



*Telebit*  
*WorldBlazer Modem*

*Addendum*

90227-01

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This addendum to the *Telebit T3000 Reference Manual* (part number 90201-01) and *Telebit T3000 Rackmount Modem Reference Manual* (part number 90208-01) describes the following new features of the WorldBlazer modem:

- Enhanced Packetized Ensemble Protocol (Turbo PEP)
- V.42bis data compression over Turbo PEP
- DTE interface speeds up to 115,200 bps
- More robust connectivity over highly impaired lines with the addition of trellis coding
- Universal compatibility with PEP and CCITT standards

## **Turbo PEP**

Telebit's new multicarrier modulation –Turbo PEP – now provides data transmission speeds up to 23,000 bps without data compression.

The WorldBlazer modem sends hundreds of different frequency carriers onto the line at once. Each carrier optimizes its small portion of the channel by sending two to seven bits of data. This allows higher throughput with increased efficiency.

## **Data Compression over PEP**

The WorldBlazer modem uses either CCITT V.42bis or Telebit Lempel-Ziv data compression with Turbo PEP. V.42bis gives you a maximum data compression ratio of four to one. This yields throughput of more than 70,000

bps when *V.42bis* is used with Turbo PEP. Telebit Lempel-Ziv gives you a maximum data compression ratio of nearly two to one.

## **DTE Speeds**

WorldBlazer supports DTE interface speeds up to 115,200 bps. This allows data transmission rates of more than 70,000 bps with data compression and PEP.

## **Robust Connectivity over Impaired Lines**

Turbo PEP gives you robust connectivity over highly impaired telephone lines by using trellis coding – more robust connectivity than original PEP. Trellis coding is a modulation method that improves modem performance on noisy telephone lines. Trellis coding is a CCITT-endorsed technique usually found in V.32 and *V.32bis* modems.

The WorldBlazer modem can establish international connections when other CCITT standard devices cannot. Turbo PEP lets the WorldBlazer modem fall back in increments of less than 100 bps to find a telephone line's fastest transmission rate.

## **Universal Compatibility with PEP and CCITT Standards**

The WorldBlazer modem's Turbo PEP is compatible with all PEP modems including the TrailBlazer and TrailBlazer Plus modems as well as the T1000, T2000, and T2500 modems. The WorldBlazer modem also works with CCITT standards *V.32bis*, V.32, V.23, *V.22bis*, V.22, and V.21 as well as Bell 212A and Bell 103.

## Manual Changes

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The changes to the *Telebit T3000 Reference Manual* and *Telebit T3000 Rackmount Modem Reference Manual* that support the WorldBlazer modem are in the following areas:

- Turbo PEP
- AT commands
- S registers
- Prestored configurations
- Escape sequence

These changes apply to both the standalone and rackmount versions of the T3000 modem.

### Turbo PEP

Turbo PEP is the most important feature of the WorldBlazer modem. With Turbo PEP, the modem can transmit or receive data asynchronously at speeds up to 23,000 bps over dial-up telephone lines, or more than 70,000 bps when V.42bis data compression is enabled. Also, Turbo PEP provides more robust connectivity on impaired channels by using trellis coding.

The WorldBlazer modem supports both Turbo PEP and original PEP.

### Front Panel Indicator

A PEP indicator has replaced the high speed (HS) indicator on the front panel of the standalone and rackmount versions. The PEP indicator, when lit, shows that the modem is in fast transmission operation using the PEP communications protocol.

## AT Commands

This section describes changes and additions to the T3000 modem's AT command set. The WorldBlazer modem supports these changes and additions.

### **Qn Quiet Mode Select**

The default is 0 for the standalone WorldBlazer modem. For the rackmount WorldBlazer modem, the default is 2.

### **Xn Result Code Select**

New result codes have been added to X1 and X11 as follows:

X1 – Adds modulation speed to the `CONNECT` message:

Number	Words
50	CONNECT FAST

X11 – Adds the serial interface speed to the `CONNECT` message:

Number	Words
17	CONNECT 76800
18	CONNECT 115200

## **&Cn Data Carrier Detect (DCD) Control**

Range: 0–6

Default: 0

The descriptions of the &C4, &C5, and &C6 commands have been added as follows:

**&C4** For synchronous operation only. When the local modem detects a carrier from the remote modem, the DCD signal goes on. The DCD signal goes off when the carrier is dropped.

When the modem detects a V.13 pattern from the remote modem, it sets received data to mark and drops DCD. (Received data is the RS-232 data signal received by the DTE from the modem on pin 3.)

**&C5** The DCD signal is on only when received data is being transmitted to the DTE. The &C5 command is intended for use with the SDLC accelerator (S111).

**&C6** The DCD signal follows the DTR signal when the modem is on hook. DCD goes on after the `CONNECT` message is sent to the DTE and stays on during the connection.

## **&Fn Load Factory Defaults**

Range: 0–6, 8–15, 32–34

The descriptions of the &F6, &F14, and &F15 commands have been added as follows:

**&F6** Half-duplex transparent synchronous LPDA dialing.

**&F14** Half-duplex PEP SDLC with no command set selection.

**&F15** Half-duplex PEP SDLC LPDA dialing.

## **&Mn Async/Sync Mode Select**

The T3000 Quick Reference Card states that &M commands are equivalent to Q commands. This is incorrect. &M commands are equivalent to &Q commands.

## **&Qn Async/Sync Mode Select**

The descriptions of the &Q commands have been changed as follows:

**&Q0** Asynchronous data operation. Use S253 to set the command mode.

**&Q1** Synchronous data operation. Use S253 to set the command mode. When DCD goes on, the modem checks DTR after the S25 delay. If DTR is on, the modem completes the data connection. If DTR is off, the modem disconnects.

**&Q2** Synchronous data operation. Use S253 to set the command mode. An off-to-on DTR change causes the modem to dial a stored telephone number and try to connect.

If the A/B switch on the standalone modem is set to A, the modem dials the telephone number in the first location (~N0). If the switch is set to B, the modem dials the number in the second location (~N1). For the rackmount version, the modem dials the number in the first location. S104, automatic dialing, is ignored.

**&Q3** Synchronous data operation. Use S253 to set the command mode. The &Q3 command uses the automatic dialing setting in S104. The S104 setting enables automatic dialing using the DTR signal from the local DTE or from the T/D switch on the front panel of the standalone T3000 modem.



**&Q6** Synchronous data operation. Use S253 to set the command mode. The modem interprets RS-232 signals according to the parameters stored in the modem.

**&Rn Request to Send (RTS) and Clear to Send (CTS) Interpretation**

Range: 0–8

Default: 3

The descriptions of the &R commands have been changed or added as follows:

**&R0** CTS is on when the modem is not connected to another modem.

CTS goes off at the end of dialing when call progress monitoring begins, or when the modem goes off hook to answer a call.

During a connection, the CTS signal follows the RTS signal after the delay specified by the S26 register.

**&R1** The CTS signal goes on after the modem sends the `CONNECT` result code and stays on during the connection.

**&R2** CTS stays off until a valid carrier is detected. When a carrier is detected, CTS goes on 200 milliseconds after RTS goes active. If RTS/CTS flow control is used, CTS controls the flow of data from the DTE.

**&R3** CTS is always on if hardware flow control is disabled.

- &R4            CTS follows DTR when the modem is not connected to another modem.
- CTS goes off at the end of dialing when call progress monitoring begins, or when the modem goes off hook to answer a call.
- During a connection, the CTS signal follows the RTS signal after the delay specified by the S26 register.
- &R5            Same as &R0 plus the modem transmits the V.13 pattern when RTS is off. Valid for synchronous only.
- &R6            Same as &R4 plus the modem transmits the V.13 pattern when RTS is off. Valid for synchronous only.
- &R7            The CTS signal follows the RTS signal after the delay specified by the S26 register.
- &R8            CTS control for the SDLC accelerator (S111). When the modem is in data mode and the SDLC accelerator is running, the modem sends the current SDLC packet to the DTE when RTS goes from off to on, before the modem turns on CTS. When RTS goes from on to off, the modem restarts the SDLC accelerator.

**Note:**        *For &R0, &R1, and &R4, hardware flow control (S68) is overridden.*

## **&Sn Data Set Ready (DSR) Control**

The &S4 command has been changed as follows:

**&S4** When the local modem detects a carrier from the remote modem, the DSR signal turns on after the `CONNECT` result code is sent to the DTE. The DSR signal turns off when the carrier is dropped.

## S Registers

This section describes changes to the S registers of the T3000 modem. The WorldBlazer modem supports these changes.

### **S5 Backspace Character**

Range: ASCII Code 0–255

Default: ASCII Code 8 (backspace)

Register S5's range has been increased.

### **S50 Modulation Speed**

Range: 0–3, 5–7, 254, 255

Default: 0

See also: B, S92, and S94

Register S50's selections have been changed to the following:

0	Automatic speed determination
1	300 bps (V.21 or Bell 103)
2	1200 bps (V.22 or Bell 212A)
3	2400 bps (V.22 <i>bis</i> )
5	1200/75 bps (V.23)
6	9600 bps (V.32)
7	14,400 bps (V.32 <i>bis</i> )
254	Attempt to connect at the closest current DTE speed (non-PEP)
255	Fast operation (PEP) only

## **S51 DTE Interface Speed**

Range: 0–9, 35, 43, 46, 252–255

Default: 255

The S51 register determines the data rate between the modem and the local DTE when the modem is operating asynchronously. Register S51's selections have been changed to the following:

0	300 bps
1	1200 bps
2	2400 bps
3	4800 bps
35	7200 bps
4	9600 bps
43	12,000 bps
46	14,400 bps
5	19,200 bps
6	38,400 bps
7	57,600 bps
8	76,800 bps
9	115,200 bps
252	Autobaud; type-ahead is not permitted. Default to speed of last &W command.
253	Autobaud; type-ahead is permitted. Default to 38,400 bps.
254	Autobaud; type-ahead is permitted. Default to 19,200 bps.
255	Autobaud; type-ahead is permitted. Default to 9,600 bps.

**Note:** *Autobaud does not support 57,600, 76,800, or 115,200 bps.*

## **S71 Transmit Bits per Channel**

S71 is a read-only register used for PEP connections only. It shows the number of transmit bits assigned to each channel at 512 frequency points in the current telephone connection.

## **S73 Receive Bits per Channel**

S73 is a read-only register used for PEP connections only. It shows the number of receive bits assigned to each channel at 512 frequency points in the current telephone connection.

## **S74 Packet Transmission Status**

This is a read-only register. It shows the statistics of the connection in the following format:

```
nnnn PACKETS TRANSMITTED
nnnn PACKETS RECEIVED
nnnn PACKETS RETRANSMITTED
nnnn PACKETS NACKED
OK
```

If the data transmission is not error corrected, S74 shows OK only.

## **S92 Answering Sequence Selection**

Range: 0 or 1

Default: 0

See also: S50

The S92 register is used to change the sequence of answering tones issued by the modem when it answers a call with automatic speed determination (S50=0). S92=1 accommodates slower-speed modems that may be adversely affected by PEP answer tones.

The following values for the S92 register are valid only when the modem answers a call with automatic speed determination (S50=0):

- |   |  |
|---|--|
| 0 | Issue the PEP answer tones at the beginning of the search sequence.  |
| 1 | Issue the PEP answer tones at the end of the search sequence rather than at the beginning to accommodate slower-speed (non-PEP) modems. To connect with PEP when the answering modem's S92 register is set to 1, the calling (originating) modem must have its S50 register set to 255. Also, the calling modem's S7 register should be set to at least 60 seconds to allow enough time to detect a valid PEP answer sequence. |

## **S102**

The S102 register is no longer used.

## **S111 File Transfer Protocol Support**

Range: 0, 10–14, 20, 30, 40–43, 50, 255

Default: 255

The following value has been added to the S111 register:

50	Selects the SDLC accelerator. (Set &Q6 when S111=50.)
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## **S151 Synchronous Clock Speed**

Range: 0–5, 35, 43, 46

Default: 4

The S151 register is in effect in synchronous command modes and when you use the SDLC accelerator (S111). Possible settings for this register are as follows:

0	300 bps
1	1200 bps
2	2400 bps
3	4800 bps
35	7200 bps
4	9600 bps
43	12,000 bps
46	14,400 bps
5	19,200 bps



### **S155 NRZ/NRZI Data Encoding**

Range: 0 or 1

Default: 0

This register specifies which data-encoding method is used with the SDLC accelerator. The values for the S155 register are the following:

- 0 NRZ encoding is used. A 1 (one) is represented by a high level and a 0 (zero) by a low level.
- 1 NRZI encoding is used. A 1 (one) is represented by no change in the level and a 0 (zero) by a change in the level.

### **S183 Error Control Detection Timer**

Range: 8–255

Default: 25 (2.5 seconds)

Change the default for the S183 register to 25.

**S191 Telebit LZ Data Compression Negotiation**

Range: 6 or 7

Default: 7

See also: S190

This register applies only to PEP connections when data compression is enabled (S190 is not equal to 0).

If S191=7, Telebit Lempel-Ziv (LZ) is negotiated along with V.42bis data compression. V.42bis is selected if the remote modem supports both compressions.

If S191=6, Telebit LZ is not negotiated.

The values for the S191 register are the following:

- 6 Telebit LZ data compression is not negotiated.
- 7 Telebit LZ is negotiated if data compression is enabled.

**S253 Command Set Selection**

Range: 0, 10, 32

Default: 10

The following value has been added to the S253 register:

- 32 LPDA bit-synchronous dialing

## Prestored Configurations

The WorldBlazer modem has 18 prestored configurations. These configurations address a wide range of applications. Before choosing your application, decide which configuration meets the requirements of your system.

The table on the next page shows you how to select 15 of the prestored configurations from the front panel or by using the &F commands. Three new &F commands (&F6, &F14, and &F15) are shown in this table.

To select a prestored configuration from the front panel of the standalone modem, use the T/D and A/B switches. The LEDs provide a visual display of the configuration selected. See the instructions in Chapter 3, *The Basics*, in the *Telebit T3000 Reference Manual*. For the rackmount modem, enter an &F command on the personal computer's or workstation's keyboard. Alternatively, you can press the reset switch while you hold down the power fail reset switch on the control panel of the chassis to reset the modem to the factory default settings.

### Prestored Configurations

Prestored Configuration	Front Panel LED					AT&F Command
	MR	OH	CD	PEP	EC	
TTY (factory default)	●	●	●	●	●	&F or &F0
Unattended Answer Mode	●					&F1
Intelligent Answer Mode		●				&F2
System V (HDB) (UUCP)	●	●				&F3
Ver 2 (BSD) (UUCP) 4.2–4.3 and SCO Xenix			●			&F4
Transparent Sync	●		●			&F5
Half-Duplex Transparent Sync LPDA Dialing		●	●			&F6
IBM PC/MAC with SW flow control (XON/XOFF)				●		&F8
IBM PC/MAC with HW flow control (RTS/CTS)	●			●		&F9
Leased-Line Async Originate Mode		●		●		&F10
Leased-Line Async Answer Mode	●	●		●		&F11
Leased-Line Sync Originate Mode			●	●		&F12
Leased-Line Sync Answer Mode	●		●	●		&F13
Half-Duplex PEP SDLC with No Command Set		●	●	●		&F14
Half-Duplex PEP SDLC LPDA Dialing	●	●	●	●		&F15

## Prestored Configuration Displays

The WorldBlazer modem provides you with prestored configurations. After you select a configuration, you can use AT&V to display the configuration on the screen.

Three new configurations displays are shown here:

### Configuration: Half-Duplex Transparent Sync LPDA Dialing Command: &F6

The screen display is as follows:

```
WorldBlazer SA - Version LA5.00 - Active Configuration
  B1 E1 L2 M1 P Q0 V1 X1 Y0
  &C6 &D2 &G0 &J0 &L0 &Q6 &R4 &S4 &T4 &X0
S000:1 S001=0 S002=43 S003=13 S004=10 S005=8 S006=2 S007=40
S008=2 S009=6 S010=14 S011=70 S012=50 S018=0 S025=5 S026:0
S038=0 S041=0 S045=0 S046=0 S047=4 S048=0 S050:7 S051=255
S056=17 S057=19 S058=3 S059=0 S060=0 S061=1 S062=15 S063=0
S064=0 S068=255 S069=0 S090=0 S092=0 S093=8 S094=1 S100=0
S104=0 S105=1 S111=255 S112=1 S151=4 S155=0 S180:0 S181:0
S183=25 S190=1 S191=1 S253:32 S254=255 S255=255
```

### Configuration: Half-Duplex PEP SDLC with No Command Set Selection Command: &F14

The screen display is as follows:

```
WorldBlazer SA - Version LA5.00 - Active Configuration
  B1 E1 L2 M1 P Q0 V1 X1 Y0
  &C3 &D2 &G0 &J0 &L0 &Q6 &R7 &S3 &T4 &X0
S000:1 S001=0 S002=43 S003=13 S004=10 S005=8 S006=2 S007=40
S008=2 S009=6 S010=14 S011=70 S012=50 S018=0 S025=5 S026:0
S038=0 S041=0 S045=0 S046=0 S047=4 S048=0 S050:255 S051=255
S056=17 S057=19 S058=3 S059=0 S060=0 S061=1 S062=15 S063=0
S064=0 S068=255 S069=0 S090=0 S092=0 S093=8 S094=1 S100=0
S104=0 S105=1 S111:50 S112=1 S151:5 S155:1 S180:0 S181:0
S183=25 S190=1 S191=1 S253:0 S254=255 S255=255
```

# Configuration: Half-Duplex PEP SDLC LPDA Dialing Command: &F15

The screen display is as follows:

```
WorldBlazer SA - Version LA5.00 - Active Configuration
  B1  E1  L2  M1  P   Q0  V1  X1  Y0
&C6 &D2 &G0 &J0 &L0 &Q6 &R4 &S4 &T4 &X0
S000=1  S001=0  S002=43 S003=13 S004=10 S005=8 S006=2  S007=40
S008=2  S009=6  S010=14 S011=70 S012=50 S018=0 S025=5  S026=0
S038=0  S041=0  S045=0  S046=0  S047=4  S048=0 S050:255 S051=255
S056=17 S057=19 S058=3  S059=0  S060=0  S061=1 S062=15 S063=0
S064=0  S068=255 S069=0  S090=0  S092=0  S093=8 S094=1  S100=0
S104=0  S105=1  S111:50 S112=1  S151:5 S155=0 S180:0  S181:0
S183=25 S190=1  S191=1  S253:32 S254=255 S255=255
```

## Escape Sequence

During a data connection, the escape sequence provides a way to enter command mode without disconnecting the communications link. An escape sequence contains three consecutive escape characters (defined by the S2 register) followed by a valid AT command. For example, to disconnect a call, type the following:

```
+++ATH
```

The modem switches to command mode only after you enter an escape sequence. The data connection is maintained while the modem is in command mode.

**Note:** *When the local modem receives an escape sequence, it discards any data received from the remote modem if no link protocol (MNP, V.42, or PEP) is active.*



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