V.3600
Manual

For Sales or Service Contact:

Data Connect Enterprise
301-924-7400

http://www.data-connect.com/
sales@data-connect.com

Before attempting diagnostic tests, verify that all connectors and plugs are firmly inserted. The test procedures identify the faulty component in a bad communications link.

Calling Technical Support

The Service and Support page at the back of this User's Guide contains several phone and faxback numbers and the Web address. If calling Technical Support, please call from a location near the computer with the modem. It helps expedite the call to have the following information available:

- Type of modem -- V.3600
- Modem serial number
- Date code
- Purchase date
- Type and version of software, including data communications, fax, and browser/reader software
- Type and version of other software running at the same time

Note
Do not return the modem to the manufacturer without prior authorization.

If the unit appears faulty, contact Motorola Technical Support at 1-800-544-0062 (USA) for service and assistance.

Appendix A Specifications

Size

Width	7.0 inches (17.78 cm)
Depth	10.5 inches (26.67 cm)
Height	2.25 inches (5.72 cm)
Weight	2 lbs. 13 oz. (1.28 kg)
Front Panel	32 ASCII character LCD

Environmental Conditions

Temperature:

Operation	+32° F to +122° F (0° C to +50° C)
Storage	-40° F to +158° F (-40° C to +70° C)
Humidity:	0 to 95% relative humidity, noncondensing

Power Requirements

The modem can be ordered for operation with one of three power input options.

- 115 VAC ±10%; 50-60 Hz
- 230 VAC ±10%; 50–60 Hz
- 12 to 60 VDC

Power consumption: 14 watts

Telephone Line

Balanced 600 ohm type 3002 or equivalent 16 dB nominal loss, frequency translation up to ±10 Hz

Digital Interface

Conforms to EIA-232D and CCITT V.24

Modem Data Rates
300, 1200, 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 26400, 28800, 31200, 33600 bps.

Fax Rates
14400, 12000, 9600, 7200, 4800, and 2400

Modulations
V.34, V.32, V.22, V.21, V.27 bis, V.29, Bell 103, Bell 1200, V.17, V.33, V.22 bis, V.32 bis

Fax Modulation

Modulation	Speed
V.21 channel 2	300 bps
V.27 ter	2400 bps
V.27 ter	4800 bps
V.29	7200 bps
V.17	7200 bps
V.17	7200 bps with short train
V.29	9600 bps
V.17	9600 bps
V.17	9600 bps with short train
V.17	12000 bps
V.17	12000 bps with short train
V.17	14400 bps
V.17	14400 bps with short train

Internal Transmit Clock Frequency
Selected bit rate ± 0.01%

External Transmit Clock Frequency
Selected bit rate ± 0.01%

Transmit Output Level
0 to -30 dBm, selectable.

Operation
4-wire, full-duplex, leased (private) line
2-wire, full-duplex, leased (private) line or PSTN

Carrier Detect Level
Dynamic to -43 dBm

Telco Connection
8-pin modular jack, dial and private lines

Testing
511 PN pattern (per V.52) V.54 remote loopback control

Line Equalization
Automatic adaptive

RTS/CTS Delay
From 0 ± 2 ms to 90 ± 2 ms, user selectable in 10 ms increments (The default is 0 ms.)

Link Layer Protocols
V.42/V.42 bis error correction and compression protocol
MNP levels 2-5 error correction and compression protocol

Appendix B
Phone Jack Descriptions

DIAL Pin Functions

The DIAL jack connects to the PSTN dial-up lines. Pin functions are as follows:

Pin	Function
1, 2, 3	Not used
4 R	Ring side of telephone line
5 T	Tip side of telephone line
6, 7, 8	Not used

TELSET/LEASED LINE Pin Functions

The 8-pin TELSET/LEASED LINE jack allows a standard telephone or a leased line to be connected to the modem. Pin functions are as follows:

Pin	Function
1, 2	Transmit pair - 4-wire leased line or Tx and Rx for 2-wire leased line
4, 5	Ring and tip (respectively) of telephone line for a telephone
7, 8	Receive pair - 4-wire leased line

Appendix C
Hardware Options

Jumper Option Selection

Modem configuration is controlled by front panel pushbuttons and the LCD, AT or V.25 bis commands, and one hardware option jumper located on the PC board. Normally, jumpers do not have to be changed. If a change is required, remove the modem cover. The jumper diagrams on the following pages indicate the factory settings.

Removing the Cover

Warning

Disconnect power before removing the cover. Although dangerous voltage levels are not exposed, disconnecting power ensures an electrical shock hazard is not present.

1) Place the unit on its side on a flat surface.
2) To disengage the cover's locks from the base of the modem, insert a medium size flat screwdriver blade in one of the slots as illustrated in Figure C-1. DO NOT PUSH the screwdriver, but pry the lock open by applying pressure toward the unit.
3) Assist removal by pushing the cover from the base.
4) Repeat this procedure with the remaining three slots.

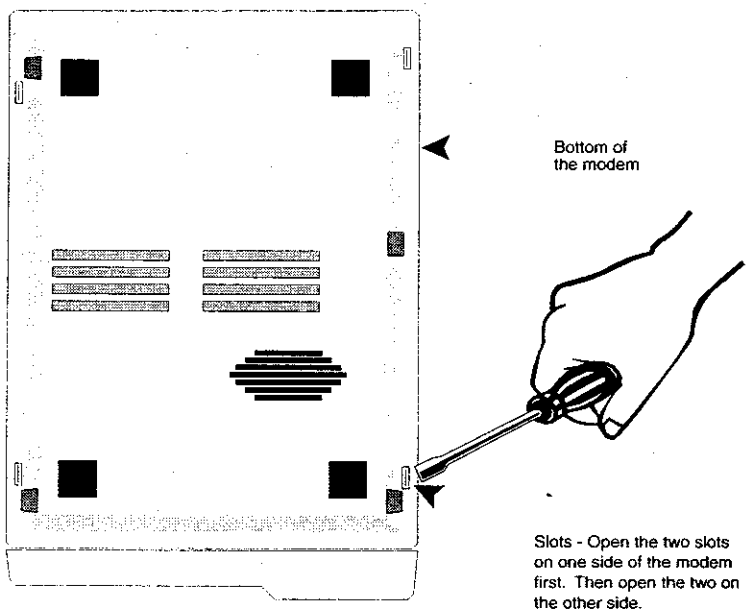


Figure C-1. Cover Removal

Figure C-2 shows the jumper location.

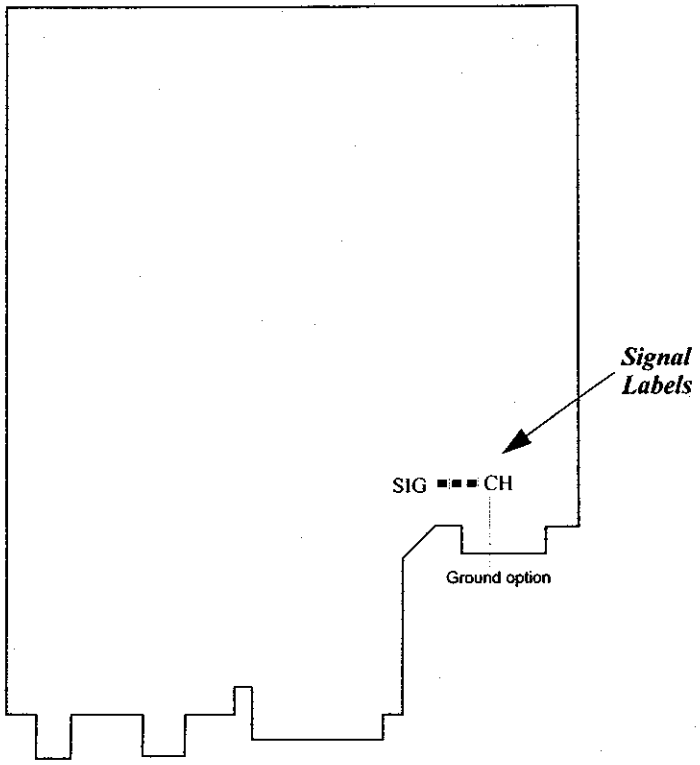


Figure C-2. Jumper Location for Ground Option

Figure C-3 shows a typical jumper configuration.

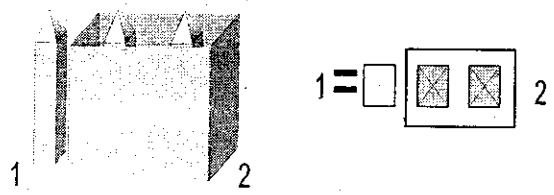
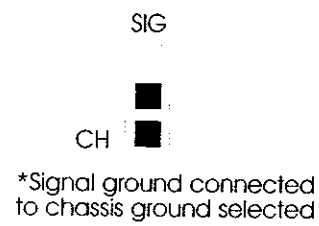


Figure C-3. Typical Jumper Configuration

Ground Option Jumper

Signal ground is normally connected to chassis ground. If interference exists, isolate signal ground from chassis ground.



* *factory setting*

Replacing the Cover

To replace the cover, align the lock clips, rear guide grooves, and front lock tabs. Press the cover in place until the lock clips engage the lock prongs.

Appendix D
Fault Isolation Procedure

Fault Isolation Procedure

This diagnostic test procedure and the indicator lights built into the modem allow a rapid check of the terminals, modems, and telephone line interface. This procedure can be used to verify normal system operation and to isolate faulty equipment in case of failure.

Ensure the units are turned on and remote loops are enabled at both sites before starting the fault isolation procedure.

Note
In some cases the observer must distinguish between rapid LED blinking and steady on in tests.

Telephone Interface

1) Connect the modem to the dial-in line by the LINE jack on the back panel.
2) If the dial line is installed with a standard data jack, connect a standard telephone to the TELSET/LEASED LINE jack on the back panel of the modem and use the standard telephone procedure.

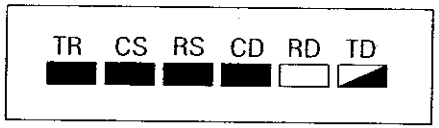
Standard Phone

1) Configure the modem to V.34 33600 IDLE mode by pressing the TALK/ DATA button, and then lift the receiver. No dial tone is heard. Press the TALK/DATA button to display V.34 IDLE and wait for dial tone.
2) Dial out; the phone should operate normally.

Modem and Telephone Line Check

Part I

1) Configure the modem for LOCAL ANALOG LOOP WITH TEST PATTERN. This terminates the local modem telephone lines into 600 ohms and connects the local modem transmit output amplifier back to its own receiver through the AGC. Transmit input data from the terminal is inhibited and is substituted with a V.52 test pattern.
2) This test checks operation of the local modem modulator and demodulator circuitry and should be attempted at both local and remote sites if operators are available.
3) When random errors are present, the TEST PATTERN ERRORS display counts receive errors.
4) If the circuitry is working properly, the front panel indicators show the following:

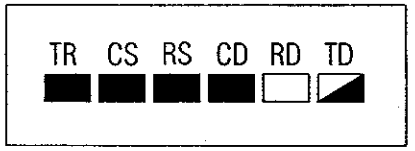


5) Configure the modem for LOCAL ANALOG LOOP to switch the transmitter back to its normal data input.
6) If the transmit data input is in a mark hold condition, both the TD and RD indicators should remain off.
7) If the transmit data input is in a space hold condition, both the TD and RD indicators should come on. All other indicators should remain the same.
8) If the indicators are correct, the modem is probably operating correctly.
9) If the preceding tests were not successful, call Technical Services. Refer to the "Calling Technical Support" section on page 12-2.

Part II

This part determines the performance of the local and remote modems and the telephone circuits. It also determines each modem's ability to receive a transmitted signal from the other site, properly equalize and decode the signal and then loop this regenerated signal into the transmitter for transmission back to the other modem. This test applies to both leased line and dial line operation.

1) Configure the local modem for REMOTE DIGITAL LOOP WITH TEST PATTERN. This signals the remote modem to go into digital loop. The remote modem receives and then retransmits the data back to the local mode. If the digital bilateral loop is enabled at the remote, the remote DTE is looped back to itself.
2) An alternative to the above procedure is to request the operator at the remote modem to configure his modem for LOCAL DIGITAL LOOP. Configure the local modem for TEST PATTERN. The remote modem receives and retransmits the data back to the local modem.
3) The TEST PATTERN ERRORS display will count received errors.
4) At the local modem, the indicators should be as follows:



5) To further test the modem and communications link, reverse the system loopback. First exit the existing loopback test. Reverse the roles of the local and remote modems and repeat step two.

Note
If the bilateral digital loop is enabled at the local modem, the DTE interface is looped to itself and permits the DTE to check the interface circuitry as well as itself.

Appendix E
Command Index and Defaults

General

This reference guide provides asynchronous command characters and their descriptions. The pages listed provide initial information on the commands. The S-registers listed are cross references (see the "Status Registers" section on page E-17).

Note
Bold text indicates command parameter defaults.

Table E-1. Synchronous Command Reference

Command	Page	S-Reg	Description
AT	5-3	--	Attention code - command prefix
A/	5-4	--	Repeat last command
+ + +	5-22	S2, S12	Escape sequence (pause, + + +, pause)
A	5-17	--	Answer
D	5-13, 9-4	--	Dial
Dial Modifiers:			
T	5-14	**S14**	**Tone dial**
P		S14	Pulse dial
,		S8	Long pause (2 sec or S8 value)
W	5-15	S7	Wait for 2nd dial tone (S7 value)
!		--	Flash switchboard
R		--	Switch to answer mode after dialing
;		--	Return to command mode after dialing
@	5-16	--	Wait for 5 seconds of silence
Sn		--	Dial stored command line
E	5-22	S14	Local character echo off
E1		**S14**	**Local character echo on**
† *cannot be executed from remote configuration mode*			

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
H	5-23	--	Hang up †
H1		--	Forces modem off hook †
H2		**S14**	**Set H command to V.32 †**
H3		S14	Set H command to fast †
I	5-24	--	Request product code
I1		--	Request EPROM CRC value
I3		--	Request product version
I4		--	Returns Motorola V.3600
I5		--	Disconnect reason
L, L1, **L2**	5-24	S22	**Speaker volume low**
L3		S22	Speaker volume high
M	5-24	S22	Speaker off
M1		S22	**Speaker off when carrier is present**
M2		S22	Speaker always on
M3		S22	Speaker off when dialing and carrier is present
O	5-25	--	Restore data mode (after escape) †
O1		--	Retrain and restores data mode (after escape) †
Q	5-6	**S14**	**Response displays on**
Q1		S14	Response displays off
Q2		S14	Response displays on in originate mode only
Sn?	10-3	--	Read value in register n (decimal)
Sn?^		--	Read value in register n (hexadecimal)
Sn=v		--	Set v (value) in register n (decimal)
Sn=v^	10-3	--	Set v (value) in register n (hexadecimal)
Sn.#=v	10-4	--	Set single bit value in register n, #= bit position 0-7, v = bit value 1 or 0
V	5-6	S14	Response codes
V1		**S14**	**Response messages**
† *cannot be executed from remote configuration mode*			

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
W	5-6	S82	Negotiation display disabled
W1		**S82**	**Negotiation display enabled**
W2		S82	Displays DCE link rate
X		S22	CONNECT (code 1), for all speeds, no dial tone or busy signal detection
X1		S22	Appropriate connect codes for rate, no dial tone detection
X2		S22	Wait for dial tone (appropriate connect codes)
X3		S22	Detect busy signal (appropriate connect codes)
X4		**S22**	**Wait for dial tone, detect busy signal (appropriate connect codes)**
Y	5-25	S21	Long space disconnect disabled
Y1		**S21**	**Long space disconnect enabled**
Z	5-39	--	Reset to user option set #1 †
Z1		--	Reset to user option set #2 †
&C	5-19	S21	DCD always on
&C1		**S21**	**DCD on while carrier is present**
&C2		S21	DCD off 5 seconds after disconnect
&C3		S21	DCD follows remote RTS
&D	5-20	S21	DTR ignored
&D1		S21	DTR recalls command mode
&D2		**S21**	**DTR disconnects**
&D3	5-20	S21	DTR disconnects and resets modem to stored configuration
&F or **&F1**	5-39	--	**Restore factory configuration 1 †**
&F2		--	Restore factory configuration 2 †
&F3		--	Restore factory configuration 3 †
&F4		--	Restore factory configuration 4 †
&F5		--	Restore factory configuration 5 †
&F6		--	Restore factory configuration 6 †
&F7		--	Restore factory configuration 7 †
&F8		--	Restore factory configuration 8 †
&F9		--	Restore factory configuration 9 †
&G	5-25	**S23**	**No guard tone**
&G1		S23	550 Hz tone
&G2		S23	1800 Hz tone
† *cannot be executed from remote configuration mode*			

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
&L	5-36	**S27**	**Dial line †**
&L1		S27, S32	Leased line 2-wire †
&L2		S27, S32	Leased line 4-wire †
&M	5-25	**S27, S30**	**Asynchronous dial / asynchronous data**
&M1		S27	Asynchronous dial / synchronous data
&M2		S27	Dials stored number when DTR off / on transition is detected / sync data
&M3		S27	Manual dial / sync data
&M4		S30	V.25 bis autodialer with BISYNC protocol / sync data
&M5		S30	V.25 bis autodialer with SDLC protocol /sync data
&M6		S30	V.25 bis async dialer / sync data
&M7		--	V.25 bis async dialer / async data
&M8	5-25	--	V.25 bis async dialer / BISYNC protocol / sync data (EBCDIC)
&M9		--	V.25 bis async dialer / SDLC protocol/ sync data (EBCDIC, NRZ)
&M10		--	V.25 bis async dialer / SDLC protocol/ sync data (ASCII, NRZ1)
&M11		--	V.25 bis async dialer / sync data (EBCDIC, NRZ1)
&P	5-26	**S22**	**39/61 pulse make / break ratio**
&P1		S22	33/67 pulse make / break ratio
&R	5-21	S21	CTS normal operating state
&R1		**S21**	**CTS forced on**
&R2		S72	CTS follows DCD
&R9		S72	CTS equals RTS
&S	5-20	**S21**	**DSR always on**
&S1		S21	DSR on when ready to accept data
&S2		S21	DSR off for 5 seconds after disconnect
&S3		S21	DSR follows off hook (OH)
&T	7-2	--	Terminate current test †
&T1	7-3	--	Initiate analog loopback †
&T3	7-5	--	Initiate digital loopback †

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
&T4	7-5	**S23**	**Grant remote commanded digital loopback †**
&T5		S23	Denies remote commanded digital loopback †
&T6		--	Initiate remote digital loopback †
&T7	7-6	--	Initiate self test remote digital loopback †
&T8	7-4	--	Initiate self test analog loopback †
&V	5-40	--	**View configuration profiles**
&V1	5-40	--	Display received signal status
&V2		--	Display active profile
&W	5-38	--	**Store current configuration to user option set #1**
&W1		--	Store current configuration to user option set #2
&X	5-27	**S27**	**Internal clock**
&X1		S27	External clock
&X2		S27	Receive clock
&Y	5-38	--	**Powerup with user option set #1**
&Y1		--	Powerup with user option set #2
&Y?		--	Display powerup option set
&Zn=x	5-40	--	Store dial string x to location n (n=0-9)
%A	6-6	**S64**	**Disable auto-reliable fallback character**
%An		S64	Set auto-reliable fallback character to n (n = ASCII 1-127) †
%B	5-28	S69	Use DTE speed/maximum DCE speed
%B1		S69	300 bps max
%B2		S69	1200 bps max
%B3		S69	2400 bps max
%B4		S69	4800 bps max
%B5		S69	9600 bps uncoded max
%B6		S69	9600 bps max
%B7		S69	7200 bps max
%B8		S69	12000 bps max
%B9		S69	14400 bps max
%B10		S69	600 bps
%B11		S69	16800 bps max
%B12		S69	19200 bps max

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
%B13	5-28	S69	21600 bps max
%B14		S69	24000 bps max
%B15		S69	26400 bps max
%B16		S69	28800 bps max
%B17		S69	31200 bps max
%B18		**S69**	**33600 bps max**
%C	6-11	S56	Compression disabled
%C1		**S56**	**Compression enabled on transmit and receive data**
%C2		S56	Compression enabled on transmit data only
%C3		S56	Compression enabled on receive data only
%D	6-4	**S62**	**Disable disconnect buffer delay**
%Dn		S62	Set disconnect buffer delay in seconds n (n = 1-255)
%E	5-30	S60	Disable auto retrain
%E1		**S60**	**Enable auto retrain**
%L	5-29	S81	Disabled minimum DCE speed
%L1		**S81**	**Disabled**
%L2		S81	1200 bps min
%L3		S81	2400 bps min
%L4		S81	4800 bps min
%L5		S81	9600 bps uncoded min
%L6		S81	9600 bps min
%L7		S81	7200 bps min
%L8		S81	12000 bps min
%L9		S81	14400 bps min
%L10		S81	600 bps
%L11		S81	16800 bps min
%L12		S81	19200 bps min
%L13		S81	21600 bps min
%L14	5-29	S81	24000 bps min
%L15		S81	26400 bps min
%L16		S81	28800 bps min
%L17		S81	31200 bps min
%L18		S81	33600 bps min
%P1=pw	5-41	--	Set software download password
%P1=D		--	Disable software download
%P1?		--	Display software download password

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
%R	5-30	**S53**	**Disable automatic rate adaption**
%R1		S53	Enable automatic rate adaption low BER
%R2		S53	Enable automatic rate adaption medium BER
%R3		S53	Enable automatic rate adaption using high BER
%T	7-7	--	Transmit test pattern †
%T=	5-43	--	Followed by a remote configuration security code, establishes remote configuration †
%V	5-31	--	Display product revision level
\A	6-10	S63	Maximum block size of 64 characters
\A1		S63	Maximum block size of 128 characters
\A2		S63	Maximum block size of 192 characters
\A3		**S63**	**Maximum block size of 256 characters**
\B	6-11	**S79**	**Transmit a break signal**
\Bn		S79	Sets break length in 20 ms increments, n=1-255, default is 35 (700 ms)
\C	6-11	**S60**	**Disable auto-reliable buffer**
\C1		S60	Buffer data for 4 seconds or 200 characters
\G	6-8	**S54**	**Disable modem port flow control**
\G1		S54	Enable modem port XON/XOFF flow control
\J	6-4	**S72**	**Disable slaved DTE/DCE speed (constant speed DTE on)**
\J1		S72	Enable slaved DTE/DCE speed (constant speed DTE off)
\J2		--	Enable 230.4 kbps DTE speed
\J3		--	Disable 230.4 kbps DTE speed

Note

The 230.4 kbps DTE speed is available, but the DTE will not autobaud to 230.4 kbps. With the modem set for 115.2 kbps, enter AT\J2 to enable the speed, and reset the DTE for 230.4 kbps. When the modem is set for 230.4 kbps, enter AT\J3 to disable it if needed. Reset the DTE for 115.2 kbps.

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
\Kn	6-9	S59	Selects action when encountering a break
\K		S59	Break option 0
\K1		S59	Break option 1
\K2		S59	Break option 2
\K3		S59	Break option 3
\K4		S59	Break option 4
\K5		**S59**	**Break option 5**
\M	6-5	S70	V.42 fast detect data sequence disabled
\M1		**S70**	**V.42 fast detect data sequence enabled**
\N	6-5	S70	Normal mode
\N1		S70	Direct mode
\N2	6-5	S70	MNP only
\N3		S70	MNP or normal
\N4		S70	LAPM only
\N5		S70	LAPM with normal fallback
\N6		S70	LAPM with MNP fallback
\N7		**S70**	**LAPM with MNP and normal fallback**
\Q	6-7	S54	Disable DTE flow control
\Q1		S54	Enable DTE XON/XOFF flow control
\Q2		S54	Enable CTS flow control to the DTE
\Q3		**S54**	**Enables bilateral CTS/RTS flow control**
\Q4		S54	Disable DCE flow control
\Q5		S54	Enable DCE XON/XOFF flow control
\Q6		S54	Enable CTS flow control to the DTE
\Q7		S54	Enable CTS flow control to the DTE
\R	10-18	S60	Ring indicate, blinks for ring and remains on for duration of call
\R1		**S60**	**Ring indicate, blinks for ring and turns off when call is answered**
\T	6-10	**S58**	**Disable inactivity timer**
\Tn		S58	Set inactivity timer to n (n = 1-255 minutes)

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
\V	10-18	**S60**	**Disable protocol result codes**
\V1		S60	Enable protocol result codes
\V2	--	--	Connect DCE rate
\V3	--	--	Connect DCE rate/protocol
\V4	--	--	Connect DCE rx rate/DCE tx rate/ modulation mode/protocol
\X	6-8	**S54**	**No XON/XOFF characters to remote DCE**
\X1		S54	Pass XON/XOFF characters to remote DCE
*AS	5-27	--	Disable V.34 asymmetric bit rate
*AS1		--	Enable V.34 asymmetric bit rate
*AUn	5-16	--	Dial number stored at location n upon transition of DTR in command mode (n = 1-9)
*CNx,n	5-40	--	Store phone number n in location x (x = 1-9)
***DA**	5-32	**--**	**Switches modem to talk mode †**
*DA1		--	Switches modem to data mode †
***DB**	5-36	**S32**	**Manual dial backup operation**
*DB1		S32	Automatic dial backup operation
***DG**	7-7	**S34**	**Disables bilateral digital loop**
*DG1		S34	Enables bilateral digital loop
***FB**	5-22	**S29**	**Ignore pin 23**
*FB1		S29	Pin 23 transition causes DTE speed fallback
***FT**	5-32	**S29**	**Disable fast train**
*FT1		S29	Enable fast train
*IC		--	Disregard incoming call
***LA**	7-8	**S34**	**Ignore pin 18**
*LA1		S34	DTE commanded LAL enabled
*LB	5-36	--	Return to leased line from dial backup†
*LC	5-32	S32	Line current disconnect disabled
*LC1		S32	Short (8 ms) line current disconnect
***LC2**		**S32**	**Long (90 ms) line current disconnect**
*LD	5-36	--	Manual dial backup

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
***MM**	5-27	--	**Automode (modulation)**
*MM1		--	V.21
*MM2		--	Bell 103J
*MM3		--	Reserved
*MM4		--	Bell 212A
*MM5		--	V.22 bis
*MM6		--	V.27 bis 4-wire leased only
*MM7	5-27	--	Reserved
*MM8		--	V.29 4-wire leased only
*MM9		--	Reserved
*MM10		--	V.33 4-wire leased only
*MM11		--	V.32 bis
*MM12		--	V.34
*ND	5-40	--	Displays the nine stored numbers
*NT	5-33	S29	AT command set disabled
***NT1**		**S29**	**AT command set enabled**
***OR**	5-36	**S14**	**Originate**
*OR1		S14	Forced answer
***RC**	5-8	**S57**	**15 - 4800 bps, 18 - 9600 bps**
*RC1		S57	11 - 4800 bps, 12 - 9600 bps
***RD**	7-8	**S34**	**Ignore pin 21**
*RD1		S34	DTE commanded RDL enabled
***RO**	5-41	**S29**	**Retain options at disconnect**
*RO1		S29	Restore options at disconnect
*RR	5-31	--	Rate negotiate to 2400 †
*RR1		--	Rate negotiate to 4800 †
*RR2		--	Rate negotiate to 7200 †
*RR3		--	Rate negotiate to 9600 †
*RR4		--	Rate negotiate to 12000 †
*RR5		--	Rate negotiate to 14400 †
*RR6		--	Rate negotiate to 16800 †
*RR7		--	Rate negotiate to 19200 †
*RR8		--	Rate negotiate to 21600 †
*RR9		--	Rate negotiate to 24000 †
*RR10		--	Rate negotiate to 26400 †
*RR11		--	Rate negotiate to 28800 †
*RR12		--	Rate negotiate to 31200 †
*RR13	5-31	--	Rate negotiate to 33600 †

† *cannot be executed from remote configuration mode*

Table E-1. Synchronous Command Reference (Continued)

Command	Page	S-Reg	Description
*TDn	5-33	S51	Sets dial transmit level -10 to -30 dBm
*TH	5-27	S97	Low V.34 rate selection threshold (10^{-6} BER)
*TH1		S97	Medium V.34 rate selection threshold (10^{-4} BER)
***TH2**		**S97**	**High rate selection threshold (10^{-2} BER)**
*TLn	5-36	S52	Sets leased line transmit level to n where n is a number between 0 and 30 corresponding to 0 to -30 db †
$H	5-32	--	Online quick reference
$H=string		--	Online quick reference for *string*
$V		--	Display product serial number
$Y	5-41	--	Enable soft download flash

† *cannot be executed from remote configuration mode*

Caller ID Commands

Command	Page	S-Reg	Description
***ID**	5-17	--	**Disable Caller ID**
*ID1		--	Enable Caller ID

Distinctive Ring Commands

Command	Page	S-Reg	Description
***DR**	5-18	**S53**	**Disable Distinctive Ring**
*DR=1		S53	Enable Distinctive Ring

Fax Commands

Fax Command	Page	Description
+FCLASS=0	9-6	**Service Class 0 (data modem)** †
+FCLASS=1		Service Class 1 (fax modem) †
+FCLASS?		Display current Service Class setting †
+FCLASS=?		Display available Service Class settings †
+FAA=	9-10	Enables fax auto answer function
*FR		Fax auto answer DTE autobaud forced to >=19200
*FR1		Fax auto answer DTE autobaud forced to =19200
*FR?		Display option status

† *Cannot executed from remote configuration*

Class 1 Commands Valid in Only Fax Mode

Command	Page	Description
+FTH=(MOD)	9-9	Transmit HDLC data with (MOD) carrier *
+FRH=(MOD)	9-9	Receive HDLC data with (MOD) carrier *
+FRM=(MOD)	9-8	Receive data with (MOD) carrier *
+FRS=(Time)	9-7	Waits for silence (10 ms intervals, 0-255) *
+FTM=(MOD)	9-8	Transmit data with (MOD) carrier *
+FTS=(Time)	9-7	Stop transmission and pause (10 ms intervals, 0-255) *

* *cannot be executed from remote configuration*

Command	Page	Description
NOTE: The (MOD) parameter can be one of the following values: 0 or		
Value **Modulation** **Speed**		
3 V.21 channel 300 bps		
24 V.27 ter 2400 bps		
38 V.27 ter 4800 bps		
72 V.29 7200 bps		
73 V.17 7200 bps		
74 V.17 7200 bps with short train		
96 V.29 9600 bps		
97 V.17 9600 bps		
98 V.17 9600 bps with short train		
121 V.17 12000 bps		
122 V.17 12000 bps with short train		
145 V.17 14400 bps		
146 V.17 14400 bps with short train		
+FTx=?	9-9	Check range for values supported where *x* may be M, S, or H. If x is M or H, the modem returns 3, 24, 48, 72, 73, 96, 97, 98, 121, 122, 145, 146. If x is S, the modem returns 0-255.
+FRx=?		
+FCERROR		Carrier different from specified in +FRM or +FRH

Security Commands

Command	Page	Description
Low Security		
$S=x	8-4	Sets an empty password location to x
$C=x,y		Changes either password where x represents the old password and y is the new one
$C=x,-		Deletes password *x* from memory
$DR		Reset security
$D=x		Disables security where x is either password
$D? or $E?		Displays the current status of security
$E=x		Enables security where x is either password
High Security		
$Cn=m	8-9	Set user callback number. n = user number and m = the callback number
$D	8-8	**Disable security**
$E? or $D?	8-10	Display current security status
$EH=pw	8-7	Enable security (pw = superuser password) †
$F= pw$pw	8-10	**Reinitialize security**
$IBn	8-11	Display user information for a block of up to ten valid users (n = first user number)
$In		Display user information (n = user number)
$Ln=m	8-8	Set security level for the user specified by n (m = security level)
$M		Display illegal attempts information
$M*		Reset illegal attempts registers/restore suspended users to normal status
$Mn		Reset illegal attempts registers and restore suspended user n to normal status
$Pn= pw$pw	8-8	Set user password; n = user number and new password (n = 0 for superuser *pw* = password)
$Rn	8-10	Remove a user (n = user number)
$S?	8-11	Display current user status (superuser / user)
†*cannot be executed from remote configuration mode*		

$W0	8-9	Disable user changes (password and callback number) †
$W1		Enable user changes (password and callback number) †
$W2		Enable remote superuser †
$W?		Display user changes remote superuser option status
$$	8-11	Local logoff
$n=pw	8-11 8-12	Local logon (n = user number and pw = password)
$S=pw	8-11	Request to enter superuser status (pw = password)
†*cannot be executed from remote configuration mode*		

Remote Configuration Commands

Command	Page	Description
%P=n	5-42	Set remote configuration security code to value n (0 to 99999999)
%P?		Display local modem remote configuration security code
%P= (blank)		Clear security code
*RA	5-44	Disable remote configuration
***RA1**		**Enable remote configuration**
*RB		Remote configuration DTE speed = 300 bps
*RB1		Remote configuration DTE speed = 600 bps
*RB2		Remote configuration DTE speed = 1200 bps
*RB3		Remote configuration DTE speed = 2400 bps
*RB4		Remote configuration DTE speed = 4800 bps
*RB5		Remote configuration DTE speed = 7200 bps
*RB6		Remote configuration DTE speed = 9600 bps
*RB7	5-44	Remote configuration DTE speed = 12000 bps
*RB8		Remote configuration DTE speed = 14400 bps
*RB9		Remote configuration DTE speed = 16800 bps
*RB10		Remote configuration DTE speed = 19200 bps
*RB11		Remote configuration DTE speed = 21600 bps
*RB12		Remote configuration DTE speed = 24000 bps
*RB13		Remote configuration DTE speed = 26400 bps
*RB14		Remote configuration DTE speed = 28800 bps
*RB15		Remote configuration DTE speed = 28400 bps
*RB16		Remote configuration DTE speed = 57600 bps
*RB17		Remote configuration DTE speed = 115200 bps
*RF	5-44	7 data bits, mark parity, 1 stop bit
*RF1		7 data bits, no parity, 2 stop bits
*RF2		7 data bits, odd parity, 1 stop bit
*RF3		7 data bits, even parity, 1 stop bit
*RF4		8 data bits, mark parity, 1 stop bit
*RF5		8 data bits, no parity, 1 stop bit
*RF6		8 data bits, odd parity, 1 stop bit
*RF7		8 data bits, even parity, 1 stop bit
*RQ	5-45	Exit remote configuration, save new configuration
*RQ1		Exit remote configuration, discard new configuration

Status Registers

S-Reg	RO/ RW	Page	Function	Default Factory Set #1
S0	RW	10-5	Ring to answer	1
S1	RO		Ring count	0
S2	RW		Escape sequence character	43 (+)
S3	RW		End-of-line character	13 (CR)
S4	RW		Line-feed character	10 (LF)
S5	RW	10-5	Backspace character	8 (BS)
S6	RW		Pause before blind dialing	2 (2 sec)
S7	RW		Pause for carrier	30 (30 sec)
S8	RW		Pause for comma	2 (2 sec)
S9	RW		Carrier validation	6 (0.6 sec)
S10	RW		Loss carrier delay time	14 (1.4 sec)
S11	RO	10-6	DTMF tone duration	80 ms
S12	RW		Escape sequence pause	50 (1 sec)
S14	RW	10-8	Bit mapped	8A hex
S16	RO	10-9	System tests	0
S18	RW		Test timer	0
S21	RW	10-10	Bit mapped	B4 hex
S22	RW	10-10	Bit mapped	46 hex
S23	RW		Bit mapped	01 hex
S25	RW	10-11	DTR recognition time	5 (0.5 sec)
S26	RW		RTS/CTS delay	0
S27	RW		Bit mapped	0
S28	RW		Lookback timer	15 min
S29	RW	10-12	Bit mapped	0
S30	RW		V.25 mode selection	0
S32	RW	10-14	Bit mapped	06 hex
S34	RW		Bit mapped	60 hex
S35	RW		Default dial number	1

RO=Read only RW=Read or write

S-Reg	RO/ RW	Page	Function	Default Factory Set #1
S41	RW	10-14	Remote configuration escape character	3d hex
S42	RW		Remote configuration guard time	32 hex
S44	RW		DTE XON character	11 hex
S45	RW		DTE XOFF character	13 hex
S49	RW		DCE XON character	11 hex
S50	RW		DCE XOFF character	13 hex
S51	RW		Dial transmit level	10
S52	RW	10-16	Lease transmit level	0
S53	RW		Bit mapped	0
S54	RW	10-16	Bit mapped	63 hex
S56	RW	10-17	V.42 compression	03 hex
S57	RW		Bit mapped	0
S58	RW		Inactivity timer	0
S59	RW	10-18	MNP break control	5
S60	RW		Bit mapped	5b hex
S61	RO	10-19	DTE word length, parity	18 hex
S62	RW		Disconnect buffer delay	0
S63	RW		Maximum protocol block size	255
S64	RW	10-20	Auto-reliable character	0
S67	RO		Link speed status	0
S69	RW	10-21	Maximum DCE speed	18
S70	RW	10-22	Protocol operating mode	0f hex
S71	RO		Protocol operating mode status	0
S72	RW	10-23	Bit mapped	0
S73	RW		Password timeout security	0
S74	RW		Callback delay	15
S75	RW		Callback retry	0
S76	RW	10-24	Callback retry delay	15
S77	RW		Lockout threshold	0
S78	RW		Autocallback timer	30
S79	RW		Break length	35
S80	RO	10-25	Serial port speed	20
S81	RW	10-26	Minimum DCE rate	1
S82	RW		Bit mapped	0 hex
S84	RO	10-26	Negotiation status	0
S88	RW		Modulation type	0

RO=Read only RW=Read or write

S-Reg	RO/ RW	Page	Function	Default Factory Set #1
S91	RW	10-27	Current modulation	0
S95	RW		V.34 settings	f3 hex
S96	RW	10-28	V.34 settings	a0 hex
S97	RW		Bit mapped	06 hex

RO=Read only RW=Read or write

V.25 bis Dialer Commands

Synchronous Command	Page	Description
CIC	11-8	Connect incoming call command
CRN nn...n	11-5	Dial command (nn...n = number to be dialed)
0 - 9		DTMF and pulse digit
* #		DTMF digit
W		Wait for second type of dial tone
>		Pause for 1 second
=		Pause for 3 seconds
<		Pause for programmed delay time
P		Pulse dial
T		Tone dial
&		Flash (go on hook) for 1/2 second
;		Parameter separator
Space, dash, parentheses, period	11-4	Clarity characters
CRRn	11-8	Redial the last number a maximum of n times
CRSa	11-6	Dial stored number command (a = address)
DIC	11-7	Disregard incoming call command
PRK	11-13	Save current option settings
PRLa;b	11-8	Link number at address a with number at address b
PRNa; nn...n	11-6	Program number command (nn...n = number to be dialed, a = address)
PROxxx;yy;0 ;0...	11-11	Program options command (xxx = register address, yy = option count)
PRPn	11-13	Restores current option settings to the factory defaults in default bank n (1-9)
RLD	11-9	Request list of delayed numbers command (country-specific)
RLL	11-10	Request list of linked numbers command
RLN	11-7	Request list of stored numbers command
RLOxxx;yy	11-14	Request list of stored options command (xxx = register address, yy = option count)
RLV	11-11	Request list of version information command

V.25 Response Messages

Response Message	Meaning
CFIAB	Call failure - answer back tone but no connection
CFICB	Call failure - the delayed call list cannot store any more numbers
CFIDT	Call failure - no dial tone
CFIET	Call failure - reorder or busy
CFILD	Call failure - link list complete
CFINS	Call failure - number not stored
CFINT	Call failure - no answer back tone, no ringback
CFIRT	Call failure - timeout occurred
CNX @ 33600 bps	Intermediate call progress - connection made at 33600
CNX @ 31200 bps	Intermediate call progress - connection made at 31200
CNX @ 28800 bps	Intermediate call progress - connection made at 28800
CNX @ 26400 bps	Intermediate call progress - connection made at 26400
CNX @ 24000 bps	Intermediate call progress - connection made at 24000
CNX @ 21600 bps	Intermediate call progress - connection made at 21600
CNX @ 19200 bps	Intermediate call progress - connection made at 19200
CNX @ 16800 bps	Intermediate call progress - connection made at 16800
CNX @ 14400 bps	Intermediate call progress - connection made at 14400
CNX @ 12000 bps	Intermediate call progress - connection made at 12000
CNX @ 9600 bps	Intermediate call progress - connection made at 9600
CNX @ 7200 bps	Intermediate call progress - connection made at 7200
CNX @ 4800 bps	Intermediate call progress - connection made at 4800
CNX @ 2400 bps	Intermediate call progress - connection made at 2400
CNX @ 1200 bps	Intermediate call progress - connection made at 1200

Response Message	Meaning
DLC;xxx	Delayed call - call attempt to number is delayed for xxx minutes
INC	Incoming ring detected
INVCU	Invalid command - command unknown
INVMS	Invalid command - message syntax error
INVPS	Invalid command - parameter syntax error
INVPV	Invalid command - parameter value error
VAL	Valid command received

Factory Option Sets

Factory Option Set #1

(Asynchronous Dial-up with V.42 bis Protocol) (AT&F or AT&F1)

MODEM OPTIONS
DCE rate - 33600
Modulation automode
V.34 rate threshold high
V.34 asymmetric rate enabled
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Dial line
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol enabled
MNP protocol enabled
Protocol fallback enabled
Data compression normal
Constant DTE speed
DTE flow control RTS
DCE flow control CTS
XON/XOFF pass through disabled
Inactivity timer off
Break control 5
V.42 fast detect enabled

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Async data
DTE rate - 115200
8 bit, no parity
Async controlled dialer
AT command set enabled
DTR disconnects
DSR forced high
DCD normal
CTS forced high
DTE fallback disabled
Options retained at disconnect

Factory Option Set # 2

(Asynchronous Dial-up without V.42 bis Protocol) (AT&F2)

MODEM OPTIONS
DCE rate - 33600
Modulation automode
V.34 rate threshold low *
V.34 asymmetric rate enabled
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Dial line
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Normal buffer mode *
Constant DTE speed
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled *
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Async data
DTE rate - 115200
8 bit, no parity
Async controlled dialer
AT command set enabled
DTR disconnects
DSR forced high
DCD normal
CTS forced high
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set #3

(Synchronous Dial-up) (AT&F3)

MODEM OPTIONS
DCE rate - 33600
Modulation automode
V.34 rate threshold low *
V.34 asymmetric rate disabled *
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Dial line
Jack type RJ11
Line current disconnect long
Long space disconnect disabled *
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Direct buffer mode *
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Sync data *
Dial method manual *
AT command set disabled *
DTR disconnects *
DSR normal *
DCD normal
CTS follows RTS *
RTS/CTS delay 0 ms *
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set # 4

(Synchronous 4-wire Leased Line) (AT&F4)

MODEM OPTIONS
DCE rate - 33600
V.34 modulation *
V.34 rate threshold low *
V.34 asymmetric rate disabled *
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Leased line *
4-wire *
Transmit level - 0 dBm *
Dial backup manual *
Lookback timer - 15 min *
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Direct buffer mode *
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop enabled *
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 60 seconds *
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Sync data *
AT command set disabled *
Ignores DTR *
DSR normal *
DCD normal
CTS follows RTS *
RTS/CTS delay 0 ms *
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set #5

(Asynchronous 4-wire Leased Line with V.42bis Protocol) (AT&F5)

MODEM OPTIONS
DCE rate - 33600
V.34 modulation *
V.34 rate threshold high
V.34 asymmetric rate enabled
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Leased line, 4-wire *
Transmit level - 0 dBm *
Dial backup manual *
Lookback timer - 15 min *
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol enabled
MNP protocol disabled *
Protocol fallback disabled *
Data compression normal
Constant DTE speed
DTE flow control RTS
DCE flow control CTS
XON/XOFF pass through disabled
Inactivity timer off
Break control 5
V.42 fast detect enabled

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Async data
DTE rate - 115200
8 bit, no parity
AT command set enabled
Ignores DTR *
DSR forced high
DCD normal
CTS forced high
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set # 6

(Asynchronous 4-wire Leased Line without V.42 bis Protocol) (AT&F6)

MODEM OPTIONS
DCE rate - 33600
V.34 modulation *
V.34 rate threshold low *
V.34 asymmetric rate enabled
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Leased line, 4-wire *
Transmit level - 0 dBm *
Dial backup manual *
Lookback timer - 15 min *
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Normal buffer mode
Constant DTE speed
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Async data
DTE rate - 115200
8 bit, no parity
AT command set enabled
Ignores DTR *
DSR forced high
DCD normal
CTS forced high
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set # 7

(Synchronous 2-wire Leased Line Normal Originate) (AT&F7)

MODEM OPTIONS
DCE rate - 33600
V.34 modulation *
V.34 rate threshold low *
V.34 asymmetric rate disabled *
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Leased line, 2-wire *
Transmit level - 0 dBm *
Dial backup manual *
Lookback timer - 15 min *
Jack type RJ11
Line current disconnect long
Long space disconnect disabled *
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Direct buffer mode *
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop enabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Sync data *
AT command set disabled *
Ignores DTR *
DSR normal *
DCD normal
CTS follows RTS *
RTS/CTS delay 0 ms *
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set # 8

(Synchronous 2-wire Leased Line Forced Answer) (AT&F8)

MODEM OPTIONS
DCE rate - 33600
V.34 modulation *
V.34 rate threshold low *
V.34 asymmetric rate disabled *
Forced answer *
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Leased line, 2-wire *
Transmit level - 0 dBm*
Dial backup manual *
Lookback timer - 15 min *
Jack type RJ11
Line current disconnect long
Long space disconnect enabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Direct mode *
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop enabled *
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds *
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Sync data *
AT command set disabled *
Ignores DTR *
DSR normal *
DCD normal
CTS follows RTS *
RTS/CST delay 0 ms *
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Factory Option Set #9

(Synchronous V.25bis Dialer) (AT&F9)

MODEM OPTIONS
DCE rate - 33600
Modulation automode
V.34 rate threshold low *
V.34 asymmetric rate disabled *
Normal originate
Fast train disabled
Auto retrain enabled
SQ auto rate disabled
Transmit clock internal
Dial line
Jack type RJ11
Line current disconnect long
Long space disconnect disabled
V.22 guard tone disabled

PROTOCOL OPTIONS
LAPM protocol disabled *
MNP protocol disabled *
Direct mode *
DTE flow control disabled *
DCE flow control disabled *
XON/XOFF pass through disabled
Inactivity timer off
Break control 0 *
V.42 fast detect disabled *

SPEAKER OPTIONS
Volume low
On until carrier detect

TEST OPTIONS
Bilateral digital loop disabled
DTE local test disabled
DTE remote test disabled
Remote commanded test enabled
Test timeout off

DIAL LINE OPTIONS
Tone dial
Auto dial #1
Wait for dial tone
Wait delay 2 seconds
Pause delay 2 seconds
Call timeout 30 seconds
Answer on 1 ring
Autocallback disabled

DTE OPTIONS
Sync data *
V.25 SDLC dialer *
Character type ASCII
SDLC data format NRZ *
DTR disconnect *
DSR normal *
DCD normal *
CTS follows RTS *
RTS/CTS delay 0 ms *
DTE fallback disabled
Options retained at disconnect

*Indicates variation from factory option set #1

Appendix F
ASCII and EBCDIC Characters

Hexadecimal equivalents of binary and decimal numbers are as follows.

Binary	Decimal	Hexadecimal
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F

Hexadecimal Examples:

0101	1011	=5B hex
1001	1101	=9D hex
1110	0010	=E2 hex

The following table lists ASCII decimal, hexadecimal, and equivalent character values, and EBCDIC characters. The table shows only available keyboard symbols. Control keys are shown in the right column of the first table.

ASCII Symbol	Decimal	Hex	EBCDIC	Control Key
(NUL)	0	00	NU (null)	@
(SOH)	1	01	SH (start of header)	A
(STX)	2	02	SX (start of text)	B
(ETX)	3	03	EX (end of text)	C
(EOT)	4	04	PF	D
(ENQ)	5	05	HT (horizontal tab)	E
(ACK)	6	06	LC (lower case)	F
(BEL)	7	07	delete	G
(BS)	8	08	--	H
(HT)	9	09	--	I
(LF)	10	0A	(SMM)	J
(VT)	11	0B	VT (vertical tab)	K
(FF)	12	0C	FF (form feed)	L
(CR)	13	0D	CR (carriage return)	M
(SO)	14	0E	SO (shift out)	N
(SI)	15	0F	SI (shift in)	O
(DLE)	16	10	DL (data link escape)	P
(DC1)	17	11	D1 (device control 1)	Q
(DC2)	18	12	D2 (device control 2)	R
(DC3)	19	13	D3 (device control 3)	S
(DC4)	20	14	RE (restore)	T
(NAK)	21	15	NL (new line)	U
(SYN)	22	16	BS (back space)	V
(ETB)	23	17	IL (light)	W
(CAN)	24	18	CN (cancel)	X
(EM)	25	29	EM (end of message)	Y
(SUB)	26	1A	CC	Z
(ESC)	27	1B	C1 (CU1)	[
(FS)	28	1C	FS (form separator)	\
(GS)	29	1D	GS (group separator)	]
(RS)	30	1E	RS (record separator)	^
(US)	31	1F	US (unit separator)	DEL
(SP)	32	20	DS	--

ASCII Symbol	Decimal	Hex	EBCDIC	Control Key
!	33	21	SS (SOS)	--
"	34	22	--	--
#	35	23	--	--

ASCII Symbol	Decimal	Hex	EBCDIC
$	36	24	CP (bypass)
%	37	25	LF (line feed)
&	38	26	EB (end of block)
'	39	27	EC (escape)
(	40	28	--
)	41	29	--
*	42	2A	SM
+	43	2B	C2 (CU2)
,	44	2C	--
-	45	2D	EQ (enquiry)
.	46	2E	AK (acknowledgment)
/	47	2F	BL (bell)
0	48	30	--
1	49	31	--
2	50	32	SY (sync)
3	51	33	--
4	52	34	PN
5	53	35	--
6	54	36	UC (uppercase)
7	55	37	ET (end of transmission)
8	56	38	--
9	57	39	--
:	58	3A	--
;	59	3B	C3 (CU3)
<	60	3C	D4 (device control 4)
=	61	3D	NK (no acknowledgment)
>	62	3E	--
?	63	3F	SB (substitute)
@	64	40	space
A	65	41	--
B	66	42	--

ASCII Symbol	Decimal	Hex	EBCDIC
C	67	43	--
D	68	44	--
E	69	45	--
F	70	46	--
G	71	47	--
H	72	48	--
I	73	49	¢ (cent)
J	74	4A	. (period)
K	75	4B	< (less than)
L	76	4C	((open parenthesis)
M	77	4D	+ (plus)
N	78	4E	--
O	79	4F	& (ampersand)
P	80	50	--
Q	81	51	--
R	82	52	--
S	83	53	--
T	84	54	(leading pad)
U	85	55	--
V	86	56	--
W	87	57	--
X	88	58	--
Y	89	59	! (exclamation)
Z	90	5A	$ (dollar sign)
[	91	5B	* (asterisk)
\	92	5C	) (close parenthesis)
]	93	5D	; (semicolon)
^	94	5E	^ (caret or ¬)
_	95	5F	--
`	96	60	/ (ACK1)
a	97	61	--
b	98	62	--
c	99	63	--
d	100	64	--
e	101	65	--
f	102	66	--
g	103	67	--
h	104	68	--
i	105	69	--

ASCII Symbol	Decimal	Hex	EBCDIC
j	106	6A	|
k	107	6B	,
l	108	6C	%
m	109	6D	_
n	110	6E	>
o	111	6F	?
p	112	70	ACK0
q	113	71	--
r	114	72	--
s	115	73	--
t	116	74	--
u	117	75	--
v	118	76	--
w	119	77	--
x	120	78	--
y	121	79	` (single quote)
z	122	7A	: (colon)
{	123	7B	# (pound)
|	124	7C	@ (at)
}	125	7D	' (apostrophe)
~	126	7E	= (equal)
DEL	127	7F	" (double quote)
--	128	80	--
--	129	81	a
--	130	82	b
--	131	83	c
--	132	84	d
--	133	85	e
--	134	86	f
--	135	87	g
--	136	88	h
--	137	89	i
--	138	8A	--
--	139	8B	--
--	140	8C	≤ (less than or equal)
--	141	8D	(
--	142	8E	+

ASCII Symbol	Decimal	Hex	EBCDIC
--	143	8F	--
--	144	90	--
--	145	91	j

Decimal	Hex	EBCDIC
146		
147	93	l
148	94	m
149	95	n
150	96	o
151	97	p
152	98	q
153	99	r
154	9A	--
155	9B	--
156	9C	x
157	9D	)
158	9E	±
159	9F	--
160	A0	--
161	A1	~
162	A2	s
163	A3	t
164	A4	u
165	A5	v
166	A6	w
167	A7	x
168	A8	y
169	A9	z
170	AA	--
171	AB	Î
172	AC	È
173	AD	[
174	AE	Š
175	AF	•
176	B0	S0 (SM0)
177	B1	S1 (SM1)

Decimal	Hex	EBCDIC
178	B2	S2 (SM2)
179	B3	S3 (SM3)
180	B4	S4 (SM4)
181	B5	S5 (SM5)
182	B6	S6 (SM6)
183	B7	S7 (SM7)
184	B8	
185	B9	S9 (SM9)
186	BA	--
187	BB	°
188	BC	•
189	BD	] (close bracket)
190	BE	≠ (not equal)
191	BF	--
192	C0	{ (open brace)
193	C1	A
194	C2	B
195	C3	C
196	C4	D
197	C5	E
198	C6	F
199	C7	G
200	C8	H
201	C9	I
202	CA	--
203	CB	--
204	CC	(unprintable character)
205	CD	--
206	CE	(unprintable character)
207	CF	} (close bracket)
208	D0	J
209	D1	K
210	D2	L
211	D3	M
212	D4	N
213	D5	O
214	D6	P
215	D7	Q
216	D8	R
217	D9	--

Decimal	Hex	EBCDIC
218	DA	--
219	DB	--
220	DC	--
221	DD	--
222	DE	--
223	DF	--
224	E0	\ (back slash)
225	E1	--
226	E2	S
227	E3	T
228	E4	U
229	E5	V
230	E6	W
231	E7	X
232	E8	Y
233	E9	Z
234	EA	--
235	EB	--
236	EC	(unprintable character)
237	ED	--
238	EE	--
239	EF	--
240	F0	0
241	F1	1
242	F2	2
243	F3	3
244	F4	4
245	F5	5
246	F6	6
247	F7	7
248	F8	8
249	F9	9
250	FA	!
251	FB	--
252	FC	--
253	FD	--
254	FE	--
255	FF	(trailing pad)

Appendix G
Abbreviations and Acronyms

A

ABT	Abort Timer OR Answer Back Tone
ac	Alternating Current
ACK	Acknowledgment, positive
ACR	Abort Call, Retry
ACU	Automatic Call Unit
ADD	Address Field
ADDR	Address
ASCII	American Standard Code for Information Interchange (7 level)
AT&T	American Telephone and Telegraph

B

BER	Bit Error Rate
BERT	Bit-Error-Rate-Test (set)
BIL LB	Bilateral Loopback
Bit	Binary Digit
bps	Bits Per Second
BSC	Binary Synchronous Communications

C

C	Celsius
CA	Circuit Assurance
CC	Carrier Control
CCITT	International Consultative Committee for Telegraph and Telephone
CD	Carrier Detect
CFICB	Call Failure Indication - Local DCE Busy
CFIDT	Call Failure Indication - No Dial Tone
CFINT	Call Failure Indication - No Answer Back Tone
CFIRT	Call Failure Indication - Ringback Detected
Ch Gnd	Chassis Ground
CIC	Connect Incoming Call
CO	Central Office
COS	Call Originate Status
CR	Carriage Return
CRC	Cyclic Redundancy Check
CRQ	Call Request
CTRL	Control Field
CTS, CS	Clear to Send

D

DAA	Data Access Arrangement (AT&T)
dB, db	Decibel
dc	Direct Current
DCE	Data Communications Equipment (modem)
DCD	Data Carrier Detect
DCPSK	Differentially Coherent Phase-Shift Keying
DIC	Disregard Incoming Call
DIS, DS	Disable
DLE	Data Link Escape
DLO	Data Line Occupied
DMS	Digital Multiplexer System
DOS	Disk Operating System
DPR	Digit Present
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready

E

EBCDIC	Extended Binary-Coded Decimal Interchange Code (8 level)
EIA	Electronic Industries Association
EIA-232C,D	Interface between DTE and Data Interchange Communication Equipment employing serial binary data
EN	Enabled
ENQ	Enquiry
EOA	End of Address

EOM	End of Message
EON	End of Number
EOT	End of Text OR End of Transmission
EPROM	Erasable Programmable Read Only Memory
ER	Error
ESC	Escape Key
ETB	End of Block
ETC	External Transmit Clock
ETX	End of Text
EXT	External

F

FB	Fallback
FCC	Federal Communications Commission
FF	Form Feed
FGND	Frame Ground
FL	Flag
FLL	Fixed loss loop
FM	Frequency Modulation
Fox message	Test message
FSK	Frequency-Shift Keying

H

HDLC	High Level Data Link Control
Hz	Hertz (cycles per second)

I

INC	Incoming Call
IC	Industry Canada
INV	Invalid
INVCU	Invalid Command - Command Unknown
INVMS	Invalid Command - Message Syntax Error
INVPS	Invalid Command - Parameter Syntax Error
INVPV	Invalid Command - Parameter Value Error
I/O	Input / Output
IS	International Standard

K

KBD	Keyboard
kbps	Kilobits per Second

L

LAL	Local Analog Loopback
LAPD	Link Access Protocol - D Channel
LAPM	Link Access Protocol for Modems
LB OPTS	Loopback Options
LCD	Liquid Crystal Display OR Line Current Disconnect
LDL	Local Digital Loopback
LED	Light Emitting Diode
LF	Line Feed
LL	Local Loopback
LO	Line Occupancy
LRC	Longitudinal Redundancy Check
LSD	Long Space Disconnect
LSO	List of Stored Options
LSV	List Version

M

mA	Milliamps
MHz	MegaHertz
Modem	Modulator/Demodulator
MR	Modem Ready
ms	Millisecond

N

NAK	Negative Acknowledgment
NET STAT	Network Status
NRZ	Non Return to Zero
NRZI	Non Return to Zero Inverted
NS	No Signal
NT	Network Termination

O

OH	Off Hook
OS	Out-of-Service

P

PBX	Private Branch Exchange
PC	Personal Computer
pc	Printed circuit (board)

PIW	Power Indication
PN	Pseudo random
PND	Present Next Digit
POTS	Plain Old Telephone Service
PRI	Primary
PRO	Program Option
PROG,	Programmable PR
PROM	Programmable - Read Only Memory
PSK	Phase Shift Keying
PSTN	Public Service Telephone Network
PWI	Power Indication

Q

QAM	Quadrature Amplitude Modulation

R

RAD	Random Access Method
RAL	Remote Analog Loopback
RAM	Random Access Memory
RC	Receive Clock
RCD	Receiver-Carrier Detector
RCV, RCVR	Receiver
RD	Receive Data
RDL	Remote Digital Loopback
RI	Ring Indication
RL	Remote Loopback
RLO	Request List of Stored Options
RLSD	Received Line Signal Detector
RLV	Request List of Version
rms	Root-Mean-Square
RMT LB	Remote Loopback
RNG	Ringback Detection
RO	Receive Only
ROM	Read Only Memory
RT	Remote Terminal
RTS, RS	Request to Send
RX	Receive

S

SD	Send Data
SDLC	Synchronous Data Link Control (IBM)
SGND, SG	Signal Ground
SH	Switch Hook
SNR	Signal / Noise Ratio
SPID	Service Profile Identifier
SQ	Signal Quality
SQM	Signal Quality Monitor
SS	Systems Status
STX	Start of Text
SYN	Synchronization Character

T

TC	Transmit Clock
TD	Transmit Data
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier
TELCO	Telephone Company
TELSET	Telephone Set
TM	Test Mode
TP	Test Pattern
TR	Terminal Ready
TST	Test
TX	Transmit

U

UART	Universal Asynchronous Receiver/Transmitter
USOC	Universal Service Ordering Code

V

V.	CCITT Code Designation
V.24	Definitions of interchange circuits between data terminal equipment and data circuit-terminating equipment (and provisional amendments, May 1977)
Vac	Volts Alternating Current
VAL	Valid
Vdc	Volts Direct Current

X

X.	CCITT Recommendation Designation
XMIT	Transmit
XOFF	Transmitter Off
XON	Transmitter On

Appendix H
Flash Upgrade

Update your V.3600 modem easily using this flash upgrade procedure.

What You Need

- A data communications software package that supports a 57.6 kbps DTE rate and "X modem CRC" protocol
- Flash upgrade file

Look for modem software upgrades on the Web at this address:

http://www.mot.com/networking

Steps For Downloading

IMPORTANT: Do not abort this process, once started!

1) Activate your data communications software package, and set up your DTE for 57.6 kbps.
2) Enter AT.
   You should receive an OK response message.
3) Enter AT%P1=*password (8 digits)*
   For example: AT%P1=12345678
   This entry sets a soft download password. (See the AT command set for further information on the %P commands if needed.)
   You should receive an OK response message.
4) Enter
   AT$Y=password (8 digits)
   For example:
   AT$Y=123456768
   You should receive this response message:
   SOFTLOAD XM86-1
   READY
   This means that your modem is ready to be upgraded.

5) From your terminal software package, send the "flash upgrade file" to the modem. You know the download is working because the LCD displays:
FLASH UPGRADE
IN PROGRESS

Note
Be sure you use the "X modem CRC" protocol.

The modem automatically resets after the upgrade is complete. The process can take several minutes.

One of two messages returns.

DOWNLOAD OK

indicates a successful upgrade.

DOWNLOAD ERROR

indicates a problem with the download.

Enter `ATI3` if you want to verify the latest software update.

Troubleshooting

1) You did not choose the correct download protocol.
Response: Repeat the process.

2) The upgrade flash file is corrupted.
Response: Get a clean file and redo the steps.

3) If all else fails:
Response: See the "Calling Technical Support" section on page 12-2

Appendix I
Country-Specific Parameters

Modems are pre-configured for a country or region of operation. These default options vary by country.

The tables that follow show, for countries or regions with changes, the default parameter option, the available options, and any other country-specific information.

India

Command	Command Name	Default Option	Available Options
ATS0	Ring Count to Answer On	0	0 - 255
ATS6	Blind Dial	4	4
L	Call Time-Out	30	1 - 60
ATS10	DCD Loss Disconnect	14	0 - 255
ATP or ATT	Dial Type	0	0, 1
AT*TD or ATS51	Dial Transmit (Tx) Level	10	0 - 15
	Dial Wait	8	
ATS11	DTMF Tone Length	80	50 - 255
AT&G	Guard Tone	0	0, 1, 2
ATH1	LAL Busy Out	Allowed	
AT*TL or ATS52	Leased-Line Transmit (Tx) Level	0	0 - 15
ATS8	Pause Delay	4	4 - 12
AT&P	Pulse Dial Cycle	0	0, 1
AT\T or ATS58	Terminal Inactivity Timer	0	0 - 255
Other country-specific restrictions:			
(None)			
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**			

Japan

Command	Command Name	Default Option	Available Options
ATS0	Ring Count to Answer On	0	0 - 255
ATS6	Blind Dial	4	4 - 255
L	Call Time-Out	45	1 - 110
ATS10	DCD Loss Disconnect	14	0 - 255
ATP or ATT	Dial Type	0	0, 1
AT*TD or ATS51	Dial Transmit (Tx) Level	15	1 - 15
	Dial Wait	10	
ATS11	DTMF Tone Length	80	50 - 255
AT&G	Guard Tone	0	0, 1, 2
ATH1	LAL Busy Out	Allowed	
AT*TL or ATS52	Leased-Line Transmit (Tx) Level	1	1 - 15
ATS8	Pause Delay	2	2
AT&P	Pulse Dial Cycle	0	0, 1
AT\T or ATS58	Terminal Inactivity Timer	0	0 - 255
Other country-specific restrictions:			
The following dial modifiers are not permitted: , = < >			
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**			

Malaysia

Command	Command Name	Default Option	Available Options
ATS0	Ring Count to Answer On	0	0 - 255
ATS6	Blind Dial	2	0 - 255
ATS7	Call Time-Out	30	0 - 255
ATS10	DCD Loss Disconnect	14	0 - 255
ATP or ATT	Dial Type	0	0, 1
AT*TD or ATS51	Dial Transmit (Tx) Level	10	0 - 15
	Dial Wait	10	
ATS11	DTMF Tone Length	80	50 - 255
AT&G	Guard Tone	0	0, 1, 2
ATH1	LAL Busy Out	Allowed	
AT*TL or ATS52	Leased-Line Transmit (Tx) Level	0	0 - 15
ATS8	Pause Delay	2	0 - 255
AT&P	Pulse Dial Cycle	0	0, 1
AT\T or ATS58	Terminal Inactivity Timer	0	0 - 255
Other country-specific restrictions:			
(None)			
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**			

Universal/International

Command	Command Name	Default Option	Available Options
ATS0	Ring Count to Answer On	0	0 - 255
ATS6	Blind Dial	3	1 - 255
ATS7	Call Time-Out	60	0 - 255
ATS10	DCD Loss Disconnect	15	0 - 255
ATP or ATT	Dial Type	0	0, 1
AT*TD or ATS51	Dial Transmit (Tx) Level	9	0 - 20
	Dial Wait	2	
ATS11	DTMF Tone Length	72	50 - 255
AT&G	Guard Tone	0	0, 1, 2
ATH1	LAL Busy Out	Allowed	
AT*TL or ATS52	Leased-Line Transmit (Tx) Level	0	0 - 20
ATS8	Pause Delay	3	0 - 255
AT&P	Pulse Dial Cycle	1	0, 1
AT\T or ATS58	Terminal Inactivity Timer	0	0 - 255
Other country-specific restrictions:			
(None)			
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**			

U. S. A.

Command	*Command Name*	*Default Option*	*Available Options*
ATS0	Ring Count to Answer On	1	0 - 255
ATS6	Blind Dial	2	1 - 255
ATS7	Call Time-Out	30	0 - 255
ATS10	DCD Loss Disconnect	14	0 - 255
ATP or ATT	Dial Type	0	0, 1
AT*TD or ATS51	Dial Transmit (Tx) Level	10	9 - 30
	Dial Wait	10	
ATS11	DTMF Tone Length	80	50 - 255
AT&G	Guard Tone	0	0, 1, 2
ATH1	LAL Busy Out	Allowed	
AT*TL or ATS52	Leased-Line Transmit (Tx) Level	0	0 - 30
ATS8	Pause Delay	2	0 - 255
AT&P	Pulse Dial Cycle	0	0, 1
AT\T or ATS58	Terminal Inactivity Timer	0	0 - 255
Other country-specific restrictions:			
(None)			
The characters **AT** or **at** precede all commands except: **+++**, **#####**, and **A/**			

Service and Support

Introduction

U.S.A. customers who have questions about Motorola products or services should refer to the following sections. Non-U.S.A. customers should contact their local Motorola subsidiary office or distributor.

Questions About Product Shipment or Technical Assistance

Please call the nearest Motorola representative, or Customer Administration at (800) 544-0062.

To Access the Motorola Internet Web Pages

Additional company and product information can be found on our Internet Web site: **http://www.mot.com/networking**

Comments About the Guide

To help us improve our product documentation, please complete and return the prepaid comment card in this guide.

Motorola Limited Hardware Warranty

Two Year Limited Hardware Warranty

Motorola, Inc. warrants this product against defects in hardware material and workmanship under normal use for two (2) years from the date of original retail purchase. Motorola, at its option, will, at no charge, either repair the product (with new or reconditioned parts), or replace it (with a new or reconditioned product), or refund the purchase price of the product during the warranty period. Repaired/replacement products are warranted for either 90 days or the remainder of the original warranty period, whichever is longer. This warranty extends to the original end-user only.

What This Warranty Does Not Cover

This warranty does not cover: (a) software; (b) installation or service of the product; (c) conditions resulting from consumer damage such as improper maintenance or misuse, abuse, accident or alteration; (d) all plastic surfaces (including screens) and all other exposed parts that are scratched or damaged due to normal use; (e) the operation of our products with equipment not supplied by Motorola; (f) products which have had the serial number removed or made illegible; or (g) products rented to others.

This warranty applies only to hardware products manufactured by or for Motorola and identified by the Motorola trademark, trade name or product identification logo affixed to them.

Refer to the Service and Support section of the User's Guide for service after the warranty expires. No warranty is made as to coverage availability or grade of service provided by the carrier.

General Provisions

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HOW TO USE MOTOROLA'S LIMITED WARRANTY SERVICE

To take advantage of this warranty, you must do the following:

If you are having trouble with your modem, contact Motorola using the appropriate number from the Service and Support section of the User's Guide. If it is determined that your product requires service, you will be issued a Return Materials Authorization ("RMA") number.

- Pack the defective product securely for shipping. Include only the Motorola product or products that are defective.
- This warranty is void if the product is damaged in transit. Insure your shipment.
- Ship the defective product, proof of date of purchase, and the RMA number to the address specified in the Return Materials Authorization.
- Display your RMA number prominently on the outside of the shipping box.
- To ensure prompt service, please include a letter indicating the specific cause for returning the product.

Motorola
20 Cabot Boulevard
Mansfield, Massachusetts 02048

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