Self-mode Technical Reference for

Sportster Message Plus / 56K Message Modem
56K Professional Message Modem

Revision 1.03

Revision History

Date	Description
January 98	**Revision 1.0** Initial release. All information listed in this document are valid as of the version 11.1.18 of the modem code.(ATi7)
May 98	**Revision 1.01** Addition of specific commands for 56K Professional Message modem valid as of the version 12.1.14.(initial) of the modem code. Addition of specific commands for 56K Professional Message modem valid as of the version 12.2.5. (V.90 upgrade) of the modem code. Addition of specific commands for Sportster MessagePlus/56K Message modem valid as of the version 11.2.2 of the modem code.
November 98	**Revision 1.02** Addition of Fax forwarding commands (+MFF / +MFN) for 56K Professional Message modem valid as of the version 14.2.7 of the modem code.
March 99	**Revision 1.03** Addition of new features integrated to the 56K Message modem second generation valid as of the version 14.8.1 of the modem code.

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1. Self-Mode Command Reference

1.1 Introduction

This document specifies the new AT+M commands for the 3Com U.S. Robotics Self-mode, which enables the 3Com U.S. Robotics modems to receive and store fax and voice messages without any support from the computer. The stored messages can be later retrieved by a communication application which supports the Self-Mode Feature or remotely by a dial up connection.

1.2 General Consideration

The Self-mode is controlled only through the RS-232 interface. No manual control is provided. The Self-mode implementation requires to add several new AT commands to the U.S. Robotics AT command set, which consequently have to be supported by a Self-mode enabled communication application.

So far there is no standard governing functionality of a feature, that would be comparable to the Self-Mode.

The format of the added commands has to be selected with in such a way,

1. That it would reflect the proprietary nature of the Self-mode.
2. That it would be intuitive enough to ease the programming of the application command interface,
3. That it would follow currently implemented schemes for fax and voice functions,
4. That it would not conflict with any commands supported by a group of manufacturers,
5. That it would not conflict with any commands included in any standards, and
6. That it would try to avoid above mentioned conflicts in the future.

The format of the Self-mode commands should not use the scheme of the AT# (pound) commands. Although commands based on this scheme, supporting both fax and voice based functions, would be very intuitive, the AT# command set is not under U.S. Robotics' control and it is an open de facto standard subject to change. If the Self-mode commands would be based on the # prefix, the danger of future conflicts with commands with different purpose is high.

The format of the Self-mode commands should not be an extension to the +F command set from the TIA/EIA Class 1 and Class 2 Fax standards, which are supported by virtually every fax enabled modem. Although these standards are well established and settled, they were not meant to support any voice based functions. Also the format choices of any additional +F based commands for the Self-mode would be restricted due to large amount of already existing command codes for the above mentioned fax standards.

The format of the +M commands should not be an extension to the +V command set from the TIA/EIA IS-101 Interim Standard for the same reasons as those against the extension to the +F command set.

The format of the new +M commands should be both intuitive to build on previous experience of the user, flexible to allow for control of complex +M functionality, and protected against possible conflicts with any standardised command schemes.

2. The +M (Plus Message) command scheme.

The basic format of the AT commands under this scheme is:

AT+M<cChar1><cChar2> [= [<iPar1>[,<iPar2>[,<iPar3>[,...[,<iParn>]...]]]]]
where

AT	is the AT command mandatory prefix,
+M	(Plus Message) is a mandatory prefix of a command based on the +M command scheme,
<cChar1><cChar2>	is a two letter alphabetic command mnemonic based on the command's scope,
=	is optional formatting character
iPar1 to iParn	are optional numeric integer parameters.

Example:

1. AT+MCR=4 sets the +M number of Rings before answering in +M Mode to 4.
2. The +M command scheme follows the common use of the # and +F commands, therefore is intuitive for people familiar with those schemes.
3. The +M command flexibility should be sufficient given the option of two mnemonic based alphabetic characters in command's body and the large number of optional command's numeric parameters.

The +M command should be resistant against conflicts with standardised command schemes. The possibly conflicting +F prefix is already standardised and detected reliably by many existing modems. The complex # command scheme is avoided. It should be noted, that Rockwell is currently using the +MS (Select Modulation) command for their single chip modems, but it is used for different purpose and it has different format, which should prevent any possible conflicts in the future. Also there should not be any conflict with any U.S. Robotics AT commands, since all U.S. Robotics modems are fax enabled, and therefore parse the +F prefix reliably. The integrity of the +M command scheme should be also increased by the fact, that the single + command does not exist in the Hayes compatible AT command set, and it will trigger the ERROR response in any modem without the Self-mode enabled.

2.1 New +M Commands

2.2 +M Command Groups

The +M commands can be divided into several groups based on their scope of functionality:

+MC Plus Message Control Group

+ME Plus Message Erase Group

+MF Plus Message Fax Group

+MS Plus Message Status Group

+MT Plus Message Transfer Group

+MV Plus Message Voice Group

2.3 Modem Responses to +M Commands

The +M command response consists of an information string, that can be empty, followed by either a success (CR,LF,"OK",CR,LF) qualifier or a failure (CR,LF,"ERROR",CR,LF) qualifier.

The information string can be formatted for each +M command differently. The qualifier, following the optional information string, is always present.

The information string for the test parameter ? conforms to the TIE/EIA - 592 (Class 2.0 Fax).

2.4 +M Command Description

2.4.1 Plus Message Control Group (+MC)

2.4.1.1 +MCA Plus Message Control Auto-answer

Supported in 56K Professional Message Modem and in 56K Message Modem as of code rev 14.8.1 and above.

Function: Enable/disable the +M Auto-answer feature. This command set a permanent state of the modem. ATZ or AT&Fn will not have any effect on the value of this command.

Syntax: +MCA =<iPar> or

+MCA=?

Parameter:

	0	Disable the +M Auto-answer feature.
	1	Enable the +M Auto-answer feature.
	?	Report the valid range of command parameters.

Information String:

(0,1)	for test parameter ?.
None	for 0 and 1 parameters.

2.4.1.2 +MCA? Plus Message Control Auto-answer Query

Supported in 56K Professional Message Modem and in 56K Message Modem as of code rev 14.8.1 and above.

Function: Report enabled/disabled status of the +M Auto-answer feature.

Syntax: +MCA?

Parameter: None

Information String:

0	+M Auto-answer feature disabled.
1	+M Auto-answer feature enabled.

2.4.1.3 +MCC Plus Message Control Clock

Function: Reset +M clock to 0 days, 0 hours, 0 minutes, 0 seconds. The +M Clock measures time up to 255 days.

After modem's power up, the +M clock is set to 255 days, 255 hours, 255 minutes, 255 seconds. The +M Clock does not roll over, it saturates at 254 days, 24 hours, 0 minutes, 0 seconds instead. The +M clock has to be reset by the +MCC command in order to start running.

Syntax: +MCC

Parameter: None

Information String: None

2.4.1.4 Plus Message Control Clock Use

A real time clock, the +M Clock is implemented in the +M Modem in order to time stamp received messages. The message time stamp is recorded by copying the value of the +M Clock to the message header upon the off hook transition, when an incoming call is answered in +M Mode.

Upon power up the +M clock is in a not initialised state and it is not running. The +M Clock can be reset by an AT command +MCC. The +M Clock reset is required to run the +M clock. The +M clock is running in all modes of the +M Modem.

The +M Clock is capable to measure time interval from 0 seconds to 255 days. The +M Clock tick is 2 seconds. The +M Clock does not roll over, the overflow is indicated by reported time of 254 days, 24 hours, 0 minutes and 0 seconds. The +M Clock time reporting is invoked by an AT command +MCC?.

The +M clock is not battery backed. If the +M modem power cycles, the clock is set to the not initialised state, which then can be used to indicate the occurrence of a power cycle. The not initialised state is indicated by reported time of 255 days, 255 hours, 255 minutes, 255 seconds.

In order to translate the recorded message time stamp value to a meaningful date and time of reception, the DTE application is required to record the actual system time, when the +M Clock is reset by the AT command +MCC. Then the actual date and time of reception of a retrieved message, which is displayed by the application, is computed as the sum of the recorded system date and time and the value of the time stamp of the stored message.

2.4.1.5 +MCC ? Plus Message Control Clock Query

Function: Report current clock setting.

Syntax: +MCC?

Parameter: None

Information String: <days>,<hours>,<minutes>,<seconds>

<days>	Number of expired days (000 - 254) since last +MCC reset, consisting of 3 ASCII digits.
,	Separator, ASCII character 02Ch
<hours>	Number of expired hours (000 - 024) since last +MCC reset, consisting of 3 ASCII digits.
,	Separator, ASCII character 02Ch
<minutes>	Number of expired minutes (000 - 059) since last +MCC reset, consisting of 3 ASCII digits.
,	Separator, ASCII character 02Ch
<seconds>	Number of expired seconds (even numbers 000 - 058) since last +MCC reset, consisting of 3 ASCII digits.

Notes: The clock increment is 2 seconds, therefore number of expired seconds is even.

The response string 255,255,255,255 indicates either missing +M clock initialisation or power cycle occurrence.

The response string 254,024,000,000 indicates a 255 day +M clock overflow.

2.4.1.6 +MCD Plus Message Control Dialup Retrieval

Function: Enable/disable +M Dialup Retrieval Option.

Syntax: +MCD =<iPar> or

+MCD=?

Parameter:

0	Dialup Retrieval Option.
1	Enable the +M Dialup Retrieval Option.
?	Report the valid range of command parameters.

Information String: (0,1) for test parameter ?.

None for 0 and 1 parameters.

2.4.1.7 Plus Message Control Dialup Retrieval Use

When enabled, the user can remotely retrieve the stored voice messages through a dialup connection. A user configurable four digits password called the +M Dialup Retrieval Password (+MCP=ijkl), that has to be entered during a dialup retrieval session using the DTMF tones, protect the access. Sending appropriate DTMF signals as control commands controls the progress of a dialup retrieval session.

Voice retrieval is entered through the call selection, discussed in the reception mode. Once a DTMF digit is detected during call selection, the +M Dialup Password verification is started. The user has three chances to enter the correct +M Dialup Password. If he fails to enter the correct +M Dialup Password, the call is aborted and the modem goes back on hook. If the correct +M Dialup Password is entered, the modem acoustically indicates the number of present Unchecked Messages (new) including the case of no new messages. The user may then enter the DTMF digit. When there are no more voice messages selected for playback, the modem acoustically indicates the end of currently played message and waits for more DTMF tones for a predefined amount of time. The user can either hang up the +M Modem by DTMF digit * or the +M Modem hangs up automatically after a certain is period of time has expired.

Digit	Sportster Message Plus / 56K Message	56K Message (second generation)	56K Professional Message
0	Repeat the acoustic indication of new messages	End of Playback or Record	End of Playback or Record
1	Playback of all Unchecked Messages / Restarts the	Playback of all Unchecked Messages	Playback of all Unchecked Messages
2	Playback of all Stored Messages / Aborts current	Playback of all Stored Messages	Playback of all Stored Messages
3		Next message	Next message
4		(Twice :44) Erase all Fax and Voice Messages	(Twice :44) Erase all Fax and Voice Messages.
5		Enable/Disable Fax Fowarding	Enable/Disable Fax Fowarding (as of code Rev 14.2.7)
6		Restarts the playback of currently played voice message	Restarts the playback of currently played voice message
7		Starts recording Greeting Message	Starts recording Greeting Message
8			
9		Repeat the acoustic indication of new messages count	Repeat the acoustic indication of new messages count
*****	Hang-up	Hang-up	Hang-up
#			

2.4.1.8 +MCD? Plus Message Control Dialup Retrieval Query

Function: Report +M Dialup Retrieval Option status.

Syntax: +MCD?

Parameter: None

Information String: 0 +M Dialup Retrieval Option disabled.

1 +M Dialup Retrieval Option enabled.

2.4.1.9 +MCF Plus Message Control Fax Reception

Function: Enable/disable fax reception and storage in +M Mode. The +M Modem receives and stores fax messages in the +M Memory. If this option is disabled, then no fax messages are received and stored in the +M Mode.

Syntax: +MCF =<iPar> or

+MCF=?

Parameter: 0 Disable the fax reception and storage in +M Mode.

1 Enable the fax reception and storage in +M Mode.

? Report the valid range of command parameters.

Information String: (0,1) for test parameter ?.

None for 0 and 1 parameters.

2.4.1.10 +MCF? Plus Message Control Fax Reception Query

Function: Report status of the fax reception and storage in +M Mode.

Syntax: +MCF?

Parameter: None

Information String: 0 Fax reception and storage in +M Mode disabled.

1 Fax reception and storage in +M Mode enabled.

2.4.1.11 +MCG Plus Message Control Acoustic Ring

Supported in 56K Professional Message Modem only

Function: Enable/disable and relative volume level of the Acoustic Ring.

Syntax: +MCG=<iPar>

Parameter: 0 Disable Acoustic Ring feature.

1 - 255 Enable Acoustic Ring feature with a specific volume level.

? Report the valid range of command parameters.

Information String: (0-255) for test parameter ?.

None for 0 to 255 parameters.

Note 1: The Acoustic Ring volume level is independent of any volume settings used before an incoming ring was detected. In this way it is assured, that the user will not accidentally miss a Acoustic Ring signal, if the volume is set low before an incoming ring has been detected.

Note 2: For driver compatibility reasons the 56K Message Modem (Second generation : code rev 14.8.1 and up) this command is recognized and will be answered by OK but has no effect.

2.4.1.12 +MCG? Plus Message Control Acoustic Ring Query

Supported in 56K Professional Message Modem only

Function: Report status of Acoustic Ring.

Syntax: +MCG?

Parameter: None

Information String:	0	Acoustic Ring Disabled.
	1-255	Acoustic Ring enabled with a specific volume level selected.

2.4.1.13 +MCL Plus Message Control Local

Function: Enable/disable the +M Local Mode or report the range of valid +MCL parameters.

Syntax: +MCL=<iPar> or

+MCL=?

Parameter	0	Disable +M Local Mode.
	1	Enable +M Local Mode.
	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ? if +M Local Mode disabled.
	None	for 0 and 1 parameters.
	None	for test parameter ? if +M Local Mode enabled

Note: There is no OK response qualifier to +MCL=1 command.

2.4.1.14 +MCL? Plus Message Control Local Query

Function: Report current enabled/disabled status of the +M Local Mode.

Syntax: +MCL?

Parameter: None

Information String:	0	+M Local Mode disabled.
	1	+M Local Mode enabled.

Note: There is no OK response qualifier to if +M Local Mode enabled.

2.4.1.15 +MCM Plus Message Control Monitor

Function: Enable/disable +M Call Monitor Option. When enabled, then all audio signals present on the phone line during an answer session in the +M Mode are routed to the external speaker connector in addition to all standard signal routing.

Syntax: +MCM=<iPar> or

+MCM=?

Parameter:	0	Disable the +M Call Monitor Option.
	1	Enable the +M Call Monitor Option.
	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ?.
	None	for 0 and 1 parameters.

2.4.1.16 +MCM? Plus Message Control Monitor Query

Function: Report the enabled/disabled status of the +M Call Monitor Option.

Syntax: +MCM?

Parameter: None

Information String:	0	Monitor Option disabled.
	1	Monitor Option enabled.

2.4.1.17 +MCP Plus Message Control Password

Function: Set up and store the +M Dialup Password. The +M Dialup Password consists of 4 digits.

Syntax: +MCP=<4 digit string> or

+MCP=?

Parameter:	<4 digit string>	Set +M Dialup Password to the string of four digits.
	?	Report the range of valid characters for the +M Dialup Password formatted as in TIA/EIA-592 (Class 2.0 Fax).
Information String:	"(30-39)"	For test parameter ?. ASCII characters from 030h to 039h allowed in the +M Dialup Password.
	None	for <4 digit string>.

2.4.1.18 +MCP? Plus Message Password Query

Function: Report the current setting of the +M Dialup Password.

Syntax: +MCP?

Parameter: None

Information String:	<Four ASCII coded digit string>	if the +M Dialup Password is set up.
	None	if the +M Dialup Password is not set up.

2.4.1.19 +MCR Plus Message Ring Setup

Function: Set up the number of incoming RINGs before answering in the +M Mode.

Syntax: +MCR=<iPar> or

+MCR=?

Parameter:	3	Answer in +M Mode after the third detected ring.
	4	Answer in +M Mode after the fourth detected ring.
	5	Answer in +M Mode after the fifth detected ring.
	6	Answer in +M Mode after the sixth detected ring.
	?	Report the valid range of command parameters.
Information String:	(3-6)	for test parameter ?.
	None	for 3 to 6 parameters.

2.4.1.20 +MCR? Plus Message Ring Setup Query

Function: Report current settings for the number of RINGs before answering in the +M Mode.

Syntax: +MCR?

Parameter: None

Information String:	3	Set to answer in +M Mode after the third detected ring.
	4	Set to answer in +M Mode after the fourth detected ring.

	5	Set to answer in +M Mode after the fifth detected ring.
	6	Set to answer in +M Mode after the sixth detected ring.

2.4.1.21 +MCS Plus Message Control Switch

Supported in Sportster Message Plus and 56K Message Modem only

***NOT supported** in 56K Message Modem with code revision 14.8.1 and above.*

Function: Enable/disable the Self-Mode Feature functionality.

Syntax: +MCS=<iPar> or

+MCS=?

Parameter:	0	Disable the +M functionality.
	1	Enable the +M functionality.
	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ?.
	None	for 0 and 1 parameters.

***Note 1 :** The command ATZ is also supported in +M mode. It is intended to let the "Non-+M-aware" softwares the possibility to use the +M as a regular Voice/Fax modem. It reverts the +M to off-line data command mode (therefore disabling the Self-mode) and loads the &F1 factory profile into the +M's RAM. This command SHOULD NOT be used to disable Self-mode by a "+M-aware" application. +MCS=0 shall preferably be used for this purpose.*

***Note 2** : The 56K Professional Message modem will reply OK to this command for compatibility purposes, but the command will be ignored. The +MCA command should be used instead.*

2.4.1.22 +MCS? Plus Message Control Switch Query

Supported in Sportster Message Plus and 56K Message Modem only

***NOT supported** in 56K Message Modem with code revision 14.8.1 and above.*

Function: Report current enabled/disabled status of the +M Feature's functionality.

Syntax: +MCS?

Parameter:	None	
Information String:	0	Self-Mode Feature functionality disabled.
	1	Self-Mode Feature functionality enabled.

2.4.1.23 +MCT Plus Message tollsaver.

Supported in 56K Professional Message Modem only

Function: When enabled modem will answer after following number of rings if new voice message is present in flash memory.

Syntax: +MCT=<iPar> or

+MCT=?

Parameter:	0	Disable the +M Tollsaver
	1	Enable the +M Tollsaver. With this option Rings to answer with tollsaver = (Rings to answer set by +MCR) - 2

	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ?.
	None	for 0 and 1 parameters.

Note 1 : *This command has been implemented as of the V.90 capable version of the 56K Professional Message modem. .Supervisor revision 12.2.5 and up.*

Note 2 : *This command is not supported in the* French *version of the 56K Professional Message modem..*

2.4.1.24 +MCT Plus Message Tollsaver Query

Supported in 56K Professional Message Modem only

Function:	Report current enabled/disabled status of the +M Tollsaver.	
Syntax:	+MCT?	
Parameter:	None	
Information String:	0	Tollsaver Feature functionality disabled.
	1	Tollsaver Feature functionality enabled.

2.4.1.25 +MCV Plus Message Control Voice Reception

Function:	Enable/disable voice reception and storage in +M Mode. The +M Modem receives and stores voice messages in the +M Memory. If this option is disabled, then no voice messages are received and stored in the +M Mode.	
Syntax:	+MCV=<iPar> or	
	+MCV=?	
Parameter:	0	Disable the voice reception and storage in +M Mode.
	1	Enable the voice reception and storage in +M Mode.
	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ?.
	None	for 0 and 1 parameters.

2.4.1.26 +MCV? Plus Message Control Voice Reception Query

Function:	Report enabled/disabled status of the voice reception and storage in +M Mode	
Syntax:	+MCV?	
Parameter:	None	
Information String:	0	Voice reception and storage in +M Mode disabled.
	1	Voice reception and storage in +M Mode enabled.

2.4.1.27 +MCW Plus Message Control Write Settings

Function:	Store the current settings of the Self-Mode Feature in a non-volatile memory. Then, if a power cycle occurs, the Self-Mode Feature stays enabled and the stored settings are used.	
Syntax:	+MCW	
Parameter:	None	
Information String:	None	

2.4.2 Plus Message Erase Group (+ME)

2.4.2.1 +MEA Plus Message Erase All

Function: Clear the whole +M Flash Memory.

Syntax: +MEA

Parameter: None

Information String: None

2.4.2.2 +MEM Plus Message Erase Messages

Function: Clear the partition of the +M Flash Memory, which contains Stored Messages.

Syntax: +MEM

Parameter: None

Information String: None

2.4.2.3 +MEU Plus Message Erase User Sector

Function: Clear the partition of the +M Flash Memory, which contains the user configurable settings and information.

Syntax: +MEU

Parameter: None

Information String: None

2.4.3 Plus Message Fax Group (+MF)

2.4.3.1 +MFI Plus Message Fax ID String

Function: Set up and store the T.30 compliant +M Fax ID String for fax reception in +M Mode. The +M Fax ID String consists of up to 20 ASCII characters from 020h (space) to 060h (‘), and from 07Bh ({) to 07Eh (~).

Syntax: +MFI=“<+M Fax ID String>“ or
+MFI=?

Parameter:	<+M Fax ID String>	Set +M Fax ID String to the string of up to twenty printable ASCII characters within “.
	?	Report the range of valid characters for the +M Fax ID String, formatted as in TIA/EIA-592 (Class 2.0 Fax) Here for up to twenty printable ASCII characters the response string is “(20-7^E)”
Information String:	“(20-60,7B-7^E)”	for test parameter ?. ASCII characters from 020h to 060h, and from 07Bh to 07Eh allowed in the Fax ID String.
	None	for “<+M Fax ID String>”.

2.4.3.2 +MFI? Plus Message Fax ID String Query

Function: Report the current setting of the local fax ID string.

Syntax: +MFI?

Parameter: None

Information String: "<+M Fax ID String>"

2.4.3.3 +MFF Plus Memory Fax Forwarding Options

Only supported in 56K Professional Message Modem with code revision 14.2.7 and above

Only supported in 56K Message Modem with code revision 14.8.1 and above.

Function: This command changes bitmapped register's settings to turn on and off following features in fax forwarding.

Syntax: +MFF or
+MFF=<iPar> or
+MFF=?

Bit Information

Bit 0	Enables/disables fax forwarding feature. =0 disables the fax forwarding feature =1 enables the fax forwarding feature
Bit 1	Enables/disables blind dialing =0 disables the blind dialing =1 enables the blind dialing.
Bit 2	Enables/disables speaker during the fax forwarding option =0 speaker is turned on during the fax forwarding mode. =1 speaker is turned off during the fax forwarding mode.
Bit 3 to 15	Undefined.

Parameter:

None	Disable the fax forwarding option in SR Mode
0 ,2,4,6	Disable the fax forwarding option in SR Mode.
1	Enable the fax forwarding option in SR Mode with blind dialing disabled and speaker is turned on.
3	Enables the fax forwarding option with blind dialing enabled and speaker is turned on.
5	Enables the fax forwarding option with blind dialing disabled and speaker is turned off.
7	Enables the fax forwarding option with blind dialing enabled and speaker turned off

Response: (0-7) Response to the command test parameter ?.

2.4.3.4 +MFF? Plus Memory Fax Forwarding Option Inquiry

Only supported in 56K Professional Message Modem with code revision 14.2.7 and above.

Only supported in 56K Message Modem with code revision 14.8.1 and above.

Function: Report Enabled/Disabled status of the fax forwarding option in SR Mode

Syntax: +MFF?

Parameter None

Response:

0,2,4,6	Fax Forwarding option disabled.
1,3,5,7	Fax Forwarding option enabled..

2.4.3.5 +MFN Plus Memory Fax Forwarding number

Only supported in 56K Professional Message Modem with code revision 14.2.7 and above.

Only supported in 56K Message Modem with code revision 14.8.1 and above.

Function: Set up and store the Fax Forwarding Number. The Fax Forward Number consists of up to 20 digits. You can also tell dialing mode, Pulse or Tone by adding P or T in front of numbers, like +MFN="P96767311" or +MFN="T3859213."

Syntax: +MFN
+MFN="<Fax number >" or
+MFN=?

Parameter: none Fax forward number is uninitialised

<Fax FWD Number> Sets up to 20 digits of forwarding number.

? Report the valid range of digits.

Response: "(0-9)" Response to the command test parameter ?.

2.4.3.6 +MFN? Plus Memory Fax Forwarding Number Inquiry

Only supported in 56K Professional Message Modem with code revision 14.2.7 and above.

Only supported in 56K Message Modem with code revision 14.8.1 and above.

Function: Report the current fax forwarding number saved in memory.

Syntax: +MFN?

Parameter: None

Response: "<Zero to twenty digits>"

2.4.4 Plus Message Status Group (+MS)

2.4.4.1 +MSI Plus Message Status Query

Function: Generate the +M Information Screen in a user friendly format.

The +MSI command is intended for displaying of the +M Memory information on a terminal screen. The +MSI command is not intended for providing information to the +M Application.

The +M Information Screen contains the administrative information about the Stored Messages.

Syntax: +MSI

Parameter: None

Information String: String of printable ASCII characters. Formatting and content is subject to change.

2.4.4.2 +MSR Plus Message Status Report

Function: Report the status information of the +M Flash Memory and Stored Messages in a computer friendly format.

The +MSR command is intended for providing the +M information to the DTE application.

Syntax: +MSR=<iPar>

Parameter: 0 Report general status of the +M Memory. The data reported are total +M Memory space, percentage of used +M Memory space, number of voice Unreleased Messages, number of voice Stored Messages, number of fax Unreleased Messages, number of fax Stored Messages, presence of +M Outgoing Message and +M Memory Full Messages.

1 to 255 Report message status of the specified Stored Message. The data reported are message index, message type, voice message duration or fax size in pages, message +M status flags, message reception status, message time stamp, message Caller ID, page and address of message beginning in the +M Memory, and the checksum of the information string.

Information String: String of eight ASCII coded 3-digit numbers separated by commas for the parameter 0:

<+M Memory Size>	002 for 2 Mbytes of +M Memory.
,	Separator ASCII 02Ch.
<% of used space>	000 to 100 for percentage of used +M Memory.
,	Separator ASCII 02Ch.
<# of stored voice messages>	000 to 255.
,	Separator ASCII 02Ch.
<# of unreleased voice messages>	000 to 255.
,	Separator ASCII 02Ch.
<# of stored fax messages>	000 to 255.
,	Separator ASCII 02Ch.
<# of unreleased fax messages>	000 to 255.
,	Separator ASCII 02Ch.
<Presence of +M Outgoing Message>	000 for not present, 001 for present.
,	Separator ASCII 02Ch.
<Presence of +M Memory Full Message>	000 for not present, 001 for present.

Example: The string 002,025,003,001,001,000,001,000 signifies a 2 MB +M Memory, where 25 % of the available storage space is used for 3 voice messages and 1 fax message, from which 1 voice message has not been transferred to the DTE yet. The +M Outgoing Message is recorded, the +M Memory Full Message is not present.

A string of twelve ASCII coded 3-digit numbers and one twenty ASCII character string for Fax ID separated by commas for the parameter from 1 to 255, if a message with index equal to the specified parameter exists in the +M Memory.

<Index>	001 to 255	Message index. Same as the +MSR parameter.
,	Separator ASCII 02Ch	
<Type>	000, 001, 002, 003	0 for unidentified, 1 for fax, 2 for voice, 3 for data.
,	Separator ASCII 02Ch	
<Information>	000 to 255	Number of pages for fax, duration in seconds for voice.
,	Separator ASCII 02Ch	
<Attributes>	248, 252, 253, 255	Bit mapped value.

	Bit 0	= 1 : Message Unchecked = 0 : Message Checked
	Bit 1	= 1: Message Unreleased = 0 : Message Released
	Bit 2	= 1 : Message Valid = 0 : Message Erroneous
	Separator ASCII 02Ch	
<Status>	000 to 255	For fax the EIA/TIA-592 +FHS: call termination status code or 3Com manufacturers specific code, if the fax reception in +M Mode was aborted without a received +FHS: response. For voice the terminating DLE code character coded as ASCII 3-digit decimal number, or 255, if the voice reception in +M Mode was terminated without DLE code available.
,	Separator ASCII 02Ch	
<Day>	000 to 254	The number of days from the last +M Clock reset to the start of reception of the message.
	255	+M Clock was not initialised or power cycle in +M Mode occurred.
,	Separator ASCII 02Ch	
<Hour>	000 to 024	The hours section of the message reception time stamp.
	255	+M Clock was not initialised or power cycle in +M Mode occurred.
,	Separator ASCII 02Ch	
<Minute>	000 to 059	The minute section of the message reception time stamp.
	255	+M Clock was not initialised or power cycle in +M Mode occurred.
,	Separator ASCII 02Ch	
<Caller ID>	Twenty ASCII characters	For fax message the 20 character string reported by the +FTI: response. If the reported string is shorter than 20 characters, appropriate number of ACSII 020h (space) characters is added. For voice message a string of 20 ASCII 020h (space) characters.
,	Separator ASCII 02Ch	
<Page>	004 to 063	The offset element of message starting address.
,	Separator ASCII 02Ch	

<Address High>	000 to 127	The high address byte element of message starting address.
,	Separator ASCII 02Ch	
<Address Low>	000 to 255	The low address byte element of message starting address.
,	Separator ASCII 02Ch	
<Checksum>	000 to 255	The simple byte wide checksum, coded as ASCII 3-digit decimal number, of all ASCII characters in the response string from and including the first character of <Index> to and including the Separator after <Address High>.

Example: The string
003,001,003,252,000,001,015,030,(847)676-7010 ,005,089,145,230 is for message number 3, which is a fax with 3 pages, that has been already transferred to the DTE, that was correctly received 1 day, 15 hours and 30 minutes after the latest +M Clock reset (+MCC), from the station with Fax ID (847)676-7010. In the memory dump +MTM the message starts at location 0D991h after all checksum bytes have been discarded (memory dump starts with page 4). The checksum of the response string is 0E6h.

2.4.5 Plus Message Transfer Group (+MT)

2.4.5.1 +MTM Plus Message Transfer Messages

Function: Start transfer of binary data of all messages, that are stored in the +M Memory starting with the lowest +M Memory page #4. When all binary data from the pages, that contain stored messages, is transferred, the modem sends the response qualifier OK. Before each 32kB block of binary data-to-be-transferred, two ASCII coded bytes are transferred, that correspond to a simple byte long checksum of the 32kB block of binary data-to-be-transferred.

If after the transmission of binary data from all pages with stored messages the DTE cannot find a match between a computed checksum of any 32kB block of binary page data and the ASCII coded checksum of that 32kB block of binary data sent from the +M Modem, the DTE can request a retransmission of only the corrupted 32kB block of binary page data by the +MTP command.

Syntax: +MTM

Parameter: None

Information String: If there is at least one stored message in the +M Memory, following string is sent:
<ASCII coded upper nibble of a byte-long checksum of following 32kB of page #4 data>
<ASCII coded lower nibble of a byte-long checksum of following 32kB of page #4 data>
<32kB of page #4 stored message data>
…
<ASCII coded upper nibble of a byte-long checksum of following 32kB of last page data>
<ASCII coded lower nibble of a byte-long checksum of following 32kB of last page data>
<32kB of last page with any stored message data>.

None if there is no stored message in the +M Memory.

2.4.5.2 +MTP Plus Message Transfer Page

Function: Start transfer of binary data stored in a specified 32kB +M Flash Memory page. Before the 32kB block of binary data-to-be-transferred, two ASCII coded bytes are transferred, that correspond to a simple byte long checksum of the 32kB block of binary data-to-be-

sent. Then the 32kB block of binary data from the specified +M Flash Memory page is transferred followed by the OK response qualifier.

+MTP command can be used to obtain the data from the two User Sector pages 0 and 1, that contain the +M Dialup Password, +M Fax ID String, +M Outgoing Message and +M Memory Full Message, that is not part of the data transmitted by the +MTM command.

Syntax: +MTP=<iPar>

Parameter: 0 - 63 Number of the +M Memory page from which the data should be transferred.

Information String: <ASCII coded upper nibble of a byte-long checksum of 32kB of page #n data>
<ASCII coded lower nibble of a byte-long checksum of 32kB of page #n data>
<32kB of page #n data>

2.4.6 Plus Message Voice Group (+MV)

2.4.6.1 +MVC Plus Message Voice Capture Outgoing Message

Function: Capture the subsequent data stream from the DTE and store it in the +M Flash Memory either as the +M Outgoing Message or as the +M Memory Full Message.

The data stream has to be terminated by the DLE ETX sequence. The data stream has to be smaller than the storage space allocated in the +M Memory.

After the +MVC=<iPar> command is issued, the DTE shall wait for a CONNECT response from the +M Modem before the data transfer is commenced.

If no data is received within 5 seconds after the CONNECT response was generated, or if the data stream is interrupted for more than 5 seconds for reasons other than activated transmit flow control, the +M Capture Mode is aborted, all received data is discarded, and the original data is preserved.

If the amount of data sent from the DTE becomes larger than the space allocated in the +M Memory for the specified outgoing message, the +M Capture Mode is aborted, and all received data is discarded, and the original data is preserved.

Syntax: +MVC=<iPar>

Parameter: 0 Capture +M Outgoing Message.

1 Capture +M Memory Full Message.

Information String: None

2.4.6.2 +MVD Plus Message Voice Duration Message

Function: Specify the duration in seconds of the received voice messages.

Syntax: +MVD=<iPar>

Parameter: 0 Do not limit duration of received voice messages.

1 - 254 Limit duration of received voice messages to the number of seconds equal to parameter value.

255 Do not limit duration of received voice messages. Legacy of +M Application with no +MVD support.

Information String: None

2.4.6.3 +MVD? Plus Message Voice Duration Message Query

Function: Report current setting of the received messages' duration.

Syntax: +MVD?

Parameter: None

Information String:
0 Unlimited duration of the received voice messages.
1 - 254 Duration of received voice messages in seconds.
255 Unlimited duration of the received voice messages.

2.4.6.4 +MVP Plus Message Voice Play Message

Function: Play back the specified voice message through the external speaker.

Syntax: +MVP=<iPar>

Parameter:
0 Play +M Outgoing Message.
1 -254 Play the message with index equal to parameter.
255 Play +M Memory Full Message.

Information String: None

2.4.6.5 +MVR Plus Message Voice Record Message

Function: Record the specified +M outgoing message through the internal microphone and store it in the +M Memory. The recording is terminated either by a key press abort, or if the size of the recorded +M message exceeds the space available for its storage in the +M Memory.

Syntax: +MVR=<iPar>

Parameter:
0 Record and store +M Outgoing Message
1 Record and store +M Memory Full Message

Information String: None

3. Flash Memory

The total memory space available for the Self-Mode Feature is 2MB (2097152 bytes). The flash memory space is divided into 32 equally large sectors of 64kB (65536 bytes), that can be individually erased.

The first sector, the User Sector, is used for storage of user configurable data, which are required for +M Options.

The nature of the flash memory requires to allocate one extra sector as a mirror to the User Sector, so the information fields in the User Sector can be updated independently. This extra sector is called the Mirror Sector and is located right after the User Sector.

The remaining 30 sectors, called Data Sectors, are used for storage of the incoming messages. The Data Sectors represent 93.75% of the capacity of the +M Memory.

Table 1 *Partitioning of +M Memory*

Sector Name	Physical Address Range	Stored Data Fields	Field Length
User Sector	000000h - 00FFFFh	+M Outgoing Message +M Memory Full Message +M Fax ID String +M Dialup Retrieval Password Free	8000h 7F00h 0014h 0004h 00E8h
Mirror Sector	010000h - 01FFFFh	Mirror of User Sectors data fields	
Data Sectors	020000h - 1FFFFFh	Variable length messages	

3.1 User Sector

The User Sector holds the data for the +M Dialup Retrieval Password, the +M Fax ID String, the +M Outgoing Message, and the +M Memory Full Message in separate fields.

The +M Outgoing Message is stored in 32768 bytes of contiguous space in the User Sector. This corresponds to approximately 15 seconds of GSM encoded audio signal.

The +M Memory Full Message is stored in 32512 bytes of contiguous space in the User Sector. This corresponds to approximately 15 seconds of GSM encoded audio signal.

1. The +M Fax ID String is stored in 20 bytes of contiguous space.
2. The +M Dialup Retrieval Password is stored in 4 bytes of contiguous space.
3. The remaining 232 bytes are for future additions.

3.2 Mirror Sector

This sector is used when the information in the User Sector is being updated, since every of the separate data fields in the User Sector must be able to be updated independently.

The information in the User Sector is updated in five steps:

1. The Mirror Sector is erased.
2. The new data is written into the respective blank fields in the Mirror Sector.

3. The information from the User Sector is transferred to the Mirror Sector, except of the fields already updated in the Mirror Sector..
4. The User Sector is erased.
5. The information from the Mirror Sector is transferred to the User Sector

It should be noted, that the five steps can take up to twenty seconds to execute.

3.3 Data Sectors

The Data Sectors represent a contiguous memory space of approximately 2MB (1966080 bytes), where the incoming messages are stored.

The Data Sectors are all erased at the same time, no selective erasure is provided for.

4. Format of Messages Stored in the +M Memory

Received messages are stored in form of records, sequentially from the first data sector to the last one. Because the received messages vary in size significantly, they are stored in records of variable size, so the available memory space is used efficiently. To ease the navigation within the +M Memory, each record will contain a fixed size header field with administrative information, and a variable size data field, where the captured message is stored.

4.1 Header Field

The 34 bytes long fixed size Header Field contains main characteristics of the stored message and information related to its management.

Table 2 *Sections in Header Field*

	Parameter Name	**Purpose**	**Size**	**Values**	
0	Message Index	Message reference number	1 byte	0 1-254 255	Invalid Valid Not set
1	Message Type	Type of message data	1 byte	0 1 2 3 4-254 255	Undetermined Fax Voice Data Undetermined Not set
2	Message Information	Information related to specific message type	1 byte	Type fax 0 1-254 255 Type voice 0 1-254 255	Number of pages Undetermined Valid Not set Length in seconds Undetermined Valid Not set
3	Message Attributes	Retrieval related management flags	1 byte	Bit 0 Bit 1 Bit 2-7	H Unreleased L Released H Unchecked L Checked X Not used
4	Reception Status	Status of message reception	1 byte	0 1-254 255	OK ERROR (Code) Not set
 5 6 7	Time Stamp Days Hours Minutes	 Time expired between last +M clock reset and message reception	3 bytes	 0-254,255 0-23,255 0-59,255	 Number of days, uninitialized Number of hours, uninitialized. Number of minutes, uninitialized.
8 27	Sender Fax ID	Fax ID of the received fax message sender	20 bytes	Type Fax Type voice	The string reported by the +FTI: Class 2.0 Fax response. String of 20 ASCII characters 020h (space).
28 29 30	Previous Message	Address of the beginning of previous message	3 bytes	Byte 5 Byte 6 & 7	6-bit page number 15-bit address

31 32 33	Next Message	Address of the beginning of following message	3 bytes	Byte 8 Byte 9 & 10	6-bit page number 15-bit address

Message size can be determined by the subtracting the address of the Next Message Parameter from the value of the Next Message Parameter decreased by two. This does not include the length of Header Field.

4.2 Data Field

The data field contains captured data, which was generated by Modem Software during message reception. The size of the data field is limited only by the available space in the +M Memory.

The captured data format for each fax page within fax messages is formatted according to the ITU-T T.4 recommendation. Refer to this recommendation for more information.

The captured data format for voice messages is formatted according to the ETSI 06.10 GSM specification. The GSM data stream is terminated by the DLE ETX End-of-Stream shielded command. Refer to U.S. Robotics Voice Command Set Technical Reference for more information.

5. Acoustic Beeps

Following signals are transmitted to the phone line in various +M Modes and +M States to inform the caller about the results of the automatic or requested actions of the +M Modem. Each signal has a unique meaning.

Table 3 *Acoustic Beeps*

Name	Meaning	Frequency	Duration
+M Record Start	Voice Recording Started of a +M outgoing messages.	None 900 Hz 960 Hz 1080 Hz	200 ms 200 ms 200 ms 200 ms
+M Record End	Voice Recording Ended of a +M outgoing message.	None 1080 Hz 960 Hz 900 Hz	200 ms 200 ms 200 ms 200 ms
+M Error	Incorrect action was performed.	None 720 & 765 Hz	200 ms 1500 ms
+M Unchecked Voice Message	One unchecked voice message stored in the +M memory. The beep is repeated for each unchecked voice message.	None 1260 Hz	200 ms 200 ms
+M No Unchecked Messages	There is no unchecked message in the +M Memory.	None 1260 Hz	200ms 1000 ms
+M Playback End	The playback of current message finished.	None 1000 Hz	200 ms 100 ms
+M Hang Up	Modem is hanging up.	None 1000 Hz	200ms 2000ms
+M No Voice Reception	The incoming voice message cannot be received.	None 720 & 765 Hz	200ms 800 ms
+M Voice Reception Start	Started recording the incoming message.	None 1000 Hz	200 ms 400 ms

6. +M LED Display

6.1 Sportster Message Plus / 56K Message (First Generation)

The ARQ/FAX LED is used to indicate +M Modem's functionality. A dual color LED is used. If Self-mode is disabled, LED will be red and the functionality described in the User's Manual will occur. If the Self-mode is enabled the LED will be green. The LED will be solid green if there are no unreleased messages present in the memory. The ARQ/FAX LED will blink once slowly for each new message and will blink fast if the memory is full. The state of the +M LED always reflects the current state of the +M Memory when the Self-mode is enabled.

6.2 56K Message (Second Generation)

This version bring a new layout of the LED's and uses now 2 LED to indicate self-mode status (similarily to the 56K Professional Message.

6.2.1 MEM

This LED is used to indicate +M Modem's functionality. If Self-mode is disabled, LED will be off, . If the Self-mode is enabled the LED will be steady red and will blink fast if the memory is full

6.2.2 MSG

Blinks red for any new fax received. and Blinks green for any new voice message received. One blink per message. If you received 2 voice message and 1 fax, the LED will blink twice green and once red.
Steady amber when all messages have been retrieved or checked.
The steady amber state is intended to warn the user that portions of the memory are being used by messages already retrieved or checked.
IMPORTANT :
An unsuccessful call will ALSO turn the MSG led to amber even if the memory of the modem seems empty.
The type of unsuccessful calls can be :
⇒ The calling party hanged up during the greeting message.
⇒ A fax call was received while your modem was configured for Voice only mode.
⇒ A voice call was received while your modem was configured for fax only mode.
These events use a small amount of memory each time they occur and therefore turn the MSG led to amber.
Generally, you cannot retrieve these « false » messages.

6.3 56K Professional Message

6.3.1 PWR / MEM

This LED is used to indicate +M Modem's functionality. A dual color LED is used. If Self-mode is disabled, LED will be red, . If the Self-mode is enabled the LED will be steady green and message and will blink fast if the memory is full.

6.3.2 MSG

6.3.2.1 Initial behaviour

Blinks red for any new fax received. and Blinks green for any new voice message received. One blink per message. If you received 2 voice message and 1 fax, the LED will blink twice green and once red.

6.3.2.2 As of the V.90 code release (SV Rev : 12.2.5 and up) :

Steady amber when all messages have been retrieved or checked.
The steady amber state is intended to warn the user that portions of the memory are being used by messages already retrieved or checked.
IMPORTANT :

An unsuccessful call will ALSO turn the MSG led to amber even if the memory of the modem seems empty.
The type of unsuccessful calls can be :

⇒ The calling party hanged up during the greeting message.

⇒ A fax call was received while your modem was configured for Voice only mode.

⇒ A voice call was received while your modem was configured for fax only mode.

These events use a small amount of memory each time they occur and therefore turn the MSG led to amber.
Generally, you cannot retrieve these « false » messages.
To turn the MSG led off, simply erase the modem's memory using your supplied software application or the DEL button.

7. +M Buttons

7.1 Sportster Message Plus / 56K Message

As of the code revision 11.2.2 and up, the ability to listen to voice messages without the need to power-up the computer has been implemented. This function works with the Volume Up and Volume Down buttons and while the modem is in Self-Mode (+MCS=1)

Depressing Volume Up and Volume Down	Enter Playback mode and Playback first message / Exit Playback mode.
Depressing Volume Up	Play next message.
Depressing Volume Down	Play previous message.

7.2 56K Professional Message

7.2.1 General considerations about the buttons.

The philosophy of the product is always to give priority to the front panel button , therefore it requires a mechanism to « warn » the application that the button are used and in such a way that this would work for +M application or non-+M applications.

This is achieved by lowering DSR and CTS at the same time. Those signals will be lowered as soon as a button is pressed and will remain low as long as the action triggered by the button is not completed. This behaviour applies to all buttons but the volume buttons.

7.2.2 Disabling the buttons

This command is primarily intended for the non-+M applications that provide a specific driver for the 56K Professional Message Modem to be able to disable the button while it operates, or add this command to existing drivers. *This command has been implemented as of the V.90 capable version of the 56K Professional Message modem. Supervisor revision 12.2.5 and up.*

7.2.2.1 +MCB Plus Message Buttons.

Function:	Enable/disable all but the volume buttons.	
Syntax:	+MCB=<iPar>	or
	+MCB=?	
Parameter:	0	disables all but volume buttons
	1	enables all the buttons
	?	Report the valid range of command parameters.
Information String:	(0,1)	for test parameter ?.
	None	for 0 and 1 parameters.

7.2.2.2 +MCB Plus Message Buttons Query

Function:	Report current enabled/disabled status of the +M Buttons.	
Syntax:	+MCB?	
Parameter:	None	
Information String:	0	All but volume buttons disabled.

1 All buttons enabled.