

FCCMZNGMN112I

REGISTRATION DEC 17 1998

User's Guide

GEMINI™

112,000 bps Modem

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TR A N S E N D

Transend Modems

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1 Introduction

If one line is inadvertently interrupted, data continues on the other.
No data is ever lost.

This manual covers the following Transend modems:

- GEMINI™ external modem (Figure 1)
- GEMINI™ internal modem (Figure 2)

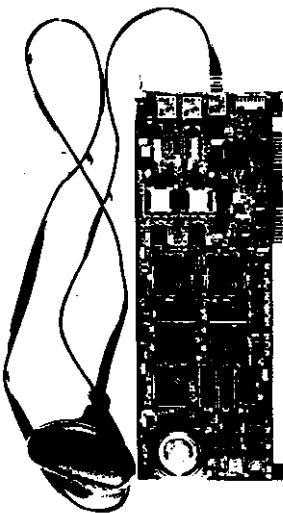


Figure 2. Internal Modem

Figure 1. External Modem

About the Modems

The Gemini family of modems are based on a totally-new design incorporating a high-capacity processor, huge memory, and powerful firmware. They are unlike any other existing modems. When connected on two standard, dial-up lines, the modems can achieve more than twice the throughput of standard analog or PCM modems. Operation is automatic and transparent to the user.

Capabilities

- You need two standard lines to reach full speed. But on one line, the modem connects to any standard modem.
- The second line accepts Call Waiting. You can interrupt the second line to answer an incoming call or pick up the phone to make a call without interrupting data flow. When the call is completed, the modem automatically reconnects the second line to the data stream.

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- You can use all standard AT commands. Your current fax and data software will work fine.
- Several dialing methods are built in so you can adapt the modem to your needs
- You can connect to a hunt group (rotary).

Modem Features

- Fully compliant with ITU-T standards - Including V.90, V.34, V.32 bis, V.32, V.8, V.14, V.24, V.25 bis, V.42, V.42 bis..
- Advanced DSP Technology - Transend uses advanced Digital Signal Processing technology developed and engineered in-house to provide better connectivity, higher speeds, better error correction, and the ability to add and customize leading-edge features.
- Voice/data switch - Second line can be switched between data and voice without data loss. After a voice call is completed on Line 2, the modem will reconnect on Line 2 and resume high-speed transfer.
- Complete fax and data capability - Fax software included. Automatic mode selection. Automatic speed fall forward and fall back. Asymmetric speeds. Error correction. Data compression.. Preset profiles. Caller-ID. Dial or leased lines.
- Flash Memory Software Upgrades - On-board Flash memory allows easy upgrades over the telephone or Internet--no EEPROM replacement is required.
- Jumperless Configuration - Fully software configurable. No jumpers or dip switches (except internal).
-

- Asymmetric Speed Operation - The modem will transmit and receive at different speeds to achieve the highest throughput possible. Transmit and receive speeds are processed independently to adapt to varying line conditions.
- Error Correction and Compression - Fully implemented error correction (V.42) and data compression (V.42 bis) maximizes throughput.
- Autodial/Autoanswer - Compliant with V.25 bis autodial/auto-answer criteria. Stores up to 5 telephone numbers and access codes with up to 40 digits each.
- Asynchronous Operation - Adapts to new or old systems, dial or leased lines, and most data protocols.
- Dial-up or Leased Lines - Use with either 2-wire dial-up lines or 2-wire leased (private) lines.
- Factory Profiles - Five preset factory profiles make setup quick and easy. Configurations are provided for asynchronous communication and connection to Windows NT and UNIX servers.
- Remote Configuration - Password protected access to the remote modem. Control the remote modem directly; change configuration.

This Guide

The guide is arranged to help you find the information you need quickly:

- **Section 1. Introduction**—general information about the modem, its capabilities, and use of this guide

Transcend Modems

- **Section 2. Installation and Setup**—installation and setup instructions to get you up and running quickly.
- **Section 3. Operation**—complete operating instructions.
- **Section 4. Troubleshooting, Testing, and Customer Support**—procedures to check out your modem, find the source of problems, and get customer support if you need it.

- **Section 5. Reference Data**—reference information including AT commands, V.25 bis commands, and S-register functions.
- **Customer Support**
See *Section 4, Troubleshooting, Testing, and Customer Support*, for customer support information, telephone numbers, hours of operation, and return and repair policies.

2 Installation and Setup

External Modem Installation

Equipment Needed	
We Furnish:	You Need:
• Modem	• Computer with serial port
• 2 Standard telephone cords (gray) for line 1 and line 2	• Serial port computer
• 2 lines adaptor	• 2 separate telephone lines with outlets
• Modem power transformer	
• User's Guide	
• FAX/Communications software package	
• Driver CD-ROM	

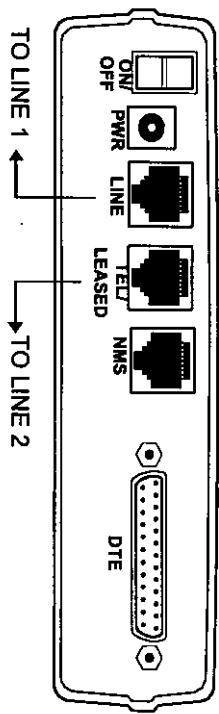


Figure 3. External Modem Connections

1. Be sure the computer is off and the modem is not powered up.
2. Turn the modem so you have access to the connectors at the back (Figure 3).
3. For Line 1 on a dial-up network, plug one end of the gray telephone cord into the telephone outlet on the wall. Plug the other end of the cord into the LINE connector.
4. For Line 2, plug the 2-line adaptor on the line connector. Then plug one end of the gray telephone cord into the second telephone outlet on the wall. Plug the other end of the cord into the LINE 2 jack in the adaptor. In this case, the Line 1 must be connected in the LINE 1 jack in the same adaptor.
5. Connect the serial port cable between the computer's serial port and the DTE (Data Terminal Equipment) connector.
6. Plug the power transformer into any standard, 110/220 VAC, grounded outlet. Plug the power transformer cord into the PWR connector.
7. To use a telephone handset with the modem, you can connect the handset to the telephone jack.

Setup

1. Turn on the power switch at the back of the modem.
2. Install the fax/data software on your computer using the instructions furnished with the software. You can use the software package furnished with the modem or your own software package.

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3. Place the Driver diskette in drive A or B.
4. Install the drivers for the program as follows:
 - Windows 3.11 - copy the file a:\modem.inf to the directory c:\windows\inf of your hard-disk. Reboot the system and select the Transend Modem through your communication software.
 - Windows NT 3.5 - copy the file a:\modem.inf to the directory c:\windows\system32\ras of your hard-disk. Reboot the system and select the Transend Modem through your communications software.
 - Windows 95 - click the "My Computer" icon, then go to "Control Panel" and click "Modem". Enter "Add" and let Windows 95 find your modem. After that, select "Next" and "Have Disk...". Go to the directory a:\drivers\95_NT_4 and then click OK. From the list of Transend Modems, select the model you have and then click "Next". The installation has been completed.
 - Windows NT 4.0 - follow the same procedure described for Windows 95.
 - 5. On your computer, start your fax software or other program and enter Terminal mode (HyperTerminal in Windows 95).
 - 6. Type the command "AT," and press the Return or Enter key. You will see the characters "AT" on your computer screen.
 - 7. The modem will respond with the letters "OK" on your screen. This indicates the modem is functioning properly and ready to communicate.
 - 8. Select one of the factory-supplied operating profiles that is best for your application.

Internal Modem Installation

Equipment Needed

We Furnish:	You Need:
• Modem card	• Computer with available 32-bit EISA slot
• Detachable "Alien" LED display (optional)	• 2 Telephone lines with outlets
• 2 Standard telephone cords (gray)	• Screwdriver to remove cover and install card
• Installation and Operation Guide	
• FAX/Communications software package	
• CD-ROM	

Preparation

1. First, find out the existing serial port assignments for COM1 and COM2 and IRQ (interrupt) settings for each port.
2. If you are using Windows 3.X, you can run the MSD.EXE (Microsoft Diagnostic) program located in the Windows sub-directory to determine the COM port and IRQ settings.
3. If you are using Windows 95, you can check the COM port settings in SYSTEM under CONTROL PANEL. Click on the DEVICE MANAGER. Then select PORTS. Double click on the port you select, and next click on the RESOURCE tab.
4. Since other devices in your computer may use COM ports, you need to know exactly which ports and IRQs are in use to avoid a conflict. For example, you may have a serial mouse or a serial port printer connected to serial ports. If you set up the modem card for a COM port and IRQ that are already in use, the modem will not work. If you choose the wrong COM port, no problem, you just have to select different DIP switch setting on the modem (see Figure 5).

Setting the DIP Switches on the Card

1. First, select the correct COM port and IRQ you want to use. The standard COM port and IRQ settings are:

COM Port

IRQ

1 4
2 3
3 4
4 3

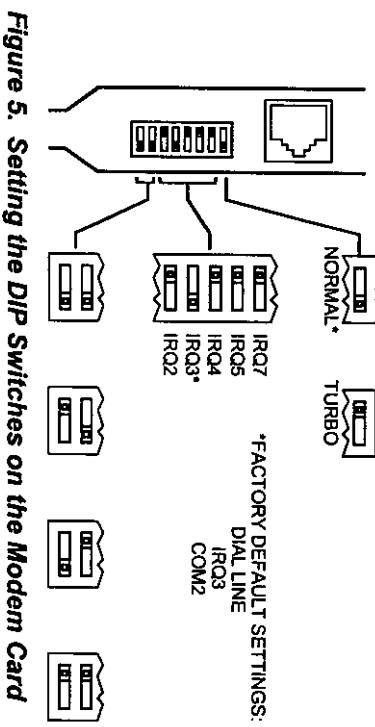


Figure 5. Setting the DIP Switches on the Modem Card

Installing the Card

1. All computers have COM1 and COM2 ports. Some computers also have COM3 and COM4 ports. Refer to your computer
2. and BIOS documentation to set up and use COM3 or COM4 or reconfigure the IRQs.

and BIOS documentation to set up and use COM3 or COM4 or reconfigure the IRQs.

3. Before handling the card, ground yourself by touching an earth ground (such as the metal computer cabinet) to remove any static electricity from your body.

Caution: Static discharge can damage the modem card.

4. Remove the modem card from its protective packaging.
5. Factory settings for the switches on the modem card are: dial line, IRQ3, and COM2. If this is your desired setting, leave the switches in this position.
6. If you need to change the switch position, see Figure 5.

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3. Remove the cover of your computer by removing the cover screws, typically located at the back of the computer (Figure 6).
6. Your computer may look different, but the principles are the same.

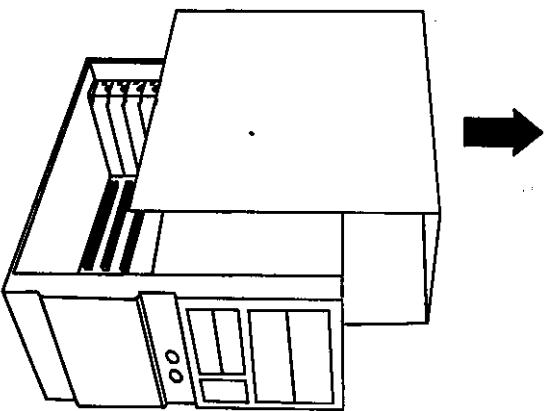


Figure 6. Remove Computer Cover

4. Locate an unused ISA expansion slot in your computer.
5. Remove the screw and slot cover for the slot you have chosen (Figure 7). Save the screw.

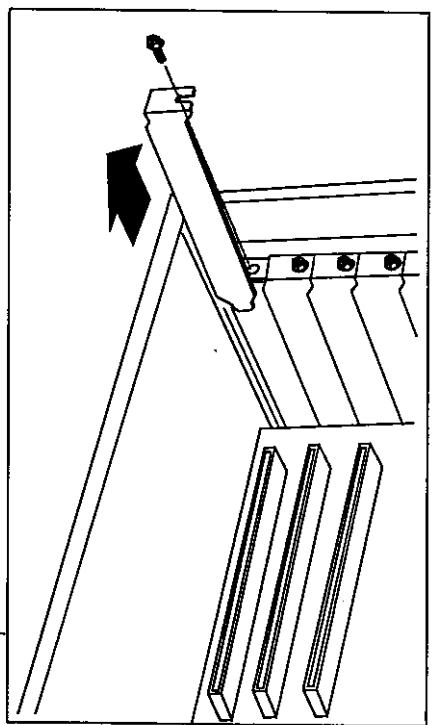


Figure 7. Remove Screw and Slot Cover

6. Discharge any static electricity from your body by touching an earth ground such as the metal computer cabinet.
7. Align the gold plated connectors on the bottom edge of the card with the matching ISA connector slot on the computer's main board and press the card firmly into the slot (Figure 8). Don't touch the connectors.
8. Be sure that the card edge is pressed fully into the slot, the end plate of the card is aligned with the back of the computer, and the screw hole in the card bracket is aligned with the hole in the computer frame.

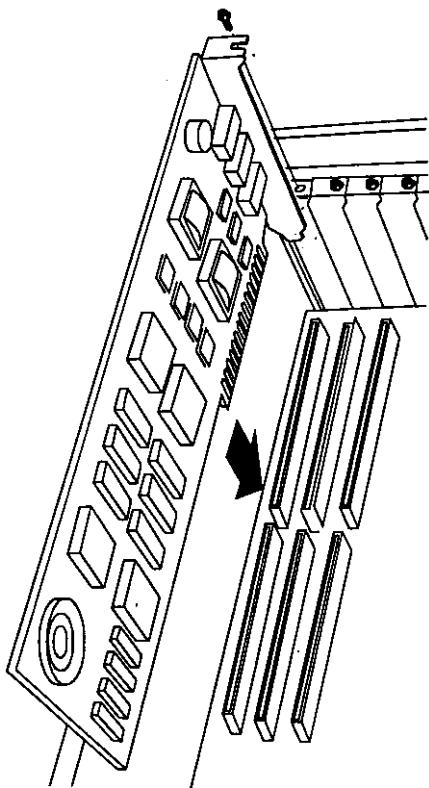


Figure 8. Insert the Modem Card

9. Using the screw you removed previously, attach the end plate of the card to the computer frame.
10. Replace the cover of the computer.
11. Reconnect any cables or power cords you may have disconnected.

Connecting the Modem

1. Be sure the computer is off and the modem is not powered up.
2. Turn the computer case so you have access to the connectors at the back.

3. Plug one end of a gray telephone cord supplied with the modem into the LINE 1 jack on the back of the modem (Figure 9). Plug the other end of the cord into the telephone wall outlet for Line1.
4. Connect the other gray telephone cord between the LINE 2 jack and the wall plug for Line 2.
5. If you want to use the optional LED indicator ("Alien"), plug the Alien's cord into the ALIEN jack the back of modem card.
6. The LED indicator can be placed in any convenient location such as the top of your monitor. For a more secure mounting, use the adhesive-backed hook-and-loop strip. Be sure the mounting surface is clean and dry. Remove the paper strip to expose one of the adhesive surfaces and press the adhesive firmly against the back of the LED indicator. Remove the other paper strip and press the LED indicator firmly against the mounting surface.

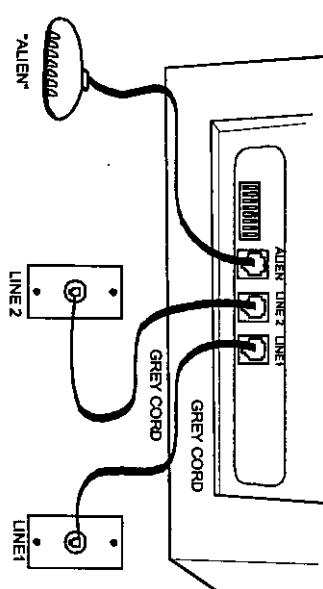


Figure 9. Internal Modem Connection

REFMERGEFORMATEMBEDSEQARABICSetup

1. Turn on the computer.
2. Install your fax/data software according to the manufacturer's instructions if you have not already done so. You can use the software supplied with the modem or another software package. The modem uses standard AT commands that are compatible with most software.
3. Place the Driver diskette in drive A: or B:.
4. Install the drivers for the program as follows:
 - Windows 3.11 - copy the file a:\modem.inf to the directory c:\windows\inf of your hard-disk. Reboot the system and select the Transend Modem through your communication software.
 - Windows NT 3.5 - copy the file a:\modem.inf to the directory c:\windows\system32\ras of your hard-disk. Reboot the system and select the Transend Modem through your communications software.
 - Windows 95 - click the "My Computer" icon, then go to "Control Panel" and click "Modem". Enter "Add" and let Windows 95 find your modem. After that, select "Next..." and "Have Disk...". Go to the directory a:\drivers\95_NT_4 and then click OK. From the list of Transend Modems, select the model you have and then click "Next". The installation has been completed.
 - Windows NT 4.0 - follow the same procedure described for Windows 95.
5. On your computer, start your fax software or other program and enter Terminal mode (HyperTerminal in Windows 95).

Installation Troubleshooting

If your modem does not appear to be working after you install it, try these suggestions:

6. Type the command "AT," and press the Return or Enter key. You will see the characters "AT" on your computer screen.
7. The modem will respond with the letters "OK" on your screen. This indicates the modem is functioning properly and ready to communicate.
8. Select one of the factory-supplied operating profiles that is best for your application.
 - If you are using Factory Profile 0 for an asynchronous, dial-up line (the most common situation), the installation is complete.
 - If you need to change to one of the other profiles, go to "Factory Profiles," page 11.
9. Open your fax/data software and enter the terminal mode.
10. Select the port (COM1, COM2, etc.) to which the modem is connected.
11. Type "AT" and press the Enter key.
12. The modem will respond by displaying "OK" on your computer screen. This indicates the modem is operating properly with the software and is responding to commands.
13. Type "ATD" and press the Enter key. You will see the OH1 light go on and hear the dial tone from the speaker mounted on the modem card inside your computer. This indicates the modem has connected to the telephone system and is ready to dial. To cancel the dial, press any key.

Modem does not show "OK" on the screen after you type in "AT" and press Enter.

- Is the modem Echo turned on? Type AT&E1 and press the return key. If this was the problem, you will now see the AT commands.
- Are the modems jumpers set to the correct COM port and IRQ? The modem is factory-set to COM2 and IRQ 3.
- Is the modem set to a COM port and IRQ already in use? You can check this by running the MSD.EXE program for Windows 3.X or by printing the Device Manager for Windows 95 (From the Start icon, select Settings, Control Panel, System, Device Manager). If a conflict exists, you will either have to change the modem jumpers, or move the conflicting device to another COM port.
- Is the software properly set up? Check your software documentation to verify that you have set up the software to use the COM port assigned to the modem and that the modem is set to the correct initialization string.

Dial tone is not heard when sending the command "ATD" from the Terminal.

- Is the telephone line active? Check the wall socket by plugging in a regular telephone to see if you get a dial tone.
- Are you using the correct telephone cord connected to the right jack? You should connect the gray telephone cords supplied with your modem and connect line 1 to LINE and line 2 to TEL/LEASED.
- Is the internal speaker volume set properly? Type the command ATL3 and press return this turns the volume up to the highest level. Then type ATA and press return. If this works,

you can then lower the volume by typing ATL1 or ATL2. If you type ATL or ATL0, the speaker is turned off.

Factory Profiles

Since there are so many settings to configure during initial setup, the easiest way to get started is to use the pre-set factory profiles. These profiles are stored settings that have been selected and tested by the factory for different applications. They are permanently stored in memory.

In most cases, one of the factory profiles will completely suit your needs.

You should select the factory profile that most closely matches your application and load it into the active profile (S-registers). Once the system is operating, you can go back and change individual settings to optimize your installation.

Refer to the descriptions below and the table of settings for details of the factory settings.

Profile 0: DIAL ASYNC, Hardware Flow Control

This profile is provided for dial-up line applications such as fax, on-line services, Internet access, bulletin board access, and point-to-point modem file transfers. This setting will work with most asynchronous applications.

Profile 1: DIAL ASYNC, Software Flow Control

This profile is the same as Profile 0 except that software flow control (XON/XOFF) is used instead of hardware flow control. It is for dial-up applications such as fax, on-line services, Internet access,

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bulletin board access, and point-to-point modem file transfers.

Select this profile only if Profile 0 doesn't work.

Profile 2: 2W LEASED, Asynchronous

Significant characteristics of profile 2 are the same as profile 1 except:

- Operation on a leased line.
- V.34 modem speeds and modulations enabled (auto-mode).

To reach maximum speed, GEMINI requires two, 2-wire leased lines. This is the functional equivalent of a 4-wire leased line.

Profile 3: DIAL ASYNC, Windows NT Servers, Hardware Flow Control

This profile is intended for installations where the modem is operated through a server running under Windows NT. Applications include multi-unit installations and Internet service providers.

Profile 4: DIAL ASYNC, UNIX Servers, Hardware Flow Control

This profile is intended for installations where the modem is operated through a server running under UNIX. Applications include multi-unit installations and Internet service providers. It is also intended for applications where the modem is used with "dumb" terminals or for *incoming calls only*.

MODEM

Menu Command	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4
Operate	Async	Async	Async	Async	Async
Rate DTE	115200	115200	115200	115200	115200
Data Size	8	8	8	8	8
Parity	None	None	None	None	None
Stop Bits	1	1	1	1	1
DTR	Off-Disc	Off-Disc	Off-Disc	Off-Disc	Off-Disc
DTR Detect	0	0	0	0	0
CTS	Controlled	Controlled	Controlled	Controlled	Controlled
CTS DEL	0010ms	0010ms	0010ms	0010ms	0010ms
DCD	Rx Carrier				
DSR	Controlled	Controlled	Controlled	Controlled	Controlled
CT108	Type/2	Type/2	Type/2	Type/2	Type/2
Recv RDL	Off	Off	Off	Off	Off

Line	Dial	Dial	Leased	Dial	Dial
Channel	Origin	Origin	Origin	Origin	Origin
Modulation	Auto	Auto	V.34	Auto	Auto
Max Rate	33600	33600	33600	33600	33600
Min Rate	1200	1200	1200	1200	1200
Leased	-12 dBm				
TXLvl	Dial up	-12 dBm	-12 dBm	-12 dBm	-12 dBm
DCD Det	0.6s	0.6s	0.6s	0.6s	0.6s

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Factory Profile Settings

Menu Command	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4
DCD Loss	1.4s	1.4s	1.4s	1.4s	1.4s
Data Disc	Off	Off	Off	Off	Off
Space Disc	Off	Off	Off	Off	Off
Cleardown	On	On	On	On	On
	PROTOCOL				
Type	LAPM&NO R/WAL	LAPM&NO R/WAL	LAPM	LAPM&NORMAL	LAPM&NORMAL
Compress	TxRx	TxRx	TxRx	TxRx	TxRx
Flow Ctl	Bidi Hard	Bidi Soft	Bidi Hard	Bidi Hard	Bidi Hard
Pass Thru	Off	Off	Off	Off	Off
Break	Data+Bk	Data+Bk	Data+Bk	Data+Bk	Data+Bk
Fast Detect	On	On	On	On	On
Block Size	256	256	256	256	256
ModPortFC	Off	Off	Off	Off	Off
AutoReBuf	Off	Off	Off	Off	Off
Auto Char	0	0	0	0	0
Inact Tim	0	0	0	0	0
	DIAL				
Dialer	Tone	Tone	Tone	Tone	Tone
Busy Tone	Det	Det	Det	Det	Det
Dial Tone	Det	Det	Det	Det	Det
Spker	Carrier	Carrier	Carrier	Carrier	Carrier
Volume	Medium	Medium	Medium	Medium	Medium
AnsW Ring	2	2	2	2	2

Factory Profile Settings

Menu Command	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4
Phone Numbers	(user set-tings)				
Ring Indic	Off	Off	Off	Off	Off
Delay	2s	2s	2s	2s	2s
Pulse Ratio	US	US	US	US	US
Tone Len	0070	0070	0070	0070	0070
Timeout	0045	0045	0045	0045	0045
(.) Pause	2s	2s	2s	2s	2s
Dial Conn	On	On	On	On	On
Auto Redial	Off	Off	Off	Off	Off
	COMMAND				
Type	At	At	Dumb	At	Dumb
Echo	On	On	On	On	On
AT Messag	Word	Word	Word	Word	Word
Speed Code	On	On	On	On	On
Prot Code	On	On	On	On	On
Esc Char	43	43	43	43	43
Esc Delay	0050	0050	0050	0050	0050
CR Char	13	13	13	13	13
LF Char	10	10	10	10	10
BS Char	8	8	8	8	8

Loading a Factory Profile

You can load a factory profile to become the active profile by using an AT command.

To use the AT command to enter a factory profile, send the AT command AT&Fn, where n = the number of the profile desired.

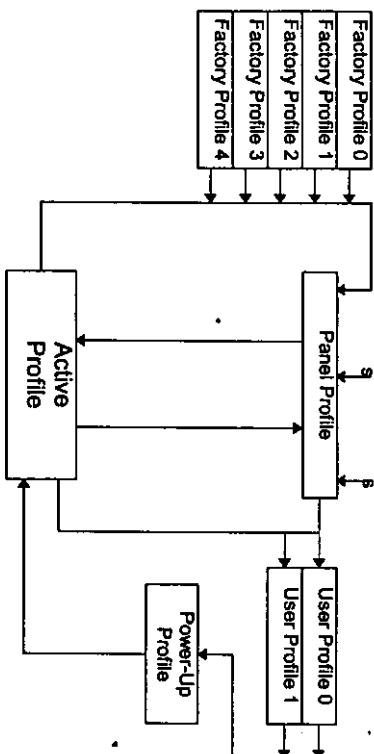


Figure 11. Modem Profiles

Active Profile

The active profile is the modem's current configuration which is stored in the S-registers.

You can check the current active profile by entering the AT&V command from a terminal, which displays the current settings on the terminal screen.

You can also check the current active profile by pressing the MENU button and scrolling through the menu. When you are finished checking, exit by entering CANCEL & EXIT in the SAVE MENU.

User Profiles

The two stored user profiles, 0 and 1, contain settings configured for your application and are stored in nonvolatile memory.

- You can load either user profile to the active profile.
- You can enter which user profile will be the modem power-up profile, that is, the profile which will be used when the modem is powered up or reset.

Stored user profiles 0 and 1 are factory pre-configured with factory profiles 0 and 1, but can be modified through commands or the front panel.

To Load a User Profile to Active

You can load a User Profile to the active profile with the command ATZn, where n is 0 or 1.

To Select a User Profile for Power-Up

You can select one of the user profiles to be loaded to active each time you turn on power to the modem.

To select a user profile for power-up, enter the AT command AT&Yn, where n is 0 or 1.

Changing Your Setup

You can change any of the setup parameters through the front panel using the display and buttons or you can change them from your computer terminal using AT commands. Section 3 describes the use of the front panel and the AT command conventions. See Section 5, **Reference Data**, for definitions of the front panel and AT commands.

About Fax Operation

Fax Software

Fax operation with the modem requires facsimile-compatible software that can send and receive Group III faxes. You can use the software supplied with your modem or any other standard software. Refer to the instructions in your fax software manual for detailed instructions for installing and operating the software.

Operating Modes

The modem's normal operating mode is Data mode. Fax software will typically switch to Fax mode when sending a fax, then switch back to Data mode when the fax is completed.

If you think a problem exists with switching modes, and you think the modem may be in the wrong mode, use one of the following AT commands to manually switch to Data mode:

- AT+FCLASS=0 will switch to the Data mode.
- AT+FCLASS=1 will switch to the Fax mode class 1.

When you press Enter, the terminal responds with "OK."

To find out what mode the terminal is in, enter the command AT+FCLASS?. The terminal will display 0 for Data mode and 1 for Fax mode.

Fax Mode Flow Control

Since many fax software programs use software flow control as the default in the Fax mode, the modem automatically changes to software flow control when entering the Fax mode. If hardware flow control is desired, the Class 1 software allows changing the type of flow control.

When switching from Fax mode to Data mode, the modem will be set for the type of flow control set in the active profile. In the Data mode, hardware flow control is recommended.

FCC Notice

FCC part 68, rules regarding fax operation, has been amended as follows:

Telephone facsimile machines—identification of the sender of the message: It shall be unlawful for any person within the United States to use a computer or other electronic device to send any message via a telephone facsimile machine unless such a 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, other entity, or individual sending the message and the telephone number of the sending machine or of such business, or entity, or individual. Telephone facsimile machines manufactured on and after December 20, 1992 must clearly mark such identifying information on each transmitted page.

Connection and Dialing Methods

You have a number of choices when you install your Transend Sixty-Seven. This paragraph will help you choose the methods that are most suitable for your application.

Connection Options

Two types of line connections are possible—dedicated number and hunt group number.

- In a **dedicated connection**, each line is connected to a fixed telephone number.
- In a **hunt group connection**, multiple lines are connected to a single hunt group number. When activated, the hunt group equipment "hunts" for the next available line and connects it to any available idle modem.

Hunt group functions can be furnished by the telephone company or be incorporated in a PBX. A hunt group is only used where multiple modems are installed.

Dialing Methods

Five dialing methods are available to let you configure your system to take advantage of your local phone rates, security needs, convenience, etc. You choose the dialing methods using special dial strings. Commands can be entered from a terminal or embedded in software.

Standard

Local modem calls the remote modem on one line and initiates a V.34 connection. This is a single-line connection only. Speed is limited to 33.6 Kbps.

Call-Back

The local modem calls the remote modem on Line 1 and sends the number for Line 2. Without disconnecting from Line 1, the remote modem calls back on Line 2.

Double-Dial

The local modem places both calls to the remote modem.

Double-Callback

The local modem calls the remote modem on Line 1 and sends two numbers stored in memory, then disconnects. The remote modem then uses the two numbers that were sent by the local modem and calls the local modem back on both lines.

Remote Redial

Local modem calls the remote modem on Line 1. Remote modem sends its Line 2 number, embedded in the data stream of line 1, back to the local modem. The local modem then calls the remote modem on line 2 using the number that was sent over line 1 from the remote modem to complete the two-line connection.

Dialing Strings

The following table shows the dial strings used with each dialing method.

No.	Description	Dial String	Comment
1	Standard	AT&L1 remote #1	Local modem dials remote number on Line 1.

Transend Modems

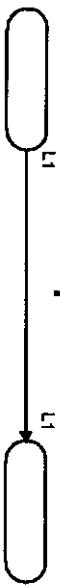
No.	Description	Dial String	Comment	Connection Sequence:
2	Call-Back	ATD[L1 remote #]DB1	"B1" tells the local modem to send a telephone number stored in memory position 2. The remote modem answers, receives the number and dials back on Line 2.	1. The local modem calls the remote modem on Line 1. Comments: <ul style="list-style-type: none">• This is a one-line, "any modem" connection• This is the only possible setup if one of the modems is not a Transend Sixty-Seven.• Use dial string 1.
3	Double-Dial	ATD[L1 remote #]D[L2 remote #]	Local modem dials both numbers contained in the dial string.	
4	Double-Callback	ATD[L1 remote #]DB2	"B2" tells the local modem to send two telephone numbers to the remote modem. The numbers are stored in the local modem's memory, position1 = Line 1, position 2 = Line 2. Remote modem calls back on these two numbers.	
5	Remote Redial	ATD[L1 remote #]DD	"DD" instructs remote modem to send its line 2 number to the local modem through the data stream of line 1. Local modem then dials out on Line 2 using the received phone number.	

Setup Options

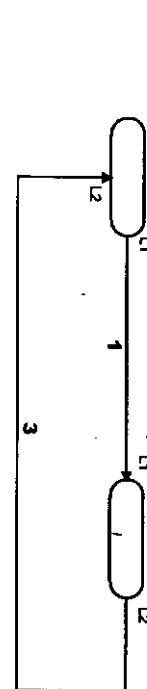
When you combine dialing method with line connection, you can have the following combinations:

Dedicated Number Setup Options

Standard
LOCAL
REMOTE



Connection Sequence:



1. Local modem calls the remote modem on Line 1.
2. Local modem sends its Line 2 number to the remote modem.
3. Remote modem calls back on Line 2.

Comments:

- This is the simplest 2-line connection.
- Use dial string 2.

Transend Modems

Double-Dial

LOCAL

REMOTE



Connection Sequence:

1. Local modem calls both numbers of remote modem.

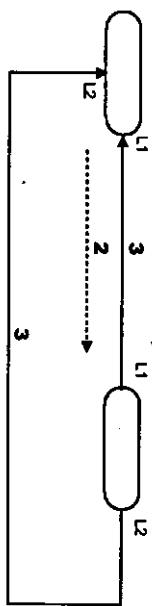
Comments:

- Local site pays all tolls.
- Use dial string 3.

Double Callback

LOCAL

REMOTE



Connection Sequence:

1. Local modem calls both numbers of remote modem.

Comments:

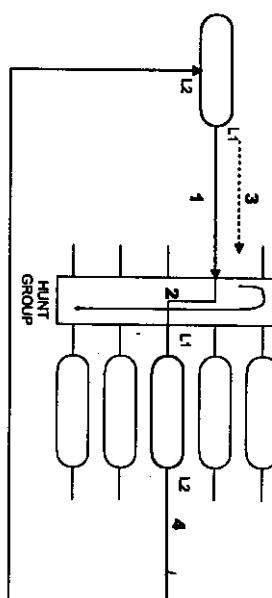
- Remote site pays all tolls.
- Use dial string 4.

Hunt Group Setup Options

Call-Back with Incoming Hunt Group

LOCAL

REMOTE



Connection Sequence:

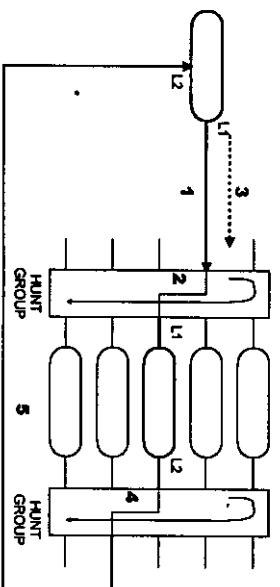
1. Local modem calls the remote hunt group number on Line 1.
2. Local group connects the next available remote modem.
3. Local modem sends its Line 2 number to the remote modem.
4. Remote modem calls back on Line 2, using the numbers from step 3.

Transend Modems

Comments:

- Incoming hunt group permits more efficient utilization of a group of modems.
- Use dial string 2.

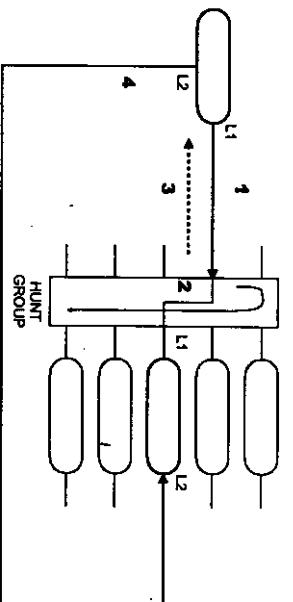
Call-Back with Incoming and Outgoing Hunt Groups



Connection Sequence:

1. Local modem calls the remote incoming hunt group on Line 1.
2. Incoming hunt group connects to the next available modem on Line 1.
3. Local modem sends remote modem the number connected to Line 2 of local modem.
4. Outgoing hunt group finds next available line and connects it to remote modem's Line 2.
5. Remote modem calls local modem on Line 2, using the number that was sent to it in step 3.

Remote Redial with Incoming Hunt Group



Connection Sequence:

1. Local modem calls the remote hunt group on Line 1.
2. Remote hunt group connects to the next available modem.
3. Remote modem sends its Line 2 number to the local modem.
4. Local modem calls remote modem Line 2, using the number from step 3.

Comments:

- Maximizes modem usage at remote site, but local site pays tolls.
- Use dial string 5.

Comments:

- Incoming and outgoing hunt groups provide best utilization of modems and lines at remote site.
- Dial string 2.

Hunt Group Setup for Remote Redial Procedure

Use the following steps to set up the modem at the Hunt Group location

Connection

1. Plug the hunt group line into the RJ-11 connector marked LINE on the back of the modem.
2. Connect the second line to the connector marked TEL/LEASED on the back of the modem. This is the line that will be programmed into position two of the modem's memory.

Setup

Use the following steps to store the second line telephone number into the modem's memory.

1. Turn the modem on. From the idle screen, press the MENU button four times. This will bring you to the DIAL MENU.
2. Press the ENTER key on the modem's front panel once. This will bring up the first DIAL screen ("Dialer: Tone").
3. From this screen press the down arrow button on the modem's front panel six times. This will scroll down to the "Phone Numbers" screen. Press ENTER. You will see the number for memory position "0."
4. Now press the down arrow key two times until the number "2->" appears on the left side of the screen. This is phone number for position two in the modem's memory.

5. Press the ENTER key once. Now begin entering the telephone number of line two. Do this by using the down or up arrow buttons until each number of line two appears on the modem's front panel. Then press ENTER. This will enter the number and move the cursor to the next position.
6. Once you have entered the last digit of line two, use the down arrow button on the modem's front panel to scroll to the symbol that represents the ENTER key (a backward arrow like the arrow on the "Enter" key of a computer keyboard). Now press the enter key. This will store the phone number of line two into the modem's memory. You can now use the menu button to scroll back to the idle screen. The modem is now configured to operate in a hunt group.

Note: if you make an incorrect entry, scroll to the arrow symbol and this will make the cursor erase the previous entry.

Hunt Group Dialling

The following information illustrates how the remote modem will dial into the hunt group.

1. The remote modem would use the following dial string to utilize the hunt group.
2. ATD[remote #1]DD where remote #1 is the telephone number you will be giving all users of the hunt group. Following the numbers enter the letters, "DD."
3. Example: If your hunt group number was 123-4567, you would enter ATD1234567DD.
4. The code DD tells the remote modem to dial the number stored in the remote modem's memory in position two.

Transend Modems

This completes the REMOTE REDIAL method of dialing into a hunt group. In this method, the server will only be receiving incoming calls.

Call-Back Hunt Group

The call-back method can also be used to dial into a hunt group. The call-back method receives one incoming call and places one outgoing call. If you use the call-back method it will not be necessary to store a number into the modem's memory. See page 16 for the call-back procedure.

3 Operation

Startup

1. Be sure the modem is properly installed and connected as described in Section 2.
2. Turn on the power switch at the back of the external modem. The display and lights will come on.
3. On your computer, start your fax software or other program and enter terminal mode.
4. Type the command "AT," and press the Return or Enter key. You will see the characters "AT" on your computer screen.
5. The modem will respond with the letters "OK" on your screen. This indicates that the modem, the terminal, and the software are functioning properly.

REFMERGEFORMAT EMBED SEQARABIC CEMBED SEQARABIC

REFMERGEFORMAT EMBED SEQARABIC CLED

The LED indicator lights are located along the left side of the front panel. All the lights are green except TST (test) which is red. These lights have the following meanings:

- OH1 and OH2 - Off Hook Line 1 and Line 2. Lighted when line 1 or line 2 is off hook.
- CD - Carrier Detect. Lighted when the Data Carrier Detect (DCD) signal is high.

- RD - Receive Data. Lighted when the modem is receiving data.
- TD - Transmit Data. Lighted when the modem is transmitting data.
- CS - Clear to Send. Lighted when the Clear to Send (CTS) signal is high.
- TR - Terminal Ready. Lighted when the Data Terminal Ready (DTR) signal is high.
- EC - Error Control. Lighted when connected using no error control protocol (V.42 or MNP). Flashing when compression is running.

Controlling the Modem with Commands

You can also control the external modem by standard AT commands or V.25bis commands. You can switch between the AT command set and the V.25bis command set whenever necessary. Since the internal modem has no front panel, you can only control it with AT commands.

Commands are issued by your fax/data software. Or, you can enter them yourself directly from the computer when you are in the terminal mode and connected to the modem.

In the following paragraphs:

Transend Modems

- The abbreviation DTE (Data Terminal Equipment) means your computer or terminal.
- <CR> indicates a carriage return (ENTER or RETURN on the keyboard).

Command Concepts

The following concepts are common to both the AT and the V.25bis commands.

Command Buffer

Each received character is stored in the modem command buffer. Only after receiving the <CR> character does the modem analyze and execute the command.

The command buffer can store up to 60 characters. If this limit is exceeded, the modem starts to execute the commands stored in the buffer.

Space Characters

The space characters (ASCII code 20) are ignored by the modem.

Parity

The modem does not verify the parity of the command characters.

Escape Sequence (+++)

This command causes the modem to exit the On-Line state and go to the Command state. The escape sequence consists of a pause in receiving data from the DTE (time set by register S12, usually 1 second) and three escape characters (character set by register S2). The + character is the default value (ASCII code 43). This sequence prevents the modem from mistaking a similar series of

characters in the data stream that might inadvertently cause an interruption in the transmission.

S-Registers

The current modem configuration (active profile) is stored in registers S0 through S99. When the modem receives a command from the DTE, it identifies the parameter and stores its configuration in the corresponding register.

A table in Section 5 gives a complete listing of all S-registers, explains the function of each register, and shows the corresponding AT command.

Entering Data Directly into S-Registers

Some parameters are available only by direct entry into registers, such as auto answer ring (ATS0=2, for example), dial tone wait time (ATS6=4), etc. The syntax for direct entry is ATSn=m, where n is the register number and m is the value to be entered.

You can enter commands using decimal values (ATS0=10).

Or, you can use hexadecimal values (ATS0=0Ah). The "a" character identifies the value as hexadecimal. The letter "h" also indicates a hexadecimal value (ATS0=0Ah). The letter can be upper case (H) or lower case (h).

You can also modify a specific bit in an S-register by entering a period followed by the bit number after the S-register number.

Examples:

- ATS96.1=0 Sets bit 1 of S96 to the value "0."
- ATS89.3=1 Sets bit 3 of S89 to the value "1."

Transend Modems

If the modem receives a command without the S-register indication, it will assume the last selected register (n).

Examples:

- AT\$0=4 Selects S0 and programs to answer the incoming call after 4 rings.
- AT=3 Selects S0 and programs to answer the incoming call after 3 rings.

Verifying Values in S-Registers

To verify the values in the S-registers, use the command AT\$Sn? to verify a specific register n or use the command AT&V to verify all the registers. The modem will return the register values to the DTE.

Examples:

- AT? Returns the current value of S0.
- AT\$2? Returns the current value of S2 (decimal value).
- AT\$2?^ Returns the current value of S2 (hexadecimal value).
- AT&V Returns the current value of all the registers.

When operating in the V.25bis command state, you can access these registers through the "PRP;n,m" command by programming the "m" value in the "n" register. This allows access to the entire modem configuration. The RLPn command allows you to see the value of any specific register (n).

Examples:

- PRP6;6 Sets the value 6 in S6 register.
- RLP6 Checks the value of S6 register.

When configuration is entered through the front panel, registers change only when the configuration phase is completed. Using the SAVE menu, you select one of the configuration storage options, for example, select "SAVE TO ACTIVE & EXIT" to save it in the active profile.

Some registers are bit-mapped, that is, each bit has a specific decimal or hexadecimal value that represents the desired bits.

To program a bit-mapped register, refer to Section 5 to determine the exact meaning of the bits. Then construct the desired binary number that represents the bits that you wish to set. Then convert the binary number to a decimal or hexadecimal number.

Example:

Set up register S94 (network management system) parameters for address=9, bus speed =9600 bps, and network management system enabled:
bits 4, 3, 2, 1, 0 are the address from 0 to 31
the binary representation of 9 is 01001
bits 6, 5 are the bus speed as follows:
00 = 1200 bps
01 = 2400 bps
10 = 4800 bps
11 = 9600 bps
bit 7 is the NMS capability (0=disabled, 1=enabled)

Construct the binary word with the least significant bit on the right and the most significant bit on the left:

7 6 5 4 3 2 1 0
1 1 1 0 1 0 0 1 = 244 (decimal) or E9

(hexadecimal)

Control by AT Commands

The AT command set permits access to most of the modem's functions.

In the Command state, the modem accepts only 10-bit asynchronous data (including start, parity and stop bit).

Section 5 contains an alphabetical listing of the AT commands.

Attention Code and AUTOBAUD

When operating using AT commands, the modem automatically detects the DTE's interface speed and parity (AUTOBAUD).

AUTOBAUD is executed whenever the modem receives an AT code, defining the DTE parity and speed.

The attention code (AT) must be either all upper (AT) or all lower case (at). The combination of upper and lower case (At or aT) will cause improper operation during the command state.

AUTOBAUD is not executed when the modem is operating in interactive command state, that is, when connected to a remote modem. In this condition, the modem assumes the most current DTE data speed prior to switching to command state.

AT Command Syntax

AT commands have the following syntax:

AT<command1><command2> ... <commandn><CR>

Where:

- AT is the attention code that identifies the beginning of a command string.
- <command1> <command2> ... <commandn> is the set of commands sent by the DTE to be executed by the modem.
- <CR> is a carriage return (ASCII code = 13). This signals the end of the command string and enables the command execution.

Example:

ATE1Q0&V<CR>

Where:

- E1 enables command echo to DTE.
- Q0 enables the modem to send responses to the commands.
- &V sends the active profile to the DTE.

Command Repetition

In order to re-execute the last command sent by the DTE, send the A/ sequence to the modem. You do not have to enter a <CR> after this command.

Example:

If, after sending the command ATD22222222<CR>, the BUSY message is displayed, this means the dialed number is busy. Repeat dial by sending A/ to the modem.

You can re-execute the last dial command using the ATDL<CR> command, even if the last received command is not a dial command.

Example:

If, after sending the ATD33333333<CR>, the command NO DIAL TONE message is displayed, this means that the modem did not receive the dial tone from the telephone line.

Disable the dial tone detection using ATX3<CR> command and repeat dial with the ATD<CR> command.

Control by V.25bis Commands

The Command state compatible with the ITU-T V.25bis recommendations accepts bit- or character-oriented or asynchronous data (10 bits).

The modem's command set, and the commands compatible with V.25bis include additional commands which provide greater control of the modem. For configuring, you can use the PRPn:m command which directly accesses the S-registers in active profile..

Basic Configuration

To use the V.25bis command state properly, you must adapt the configuration to fit the characteristics of the connected computer (DTE). The following parameters should be considered:

- DTE speed
- Data parity
 - Even parity (command PAR0)
 - Space parity (command PAR1)
 - Odd parity (command PAR2)
 - Mark parity (command PAR3)

- Asynchronous mode
- 10-bit character size (including start, parity and stop bits).

Syntax

V.25bis commands have the following syntax:
<command1>;<command2>;...;<commandn><CR>

Where:

- <command1>;<command2>;...;<commandn> is the command string
- ; is the command separator character
- <CR> (Carriage Return) is the string end and command execution character.

Example:

CIC;RLN<CR>

Where:

- CIC enables autodisconnect.
- RLN sends the list of stored telephone numbers to the DTE.

Dialing Two Numbers

GEMINI can reach speeds of 67,200 bps by using two lines simultaneously when connected to another GEMINI. The data stream is split, sent over the two lines, and recombined automatically within the modem.

Transend Modems

Four methods of connection are possible: Call-Back, Double-Dial, Double-Callback, and Remote Redial.

All methods of dialing use the standard ATD command including modifiers. But for two-line dialing, the command is separated into two parts by the character "D." The first part of the command applies to line 1; the second part of the command applies to line 2. The dialing command has the following general form:

ATD[modifiers] {1st number} [code] [modifiers] {2nd number}

Example:

ATDP3215963D13312719

Where: line 1 is pulse dialed (P) to 321-5963, line 2 is tone dialed (T) to 331-2719, and "D" is the code.

Call-Back

In this method, the local modem dials the remote modem. The remote modem answers, establishes communication, then dials back a number transmitted from the local modem.

Example:

ATD3214991DB1

The local modem dials 321-4991 on line 1. The code "B1" tells the local modem to send a telephone number stored in memory position 2. When the remote modem answers, it receives the number and dials back on line 2.

An alternate method of Call-Back lets you send the call-back number in your command.

Example:

ATD3214991DC3312719

In this example, the local modem dials 321-4991, sends the code "C" and a number. This tells the remote modem to dial back on line 1 to the number 331-2719.

Double-Dial

In this method, the local modem dials both numbers. The remote modem answers both line 1 and line 2.

Example:

ATD3215963D3312719

Where: line 1 is dialed to 321-5963 and line 2 is dialed to 331-2719.

Double-Callback

In this method, the local modem dials the remote modem on line 1. The code "B2" tells the local modem to send two telephone numbers to the remote modem. The numbers are stored in the local modem's memory, position 1 = line 1 and position 2 = line 2. The remote modem receives the initial call, stores the two telephone numbers, hangs up, and calls back the local modem using the two stored numbers.

Example:

ATD3214991DB2

The local modem dials 321-4991. When the remote modem answers, the local modem sends the two numbers stored in the local modem's memory positions 1 and 2. The remote modem hangs up the initial call, then places two new calls back to the local modem.

Remote Redial

In this method, the local modem dials the remote modem on line 1. The code "D" tells the remote modem to send its line 2 number to the local modem in the data stream. The number is stored in the remote modems memory, position 2 = line 2. The local modem then dials this number on Line 2 to make the second line connection.

Example:

ATD3214991DD

The local modem dials 321-4991. When the remote modem answers, the remote modem sends its line 2 number. The local modem then dials the remote modem on line 2.

Caller-ID Security

Caller-ID Security requires that you subscribe to Caller-ID service from your telephone company. This service lets you see the telephone number and the listed name of the caller, if you have the proper display equipment. The LCD display of your Transend modem serves as the Caller-ID display equipment. Although Caller-ID service is not available in all areas, it is rapidly expanding.

During normal operation without Caller-ID Security, the Caller-ID of each incoming call is displayed on the panel. You can see the name and number of the calling party.

When Caller-ID Security is enabled, your modem checks the telephone number of each incoming call. If the Caller-ID of the incoming call matches the information you have previously stored in the modem's memory, the modem answers the call. But if the Caller-ID information does not match the information in memory,

the call is considered an unauthorized call, and the modem will not answer the call. This prevents unauthorized access.

Operation

When Caller-ID Security is enabled and an incoming call is detected, the modem's display shows "CONNECTING, Incoming Call." If the information stored in memory matches the Caller-ID information of the incoming call, the display shows "CALL ID SECURITY, OK" and the calling telephone number. The modem connects to the remote modem and the display changes to "ON-LINE."

If the incoming call is from an UA (unauthorized) telephone number not stored in memory, the display first shows "CONNECTING, Incoming Call." When the modem checks the Caller-ID, the display changes to "CALL ID SECURITY, UA" and the telephone number. The modem does not answer the unauthorized call.

Increasing Through-put

Marginal Telephone Lines

Not all telephone lines are created equal!! Your Transend Sixty Seven modem is designed and configured to give you the highest through-put under most telephone network conditions. However, some phone lines have impairments that could, under some circumstances, cause diminished performance and through-put using the standard modem configuration.

If you believe you are experiencing marginal through-put, please reconfigure your Transend Sixty Seven using the following procedure to boost performance.

Transcend Modems

Note: Although throughput will actually INCREASE, at times you may see connect speeds change to Less than in the standard configuration. This is normal, even though you will see a performance increase.

1. You will need a terminal program such as Quicklink 2, Hyper-terminal, Comit, or any communication program that will allow you to echo AT commands.
2. Open your communication program to the terminal screen..
3. You will see the cursor flashing in the upper left hand corner of the screen. You can test the program by typing AT and pressing the enter key.
4. You should see the following appear on your screen after you have completed step three:
AT
OK
5. This test makes sure AT commands are being echoed.
6. Next, type AT%R1 and press the Enter key.
7. Store the change into the modem's memory by typing AT&W0 (where 0 is the number zero) and press the enter key.
8. You have now completed all the steps necessary to increase your throughput with your present line conditions. You can now close your terminal program.

If you need to restore your modem to its original configuration, follow steps 1 through 5 above. In step 6, insert the AT command AT%R2 in place of the AT%R1 command. Follow the remaining steps as outlined above.

Block Size

In some conditions, a small data block size may significantly lower throughput. This occurs because of interaction between equipment (such as routers), the protocol in use (for example, point-to-point protocol, PPP), and the use of software flow control.

If you are experiencing (1) low throughput, and (2) are connected using hardware flow control, and (3) CTS LED light is not flashing, you should experiment by setting the small block size selection to on. If this increases throughput, leave the setting on. If not, set the small block setting off.

You can change the block size setting as follows:

1. In terminal mode, enter ATS86.5=1. This sets the small block selection on.
2. To return to large block transmission, enter ATS86.5=0. This turns small block selection off.

4 Troubleshooting, Testing, and Customer Service

Troubleshooting

Nothing happens when I send a command from the terminal.

- Is the modem properly connected to the DTE?
- Is the proper port selected?
- Is the Command mode enabled?
- Is the DTE speed and format matched to the modem?
- If the Command mode is V.25 bis, is the DTE characters size 10 bits and the parity correct?
- Is the command response turned off?

The modem will not answer an incoming call.

- Is the telephone line connected properly?
- Is Autoanswer on?
- Is the DTE providing a DTR (Data Terminal Ready) signal? (TR light on front panel on.) If not, select DTR=IGNORED under the TERMINAL menu.

The modem will not dial an outgoing call.

- Is the telephone line properly connected? Push the TALK/DATA button. If you hear a dial tone, this means you are properly connected to the phone line.

- Is the DTE providing a DTR (Data Terminal Ready) signal? (TR light on front panel on.) If not, select DTR=IGNORED under TERMINAL menu.
- Is the phone company providing a continuous dial tone? If not, disable the dial tone detect.

The modems are connected, but data is not being sent or received.

- Is the selected line type correct?
- Is flow control set correctly on both modems?
- Is the speed configuration of both modems correct? In dial lines, the modems should have at least one enabled speed in common. In leased lines, the selected modulation (V.34, V.32bis, V.22, etc.) must be the same in both modems. Speed negotiation occurs only within the V.32 bis speeds (4800 to 14000 bps), if V.22 bis speed is programmed (2400 or 1200 bps), both modems should have the same programmed speed.
- Are both modems using the same protocol?

The modems are transmitting and receiving, but there are errors in the data.

- Are both modems using error correction?
- Are both modems using the same character size?
- Are the modem clock parameters properly set?

Testing

Loopback Tests

The modem provides a set of loopback tests to help you diagnose a problem detected during a connection. You can often isolate a problem to major components by performing one or more of the following loopback tests. To perform a test, activate your communications software in terminal mode and then execute the loopback tests. On the terminal, type in data to send and verify the data returns to the screen.

- **Local Digital Loopback (LDL)** - This test allows you to check the connection of the modem to the DTE (Figure 15). Data received from the line is returned to the remote modem. A successful LDL test means that the DTE and connections are working properly.

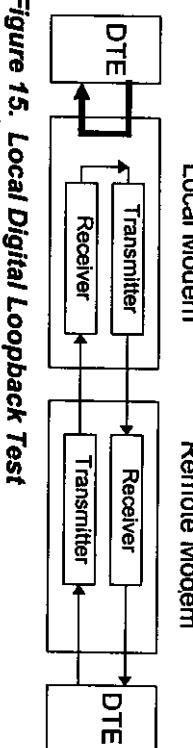


Figure 15. Local Digital Loopback Test

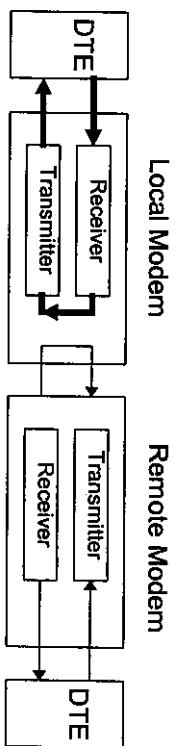


Figure 16. Local Analog Loopback Test

- **Remote Digital Loopback (RDL) Test** - This test checks the interface and connection of the local modem with its DTE, the local and remote modems themselves (Figure 17). The remote modem returns data received from the line and executes a Local Digital Loopback to the remote DTE.

Note: When the mode is operating with LAPM or MNP protocol, it does not execute the remote digital loopback.

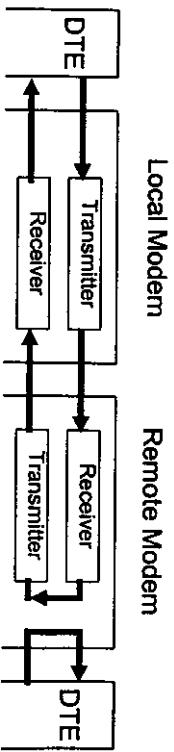


Figure 17. Remote Digital Loopback Test

Note: You have to verify that the modem to be remotely tested has its remote loopback reception enabled.

Self-Test Pattern Generator (SAL, SRL)

The modem incorporates a built-in self-test pattern generator which allows the user to evaluate the modem operation without a

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test set. The self-test can be used simultaneously with the LAL (option SAL) or with the RDL (option SRL).

When operating with self test, the modem ignores the DTE data and transmits a built-in pattern (pattern mark scrambled). If the modem detects an error in transmission, it will report to the operator either via the front panel or via the DTE.

Activating Loopback Using Commands

To activate a test when two modems are already connected, you must instruct your modem to go to interactive command state by sending an escape sequence and then sending the corresponding test command.

The LDL is activated by the AT&T3 command and can be activated using the "off-line" command state or the interactive command state.

The LAL is activated by the AT&T1 command and can be activated using the "off-line" command state or the interactive command state. In order to select LAL with self-test pattern (SAL), use the AT&T8 command. Errors can be observed on the DTE screen.

The RDL is activated using the AT&T6 command and can only be activated using the interactive command state. To select RDL with self -test pattern (SRL), use the AT&T7 command.

The AT&T4 command enables reception of a remote loopback and the AT&T5 command disables it.

The amount of time for the modem test is set in register S18 (ATS18=10 corresponds to 10 seconds, for example). Active test automatically terminates and the modem returns to command state after the number of seconds contained in S18. In order to turn off the timer, set 0 in the S18 register (ATS18=0).

Another option to terminate a test is to send an escape sequence followed by the AT&T0 command.

Customer Service

Exchange Express Service

In the unlikely event a Transend modem should fail during the warranty period, Transend will supply a replacement unit to the original purchaser via overnight delivery service at no cost to the customer.

In order to qualify for Exchange Express Service, the customer must adhere to and accept the conditions of the Transend Warranty Policy and follow the return procedures outlined to obtain an RMA (Returned Material Authorization). The customer must request Exchange Express Service at the time of reporting the Warranty claim.

The customer shall return the defective unit to Transend Corporation, shipping prepaid, within 15 days of receiving the Exchange Express replacement unit. Should the defective unit not be returned within that time, the customer shall be billed the current prevailing full list price for the replacement unit.

Should the returned unit be found to be fully functional and not defective, Transend Corporation reserves the right to bill the customer for actual 3rd party shipping charges incurred for sending the replacement unit.

- Press firmly on each side of the front panel until the PC board connector seats in the receptacle at the rear of the case and the hidden latch snaps shut.

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Warranty Policy

Transend Corporation warrants to the original customer, service provider, or other end user purchaser that this product is free from defects in material or workmanship for a period of 5 years from date of purchase. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with the same or similar model) at the sole option of Transend Corporation, without charge for either repair or replacement. This warranty will not apply if the product is modified, tampered with, damaged due to fire, wind, water, vandalism, or other natural disaster, misused, damaged by lightning or high voltage conditions, or subjected to abnormal or unreasonable working conditions or negligence.

Repair or replacement as provided under this warranty is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of fitness or merchantability for a particular use or purpose, and Transend Corporation shall in no event be liable to purchaser for indirect or consequential damages of any kind.

A repaired or replaced product will carry the balance of the warranty period remaining on the original product. Transend may at its own discretion use new or used parts, or a combination thereof, in the repaired/replaced product.

In order to effect repair or replacement under warranty, the following procedures, terms, and conditions must be followed: 1) The customer must call the Transend Technical Services Hotline, and obtain an RMA number. 2) The customer must return the product to the place specified by Transend, shipping prepaid (products returned COD will be refused). Transend will pay the shipping costs to return the repaired/replaced product to the customer. 3) Product must be properly and reasonably packed for shipping, in a manner usual and customary for delicate electronic equipment. 4) The assigned RMA number is to be written in large and legible numbers on the outside of the shipping box.

Contacting Customer Service

You can contact Transend Customer Service through any of the following:

- Technical Support Hotline: 407-638-0016
- Internet: <http://www.transendmodems.com>
- E-mail: techsupport@transendmodems.com
- Fax: 407-638-0333

5 Reference Data

AT Commands

AT Command List		
Command	Function	Register
In	Modem information	-
AT	I0=request product code	-
	I1=request CRC value of EPROM	-
	I3=request product version number	-
	I4=request capability code	-
	I5=request disconnect reason	-
A/	-	-
+++	-	-
Escape sequence	-	-
An	S14	-
Answer:	-	-
A0=connect to line as answer modem	-	-
A1=connect to line as originate modem	-	-
A2=connect to both lines as originate modem	-	-
Bn	S19	-
Type of modulation	-	-
B0=automatic modulation select	-	-
B1=V.21	-	-
B1=V.32bis	-	-
B12=V.34	-	-
D	S14	-
Dial (connect to line as originate modem)	-	-
Dn	S14	-
Dial number n (connect to line as originate modem)	-	-
D[1],[2]	-	-
Dial two numbers (GEMINI) where [1] is the line 1 modifiers and number and [2] is the line 2 code, modifiers, and number.	-	-
En	S14	-
Echo the command to the terminal	-	-
E0=disable	-	-
E1=enable	-	-
Hn	-	-
Hang up	-	-
H0=hang up	-	-
H1=forces modem off hook	-	-
H2=set H command to normal hang up procedure (long space, countdown, protocol)	-	-
H3=set H command to fast hang up	-	-

AT Command List		
Command	Function	Register
In	Modem information	-
	I0=request product code	-
	I1=request CRC value of EPROM	-
	I3=request product version number	-
	I4=request capability code	-
	I5=request disconnect reason	-
Ln	Speaker volume	S22
	L0=low volume	-
	L1=low volume	-
	L2=medium volume	-
	L3=high volume	-
Mn	Speaker control	S22
	M0=speaker off	-
	M1=speaker off when carrier is present	-
	M2=speaker off when dialing and carrier is present	-
On	Data mode	-
	O0=restore data mode	-
	O1=retrain and restore data mode	-
P	Pulse dial	S14
Qn	DTE responses	S14
	Q0=response displays on	-
	Q1=response displays off	-
Sn?	Read the value in S-register n (n=decimal value).	-
Sn?^	Read the value in S-register n (n=hexadecimal value)	-
Sn=v	Set value v in register n (decimal values)	-
Sn=v^	Set value v in register n (hexadecimal values)	-
S#v	Set single bit value in register n, #=bit position	-
	0-7, v=bit value 1 or 0	-
T	Tone dial	S14

Transend Modems

AT Command List		
Command	Function	Register
Vn	Response codes V0=select response codes (0,1,...) V1=select response messages (OK, ERROR,...)	S14
Xn	Extended response codes X0=(ignore dial and busy tones; show connect code without speed indication X1=ignore dial tone; show connect codes with speed indication X2=wait for dial tone; show connect codes with speed indication X3=defect busy tone; show connect codes with speed indication X4=wait for dial tone and detect busy tone; show connect codes with speed indication	S22
Yn	Long space disconnect Y0=disable Y1=enable	S21
Zn	Reset modem configuration Z0=reset to User Profile 0 Z1=reset to User Profile 1	-
&Cn	DCD signal control &C0=DCD always ON on the digital interface &C1=DCD follows remote carrier &C2=same as &C0 except that DCD goes off during disconnection &C3=according to V.25bis recommendation	S21
&Dn	DTR signal control &D0=DTR always on &D1=go to command state after losing DTR &D2=disconnect after losing DTR &D3=Modem resets when DTR turns off	S21

AT Command List		
Command	Function	Register
&Fn	Factory profiles. Load factory profile into the modem active profile &F0=load factory profile 0 &F1=load factory profile 1 &F2=load factory profile 2 &F3=load factory profile 3 &F4=load factory profile 4	-
&Ln	Line type &L0, 2-wire dial-up line &L1, 2-wire leased line	S27
&Pn	Pulse make/break ratio &P0=pulse make/break ratio 39/61 (USA) &P1=pulse make/break ratio 33/67 (UK)	S22
&Rn	CTS signal control &R0=CTS normal operating state &R1=CTS forced on &R2=CTS follows DCD &R9=CTS equals RTS (&R0, with S26=0)	S21 S23
&Sn	DSR signal control &S0=DSR always on &S1=DSR on when ready to accept data &S2=DSR off for 5 seconds after disconnect &S3=DSR follows off hook	S21

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AT Command List

Command	Function	Register
&Tn	Test control &T0=terminate current test &T1=start local analog loopback test (LAL) &T3=start local digital loopback test (LDL) &T4=accept remote digital loopback (RDL) request &T5=disregard remote digital loopback (RDL) request &T6=start remote digital loopback test (RDL) &T7=start remote digital loopback test with self- test (SRL) &T8=start local analog loopback test with self- test (SAL)	S16 S16 S16 S23 S16 S16 S16
&Vn	View configuration &V0=display received signal status &V1=display active profile	-
&Wn	Write configuration &W0=store active profile to user profile 0 &W1=store active profile to user profile 1	-
&Yn	Power-up profile &Y0=store user profile 0 upon power-on or reset &Y1=store user profile 1 upon power-on or reset &Y2=display power-on option selected Store telephone number in location n in mem- ory	-
%An	Auto-reliable fallback recognition character %A0=disable auto-reliable fallback character %An=set auto-reliable fallback character to n, where n is an ASCII number from 1 to 127	S88

AT Command List

Command	Function	Register
%Bn	Maximum speed %B0=use DTE speed %B1=300 bps %B4=4800 bps %B5=9600 bps uncoded %B6=9600 bps %B7=7200 bps %B8=12000 bps %B9=14400 bps %B11=16800 bps %B12=19200 bps %B13=21600 bps %B14=24000 bps %B15=26400 bps %B16=28800 bps %B17=31200 bps %B18=33600 bps %B19=28000bps %B20=28333bps %B21=30666bps %B22=32000bps %B23=33333bps %B24=34666bps %B25=36000bps %B26=37333bps %B27=38666bps %B28=40000bps %B29=41333bps	S90, S91, S92

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AT Command List

Command	Function	Register
%B30=42666bps		
%B31=44000bps	S90, S91, S92,	
%B32=45333bps	S93, S94	
%B33=46666bps		
%B34=48000bps		
%B35=49333bps		
%B36=50666bps		
%B37=52000bps		
%B38=53333bps		
%B39=54666bps		
%B40=56000bps		
%Cn	Data compression %C0=disable data compression %C1=enable bilateral V.42bis or MNP5 compression %C2=enable V.42bis on transmitted data only %C3=enable V.42bis on received data only	S82
%Dn	Disconnect buffer delay %D0=disable %Dn=set disconnect buffer delay in seconds where n=1 to 255 seconds	S21
%En	Auto retrain %E0=disable %E1=enable	S86
%Ln	Minimum speed %L0=disable %L1=disable %L2=1200 bps	

AT Command List

Command	Function	Register

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AT Command List		
Command	Function	Register
%Ln	Minimum speed %L0=disable %L1=disable %L2=1200 bps %L3=2400 bps %L4=4800 bps %L5=9600 bps uncoded %L6=9600 bps %L7=7200 bps %L8=12000 bps %L9=14400 bps %L11=16800 bps %L12=19200 bps %L13=21600 bps %L14=24000 bps %L15=26400 bps %L16=28800 bps %L17=31200 bps %L18=33600 bps Minimum speed %L0=disable %L1=disable %L2=1200 bps %L3=2400 bps %L4=4800 bps %L5=9600 bps uncoded %L6=9600 bps %L7=7200 bps %L8=12000 bps %L9=14400 bps %L11=16800 bps %L12=19200 bps %L13=21600 bps %L14=24000 bps %L15=26400 bps %L16=28800 bps %L17=31200 bps	S90, S91
%Rn	Automatic rate adaptation %R0=disable %R1=enable with low BER %R2=enable with medium BER %R3=enable with high BER	S86
%T=pass	Establishes remote configuration	S86
%V	Displays version of software	-
\An	Protocol block size VA0=block size is 64 characters VA1=block size is 128 characters VA2=block size is 192 characters VA3=block size is 256 characters	S81-
\Bn	Break signal \B0=transmit a break signal \Bn=set break length in 20 ms increments where n = 1 to 255; default is 35 (700 ms)	-S81

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AT Command List	
Command	Function
\Cn	Register S81- Auto Reliable buffer control \C0=disable auto reliable buffer \C1=enable auto reliable buffer data for 4 seconds or 200 characters \C2=enable auto-fallback character detection- Break signal
\Gn	S84 Modem port flow control \G0=disable \G1=enable modem port XON/XOFF flow control
\Kn	S81 Break control \K0= \K1=send a break after de-storing data buffers \K2= \K3=immediately send a break and then the data \K4= \K5=send the data held in the data buffers and then the break signal
\Ln	S85 Ring indication \R0=blinks for ring and stays on for duration of call \R1=blinks for ring and turns off when call is answered
\Tn	S38 Inactivity timer \TO=disable \Tn=set inactivity timer to n where n=1-255 minutes
\Vn	S82 Protocol result codes
\Wn	S87 Protocol selection \N0=Normal mode (DTE steady speed) \N1=Direct mode (DTE speed = modem speed) \N4=LAPM mode \N5=LAPM or normal mode \N7=LAPM or normal mode

AT Command List	
Command	Function
\Qn	Register S82 Flow Control \Q0=disable DTE flow control \Q1=enable DTE bilateral XON/XOFF flow control (software) \Q2=enable unilateral CTS flow control to DTE (hardware) \Q3=enable bilateral CTS/RTS flow control (hardware) \Q4=disable DCE flow control \Q5=enable DCE XON/XOFF flow control \Q6=enable CTS flow control to the DTE \Q7=enable CTS flow control to the DTE
\Rn	S85 Ring indication
\Tn	S38 Inactivity timer \TO=disable \Tn=set inactivity timer to n where n=1-255 minutes
\Vn	S82 Protocol result codes
\Wn	S87 Protocol selection \W0=disable \W1=enableBreak control
*AUn	S82 Dial number stored at location n (where n=1 to 9) when modem is in command state and the DTR signal transitions
-An	Channel select. Select channel when transmitting on leased line -A0=select channel ATX -A1=select channel BTX

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AT Command List

Command	Function	Register
-Dn	Dial Repetitions. Repeat dial of number n, up to 10 attempts. Channel select. Select channel when transmitting on leased line	-
-A0	=select channel ATX	
-A1	=select channel BTX	
-Hn	Disconnect	S83-
-H0	=disable disconnect by data and DCD loss	
-H1	=disable disconnect by carrier loss	
-H2	=enable disconnect by 4-minute data loss	
-H3	=enable disconnect by DCD and data loss-Dial Repetitions. Repeat dial of number n, up to 10 attempts.	
-Rn	Autoredial	S83
-Un	DTE speed (n=1200 to 460800)Autoredial	S29
:Mn	Command state	S87
:M0	=disabled	
:M1	=enable	
:Mn	Command state	S87
:M0	=disabled	
:M1	=enable	

AT Command Responses

AT Command Responses			
Word Response	C0	C1	Meaning
OK	0	0	Command was executed. Modem is ready to receive another command.
CONNECT	1	1	Connection made with the remote modem without speed and protocol indication.
RING	2	2	Incoming ring detected.
NO CARRIER	3	3	Indicates communication failure after connection was established.
ERROR	4	4	Syntax error or invalid command.
NO DIAL TONE	6	6	Modem did not detect a dial tone to proceed with dialing.
BUSY	7	7	Modem detected a busy signal.
CONNECT 1200	5	5	Connection made at 1200 bps without protocol or with inhibited protocol message.
CONNECT 2400	10	10	Connection made at 2400 bps without protocol or with inhibited protocol message.
CONNECT 4800	11	30	Connection made at 4800 bps without protocol or with inhibited protocol message.
CONNECT 7200	40	40	Connection made at 7200 bps without protocol or with inhibited protocol message.
CONNECT 9600	12	32	Connection made at 9600 bps without protocol or with inhibited protocol message.

AT Command Responses

Word Response	C0	C1	Meaning
CONNECT 12000	41	41	Connection made at 12000 bps without protocol or with inhibited protocol message.
CONNECT 14400	14	42	Connection made at 14400 bps without protocol or with inhibited protocol message.
CONNECT 16800	46	46	Connection made at 16800 bps without protocol or with inhibited protocol message.
CONNECT 19200	47	47	Connection made at 19200 bps without protocol or with inhibited protocol message.
CONNECT 21600	48	48	Connection made at 21600 bps without protocol or with inhibited protocol message.
CONNECT 24000	49	49	Connection made at 24000 bps without protocol or with inhibited protocol message.
CONNECT 26400	51	51	Connection made at 26400 bps without protocol or with inhibited protocol message.
CONNECT 28800	52	52	Connection made at 28800 bps without protocol or with inhibited protocol message.
CONNECT 31200	150	150	Connection made at 31200 bps without protocol or with inhibited protocol message.
CONNECT 33600	152	152	Connection made at 33600 bps without protocol or with inhibited protocol message.
CONNECT 38400	153	153	Connection made at 38400 bps without protocol or with inhibited protocol message.

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AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 43200	154	154	Connection made at 43200 bps without protocol or with inhibited protocol message.
CONNECT 48000	155	155	Connection made at 48000 bps without protocol or with inhibited protocol message.
CONNECT 52800	156	156	Connection made at 52800 bps without protocol or with inhibited protocol message.
CONNECT 57600	157	157	Connection made at 57600 bps without protocol or with inhibited protocol message.
CONNECT 62400	158	158	Connection made at 62400 bps without protocol or with inhibited protocol message.
CONNECT 67200	159	169	Connection made at 67200 bps without protocol or with inhibited protocol message.
CONNECT 115200	164	164	Connection made at 115200 bps without protocol or with inhibited protocol message.
CONNECT 28800	256	256	Connection made at 28800 bps, V.90 without protocol or with inhibited protocol message.
CONNECT 29333	260	260	Connection made at 29333 bps without protocol or with inhibited protocol message.
CONNECT 30666	264	264	Connection made at 30666 bps without protocol or with inhibited protocol message.
CONNECT 32000	268	268	Connection made at 32000 bps without protocol or with inhibited protocol message.

AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 32800	302	302	Connection made at 32800 bps with inhibited protocol message.
CONNECT 33333	180	180	Connection made at 33333 bps without protocol or with inhibited protocol message.
CONNECT 34133	302	302	Connection made at 34133 bps with inhibited protocol message.
CONNECT 34666	272	272	Connection made at 34666 bps without protocol or with inhibited protocol message.
CONNECT 35466	302	302	Connection made at 35466 bps with inhibited protocol message.
CONNECT 36000	276	276	Connection made at 36000 bps without protocol or with inhibited protocol message.
CONNECT 36600	302	302	Connection made at 36600 bps with inhibited protocol message.
CONNECT 37333	184	184	Connection made at 37333 bps without protocol or with inhibited protocol message.
CONNECT 38133	302	302	Connection made at 38133 bps with inhibited protocol message.
CONNECT 38666	280	280	Connection made at 38666 bps without protocol or with inhibited protocol message.
CONNECT 39466	302	302	Connection made at 39466 bps with inhibited protocol message.
CONNECT 40000	284	284	Connection made at 40000 bps without protocol or with inhibited protocol message.
CONNECT 40800	302	302	Connection made at 58666 bps with inhibited protocol message.

AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 41333	188	188	Connection made at 41333 bps without protocol or with inhibited protocol message.
CONNECT 42133	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 42666	192	192	Connection made at 43466 bps without protocol or with inhibited protocol message.
CONNECT 43466	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 44000	196	196	Connection made at 44000 bps without protocol or with inhibited protocol message.
CONNECT 44800	302	302	Connection made at 44800 bps with inhibited protocol message.
CONNECT 45333	200	200	Connection made at 45333 bps without protocol or with inhibited protocol message.
CONNECT 46133	302	302	Connection made at 46133 bps with inhibited protocol message.
CONNECT 46666	204	204	Connection made at 46666 bps without protocol or with inhibited protocol message.
CONNECT 47466	302	302	Connection made at 47466 bps with inhibited protocol message.
CONNECT 48000	208	208	Connection made at 48000 bps without protocol or with inhibited protocol message.
CONNECT 48800	302	302	Connection made at 48800 bps with inhibited protocol message.
CONNECT 49333	212	212	Connection made at 49333 bps without protocol or with inhibited protocol message.

AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 50133	302	302	Connection made at 50133 bps with inhibited protocol message.
CONNECT 50666	216	216	Connection made at 50666 bps without protocol or with inhibited protocol message.
CONNECT 51466	302	302	Connection made at 51466 bps with inhibited protocol message.
CONNECT 52000	220	220	Connection made at 52000 bps without protocol or with inhibited protocol message.
CONNECT 52800	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 53333	224	224	Connection made at 53333 bps without protocol or with inhibited protocol message.
CONNECT 54133	302	302	Connection made at 54133 bps with inhibited protocol message.
CONNECT 54666	228	228	Connection made at 54666 bps without protocol or with inhibited protocol message.
CONNECT 55466	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 56000	232	232	Connection made at 56000 bps without protocol or with inhibited protocol message.
CONNECT 56800	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 57333	300	300	Connection made at 57333 bps with inhibited protocol message.
CONNECT 58133	302	302	Connection made at 58666 bps with inhibited protocol message.
CONNECT 58666	302	302	Connection made at 58666 bps with inhibited protocol message.

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AT Command Responses

Word Response	C0	C1	Meaning
CONNECT 59466	302	302	Connection made at 59466 bps with inhibited protocol message.
CONNECT 60000	304	304	Connection made at 60000 bps with inhibited protocol message.
CONNECT 60800	302	302	Connection made at 60800 bps with inhibited protocol message.
CONNECT 61333	306	306	Connection made at 61333 bps with inhibited protocol message.
CONNECT 62666	308	308	Connection made at 62666 bps with inhibited protocol message.
CONNECT 64000	310	310	Connection made at 64000 bps with inhibited protocol message.
CONNECT 65333	312	312	Connection made at 65333 bps with inhibited protocol message.
CONNECT 66666	314	314	Connection made at 66666 bps with inhibited protocol message.
CONNECT 68000	316	316	Connection made at 68000 bps with inhibited protocol message.
CONNECT 69333	318	318	Connection made at 69333 bps with inhibited protocol message.
CONNECT 70666	320	320	Connection made at 70666 bps with inhibited protocol message.
CONNECT 72000	322	322	Connection made at 72000 bps with inhibited protocol message.
CONNECT 73333	324	324	Connection made at 73333 bps with inhibited protocol message.
CONNECT 74666	326	326	Connection made at 74666 bps with inhibited protocol message.
CONNECT 76000	328	328	Connection made at 76000 bps with inhibited protocol message.
CONNECT 77333	330	330	Connection made at 77333 bps with inhibited protocol message.

AT Command Responses

Word Response	C0	C1	Meaning
CONNECT 78666	332	332	Connection made at 78666 bps with inhibited protocol message.
CONNECT 80000	334	334	Connection made at 80000 bps with inhibited protocol message.
CONNECT 81333	336	336	Connection made at 81333 bps with inhibited protocol message.
CONNECT 82666	338	338	Connection made at 82666 bps with inhibited protocol message.
CONNECT 84000	340	340	Connection made at 84000 bps with inhibited protocol message.
CONNECT 85333	342	342	Connection made at 85333 bps with inhibited protocol message.
CONNECT 86666	344	344	Connection made at 86666 bps with inhibited protocol message.
CONNECT 88000	346	346	Connection made at 88000 bps with inhibited protocol message.
CONNECT 89333	348	348	Connection made at 89333 bps with inhibited protocol message.
CONNECT 90666	350	350	Connection made at 90666 bps with inhibited protocol message.
CONNECT 92000	352	352	Connection made at 92000 bps with inhibited protocol message.
CONNECT 93333	354	354	Connection made at 93333 bps with inhibited protocol message.
CONNECT 94666	356	356	Connection made at 94666 bps with inhibited protocol message.
CONNECT 96000	358	358	Connection made at 96000 bps with inhibited protocol message.
CONNECT 97333	360	360	Connection made at 97333 bps with inhibited protocol message.
CONNECT 98666	362	362	Connection made at 98666 bps with inhibited protocol message.

AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 100000	364	364	Connection made at 100000 bps with inhibited protocol message.
CONNECT 101333	366	366	Connection made at 101333 bps with inhibited protocol message.
CONNECT 102666	368	368	Connection made at 102666 bps with inhibited protocol message.
CONNECT 104000	370	370	Connection made at 104000 bps with inhibited protocol message.
CONNECT 105333	372	372	Connection made at 105333 bps with inhibited protocol message.
CONNECT 106666	374	374	Connection made at 106666 bps with inhibited protocol message.
CONNECT 108000	376	376	Connection made at 108000 bps with inhibited protocol message.
CONNECT 109333	378	378	Connection made at 109333 bps with inhibited protocol message.
CONNECT 110666	380	380	Connection made at 110666 bps with inhibited protocol message.
CONNECT 112000	382	382	Connection made at 112000 bps with inhibited protocol message.
CONNECT 12000/LAPM			
CONNECT 4800/LAPM	38	38	Connection made at 4800 bps with LAPM protocol (V.42/V.42bis).
CONNECT 7200/LAPM	43	43	Connection made at 7200 bps with LAPM protocol (V.42/V.42bis).
CONNECT 9600/LAPM	39	39	Connection made at 9600 bps with LAPM protocol (V.42/V.42bis).
CONNECT 12000/LAPM	44	44	Connection made at 12000 bps with LAPM protocol (V.42/V.42bis).
CONNECT 14400/LAPM	45	45	Connection made at 14400 bps with LAPM protocol (V.42/V.42bis).
CONNECT 16800/LAPM	61	61	Connection made at 16800 bps with LAPM protocol (V.42/V.42bis).
CONNECT 19200/LAPM	62	62	Connection made at 19200 bps with LAPM protocol (V.42/V.42bis).
CONNECT 21600/LAPM	63	63	Connection made at 21600 bps with LAPM protocol (V.42/V.42bis).
CONNECT 24000/LAPM	64	64	Connection made at 24000 bps with LAPM protocol (V.42/V.42bis).
CONNECT 26400/LAPM	65	65	Connection made at 26400 bps with LAPM protocol (V.42/V.42bis).
CONNECT 28800/LAPM	66	66	Connection made at 28800 bps with LAPM protocol (V.42/V.42bis).

AT Command Responses			
Word Response	C0	C1	Meaning
CONNECT 4800/LAPM	38	38	Connection made at 4800 bps with LAPM protocol (V.42/V.42bis).
CONNECT 7200/LAPM	43	43	Connection made at 7200 bps with LAPM protocol (V.42/V.42bis).
CONNECT 9600/LAPM	39	39	Connection made at 9600 bps with LAPM protocol (V.42/V.42bis).
CONNECT 12000/LAPM	44	44	Connection made at 12000 bps with LAPM protocol (V.42/V.42bis).
CONNECT 14400/LAPM	45	45	Connection made at 14400 bps with LAPM protocol (V.42/V.42bis).
CONNECT 16800/LAPM	61	61	Connection made at 16800 bps with LAPM protocol (V.42/V.42bis).
CONNECT 19200/LAPM	62	62	Connection made at 19200 bps with LAPM protocol (V.42/V.42bis).
CONNECT 21600/LAPM	63	63	Connection made at 21600 bps with LAPM protocol (V.42/V.42bis).
CONNECT 24000/LAPM	64	64	Connection made at 24000 bps with LAPM protocol (V.42/V.42bis).
CONNECT 26400/LAPM	65	65	Connection made at 26400 bps with LAPM protocol (V.42/V.42bis).
CONNECT 28800/LAPM	66	66	Connection made at 28800 bps with LAPM protocol (V.42/V.42bis).

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AT Command Responses			Meaning			
Word Response	C0	C1	Word Response	C0	C1	
CONNECT 31200/LAPM	190	190	Connection made at 31200 bps with LAPM protocol (V.42/V.42bis).	54	54	Remote modem detected syntax error or invalid command.
CONNECT 33600/LAPM	192	192	Connection made at 33600 bps with LAPM protocol (V.42/V.42bis).	86	86	Access to remote modem enabled.
CONNECT 38400/LAPM	193	193	Connection made at 38400 bps with LAPM protocol (V.42/V.42bis).	87	87	Access to remote modem failed.
CONNECT 43200/LAPM	194	194	Connection made at 43200 bps with LAPM protocol (V.42/V.42bis).	88	88	Modem dialing back.
CONNECT 48000/LAPM	195	195	Connection made at 48000 bps with LAPM protocol (V.42/V.42bis).			
CONNECT 52800/LAPM	196	196	Connection made at 52800 bps with LAPM protocol (V.42/V.42bis).			
CONNECT 57600/LAPM	197	197	Connection made at 57600 bps with LAPM protocol (V.42/V.42bis).			
CONNECT 62400/LAPM	198	198	Connection made at 62400 bps with LAPM protocol (V.42/V.42bis).			
CONNECT 67200/LAPM	199	199	Connection made at 67200 bps with LAPM protocol (V.42/V.42bis).			
CONNECT 115200 /LAPM	204	204	Connection made at 115200 bps with LAPM protocol (V.42/V.42bis).			
REMOK	50	50	Command executed by the remote modem. Ready to receive new commands.			

AT Command Responses			Meaning			
Word Response	C0	C1	Word Response	C0	C1	
REM ERROR	54	54	Remote modem detected syntax error or invalid command.			
REMOTE ACCESS	86	86	Access to remote modem enabled.			
ENABLE						
REMOTE ACCESS FAIL	87	87	Access to remote modem failed.			
CALLING BACK	88	88	Modem dialing back.			

V.25bis Commands

Command	Function	Register
CIC	Enable autoanswer.	
CRNn	Connect as originate modem and dial telephone number n.	
CRSn	Connect as originate modem and dial telephone number stored in position n in memory.	
DIC	Disable autoanswer.	
GAT*	Switch to AT command state.	
PAR0	Select even parity.	S15
PAR1	Select space parity.	S15
PAR2	Select odd parity.	S15
PAR3	Select mark parity.	S15
PRNn;m	Write telephone number m in position n in memory.	
PRPn;m	Set value m to register n.	
RLN	Display telephone numbers stored in the modem memory.	
RLPn	Display value of register n.	
RES*	Reset the modem configuration.	

* Transend only.

V.25bis Command Responses

Response	Function
VAL	Valid command. Modem ready to receive a new command.
INV	Syntax error invalid command.
CNXvel	Connection made at "vel" speed.
INC	Ring indicator, that is, the modem is receiving an incoming call.
LSN	List of telephone numbers stored in the telephone number memory in response to the RLN command.
LSPn;m	Display current value of register n in response to the RLPn command.
NS	Indicates that the memory position has no stored value.
CFI	Indicates that attempted connection with remote modem failed.
CFI AB	Connection aborted by time-out.
CFI ND	Modem did not detect dial tone.
CFI ET	Modem did not detect busy tone.
CFI NS	There is no number stored in position n in memory indicated by the CRSn command.
CFI NT	Modem did not detect response tone from remote modem.

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S-Registers

S-Registers				
No.	Function	Range	Default	Command
S0	Number of rings to answer an incoming call (0 disables autoanswer)	0-255	2	AT&S0
S1	Ring count	0-255	0	-
S2	Escape sequence character (values greater than 127 disable the escape feature)	0-127	43	AT&S2
S3	Carriage return character	0-127	13	AT&S3
S4	Line feed character	0-127	10	AT&S4
S5	Backspace character	0-127	8	AT&S5
S6	Dial tone wait time (seconds)	0-255	2	AT&S6
S7	Remote carrier wait time (seconds)	0-255	30	AT&S7
S8	Pause time for comma (,) used as dial modifier (seconds)	0-255	2	AT&S8
S9	Carrier Detect Time	0-255	6	AT&S9
S10	Lost Carrier Detect Time	0-255	14	AT&S10
S11	DTMF tone time duration (milliseconds)	0-255	80	AT&S11
S12	Escape sequence guard time (in 1/50 seconds)	0-255	50	AT&S12
S13	Amount of time, in 1 minute increments, that the Modem will remain in Dial Backup mode before retrying the leased line mode. A zero will disable automatic lookback to leased line.	0-255	15	-
S14	bit 0 - Connect message 0=DCE speed 1=DTE speed bit 1 - Command echo 0 = disable 1 = enable	0-255	-	ATE0 ATE1

S-Registers				
No.	Function	Range	Default	Command
S15	bit 2 - Command responses 0 = enable 1 = disable bit 3 - Response type 0 = codes 1 = messages bit 4 - Response messages 0 = ignore 1 = originate mode only bit 5 - Dial type 0 = tone 1 = pulse bit 6 - Hang Up 0 = normal 1 = not used bit 7 - Answer/originate designation 0 = answer 1 = originate bit 0 - Reserved bit 3, 2, 1 - Transmit level, leased line 000 = 0 dBm 001 = -3.0 dBm 010 = -6.0 dBm 011 = -9.0 dBm 100 = -12.0 dBm 101 = -15.0 dBm 110 = -18.0 dBm 111 = -21.0 dBm bit 5, 4 - Asynchronous V.25bis parity 00 = even 01 = space 10 = odd 11 = mark bit 6, 7 - Reserved	6-2	9	AT-K

Transend Modems

S-Registers				
No.	Function	Range	Default	Command
S16	bit 0 - Local Analog Loopback (LAL) bit 1 - not used bit 2 - Local Digital Loopback (LDL) bit 3 - Remote loopback reception bit 4 - Remote Digital Loopback (RDL) bit 5 - RDL with self-test (SRL) bit 6 - LAL with self-test (SAL) bit 7 - not used	0-255	0	AT&T1 AT&T3 AT&T6 AT&T7 AT&T8
S17	Used internally			
S18	Test timer in seconds (0 disables timer control)	0-255	0	AT\$T18
S19	bit 0-3 - Modulation type 0000 = automode 0001 = V.21 1011 = V.32bis 1100 = V.34 1101 = V.90 bit 4-7 - Reserved	0-13	0	ATBn ATB0 ATB8 ATB11 ATB12 ATB13
S20	Reserved			
S21	bit 6,0 - DSR mode 00 = always on 01 = on when online 10 = off 5 seconds after disconnect 11 = follows off-hook bit 1,5 - DCD mode 00 = always on 01 = on when carrier present 10 = on except 5 seconds after disconnect 11 = reserved bit 2 - CTS mode 0 = follows RTS by S26 delay 1 = CTS always on bit 4,3 - DTR mode	0	AT&S0 AT&S1 AT&S2 AT&S3 0 0 0	AT&S0 AT&S1 AT&S2 AT&S3 AT&C0 AT&C1 AT&C2 AT&C3 AT&R0 AT&R1
S22	bit 1, 0 - Speaker volume	0-255		
S23	bit 0 - Remote Digital Loopback (RDL) control 0 = deny RDL request 1 = enable RDL request bit 1 - V.25 VAL 0 = enabled	0-255		AT&T5

S-Registers				
No.	Function	Range	Default	Command
	00 = ignores DTR 01 = assumes command mode when DTR off 10 = hangs up when DTR turns-off 11 = resets when DTR turns-on		0	AT&D0 AT&D1
	bit 7 - Long Space disconnect 0 = disabled 1 = enabled		0	AT&D2 AT&D3 ATY0 ATY1
	bit 1, 0 - Speaker volume 00 = minimum 01 = low 10 = medium 11 = high			ATL0 ATL1 ATL2 ATL3
	bit 3, 2 - Speaker control 00 = off 01 = on until 2100 Hz received 10 = always on 11 = off while modem is dialing			ATM0 ATM1 ATM2 ATM3
	bit 6, 5, 4 - Line tone, connect message 000 = ignore tones, without speed 100 = detect busy tone, without speed 101 = ignore tones, with speed 110 = detect busy tone, with speed 111 = detect tones, with speed bit 7 - Pulse make/break ratio 0 = 3961 (USA standard) 1 = 3367 (UK standard)			ATX0 ATX1 ATX2 ATX3 ATX4 AT&P0 AT&P1
S23	bit 0 - Remote Digital Loopback (RDL) control 0 = deny RDL request 1 = enable RDL request bit 1 - V.25 VAL 0 = enabled	0-255		AT&T5

Transend Modems

S-Registers				
No.	Function	Range	Default	Command
S23	1 = disabled bit 2 - resetted bit 3 - CTS Control 0 = does not follow DCD 1 = follows DCD bits 5, 4 Asynchronous parity selection 00 = even parity 01 = space parity 10 = odd parity 11 = mark parity bit 7, 6 - reserved			AT&R2
S24	Reserved			
S25	DTR detect delay in (1/100 seconds)	0-255	AT\$25	
S26	RTS-CTS delay in (1/100 seconds)	0-255	ATS26	
S27	bit 0 - Reserved bit 1 - Reserved bit 3, 2 - Line selection 00 = dial-up line 01 = 2-wire leased line bit 5, 4 - Clock source 00 = internal clock 10 = slave clock bit 6 - Not used bit 7 - Dial on manual connection 0 = disable 1 = enable		AT&L0 AT&L1	
S28	Used internally	0-128,		
S29	Select DTE speed (0 disables DTE steady speed) bit 4, 3, 2, 1, 0 00000 = disable DTE speed 00100 = 1200 00101 = 2400 00110 = 4800	000	AT-U AT-U0 AT-U1200 AT-U2400 AT-U4800	
S-Registers				
No.	Function	Range	Default	Command
S30	bit 7,0 - Break length sent to DTE (x 20ms)	0-255	35	AT!Bn
S31	bit 7,0 - Timeout password	0-255		
S32	bit 7,0 - Callback delay	0-255	15	
S33	bit 7,0 - Number of callback retries	0-255		
S34	bit 6,0 - XON character to DTE	0-127	17	
S35	bit 6,0 - XOFF character to DTE bit 7 - Reserved	0-127	19	
S36	bit 6,0 - XON character from DTE bit 7 - Reserved	0-127	17	
S37	bit 6,0 - XOFF character from DTE bit 7 - Reserved	0-127	19	
S38	bit 7,0 - Inactivity timer	0-255		AT!Tn

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No.	Function	Range	Default	Command
S39	bit7,0 - Buffer delay	0-255		
S80	bit 0-5 - Reserved bit 7, 6 - Size of asynchronous character ter	0-255		AT&B0 AT&B1 AT&B2 AT&B3
S81	bit 1, 0 - Block size 00 = 64 characters 01 = 128 characters 10 = 192 characters 11 = 256 characters bit 2, 3 - Normal mode buffer 00 = disable 01 = buffer for 200 characters 10 = enable fallback character bit 6, 5, 4 - Break treatment 001 = send after buffer is empty 011 = send immediately 101 = send in sequence with data bit 7 - V.42 detect phase 0 = disable 1 = enable	0-255		AT&A0 AT&A1 AT&A2 AT&A3 AT&C0 AT&C1 AT&C2 AT&K1 AT&K3 AT&K5 AT&M0 AT&M1

No.	Function	Range	Default	Command
S83	bit 2, 1, 0 - Reserved bit 4, 3 - Dial-up line disconnect 00 = disable 01 = by carrier loss 10 = by data loss 11 = by carrier and data loss	0-255		AT-H0 AT-H1 AT-H2 AT-H3
S84	bit 2, 1, 0 - Reserved bit 5, 4, 3 - Transmit level 000 = 0 dBm	0-255		AT-T0 AT-T1
S82	bit 2, 1, 0 - Flow control 000 = disable 001 = bilateral XON/XOFF 010 = unilateral CTS 011 = bilateral RTS/CTS 100 = bilateral XON/XOFF	0-255		AT&Q0 AT&Q1 AT&Q2 AT&Q3 AT&Q4 AT&V0 AT&V1
S85	bit 0 - Reserved bit 1 - Ring Indicator 0 = blinks while dialing and stays on 1 = blinks while dialing and turns-off when answered bit 2 - Reserved bit 3 - V.8	0-255		AT&R0 AT&R1

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No.	Function	Range	Default	Command
0	0 = disabled for non V.34 answer 1 = enabled for V.34 answer			
bit 4 - Reserved				
bit 5 - CT108 Function (DTR)				
0 = CT108/2 1 = CT108/1				AT:D0 AT:D1
bit 6 - Disconnect by DCD loss				
0 = fast (approx. 5 seconds) 1 = normal (approx. 45 seconds)				AT:P0 AT:P1
bit 7 - Reserved				
S86	bit 0 - Remote disconnect 0 = disable 1 = cleardown bit 1 - Auto-redial 0 = disabled 1 = enabled bit 2, 3 - Automatic rate adaptation 00 = disabled 01 = enabled with low BER 10 = enabled with medium BER 11 = enabled with high BER bit 4 - Auto retrain 0 = disabled 1 = enabled bit 5 - Small block 0 = off 1 = on bit 6 - Character length 0 = 7 bits 1 = 8 bits bit 7 - Number of stop bits 0 = 1 bit 1 = 2 bits	0-1		AT:F0 AT:F1 AT-R0 AT-R1 AT%R0 AT%R1 AT%R2 AT%R3 AT%E0 AT%E1
S87	bit 2, 1, 0 - Protocol selection	0-255		

No.	Function	Range	Default	Command
000	000 = normal mode 001 = direct mode 100 = LAPM 101 = LAPM or normal 111 = LAPM or normal			AT:NN0 AT:NN1 AT:NN4 AT:NN5 AT:NN7
bit 3 - DTR Dial				
0 = disable 1 = enable				AT%D0 AT%D1
bit 5, 4 - reserved				
bit 6 - Command state select				
0 = AT command state 1 = V.25bis command state				AT:S0 AT:S1
bit 7 - Command state enable				
0 = disable 1 = enable				AT:MO AT:M1
S88	Fallback character for normal mode	0-127		
S89	Management			
S90	Enable modem speed	8-255		AT:B AT%B
	bit 4-0 - Reserved			
	bit 5 - 4800 bps			
	bit 6 - 7200 bps			
	bit 7 - 9600 bps			
S91	Enable modem speed	0-255		AT:B AT%B
	bit 0 - 12000 bps			
	bit 1 - 14400 bps			
	bit 2 - 16800 bps			
	bit 3 - 19200 bps			
	bit 4 - 21600 bps			
	bit 5 - 24000 bps			
	bit 6 - 26400 bps			
	bit 7 - 28800 bps			
S92	Enable modem speed	0-255		AT:B AT%B
	bit 0 - 31200			
	bit 1 - 33600			

No.	Function	Range	Default	Command
S93	Enable modem speed	0-255	AT:B AT%:B	
S94	Enable modem speed	0-255	-	
S95	bits 1, 0 - Reserved bit 2 - reserved bit 3, Call back enable bit 4 - Caller ID Detection 1 = enable 0 = disable bit 5 - L1 disconnect L2 0 = off	AT:SO AT:SI AT:F0 AT:F1		

No.	Function	Range	Default	Command
S96	1 = on bit 6 - Auto Baud 0 = disabled 1 = enabled bit 7 - Number Code 0 = standard (15 - 4800bps, 18 - 9600bps) 1 = alternative (11 - 4800bps, 18 - 9600bps)	-	-	AT*RC0
S97	bit 0 - Reserved bit 1 - Call waiting 0 = off 1 = on	-	-	AT*RC1
S98	bit 2 - Asymmetrical speed option 0 = disable 1 = enable bit 3 - Storing option 0 = store option when disconnect 1 = reset option when disconnect	-	-	
S99	bit 5,4 - Switched Line TX level 00 = 0 dB 01 = -1 dB 10 = -2 dB bit 7,6 - Leased line TX level 00 = 0 dB 01 = -1 dB 10 = -2 dB	0-255	0	

Transend Modems

Certifications

Your modem is manufactured to meet the requirements of both governmental regulatory agencies such as the U.S. Federal Communications Commission (FCC) and Industry Canada (IC) as well as commercial testing laboratories such as Underwriters' Laboratory (UL).

FCC Requirements

The modem complies with Parts 15 and 68 of FCC regulations. These regulations govern the operation of devices that connect to the public telephone lines and devices that may produce electromagnetic interference.

Industry Canada Requirements

The modem meets Industry Canada requirements as described below under "Regulatory Information."

Testing Laboratory Approval

The equipment is listed by Underwriters' Laboratory (UL) and approved by the Canadian Standards Association (CSA) for normal use as a modem when operated as described in this manual.

Regulatory Information

Connecting to the Telephone Company

This equipment complies with Part 68 of the FCC rules. On the bottom of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence

number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive REN's on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total REN's, contact the telephone company to determine the maximum REN for the calling area.

This equipment uses the following USOC jacks:

RJ11C, RJ14C, RJ21X

An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

This equipment cannot be used on telephone company-provided coin service. Connection to Party Line Service is subject to state tariffs.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes to its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will

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provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

If trouble is experienced with this equipment, please contact Transend Corporation, 407-638-4400, for repair or warranty information. U. S. service center location is: Transend Corporation, 1240 U.S. 1, Rockledge, FL 32955. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

The following repairs can be done by the customer:

- Upgrade the modem software.

It is recommended that the customer install an AC surge arrestor in the AC outlet to which the device is connected. This is to avoid damaging the equipment caused by local lightning strikes and other electrical surges.

Radio and Television Interference

This equipment generates and uses radio frequency energy, and, if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. Transend high speed modems have been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause interference to radio or television reception, which you can determine by monitoring

reception when the modem is on and off, try to correct the problem with one or more of the following measures.

- Reorient the receiving antenna.
- Relocate the modem with respect to the receiver.
- Relocate the modem and/or the receiver so that they are on separate branch circuits.

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions.

In accordance with Part 15 of the FCC rules, any modification to or tampering with this device that causes harmful interference to others may be reason for prohibiting future operation.

IC (Industry Canada)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the radio interference regulations of Industry Canada (formerly Canadian Department of Communications).

Le présent appareil numerique n'émet pas de bruits radioélectriques dépassant le limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

For Canadian Modem Users

The Industry Canada (formerly DOC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The department does not guarantee the equipment will operate to a user's satisfaction.

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Before installing this equipment, make sure you are permitted to connect it to the facilities of the local telecommunications company. You must also install the equipment using an acceptable method of connection. In some cases, you may also extend the company's inside wiring for single line individual service by means of a certified connector assembly (telephone extension cord). You should be aware, however, that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by a user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For your own protection, make sure that the electrical ground connections of the power utility, the telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

WARNING: Do not attempt to make such connections yourself; contact the appropriate electrical inspection authority or electrician.

Transend Modems Load Number: 5

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to the telephone loop used by the device, without overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the Load Numbers of all the devices not exceed 100.

Transend Modems

Specifications

Description	Specification	Description	Specification
Compatibility	ITU-T V.90, V.80 V.34, V.32bis, V.32, V.8, V.14, V.24, V.25 bis, V.28, V.42, V.42bis,	Modem Speeds (all)	300; 4800, 9600 (V.32); 4800, 9600, 12000, 14400 (V.32bis); 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 26400, 28800, 31200, 33600 (V.34), 36000, 38400, 40800, 43200, 45600, 48000, 50400, 52800, 55200, 57600, 60000, 62400, 64800, 67200 bps
Modulation	DPSK	QAM with bidimensional trellis code	7200 to 14400 (V.32bis) bps
		QAM with Multidimensional trellis code	2400 to 33600 (V.34) bps
Configuration	By commands	TX Power Level (dial)	From -9 to -30 dBm in 1 dB steps
Factory Profiles	AT (local and remote), V.25bis (local) profiles 0-4	TX Power Level (leased)	From -9 to -30 dBm in 1 dBm steps
DTE Interface	Type	Sensitivity	-45 dBm
	Connector	TX frequency tolerance	Less than 0.01%
	Asynchronous speed	Other Features	<ul style="list-style-type: none"> • Full Asymmetric Transmission • High Performance DSP Processor • Flash EPROM • 8 Front Panel LEDs
Security	Autobaud speed	Environmental:	
Lines	Interface	Storage Temperature	-40 to +158°F (-40 to +70 °C)
	Dial-up Line	Operating Temperature	+23 to +113°F (-5 to +45 °C)
	Leased Line	Relative Temperature	+32 to +113°F (0 to +45 °C)
Diagnostic	Loopbacks	Relative Humidity	10 to 90%
Test Pattern Generator and Detector	Local Digital, Remote Digital, and Local Analog		
	Scrambled ; Mark (V.34, V.32bis, V.32) or 1 x 1 (V.22, V.22bis)		
	Analysis of signal quality		
	Diagnostic of Line		

Transcend Modems

Description	Specification
Power	
AC power	120/220 VAC, 1-phase, 50-60 Hz
Transformer voltage	+12 VDC
Power consumption:	
Modem	6 watts
CardCage	60 watts
Standard	UL listed
Dimensions (external):	
Data Compression	V.42 bis data compression, all modes and speeds 1200 bps and higher.
Error Control	V.42 bits data compression, all modes and speeds 1200 bps and higher..
Certification	FCC Part 68 and part 15, Class B Domestic; IC (Canada), UL listed
Fax	Provides Group III compatibility when combined with Class 1 fax software. Modems adhere to the following standards: <ul style="list-style-type: none"> • TIA/EIA -57B: Service Class 1 Asynchronous Facsimile DCE Standard • ITU-T V.17: 14400/12000 bps • ITU-T V.29: 9600/7200 bps • ITU-T V.27 ter: 4800/2400 bps • ITU-T V.21: 300 bps