



**Digi International Inc.**

11001 Bren Road  
Minnetonka, MN 55343  
(800) 344-4273  
(612) 912-3444

**Digi International GmbH**

Domkloster 1  
50667 Köln  
Germany  
+49 221 920520

**Digi International Asia Pte Ltd**

13-06 Tower 'A'  
391A Orchard Road  
Ngee Ann City  
Singapore 0923  
+65 732 1318

# Installation Guide

and

# Reference Manual

**AccelePort Modem/8em, Modem/4em  
Modem Modules for Xem Systems, EPC/X  
Concentrators and PortServer II Systems**

90031700 Rev A

**AccelePort™, Xem™, PORTS/16em™, PORTS/8em™, PORTS/8emp™, Modem/8em™, Modem/4em™, PC/Xem™, PCI/Xem™, EISA/Xem™, MC/Xem™, AccelePort Xem™** and the Digi logo are trademarks of Digi International Inc. All other brand and product names are the trademarks of their respective holders.

© Digi International Inc. 1992-1996

All Rights Reserved

<b>Digi International Inc.</b>	Phone	(800) 344-4273
11001 Bren Road		(612) 912-3444
Minnetonka, MN 55343	FAX	(612) 912-4952
	BBS	(612) 912-4800

<b>Digi International GmbH</b>	Phone	+49 221 920520
Domkloster 1	FAX	+49 221 9205210
50667 Köln	BBS	+49 221 9205211
Germany		

<b>Digi International Asia Pte Ltd</b>	Phone	+65 732 1318
13-06 Tower 'A'	FAX	+65 732 1312
391A Orchard Road	BBS	+65 292 7163
Ngee Ann City		
Singapore 0923		

Information in this document is subject to change without notice and does not represent a commitment on the part of Digi International.

Digi provides this document "as is", without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of fitness or merchantability for a particular purpose. Digi may make improvements and/or changes in this manual or in the product(s) and/or the program(s) described in this manual at any time.

This product could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes may be incorporated in new editions of the publication.

# Table of Contents

---

Approvals and Notices.....	v
Federal Communications Commission (FCC) Statement .....	v
FCC Part 68.....	vi
Industry Canada Compliance Statement .....	vii
Safety.....	vii
Fax Branding .....	viii
Introduction .....	1
Features .....	2
Installation .....	3
AccelePort Xem Systems .....	3
EPC/CON-16 and PortServer II .....	4
Configuring the Modem/Xem .....	5
Speaker Control.....	5
Connecting to Phone Lines.....	6
Modem/Xem Software Setup .....	7
Modem/Xem Command Reference .....	8
Basic AT Commands.....	8
AT& ( <i>Ampersand</i> ) Commands .....	16
AT% (Percent) Commands .....	25
AT\ (Backslash) Commands.....	26
AT- (Dash) Commands .....	31
AT" (Quote) Commands .....	32
Class 1 FAX Commands .....	33
Class 2 FAX Commands .....	36
Class 2 FAX Responses .....	44
S Registers.....	46
S Register Definitions .....	47
Result Codes.....	64
Display Format Options .....	64
Extended Message Options .....	65
Negotiation Progress Messages.....	67
Specifications.....	71

Digi Support Services.....	72
The Digi Bulletin Board System .....	72
Internet FTP Server .....	73
World Wide Web Server .....	73
DigiFACTs FaxBack Server .....	73
Technical Support .....	75
Customer Service .....	75
Return Procedures .....	76
Index .....	77

**Figures**

Figure 1	EBI and POWER Connectors .....	3
Figure 2	EPC/CON-16 Concentrator with Two Modem/Xem Modules.....	4
Figure 3	Speaker Control DIP Switch Settings .....	5
Figure 4	Modem/8em Rear Panel.....	6
Figure 5	Modem/4em Rear Panel.....	6

**Tables**

Table 1	Supported FAX Transmit/Receive Modulations .....	34
---------	--------------------------------------------------	----

# Approvals and Notices

---

## Federal Communications Commission (FCC) Statement

### Radio Frequency Interference (RFI) (FCC 15.105)

This equipment has been tested and found to comply with the limits for Class A digital devices pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### Labeling Requirements (FCC 15.19)

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Digi may void the user's authority to operate this equipment.

### Cables (FCC 15.27)

Shielded cables *must* be used to remain within the Class A limitations.

# FCC Part 68

**FCC Registration: 5TLUSA-30679-MD-E**  
**Ringer Equivalence Number: 0.1B**

This modem module complies with Part 68 of FCC Rules. On the bottom of the Modem/Xem is a label that includes the FCC Registration Number and Ringer Equivalence Number (REN) for this modem module.

The REN is used to determine the number of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most, but not all, areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If your modem module interferes with the network, the Telephone Company may discontinue your service temporarily. If possible, they will notify you in advance. If advance notice isn't practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper function of your modem. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

## **Problems with your Modem/Xem**

If you experience trouble with your Digi Modem/Xem, please contact Digi Technical Support (see page 72 for phone numbers) for information on obtaining service or repairs. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning.

This equipment may not be used with coin operated telephones or party lines.

# Industry Canada Compliance Statement

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

This digital apparatus meets the telecom requirements of ICCS-03 (1846 7426 A).

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Cet appareil numérique satisfait les exigences télécommunications d'ICCS-03 (1846 7426 A).

## Safety

This product complies with the following safety standards:

- UL 1950
- CSA 22.2 No. 950

## **Fax Branding**

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual.

This information must be configured into your fax application software. Please consult the documentation provided with your fax application software for instructions.

# Introduction

---

This manual covers the installation, configuration and operation of the Digi AccelePort Modem/8em and Modem/4em modules. Software installation is described in a separate manual.

Digi offers two modem modules: the Modem/4em, which provides four high-speed asynchronous modems, and the Modem/8em, which provides eight high-speed asynchronous modems. The modems support throughput rates of up to 33,600 bps in data mode and up to 14,400 bps in FAX mode.

Modem/Xem modules may be connected to the following Digi products:

- AccelePort Xem host adapters
- PORTS/Xem modules
- Additional Modem/Xem modules
- EPC/CON-16 concentrators
- PortServer II network concentrators

The modem modules are connected to compatible products by a Digi EBI (external bus interface) cable. Additional modem modules can be daisy-chained to the first, for a total of up to 32 modems (four modules) per daisy chain.

# Features

- Data modes:
  - V.34: 33.6K bps - 2400 bps
  - V.32terbo: 19.2K bps, 16.8K bps (TCM)
  - CCITT V.32bis: 14.4K bps, 12.0K bps, 7200 bps (TCM)
  - CCITT V.32: 9600 bps (TCM), 4800 bps (QAM)
  - CCITT V.22bis: 2400 bps (QAM)
  - CCITT V.22: 1200 bps (DPSK)
  - CCITT V.21: 300 bps (FSK)
  - CCITT V.23: 600/75 bps, 1200/75 bps (FSK)
  - Bell 212A: 1200 bps (DPSK)
  - Bell 103: 300 bps (FSK)
- FAX modes:
  - CCITT V.17: 14.4K bps, 12.0K bps, 9600 bps, 7200 bps (TCM)
  - CCITT V.29: 9600 bps, 7200 bps (QAM)
  - CCITT V.27ter: 4800 bps, 2400 bps (DPSK)
  - CCITT V.21 Channel 2: 300 bps (FSK)
- V.42 error correction (LAPM and MNP)
- V.42bis and MNP Class 5 data compression
- V.42 Appendix III—robustness of operation
- FAX command set: EIA/TIA 578 Class 1, 2
- Extensive AT command set

# Installation

---

## AccelePort Xem Systems

The modem modules are connected to the Xem host adapter with the Digi EBI cable. Plug one end of the cable into the host adapter, and the other end into the connector on the modem module labeled EBI IN.

Up to three additional modules can be daisy-chained to the first module with an EBI cable between the EBI OUT connector of the first module and the EBI IN connector of the added module (a short cable is provided with additional modules for this purpose).

Any combination of PORTS and/or modem modules (Modem/4em, Modem/8em, PORTS/16em, PORTS/8em, PORTS/8emp) can be connected in this manner.

### **Important!**

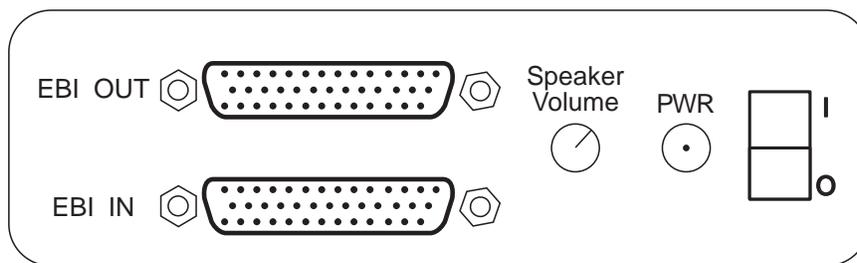
Make sure that power to the host system is turned OFF before plugging the modem module into the host adapter. Also make sure that power to the host system is turned OFF before connecting two modem modules with a daisy-chain cable.

### **Note:**

To remain within Class A emissions standards, the Digi-supplied cabling between the host adapter and modem module (or between two modem modules) must be used.

**Figure 1** EBI and POWER Connectors (Modem/Xem)

---



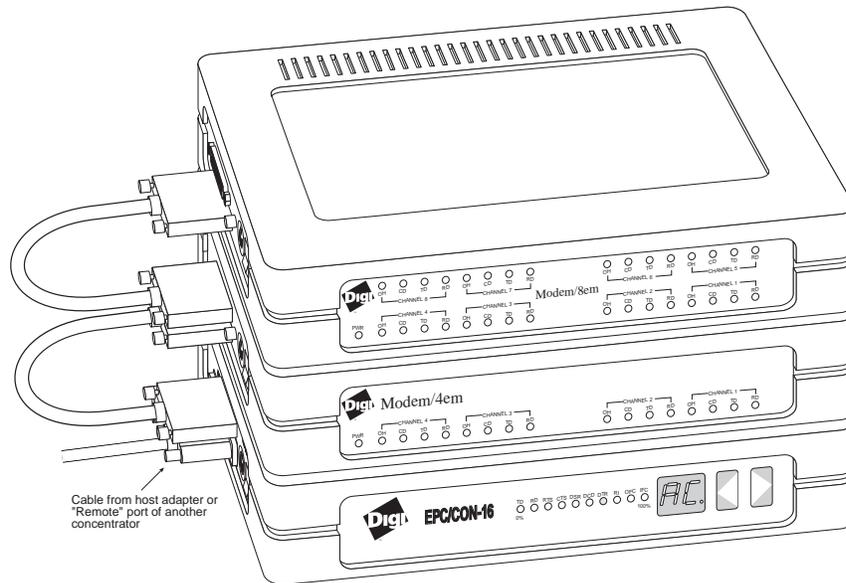
*(Left side of modem module)*

## EPC/CON-16 and PortServer II

Modem/Xem modules may also be connected to the EBI ports of EPC/CON-16 and PortServer II concentrators.

To connect Modem/Xem modules to an EPC/CON-16 or PortServer II concentrator, connect the “EBI Out” port of the concentrator to the “EBI In” port of the modem module (use the short cable provided with the module). Additional modem modules can be connected in the same way, as shown below.

**Figure 2 EPC/CON-16 Concentrator with Two Modem/Xem Modules**

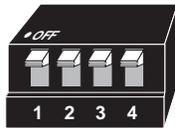


# Configuring the Modem/Xem

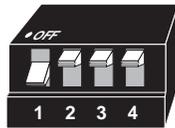
## Speaker Control

The Modem/Xem has one bank of DIP switches at the rear of the unit that selects which port is connected to the speaker. Refer to the figure below for the switch setting for each port. Note that switch 1 turns the speaker on or off; switches 2-4 form a binary number from 0-7, which corresponds to ports 1-8.

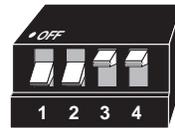
**Figure 3** Speaker Control DIP Switch Settings



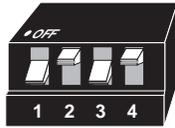
None



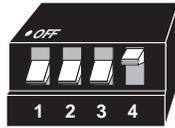
Modem/8em: Port 8  
Modem/4em: Port 4



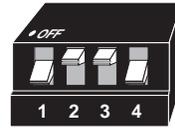
Modem/8em: Port 7  
Modem/4em: Port 3



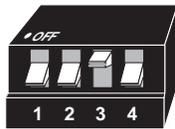
Modem/8em: Port 6  
Modem/4em: Port 2



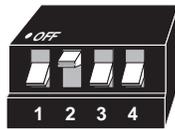
Modem/8em: Port 5  
Modem/4em: Port 1



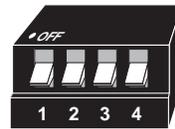
Modem/8em: Port 4  
Modem/4em: None



Modem/8em: Port 3  
Modem/4em: None



Modem/8em: Port 2  
Modem/4em: None



Modem/8em: Port 1  
Modem/4em: None

A speaker volume control is provided on the left side of the module, near the power and EBI connectors.

To turn up the volume, use a small screwdriver turn the speaker control potentiometer *counter-clockwise*. To turn down the volume turn the control *clockwise*. The speaker will remain on for the entire duration of the call (not just for the training sequence). You must use the dip switches to turn off the speaker. AT commands do not effect the operation of the speaker.

## Connecting to Phone Lines

The Modem/Xem has four or eight RJ-11 telephone jacks on the rear of the unit. Use standard RJ-11C telephone cables to connect the modem module to the telephone lines.

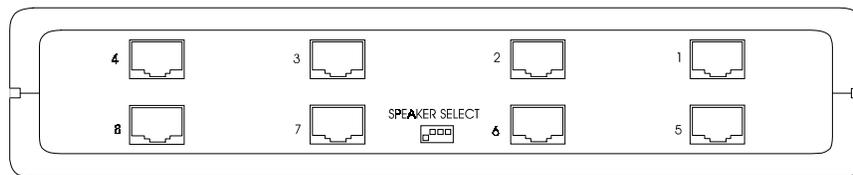
### **Important!**

Modem/Xem modules are to be connected only to analog telephone circuits. Never connect the modem module to a digital wall jack. If you are using an internal telephone system, it may be a PBX (Private Branch Exchange), which is a digital system.

The Modem/Xem is intended for use only with public access phone lines. Leased line operation is not supported.

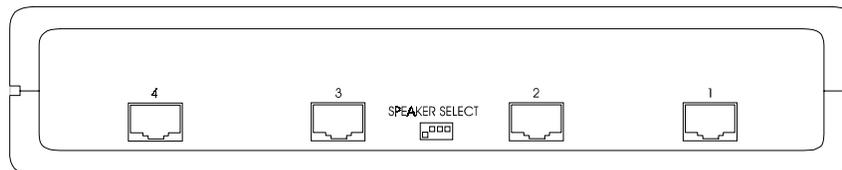
**Figure 4**

**Modem/8em Rear Panel**



**Figure 5**

**Modem/4em Rear Panel**



## Modem/Xem Software Setup

Digi provides a modem inf file with the Windows NT and Windows 95 drivers. This file is copied to your system during the driver installation. The modem inf file provides information that allows the operating system to detect and initialize the Modem/Xem.

Novell provides a modem definition file which includes the Digi Modem/Xem. Contact Novell for an updated file.

Some programs may require you to enter a modem initialization string as part of the program's modem setup. If this is the case, enter the following string to initialize your modem with the optimal settings:

```
AT&F <Enter>
```

This sets the modem to the default factory settings, which include: hardware flow control, error control, and data compression.

To enable auto answer, use the following string:

```
AT&FS0=1 <Enter>
```

In addition to the factory defaults, the modem will answer a call after one ring.

# Modem/Xem Command Reference

---

**Note:**

Default values of command parameters, if applicable, are indicated by an asterisk (\*).

## Basic AT Commands

**A/** Repeat Last Command

Repeats execution of the previous command string. “A/” must not be preceded with AT, or followed by pressing <Enter>.

**A** Answer

Causes the modem to go off-hook and attempt to establish a connection, even in the absence of a ring.

**Bn** Line Modulation Options

Configures the modem to the desired communications standard setting at a particular line speed.

**B0:** Selects CCITT V.22 mode when the modem is at 1200 bps, and CCITT V.21 when the modem is at 300 bps.

\* **B1:** Selects Bell 212A when the modem is at 1200 bps, and Bell 103 when the modem is at 300 bps.

**B2:** Selects V.23 originate mode receive 1200 bps, transmit 75 bps; answer mode receive 75 bps, transmit 1200 bps.

**B3:** Selects V.23 originate mode receive 75 bps, transmit 1200 bps; answer mode receive 1200 bps, transmit 75 bps.

Result Codes:

**OK** Returned when *n* = 0, 1, 2 or 3.

**ERROR** Returned for any other value of *n*.

**Cn Carrier Control Option (no operation)**

This command is included to provide backward compatibility with communications software that issues this command.

**C0:** Returns ERROR.

**C1:** Normal transmit carrier switching.

Result Codes:

**OK** Returned when *n* = 1.

**ERROR** Returned for any other value of *n*.

**Dn Dial Command**

Initiates the dialing sequence. The string *n* includes the dial modifiers and the telephone number to be dialed.

Dial Modifiers:

**P:** Pulse dial. Only digits 0-9 may be used in pulse dial mode.

**R:** Reverse dial mode. Originates call in answer mode.

**S=*n*:** Dial stored number. Dials the number stored in location *n* (0-3).

**T** Tone DTMF dial. Any digit 0-9, \*, #, A, B, C, D may be dialed as a tone.

**W** Wait for dial tone. The modem waits for dialtone before dialing.

**,** Pause. Causes the modem to pause before processing the next character in the dial string.

**!** Flash hook. Causes the modem to go on-hook for 0.5 seconds, then go off-hook again.

**@** Wait for quiet answer. Wait for five seconds of silence after dialing the number.

**;** Return to idle state. Modem returns to command mode after dialing a number, but does not disconnect call.

**En AT Command Echo Options**

Enables or disables echo of characters from the modem to the DTE when the modem is in command mode.

**E0:** Echo disabled.

\* **E1:** Echo enabled.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**Fn Online Echo Command (no operation)**

This command is included to provide backward compatibility with communications software that issues this command.

**F0:** Returns ERROR.

**F1:** Online echo disabled.

Result Codes:

**OK** Returned when *n* = 1.

**ERROR** Returned for any other value of *n*.

**Hn Switchhook Control**

Provides control of the line relay.

**H0:** Causes modem to go on-hook.

**H1:** Causes modem to go off-hook, but does not train.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

***ln* Modem Identification**

Causes modem to provide information about itself.

**I0:** Returns product code (for example, “Digi International Modem/Xem”).

**I1:** Returns 3-digit checksum of ROM.

**I2:** Checks ROM by calculating and verifying checksum. Returns “ROM IS OK” or “ERROR”.

**I3:** Returns type of ROM (for example, “ROM 27C010”).

**I4:** Returns modem capabilities: “007040C0040000”

Result Codes:

**OK** Returned when *n* = 0, 1, 2, 3 or 4.

**ERROR** Returned for any other value of *n*.

***Ln* Speaker Volume (dummy command)**

This command is used by some modems to control speaker volume. This product supports this command only to ensure compatibility with scripting tools. This command has no effect.

*See Speaker Control, on page 5.*

**L0:** Lowest speaker volume.

**L1:** Low speaker volume.

\* **L2:** Medium speaker volume.

**L3:** High speaker volume.

Result Codes:

**OK** Returned when *n* = 0, 1, 2 or 3

**ERROR** Returned for any other value of *n*.

**Mn Speaker Control (dummy command)**

This command is used by some modems to enable the speaker. This product supports this command only to ensure compatibility with scripting tools. This command has no effect.

See Speaker Control, on page 5.

**M0:** Speaker always off.

\* **M1:** Speaker on until carrier present.

**M2:** Speaker always on.

**M3:** Speaker off during dialing and on until carrier.

Result Codes:

**OK** Returned when *n* = 0, 1, 2 or 3

**ERROR** Returned for any other value of *n*.

**Nn Select Negotiate Handshake**

Controls automode enable/disable.

**N0:** When originating or answering, handshake only at the communication rate specified by register **S37** and command **Bn**, with no fallback.

\* **N1:** When originating or answering, start handshake at the communication standard specified by register **S37** and command **Bn**. During handshake, fallback to lower speed may occur except in **W1** mode.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**On Go Online**

Causes the modem to go to online or data mode.

**O0:** Returns modem to previously established rate.

**O1:** Begins an equalizer retrain sequence, then returns to online state.

**O3-14:**

Forces the modem to a new rate (defined in register **S62**).

Result Codes:

**OK** Returned when  $n = 0, 1$  or 3-14.

**ERROR** Returned for any other value of  $n$ .

**P Enable Pulse dialing**

Instructs the modem to use pulse dialing. Dialed digits will be pulse dialed until a **T** command or dial modifier is received. Tone dial is the default setting.

**Qn Result Code Display Option**

Controls whether result codes are returned to the DTE.

\* **Q0:** Enable result codes.

**Q1:** Disable result codes.

Result Codes:

**OK** Returned when  $n = 0$  or 1.

**ERROR** Returned for any other value of  $n$ .

**Sn Select S Register  $n$**

Selects a specific S register.

$n=0-99$

**Sn=m Write to S Register  $n$**

Writes the value  $m$  to S register  $n$ .

$n=0-99$

$m=0-255$

**Sn? Read S Register  $n$**

Reports the value of S register  $n$  as a 3-digit decimal number.

$n=0-99$

**T      Enable Tone dialing**

Instructs the modem to use DTMF tones when dialing. Dialed digits will be tone dialed until a **P** command or dial modifier is received. Tone dial is the default setting.

**Vn     Result Code Format**

Controls whether result codes are returned to the DTE.

**V0:** Numeric form (0 for OK).

\* **V1:** Verbose form (OK for OK).

Result Codes:

**OK**            Returned when *n* = 0 or 1.

**ERROR**        Returned for any other value of *n*.

**Wn     Select Extended Result Codes**

Defines which result codes are to be used to identify the type of connection and protocol that resulted from handshaking and negotiation.

\* **W0:CONNECT** result code reports DTE speed.

**W1:CONNECT** result code reports DTE speed, plus the **CARRIER**, **COMPRESSION** and **PROTOCOL** extended result codes.

**W2:CONNECT** result code reports DCE speed.

Result Codes:

**OK**            Returned when *n* = 0, 1 or 2.

**ERROR**        Returned for any other value of *n*.

### **Xn Select Result Codes/Call Progress Options**

Enables the tone detection options used in the dialing process. As these functions are chosen, the modem chip set's result codes are also affected. This command is therefore frequently used to control the modem chip set's responses. The primary function of this control is to control the modem chip set's call response capabilities.

**X0:** Display **CONNECT** or **1** for all speeds.

**X1:** Display connect message according to **ATW** and **ATV**, blind dial, ignore busy signal.

**X2:** Display connect message according to **ATW** and **ATV**, wait for dial tone, ignore busy signal.

**X3:** Display connect message according to **ATW** and **ATV**, blind dial, check for busy signal after dialing.

\* **X4:** Display connect message according to **ATW** and **ATV**, wait for dial tone, check for busy signal after dialing.

Result Codes:

**OK**            Returned when  $n = 0, 1, 2, 3$  or  $4$ .

**ERROR**        Returned for any other value of  $n$ .

### **Yn Dummy Command**

Dummy command for compatibility.

**Y0:** Returns OK.

**Y1:** Returns OK.

### **Zn Recall Stored Profile**

Forces the modem to go on-hook and restore the selected profile. Non-storable parameters are returned to their factory settings.

**Z0:** Reset and recall user profile 0.

**Z1:** Reset and recall user profile 1.

Result Codes:

**OK**            Returned when  $n = 0$  or  $1$ .

**ERROR**        Returned for any other value of  $n$ .

## *AT& (Ampersand) Commands*

### **&Bn Autoretrain**

Defines modem action when it receives a poor signal.

- &B0:** Hang up on a poor received signal.
- \* **&B1:** Retrain on a poor received signal. Hang up if condition persists longer than the threshold set in register **S7**.
- &B2:** Do not hang up; do not retrain (tolerate any connection).

Result Codes:

- OK** Returned when **n** = 0, 1 or 2.
- ERROR** Returned for any other value of **n**.

### **&Cn Data Carrier Detect Option (Async Only)**

Controls how the state of the DCD or RLSD (Receive Line Signal Detect) relates to the carrier from the remote system. Always use **&C1** for Sync mode.

- &C0:** State of carrier from remote modem is ignored. RLSD circuit is always on.
- \* **&C1:** State of carrier from remote modem is tracked. RLSD circuit reflects the state of the carrier.

Result Codes:

- OK** Returned when **n** = 0 or 1.
- ERROR** Returned for any other value of **n**.

### **&Dn Data Terminal Ready Option**

Defines modem action when it receives a poor signal.

**&D0:** DTR ignored.

**&D1:** Go to command mode when DTR changes from on to off.

\* **&D2:** Hang up and go to command mode when DTR changes from on to off. Auto answer is disabled if DTR is low.

**&D3:** Reset when DTR changes from on to off.

Result Codes:

**OK** Returned when  $n = 0, 1, 2$  or  $3$ .

**ERROR** Returned for any other value of  $n$ .

### **&F Load Factory Settings**

Loads the configuration programmed at the factory. This command replaces all command options and S register settings in the active configuration with the factory values stored in the nonvolatile RAM.

**&F:** Recall factory setting as active configuration.

### **&Gn Guard Tone Operation**

Determines which guard tone, if any, to transmit while transmitting in the high band (answer mode). Used only in V.22 and V.22*bis* mode.

\* **&G0:** No guard tones.

**&G1:** 550 Hz guard tone.

**&G2:** 1800 Hz guard tone.

Result Codes:

**OK** Returned when  $n = 0, 1$  or  $2$ .

**ERROR** Returned for any other value of  $n$ .

### **&Jn Dummy Command for AutoSync**

Dummy command for AutoSync compatibility.

**&J0:** Returns **OK**.

**&J1:** Returns **OK**.

### **&Kn Set Flow Control**

Determines which guard tone, if any, to transmit while transmitting in the high band (answer mode). Used only in V.22 and V.22*bis* mode.

**&K0:** Disable flow control.

**&K1:** Reserved.

**&K2:** Reserved.

\* **&K3:** Enable bi-directional hardware flow control (RTS/CTS).

**&K4:** Enable bi-directional XON/XOFF flow control.

**&K5:** Error.

Result Codes:

**OK** Returned when *n* = 0, 3 or 4.

**ERROR** Returned for any other value of *n*.

### **&Ln Dial-Up/Leased-Line Option**

Selects between dial-up and leased-line operations. **NOTE: Full-featured leased line operation is not available at this time. Please call Digi Sales for more information.**

\* **&L0:** Dial line.

**&L1:** Leased line.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

### **&Mn** Select Sync, Async or AutoSync Mode Options

Selects the communication mode.

- \* **&M0:** Async mode.
- &M1:** Sync mode 1. Async off-line and Sync on-line. To switch to on-line command mode, select **&D1** and drop DTR.
- &M2:** Sync mode 2. Autodial stored #0 when DTR changes from off to on, ignore **&D** option, always **&D2** when DTR changes from off to on.
- &M3:** Sync mode 3. Manual dial mode with talk/data switch, same as **&M2** when in on-line mode.
- &M4:** Hayes *AutoSync* mode.

Result Codes:

- OK** Returned when *n* = 0, 1, 2, 3 or 4.
- ERROR** Returned for any other value of *n*.

### **&Pn** Dial Pulse Ratio

Determines the make/break ratio used during pulse dialing.

- \* **&P0:** Make = 39%; Break = 61%; for use in the United States.
- &P1:** Make = 33%; Break = 67%; for use in some other countries.

Result Codes:

- OK** Returned when *n* = 0 or 1.
- ERROR** Returned for any other value of *n*.

### **&Qn** Communications Mode Option

Selects the communication mode. This is the Hayes command, and performs identically to **&Mn**, above.

Result Codes:

- OK** Returned when *n* = 0, 1, 2, 3 or 4.
- ERROR** Returned for any other value of *n*.

**&Rn CTS/RTS Option (non-CTS Flow Control Mode)**

Defines the functions of CTS.

\* **&R0:** CTS follows RTS (Synchronous modes only).

**&R1:** CTS always true.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**&Sn Data Set Ready Option**

Controls the functions of DSR. DSR indicates when the modem is connected to a communications channel and is ready. Async mode only. If the modem is in Sync mode, DSR is on during handshake and when on-line. DSR is off in test or idle mode.

\* **&S0:** DSR always on.

**&S1:** DSR on during handshake and when on-line; off in test or idle modes.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

## **&Tn** Self Test Commands

Used to configure and place the modem in various test modes as defined by CCITT V.54. These tests are typically used to verify the analog and digital portions of a modem's operation.

**&T0:** Terminate test.

**&T1:** Local analog loopback.  
O: low frequency band.  
A: high frequency band.

**&T3:** Local activate remote digital loopback (RDL).

\* **&T4:** Grant request from remote for RDL test.

**&T5:** Deny request from remote for RDL test.

**&T6:** Remote digital loopback test.

**&T7:** Remote digital loopback with self test.

**&T8:** Local analog loopback with self test.

Result Codes:

**OK** Returned when *n* = 0, 3, 4, 5, 7 or 8.

**CONNECT** Returned when *n* = 1 or 6.

**ERROR** Returned for any other value of *n*.

## **&Vn View Active Configuration and Stored Profile**

Displays the active and stored profiles (commands and S register settings), and any stored telephone numbers. The following example illustrates typical &V information for the Digi Modem/Xem.

**&V0:** View active file, stored profile #0, and stored phone numbers.

**&V1:** View active file, stored profile #1, and stored phone numbers.

EXAMPLE:

### **ACTIVE PROFILE:**

```
B1 E1 L2 M1 N1 P Q0 V1 W0 X4 Y0 &B1 &C1 &D2
&G0 &J0 &K3 &L0 &P0 &Q0 &R0 &S0 &U0 &X0 &Y0
%A013 %C1 %E1 %G0 %01 \A3 \C0 \G0 \J0 \K5
\N3 \Q3 \T000 \V1 \X0 -J1 "H3 "O016
S00:000 S01:000 S02:043 S03:013 S04:010
S05:008 S06:002 S07:030 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005
S26:001 S37:000
```

### **STORED PROFILE 0:**

```
B1 E1 L2 M1 N1 P Q0 V1 W0 X4 Y0 &B1 &C1 &D2
&G0 &J0 &K0 &L0 &P0 &Q0 &R0 &S0 &U0 &X0 &Y0
%A013 %C1 %E1 %G0 %01 \A3 \C0 \G0 \J0 \K5
\N3 \Q3 \T000 \V0 \X0 -J1 "H3 "O016
S00:000 S02:043 S06:002 S07:030 S08:002
S09:006 S10:014 S11:095 S12:050 S18:000
S25:005 S26:001 S37:000
```

### **TELEPHONE NUMBERS:**

```
&Z0=          &Z1=
&Z2=          &Z3=
```

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**&Wn Store Active Profile**

Stores certain command options and S register values into one of the two nonvolatile stored profile locations:

**&W0:** Save active configuration as user profile 0.

**&W1:** Save active configuration as user profile 1.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**&Xn Sync Transmit Clock Source**

Determines how the DTE transmit clock is generated while the modem is in synchronous modes.

\* **&X0:** The modem generates the transmit clock and applies it to pin 15 (EIA-232).

**&X1:** The DTE generates the transmit clock on pin 25 (EIA-232) and the modem applies it to pin 15 (EIA-232)

**&X2:** The modem derives the transmit clock from the receive carrier signal and applies it to pin 15 (EIA-232).

Result Codes:

**OK** Returned when *n* = 0, 1 or 2.

**ERROR** Returned for any other value of *n*.

**&Yn Select Stored Profile on Powerup**

Selects which user profile will be recalled into the active profile when the modem is powered up.

**&Y0:** Select user profile 0.

**&Y1:** Select user profile 1.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**&Zn=x Store Telephone Number**

Stores a dialing string **x** in one of four non-volatile memory locations **n**. Dialing strings can be up to 36 characters long, including dial modifiers; spaces are not counted.

**n**=0-3

**x**=0-9, A, B, C, D, #, \*, T, P, R, W, @, comma, !, ; (dial string)

## AT% (Percent) Commands

### **%An** Set Autoreliable Fallback Character

Allows the user to specify the character that tells the modem to return (or fall back) from autoreliable (MNP) mode to a normal connection on the answering modem.

Result Codes:

**OK** Returned when  $n = 0-127$  (ascii character set).

**ERROR** Returned for any other value of  $n$ .

Default: 0x0D

### **%Cn** Data Compression

Controls the MNP Class 5 compression. The modem can only perform data compression on an error corrected link.

**%C0**: No compression.

\* **%C1**: MNP Class 5 compression.

Result Codes:

**OK** Returned when  $n = 0$  or  $1$ .

**ERROR** Returned for any other value of  $n$ .

### **%Gn** Auto Fallforward/Fallback Enable

Selects the auto fallback option.

**%G0**: Disabled.

\* **%G1**: Enabled.

Result Codes:

**OK** Returned when  $n = 0$  or  $1$ .

**ERROR** Returned for any other value of  $n$ .

## AT\ (Backslash) Commands

### **\An** Block Size for V.42

Sets the maximum block size during connection. This option forces the modem chip set to transmit smaller blocks of data. The command is typically used for poor quality telephone lines where transmitting smaller blocks reduces retransmission and improves throughput.

**\A0:** Max 64 characters.

**\A1:** Max 128 characters.

**\A2:** Max 192 characters.

\* **\A3:** Max 256 characters.

Result Codes:

**OK** Returned when *n* = 0, 1, 2 or 3.

**ERROR** Returned for any other value of *n*.

### **\Bn** Transmit Break

Sends a break to the remote modem. Equivalent to using the <Break> key on your terminal. This command can be used if your keyboard does not have a <Break> key.

**\B0 - \B9:** BREAK length, in 100 ms increments.

Result Codes:

**OK** If connected in data mode.

**ERROR** If not connected, or connected in FAX mode.

**\Cn Set Autoreliable Buffer**

Defines whether the modem buffers the data it receives during link negotiation.

- \* **\C0:** Do not buffer data.
- \C1:** Buffers data on answering modem for 4 seconds, until 200 characters have been buffered, then switches to normal mode and the buffered characters are passed to the serial port. If a SYN character is detected, reliable mode is attempted.
- \C2:** Does not buffer data on answering modem. Switches to normal mode upon receipt of autoreliable character and passes it to serial port.

Result Codes:

**OK** Returned when *n* = 0, 1 or 2.

**ERROR** Returned for any other value of *n*.

**\Gn Set Modem Port Flow Control (Only in Normal Mode)**

Selects the modem's DCE or port flow control. If the modem is receiving data from the remote modem faster than it can be processed, enabling port flow control allows the modem to handle the data efficiently.

- \* **\G0:** Disable port flow control.
- \G1:** Set port flow control to XON/XOFF flow control.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

**\Jn Constant DTE Speed Option**

- \* **\J0:** DCE and DTE rates are independent.
- \J1:** DTE rate adjusts to DCE connection rate after online.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

## **\Kn Set Break Control**

Selects the way in which the modem handles a break signal. The Modem Xem can handle a break in one of three ways: expedited destructive, expedited, or queued break.

*In online data mode with V.42 protocol or normal mode, then break signal to DTE through EIA-232,*

**0, 2, 4:** Enter online command mode but do not send break to remote modem.

**1:** Empty the data buffers and send break to the remote modem immediately.

**3:** Immediately send break to the remote modem.

\* **5:** Send break to the remote modem in sequence with data.

*In online data mode with direct mode, then receive break at serial port,*

**0, 2, 4:** Immediately send break and enter online command state.

**1, 3, \*5:** Immediately send break through.

*In online command mode with V.42 protocol or normal mode, and the DTE issues a transmit break command,*

**0, 1:** Empty the data buffers and send break to the remote modem.

**2, 3:** Immediately send break to the remote modem.

**4, \*5:** Send break to the remote modem in sequence with data.

*In online data mode with normal mode, receive break signal from remote at modem port, send to serial port,*

**0, 1:** Empty the data buffers and send break to the local DTE.

**2, 3:** Immediately send break to the local DTE.

**4, \*5:** Send break to the local DTE in sequence with data.

Result Codes:

**OK** Returned when **n** = 0, 1, 2, 3, 4 or 5.

**ERROR** Returned for any other value of **n**.

### **\Nn Modem Protocol Options**

Selects the type of data connection the modem can establish.

**\N0:** Normal mode. No protocol, but flow control is allowed.

**\N1:** Direct mode. No protocol and no flow control is allowed.

**\N2:** MNP reliable mode.

\* **\N3:** LAPM, MNP or Normal mode

**\N4:** LAPM or MNP mode.

Result Codes:

**OK** Returned when *n* = 0, 1, 2, 3 or 4.

**ERROR** Returned for any other value of *n*.

### **\Qn DTE Flow Control Options**

Selects the flow control method the modem provides to the DTE to prevent the modem's buffer from overflowing with data. A data buffer holds the data until the modem is ready to transmit it. When the data buffer is full, flow control instructs the DTE to stop sending to the modem while the modem continues to send characters.

**\Q0:** Disables flow control.

**\Q1:** XON/XOFF software flow control.

**\Q2:** CTS flow control to DTE.

\* **\Q3:** RTS/CTS hardware flow control.

Result Codes:

**OK** Returned when *n* = 0, 1, 2 or 3.

**ERROR** Returned for any other value of *n*.

### **\Tn Set Inactivity Timer**

Permits the modem to disconnect if no data activity has occurred for the selected period of time.

\* *n*=0: Disable inactivity timer.

*n*=1-90: Length in minutes.

**\Wn Protocol Result Code**

Enables/disables the protocol result code on connect (effective only with **\W0** and **\W2** options)

- \* **\W0:** Disable protocol result code (**Connect 9600**).
- \W1:** Enable protocol result code (**Connect 9600/LAPM**).

Result Codes:

- OK** Returned when **n** = 0 or 1.
- ERROR** Returned for any other value of **n**.

**\Xn Set XON/XOFF Passthrough Option**

Valid only if XON/XOFF flow control is enabled, such as with **\G1** or **\Q1**; otherwise, XON/XOFF will not be detected by the modem, and thus will always pass through.

- \* **\X0:** Process XON/XOFF per **\G** and **\Q** options; do not pass XON/XOFF to the remote modem or local DTE.
- \X1:** Process XON/XOFF per **\G** and **\Q** options; always pass XON/XOFF to the remote modem or local DTE.

Result Codes:

- OK** Returned when **n** = 0 or 1.
- ERROR** Returned for any other value of **n**.

## AT- (Dash) Commands

### **-Jn** Set V.42 Detection Phase

Defines whether the originating modem sends a sequence to the answering modem to determine the type of error correction it has enabled.

**-J0:** Disables the V.42 detection phase.

\* **-J1:** Enables the V.42 detection phase.

Result Codes:

**OK** Returned when *n* = 0 or 1.

**ERROR** Returned for any other value of *n*.

## AT" (Quote) Commands

### "Hn V.42bis Compression Control

Controls V.42bis data compression over an error correction link.

"H0: Disable V.42bis.

"H1: Enable V.42bis only when transmitting data.

"H2: Enable V.42bis only when receiving data.

\* "H3: Enable V.42bis for both directions.

Result Codes:

**OK** Returned when  $n = 0, 1, 2$  or  $3$ .

**ERROR** Returned for any other value of  $n$ .

### "Nn V.42bis Dictionary Size

512 bytes < btlz\_dict\_size < maximum RAM allows, default is 1.5 Kbytes.

"N0: 512 bytes.

"N1: 1024 bytes.

"N2: 1536 bytes

Result Codes:

**OK** Returned when  $n = 0, 1$  or  $2$ .

**ERROR** Returned for any other value of  $n$ .

### "On Select V.42bis Maximum String Length

Selects the string size for V.42bis compression.

$n = 6-64$ .

\* Default = 32

## Class 1 FAX Commands

The Digi Modem/Xem supports FAX commands conforming to EIA standard 578. These commands are given here with short descriptions; complete descriptions are given in the standard, available from the Electronic Industry Association. It also supports ECM mode and V.17terbo at 19.2K bps.

### **+FCLASS?**      **Service Class Indication**

Causes the modem to display the current setting. The modem can operate either as a Class 0 data modem or a Class 1 FAX modem. Returns **0** for a Class 0 data modem, or **1** for a Class 1 FAX modem.

### **+FCLASS=?**    **Service Class Capabilities**

Causes the modem to display the classes it supports. Returns “**0**” if set up for data mode; “**0, 1**” indicates that the modem is capable of data and Class 1 FAX services.

### **+FCLASS=*n***    **Service Class Selection**

Sets the modem for Class 0 (data) or Class 1 (FAX) operation.

**+FCLASS=0**    Sets the modem for Class 0 data operation.

**+FCLASS=1**    Sets the modem for Class 1 FAX operation.

### **+FTS=?**            **FTS Range Capabilities**

Modem returns “**0-255**”.

### **+FTS=*n***            **Transmission Silence**

Causes the modem to stop transmitting data and pause for ***n*** x 10 ms. Modem returns OK after timer has expired.

### **+FRS=?**            **FRS Range Capabilities**

Modem returns “**0-255**”.

### **+FRS=*n***            **Receive Silence**

Causes the modem to stop transmitting data and pause for ***n*** x 10 ms for silence; then the timer is reloaded.

**+FTM=? FAX Normal Mode Transmit Capabilities**

Causes the modem to output the transmit modulations supported by the modem. See Table 1.

**+FTM=*n* Modem Initiate Training**

Causes the modem to initiate training with modulation of type *n*. Table 1 shows the values you can enter for this command and the meaning of those values.

**Table 1 Supported FAX Transmit/Receive Modulations**

<i>n</i>	Modulation	Speed (Bits/Second)
<b>3</b>	V.21 ch. 2	300
<b>24</b>	V.27terbo	2400
<b>48</b>	V.27terbo	4800
<b>72</b>	V.29	7200
<b>73</b>	V.17LT	7200
<b>74</b>	V.17ST	7200
<b>92</b>	V.17terbo 192 LT	19200
<b>93</b>	V.17terbo 192 ST	19200
<b>96</b>	V.29	9600
<b>97</b>	V.17LT	9600
<b>98</b>	V.17ST	9600
<b>121</b>	V.17LT	12000
<b>122</b>	V.17ST	12000
<b>145</b>	V.17LT	14400
<b>146</b>	V.17ST	14400

**+FRM=? FAX Normal Mode Receive Capabilities**

Causes the modem to output the receive modulations supported by the modem. See Table 1.

**+FRM=*n*      Modem Accept Training**

Causes the modem to accept training with *n* type modulation and the protocol is normal mode. Table 1 on page 34 shows the values you can enter for this command and the meaning of those values.

Returns **CONNECT** or **1** to DTE after carrier is detected.

**+FTH=?      FAX SDLC Mode Transmit Capabilities**

Causes the modem to output the FAX SDLC transmit capabilities supported by **+FTM=?**. See Table 1.

**+FTH=*n*      Modem Initiate Training (SDLC)**

Causes the modem to initiate training with *n* type modulation and the protocol is SDLC mode. Table 1 on page 34 shows the values you can enter for this command and the meaning of those values.

Returns **CONNECT** or **1** to DTE after carrier is detected.

**+FRH=?      FAX SDLC Mode Receive Capabilities**

Causes the modem to output the FAX SDLC receive capabilities supported by **+FTM=?**. See Table 1.

**+FRH=*n*      Modem Accept Training (SDLC)**

Causes the modem to accept training with *n* type modulation and the protocol is SDLC mode. Table 1 on page 34 shows the values you can enter for this command and the meaning of those values.

Returns **CONNECT** or **1** to DTE after carrier is detected.

## Class 2 FAX Commands

### **+FAA=*n***      **FAX Auto Answer Enable**

Command Syntax: +FAA=<value>

- 0: Answer as FAX modem of type specified by +FCLASS.
- 1: Automatically determine whether to answer as FAX or data modem.

### **+FAXERR**      **T.30 Session Error Report**

Command syntax: +FAXERR

Response syntax: +FAXERRR=<value>

- 0-9      Call placement and termination.
  - 0: Normal and proper end of connection.
  - 1: Ring detected without successful handshake.
  - 2: Call aborted, from +FK or <CAN>
- 10-19    Transmit Phase A & miscellaneous errors.
- 20-39    Transmit Phase B hang-up codes.
  - 20: Unspecified transmit Phase B error.
  - 23: COMREC invalid command received.
  - 25: DCS sent 3 times without response.
  - 27: Failure to train.
- 40-49    Transmit Phase C hang-up codes.
  - 40: Unspecified transmit Phase C error.
- 50-69    Transmit Phase D hang-up codes.
  - 52: No response to MPS repeated 3 times.
  - 53: Invalid response to MPS.
  - 54: No response to EOP repeated 3 times.
  - 55: Invalid response to EOP.
  - 56: No response to EOM repeated 3 times.
  - 57: Invalid response to EOM.
- 70-89    Receive Phase B hang-up codes.
- 90-99    Receive Phase C hang-up codes.
  - 90: Unspecified receive Phase C error.
- 100-119 Receive Phase D hang-up codes.
  - 100: Unspecified receive Phase D error.
- 120-255 Reserved codes.

**+FBOR            Data Bit Order Selection.**

Command syntax: +FBOR=<value>

- 0: Direct bit order for both Phase C data and Phase B/D data.
- 1: Reversed bit order for Phase C data and direct bit order for Phase B/D data.
- 2: Direct bit order for Phase C data and reversed bit order for Phase B/D data.
- 3: Reversed bit order for both Phase C data and for Phase B/D data.

Note:

Direct bit order:        First bit transferred of each byte on the DTE-DCE link is the first bit transferred in the PSTN data carrier.

Reversed bit order:    Last bit transferred of each byte on the DTE-DCE link is the first bit transferred in the PSTN data carrier.

**+FCQ            Copy Quality Checking**

Command syntax: +FCQ=<value>

- 0: Disables copy quality checking. The modem will generate Copy Quality OK (MCF) responses to complete pages and set +FPTS=1.

**+FCR            Capability to Receive**

Command syntax: +FCR=<value>

- 0: Indicates the modem will not receive message data.
- 1: Indicates the modem can receive message data.

**+FCTCRTY      ECM Retry Count**

Command syntax: +FCTCRTY=<value>

- 0: Disable error correcting mode retries. Error correcting mode is not supported.

## **+FDCC FAX Capability Parameters**

Command syntax: +FDCC=VR,BR,WD,LN,DF,EC,BF,ST

Response syntax: VR,RB,WD,LN,DF,EC,BF,ST

Valid Values:

- VR: Vertical resolution  
0: Normal, 98 lpi  
1: Fine, 196 lpi
- BR: Bit rate  
0: 2400 bps V.27ter  
1: 4800 bps V.27ter  
2: 7200 bps V.29 or V.17  
3: 9600 bps V.29 or V.17  
4: 12000 bps V.33 or V.17  
5: 14400 bps V.33 or V.17
- WD: Page width  
0: 1728 pixels in 215 mm
- LN: Page length  
0: A4, 297 mm  
2: Unlimited length
- DF: Data compression format  
0: 1-D modified Huffman
- EC: Error Correction  
0: Disable ECM
- BF: Binary file transfer  
0: Disable BFT
- ST: Scan time/line
- |    | VR=Normal | VR=Fine |
|----|-----------|---------|
| 0: | 0 ms      | 0 ms    |
| 1: | 5 ms      | 5 ms    |
| 2: | 10 ms     | 5 ms    |
| 3: | 10 ms     | 10 ms   |
| 4: | 20 ms     | 10 ms   |
| 5: | 20 ms     | 20 ms   |
| 6: | 40 ms     | 20 ms   |
| 7: | 40 ms     | 40 ms   |

## **+FDCS**      **Current Session Results.**

Command syntax: +FDCS?

Response syntax: VR,BR,WD,LN,DF,EC,BF,ST

Valid Values:

VR:    Vertical resolution  
0:    Normal, 98 lpi  
1:    Fine, 196 lpi

BR:    Bit rate.  
0:    2400 bps V.27ter  
1:    4800 bps V.27ter  
2:    7200 bps V.29 or V.17  
3:    9600 bps V.29 or V.17  
4:    12000 bps V.33 or V.17  
5:    14400 bps V.33 or V.17

WD:    Page width  
0:    1728 pixels in 215 mm

LN:    Page length  
0:    A4, 297 mm  
2:    Unlimited length

DF:    Data compression format  
0:    1-D modified Huffman

EC:    Error Correction  
0:    Disable ECM

BF:    Binary file transfer  
0:    Disable BFT

ST:    Scan time/line

	VR=Normal	VR=Fine
0:	0 ms	0 ms
1:	5 ms	5 ms
2:	10 ms	5 ms
3:	10 ms	10 ms
4:	20 ms	10 ms
5:	20 ms	20 ms
6:	40 ms	20 ms
7:	40 ms	40 ms

The modem will return the negotiated T.30 parameters for the current session.

**+FDFFC Data Compression Format Conversion**

Command syntax: +FDFFC=<value>

- 0: Disable mismatch checking. The DTE must check the +FDCCS:DF subparameter, and transfer matching data.

**+FDIS Current Session Parameters.**

Command syntax: +FDIS=VR,BR,WD,LN,DF,EC,BF,ST

Response syntax: VR,BR,WD,LN,DF,EC,BF,ST

Valid Values:

- VR: Vertical resolution
  - 0: Normal, 98 lpi
  - 1: Fine, 196 lpi
- BR: Bit rate
  - 0: 2400 bps V.27ter
  - 1: 4800 bps V.27ter
  - 2: 7200 bps V.29 or V.17
  - 3: 9600 bps V.29 or V.17
  - 4: 12000 bps V.33 or V.17
  - 5: 14400 bps V.33 or V.17
- WD: Page width
  - 0: 1728 pixels in 215 mm
- LN: Page length
  - 0: A4, 297 mm
  - 2: Unlimited length
- DF: Data compression format
  - 0: 1-D modified Huffman
- EC: Error Correction
  - 0: Disable ECM
- BF: Binary file transfer
  - 0: Disable BFT
- ST: Scan time/line

	VR=Normal	VR=Fine
0:	0 ms	0 ms
1:	5 ms	5 ms
2:	10 ms	5 ms
3:	10 ms	10 ms
4:	20 ms	10 ms
5:	20 ms	20 ms
6:	40 ms	20 ms
7:	40 ms	40 ms

**+FDR            Begin or continue Phase C Receive Data.**

Command syntax: +FDR

This command will initiate a transition to Phase C data reception.

**+FDT            Begin Phase C Data Transmission.**

Command syntax: +FDT

This command prefixes Phase C data transmission.

**+FECM          Error Correction Mode Control.**

Command syntax: +FECM=<value>

0: Error correcting mode disabled.

**+FET            Transmit Page Punctuation.**

Command syntax: +FET=<ppm>

0: [PPS-]MPS        Another page next, same document.

1: [PPS-]EOM        Another document next.

2: [PPS-]EOP        No more pages or documents.

3: PPS-NULL         Another partial page next.

4: [PPS-]PRI-MPS    Another page, procedure interrupt.

5: [PPS-]PRI-EOM    Another document, procedure interrupt.

6: [PPS-]PRI-EOP    All done, procedure interrupt.

7: CTC                Continue to correct.

This command is used to punctuate page and document transmission, after one or more +FDT commands.

**+FK             Session Termination.**

Command syntax: +FK

This command causes the modem to terminate the session in an orderly manner.

**+FLID           Local ID String.**

Command syntax: +FLID="<local ID string>"

Valid values: ASCII string can be up to 20 characters.

Response syntax: +FLID=?

Return value: (20), (32-127)

**+FLNFC          Page Length Format Conversion.**

Command syntax: +FLNFC=<value>

0: Disables mismatch checking. The DTE must check the +FDCS:LN subparameter, and transfer matching data.

**+FLPL            Indicate Document to Poll.**

Command syntax: +FLPL=<value>

0: Indicates that the DTE has no document to poll.

**+FMDL            Request Model Identification.**

Command syntax: +FMDL?

Response value: The information text cannot exceed 2048 characters.

This command causes the modem to send one or more lines of information text which is used to identify the product.

**+FMFR            Manufacturer's Identification.**

Command syntax: +FMFR?

Response value: The information text cannot exceed 2048 characters.

This command causes the modem to send one or more lines of information text which is used to identify the manufacturer.

**+FREV            Request Product Revision Identification.**

Command syntax: +FREV?

Response value: The information text cannot exceed 2048 characters.

This command causes the modem to send one or more lines of information text which is used to identify the version, revision level or data, or other pertinent information.

**+FPHCTO        DTE Phase C Response Time-out.**

Command syntax: +FPHCTO=<value>

value = 0 - 255 (100 ms units)

Default value: 30

This value determines how long the modem will wait for a command after reaching the end of data when transmitting in Phase C.

**+FPTS            Page Transfer Status.**

Command syntax: +FPTS=<ppr>

1: MCF    Page good.

2: RTN    Page good; retrain requested.

3: RTP    Page good; retrain requested.

**+FRBC            Phase C Receive Data Block Size.**

Command syntax: +FRBC=<value>

0: Stream mode, Phase C data is terminated by <DLE><ETX>.

**+FREL            Phase C Received EOL Alignment.**

Command syntax: +FREL=<value>

0: Indicates that EOL patterns are aligned as received.

**+FSPL            Request to Poll.**

Command syntax: +FSPL=<value>

0: Indicates that the DTE does not want to poll.

**+FTBC            Phase C Transmit Data Block Size.**

Command syntax: +FTBC=<value>

0: Stream mode, Phase C data is terminated by <DLE><ETX>.

## Class 2 FAX Responses

**+FCFR            Indicate Confirmation to Receive.**

Syntax: +FCFR

Usage: Indicates the reception of an acceptable TCF training burst and valid DCS signal from the remote machine.

**+FCON            Facsimile Connection Response.**

Syntax: +FCON

Usage: Indicates connection with a FAX machine. Generated in response to an originate command or answer command.

**+FCSI            Reports the Remote ID.**

Syntax: +FCSI:"<CSI ID string>"

Usage: Reports the Called Station's ID.

**+FDCS            Reports DCS Frame Information.**

Syntax: +FDCS:VR,BR,WD,LN,DF,EC,BF,ST

Usage: Reports negotiated parameters for the current session. The subparameters are described in the +FDCS command description.

**+FDIS            Reports DIS Frame Information.**

Syntax: +FDIS:VR,BR,WD,LN,DF,EC,BF,ST

Usage: Reports remote FAX capabilities and intentions. The subparameters are described in the +FDCS command description.

**+FET            Post Page Message Response.**

Syntax: +FET:<ppm>

Usage: Generated by the receiving modem after the end of Phase C reception, on receipt of the post-page message from the transmitting station. The <ppm> codes are described in the +FET command description.

**+FHNG            Call Termination with Status.**

Syntax: +FHNG:<hangup status code>

Usage: Indicates that the call has been terminated. The <hang-up status code> values are described in the +FAXERR command description.

**+FPTS            Receive/Transmit Page Transfer Status.**

Syntax: +FPTS:<ppr>

Usage: Reports a <ppr> number representing the copy quality and related post-page message. The valid <ppr> values are defined in the +FPTS command description.

**+FTSI            Report the Remote ID.**

Syntax: +FTSI:"<TSI ID string>"

Usage: Reports the transmitting station's ID.

## S Registers

All bit-mapped registers are read-only. The appropriate AT command which controls the relevant bits in the S register should be used to change the value.

The factory default values are stored in ROM and are loaded into the active configuration at powerup or by the *ATZn* command. In addition, the designated default profile can be changed by entering the *&Yn* command where n is one of the two possible user profiles.

All of the factory default values may be loaded at any time by entering the *&F* command.

## S Register Definitions

### S0 Autoanswer Ring Count

Sets the number of the rings required before the modem automatically answers a call. Setting this register to zero disables autoanswer mode.

Range: 0-255  
Default: 000  
Units: rings

### S1 Ring Count

The value of S1 is incremented with each ring. If no rings occur over an 8 second interval, this register is cleared.

Range: 0-255  
Default: 000  
Units: rings

### S2 Escape Character (user defined)

S2 holds the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII +. A value over 127 disables the escape process, i.e., no escape character will be recognized.

Range: 0-255  
Default: 043  
Units: ASCII

### S3 Carriage Return <CR> Character (user defined)

Sets the command line and result code terminator character. Pertains to asynchronous operation only.

Range: 0-127, ASCII decimal  
Default: 013 (carriage return)  
Units: ASCII

### S4 Line Feed <LF> Character (user defined)

Sets the character recognized as a line feed. Pertains to asynchronous operation only. The line feed control character is output after the carriage return control character if verbose result codes are used.

Range: 0-27, ASCII decimal  
Default: 010 (Line Feed)  
Units: ASCII

### **S5 Back Space <BS> Character (user defined)**

Sets the character recognized as a backspace. Pertains to asynchronous operation only. The modem will not recognize the backspace character if it is set to a value that is greater than 32 ASCII. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE, the backspace character, an ASCII space character, and a second backspace character; this means a total of three characters are transmitted each time the modem processes the backspace character.

Range: 0-127, ASCII decimal

Default: 008 (backspace)

Units: ASCII

### **S6 Wait Before Dialing**

Sets the length of time, in seconds, that the modem must wait (pause) after going off-hook before dialing the first digit of the telephone number. The modem always pauses for a minimum of 2 s, even if the value of **S6** is less than 2 s. The wait for dial tone call progress feature (W dial modifier in the dial string) will override the value in register **S6**. This operation, however, may be affected by some ATX options according to country restrictions.

Range: 2-255

Default: 002

Units: seconds

### **S7 Wait for Carrier**

Sets the time, in seconds, that the modem must wait before hanging up because carrier is not detected. The timer is started when the modem finishes dialing (originate), or goes off-hook (answer). In originate mode, the timer is reset upon detection of answer tone if allowed by country restrictions. This timer also specifies the *wait for silence* time for the @ dial modifier in seconds. **S7** is not associated with the W dial modifier.

Range: 1-255

Default: 060

Units: seconds

### **S8 Pause Time for Command or Dial Modifier**

Sets the time, in seconds, that the modem must pause when the “,” dial modifier is encountered in the dial string.

Range: 0-255

Default: 002

Units: seconds

### **S9 Carrier Validation Time**

Sets the time, in tenths of a second, that the carrier must be present before the modem considers it valid and turns on RLSD. As this time is increased, there is less chance to detect a false carrier due to noise from the telephone line.

Range: 1-255  
Default: 006 (0.6 second)  
Units: 0.1 s

### **S10 Lost Carrier Delay**

Sets the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier loss without causing the local modem to disconnect. When register S10 is set to 255, the modem functions as if a carrier is always present.

The actual interval the modem waits before disconnecting is the value in register S10 minus the value in register S9. Therefore, the S10 value must be greater than the S9 value or else the modem disconnects before it recognizes the carrier.

Range: 1-255  
Default: 014 (1.4 s)  
Units: 0.1 s

### **S11 DTMF Duration and Interdigit Delay**

Range: 50-255  
Default: 095 ms  
Units: 0.001 s

### **S12 Guard Time**

Defines the maximum period, in 2-hundredths of a second, allowed between consecutive asynchronous escape characters (+) for the escape sequence to be considered valid.

Range: 0-255  
Default: 050 (1 s)  
Units: 0.02 s

## S14 Bit-Mapped Options

Indicates the status of command options.

Default: (AAh), (170d), (10101010b)

Bit 0	Reserved.
Bit 1	Command echo ( <i>E<sub>n</sub></i> )
0	E0 Echo off
1	E1 Echo on
Bit 2	Response ( <i>Q<sub>n</sub></i> )
0	Q0 on
1	Q1 off
Bit 3	Result codes ( <i>V<sub>n</sub></i> )
0	V0 is selected
1	V1 is selected
Bit 4	Dumb Mode
0	dumb mode off (normal)
1	dumb mode on
Bit 5	Tone/Pulse Dialing
0	T tone
1	P pulse
Bit 6	Reserved
Bit 7	Originate/Answer
0	answer
1	originate

### **S16 Bit-Mapped Option Status**

Indicates the test in progress status.

Default: 000

- Bit 0 Local analog loopback
  - 0 local ALB disabled
  - 1 local ALB enabled (&T1)
- Bit 1 Reserved
- Bit 2 Local digital loopback
  - 0 local DL disabled
  - 1 local DL enabled (&T3)
- Bit 3 Remote digital loopback (RDL) status
  - 0 RDL off
  - 1 RDL in progress
- Bit 4 RDL requested
  - 0 RDL not active
  - 1 RDL active (&T6)
- Bit 5 RDL w/ self-test
  - 0 RDL w/ self-test disabled
  - 1 RDL w/ self-test enabled (&T7)
- Bit 6 Local analog loopback (ALB) w/ self-test
  - 0 ALB w/ self-test disabled
  - 1 ALB w/ self-test enabled (&T8)
- Bit 7 Reserved

### **S18 Modem Test Timer**

Sets the length of time, in seconds, that the modem conducts a test (commanded by **&Tn**) before returning to the command mode. If this register value is zero, the test will not automatically terminate; the test must be terminated from the command mode by issuing an **&TO** or **H** command.

Range: 0-255 seconds  
Default: 000

### **S19 AutoSync Protocol Support Mode**

Default = (1Ah) (26d) (00011010b)

Bit 0 Reserved

Bit 1 0 Bisync protocol  
1 **HDLC protocol**

Bit 2 0 **Address detector disabled**  
1 Address detector enabled

Bit 3 0 NRZI bit coding  
1 **NRZ bit coding**

Bit 4 0 Selects mark idle  
1 **Selects flag idle**

Bit 5-7 Reserved

### **S20 AutoSync HDLC Address**

Default = 255

In HDLC mode: HDLC address.

In Bisync mode: definition of Bisync sync character.

## S21 Bit-Mapped Options

Indicates the status of command options.

Default: (30h), (048d), (00110000b)

- Bit 0 Reserved.
- Bit 1 Reserved
- Bit 2 CTS behavior (*&Rn*)
  - 0 &R0 CTS follows RTS**
  - 1 &R1 CTS is always on
- Bit 4, 3 DTR behavior (*&Dn*)
  - 00 &D0 ignore
  - 01 &D1 return to command mode
  - 10 &D2 disconnect**
  - 11 &D3 reset modem
- Bit 5 DCD behavior (*&Cn*)
  - 0 &C0 DCD is always on
  - 1 &C1 DCD is on after connect**
- Bit 6 DSR behavior (*&Sn*)
  - 0 &S0 DSR is always on**
  - 1 &S1 DSR is on after connect
- Bit 7 Reserved

## S22 Bit-Mapped Options

Indicates the status of command options.

Default: (76h), (118d), (01110110b)

Bit 1, 0 Speaker volume (*L<sub>n</sub>*)

- 00 L0 is selected
- 01 L1 is selected
- 10 L2 is selected**
- 11 L3 is selected

Bit 3, 2 Speaker control (*M<sub>n</sub>*)

- 00 M0 is selected
- 01 M1 is selected**
- 10 M2 is selected
- 11 M3 is selected

Bit 6, 5, 4 Result codes and call progress (*X<sub>n</sub>*)

- 000 X0 is selected
- 001 Reserved
- 010 Reserved
- 011 Reserved
- 100 X1 is selected
- 101 X2 is selected
- 110 X3 is selected
- 111 X4 is selected**

Bit 7 Make break ratio (*&P<sub>n</sub>*)

- 0 &P0 is selected**
- 1 &P1 is selected

### **S23 Bit-Mapped Options**

Indicates the status of command options.

Default: (001), (015d), (00001111b)

Bit 0 Grant RDL

- 0 &T5 is selected
- 1 &T4 is selected**

Bit 3, 2, 1 Reserved

Bit 5, 4 Word length (7 bits)

- 00 even parity**
- 01 space parity
- 10 odd parity
- 11 mark parity

Bit 7, 6 Guard tones (&Gn)

- 00 disabled**
- 01 550 Hz
- 10 1800 Hz
- 11 not used

### **S25 DTR Debounce time**

Sets the length of time that the modem will ignore DTR for before hanging up. Its units are seconds for synchronous mode 1 and one hundredths of a second for other modes.

Range: 0-255 (1 second for synchronous mode 1; 0.01 s otherwise)

Default: 005

Units: 0.05 s

### **S26 RTS to CTS Delay Interval**

Sets the time delay, in hundredths of a second, before the modem turns CTS ON after detecting an OFF-to-ON transaction on RTS when &R0 is commanded. Pertains to synchronous operation only.

Range: 0-255

Default: 001

Units: 0.01 s

## S27 Bit-Mapped Option

Indicates the status of command options.

Default: (40h), (064d), (01000000b)

Bit 3, 1, 0 Synchronous/asynchronous selection (&Qn, &Mn)

**000 &Q0, &M0 is selected**

001 &Q1, &M1 is selected

010 &Q2, &M2 is selected

011 &Q3, &M3 is selected

100 &Q4, &M4 is selected

Bit 2 Leased line control (&Ln)

**0 &L0 is selected**

1 &L1 is selected

Bit 5, 4 Sync transmit clock select (&Xn)

**00 &X0 internal clock**

01 &X1 external clock

10 &X2 TX slave to RX clock

11 Reserved

Bit 6 ITU-T/Bell mode select (Bn)

0 B0 is selected

**1 B1 is selected**

Bit 7 Reserved

## S30 Inactivity Timer Value

Range: 0-90

Default: 000

Units: Minutes

### **S37 Desired DCE Speed**

Default = 000

**0 = Attempt to connect at the last AT speed**

3 = Attempt a 300 bits/s connection

5 = Attempt a 1200 bits/s connection

6 = Attempt a 2400 bits/s connection

7 = Attempt a 4800 bits/s connection

8 = Attempt a 7200 bits/s connection

9 = Attempt a 9600 bits/s connection

10 = Attempt a 12000 bits/s connection

11 = Attempt a 14400 bits/s connection

12 = Attempt a 16800 bits/s connection

13 = Attempt a 19200 bits/s connection

14 = Attempt a 21600 bits/s connection

15 = Attempt a 24000 bits/s connection

16 = Attempt a 26400 bits/s connection

17 = Attempt a 28800 bits/s connection

18 = Attempt a 31200 bits/s connection

19 = Attempt a 33600 bits/s connection

### **S40 Bit-Mapped Option Status**

Default = 077

Bit 0 Automode select (*Nn*)

0 NO disabled

**1 N1 enabled**

Bit 1-5 Reserved

Bit 6 V.42 detection phase (*-Jn*)

0 -J0 disabled

**1 -J1 enabled**

Bit 7 Reserved

### **S41 Connect Message Display**

Default = 000

**0 = CONNECT with DTE speed**

1 = CONNECT with carrier, protocol, and compression

2 = CONNECT with DCE speed

**S42 V.32 Retrain Operation (&B*n*)**

Default = 001

0 = &B0 is selected

**1 = &B1 is selected**

2 = &B2 is selected

**S43 Auto Fallback Character for MNP Negotiation**

0 disabled

1-127 enabled

Default 013

**S44 Bit-Mapped Option Status**

Default = (17h) (023d) (00010111b)

Bit 0 V.42bis status

0 disabled

**1 enabled**

Bit 1-2 V.42bis selection ("H*n*)

00 "H0 is selected

01 "H is selected

10 "H2 is selected

**11 "H3 selected**

Bit 3 Reserved

Bit 4 Auto fallback/fall forward selection (%G*n*)

0 %G0 is selected

**1 %G1 is selected**

Bit 5-7 Reserved

**S46 Automatic Sleep Timer**

0-255 Sleep delay - unit = 100 ms

Specifies the time the controller waits before going to sleep. The data pump is not affected.

0-254 = 0-25.4 s

Default value = 255 (disabled)

**S47 Forced Sleep Timer with Powerdown Mode in PCMCIA**

0-255 Sleep delay - unit = 100 ms

Specifies the time the controller waits before going to sleep. The data pump is not affected.

0-254 = 0-25.4 s

Default value = 255 (disabled)

**S48 Set Autoreliable Buffer (\Cn)**

Default = 000

**0 \C0 is selected**

1 \C1 is selected

2 \C2 is selected

**S49 Set Maximum Block Size**

Default = 255

63 = 64 bytes = \A0

127 = 128 bytes = \A1

191 = 192 bytes = \A2

**255 = 256 bytes = \A3**

**S50 FAX/Data Mode Selection**

Default = 000

**0 Data mode**

1 FAX mode

### S51 Data/FAX DTE Flow Control Selection

Default = 003

Bit 0-2 (&Kn, \Qn)

000 &K0, \Q0 are selected

001 &K1, \Q1 are selected

010 &K2, \Q2 are selected

**011 &K3, \Q3 are selected**

Bit 3 Reserved

Bit 4 XON/XOFF flow control (\Gn)

**0 \G0 is selected**

1 \G1 is selected

Bit 5 DTE/DCE rate (\Jn)

**0 \J0 is selected**

1 \J1 is selected

Bit 6, 7 XON/XOFF pass-through control (\Xn)

**00 \X0 is selected**

01 \X1 is selected

### S52 Break Control Option

Reflects the &Kn value.

Range: 0-5

Default: 5

### S53 Modem Operating Mode (\Nn)

Default = 003

0 \N0 is selected

1 \N1 is selected

2 \N2 is selected

**3 \N3 is selected**

4 \N4 is selected

**S54 Bit-Mapped Option Status**

Default = 000

<i>Bit</i>	<i>Meaning</i>
<b>0</b>	<b>B2 is selected</b>
1	B3 is selected
2-6	Reserved
7	<b>0 \V0 is selected</b> 1 \V1 is selected

**S57 V.42bis Dictionary Size (see AT"N)**

**Default = 002**

Range: 0-2

0	512 bytes
1	1024 bytes
<b>2</b>	<b>1536 bytes</b>

**S58 BTLZ String Length**

**Default = 032**

Range: 6-64 bytes

**S59 Bit-Mapped MNP Options**

**Default = 001**

Bit 0	<i>MNP5</i> status (%C <i>n</i> )
0	%C0 is selected
<b>1</b>	<b>%C1 is selected</b>

**S62 DTE Rate Status**

**Default = 018**

0	300 bits/s
1	600 bits/s
2	1200 bits/s
3	2400 bits/s
4	4800 bits/s
5	7200 bits/s
6	9600 bits/s
7	12000 bits/s
8	14400 bits/s
9	16800 bits/s
10	19200 bits/s
11	21600 bits/s
12	24000 bits/s
13	26400 bits/s
14	28800 bits/s
15	31200 bits/s
16	33600 bits/s
17	38400 bits/s
<b>18</b>	<b>57600 bits/s</b>
19	115200 bits/s

**S65 Round Trip Delay**

Units: 100 ms

## **S72 DTE Speed Select During Data Transfer**

**Default = 000**

**0 last autobaud speed**

- 1 300 bits/s
- 2 600 bits/s
- 3 1200 bits/s
- 4 2400 bits/s
- 5 4800 bits/s
- 6 7200 bits/s
- 7 9600 bits/s
- 8 12000 bits/s
- 9 14400 bits/s
- 10 16800 bits/s
- 11 19200 bits/s
- 12 21600 bits/s
- 13 24000 bits/s
- 14 26400 bits/s
- 15 28800 bits/s
- 16 31200 bits/s
- 17 33600 bits/s
- 18 38400 bits/s
- 19 57600 bits/s
- 20 115200 bits/s

## Result Codes

The modem connect message is controlled by ATQ, ATV, ATW, ATX, and ATV.

### Display Format Options

If ATQ1 is selected, there will be no connect message at all. The following description is true only if ATQ0 is selected.

If ATX0 is selected, "CONNECT" or "1" will be used for all DTE and DCE speed regardless of ATW and ATV options.

The following description is true only if ATX0 is NOT selected.

If ATV0 is selected, all the messages will be displayed in numeric format, such as "0" for "OK", "1" for "CONNECT", etc.

If ATV1 is selected, all the messages will be displayed in verbose format, such as "OK", "CONNECT 14400", "CONNECT 14400/LAP-M", etc.

## Extended Message Options

AT\V1 affects only ATW0 and ATW2 commands.

If ATW0, ATV1, and AT\V0 are selected and the DTE rate is 57600 bits/s, then "CONNECT 57600" will be displayed regardless of protocol.

If ATW0, ATV1, and AT\V1, are selected and the DTE rate is 57600 bits/s, then:

- a. "CONNECT 57600/NONE" will be displayed for V.14 connection
- b. "CONNECT 57600/MNP" will be displayed for *MNP* connection
- c. "CONNECT 57600/LAP-M" will be displayed for LAPM connection

If ATW2, ATV1, and AT\V0 are selected and the DCE rate is 14400 bits/s, then "CONNECT 14400" will be displayed regardless of protocol.

If ATW2, ATV1, and AT\V1 are selected and the DCE rate is 14400 bits/s, then:

- a. "CONNECT 14400/NONE" will be displayed for V.14 connection
- b. "CONNECT 14400/MNP" will be displayed for *MNP* connection
- c. "CONNECT 14400/LAP-M" will be displayed for LAPM connection

If ATV0 is selected, then a set of numeric code will be displayed. Please refer to the table for further information.

If ATW1 and ATV1 is selected, then the display will be as follows:

- a. nonprotocol mode
  - CARRIER 14400 for line speed
  - PROTOCOL: NONE for protocol
  - COMPRESSION: NONE for data compression
  - CONNECT 57600 for DTE speed
- b. *MNP* mode, with *MNP* 3, 4 protocol and *MNP5* data compression
  - CARRIER 14400 for line speed
  - PROTOCOL: *MNP* 3,4 for protocol
  - COMPRESSION: CLASS 5 for data compression
  - CONNECT 57600 for DTE speed
- c. LAPM mode, with V.42bis data compression
  - CARRIER 14400 for line speed
  - PROTOCOL: LAP-M for protocol
  - COMPRESSION: V.42bis for data compression
  - CONNECT 57600 for DTE speed

## **0 OK**

The OK code is returned by the modem to acknowledge execution of a command line.

## **1 CONNECT**

The modem will send this result code upon connection when:

1. The line speed is 300 bits/s, and the modem has been instructed to report the line speed to the DTE upon connecting, or
2. The DTE speed is 300 bits/s, and the modem has been instructed to report the DTE speed to the DTE upon connecting, or
3. The range of result code responses is restricted by the X command such that no speed reporting is allowed.

## **2 RING**

The modem sends this result code when incoming ringing is detected on the line.

## **3 NO CARRIER**

The modem sends this result code when attempting to establish a call if:

1. Ringback is detected and later ceases but no carrier is detected within the period of time determined by register S7, or
2. No ringback is detected within the period of time determined by register S7.

This result code is also used when the modem autodisconnects due to loss of carrier.

Under X0, if busy tone detection is enforced, this result code is used as a response to the detection of busy or circuit busy. Under X0, if dial tone detection is enforced or selected, this result code is used to indicate that dial tone has not been detected.

## **4 ERROR**

The modem returns this result code if the command line contains a syntax error or it is unable to execute a command contained in the command line. It is issued if a command does not exist or if the parameter supplied is outside the permitted range.

## **6 NO DIAL TONE**

For X2 and X4, the modem sends this result code if it has been instructed to wait for dial tone during dialing but none is received.

## **7 BUSY**

For X3 and X4, if busy tone detection is enforced, the modem sends this result code when attempting to originate a call if the busy (engaged) signal is detected on the line.

## **8 NO ANSWER**

The modem sends this result code when attempting to originate a call if the @ dial modifier is used and the modem does not detect silence before the expiration of the timer S7.

5, 10-15, and 24-33 Connect Rate (see Table 6, page 10 for rate)

For X1, X2, X3, and X4, the modem sends this result code when:

1. The line speed is the speed following the connect and the modem has been instructed to report the line speed to the DTE upon connecting by the W2 command.
2. The DTE speed is 2400 bits/s and the modem has been instructed to report the DTE speed to the DTE upon connecting using the W0 command.

## **Negotiation Progress Messages**

### **40 CARRIER 300**

The modem returns this result code when either a V.21 or Bell 103 carrier has been detected on the line, and carrier reporting has been enabled. (See W1.)

### **42 CARRIER 75/1200**

The modem sends this result code when the V.23 backward channel carrier has been detected on the line, and carrier reporting has been enabled. (See X4.)

### **43 CARRIER 1200/75**

The modem sends this result code when the V.23 forward channel carrier has been detected on the line, and carrier reporting has been enabled.

### **46 CARRIER 1200**

The modem sends this result code when either the high or low channel carrier in either V.22 or Bell 212 mode has been detected on the line, and carrier reporting has been enabled.

**47 CARRIER 2400**

The modem sends this result code when either the high or low channel carrier in V.22bis or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**48 CARRIER 4800**

The modem sends this result code when the channel carrier in V.32, V.32bis, or V.34 has been detected on the line, and carrier reporting has been enabled.

**49 CARRIER 7200**

The modem sends this result code when the channel carrier in V.32bis or V.34 has been detected on the line, and carrier reporting has been enabled.

**50 CARRIER 9600**

The modem sends this result code when the channel carrier in V.32, V.32bis, or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**51 CARRIER 12000**

The modem sends this result code when the channel carrier in V.32bis or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**52 CARRIER 14400**

The modem sends this result code when the channel carrier in V.32bis or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**53 CARRIER 16800**

The modem sends this result code when the channel carrier in V.32terbo or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**54 CARRIER 19200**

The modem sends this result code when the channel carrier in V.32terbo or V.34 mode has been detected on the line, and carrier reporting has been enabled.

**55 CARRIER 21600**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**56 CARRIER 24000**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**57 CARRIER 26400**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**58 CARRIER 28800**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**59 CARRIER 31200**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**60 CARRIER 33600**

The modem sends this result code when the channel carrier in V.34 mode has been detected on the line, and carrier reporting has been enabled.

**66 COMPRESSION: CLASS 5**

This message is sent to the DTE when the modem has connected in *MNP* Class 5, and COMPRESSION message reporting has been enabled.

**67 COMPRESSION: V.42bis**

This message is sent to the DTE when the modem has connected in V.42bis data compression, and COMPRESSION message reporting has been enabled.

**69 COMPRESSION: NONE**

This message is sent to the DTE when the modem has connected without data compression, and COMPRESSION message reporting has been enabled.

**70 PROTOCOL: NONE**

This message is sent to the DTE when the modem has connected without any form of error correction, and the PROTOCOL message reporting has been enabled.

**77 PROTOCOL: LAP-M**

This message is sent to the DTE when the modem has connected in the V.42 LAPM mode of error correction, and PROTOCOL message reporting has been enabled.

**80 PROTOCOL: *MNP***

This message is sent to the DTE when the modem has connected in the *MNP* mode of error correction, and PROTOCOL message reporting has been enabled.

**81 PROTOCOL: *MNP 2***

This message is sent to the DTE when the modem has connected in the *MNP* mode of error correction, and PROTOCOL message reporting has been enabled.

**82 PROTOCOL: *MNP 3***

This message is sent to the DTE when the modem has connected in the *MNP* mode of error correction, and PROTOCOL message reporting has been enabled.

**83 PROTOCOL: *MNP 2, 4***

This message is sent to the DTE when the modem has connected in the *MNP* mode of error correction, and PROTOCOL message reporting has been enabled.

**84 PROTOCOL: *MNP 3, 4***

This message is sent to the DTE when the modem has connected in the *MNP* mode of error correction, and PROTOCOL message reporting has been enabled.

# Specifications

---

- Power requirements (must have external power supply):

+5 Volts +/- 5%	2.65 Amps (typical)
+12 Volts +/- 5%	50 mA (typical)

- Environmental:

Ambient Temperature	10 Degrees C to 55 Degrees C
Relative Humidity	20% to 80%
Air Movement	30 CFM Forced (host adapter only)
Altitude	0 to 12,000 Feet

- Mechanical:

Length	12 inches	Depth	7 inches
Height	2.25 inches	Weight	2.7 pounds

- Emissions:

FCC Part 15, Subpart J, Class A  
CSA C108.8-M83, Class A

**Note:** To remain within Class A emissions standards, the Digi-supplied shielded cabling between the host adapter and Modem module (or between multiple Modem and/or PORTS modules) must be used.

# Digi Support Services

---

## The Digi Bulletin Board System

Digi provides an electronic bulletin board service (BBS) for our customers. This bulletin board provides general and technical information about Digi's products.

The Digi BBS allows users to download software drivers as soon as they become available. There is also a feature to allow users with problems or questions about Digi products to leave messages to Digi Technical Support.

Using the Digi BBS is easy. Simply dial **(612) 912-4800**. In Europe, dial **+49 221 9205211**; in Asia, dial **+65 735 2460**.

The recommended modem communications parameters are 8 bits, no parity and one stop bit (**8 N 1**). Other settings may also work.

Download protocols include Zmodem, Xmodem, Ymodem, Kermit and others.

## Internet FTP Server

Digi has set up an Anonymous FTP server for those with access to the Internet network. The address is **ftp.dgii.com**. Log in as **anonymous**, and enter your E-mail address when asked for a password. Drivers and installation tips are located in the **/drivers** directory. A text file, **download.doc**, gives information on uncompressing the files after downloading. Tip: Be sure to enter **"bin"** before downloading, to ensure binary transfer of files.

## World Wide Web Server

Product information, manuals, new product announcements, programs, application stories and more can be obtained through the World Wide Web. Our address is **http://www.dgii.com**.

## DigiFACTs FaxBack Server

Manuals and technical information can also be obtained by FAX. To use the FaxBack server, simply call (612) 912-4990 on a touch tone phone.

## Information About Your System

Serial number of your Digi product: \_\_\_\_\_

Make, model and clock speed of your computer: \_\_\_\_\_

\_\_\_\_\_

How much RAM does your computer have? \_\_\_\_\_

**Hard disk controller:** Type: \_\_\_\_\_ Memory addressed at: \_\_\_\_\_

I/O port used: \_\_\_\_\_ IRQ: \_\_\_\_\_

**LAN card:** Type: \_\_\_\_\_ Memory addressed at: \_\_\_\_\_

I/O port used: \_\_\_\_\_ IRQ: \_\_\_\_\_

**Other:** Type: \_\_\_\_\_ Memory addressed at: \_\_\_\_\_

I/O port used: \_\_\_\_\_ IRQ: \_\_\_\_\_

**Operating system:** \_\_\_\_\_ Version: \_\_\_\_\_

**Digi device driver version:** \_\_\_\_\_

## Technical Support

At Digi, we are proud of our products, and support them. Our dealers and distributors are fully trained on our product line, so that they can help you on a technical level should assistance be needed.

Your first level of support is your Digi dealer, the place where you purchased your Digi product. Your dealer has the training to help you with any installation questions or difficulties you might have.

If you still experience difficulties (after contacting your first level of support), Digi has a staff of Technical Support Specialists that can assist you. They can be reached at **(612) 912-3456**. In Europe, call **+49 221 920520**, and in Asia, call **+65 732 1318**. FAX numbers are: (612) 912-4958 (USA), +49 221 9205210 (Europe) and +65 732 1312 (Asia).

When you call Digi Technical Support, please call from a position where you can operate your system. Also, please fill out the form on the preceding page before calling, so your Technical Support representative can have a clear picture of your system and any potential conflicts between devices.

Digi Technical Support can also be reached via Internet E-mail. Please send correspondences to **support@dgii.com**, and include your voice and FAX phone numbers.

## Customer Service

Digi also has a staff of Customer Service representatives to help you with software and documentation update requests, as well as Returned Merchandise Authorizations (RMAs) in case you need to return your Digi product for repair (see page 76). They may be reached at **(612) 912-3456**. Digi Customer Service may be contacted by FAX at (612) 912-4959.

Digi Customer Service can also be reached via Internet E-mail. Please send correspondences to **cust\_serv@dgii.com**, and include your voice and FAX phone numbers.

## Return Procedures

All Digi products have a five-year parts and labor warranty, and we are ultimately responsible for any defective parts, according to the limits specified in the warranty. However, many of the reported problems are due to factors other than defects in the product itself. To save you time and possibly additional cost, Digi asks that you *first* try to resolve any difficulties by contacting our Technical Support representatives at **(612) 912-3456**.

### **Important!**

*Be sure to have the serial number of your Digi product at hand before calling Technical Support.*

Returns should be directed to the dealer or distributor from whom you purchased the product. If you need to return your Digi product for repair, it is first necessary to obtain an RMA (Returned Merchandise Authorization) number from Digi, by speaking to a Digi Customer Service representative. Authorized returns should be shipped to Digi International, 10000 West 76th Street, Eden Prairie, MN 55344. The RMA number should appear on the shipping carton, on or near the address label.

### **Note:**

*Products received without an RMA number clearly marked on the outside of the package will be returned, unopened, to the sender*

# Index

---

BBS, 72  
Bulletin Board, 72  
Customer Assistance, 75  
Customer Service, 75  
Digi BBS, 72  
EBI Cable, 3  
EBI connectors, 3  
EBI In, 3  
EBI Out, 3  
E-Mail addresses, 75  
FaxBack, 73  
FTP server, 73  
Installation, 3  
Internet, 73  
Return Procedures, 76  
RMA, 76  
Specifications, 71  
    Emissions, 71  
    Environmental, 71  
    Mechanical  
        PORTS/8em(p) module,  
        71  
Technical Support, 75  
World Wide Web, 73