 26, 28, 29, 30, 31, 32, 33, and 34.

In these cases, if HEC Meter is enabled (“In”) with the **HECMETER** command, one direction of ANC is then disabled. In addition, the Voice Activity Detector Post-Processor (VADPP) settings for Unvoiced Noise Sensitivity and Voiced Noise Sensitivity are fixed to “Low,” and cannot be provisioned to “High.”

However, if HEC Meter is disabled (“Out”), the bidirectional ANC feature is available for provisioning. When ANC and VADPP are enabled in both uplink and downlink directions, the VADPP Noise Sensitivity settings may be provisioned as either “High” or “Low.”

For details about ANC and VADPP, see Table 5-2 on page 72. For details about supported feature packages, see Section 4.9.8 on page 50.

9.2.3 Hybrid and Acoustic Echo Tail Delay

Tail delay is the sum of propagation, switching, and other delays incurred when a signal is propagated through a Tail or Long Haul circuit. Tail delay is an important voice quality statistic because extended Tail delays usually increase the user's perception of echo.

The round-trip delay is measured in milliseconds, to the farthest reflection point (hybrid for hybrid echo and handset/headset for acoustic echo). The commands that provide Tail delay information include the following:

- **DISCS –** Section 9.3.5 on page 125
- **1SC –** Section 9.6 on page 151

9.2.4 Echo Path Loss (EPL) and Enhanced Echo Path Loss (EEPL)

Figure 9-1 illustrates hybrid Echo Path Loss (EPL) and Figure 9-2 illustrates Enhanced Echo Path Loss (EEPL) call statistics measurements. EPL and EEPL call statistics measurements involve hybrid echo and Hybrid Echo Cancellation (HEC). EPL and EEPL are defined as follows:

- EPL — Measures the difference in dB between the signal level at Send In (Sin) and the original echo signal level at Receive Out (Rout). This is a relative measurement of echo strength in comparison to the original speech. This measurement captures the hybrid echo that may occur between these two points.
- EEPL — Measures the difference in dB between the signal level at Send Out (Sout) and the original echo signal level at Receive Out (Rout). EEPL measures echo at Send Out (Sout) *after voice quality enhancement processing* (including hybrid echo cancellation) has been applied. Used in comparison with EPL, the EEPL measurement captures how the QVP corrects for hybrid echo between these two points.

The commands that provide EPL and EEPL information include the following:

- **DISCS –** Section 9.3.5 on page 125
- **1SC –** Section 9.6 on page 151

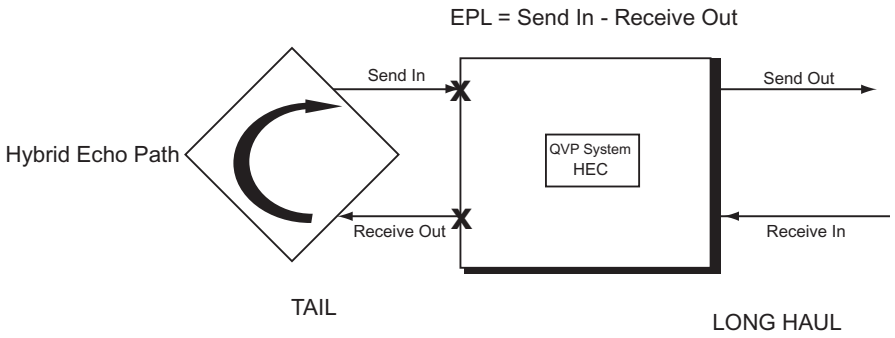


Figure 9-1 EPL Schematic

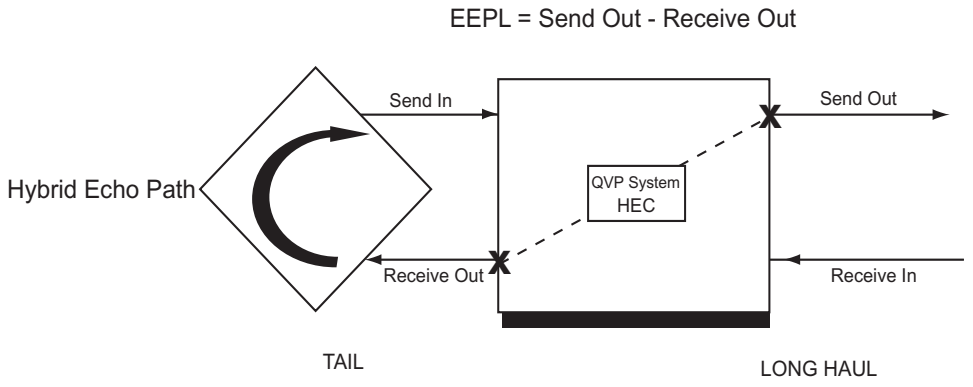


Figure 9-2 EEPL Schematic

9.2.5 Weighted Acoustic Echo Path Loss

Weighted Acoustic Echo Path Loss (WAEPL) Tail and Long Haul call statistics measurements involve acoustic echo and Acoustic Echo Control (AEC) (see AEC on page 75). WAEPL measurements for the Tail and Long Haul sides are defined as follows:

- WAEPL Tail — Measures the difference in dB between the signal level at Send In (Sin) and the original echo signal level at Receive Out (Rout). This is a relative measurement of acoustic echo strength in comparison to the original speech. This measurement captures the acoustic echo that may occur between these two points.
- WAEPL Long Haul — Measures the difference in dB between the signal level at Receive In (Rin) and the original echo signal level at Send Out (Sout). This is a relative measurement of acoustic echo strength in comparison to the original speech. This measurement captures the acoustic echo that may occur between these two points.

The commands that provide WAEPL information include the following:

- **DISCS AEC –** Section 9.3.7 on page 131

Figure 9-3 illustrates the WAEPL Tail and Long Haul call statistics measurements:

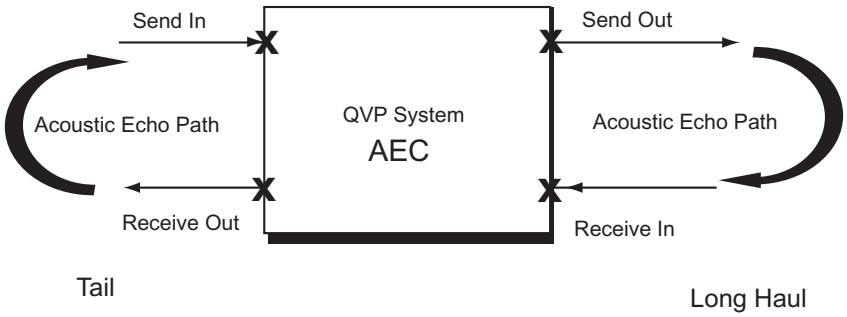


Figure 9-3 WAEPL Tail and WAEPL Long Haul Schematic

9.3 EXi Commands

The following commands permit the user to provision, display, or clear call statistics data:

- **SETCS** – Section 9.3.1 on page 115
- **STATCS** – Section 9.3.2 on page 123
- **ALLCS** – Section 9.3.3 on page 124
- **CLRCS** – Section 9.3.4 on page 124
- **DISCS** – Section 9.3.5 on page 125

9.3.1 SETCS Command

The **SETCS** command provisions the call statistics options for the QVP. The **SETCS** command syntax is as follows:

```
SETCS [CODEC|FER|DLY|HEC|AEC|ECAD|SPEECH|NOISE|SNR|DUR|EOR|IEBPL|DEFAULTS]
```

Note Hybrid echo statistics and Echo Advisor statistics are not supported in feature package 10. Therefore, the **HEC** and **ECAD** options cannot be provisioned if feature package 10 is currently active.

Note Changing the **SETCS** parameters may result in clearing statistics for the current day.

The **SETCS** command can be issued with any of the arguments listed above as a shortcut to set only the details relating to the argument. The **DEFAULTS** argument restores all values back to factory defaults. A prompt appears for confirmation before the default values are set.

The **SETCS** command with no arguments is displayed in the following example.

```
Uplink CODEC TYPE - [G.711],GSM-FR,GSM-HR,GSM-EFR,AMR-12.2 ,AMR-10.2,
AMR-7.95,AMR-7.4,AMR-6.7,AMR-5.9,AMR-5.15,AMR-4.75,EVRC,CUST-1,CUST-2 :

Downlink CODEC TYPE - [G.711],GSM-FR,GSM-HR,GSM-EFR,AMR-12.2 ,AMR-10.2,
AMR-7.95,AMR-7.4,AMR-6.7,AMR-5.9,AMR-5.15,AMR-4.75,EVRC,CUST-1,CUST-2 :

Uplink Delay (10-500; default 100 ms) - [100] :

Downlink Delay (10-500; default 100 ms) - [100] :

Uplink FER (%) - [0],0.5,1,1.5,2,2.5,3,3.5,4,4.5,5,5.5,6,6.5,7,7.5 :

Downlink FER (%) - [0],0.5,1,1.5,2,2.5,3,3.5,4,4.5,5,5.5,6,6.5,7,7.5 :

AEC DELAY RANGE-1 (40-40; default 40 ms) - [40] :

AEC DELAY RANGE-2 (60-320; default 140 ms) - [140] :

AEC DELAY RANGE-3 (80-340; default 180 ms) - [180] :

AEC DELAY RANGE-4 (100-360; default 240 ms) - [240] :

AEC DELAY RANGE-5 (120-380; default 360 ms) - [360] :
```

```
SPEECH LVL RANGE-1 (-1 to -38; default -10 dBm) - [-10] :

SPEECH LVL RANGE-2 (-2 to -39; default -20 dBm) - [-20] :

SPEECH LVL RANGE-3 (-3 to -40; default -30 dBm) - [-30] :

NOISE LVL RANGE-1 (-1 to -43; default -20 dBm) - [-20] :

NOISE LVL RANGE-2 (-2 to -44; default -30 dBm) - [-30] :

NOISE LVL RANGE-3 (-3 to -45; default -40 dBm) - [-40] :

SNR RANGE-1 (1-38; default 10 dB) - [10] :

SNR RANGE-2 (2-39; default 20 dB) - [20] :

SNR RANGE-3 (3-40; default 30 dB) - [30] :

CALL DURATION RANGE-1 (5-60; default 6 sec) - [20] :

CALL DURATION RANGE-2 (10-300; default 60 sec) - [60] :

CALL DURATION RANGE-3 (1-60; default 5 min) - [5] :

CALL DURATION RANGE-4 (2-120; default 30 min) - [30] :

EOR OFFSET (0-120; default 5 ms) - [5] :

EOR1 OFFSET (0-500; default 25 ms) - [25] :

EOR2 OFFSET (0-500; default 105 ms) - [105] :

IE FACTOR FOR CUST-1 (0-50; default 0 ) - [0] :

BPL FACTOR FOR CUST-1 (10-50; default 10 ) - [10] :

IE FACTOR FOR CUST-2 (0-50; default 0 ) - [0] :

BPL FACTOR FOR CUST-2 (10-50; default 10 ) - [10] :

OK TO USE - NO,[YES] :
```

Table 9-2 briefly describes all the arguments for the **SETCS** command. Support for each argument depends on the currently-active feature package.

Table 9-2 SETCS Command Arguments

Command Argument	Description
UL and DL CODEC TYPE	Defines the uplink codec type and downlink codec type for EXi . These parameters are used for computation of R-factors and MOS (see Section 9.3.16 on page 143 and Section 9.3.15 on page 141). Possible values are G.711, GSM-FR,GSM-HR,GSM-EFR,AMR-12.2,AMR-10.2,AMR-7.95,AMR-7.4,AMR-6.7,AMR-5.9,AMR-5.15,AMR-4.75,EVRC,CUST-1,CUST-2 :. The default value is G.711. Other codec types should only be provisioned if they are used within the network. When the codec type setting is changed, MOS and R-Factor statistics are cleared in both uplink and downlink directions for the current day.
UL and DL NETWORK DELAY	Defines the uplink network delay and the downlink network delay. These parameters are used for computation of R-factors and MOS (see Section 9.3.16 on page 143 and Section 9.3.15 on page 141). Select a delay from 10 to 500 ms for the network delay in the uplink and downlink directions. The default value is 100 ms. Any other value should only be provisioned if the extent of the network delay is reflected within the network. When the network delay setting is changed, MOS and R-Factor statistics are cleared in both uplink and downlink directions for the current day.
UL and DL FER	Defines the uplink Frame Erasure Rate and the downlink Frame Erasure Rate. FER is the ratio of erased frames to the total number of frames transmitted. These parameters are used for computation of R-factors and MOS (see Section 9.3.16 on page 143 and Section 9.3.15 on page 141). Possible values are from 0 to 7.5, in .5 increments. When the FER setting is changed, MOS and R-Factor statistics are cleared in both uplink and downlink directions for the current day.
HEC DELAY RANGE-1	Sets the first range for the hybrid echo cancellation delay distribution in the **DISCS HEC** command output (see Section 9.3.6 on page 129). Possible values are from 10 to 300 ms. Default setting is 64 ms. When the HEC delay range setting is changed, the HEC delay counters are cleared in both uplink and downlink directions for the current day.
HEC DELAY RANGE-2	Defines the second range for the hybrid echo cancellation delay distribution in the **DISCS HEC** command output (see Section 9.3.6 on page 129). Possible values are from 20 to 320 ms. Default setting is 128 ms. When the HEC delay range setting is changed, the HEC delay counters are cleared in both uplink and downlink directions for the current day.
HEC DELAY RANGE-3	Defines the third range for the hybrid echo cancellation delay distribution in the **DISCS HEC** command output (see Section 9.3.6 on page 129). Possible values are from 30 to 340 ms. Default setting is 192 ms. When the HEC delay range setting is changed, the HEC delay counters are cleared in both uplink and downlink directions for the current day.

Table 9-2 SETCS Command Arguments (Continued)

Command Argument	Description
HEC DELAY RANGE-4	Defines the fourth range for the hybrid echo cancellation delay distribution in the **DISCS HEC** command output (see Section 9.3.6 on page 129). Possible values are from 40 to 360 ms. Default setting is 256 ms. When the HEC delay range setting is changed, the HEC delay counters are cleared in both uplink and downlink directions for the current day.
HEC DELAY RANGE-5	Defines the fifth range for the hybrid echo cancellation delay distribution in the **DISCS HEC** command output (see Section 9.3.6 on page 129). Possible values are from 50 to 380 ms. Default setting is 320 ms. When the HEC delay range setting is changed, the HEC delay counters are cleared in both uplink and downlink directions for the current day.
HEC EPL/EEPL RANGE-1	Defines the first range for the Echo Path Loss (EPL) and Enhanced Echo Path Loss (EEPL) distribution in the **DISCS HEC EPL** command output (see Section 9.3.6 on page 129). Possible values are from 4 to 20 dB. Default setting is 10 dB. When the HEC EPL/EEPL range setting is changed, the HEC EPL/EEPL counters are cleared in both uplink and downlink directions for the current day.
HEC EPL/EEPL RANGE-2	Defines the second range for the Echo Path Loss (EPL) and Enhanced Echo Path Loss (EEPL) distribution in the **DISCS HEC EPL** command output (see Section 9.2.4 on page 113). Call samples between the HEC EPL/EEPL Range-1 value and this HEC EPL/EEPL range value are displayed. Possible values are from 6 to 30 dB. Default setting is 18 dB. When the HEC EPL/EEPL range setting is changed, the HEC EPL/EEPL counters are cleared in both uplink and downlink directions for the current day.
AEC DELAY RANGE-1	Defines the first range for the acoustic echo control delay distribution in the **DISCS AEC** command output (see Section 9.3.7 on page 131). This setting is fixed at 40 ms. When the AEC delay range setting is changed, the AEC statistics are cleared in both uplink and downlink directions for the current day.
AEC DELAY RANGE-2	Defines the second range for the acoustic echo control delay distribution in the **DISCS AEC** command output. Ranges are in 20ms increments (see Section 9.3.7 on page 131). Possible values are from 60 to 320 ms. Default setting is 140 ms. When the AEC delay range setting is changed, the AEC statistics are cleared in both uplink and downlink directions for the current day.
AEC DELAY RANGE-3	Defines the third range for the acoustic echo control delay distribution in the **DISCS AEC** command output. Ranges are in 20ms increments (see Section 9.3.7 on page 131). Possible values are from 80 to 340 ms. Default setting is 180 ms. When the AEC delay range setting is changed, the AEC statistics are cleared in both uplink and downlink directions for the current day.
AEC DELAY RANGE-4	Defines the fourth range for the acoustic echo control delay distribution in the **DISCS AEC** command output. Ranges are in 20ms increments (see Section 9.3.7 on page 131). Possible values are from 100 to 360 ms. Default setting is 240 ms. When the AEC delay range setting is changed, the AEC statistics are cleared in both uplink and downlink directions for the current day.

Table 9-2 SETCS Command Arguments (Continued)

Command Argument	Description
AEC DELAY RANGE-5	Defines the fifth range for the acoustic echo control delay distribution in the **DISCS AEC** command output. Ranges are in 20ms increments (see Section 9.3.7 on page 131). Possible values are from 120 to 380 ms. Default setting is 360 ms. When the AEC delay range setting is changed, the AEC statistics are cleared in both uplink and downlink directions for the current day.
ECHO ADVISOR (ECAD) TL DELAY RANGE-1	Defines the Echo Advisor first range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Tail side (Section 9.3.17 on page 146). Default setting is 192 ms. When the ECAD Tail delay range setting is changed, the Echo Advisor Tail counters are cleared for the current day.
ECHO ADVISOR (ECAD) TL DELAY RANGE-2	Defines the Echo Advisor second range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Tail side (see Section 9.3.17 on page 146). Default setting is 256 ms. When the ECAD Tail delay range setting is changed, the Echo Advisor Tail counters are cleared for the current day.
ECHO ADVISOR (ECAD) TL DELAY RANGE-3	Defines the Echo Advisor third range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Tail side (see Section 9.3.17 on page 146). Default setting is 320 ms. When the ECAD Tail delay range setting is changed, the Echo Advisor Tail counters are cleared for the current day.
ECHO ADVISOR (ECAD) TL DELAY RANGE-4	Defines the Echo Advisor fourth range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Tail side (see Section 9.3.17 on page 146). Default setting is 380 ms. When the ECAD Tail delay range setting is changed, the Echo Advisor Tail counters are cleared for the current day.
ECHO ADVISOR (ECAD) LH DELAY RANGE-1	Defines the Echo Advisor first range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Long Haul side (see Section 9.3.17 on page 146). Default setting is 64 ms. When the ECAD Long Haul delay range setting is changed, the Echo Advisor Long Haul counters are cleared for the current day.
ECHO ADVISOR (ECAD) LH DELAY RANGE-2	Defines the Echo Advisor second range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Long Haul side (see Section 9.3.17 on page 146). Default setting is 192 ms. When the ECAD Long Haul delay range setting is changed, the Echo Advisor Long Haul counters are cleared for the current day.
ECHO ADVISOR (ECAD) LH DELAY RANGE-3	Defines the Echo Advisor third range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Long Haul side (see Section 9.3.17 on page 146). Default setting is 256 ms. When the ECAD Long Haul delay range setting is changed, the Echo Advisor Long Haul counters are cleared for the current day.

Table 9-2 SETCS Command Arguments (Continued)

Command Argument	Description
ECHO ADVISOR (ECAD) LH DELAY RANGE-4	Defines the Echo Advisor fourth range for the Echo Advisor delay distribution in the **DISCS ECAD** command output for the Long Haul side (see Section 9.3.17 on page 146). Default setting is 320 ms. When the ECAD Long Haul delay range setting is changed, the Echo Advisor Long Haul counters are cleared for the current day.
SPEECH LVL RANGE-1	Defines the first range for the speech level distribution in the **DISCS SPEECH** command output (see Section 9.3.10 on page 136). Possible values are from -38 to -1. Default is -10 dBm. When the speech level range setting is changed, the speech counters are cleared in both uplink and downlink directions for the current day.
SPEECH LVL RANGE-2	Defines the second range for the speech level distribution in the **DISCS SPEECH** command output (see Section 9.3.10 on page 136). Possible values are from -39 to -2. Default is -20 dBm. When the speech level range setting is changed, the speech counters are cleared in both uplink and downlink directions for the current day.
SPEECH LVL RANGE-3	Defines the third range for the speech level distribution in the **DISCS SPEECH** command output (see Section 9.3.10 on page 136). Possible values are from -40 to -3. Default is -30 dBm. When the speech level range setting is changed, the speech counters are cleared in both uplink and downlink directions for the current day.
NOISE LVL RANGE-1	Defines the first range for the noise level distribution in the **DISCS NOISE** command output (see Section 9.3.11 on page 137). Possible values are -43 to -1. Default is -20 dBm. When the noise level range setting is changed, the noise counters are cleared in both uplink and downlink directions for the current day.
NOISE LVL RANGE-2	Defines the second range for the noise level distribution in the **DISCS NOISE** command output (see Section 9.3.11 on page 137). Possible values are -44 to -2. Default is -30 dBm. When the noise level range setting is changed, the noise counters are cleared in both uplink and downlink directions for the current day.
NOISE LVL RANGE-3	Defines the third range for the noise level distribution in the **DISCS NOISE** command output (see Section 9.3.11 on page 137). Possible values are -45 to -3. Default is -40 dBm. When the noise level range setting is changed, the noise counters are cleared in both uplink and downlink directions for the current day.
SNR RANGE-1	Defines the first range for the signal-to-noise ratio distribution in the **DISCS SNR** command output (see Section 9.3.9 on page 134). Possible values are from 1 to 38. Default is 10 dB. When the SNR range setting is changed, the SNR counters are cleared in both uplink and downlink directions for the current day.
SNR RANGE-2	Defines the second range for the signal-to-noise ratio distribution in the **DISCS SNR** command output (see Section 9.3.9 on page 134). Possible values are from 2 to 39. Default is 20 dB. When the SNR range setting is changed, the SNR counters are cleared in both uplink and downlink directions for the current day.

Table 9-2 SETCS Command Arguments (Continued)

Command Argument	Description
SNR RANGE-3	Defines the third range for the signal-to-noise ratio distribution in the **DISCS SNR** command output (see Section 9.3.9 on page 134). Possible values are from 3 to 40. Default is 30 dB. When the SNR range setting is changed, the SNR counters are cleared in both uplink and downlink directions for the current day.
CALL DURATION RANGE-1	Defines the first range for the call duration time in the **DISCS DURATION** command output (see Section 9.3.13 on page 139). Possible values are from 5 to 60. Default is 6 seconds. When the call duration range setting is changed, the call duration counters are cleared for the current day.
CALL DURATION RANGE-2	Defines the second range for the call duration time in the **DISCS DURATION** command output (see Section 9.3.13 on page 139). Possible values are from 10 to 300. Default is 60 seconds. When the call duration range setting is changed, the call duration counters are cleared for the current day.
CALL DURATION RANGE-3	Defines the third range for the call duration time in the **DISCS DURATION** command output (see Section 9.3.13 on page 139). Possible values are from 1 to 60. Default is 5 minutes. When the call duration range setting is changed, the call duration counters are cleared for the current day.
CALL DURATION RANGE-4	Defines the fourth range for the call duration time in the **DISCS DURATION** command output (see Section 9.3.13 on page 139). Possible values are from 2 to 120. Default is 30 minutes. When the call duration range setting is changed, the call duration counters are cleared for the current day.
EOR OFFSET	Defines the delay offset value used in the computation of the Echo Objection Rate (see Section 9.3.8 on page 132). Possible values are from 0 to 120 ms. Default setting is 5 ms. When the EOR offset setting is changed, the EOR counters are cleared in both uplink and downlink directions for the current day.
EOR1 OFFSET	Defines the delay offset value used in the computation of the Echo Objection Rate (see Section 9.3.8 on page 132). Possible values are from 0 to 500 ms. Default setting is 25 ms. When the EOR1 offset setting is changed, the EOR counters are cleared in both uplink and downlink directions for the current day.
EOR2 OFFSET	Defines the delay offset value used in the computation of the Echo Objection Rate (see Section 9.3.8 on page 132). Possible values are from 0 to 500 ms. Default setting is 105 ms. When the EOR2 offset setting is changed, the EOR counters are cleared in both uplink and downlink directions for the current day.
IE FACTOR FOR CUST-1	Defines the Equipment Impairment value for the first custom codec (uplink or downlink). This parameter is used for computation of R-factors and MOS. Contact Ditech Customer Service for information about the configuration of this parameter. Possible values are from 0 to 50.
IE FACTOR FOR CUST-2	Defines the Equipment Impairment value for the second custom codec (uplink or downlink). This parameter is used for computation of R-factors and MOS. Contact Ditech Customer Service for information about the configuration of this parameter. Possible values are from 0 to 50.

Table 9-2 SETCS Command Arguments (Continued)

Command Argument	Description
BPL FACTOR FOR CUST-1	Defines the Packet Loss Robustness value for the first custom codec (uplink or downlink). This parameter is used for computation of R-factors and MOS. Contact Ditech Customer Service for information about the configuration of this parameter. Possible values are from 10 to 50.
BPL FACTOR FOR CUST-2	Defines the Packet Loss Robustness value for the second custom codec (uplink or downlink). This parameter is used for computation of R-factors and MOS. Contact Ditech Customer Service for information about the configuration of this parameter. Possible values are from 10 to 50.

9.3.2 STATCS Command

The **STATCS** command displays the current settings for the call statistics and Echo Advisor parameters (refer to section 9.3.1, “SETCS Command,” on page 115 for parameter definitions). The **STATCS** command syntax is as follows:

```
STATCS [CODEC|FER|DLY|HEC|AEC|ECAD|SPEECH|NOISE|SNR|DUR|EOR|IEBPL]
```

The **STATCS** command can be issued with any of the arguments shown above to display only details relating to the argument.

Note Hybrid echo statistics and Echo Advisor statistics are not supported in feature package 10. Therefore, parameters for the **HEC** and **ECAD** arguments are not displayed if feature package 10 is currently active.

The **STATCS** command with no arguments is displayed in the following example.

```
Uplink CODEC TYPE - [G.711],GSM-FR,GSM-HR,GSM-EFR,AMR-12.2 ,AMR-10.2,
AMR-7.95,AMR-7.4,AMR-6.7,AMR-5.9,AMR-5.15,AMR-4.75,EVRC,CUST-1,CUST-2
Downlink CODEC TYPE - [G.711],GSM-FR,GSM-HR,GSM-EFR,AMR-12.2 ,AMR-10.2,
AMR-7.95,AMR-7.4,AMR-6.7,AMR-5.9,AMR-5.15,AMR-4.75,EVRC,CUST-1,CUST-2
Uplink Delay (10-500; default 100 ms) - [100]
Downlink Delay (10-500; default 100 ms) - [100]
Uplink FER (%) - [0],0.5,1,1.5,2,2.5,3,3.5,4,4.5,5,5.5,6,6.5,7,7.5
Downlink FER (%) - [0],0.5,1,1.5,2,2.5,3,3.5,4,4.5,5,5.5,6,6.5,7,7.5
AEC DELAY RANGE-1 (40-40; default 40 ms) - [40]
AEC DELAY RANGE-2 (60-320; default 140 ms) - [140]
AEC DELAY RANGE-3 (80-340; default 180 ms) - [180]
AEC DELAY RANGE-4 (100-360; default 240 ms) - [240]
AEC DELAY RANGE-5 (120-380; default 360 ms) - [360]
SPEECH LVL RANGE-1 (-1 to -38; default -10 dBm) - [-10]
SPEECH LVL RANGE-2 (-2 to -39; default -20 dBm) - [-20]
SPEECH LVL RANGE-3 (-3 to -40; default -30 dBm) - [-30]
NOISE LVL RANGE-1 (-1 to -43; default -20 dBm) - [-20]
NOISE LVL RANGE-2 (-2 to -44; default -30 dBm) - [-30]
NOISE LVL RANGE-3 (-3 to -45; default -40 dBm) - [-40]
SNR RANGE-1 (1-38; default 10 dB) - [10]
SNR RANGE-2 (2-39; default 20 dB) - [20]
SNR RANGE-3 (3-40; default 30 dB) - [30]
CALL DURATION RANGE-1 (5-60; default 6 sec) - [20]
CALL DURATION RANGE-2 (10-300; default 60 sec) - [60]
CALL DURATION RANGE-3 (1-60; default 5 min) - [5]
CALL DURATION RANGE-4 (2-120; default 30 min) - [30]
EOR OFFSET (0-120; default 5 ms) - [5]
EOR1 OFFSET (0-500; default 25 ms) - [25]
EOR2 OFFSET (0-500; default 105 ms) - [105]
IE FACTOR FOR CUST-1 (0-50; default 0 ) - [0]
BPL FACTOR FOR CUST-1 (10-50; default 10 ) - [10]
IE FACTOR FOR CUST-2 (0-50; default 0 ) - [0]
BPL FACTOR FOR CUST-2 (10-50; default 10 ) - [10]
```

9.3.3 ALLCS Command

The **ALLCS** command displays call statistics data in comma-separated value format. This format provides a comma after each data column and can be used for importing the statistics into spreadsheets.

The **ALLCS** command syntax is as follows:

```
ALLCS [HIST [1-7]]
```

9.3.4 CLRCS Command

The **CLRCS** command clears all data for Call Statistics in the current data collection bins. History is not cleared.

The **CLRCS** command syntax is as follows:

```
CLRCS
```

An example of the **CLRCS** command display is as follows:

```
3-3, 1-1>CLRCS
Clearing Call Statistics for all E1s
    Are you sure? - Y/[N]: Y
Done
```

9.3.5 DISCS Command

The **DISCS** (DISplay Call Statistics) command displays Call Statistics for the measurement types listed below. Call Statistics are accumulated for a 24-hour period, finishing at midnight (per local system clock). At the end of this period, the statistics are moved to a history bin and a new 24-hour sampling period begins. Historical data can be accessed and displayed with the **HIST** command argument (see Section 9.3.5.3 on page 127).

The **DISCS** command arguments and syntax are as follows:

```
DISCS HEC [DLY|EPL]       [#|A] [HIST [1-7]]
DISCS AEC                 [#  ] [HIST [1-7]] [TL|LH]
DISCS SPEECH|NOISE        [#|A] [HIST [1-7]] [DL|UL]
DISCS SNR                 [#|A] [HIST [1-7]] [DL|UL] [OUT]
DISCS CALLS|DURATION      [#|A] [HIST [1-7]]
DISCS MOS|R [CQ|LQ]       [#|A] [HIST [1-7]] [DL|UL] [OUT]
DISCS EOR|EOR1|EOR2       [#|A] [HIST [1-7]] [TL|LH]
DISCS VQACNT              [#|A] [HIST [1-7]]
DISCS ECAD                [#|A] [HIST [1-7]] [TL|LH]
```

Note Hybrid echo statistics and Echo Advisor statistics are not supported in feature package 10. Therefore, **DISCS HEC** and **DISCS ECAD** measurements cannot be displayed if feature package 10 is currently active.

Table 9-3 briefly describes the arguments for the **DISCS** command.

Table 9-3 DISCS Command Arguments

Command Argument	Description
HEC DLY	Displays the hybrid echo delay statistics (default).
HEC EPL	Displays the hybrid echo path loss statistics (EPL) as well as enhanced echo path loss statistics (EEPL).
AEC	Displays the acoustic echo statistics.
EOR, EOR1, EOR2	Displays the Echo Objection Rate per ITU-T G.131.
SNR	Displays the signal-to-noise ratio statistics.
SPEECH	Displays the speech level statistics.
NOISE	Displays the noise level statistics.
CALLS	Displays the overall call type statistics.
DURATION	Displays the call duration statistics.
VQACNT	Displays the voice quality enhancement (provided by VQA™ technology) activity counter statistics.
MOS CQ	Displays the Mean Opinion Score Conversational Quality statistics (default).
MOS LQ	Displays the Mean Opinion Score Listening Quality statistics.
R CQ	Displays the R-factor Conversational Quality statistics (default).
R LQ	Displays the R-factor Listening Quality statistics.
ECAD	Displays the calls with uncancelled echo (Echo Advisor).
#	Specifies the E1 number data is to be displayed for (default is current E1).

Table 9-3 DISCS Command Arguments (Continued)

Command Argument	Description
A	Displays statistics for all E1s (otherwise statistics for the current E1 are displayed).
HIST	Displays historical data for a specified day (default is the current 24-hour period). Report includes generation of timestamp of sample.
1-7	Specifies the day for which historical data is requested (default value is 1, which represents historical data one day old). The data collection day begins at midnight.
TL	Displays statistics for the Tail side (default).
LH	Displays statistics for the Long Haul side.
DL	Displays statistics for the downlink direction (Send In, Send Out) (default).
UL	Displays statistics for the uplink direction (Receive In, Receive Out).
OUT	Displays measurements of voice quality enhancement after voice quality enhancement processing has been applied.

The following sections illustrate some of the types of call statistics available when using the **DISCS** command.

- **DISCS HEC** Command – Section 9.3.6 on page 129
- **DISCS AEC** Command – Section 9.3.7 on page 131
- **DISCS EOR** Command – Section 9.3.8 on page 132
- **DISCS SNR** Command – Section 9.3.9 on page 134
- **DISCS SPEECH** Command – Section 9.3.10 on page 136
- **DISCS NOISE** Command – Section 9.3.11 on page 137
- **DISCS CALLS** Command – Section 9.3.12 on page 138
- **DISCS DURATION** Command – Section 9.3.13 on page 139
- **DISCS VQACNT** Command – Section 9.3.14 on page 140
- **DISCS MOS** Command – Section 9.3.15 on page 141
- **DISCS R** Command – Section 9.3.16 on page 143
- **DISCS ECAD** Command – Section 9.3.17 on page 146

9.3.5.1 "OUT" Command Argument

The **DISCS SNR**, **DISCS MOS**, and **DISCS R** commands have an **OUT** argument available. The report data when no **OUT** argument is included shows scores for the call leg that have not had voice quality enhancement applied (i.e., Send In or Receive In). When the **OUT** argument is given, the scores reflect the influence of Ditech's voice quality enhancement technology and improvements on the call quality (i.e., Send Out or Receive Out).

9.3.5.2 "A" Command Argument

Issuing a **DISCS** command that includes the **A** argument displays data for all E1s on the current shelf and slot. As an example, **DISCS ECAD A** results in the following:

```
* DITECH QVP-E1  ******* Echo Advisor (Curr) ******** 02/16/2007 13:27:26 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1-4  TL side

 E1  Total Calls  ------------- Calls with Uncancelled Hybrid Echo ------------
       Sampled                   Delay (ms)                    Total
                     <192 192-255 256-319 320-380    >380
  1           0         0       0       0       0       0         0
  2           0         0       0       0       0       0         0
  3           0         0       0       0       0       0         0
  4           0         0       0       0       0       0         0
```

9.3.5.3 "HIST" Command Argument

Issuing a **DISCS** command that include the **HIST** argument displays information about a specific day of data. As an example, **DISC ECAD HIST 2** results in a report of 2 day old history, similar to the following:

```
* DITECH QVP-E1  ** Echo Advisor  (Curr)    ***** 12/31/2006 11:51:14 **
RACK: DITECHCOM   PORT: Maint.  Shelf 4, Slot 1

Historical Data are 2 days old.
Report Start 7/29/06 00:00:00 End 7/30/06 00:00:00

Report data for Data E1=1  TL side

E1  Total Calls   ---------Calls with Uncancelled Hybrid Echo---------
     Sampled                      Delay (ms)                      Total
                   <192  192-255  256-319   320-380  >380
1       0             0        0        0         0     0           0
```

9.3.5.4 "#" Command Argument

To specify an E1 other than the default line #1, include the number of the E1 in the command. As an example, **DISCS ECAD 2 HIST 2** results in a report about E1 #2 and 2 day old history. The E1 number must follow the command and come before the HIST argument. To see information for E1 #1, the default line number is "1" and need not be explicitly specified. E1 #2 data is similar to the following:

```
* DITECH QVP-E1  ** Echo Advisor  (Curr)    ***** 12/31/2006 11:51:14 **
RACK: DITECHCOM   PORT: Maint.  Shelf 4, Slot 1

Historical Data are 2 days old.
Report Start 7/29/06 00:00:00 End 7/30/06 00:00:00

Report data for Data E1=2  TL side

E1  Total Calls   ---------Calls with Uncancelled Hybrid Echo---------
     Sampled                      Delay (ms)                      Total
                  <192  192-255  256-319   320-380  >380
2       0            0        0        0         0     0           0
```

9.3.5.5 "UL/DL" "TL/LH" Command Argument

The default is to present Tail (TL) side and Downlink (DL) data. To see Long Haul (LH) or Uplink (UL) data, add the appropriate LH or UL argument to the command. For more information about uplink and downlink directions, refer to section 4-2, "Uplink and Downlink Directions," on page 55.

9.3.5.6 Informative Messages

Information may appear at the bottom of the report such as a data collection period. Sample messages include:

```
The data collection period was longer than 24 hours.
Partial data: Configuration was modified during sampling.
```

If the **CLRCS** command has been issued or the **SETCS** parameter settings have been changed, the message will indicate that the data collection period was less than 24 hours, and therefore, the statistics have been cleared.

9.3.6 DISCS HEC Commands

The **DISCS HEC** call statistics commands display statistics for hybrid echo delay on the Tail side. HEC Delay Ranges are defined by using the **SETCS** command (see Section 9.3.1 on page 115).

Note Hybrid echo statistics are not supported in feature package 10. Therefore, **DISCS HEC** measurements cannot be displayed if feature package 10 is currently active.

Note Statistics from the **DISCS HEC** commands are not collected if HEC Meter is disabled (see Section 6.10 on page 97).

The **DISCS HEC** command set includes the following:

- The **DISCS HEC** command displays call statistics for hybrid echo delay on the Tail side.
- The **DISCS HEC DLY** command is the default **DISCS HEC** command.
- The **DISCS HEC EPL** command displays call statistics for hybrid echo path loss and loss improvement.

HEC Delay Ranges are defined by using the **SETCS** command (see Section 9.3.1 on page 115).

Refer to Table 9-3 for definitions of the command arguments. The **DISCS HEC** command syntax is as follows:

```
DISCS HEC [DLY|EPL]       [#|A] [HIST [1-7]]
```

A discussion of each of the **DISCS HEC** commands with arguments is presented below.

9.3.6.1 DISCS HEC DLY

DISCS HEC DLY is the default report. If the command is issued as **DISCS HEC**, the **DLY** argument is assumed.

An example of the **DISCS HEC DLY** command output follows:

```
* DITECH QVP-E1  ** Call statistics HEC DLY (Curr) ** 01/12/2007 14:14:14 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1

 E1  Total Calls   ----------------- Delay (ms) ------------------
       Sampled         <64  64-127 128-191 192-255 256-320    >320
  1        88608      1630    1812     314      51       2       0
```

To help understand this example, the output shows calls with hybrid echo and the corresponding echo delay distribution on the Tail side. There were 88608 total calls sampled on this E1, with a total of 3809 (1630 + 1812 + 314 + 51+ 2) calls experiencing hybrid echo with echo delay (in ms) occurring within the following ranges:

- Less than 64ms of delay – 1630 calls
- Between 64-127ms of delay – 1812 calls
- Between 128-191ms of delay – 314 calls
- Between 192-255ms of delay – 51 calls
- Between 256-320ms of delay – 2 calls
- Greater than 320ms of delay – 0 calls

The greater the delay value displayed, the greater the impact of echo experienced by the user.

9.3.6.2 DISCS HEC EPL

The **DISCS HEC EPL** command displays call statistics for hybrid echo path loss. An example of the **DISCS HEC EPL** command output follows:

```
* DITECH QVP-E1  ** Call statistics HEC EPL (Curr) ** 01/12/2007 14:14:07 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1

 E1  Total Calls   ---- EPL (dB) ---   --- EEPL (dB) ---
       Sampled       <10 10-18   >18     <10 10-18   >18
  1        13345    3245    52    48       0     0  3345
```

To explain the above example, 13345 calls were sampled with a total of 3345 calls experiencing hybrid echo. EPL and EEPL readings occurred in the following ranges:

- EPL less than 10dB – 3245 calls
- EPL between 10 - 18dB – 52 calls
- EPL greater than 18dB – 48 calls
- EEPL less than 10dB – 0 calls
- EEPL between 10 - 18dB – 0 calls
- EEPL greater than 18dB – 3345 calls

EPL measures the strength of echo as described in Section 9.2.4. The lower the EPL value in dB, the worse the impact of echo experienced by the user. EEPL measures the strength of the echo after hybrid echo cancellation has been applied. A high dB value displayed for EEPL means the QVP was able to converge on the hybrid echo for correction.

Refer to Section 9.3.1 on page 115 for information about setting HEC EPL/EEPL ranges.

Table 9-4 describes the information available with this command.

Table 9-4 DISCS HEC Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled; this number also includes calls in which no echo is detected. For more details, see Section 9.3.18 on page 147.
Delay	Displays the HEC Delay distribution within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in milliseconds.
EPL	Displays the Echo Path Loss (EPL) distribution within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dB.
EEPL	Displays the Enhanced Echo Path Loss (EEPL) distribution within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dB.

9.3.7 DISCS AEC Command

The **DISCS AEC** command displays call statistics for acoustic echo from 0ms to 400ms on the Tail and the Long Haul sides. Acoustic echo statistics are provided with +/– 20ms accuracy for echo tail delay and +/– 3dB accuracy for WAEPL. For information about AEC, refer to page 75. Refer to Section 9.3.1 on page 115 for information about setting the AEC Delay Ranges.

Acoustic echo statistics are displayed for the ranges specified by the **SETCS** command (see Section 9.3.1).

The **DISCS AEC** command syntax is as follows:

```
DISCS AEC                [#  ] [HIST [1-7]] [TL|LH]
```

Sample statistics from the **DISCS AEC** command are as follows:

```
* DITECH QVP-E1 ** Call Statistics AEC (Curr)   ****** 12/31/2006 11:51:14 **
RACK: DITECHCOM     PORT: Maint.  Shelf 4, Slot 1

Report for Data E1=1  TL side

WAEPL (dB)   -------------- AEC Delay (ms) --------------
               40-139  140-179  180-239  240-360     >360
    >36         11042     4537     6703    17524     2225
  30-36          2343     1018     1902     4863      635
  24-30          1274      547     1211     3070      391
  18-24           733      269      549     1553      209
    <18           199       49       85      354       74

Total Calls Sampled = 776162
```

To help understand the above example, the WAEPL measurements in dB indicate the strength of the echo reflection (see Section 9.2.5). Low WAEPL measurements indicate strong acoustic echo.

AEC Delay measures the echo signal delay in milliseconds. Calls with long AEC delay are more noticeable to the user. The perceived severity of the acoustic echo by the listener is a combination of both WAEPL and delay.

Table 9-5 describes the information available with this command.

Table 9-5 DISCS AEC Command Data

Header (Data Type)	Description
WAEPL	Identifies the Weighted Acoustic Echo Path Loss (WAEPL) ranges in dB.
Delay	Displays the AEC Delay distribution within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in milliseconds.
Total Calls Sampled	Displays the number of calls sampled; this number also includes calls in which no echo has been detected. For more details, see Section 9.3.18 on page 147.

9.3.8 DISCS EOR Command

The **DISCS EOR**, **EOR1**, and **EOR2** commands display the acoustic echo Echo Objection Rate per ITU-T G.131 recommendation. Commonly, only **DISCS EOR** is used. Refer to Section 9.3.1 on page 115 for information about setting the EOR Offsets.

The EOR is the level of echo annoyance as a result of the amount of transmission delay and Weighted Acoustic Echo Path Loss (WAEPL). The calculation for EOR uses the following equation defined in the ITU-T G.131 standard:

$$f(x,y) = y - 40\log\left(\frac{1+\frac{x}{10}}{1+\frac{x}{150}}\right) + 6e^{-0.3x^2}$$

Where:

x = The mean one-way delay = echo round trip delay ÷ 2 + EOR offset (EOR1 offset or EOR2 offset when running **DISCS EOR1** or **DISCS EOR2** commands).

The EOR offset (as provisioned by the user when running the **SETCS** command) is used to approximate the echo delay on the segment where it cannot be measured:

- An EOR offset of 5 ms approximates the transmission delay on a local PSTN trunk.
- An EOR offset of 25 ms approximates the transmission delay on a long distance trunk.
- An EOR offset of 105 ms approximates the transmission delay on a mobile trunk.

y = The talker echo return loss = WAEPL + 10

Based on the results of the calculation, the echo is classified as either “Unacceptable” or “Acceptable.”

The **DISCS EOR** command syntax is as follows:

```
DISCS EOR|EOR1|EOR2       [#|A] [HIST [1-7]] [TL|LH]
```

Sample statistics from the **DISCS EOR** command are as follows:

```
* DITECH QVP-E1 ** Call Statistics EOR  (Curr)  ****** 12/31/2006 11:51:14 **
RACK: DITECHCOM    PORT: Maint.  Shelf 4, Slot 1

Report for Data E1=1  TL side   EOR Offset 5 ms

E1   Total Calls  ---------------Echo Objection Rate per G.131 --------------
      Sampled         Unacceptable          Acceptable
 1       132              47                   12
```

To help understand the example shown above, 132 calls were sampled on the Tail side. Per the G.131 ITU-T standard, 47 calls were calculated to have an “unacceptable” EOR. This means most users would perceive those calls as having objectionable echo.

On the other hand, 12 calls were calculated to have an “acceptable” EOR, which means that less than one percent of users would perceive those calls as having objectionable echo.

Table 9-6 describes the information available with this command.

Table 9-6 DISCS EOR Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled; this number also includes calls in which no echo is detected. For more details, see Section 9.3.18 on page 147.
Echo Objection Rate per ITU-T G.131	Based on the results of the equation provided above, the echo is classified as either “Unacceptable” or “Acceptable.”

9.3.9 DISCS SNR Command

The **DISCS SNR** command displays signal-to-noise ratio statistics for either the Uplink or Downlink direction (see Section 4.9.8.2.1, “Uplink and Downlink Directions”, on page 55). Refer to Section 9.3.1 on page 115 for information about setting the SNR ranges.

The Uplink direction is always identified from the Receive In (Rin) side to the receive Out (Rout) side of the QVP and the Downlink direction is always identified from the Send In (Sin) side to the Send Out (Sout) side of the QVP.

Note When the **OUT** option is used with this command, outgoing values are displayed for post-voice quality enhancement processing.

Signal-to-noise ratio (SNR) is defined as the difference between the signal level and noise level, measured in dB. Low SNR readings indicate poor speech intelligibility, because a background noise level close to the speech level makes it difficult for a listener to understand. Conversely, high SNR readings indicate good speech intelligibility.

Refer to Section 9.3.1 on page 115 for information about setting the SNR Ranges.

The **DISCS SNR** command syntax is as follows:

```
DISCS SNR                [#|A] [HIST [1-7]] [DL|UL] [OUT]
```

A **DISCS SNR** command output example for the Downlink direction is shown below.

```
* DITECH QVP-E1  **** Call statistics SNR (Curr) **** 01/12/2007 14:15:31 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls    SNR     ---- SNR Sin (dB) ----   --- SNR Improvement (dB) ---
      Sampled    Avg In      <10 10-20 20-30   >30     <4   4-8  8-12 12-16   >16
  1       152     36.98       0     5    17    93     96    14     5     0     0
```

To help understand this example, the output indicates that 152 calls were sampled, a total of 115 calls (5 + 17 + 93) were sampled for level reading, and 37 calls (152 minus 115) were discarded from EXi statistics. See Section 9.3.18 on page 147 for a description of “discarding rules” for EXi statistics.

A **DISCS SNR OUT** command output example for the Downlink direction (before and after voice quality enhancement was applied) is shown below.

```
* DITECH QVP-E1 ** Call Statistics SNR   (Curr)   ***** 12/31/2006 11:51:14 **
RACK: DITECHCOM    PORT: Maint.  Shelf 4, Slot 1

Report data for Data E1=1  DL direction

E1   Total Calls   SNR       ---SNR Sin (dB)----  SNR   -- SNR Sout (dB) ------
      Sampled     Avg In   <10 10-20 20-30 >30   Avg Out  <10 10-20 20-30 >30

 1       0        0         0  0     0     0          0    0   0    0     0
```

Table 9-7 describes the information available with this command.

Table 9-7 DISCS SNR Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
SNR Average In	Displays the average incoming SNR value before voice quality enhancement processing, displayed in dB.
SNR Send In	Displays the SNR Send In distribution before voice quality enhancement processing, within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dB.
SNR Improvement	Identifies the SNR improvement from Receive In to Receive Out and from Send In to Send Out. Values are displayed in dB.
SNR Average Out	Displays the average outgoing SNR value following voice quality enhancement processing, displayed in dB.
SNR Send Out	Displays the SNR Send Out or Receive Out distribution following voice quality enhancement processing, within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dB.

9.3.10 DISCS SPEECH Command

The **DISCS SPEECH** command displays speech level statistics. Refer to Section 9.3.1 on page 115 for information about setting the Speech Level Ranges. The Uplink direction is always identified from the Receive In (Rin) side to the Receive Out (Rout) side of the QVP and the Downlink direction is always identified from the Send In (Sin) side to the Send Out (Sout) side of the QVP.

The **DISCS SPEECH** command syntax is as follows:

```
DISCS SPEECH        [#|A] [HIST [1-7]] [DL|UL]
```

Sample statistics from the **DISCS SPEECH** command are as follows:

```
* DITECH QVP-E1  ******* Speech Level (Curr) ******** 01/12/2007 14:15:41 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls  ------ SPEECH Sin (dBm) -----    ----- SPEECH Sout (dBm) -----
      Sampled    >-10 -10to-19 -20to-30   <-30    >-10 -10to-19 -20to-30   <-30
  1       152      14       69       29      3       8       97       10      0
```

To help understand this example, the output indicates that 152 calls were sampled, a total of 115 calls (14 + 69 + 29 + 3) were sampled for level reading, and 37 calls (152 minus 115) were discarded from EXi statistics. See Section 9.3.18 on page 147 for a description of “discarding rules” for EXi statistics.

Table 9-8 describes the information available with this command.

Table 9-8 DISCS SPEECH Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
SPEECH Send In	Displays the speech level Send In (Sin) or Receive In (Rin) distribution before voice quality enhancement processing, within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dBm.
SPEECH Send Out	Displays the speech level Send Out (Sout) or Receive Out (Rout) distribution after voice quality enhancement processing, within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dBm.

9.3.11 DISCS NOISE Command

The **DISCS NOISE** command displays noise level statistics. Refer to Section 9.3.1 on page 115 for information about setting the Noise Level Ranges.

The **DISCS NOISE** command syntax is as follows:

```
DISCS NOISE        [#|A] [HIST [1-7]] [DL|UL]
```

Sample statistics from the **DISCS NOISE** command are as follows:

```
* DITECH QVP-E1  ******** Noise Level (Curr) ******** 01/12/2007 14:16:17 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls  ------  NOISE Sin (dBm) -----    -----  NOISE Sout (dBm) -----
      Sampled    >-20 -20to-29 -30to-40   <-40    >-20 -20to-29 -30to-40   <-40
  1       152       7       20       46     42       0        2        4    109
```

To help understand this example, the output indicates that 152 calls were sampled, a total of 115 calls (7 + 20 + 46 + 42) were sampled for level reading, and 37 calls (152 minus 115) were discarded from EXi statistics. See Section 9.3.18 on page 147 for a description of “discarding rules” for EXi statistics.

Table 9-9 describes the information available with this command.

Table 9-9 DISCS NOISE Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
NOISE Send In	Displays the noise level distribution (pre-VQA technology processing) Send In (Sin) or Receive In (Rin), within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dBm.
NOISE Send Out	Displays the noise level distribution (pre-VQA technology processing) Send Out (Sout) or Receive Out (Rout), within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in dBm.

9.3.12 DISCS CALLS Command

The **DISCS CALLS** command displays the overall call statistics.

The **DISCS CALLS** command syntax is as follows:

```
DISCS CALLS      [#|A] [HIST [1-7]]
```

Sample statistics from the **DISCS CALLS** command are as follows:

```
* DITECH QVP-E1 ** Call Type   (Curr)     ******** 12/31/2006 11:51:14 **
RACK: DITECHCOM     PORT: Maint.  Shelf 4, Slot 1

Report data for Data E1=1

E1   OFF_HK       Total Calls   IN_BP    G.164    G.165
                   Sampled
 1   15532           13345        0          0     0
 2   14728           13129        0          0     0
 3   13934           13205        0          0     0
```

Note The G.164 and G.165 calls are properly detected only if both the Tone Disabler and Hybrid Echo Cancellation are set to “In”. If the Tone Disabler is set to “Out”, no modem calls are reported. If the Tone Disabler is set to “In”, but HEC is set to “Out”, all modem calls are reported as G.164. For details about provisioning the Tone Disable and Hybrid Echo Cancellation, see Table 5-2 on page 72.

Table 9-10 describes the information available with this command.

Table 9-10 DISCS CALLS Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
OFF_HK	Total number of Off-Hook indications detected.
Total Calls Sampled	Displays the number of calls sampled by EXi (short calls are not sampled by EXi). For more details, see Section 9.3.18 on page 147.
IN__BP	Displays the number of channels that were configured for bypass at least once during the sampling period.
G.164 / G.165	Number of times a G.164 or G.165 disabling tone was detected. The G.164 counter reports number of calls with non-phase-reversal disabling tone detected. The G.165 counter reports number of calls with phase-reversal disabling tone detected.

9.3.13 DISCS DURATION Command

The **DISCS DURATION** command displays statistics for call duration. Refer to Section 9.3.1 on page 115 for information about setting the Call Duration Ranges.

The **DISCS DURATION** command syntax is as follows:

```
DISCS DURATION      [#|A] [HIST [1-7]]
```

Sample statistics from the **DISCS DURATION** command are as follows:

```
1-20,1-1>DISCS DURATION
* DITECH QVP-E1  ******* Call Duration (Curr) ******* 10/31/2007 11:43:35 **
RACK: PVLAB             PORT: Maint. Shelf 1, Slot 20

Report data for E1=1

 E1  Total Calls  ---------------------- Call Duration --------------   Average
       Sampled      <6sec    6-59sec 60sec-5min    5-30min     >30min     (sec)
  1      30393      30393        0          0          0          0          5
```

Note The Average measurement for Call Duration is currently supported only on QVP E400 systems.

Table 9-11 describes the information available with this command.

Table 9-11 DISCS DURATION Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
Call Duration	Displays the call duration distribution within the ranges defined by the user with the **SETCS** command (Section 9.3.1 on page 115). Values are displayed in seconds and minutes.
Average	Displays the average length of calls in seconds.

9.3.14 DISCS VQACNT Command

The **DISCS VQACNT** command displays statistics for VQA™ Activity, reflecting the number of calls that benefited from specific voice quality enhancement features. For information about voice quality enhancement features provided by Ditech's VQA technology, refer to page 65.

The **DISCS VQACNT** command syntax is as follows:

```
DISCS VQACNT              [#|A] [HIST [1-7]]
```

Sample statistics from the **DISCS VQACNT** command are as follows:

```
* DITECH QVP-E1  ******* VQA Activity (Curr) ******** 01/12/2007 14:18:01 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1

 E1  Total Calls        ------ Uplink -----       ------- Downlink ----------
       Sampled          AEC     ALC     EVI       HEC     AEC     ALC     EVI
  1        328          120      12       0         0     206      18     191
```

Note Hybrid echo statistics are not supported in feature package 10. Therefore, HEC measurements are not displayed if feature package 10 is currently active.

Table 9-12 describes the information available with this command.

Table 9-12 DISCS VQACNT Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
Uplink	Displays the call distribution for each voice quality feature in the uplink direction.
Downlink	Displays the call distribution for each voice quality feature in the downlink direction.
AEC	This counter indicates the number of calls that benefited from the Acoustic Echo Control feature. The AEC activity counter is incremented if acoustic echo has been cancelled during the call.
ALC	This counter indicates the number of calls that benefited from the Level Control feature. The ALC activity counter is incremented if the call has benefited from a 3dB gain or loss provided by ALC at any time during the call.
EVI	This counter indicates the number of calls that benefited from the Enhanced Voice Intelligibility feature. The EVI activity counter is incremented if EVI is active at any time during the call. Note: If EVI Mode has been set to Fixed, EVI is active on all calls.
HEC	This counter indicates the number of calls that benefited from the Hybrid Echo Cancellation feature. The HEC activity counter is incremented if hybrid echo has been cancelled during the call. Because the HEC feature is provided only in the downlink direction, the activity counter also appears only in the downlink direction.

Note If a VQA feature has been disabled, its corresponding VQA counter displays "0" (zero).

9.3.15 DISCS MOS Command

Note This command is not supported in feature packages without EXi capabilities (i.e., feature packages 12, 14, 18, 19, 24, and 26).

The **DISCS MOS** command displays Mean Opinion Score statistics for either listening quality (MOS LQ) or conversational quality (MOS CQ). Listening quality encompasses speech quality, noise, and voice level, but does not include impairments that affect conversation such as delay or echo. Conversational quality adds echo and delay to the listening quality measurements.

MOS values are derived from the transmission rating factor (R-factor) computed per the ITU-T G.107 E-Model standard. The R-factor (0 to 93) is converted to a MOS scale (1 to 4.5) to provide MOS LQ and MOS CQ measurements per the conversion list shown in Table 9-13. A low MOS indicates poor listening or conversational quality, whereas a high MOS indicates a high level of listening or conversational quality.

Table 9-13 R-factor to MOS Conversion Values

User Opinion	R-factor	MOS (ACR Scale)
Max obtainable for G.711	93	4.1
Very Satisfied	90 – 100	4.1 – 5.0
Satisfied	80 – 90	3.7 – 4.1
Some Users Satisfied	70 – 80	3.4 – 3.7
Many Users Dissatisfied	60 – 70	2.9 – 3.4
Nearly All Users Dissatisfied	50 – 60	2.4 – 2.9
Not Recommended	0 – 50	1 – 2.4

The **DISCS MOS** command syntax is as follows:

```
DISCS MOS [CQ|LQ]       [#|A] [HIST [1-7]] [DL|UL] [OUT]
```

To display listening quality, issue the **DISCS MOS** command with the **LQ** argument. To display conversational quality, issue the **DISCS MOS** command with the **CQ** argument. When the **OUT** option is used with this command, outgoing values are displayed for post-voice quality enhancement processing.

The following is an example of **DISCS MOS** command output:

```
* DITECH QVP-E1  **** M O S   C Q   ( C u r r ) ***** 01/12/2007 14:19:05 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls    MOS      --------- MOS CQ Sin --------  -------------------- MOS CQ Improvement ------------
      Sampled    Avg In      <1   1-2   2-3   3-4    >4     <.2    .4    .6    .8   1.0   1.2   1.4   1.6   1.8  >1.8
  1      4063      2.90       0   273   281  2237  1036    1291   789   856   720   334    71    43    41    29   153
```

To help understand this example, the output indicates that 4063 calls were sampled, a total of 3827 calls (273 + 281 + 2237 + 1036) were sampled for MOS reading, and 236 calls (4063 minus 3827) were discarded from EXi statistics. See Section 9.3.18 on page 147 for a description of “discarding rules” for EXi statistics.

A **DISCS MOS OUT** command example follows.

```
* DITECH QVP-E1  **** M O S   C Q   ( C u r r ) ***** 01/12/2007 14:19:11 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls    MOS     --------- MOS CQ Sin --------  MOS CQ    -------- MOS CQ Sout ---
      Sampled     Avg In      <1   1-2   2-3   3-4    >4   Avg Out    <1   1-2   2-3   3-4    >4
  1      4063      2.90       0   273   281  2237  1036     3.32     0     2   313  1277  2735
```

Table 9-14 describes the information available with this command.

Table 9-14 DISCS MOS Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
MOS Average In	Displays the average incoming (pre-VQA technology processing) Send In (Sin) or Receive In (Rin) MOS value.
MOS Send In MOS Receive In	Displays the MOS distribution within score ranges (pre-VQA technology processing).
MOS Improvement	Identifies the incremental MOS improvement from Receive In to Receive Out, and from Send In to Send Out.
MOS Average Out	Displays the average outgoing (post-VQA technology processing) Send Out (Sout) or Receive Out (Rout) MOS value.
MOS Send Out MOS Receive Out	Displays the MOS distribution within score ranges (post-VQA technology processing).

9.3.16 DISCS R Command

Note This command is not supported in feature packages without EXi capabilities (i.e., feature packages 12, 14, 18, 19, 24, and 26).

The **DISCS R** command displays transmission rating factor (R-factor) statistics for either listening quality (R LQ) or conversational quality (R CQ). Listening quality encompasses speech quality, noise, and voice level, but does not include impairments that affect conversation such as delay and echo. Conversational quality adds echo and delay to the listening quality measurements.

The R-factor is calculated via the ITU-T G.107 E-Model standard with the following equation:

$$R = Ro - Is - Id - Ie,eff + A$$

Where:

Ro – represents the basic signal to noise ratio.

Is – represents impairments that occur simultaneously with the input signal, i.e. non optimal signal levels.

Id – represents impairments that are delayed with respect to the input signal, i.e. echo and delay.

Ie,eff – represents the impairments caused by transmission equipment, i.e. codec type and frame loss.

A – represents the expectation or advantage factor.

Scores follow the E-Model standard for each R-factor range as reflected in Table 9-15. A low R-factor range indicates poor listening or conversational quality, whereas a high R-factor range indicates a high level of listening or conversational quality.

Table 9-15 R-factor Value Ranges

R-factor Value Range	Speech Transmission Quality Category	User Satisfaction
90 ≤ R < 100	Best	Very Satisfied
80 ≤ R < 90	High	Satisfied
70 ≤ R < 80	Medium	Some Users Dissatisfied
60 ≤ R < 70	Low	Many Users Dissatisfied
50 ≤ R < 60	Poor	Nearly All Users Dissatisfied

Connections with an R-factor value below 50 are not recommended.

To display listening quality, issue the **DISCS R** command with the **LQ** argument. To display conversational quality, issue the **DISCS R** command with the **CQ** argument. When the **OUT** option is used with this command, outgoing values are displayed for post-voice quality enhancement processing.

The **DISCS R** command syntax is as follows:

```
DISCS R [CQ|LQ]       [#|A] [HIST [1-7]] [DL|UL] [OUT]
```

A **DISCS R** command example follows.

```
* DITECH QVP-E1  ****** R   C Q   ( C u r r ) ******* 01/12/2007 14:20:24 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls     R     --------------  R CQ Sin -------------  ----- R CQ Improvement --
      Sampled    Avg In      <50  50-59  60-69  70-79  80-90  >90     <5    5-9  10-20    >20
  1      4763       61      629    366    655   1070   1065  542    962    710   2165    490
```

To help understand this example, the output indicates that 4763 calls were sampled, a total of 4327 calls (629 + 366 + 655 + 1070 + 1065 + 542) were sampled for R-factor reading, and 436 calls (4763 minus 4327) were discarded from EXi statistics. See Section 9.3.18 on page 147 for a description of “discarding rules” for EXi statistics.

The following is an example of the **DISCS R OUT** command:

```
* DITECH QVP-E1  ****** R   C Q   ( C u r r ) ******* 01/12/2007 14:20:39 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  DL direction

 E1  Total Calls     R     --------------   R CQ Sin -------------    R CQ     -------------   R CQ Sout ---------
      Sampled    Avg In      <50  50-59  60-69  70-79  80-90  >90   Avg Out    <50  50-59  60-69  70-79  80-90  >90
  1      4763       61      629    366    655   1070   1065  542        71     21    212    275    494   1545 1730
```

Table 9-16 describes the information available with this command.

Table 9-16 DISCS R Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled. For details, see Section 9.3.18 on page 147.
R-factor Average In	Displays the average incoming (pre-VQA technology processing) Send In (Sin) or Receive In (Rin) R-factor value.
R-factor Send In R-factor Receive In	Displays the R-factor distribution ranges (pre-VQA technology processing).
R-factor Improvement	Identifies the incremental R-factor improvement from Receive In to Receive Out and from Send In to Send Out.
R-factor Average Out	Displays the average outgoing (post-VQA technology processing) Send Out (Sout) or Receive Out (Rout) R-factor value.
R-factor Send Out R-factor Receive Out	Displays the R-factor distribution ranges (post-VQA technology processing).

9.3.17 DISCS ECAD Command

Echo Advisor (ECAD) monitors for uncancelled hybrid echo. On the Tail side, echo can be monitored from the configured tail setting up to 400ms. On the Long Haul side, echo can be monitored from 0 to 400ms. All E1 channels are sampled without the need to pre-configure sampled circuits. Refer to Section 9.3.1 on page 115 for information about setting the ECAD Tail and/or Long Haul Delay Ranges.

The **DISCS ECAD** command displays Echo Advisor statistics for the Tail or Long Haul sides.

Note Echo Advisor statistics are not supported in feature package 10. Therefore, **DISCS ECAD** measurements cannot be displayed if feature package 10 is currently active.

The **DISCS ECAD** command syntax is as follows:

```
DISCS ECAD                [#|A] [HIST [1-7]] [TL|LH]
```

Sample statistics from the **DISCS ECAD** command for the Tail side are as follows:

```
* DITECH QVP-E1  ******* Echo Advisor (Curr) ******** 01/12/2007 14:11:30 **
RACK: PV TEST           PORT: Maint. Shelf 1, Slot 20

Report data for E1=1  TL side

 E1  Total Calls  ------------- Calls with Uncancelled Hybrid Echo ----------
       Sampled                   Delay (ms)                    Total
                     <192 192-255 256-319 320-380    >380
  1       11005         0       4       9       0       0        13
```

As an example of how to understand the above command output, the data have been collected for E1 #1. There were 11005 calls sampled, with four calls experiencing uncancelled hybrid echo with echo tail delay between 192-255ms, and nine calls experiencing uncancelled hybrid echo with echo tail delay between 256-319ms.

Table 9-17 describes the information available in the command output.

Table 9-17 DISCS ECAD Command Data

Header (Data Type)	Description
E1	Displays the ID of the E1 where data were collected.
Total Calls Sampled	Displays the number of calls sampled; this number also includes calls where no echo is detected. For more details, see Section 9.3.18 on page 147.
Calls with Uncancelled Hybrid Echo Tail Side Delay (ms)	Hybrid echo will not be cancelled if it occurs outside of the HEC feature and AEC feature operating range. If the AEC feature is disabled, the distribution of calls in which the hybrid echo delay is greater than the configured Tail delay is shown. If the AEC feature is enabled, the distribution of calls in which the hybrid echo delay is greater than the configured Tail delay and the hybrid echo return loss is less than the Weighted Acoustic Echo Path Loss (WAEPL) setting for the AEC parameter.
Calls with Uncancelled Hybrid Echo Long Haul Side Delay (ms)	Hybrid echo will not be cancelled if it occurs outside of the HEC feature and AEC feature operating range. If the AEC feature is disabled, the distribution of calls in which the hybrid echo delay is greater than 0ms is shown. If the AEC feature is enabled, the distribution of calls in which the hybrid echo delay is greater than 0ms and the hybrid echo return loss is less than the Weighted Acoustic Echo Path Loss (WAEPL) setting for the AEC parameter.
Calls with Uncancelled Hybrid Echo Total	Displays the number of calls with uncancelled hybrid echo in the statistics bin.

Note Excessive echo readings that appear after issuing this command may indicate misprovisioning of echo cancellation for Tail or Long Haul.

Note Statistics from the **DISCS ECAD** command are not available if HEC Meter has been disabled. See Section 6.10 on page 97 for information about the **HECMETER** command.

9.3.18 EXi Call Sampling and Discarding Rules

A field named "Total Calls Sampled" is always included in the output for Call Statistics (**DISCS** commands). This counter indicates the number of calls sampled by the EXi monitoring feature. This counter may be lower than the total number of calls (number of off-hooks), because some very brief calls may not be sampled by EXi. In addition, the following calls are discarded and do not provide EXi measurements:

- Calls lasting less than six seconds
- Calls with no speech activity
- Calls with a speech level less than -35dBm
- Calls with SNR less than 0dB
- G.164/G.165 data calls

The EXi monitoring feature and VQA processing are each independent processes. Therefore, even though all calls receive VQA processing enhancement, only a subset of calls may provide EXi measurements.

9.4 Facility Statistics Commands

The Facility Statistics commands permit the user to provision and display facility history data. The following are the Facility Statistics commands:

- PM – Section 9.4.1 on page 148
- CLRPM – Section 9.5 on page 150

9.4.1 PM – Performance Monitoring

```
PM [D | <offset>] | displays performance monitoring data
PM D | displays 24-hour bins
offset = show data bins, back <offset> bin intervals
```

The **PM** command displays performance monitoring data from a selected 24-hour period. There are 8 (the current plus 7 most recent) one-day groups.

To select any given 24-hour period, enter the letter “D” to indicate “Days” and a decimal number representing the number of 24-hour periods back from the present time. For example, to view the 24-hour period beginning one day previously, enter the letter “D”, enter a space, and enter the number “1”. If no number is entered, the system displays the performance monitoring data for the last complete day. Enter a number from 0 (the default) to 7.

9.4.1.1 PM Syntax Parameters

Table 9-18 describes **PM** command syntax parameters. Use these parameters when issuing the PM command.

Table 9-18 PM Command Syntax Parameters

Syntax Parameter	Description
D	Displays current 24-hour data bin.
D <day_offset>	Display 24-hour data bins, back <day_offset> intervals. Default is 0 offset.

In response to the **PM** command, the QVP responds by displaying the performance monitoring data for the current day. An example is shown below:

```
* DITECH QVP-E1  **********   E 1   P M   *********** 12/27/2006 14:55:47 **
CIRCUIT ID: LINE 1  PORT: Maint. Shelf 5, Slot 1, E1 2

FACILITY ALARMS :                LOCAL      AIS      DISTANT      E
  SEND (FROM TAIL TO FAR END):     LOS                             0
  RCV  (FROM FAR END TO TAIL):     LOS                             0

     PARAMETER    BER   BLER  FEC-L  FEC-P    CV-P   ES-P  ESA-P  ESB-P  SES-P
SND CURRENT DAY    0.0    0.0      3      0       0  13486      0      0      0
RCV CURRENT DAY    0.0    0.0      3      0       0  13486      0      0      0

     PARAMETER AISS-P   CS-P   RAIS  LFA-P  UAS-P    CV-L   ES-L  SES-L LOSS-L
SND CURRENT DAY      0      0      0      0      0       0  13486  13486  13486
RCV CURRENT DAY      0      2      0      0      0       0  13486  13486  13486
```

Table 9-19 lists the performance parameter definitions that are helpful in understanding the PM command output.

Table 9-19 Performance Parameters

Parameter	Description
BER	Bit Error Rate. BER is the ratio of the number of bit errors to the total number of bits transmitted in either a 15-minute interval or a 24-hour interval. If a CRC4 error occurs, it is assumed it was caused by one error. If a frame bit error occurs, it is assumed that a corresponding error rate is occurring in non-frame bits (rest of payload). Therefore, a frame error is multiplied by the ratio of non-frame bits to frame bits (that is, 64). If CRC4 is not enabled, then it cannot not be used, and the measurement is based only on frame bits. The error is displayed with a format *5.2E-4*. No error displays as *0.0*. An error rate below 1.0E-9 displays as <*E-9*. No updates occur when UAS-P is in effect.
BLER	Block Error Ratio. BLER is the ratio of the number of errored 1-ms blocks, divided by the elapsed number of blocks in either a 15-minute interval or a 24-hour interval. CRC4 must be enabled for this measure to be operational, otherwise *0.0* displays. The error displays with the format *5.2E-4*. No error displays as *0.0*. An error below 1.0E-9 displays as <*E-9*. No updates occur when UAS-P is in effect.
FEC-L	Failure Event Count for the line. FEC-L is a count of LOS failures that occur during a measurement period. This is done so that the total 15-minute intervals equals the total during the composite interval. Thus, if a LOS is *already* present when a new measurement period begins, it is not counted. Since this is a line parameter, updates occurs when UAS-P is in effect.
FEC-P	Failure Event Count for the path. FEC-P is a count of LFA or AIS failures that occur during a measurement period. This is done so that the total of the 15-minute intervals equals the total during the composite interval. Thus, if an LFA is *already* present when a new measurement period begins, it is not counted. If an LFA is present *and* AIS occurs, FEC-P increments and vice versa. A CRC4 alarm, indicating a CRC4 multiframe alignment error, is not counted. Updates occur when UAS-P is in effect.
CV-P	Coding Violations for the path. CV-P is the count of CRC4 errors. Anticipate a 5–15% error rate for situations where the count is greater than ~200 in one second. No updates occur when UAS-P is in effect.
ES-P	Errored Seconds for the path. ES-P increments each second on AIS, LFA or LOS, one or more CRC4 errors, or one or more FAS errors. No updates occur when UAS-P is in effect.
ESA-P	Errored Seconds for the path. ESA-P increments each second when exactly one CRC4 error is received. See note below on the *no AIS* requirement. No updates occur when UAS-P is in effect.
ESB-P	ESB-P increments each second at a count between 2 and 804 CRC4 errors. Anticipate a 5–15% error rate for situations where the count is greater than ~200 in one second. See note below on the *no AIS* requirement. No updates occur when UAS-P is in effect.
SES-P	Severely Errored Seconds for the path. SES-P increments each second on >=805 CRC4 error or an AIS. Anticipate a 5–15% error rate for situations where the count is greater than ~200 in one second. No updates occur when UAS-P is in effect.
AISS-P	AIS Seconds for the path. AISS-P increments each second when presence of an AIS is detected. No updates occur when UAS-P is in effect.
CS-P	Control Slip for the path. CS-P increments each second a *slip* occurs. A slip, in this context, refers to the relationship of the send direction to the receive direction. They are presumed to be synchronized and buffered by an *elastic store chip* that automatically re-frames if one direction shifts or rolls relative to the other by more than a frame. The occurrence of this re-frame is called a *slip* by the voice processor. This re-frame is internal and does not appear as a slip to the originating or terminating equipment unless it is provisioned in loopback or Tail timing. No updates occur when UAS-P is in effect.
RAIS	Receive Alarm Indication Seconds. RAIS increments each second when a DA (distant alarm) is detected. No updates occur when UAS-P is in effect.
LFA-P	Loss of Frame Alignment for the path. LFA-P increments each second when a LFA is detected; it does *not* increment on a LOS or CRC4 multiframe alarm. No updates occur when UAS-P is in effect.

Table 9-19 Performance Parameters (Continued)

Parameter	Description
UAS-P	Unavailable Second. UAS-P is a count of 1-second intervals during which the path is unavailable. The path becomes unavailable at the onset of 10 contiguous SES-P. The 10 SES-P are included in unavailable time. Once unavailable, the path becomes available at the onset of 10 contiguous seconds with no SES-P. The 10 seconds with no SES-P are excluded from unavailable time. Other path counters, except FEC-P, are inhibited while the path is unavailable.
CV-L	Coding Violations for the line. CV-L is a straight count of Bipolar Violations (BPVs). Anticipate a 5–15% error rate for situations where the count is greater than ~200 in one second. Since this is a line parameter, updates occur when UAS-P is in effect.
ES-L	Errored Seconds for the line. ES-L increments each second on occurrence of one or more BPVs or on a LOS. It does not increment on an AIS, LFA, or CRC4 multiframe alignment alarm. Since this is a line parameter, updates occur when UAS-P is in effect.
SES-L	Severely Errored Seconds for the line. SES-L increments each second on occurrence of 2048 or more BPVs or on a LOS. It does not increment on an AIS, LFA or CRC4 multiframe alignment alarm. Since this is a line parameter, updates occur when UAS-P is in effect.
LOSS-L	LOS Seconds for the line. LOSS-L increments each second when LOS is detected. It does not increment on an AIS, LFA or CRC4 multiframe alignment alarm. Since this is a line parameter, updates occur when UAS-P is in effect.

9.5 CLRPM – Clear PM History

The **CLRPM** command clears all the performance monitoring data bins (registers). The **CLRPM** command is issued with no arguments.

9.6 Channel Statistics

9.6.1 1-Screen Channel Provisioning

```
1SC <line #> | initiates 1-Screen mode and displays channel provisioning
line number = 1 to 4
```

The **1SC** (1-Screen™) command initially displays the 1-Screen Reflectometry™ screen, which provides a real-time overview of the signal status, Echo Return Loss (ERL), Echo Return Loss Enhancement (ERLE), actual gains, steady patterns, and Maximum Tail Delay. Used with Hybrid Echo Cancellation (HEC) to monitor voice quality in hybrid applications, the real-time measurements of ERL, ERLE, and MAX DLY indicate signal convergence and echo cancellation characteristics.

Echo Return Loss (ERL), in dB, is actually measured across the hybrid from Receive Out to Send In. This measurement shows the attenuation present in the Tail circuit. Echo Return Loss Enhancement (ERLE), in dB, is a measure of echo canceller performance. The values represent the echo canceller enhancement on a channel rather than the enhancement after the residual echo control circuit or the ERL of the Tail circuit hybrid.

Maximum reflection delay measurements show the round-trip delay (in ms) for a signal to travel from Receive Out to the hybrid and back to Send In. The QVP should be provisioned so that the maximum reflection delay is less than the provisioned Tail delay setting. For example, if a maximum reflection delay is 56ms, the QVP should be provisioned with a 64ms Tail delay for that channel.

Note that the QVP can only measure delay if it has converged on the Tail path, so Tail paths in excess of the provisioned Tail delay are not displayed. This information is useful for determining whether the Tail delay capacity is long enough. If there are delay readings approaching the 192ms maximum Tail, the operator is advised to examine the network architecture. Reflectometry measurement fields are defined in Table 9-23 on page 157.

9.6.2 Reflectometry Data Display

The following is an example of the Reflectometry data screen:

```
** DITECH QVP-E1 ****** 1-SCREEN CHANNEL MONITORING ***** 12/29/2006, 14:48:13
CIRCUIT ID: LINE 1   PORT: Maint. Shelf 4,  Slot 1,  E1 1

CHANNEL          1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
TIME SLOT        1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  17
CHAN MODE       EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN

CHAN STATUS     AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
SND SG          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
RCV SG          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
SND PTRN        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
RCV PTRN        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
SND GAIN        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
RCV GAIN        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
ERL             --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
ERLE            --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
SND LVL         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
RCV LVL         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
MAX DLY         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --

[SPACE]alter,[S]elect,[P]rov,[U]se,[A]bort,e[X]it,to[G]gle,[H]elp,[J]ump,[?]
```

9.6.3 Hybrid Echo Measurement Data Display

1-Screen also displays current hybrid echo measurement data. The data is updated per call, as measured data becomes available. The hybrid echo measurement screen can be accessed by pressing the “G” toggle key.

For details about 1-Screen navigation using the command keys, see Section 9.6.4. Definitions for the hybrid echo measurement fields are listed in Table 9-24 on page 158.

The following is an example of the hybrid echo measurement data screen:

```
 ** DITECH QVP-E1 ****** 1-SCREEN CHANNEL MONITORING ***** 12/29/2006, 14:48:13
CIRCUIT ID: LINE 1   PORT: Maint. Shelf 4,  Slot 1,  E1 1

CHANNEL          1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
TIME SLOT        1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  17
CHAN MODE       EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN


CHAN STATUS     AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
CALL NUMBR       0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
DURATION        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
DLY TAIL         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EPL TAIL         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EEPL TAIL        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
DLY LH          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EPL LH          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EEPL LH         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --

[SPACE]alter,[S]elect,[P]rov,[U]se,[A]bort,e[X]it,to[G]gle,[H]elp,[J]ump,[?]
```

9.6.4 1-Screen Navigation Commands

1-Screen commands appear at the very bottom of the screen displays (refer to Table 9-20 on page 153).

1-Screen displays 16 channels per screen, and the initial screen displays the first 16 channels. The second screen containing the remaining channels can be viewed by pressing “J” on the keyboard. The keyboard arrow keys move the cursor from channel to channel.

When the 1-Screen Reflectometry screen first appears, the cursor is located in the Channel 1 position (upper-left) of the screen. 1-Screen actually consists of two displays: one for channels 1-16, and another for the remaining channels. Pressing “J” on the keyboard (Jump command) displays the second screen.

Use the arrow keys to move the cursor to any channel/provision location in the upper part of the screen. The cursor cannot be moved into the lower part of the screen, which contains the channel status and Reflectometry / hybrid echo measurement data.

9.6.5 1-Screen Help Display

Help displays are available for 1-Screen channel provisioning by pressing “H” on the keyboard. To view Help about a specific provision, type a question mark (**?**).

The following is an example of an initial Help screen:

```
* DITECH QVP-E1  *** 1-SCREEN CHANNEL MONITORING **** 11/21/2007 00:36:16 **
CIRCUIT ID: Simon 1  PORT: Contr. Shelf 1, Slot 1, E1 1

CHANNEL         1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
TIME SLOT       1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  17
CHAN MODE      EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN




CHAN STAT - Channel Status: EN=enabled, HK=on-hook, RNG=ring detected
 BP,SB,MB= Bypassed: channel, system, metallic; LB=loopback,
 XS,RS,BS=steady pattern in Send, Rcv, Both directions; MRB=Music ringback,
 SD,RD,BD = DMW in Send Out, Rcv Out, Both directions;
 HSC,TFO,VL1,VL2 = bypassed: HSCSD,TFO,Video stream level 1, 2;
 SDT = Tandem/music Signature Detected;
 DA=data tone disabled,  EL=enhanced low frequency data, TR=transitional,
 HH=H-register frozen, 4W=4-Wire tail circuit, DV=diverged,
 AL=facility alarm, EA=equipm.alarm, **=out of sync,
\------- 1SCREEN HELP, PAGE 1 ---[H] for next help screen   ----------------/
[SPACE]alter,[S]elect,[P]rov,[U]se,[A]bort,e[X]it,to[G]gle,[H]elp,[J]ump,[?]
```

9.6.6 1-Screen Commands

Once the cursor is located at the desired channel/provision position, the commands displayed in the bottom row of the screen can be used to update the selected parameter. These commands are listed in Table 9-20.

Table 9-20 1-Screen Provisioning Commands

Command Key	Description
[SPACE]alter	With the cursor at the desired channel and provision, each press of the space bar calls up another setting. This command key only changes the value on the 1-Screen display. The [P]rov command must be executed to change the channel provisioning on the card.
[S]elect	Copies the entire configuration of the currently accessed channel into the [U]se buffer. This permits the configuration to be used for another channel with the [U]se command.
[P]rov	Provisions the currently accessed channel with current settings, stored to memory.
[U]se	Enters into the selected channel all settings stored in the [U]se buffer. [U]se provides the capability to copy settings from one channel to another.
[A]bort	Returns all settings of the selected channel to their previous state. New values displayed do not execute. The cursor can move to other channels.
e[X]it	Exits the 1-Screen display and returns to the system prompt or line command mode.

Table 9-20 1-Screen Provisioning Commands (Continued)

Command Key	Description
to[G]gle	Toggles 1-Screen display to show the Reflectometry or hybrid echo channel measurement values.
[H]elp	Displays abbreviation definitions and possible provision settings used in the upper portion of the 1-Screen display.
[J]ump	Jumps between screen views of channels.
[?]	Displays the definition of the parameter in line with the cursor and lists possible provision settings.

9.6.7 1-Screen Provisioning Settings

Table 9-21 lists the 1-Screen provisioning settings, which appear at the top left of the 1-Screen display.

Table 9-21 1-Screen Provisioning Settings

Provision	Description
Channel	Channel Number
Time Slot	Time Slot Number
Chan Mode	Mode of Operation Settings: • EN – Enabled • BP – Bypassed • RD – Receive Out direction for Digital Milliwatt signal • SD – Send Out direction for Digital Milliwatt signal • BD – Both directions for Digital Milliwatt signal

9.6.8 1-Screen Channel Status

The lower section of the 1-Screen display shows channel status conditions. The data displayed in these columns are updated in real time. Table 9-22 describes the possible channel status conditions. .

Table 9-22 Channel Status Conditions

Chan Status in 1-Screen	Description of Condition	Channel Status as Displayed by STATUS Command
**	Channel is in bypass due to of a problem related to the incoming PCM stream (E1 or DSP problem detected).	ERROR BYPASSED or ENGINE OUT OF SYNC
AL	Facility alarm - E1 alarm condition present in the Send or Receive path.	FACILITY ALARM
BD	Digital Milliwatt is generated in both the Receive Out and Sent Out directions.	DMW ROUT AND SOUT
BP	Channel is bypassed (set for clear channel).	BYPASSED
BS	Steady pattern—other than idle code—is detected in both directions.	BOTH DIR STEADY PATTERN DETECTED
DA	Channel data disable feature is set to IN, and a dial-up data call is in progress. In G.164 mode, this occurs for any data calls. In G.165 mode, this appears for G.165 data calls only.	DATA TONE DISABLE
DV	Echo cancellation diverged during call.	DIVERGED
EA	Equipment alarm.	EQUIPMENT ALARM
EL	Enhanced Low Frequency Data - Channel set for G.165 data tone disabler.	ENHANCED LOW FREQUENCY DATA
EN	Voice processing for the channel is active. 1-Screen detects and reports EN status when a steady pattern is detected.	ENABLED
4W	Measured ERL is >42dB and appearing to be a 4-wire termination. No detectable echo.	4-WIRE TAIL CIRCUIT
HH	The HHOLD feature for that channel is set to IN, indicating the H-register is “frozen.” During normal operation, this feature is set to OUT.	H REGISTER FROZEN
HK	Channel is on-hook (idle), and cancellation is inactive.	ON HOOK DISABLED
HSC	HSCSD mode.	BYPASSED - HSCSD
LB	Either Tail or Long Haul side is in Loopback mode.	LOOPBACK
MB	E1 line is in Metallic Bypass.	SYSTEM IN METALLIC BYPASS
MN	System is in Monitor Mode, and system bypass is IN.	SYSTEM BYPASSED - MONITOR MODE
MRB	Music ringback.	MUSIC RINGBACK
RD	Digital Milliwatt is generated in the Receive Out direction.	DMW ROUT
RNG	A tone (ring) is detected while the channel is on-hook. When an idle code defining the channel's on-hook state is replaced by a ring, there is no reason to start voice processing, so the DSP holds the channel in on-hook state without an idle code.	ON HOOK, RING DETECTED

Table 9-22 Channel Status Conditions (Continued)

Chan Status in 1-Screen	Description of Condition	Channel Status as Displayed by STATUS Command
RS	Steady pattern—other than idle code— is detected in the Receive direction.	RCV DIR STEADY PATTERN DETECTED
SB	System Bypass is IN.	SYSTEM BYPASSED
SD	Digital Milliwatt is generated in the Send Out direction.	DMW SOUT
SDT	Low frequency signature tone (20Hz) detected.	TANDEM / MUSIC SIGNATURE DETECTION
SLB	System in Loopback.	SYSTEM IN LOOPBACK
TDB	G.164 Tone disable.	TONE DISABLER BYPASS
TFO	Bypass due to TFO.	BYPASSED - TFO
VL1	Video stream detected: Level 1 (Annex A/H.223) protocol for low error-prone wireless channels.	VIDEO STREAM LEVEL 1
VL2	Video stream detected: Level 2 (Annex B, C, D/H.223) protocol for moderate or highly error-prone wireless channels.	VIDEO STREAM LEVEL 2
XS	Steady pattern—other than idle code—is detected in the transmit direction.	SND DIR STEADY PATTERN DETECTED

9.6.9 Reflectometry Channel Measurements

The lower portion of the 1-Screen display can provide Reflectometry measurements or hybrid echo measurements (Section 9.6.10 on page 158) for each channel.

Table 9-23 describes the Reflectometry channel measurements. Reflectometry measures echo and echo cancellation from 0 to 192ms on the Tail side. These measurements are continually updated instantaneously.

Table 9-23 1-Screen Reflectometry Channel Measurements

Parameter	Description
SND SG RCV SG	A/B or C/D signaling bit status for all channels is monitored and displayed in real time. SEND SG and RCV SG display the 0 or 1 state of these signaling bits in the Send and Receive directions, respectively.
SND PTRN RCV PTRN	Steady patterns received by the channel, if any.
SND GAIN RCV GAIN	Actual Gain or Loss applied to the signal in the voice quality applications.
ERL	Echo Return Loss in dB actually measured across the hybrid from the Receive Out to Send In port of the echo canceller (Tail circuit). This measurement shows the attenuation present in the Tail circuit. Note that Reflectometry can only show ERL values less than the channel provisioned settings. ++ in this field indicates that the echo canceller is converging. Once convergence is achieved, a measured ERL value is displayed.
ERLE	Echo Return Loss Enhancement in dB is defined as the attenuation of echo provided by the echo canceller measured from the Receive Out port to the Send Out port on the Tail side and the Send Out port to the Receive Out port on the Long Haul side. The values represent the echo canceller enhancement on a channel and not the enhancement after the residual echo control circuit or the ERL of the Tail circuit hybrid. ++ in this field indicates that the echo canceller is converging. Once convergence is achieved, a measured ERLE value is displayed.
SND LVL RCV LVL	Displays the Send and Recieve power levels.
MAX DLY	Maximum reflection measurements show the round-trip delay (in ms) for a signal to travel from Rcv Out to the hybrid and back to Send In. Provision the QVP so that the maximum reflector is less than the provisioned Tail delay setting. Note that Reflectometry can only show the Maximum Tail Delay values less than the channel provisioned settings. Channels can be individually set for optimum performance in non-switched circuit applications. ++ in this field indicates that the echo canceller is converging. Once convergence is achieved, a measured MAX DLY value is displayed.

9.6.10 Hybrid Echo Measurements

The lower portion of the 1-Screen display can provide hybrid echo measurements for each channel. To access the hybrid echo measurements, press the “G” key to toggle to the display.

The following is an example of a hybrid echo measurement screen:

```
** DITECH QVP-E1 ****** 1-SCREEN CHANNEL MONITORING ***** 12/29/2006, 14:48:13
CIRCUIT ID: LINE 1   PORT: Maint. Shelf 4,  Slot 1,  E1 1

CHANNEL          1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
TIME SLOT        0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
CHAN MODE       EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN  EN


CHAN STATUS     AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
CALL NUMBR       0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
DURATION        --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
DLY TL          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EPL TL          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EEPL TL         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
DLY LH          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EPL LH          --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
EEPL LH         --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --

[SPACE]alter,[S]elect,[P]rov,[U]se,[A]bort,e[X]it,to[G]gle,[H]elp,[J]ump,[?]
```

Table 9-24 describes the hybrid echo measurements. Echo and echo cancellation from 0 to 400ms on both the Tail and Long Haul sides are measured and displayed. These measurements are updated per call, as measurement data becomes available.

Table 9-24 1-Screen Hybrid Echo Measurements

Parameter	Description
CALL NUMBR	Call identifier that increments each time a call is made (up to 3 digit field).
DURATION	Duration of current call. Field will display number “0” to “600” for seconds, “10m” for 10 minutes (up to 59 minutes), “1h” for an hour.
DLY TAIL	Tail Delay measurement that measures delay (in ms) on the Tail (TL) side of the QVP up to 400ms.
EPL TAIL	Echo Path Loss Tail measurement that measures the relative difference of echo reflection (in dB) between Receive Out (Rout) and Send In (Sin) on the Tail (TL) side of the QVP.
EEPL TAIL	Enhanced Echo Path Loss measurement that measures the relative difference of the Tail (TL) echo reflection (in dB) after it has been processed for voice quality enhancement and HEC, and is exiting the QVP on the Send Out (Sout) side.
DLY LH	Long Haul Delay measurement that measures delay (in ms) on the Long Haul (LH) side of the QVP up to 400ms.
EPL LH	Echo Path Loss Long Haul measurement that measures the relative difference of the echo reflection (in dB) between Send Out (Sout) and Receive In (Rin) on the Long Haul (LH) side. The EPL LH and EEPL LH values should be equivalent, since there is no Hybrid Echo Cancellation on the Long Haul side.

Table 9-24 1-Screen Hybrid Echo Measurements (Continued)

Parameter	Description
EEPL LH	Enhanced Echo Path Loss measurement that measures the relative difference of the Long Haul (LH) echo reflection (in dB) after it has been processed for voice quality enhancement and HEC, and is exiting the QVP on the Receive Out (RO) side. The EPL LH and EEPL LH values should be equivalent, since there is no Hybrid Echo Cancellation on the Long Haul side.


Notes

10.1 Overview

Maintenance commands are primarily used for testing and troubleshooting. Commands include:

* Replaced by **SETSYS** command parameter IS EXPECTED (see page 92) in version QE-5.06.08 and greater.

Warning These commands can disrupt normal operation and must be used with caution.

10.2 Alarms

The QVP E1 displays equipment alarms and facility alarms of “urgent” or “deferred” severity. The front panel LEDs indicate the type and severity of the alarms occurring on the card at the **EQPT** LED and on each E1 line at the **STATUS** LEDs, numbered 1-4 for each line. Table 10-1 lists the alarm indications and descriptions.

Table 10-1 Alarm Indications

LED	Indication	Description
EQPT	Red	Urgent equipment fault has occurred.
	Yellow	Deferred equipment fault: Battery or Fuse A or B failure has occurred.
	Green	Card is operating normally.
	Green, Flashing	Card is operating normally, and a user is logged on.
	Off	No power; card is not operating.

Table 10-1 Alarm Indications (Continued)

LED	Indication	Description
STATUS Lines 1-4	Red	Urgent facility alarm has occurred on the line.
	Red, Flashing	Out of frame.
	Yellow	Deferred facility alarm has occurred on the line.
	Yellow, Flashing	AIS or line is in bypass or loopback mode.
	Green	Line is operating normally.
	Off	The card is not operating, or the card is not powered.
ACO	Green	The Alarm Cutoff has been activated.
	Off	The ACO is inactive.

The QVP front panel provides an **ACO** push button to enable the alarm cutoff function. The **ACO** button can also initiate a lamp test, which momentarily lights all front panel LEDs. Figure 2-13 on page 28 shows the front panel lamps and push button.

10.2.1 Office Alarms

Note For release QE-5.06.08 and greater, the **OFCALM** command is retired and replaced with the **SETSYS** parameter **IS EXPECTED**. To disable office alarms, use **IS EXPECTED** = **NO**; to re-enable office alarms, set **IS EXPECTED** to **YES**.

When **IS EXPECTED** is set to **NO**, the front panel LED for the related line is turned off. **IS EXPECTED** is defined on page 65.

In addition to card alarms, high density shelf assembly relays can be connected at the shelf backplane to detect office bay, aisle, and shelf alarms. These dry-contact relays are accessible for office use through the shelf's wire-wrap connectors. Sets of normally-open (NO), normally-closed (NC), and common (COM) contacts are present at the connectors to provide a display for each alarm.

The **OFCALM** command setting controls office alarm reporting—whether the office alarm relays are triggered when a facility alarm is detected on an E1 line. Turning off the reporting of office alarms (Out) may be useful during installation, when the signal may be unstable. In addition, office alarm reporting can be turned off when some lines are not used (while other lines are in use). During normal operation, alarm reporting should be set to In.

```
Syntax: OFCALM [line#|All In|Out [L]]
         line# = 1 to 4
    In|Out  - enable|disable alarm reporting
    L after Out means the LEDs will be Off, too
```

Note It is the user's responsibility to ensure that the card is in the "In" state for office alarms during normal operation.

10.2.2 Equipment Alarms

When the card registers an urgent alarm, the **EQPT** LED is red. For a deferred alarm, such as a battery failure, the **EQPT** LED is yellow. Equipment alarms include DSP failure, bootup failure, and failure of battery A or B.

Equipment alarms of urgent severity normally require card replacement. However, an Admin Bootup Failure, for example, may simply be due to insufficient DSPs for a selected feature package.

For a list of Equipment Alarms, refer to the alarm tables found in Section 5.5, “Alarms”, on page 84.

Note During administration and maintenance, the **STATUS** LED flashes yellow to indicate bypass (Section 10.3.5 on page 167) or loopback (Section 10.3.3 on page 167).

10.2.3 Facility Alarms

An urgent facility alarm indicates an immediate problem and sends an Alarm Indication Signal (AIS) to alert downstream equipment of the problem. For a list of Facility Alarms, refer to the alarm tables found in Section 5.5, “Alarms”, on page 84.

10.2.3.1 Facility Alarm Processing

Relays located on the high density shelf assembly provide dry contact closures to activate alarms. The QVP reacts to an urgent facility alarm by activating the relay contacts and lighting the line’s **STATUS** LED red. Figure 10-1 shows the alarm process.

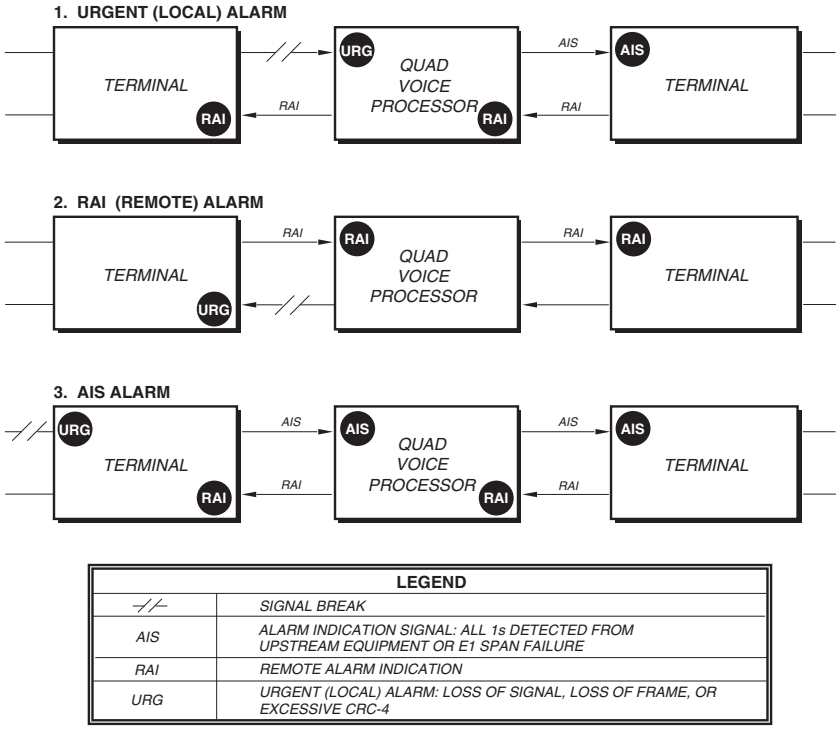


Figure 10-1 Alarm Processing

The AIS alarm indicates a disruption in the upstream path: the incoming signal is unframed and contains all ones. When the QVP receives the AIS alarm, the card activates the deferred facility alarm relay contacts and lights the line's **STATUS** LED yellow. The card also passes the AIS alarm downstream from the direction it is received. Transmission integrity is maintained, while downstream equipment is alerted to the problem.

The QVP can also receive a Remote Alarm Indication (RAI) alarm, also called a "distant" alarm, indicating that the upstream terminating equipment is experiencing a loss of framing or loss of an incoming signal. To alert the downstream equipment of this condition, bit 3 of timeslot 0 in non-frame alignment frames is set to 1 and transmitted to the distant end. On receipt of an RAI alarm, the QVP activates the deferred facility alarm relay contact and lights the **STATUS** LED yellow for the corresponding facility.

10.2.3.2 Troubleshooting a Facility Alarm

To troubleshoot a facility alarm, first locate the Ditech high density equipment that has activated the alarm by using the front panel **STATUS** LEDs (Table 10-1 on page 161). System alarm status is also accessible using the **SYSTEM** command at a DTE terminal.

When beginning to troubleshoot, determine first whether multiple alarms exist. This usually indicates either a major facility failure or power interruption. If this is the case, follow your company's procedures for service restoration.

If the fault remains after completion of the procedure in Table 10-2 on page 164, Ditech recommends replacing the suspected module. Be sure to provision the new equipment for your application.

For original equipment repair, see "Support" on page 181. For assistance in resolving technical problems, contact Ditech Customer Service at support@ditechnetworks.com or 1-800-770-0117.

Note If all LEDs are off, there is no power to the card. Check for a blown fuse at the shelf's rear panel and at the fuse distribution panel.

Use the procedure in Table 10-2 to troubleshoot facility alarms.

Table 10-2 Troubleshooting Facility Alarms Procedure

Step	Description	Comment
1	On the front panel of the QVP that has the alarm, push the **ACO** button.	Reset and release the office alarms.
2	Verify which front panel indicator is lit or flashing.	If multiple indicators are activated, investigate each individually.
3	Determine which E1 line has the alarm, the type of the alarm (LFA, LOS, DA, AIS), and its direction (SND, RCV).	If V.24 access is available, use the **SYSTEM** command.
4	Following the normal office procedure, check the following features on the upstream terminating equipment: • Drop-side (Tail) and all interconnecting cables for malfunction in the Send (SND) direction. • Line-side (Long Haul) and all interconnecting cables for malfunction in the Receive (RCV) direction.	A disruption or loss of the incoming signal at the Send-In port can cause these alarms. A disruption or loss of the incoming signal at the Receive In port can cause these alarms.

Table 10-2 Troubleshooting Facility Alarms Procedure (Continued)

Step	Description	Comment
5	Use the **SYSTEM** command to verify compatibility of the system settings with the terminating equipment.	Alarm condition can be falsely detected if the E1 is incorrectly provisioned. This is especially important during installation.
6	If the alarms persist and you cannot resolve the problem, contact Ditech Customer Service at support@ditechnetworks.com or 1-800-770-0117.	
7	When the alarm condition clears, verify that the corresponding front panel STATUS LED also clears.	Note that there is a 10-second delay between clearing the alarm condition and clearing the front panel LED.

10.3 Testing

10.3.1 DMW Signal

The **DMW** command enables a digital milliwatt signal on the current channel in the Receive Out direction, Send Out direction, or both directions.

The **DMW** command syntax is as follows:

```
DMW <OFF, ROUT, SOUT, BOTH>
Enable/disable DMW generating on the current channel
OFF = disabled, ROUT = Receive Out, SOUT = Send Out, BOTH = Receive Out and
Send Out
```

To enable DMW signal generation on Send Out, type the command and direction:

```
5-1,4-5>DMW SOUT
```

The QVP responds:

```
E1 4, CHANNEL 5 :
DIGITAL MILLIWATT - [OFF],ROUT,SOUT,BOTH
*** changed to ***
DIGITAL MILLIWATT - OFF,ROUT,[SOUT],BOTH
```

10.3.2 System Loopback

```
SYSLB <NONE, TAIL, LONG HAUL> | Put Current E1 in/out of Loopback
NONE = disabled, TAIL = Send In/Receive Out, LONG HAUL = Receive In/Send Out
```

The **SYSLB** command enables/disables digital loopback on the Long Haul and Tail sides of the E1 line. Looping either the Tail or Long Haul side interrupts service on all 31 channels. When this command is issued, voice processing stops.

Note When the E1 line is in loopback, the QVP front panel **STATUS** LED flashes yellow, and an AIS alarm is sent to the downstream equipment.

Figure 10-2 shows the loopback modes.

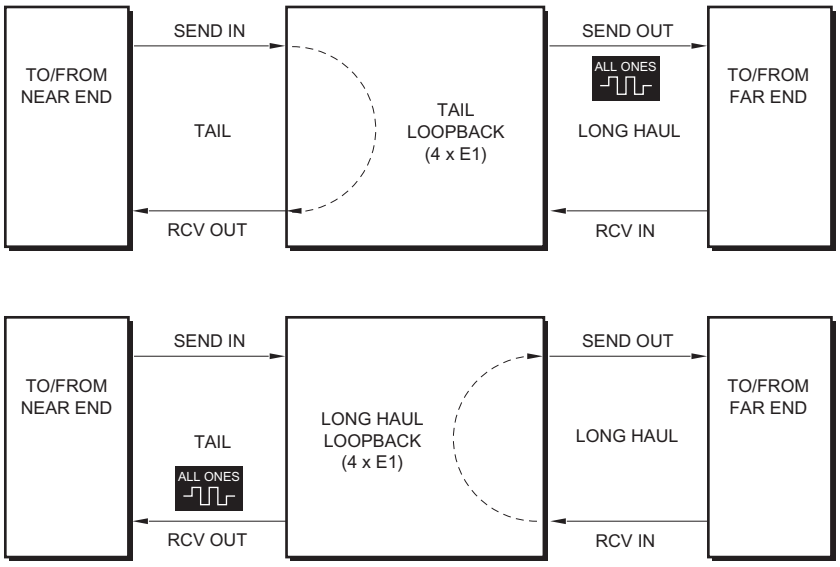


Figure 10-2 Tail and Long Haul Loopbacks

Figure 10-3 shows Tail loopback mode as it is implemented within the voice processor.

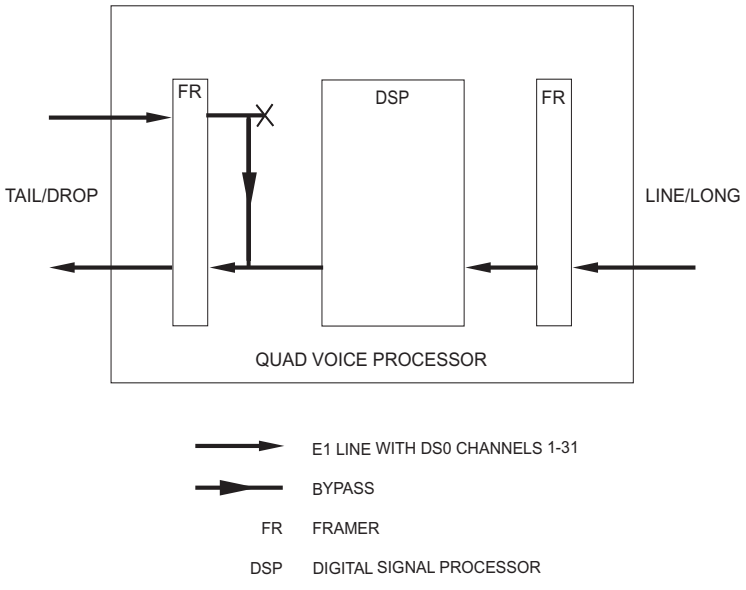


Figure 10-3 Tail Loopback in the QVP

10.3.3 Channel Loopback

The **CHANLB** command puts the current channel into loopback mode on both the Long Haul and Tail sides of the voice processor.

The **CHANLB** command syntax is as follows:

```
CHANLB <OUT, IN>
enables loopback mode for the current channel
OUT = Receive In and Send Out, IN = Send In and Receive Out
```

On the Long Haul side, Receive In and Send Out are connected. On the Tail side, Send In and Receive Out are connected. Loopback occurs outside the voice processing circuitry and removes the QVP channel from the circuit.

10.3.4 Lamp Test

The **LAMP** command initiates a lamp test, in which all front panel LEDs flash for a specified duration in seconds.

The **LAMP** command syntax is as follows:

```
LAMP <duration>
initiates a lamp test of the front panel LEDs
duration = 1 to 120 seconds
```

If no duration is set, 1sec is assumed. The **LAMP** command can be broadcast to multiple QVPs (Section 4.6, “Broadcasting Commands”, on page 40).

10.3.5 Metallic Bypass

The **METBP** command puts the selected card and its four E1 lines in metallic bypass.

The **METBP** command syntax is as follows:

```
METBP <IN, OUT>
Put current E1 in/out of Metallic Bypass
IN = enabled, OUT = disabled
```

Normally, the lines are in metallic bypass only if the card is not present or while the card is going through the initialization sequence. For troubleshooting, it is sometimes useful to physically exclude the voice processor from the signal path. When the E1 is put into metallic bypass, the signal path directly connects Receive Out with Receive In and Send Out with Send In. When typed without a parameter, the **METBP** command displays the bypass status of the four E1 lines (Figure 10-4 on page 168).

When a card is in metallic bypass, the front panel **STATUS** LED flashes yellow, and the Chan Status field in 1-Screen reads “MB.” Once put in bypass, the card stays in bypass until the **METBP OUT** command is typed. Metallic bypass is non-volatile, so the card retains its provisioning after it is reinserted.

Figure 10-4 shows the metallic bypass.

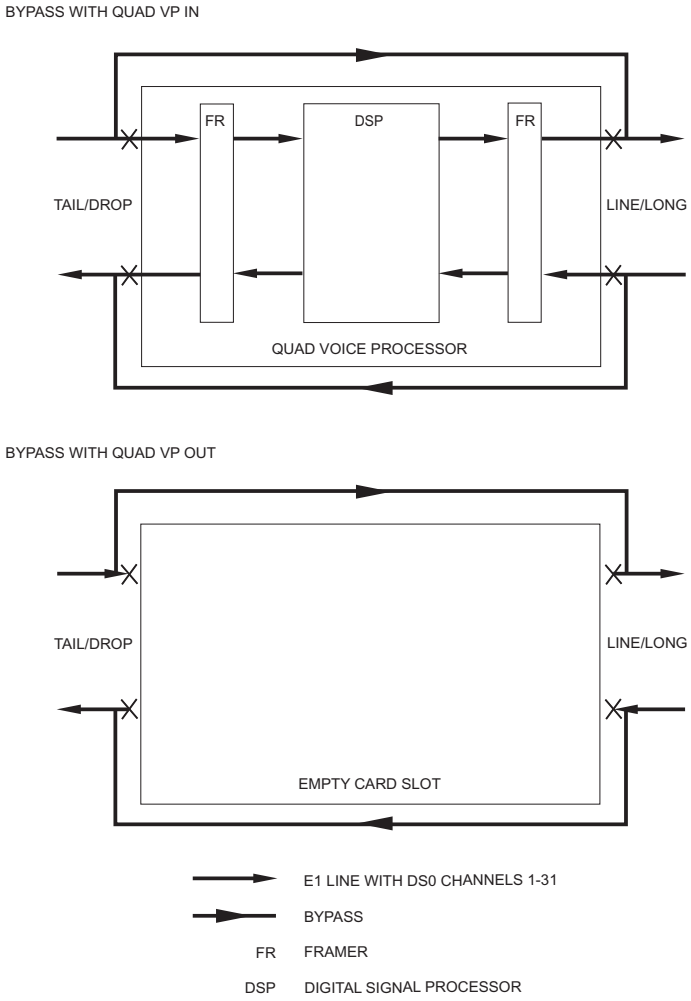


Figure 10-4 Metallic Bypass

10.4 Provisioning

10.4.1 Custom Provisioning Profile

The **CUSTCODE** command assigns a custom provisioning profile to each E1 line of the QVP.

The **CUSTCODE** command syntax is as follows:

```
CUSTCODE <k1, k2, k3, k4>
assigns the lines a custom provisioning profile
k1, k2, k3, k4 = user-defined profile for line 1, line 2, line 3, and line 4
```

Subsequent use of the **SETALL FACTORY** command (Section 4.11.3 on page 61) restores these profiles to the current provisioning settings.

Entering the command with no parameters displays the current custom code settings for each line's factory default profile:

```
1-1,1-1>CUSTCODE
     E1 1: custom code 12
     E1 2: custom code 12
     E1 3: custom code 12
     E1 4: custom code 12
```

To set the custom code for profile 12, type:

```
1-1,1-1>CUSTCODE 12 12 12 12
```

10.5 BSETALL Command

10.5.1 Provisioning Multiple E1 Lines

The **BSETALL** (Broadcast **SETALL**) command is equivalent to the **SETALL** command, but broadcasts to all E1 lines of the QVP and executes unconditionally (without requesting confirmations).

```
BSETALL [<N>|FACTORY] [NOBF]
broadcasts a SETALL command to all E1 lines and sets the default
configuration for the selected E1, unconditionally
       <N>      - default profile to use
       FACTORY  - use factory profile per custom codes
       ALL      - apply to all E1s, otherwise to the current E1
       NOBF     - do not overwrite Is Expected, Framing, Bypass,
                  and CRC4 settings
```

This command can be broadcast to all the cards in silent logon mode. See Section 5.3, "SYSTEM Command", on page 64 as well as Section 6.5, "SETALL Command", on page 93.

The **BSETALL FACTORY** command is equivalent to the **SETALL FACTORY** command, broadcast to the E1 lines and executed unconditionally. See Section 4.11.3, "Restore Factory Defaults", on page 61.

10.6 BSAVEDFLT Command

The **BSAVEDFLT** (Broadcast Save Provisioning as User Default Profile) command saves the line and channel provisioning for all E1 lines of the QVP as the user default profile.

The **BSAVEDFLT** command syntax is as follows:

```
BSAVEDFLT | Save current configuration as user default, broadcastable
```

Default profiles prevent the loss of custom changes made while provisioning cards. This command can be broadcast to all the cards in silent logon mode. See the **BSETALL** command (Section 10.5) for information about restoring provisioning from the user default settings.

To save the provisioning of all E1 lines to the user default settings, type:

```
1-8,1-1>BSAVEDFLT
```

The QVP responds with the following information:

```
E1 1 provisioning saved as user default
E1 2 provisioning saved as user default
E1 3 provisioning saved as user default
E1 4 provisioning saved as user default
```

10.7 HHOLD Command

The **HHOLD** command freezes the H-registers of the current channel or displays whether the H-register of the current channel is frozen. The H-register holds the last echo path model.

The **HHOLD** command syntax is as follows:

```
HHOLD <OUT|IN> | Freeze (IN) or release (OUT) the H-register of the current
channel
```

Entering the **HHOLD** command without any parameters displays whether the H-register of the current channel is frozen (IN) or not frozen (OUT).

The **HHOLD** and **HCLR** commands are both used for G.168 compliance testing.

10.8 HCLR Command

The **HCLR** command clears the H-register of the current channel. The H-register holds the last echo path model.

The **HCLR** command syntax is as follows:

```
HCLR <ch> | Clear H-register of the current (or given) channel
```

The **HHOLD** and **HCLR** commands are both used for G.168 compliance testing.

10.9 Data Path (RDP)

The **RDP** command sets the RDP data path. Use RDP IN for normal operation.

The **RDP** command syntax is as follows:

```
RDP <OUT, IN> | sets the RDP data path
OUT = disabled, IN = enabled
```

To enable the data path, type:

```
1-1,1-1>RDP IN
```

The QVP responds:

```
RDP DATA PATH - [OUT],IN
***changed to ***
RDP DATA PATH - OUT,[IN]
```

10.10 Narrow Band Filter (NBF)

The **NBF** command sets the Tone Disabler bandwidth to detect 2100 Hz only (In), or to also detect legacy modem answer tones (Out).

The **NBF** command syntax is as follows:

```
NBF <Out, In> | Enable/Disable Narrow Band Filter
```

When entering the **NBF** command with no parameter, the output displays the current setting:

```
NARROW BAND FILTER - OUT,[IN]
```

To disable Narrow Band Filter, type:

```
1-2,1-1>NBF OUT
```

The QVP responds:

```
NARROW BAND FILTER - OUT,[IN]
*** changed to ***
NARROW BAND FILTER - [OUT],IN
```


Notes

The following specifications describe the QVP as configured in high density (80sa) and 4sa shelf assemblies.

Table A-1 QVP Specifications

Type	Characteristic	Specification
Network Interface	Line Rate	CEPT 2.048Mbps 30/31 channel modes
	Framing Format	ITU-T G.704: CAS or CAS + CRC-4
	Line Encoding	HDB3 per ITU-T G.703, G.704
	PCM Encoding	A-law per ITU G.711 (Segmented 13)
	Jitter Tolerance	ITU-T G.823
	Signaling	CAS, CCS, Q.50 (AB/CD)
	Line Impedances per Card Types	75Ω nominal, unbalanced for BNC 120Ω balanced for Wire Wrap
	Output Synchronization	Normal (Through-Timing)
Terminal Control	Serial Interface	3 V.24 (RJ-11) ports: 1 on faceplate, 2 on backplane
	Data Transfer	Selectable up to 19200 baud
	Provisioning	Local: Command Line Interface, WinMAP™ (GUI) Multisite: NetConsul™ EMS (GUI)
Front Panel	Controls	Push button activates ACO (Alarm Cutoff).
	Alarm Indicators	LEDs for power/logon, ACO, and urgent and deferred facility and equipment alarms
Monitoring	Alarm Monitoring	Local, distant, AIS, multiframe, distant multiframe Dry contacts for Alarms and E2A Interface
	Performance Monitoring	References ANSI T1.231-1997
Redundancy	Power Input: Carrier Shelf	A&B fused inputs source redundancy
	Protection	Metallic bypass relays for failsafe operation Fans alarmed; no single fan critical
Electrical	Input Current	0.27A at –48VDC for QVP with 8 DSPs 0.22A at –48VDC for QVP with 4 DSPs
	Power Consumption QVP card	13W maximum per QVP E800 card (8 DSPs) <0.27A @ -48VDC <110mW per channel 11W maximum per QVP E400 card (4 DSPs) <0.22A @ -48VDC <95mW per channel

Table A-1 QVP Specifications (Continued)

Type	Characteristic	Specification
Electrical (Con'd)	Power Consumption 80sa High Density shelf fully loaded with 20 QVP cards	260W fully loaded shelf (QVP E800 –- 8 DSPs per card) 220W fully loaded shelf (QVP E400 –- 4 DSPs per card)
	Power Consumption 4sa shelf with 1 QVP card	13W fully loaded shelf (QVP with 8 DSPs) 11W fully loaded shelf (QVP with 4 DSPs)
	Fan Assembly (80sa High Density)	18W per fully loaded shelf
	Input Voltage (80sa High Density)	Dual A&B –48 VDC source: –36 to –60VDC
	Input Voltage (4sa shelf)	–48 VDC source: –36 to –60VDC 110/240 VAC, 50/60 Hz autosensing, universal
Environmental	Operational	Temperature: 5° to 40°C Short Term: –5° to 55°C Humidity: 5 to 90%, non-condensing
	Non Operational	Temperature: –40° to 70°C Humidity: 5 to 95%, non-condensing
	Heat Output	80sa Shelf: 890 BTU/hour (QVP E800 with 8 DSPs) 80sa Shelf: 750 BTU/hour (QVP E400 with 4 DSPs)
Physical	Card Dimensions (H x W x D)	241 x 21 x 229 mm
	Card Weight	0.55 kg
	High Density (80sa) Dimensions (H x W x D)	BNC shelf (15 U): 375 x 440 x 340 mm Wire Wrap shelf (10 U): 250 x 440 x 310 Fan assembly (2.4 U): 59 x 440 x 310 mm
	4sa Dimensions (H x W x D)	BNC shelf (1.8 U): 44 x 440 x 240 mm RJ-48C/Wire Wrap shelf (1.8 U): 44 x 440 x 240 mm
	High Density (80sa) Weight	Empty BNC shelf: 10 kg Empty Wire Wrap shelf: 8.6 kg
	4sa Weight	Empty BNC shelf: 0.9 kg Empty RJ-48C/Wire Wrap shelf: 0.9 kg
Reliability	MTBF (Mean Time Between Failures) Per Telcordia SR-332 Issue 1 May 2001	QVP Card: 42 years at 40°C
Regulatory	Regulatory Information	UL 60950 / EN 60950 CAN/CSA-C22.2 EN 300 386-1 and -2 ETS 300 132-2 / EN 61000 EN 55022 (CISPR 22) Class B CE Mark Telcordia GR-1089-CORE NEBS Level 3 per Telcordia SR-3580

B.1 Power

For rack assembly and shelf installation, refer to Chapter 2 on page 15. Observe all safety measures and warnings. Figure B-1 shows recommended safety equipment for electrostatic discharge.

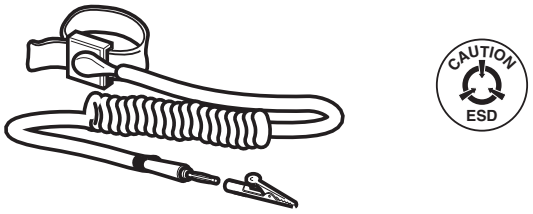


Figure B-1 ESD Wrist Strap

For the BNC rack assembly, power and ground cabling are connected to terminal block TB1 on the backplane. The –48VDC power source must be rated to independently power a fully loaded shelf. A diode-steering circuit provides failsafe protection for the A and B battery inputs should a loss occur at either source.

Ditech recommends using 16-gauge or thicker copper power cables. Using aluminum or copper-clad aluminum wire is not recommended. This complies with safety standard UL 60950 (EN 60950). Follow the EMI precautions when selecting cables (Table B-1).

Table B-1 Power and Ground Cables

Cable	Description
Power	Recommended: TFFN, 16 AWG, Red, Black, 600V.
Ground Strap	6”, 14 AWG, green/yellow wire. The ground strap links the Connector panel to the rack to prevent ground loop currents.
Power	Unshielded, THHN, 16 AWG, stranded, red, black, blue, 600V.
Power	Unshielded, cotton braid cover, gray flame retardant, 16 AWG.
Power	Shielded (90-100%), two or three conductor, 16 AWG, tinned copper, polyester insulated, 600V.

B.2 Signal

A special tool should be used for safety when BNC connectors are installed (Figure B-2).

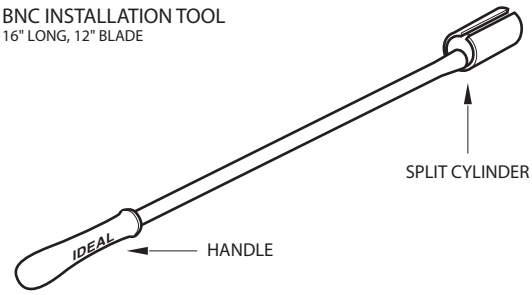


Figure B-2 BNC Installation Tool

Figure B-3 shows other typical signal cables and connectors. For a list of compatible cables used with Telco connectors, BNC connectors and Wire Wrap office alarm connections, see Table B-3 on page 178.

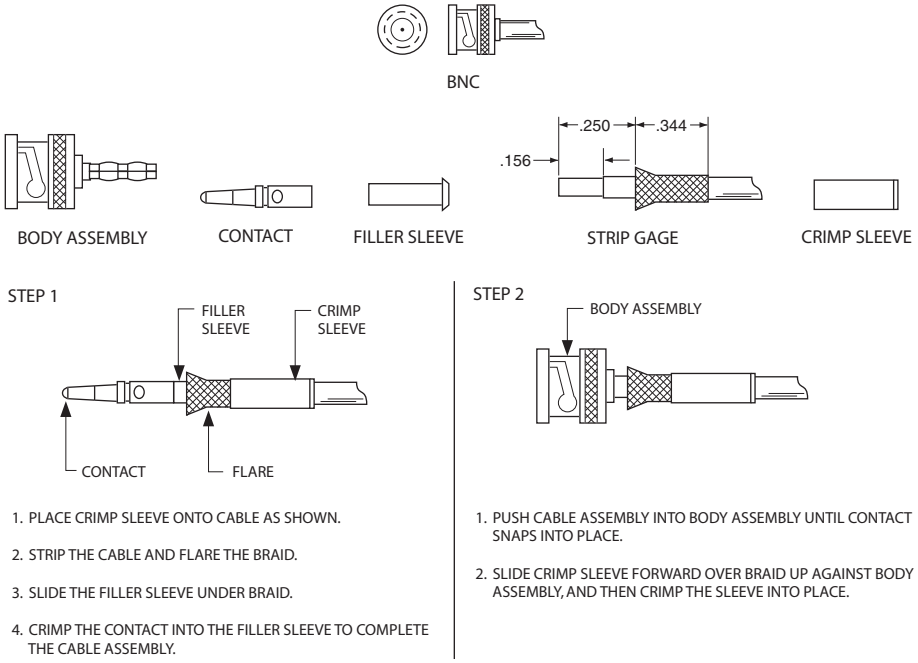


Figure B-3 Coaxial Cables and BNC Connectors

Figure B-4 shows a Telco connector pinout.

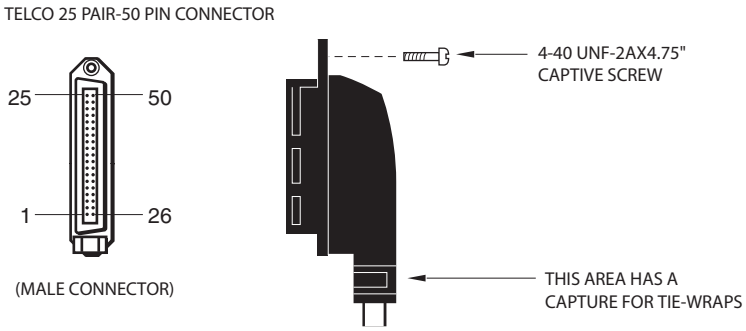


Figure B-4 Telco Connector Pinouts

The color codes in Table B-2 apply to most cables.

Table B-2 Standard Color Code for 25-Pair Cable

Ring			Tip		
1	Blue-White	BL-W	26	White-Blue	W-BL
2	Orange-White	OR-W	27	White-Orange	OR-W
3	Green-White	GR-W	28	White-Green	W-GR
4	Brown-White	BR-W	29	White-Brown	BR-W
5	Slate-white	SL-W	30	White-slate	W-SL
6	Blue-red	BL-R	31	Red-blue	R-BL
7	Orange-red	OR-R	32	Red-orange	R-OR
8	Green-red	GR-R	33	Red-green	R-GR
9	Brown-red	BR-R	34	Red-brown	R-BR
10	Slate-red	SL-R	35	Red-slate	R-SL
11	Blue-black	BL-BK	36	Black-blue	BK-BL
12	Orange-black	OR-BK	37	Black-orange	BK-OR
13	Green-black	GR-BK	38	Black-green	BK-GR
14	Brown-black	BR-BK	39	Black-brown	BK-BR
15	Slate-black	SL-BK	40	Black-slate	BK-SL
16	Blue-yellow	BL-Y	41	Yellow-blue	Y-BL
17	Orange-yellow	OR-Y	42	Yellow-orange	Y-OR
18	Green-yellow	GR-Y	43	Yellow-green	Y-GR
19	Brown-yellow	BR-Y	44	Yellow-brown	Y-BR
20	Slate-yellow	SL-Y	45	Yellow-slate	Y-SL
21	Blue-violet	BL-V	46	Violet-blue	B-BL
22	Orange-violet	OR-V	47	Violet-orange	V-OR
23	Green-violet	GR-V	48	Violet-green	V-GR
24	Brown-violet	GR-V	49	Violet-brown	V-BR
25	Slate-violet	SL-V	50	Violet-slate	V-SL

Table B-3 lists compatible signal cables used with BNC connectors, Telco connectors, and Wire Wrap office alarm connections.

Table B-3 Signal and Office Alarm (Wire Wrap) Cables

Cable	Description
Signal Coaxial	75Ω, unbalanced coaxial cable, 95% shield. For use with BNC connectors.
Signal Coaxial	75Ω, unbalanced, multiple coaxial conductors in a single sheath, 90% shield. For use with BNC connectors.
Signal Coaxial	75Ω, unbalanced, multiple coaxial conductors in a single sheath, 95% shield with straight or 90 degree BNC at both ends.
Signal Coaxial	75Ω, unbalanced, BNC connectors at both ends, double-shielded (95%).
Signal Telco	100Ω balanced, shielded, 24 AWG solid, tinned copper, E1 rated, with connectors, 90° hood with short screw, ring lug #6, drain wire 18 AWG stranded green/yellow (ground wire 12" long), and heat shrink–1/8" clear. For use with Telco Connector panels.
Signal Telco	100Ω balanced, shielded, 24 AWG solid, tinned copper, E1 rated. For use with Wire Wrap connectors (office alarms).
Signal Telco	120Ω balanced, shielded, 22 AWG, tinned copper. For use with Wire Wrap panels.

⚠ **Warning** For applications with cabling less than 300 feet (90 meters), 24-gauge wires are recommended. Lengths in excess of 300 feet must use 22-gauge or lower wires.

B.3 Serial Port Communications

Table B-4 lists the cables for serial port communications with high density shelves in a rack assembly. To configure the serial ports, see Chapter 3 on page 29.

Table B-4 Communications Cables

Cable	Application	Ditech Part Number
24" shelf interconnect data cable, RJ-11 to RJ-11	Shelf to shelf	030-0209-00
14' data cable, RJ-11 to RJ-11	Shelf to terminal/PC	030-0209-01
Adapter, RJ-11 to DB-25	Converter plug for Shelf to terminal/PC	168-0200-00
Adapter, RJ-11 to DB-9	Converter plug for Shelf to terminal/PC	168-0203-00
Kit, RJ-11 to DB-9 for shelves (with 14' RJ-11 to RJ-11 cable and RJ-11 to DB-9 adapter).	Shelf-to-terminal/PC	030-0261-00
Kit, RJ-11 to DB-9 for shelves (with 14' RJ-11 to RJ-11 cable and RJ-11 to DB-25 adapter).	Shelf-to-terminal/PC	030-0262-00

For RJ-11 configurations and pinouts, see Figure B-5 on page 179 through Figure B-7 on page 180.

Figure B-5 shows the RJ-11 configurations.

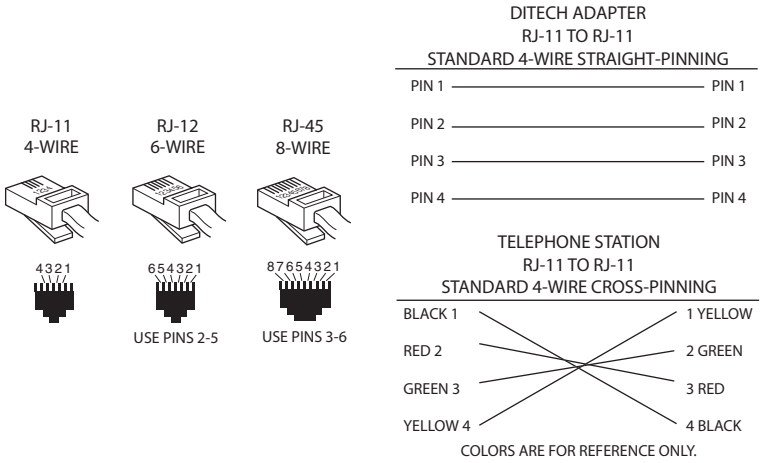


Figure B-5 RJ-11 Configurations

Figure B-6 shows the pinout for the RJ-11 to DB-9 adapter.

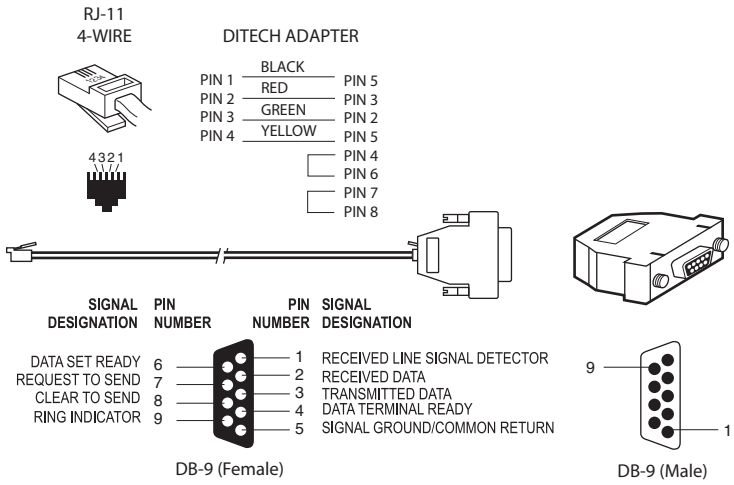


Figure B-6 RJ-11 to DB-9 Adapter Pinouts

B
Cabling

Figure B-7 shows the pinouts for the RJ-11 to DB-25 adapter.

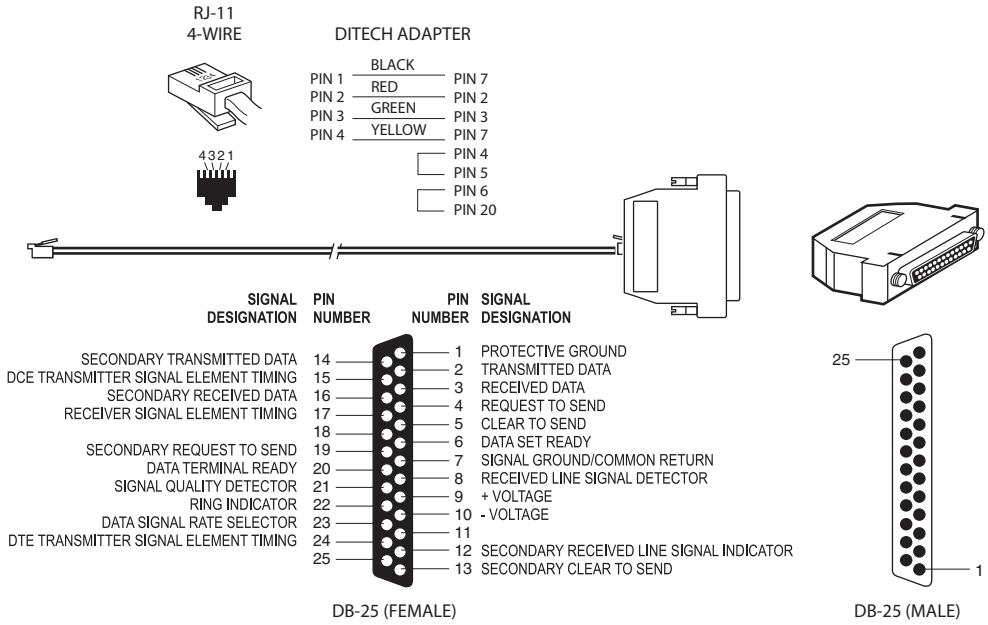


Figure B-7 RJ-11 to DB-25 Adapter Pinouts

Overview

This section contains the information needed to report a defective Ditech product or to return a Ditech product for repair or replacement in case of failure. Contact Ditech Customer Service:

- support@ditechnetworks.com
- 1-650-864-1800 Direct
- 1-800-770-0117 Toll Free (USA and Canada)

Warranty

Ditech's warranty policy covers defects in materials and workmanship for a limited period from the date of shipment. Liability under this warranty is limited to servicing, adjusting, repairing, or replacing, as necessary, any equipment returned to the factory for that purpose. Factory examination must disclose a manufacturing defect. Repaired or replaced items are returned to the purchaser surface freight prepaid within the continental USA.

This warranty does not extend to any equipment that has been subjected to misuse, neglect, accident, improper installation, or any other circumstances beyond the control of Ditech. Out of warranty repairs are billed to the purchaser at a fixed rate based on unit type. A purchase order for the repair must be received by Ditech before the repairs can be initiated. In such cases, an estimate is submitted for approval before repair is initiated. Repaired equipment is returned to the purchaser surface freight prepaid within the continental USA. For more information, see "Equipment Repair and Return" on page 182.

For detailed product warranty information, go to Ditech's corporate website at http://www.ditechnetworks.com. Liabilities of Ditech are limited and set forth in Ditech's standard terms and conditions. Copies are available on request.

To identify whether a product is currently covered by warranty services, contact Ditech Customer Service.

Warning The warranty is void if the product is not maintained properly, if it is misused, if the site is not prepared properly, or if the product is not installed properly. Further, the warranty is void if Ditech is not notified of a problem within the warranty period.

Equipment Repair and Return

Complete repair and return services are available from Ditech. If the Ditech product is considered defective, return it to Ditech without attempting repairs. The product warranty is void if the customer has made unauthorized attempts to repair the product. For more information about out of warranty repair services and advance replacements, see Ditech's corporate website at http://www.ditechnetworks.com.

To return one or more units, request the Equipment Return Authorization (ERA) number. Complete the ERA Request form on page 185. Leave the ERA number blank. Provide complete Ship To and Bill To addresses. Email the completed form to support@ditechnetworks.com, or fax it to 1-650-564-9843 with the following heading:

> Ditech Networks Repair Center
> Attn: ERA Request Form

Ditech Customer Service will respond within one business day, providing the ERA number authorizing the return, the Telecommunications Equipment number for shipping and customs, and additional information. Do not return the product to Ditech before receiving this information.

When returning the equipment, include the ERA Request form with the ERA number. For out of warranty repair services, include the product Purchase Order number.

Note on all shipping and customs declaration papers:

> Telecommunications Equipment Number
>
> US GOODS RETURNING FOR REPAIR.

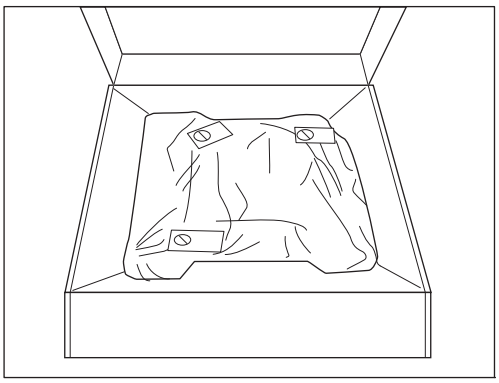
Card Packaging Instructions

Package the equipment in the original shipping container to prevent damage during transport. Use care when handling modules to prevent damage. Place each module in an anti-static bag, and pack each module with sufficient cushioning to prevent damage during shipping. If possible, replace modules in original packaging.

Package the QVP card as instructed in the table below.

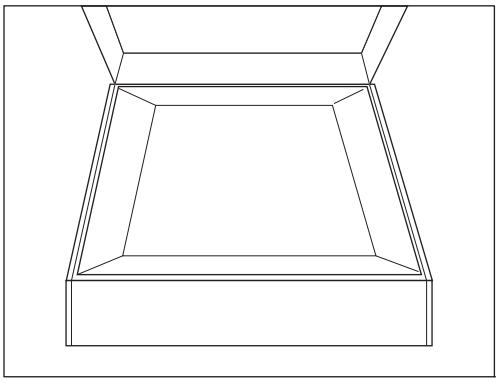
QVP Card Packaging Instructions

Step	Instructions
1	Place the QVP card in the ESD plastic bag, then place the bag in the anti-static foam. See the figure, "Place wrapped card in anti-static foam", on page 183.
2	Place the anti-static foam top over the card within the box. See the figure, "Cover the card with anti-static foam", on page 183
3	Close the box by securing the front and side flaps. See the figure, "Secure the box", on page 184
4	Seal or tape the box.
5	Mark the box with the ERA number and return address (see Ditech's Return Address).



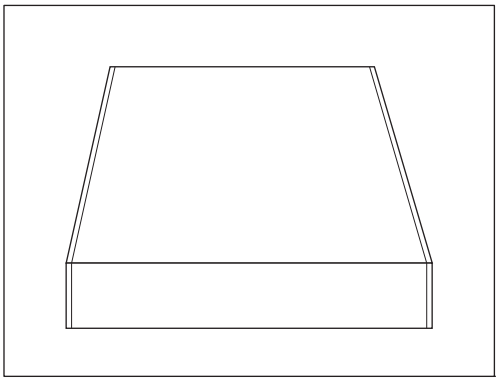
Place card in an ESD shielding bag.
Place into anti-static foam.

Place wrapped card in anti-static foam



Place top anti-static foam cover
to sandwich the card in box.

Cover the card with anti-static foam



Close box by securing side and front flaps.

Secure the box

Ditech's Return Address

Mark the ERA number along with Ditech's address on the outside of the shipping container, and send the package to:

Ditech Networks
Attn: Repair Center
ERA Number
825 East Middlefield Road
Mountain View, CA 94043
USA

Normal repair time is 15 working days from date of receipt. Ditech will incur the return freight charges for normal ground transportation only, unless prior arrangements are made through Ditech.

Shelf Accessories

To order shelf accessories such as air filters and AAD fan assemblies, complete the Shelf Accessories Order (SAO) Form on page 186. Email the completed form and a Purchase Order to Ditech Customer Service at orders@ditechnetworks.com, or fax the forms to 1-650-564-9598, Attn: Shelf Accessories Order.

Email the completed ERA form to support@ditechnetworks.com, or fax it to 1-650-564-9843.

Equipment Return Authorization (ERA) Request Form

ERA #: (Provided by Ditech)		**Date:**	
Customer/Company:		**Customer Ref #:**	
Ship To Address:		**Bill To Address:**	
Contact Name:		**Billing US$: (Warranty/Non)**	
Contact Phone:		**Unit Type: (See unit label - for example, QT1###)**	
Contact Fax:		**Warranty Date:**	
Contact Email:		**Unit Serial Number: (###-####-##)**	
Location in Office: (Rack/Shelf/System)		**Part Number:**	
Other:		**Software Version:**	
Reported Problem			
Tell us about the problem you are experiencing with the unit.			
		Signature (Required for Advance Replacements):	
By signing above, I agree to return the reported failed unit to Ditech within 10 business days or, if not returned, I will be responsible for the purchase of the new product at the current company pricing.			
Notes:			

Send the completed SAO form and PO via email to orders@ditechnetworks.com or via fax to 1-650-564-9598.

Note Pricing and availability are subject to change.

Shelf Accessories Order (SAO) Form

Date:		**Customer PO #:**			
Customer/Company:		**Contact Name:**			
Ship To Address:		**Contact Phone:**			
		Contact Fax:			
Bill To Address:		**Contact Email:**			
		Other:			
Accessory		**Ditech Part Number**	**Quantity**	**Price US$**	**Total US$**
AAD Air Filter 5-Pack for 80sa/BBEC (4-fan AADs only)		000-0101-00		100.00	
BVP Flex Air Filter 5-Pack for BVP Flex/upgraded BVP		000-0102-01		375.00	
Cooling Component					
4-Fan AAD, White for 80sa/BBEC with Quads		000-0100-02		1,500.00	
4-Fan AAD, Grey for 80sa with QVPs		000-0100-06		1,500.00	
8-Fan High Density Fan Assembly, White for 6-shelf (80sa) rack assembly with Quads		000-0100-03		1,875.00	
8-Fan High Density Fan Assembly, Grey for 6-shelf (80sa) rack assembly with QVPs		000-0100-07		1,875.00	
High Density Filter Assembly for 6-shelf (80sa) rack assembly		000-0100-00		250.00	
BVP Flex Fan Assembly for 10RU BVP Flex/upgraded BVP		000-0287-04		Quote	
Extenders					
AAD Extenders for ANSI/EIA 21”+ rack assembly		051-0320-00		38.00	
80sa/BBEC Extenders for ANSI/EIA/ETSI 21”+ rack assembly		051-0490-00		63.00	
Faceplate Covers for Empty Card Slots					
1-Slot Faceplate Cover, White for 80sa/BBEC shelf with Quad 2		050-0262-01		63.00	
1-Slot Faceplate Cover, Grey for 80sa shelf with QVPs		050-0263-01		63.00	
6-Slot Faceplate Cover, Grey for BVP/BVP Flex		051-0282-32		100.00	
1-Slot Faceplate Cover, Grey for BVP/BVP Flex		051-0282-31		100.00	
Shipping:					
Tax:					
Total:					

Symbols

Numerics

A

B

C

D

E

J

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M

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O

P

Q

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S

T

U

V

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Y