V.3229/V.3229L
Manual

Item Option

When in the Item Option column, respond to the prompt question on the LCD to either keep or change the current option displayed.

USE RECEIVE TRANSMIT CLOCK?

NO

USE EXTERNAL TRANSMIT CLOCK?

NO

USE INTERNAL TRANSMIT CLOCK?

YES

INTERNAL CLOCK CHANGE?

Selecting the Option

Select the submenu containing the option (submenu item) to be changed and press YES. The LCD displays the first Submenu Item.

If the Submenu Item (option) setting displayed is the desired option, press NO to scroll through Submenu Items. If the option displayed is not the desired setting, respond to the prompts until the desired option is displayed, and then advance to the next Submenu Item. In any case, responding to the prompt will guide you to the desired option.

Note: Because of menu structure and options available, not all Main Menus have Submenus and not all Submenus have Item Options. However, the option selection sequence is the same.

Chapter 4
Operation

GENERAL

This chapter contains a functional description of the modem.

CONTROLS AND INDICATORS

The front panel houses the LCD panel and LED indicators. The power switch is located on the rear panel.

LED DESCRIPTIONS

The LEDs display modem status during various operations. Two versions of the V.3229 contain two different LEDs. One version has a TR LED in the location where the other version has a QM LED. Definitions are as follows:

Terminal Ready TR - lights when the associated DTE is ready to exchange data with the modem. This signal is input on EIA-232 pin 20.

OR

Quality Monitor QM - lights when poor signal quality produces a bit error rate of 1×10^{-4} or greater, or when error control causes retransmission of data. This signal is output on EIA-232 pin 11.

Request to Send RS - lights when the DTE is ready to send data to the modem. This signal is input on EIA-232 pin 4.

Clear to Send CS - lights when the modem is ready to accept data from the DTE. This signal is output on EIA-232 pin 5.

Carrier Detect CD - lights when the received audio carrier signal is detected or, if enabled, when error control negotiation is complete. This signal is output on EIA-232 pin 8.

Received Data

RD - lights for a space at the receive data output, indicating receive output data activity. This signal is output on EIA-232 pin 3.

Transmit Data

TD - lights for a space at the transmit data input, indicating transmit input data activity. This signal is input on EIA-232 pin 2.

TALK / DATA

Only on the L model, the TALK / DATA LED lights to indicate that the modem is in talk mode and goes off to indicate that the modem is in data mode.

POWERUP

A powerup procedure is not required. Turn the ON/OFF power switch on the rear panel to ON.

Quick Startup Procedure

This procedure can help with first time operation of the modem. The procedure assumes that phone numbers have been inserted in memory, that an asynchronous dial-up option set is in effect, that power, DTE, and telephone line connections are made, and that a similar, remote station is available for communication.

- ☐ Make sure the modem is installed according to the instructions in Chapter 2.
- ☐ Turn on the computer and the modem.

Manual Dialing

After turning the modem on the LCD shows the software version and advances to main menu 1.

- ☐ Pick up the handset and dial the phone number of the remote modem. For the L model press the TALK / DATA button to enter talk mode.
- ☐ When a remote modem answers a high pitched tone (2100 Hz answer back tone) is heard.
- ☐ Press TALK/DATA. This puts the modem in data mode and data transfer can begin.

The display shows TRAINING as the modems negotiate a connection and then ONLINE when the connection is made. Data transfer is controlled by the user and begins when instructed.

Manual Answering

To manually answer the phone for conversation, set the autoanswer register (S0) to a ring count value high enough to allow answering by the connected phone before the modem autoanswers.

When the conversation is completed, both parties press TALK/DATA and a data connection is established.

Autodialing from the Front Panel

- ☐ Starting at the V.32 bis 14400 TALK display, press NO. The display advances to DIAL STORED NUMBER?
- ☐ Respond to the prompts until reaching the desired number to dial.
- ☐ Press YES. The modem proceeds through the dial sequence.

To follow this sequence, observe the LCD and listen to the speaker.

AT Command Dialing

Enter ATD and the telephone number or memory location number to dial. When the enter key is pressed the dial sequence starts. Follow the status of the dial sequence by observing the monitor screen and listening to the speaker.

Software Packages Communication

A large variety of software packages compatible with the modem is available. Most provide a way for the operator to select options, insert phone numbers, and establish communications with a remote modem. Software package instructions describe the actions required for these functions.

ERROR CONTROL The modem incorporates error control capabilities including LAPM and MNP protocols. Chapter 8 provides detailed explanations for error control.

FLOW CONTROL If the DTE speed exceeds the DCE (modem) speed, characters may be sent by the DTE to the modem faster than it can send them to the remote modem. The modem holds characters in an internal buffer until they can be transmitted. When this buffer is full, the modem uses flow control to cause the DTE to stop sending characters. As the modem continues to transmit data and the buffer empties, flow control is again used to cause the DTE to resume sending data.

AUTOBAUD Sending AT to the modem accomplishes autobaud. The modem can automatically detect DTE speed and adjust to communicate with the DTE at that rate (autobaud). The default is 9600 bps. Autobaud also detects the character size and parity used by the DTE. The default is 8 data bits, no parity, and one stop bit.

2- / 4-WIRE OPERATION

Note: For a 2- or 4-wire leased line connection to succeed one modem must be configured as forced answer and the other modem as normal originate. Both modems should have only one protocol, MNP or LAPM, enabled and PROTOCOL FALLBACK must be disabled. DCE line speed must be the same for both modems.

4-Wire Operation In 4-wire operation, the modem is a full-duplex, leased line modem requiring a dedicated 4-wire leased line. Only point-to-point dedicated leased lines are supported.

A V.32 or V.33 training sequence may be selected for use during 4-wire leased line operation using S31. Refer to S31 in Chapter 6 for options.

The 4-wire leased line connects to the TELSET/LEASED LINE jack on the modem rear panel. Dialing is not necessary. When connected via leased line the modems will train and begin communicating with each other. The DIAL jack can be used to connect a 2-wire PSTN line for dial backup.

2-Wire Operation In 2-wire operation, the modem is a full-duplex modem able to operate over 2-wire leased or PSTN lines.

2-WIRE LEASED LINE OPERATION

The 2-wire leased line is connected to the TELSET/LEASED LINE jack; the DIAL jack connects to a 2-wire PSTN line for dial backup. The leased line connects the local and remote modems directly and dialing is not necessary. One of the modems must be configured for forced answer. When connected via leased line the modems connect and begin communicating with each other.

Note: DTR must be held high in 2-wire leased line operation. This is accomplished by DTE control, wiring pin 20 of the digital interface cable high, or by selecting the option IGNORES DTR. If DTR is terminal controlled, loss of synchronization can be corrected by cycling DTR. This causes the modem to initiate the 2-wire training sequence.

2-WIRE DIAL-UP OPERATION

Connection to the telephone network is through the DIAL jack. A standard telephone can be connected to the TELSET/LEASED LINE jack for manual dialing.

CONFIGURATION PROFILES

Modem operations are controlled by option settings selected from factory defaults stored in ROM, active settings stored in RAM, and custom settings stored in nonvolatile memory. These three code storage locations are called profiles. Chapter 5 includes commands for profile storage and recall.

Active Profile

The active profile holds the current option settings and is used by the modem for all operations and functions. Any active profile option can be changed to meet an immediate requirement.

Stored Profile

When an active configuration is established that meets all operating requirements, it can be transferred to one of the stored profiles. Two stored profiles are available for greater versatility.

If the active profile has been temporarily changed it can be reset to either of the stored profiles with the ATZ command. Another AT command selects one of the stored profiles to be the powerup profile.

Factory Profile

The factory configurations are stored in ROM and cannot be changed by the user; they can be transferred to the active profile and then modified to fit a specific application if needed.

REMOTE CONFIGURATION

This mode of operation allows viewing or modifying the options of a remote modem that supports Motorola UDS remote configuration. Remote configuration is initiated by the local (master) modem through a routine incorporating remote digital loopback, a security code, and an acknowledgment from the remote (slave) unit to be modified. The security code is user programmable and provides protection from unauthorized entry. The modems are shipped from the factory without a security code. Refer to Remote Configuration in Chapter 5.

The ATD and AT&T commands are not accepted in remote configuration.

Note: Remote configuration is supported at all rates except 300 bps.

Remote Configuration Security

The correct code must be received by the remote modem before remote configuration can be established. Once established, the local DTE becomes a virtual terminal and can serve both local and remote modems. After starting remote configuration, the local DTE serves the remote modem.

To return DTE service to the local modem while in remote configuration, issue the +++ escape sequence.

DTE service can again be returned to the remote modem by issuing the ATO command. Switching DTE service between local and remote modems may be performed as needed.

To exit remote configuration, return DTE service to the local modem. The AT&T command will exit remote configuration mode.

Remote configuration may be entered after dialing by placing the remote configuration command (%T=), without the = sign and followed by the security code, at the end of the dial string.

SECURITY OPERATION

Security operation provides password protection against unauthorized dial-up access. The security feature can be enabled / disabled with AT commands when operating on a dial-up system.

Transmitted data and received data lines are suppressed to the host DTE during security validation; all other signals (CTS, DSR, RI, etc.) operate as selected. After the password has been validated, the modem operates normally.

Operating without Security

The modem is not factory set for security and operates like a standard V.32, except for additional AT command which allow access to security. With these commands a user can set passwords and turn security on. When security is enabled, a password must be used to change security options.

Operating with Security

A secure modem will not allow data transfer between its host and a remote host until a correct password is received from the calling party. If an incorrect password is received the secure modem disconnects. The front panel is not locked out because this type of security prevents unauthorized dial-up access.

Remote Operation

The originating modem must transmit the correct security code before the secure modem will allow data transfer. If accessing a secure remote modem, the local modem prompts the user with

PLEASE ENTER YOU PASSWORD ⇒

To Respond to the password prompt

Enter $ followed by the password.

After receiving the $ the secure remote modem accepts the security code and waits for a carriage return. Entering more than ten characters is invalid and causes the secure modem to disconnect. Entering a valid password causes the calling party's DTE to display PASSWORD ACCEPTED.

Local Operation

When accessing the local modem, the password is not required except when the user wants to change a security option. To change a password or turn security on or off, the user must enter a password when entering the appropriate AT commands. EIA-232 signals to the DTE are not affected by security in command mode.

Passwords

Two passwords of up to ten characters each can be stored in the modem's nonvolatile memory. AT commands change the passwords. Backspace and escape keys are not supported for password entry. The passwords can consist of any printable characters except a dollar sign, a comma, or space. Passwords are case sensitive.

The passwords have the same priority level and are interchangeable with each other. This can be helpful in situations such as when the user forgets one of the passwords.

LCD Indication Security

The front panel LCD indicates whether security is on or off. If disabled, the LCD appears as if the security does not exist. If enabled, main #1 consists of the following display:

SECURE 14400
xxx

Restrictions in Security Operation

The following conditions will cause the modem to disconnect:

- An error control protocol is not in effect
- Illegal password attempt
- Connection is 300 bps
- Connection is synchronous

These restrictions apply only when security is enabled.

AUTOCALLBACK SECURITY

Another security feature, Autocallback, forces the answering modem to dial the selected autodial (AT*AUn) telephone number after answering a call, holding the line for one second, and then disconnecting. When autocallback is enabled the modem will not train on an incoming call. Access autocallback via Main Menu #5 on the LCD. Refer to Chapter 3 for further information. S-register 72 enables / disables autocallback. S-register 78 determines the delay in seconds before autocallback is initiated.

DIAL BACKUP

Dial backup allows the modem to switch to a dial backup mode if the data connection on the leased line becomes unacceptable for communications. This can be accomplished in two ways:

- Automatic - backup due to extended loss of carrier or 4 unsuccessful retrains in 3 minutes
- Manual - user determined using front panel controls or AT commands

Note: In 4-wire leased line operation, if both units have autodial backup enabled, one must be configured for forced answer. This prevents both units from dialing if the leased line fails.

Both methods use the prestored autodial number. If the dial attempt is unsuccessful after three tries, a retrain on the leased line will be initiated.

In automatic and manual mode the return to leased line is initiated after the lookback time in register S28 has elapsed. In automatic mode unnecessary termination of the dial line connection is prevented by a leased line lookback test. If the leased line is not acceptable, the dial connection is resumed with a retrain. If the leased line is acceptable, the dial connection is dropped and normal leased line mode is resumed. If return to lease line is manually invoked in manual dial backup mode the dial line is dropped immediately.

When the unit attempts to return to leased line, the LCD displays LEASE LOOKBACK. If the leased line has been restored to service, data can be passed approximately 10 seconds after LEASE LOOKBACK was initiated. The LCD will continue to display LEASE LOOKBACK for slightly more than a minute. When the LCD displays ON LINE again the dial line is disconnected.

Note: A diagnostic test initiated during dial backup mode terminates when the modem performs leased line lookback.

AUTO RATE RENEGOTIATION

Auto rate renegotiation allows the modem to automatically decrease the DCE rate when the allowable bit error rate is exceeded. If line condition improves the modem automatically increases the rate.

Select this feature by front panel operation or AT command. Options include disabled (factory default), low (BER= 1 in 10^5), medium (BER= 1 in 10^4), high (BER= 1 in 10^3).

The following apply to auto rate renegotiation:

- Auto retrain is disabled when auto rate renegotiation is enabled.
- Auto rate renegotiation is disabled during direct mode.
- Manual rate renegotiation is disabled from the front panel when auto rate renegotiation is enabled.
- Only one increment or decrement in the DTE rate is allowed at a time during auto rate renegotiation.
- When online, initiator rate renegotiation occurs a maximum of every 12 to 14 seconds from the last occurrence of a rate renegotiation.
- After the modem drops data rate because of poor signal quality, the line must improve by approximately 2.5 dB before an increase in rate can occur.

PLACING A CALL

Using a Standard Telephone

☐ Lift the telephone receiver. Wait for the dial tone. With the L model enable talk mode by pressing the TALK / DATA button.

☐ Dial the number of the remote site.

☐ When the answer back tone is heard, immediately press the TALK/DATA button and hang up the phone. The modems go through a connection sequence and establish a data link. If not, hang up and return to the first step.

Autodial from Front Panel

☐ Advance the LCD to main #2, DIAL STORED NUMBER.

☐ Select the stored number to dial and press YES to dial.

Autodial with the AT Command Set

☐ To dial a number, for example 5551212 type AT D 555-1212 carriage return, or enter ATD Sn where n equals the stored telephone number location (1-9) to dial.

☐ The modem dials the number -- either pulse or tone, whichever is currently in effect -- and takes the role of the originate modem.

Refer to the DIAL COMMANDS section in Chapter 5 for additional information.

ANSWERING A CALL

Autoanswer

Normally the modem is configured to autoanswer. A telephone plugged into the telset jack will also ring.

Manual Answer

On ring detection the modem displays:

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V.32b 14400
RINGING
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Press TALK/DATA to answer the call or enter the ATA command at the DTE.

ENDING A CALL

The following conditions cause call termination:

- Abort Disconnect (No answer, busy signal, no modem, etc.) — Default 30 sec. Select 1 to 30 sec.
- ATH — Disconnect command.

• Loss of Carrier Disconnect	Select 100 ms to 25.5 sec.
• Receive Long Space Disconnect	Disable or enable.
• DTR Disconnect	Disable or select 10 ms to 2.55 sec.
• LCD Display	When TALK/DATA is pressed, the LCD displays DO YOU WANT TO DISCONNECT? When YES is pressed the modem hangs up. Pressing NO displays SWITCH TO TELSET (TALK MODE)? Pressing YES turns the connection over to the connected telephone.
• Protocol Link Establishment Failure	Reliable mode only. Failure to establish reliable link.
• Protocol Inactivity Timeout	Default (0) disabled. Select disable or 1 to 255 minutes.
• Protocol Retry Limit Exceeded	12 retransmissions of the frame.
• Signal Quality	Leased line operation with dial backup enabled; extended loss of carrier or 4 unsuccessful retrains in 3 minutes.

- Modem power is turned off.

V.32 Cleardown

V.32 cleardown is a method of call termination specified in the CCITT recommendation. Cleardown incorporates a training sequence which ends with a command to disconnect. If long space disconnect is disabled, the cleardown sequence is activated by the ATH command or by any method of disconnect request.