Atrie 288LCD
MODEM
User's Manual

Atrie

288LCD

MODEM

USER'S MANUAL

ATRIE TECHNOLOGY INC.

ATRIE
336/288/144LCD
MODEM

USER'S MANUAL
(Version 4)

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NOTICE

This user's manual is written for both V.34 and V.32bis standalone models. It is mainly written for the V.34 standalone modems. There are ***REMARK***s to describe the specified model, please skip these sections that describe the different models.

The modem optionally provide Voice and AutoSync functions, there are sections and commands that describe the Voice or AutoSync functions. If you do NOT purchase these functions, please skip these sections.

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CHAPTER 1

INTRODUCTION

Overview

The V.34 modem is a high speed Hayes Compatible DATA/FAX/ VOICE modem which can be used with various types of computers and terminals. The VOICE function is designed to be optional. It meets to the BELL 103/212A standards and ITU-T V.21, V.22, V.23, V.22bis, V.32, V.32bis, V.FC, V.34, V.25bis, V.24, V.25, V.28, V.54, V.8, V.13, V.42 and V.42bis recommendations and also equips with the Microcom Networking Protocol (MNP) Class 2 to 5 and 10 services. The modem optionally supports the Hayes AutoSync to provide synchronous communication capabilities from an asynchronous terminal or computer. It can be instructed via the Hayes AT command set to automatically dial or answer calls, and to perform MNP Class 4/5 services or ITU-T V.42/V.42bis recommendations. It can also be instructed via ITU-T V.25bis command to perform auto-dial or auto-answer functions. The effective throughput of full duplex asynchronous communication can be up to 115200bps and also the modem can support the ITU-T V.8, multi-mode handshake recommendation.

It supports two wire full duplex dial up line and two wire full duplex leased line, four wire full duplex leased line with dial back up operation. These line types can be activated via AT command, or front panel LCD controller to perform auto, manual and power on connect functions. It can meet most application requirements.

The V.34 modem can operate in both the asynchronous and synchronous modes and provide 100% error-free data transmission and data compression with auto-dial, redial, auto-answer and full call progress monitoring functions. Moreover, it supports dynamic packet size adjustment to ensure optimum data throughput and MNP10 to ensure the best performance while

using cellular phone system.

Modem Features

· Compatible with BELL 103, 212A standards and ITU-T V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, V.FC, V.42, V.42bis, V.24, V.25, V.25bis, V.28, V.54, V.8, V.13 recommendations.

· Provides Hayes AT command set with programmable S registers.

· Provides ITU-T V.25bis auto-answer, auto-dial recommendation.

· User friendly 16*2 characters LCD controller for full functions control and real time status display.

· Supports ITU-T V.42/V.42bis error correction and data compression recommendations.

· Supports Microcom Networking Protocol (MNP) Class 4/5 data compression protocol.

· Provides ITU-T V.8 and Multi-mode handshake according to ITU-T recommendation.

· Utilizes full duplex asynchronous transmission with a maximum effective throughput of 115200bps.

· Provides 100% error-free data transmission.

· Supports dynamic packet size adjustment to optimize data throughput.

· Provides 2 wire full duplex dial up line, 2 wire full duplex leased line and 4 wire leased line with dial backup operation.

· Asynchronous and synchronous operation selectable on both front panel LCD controller or AT command.

· Provides manual dial , manual answer, auto-dial, auto-answer, redial, and full call progress monitoring functions.

· Provides Microcom Networking Protocol (MNP) Class 10 to ensure best performance during Cellular Phone communication.

· Supports GIII Fax with EIA Class 1 and Class 2 command and ITU-T V.17, V.26bis, V.27ter, V.29.

· Optionally provides Voice and AutoSync function.

REMARK: V.32bis Modem Function

The maximum DTE speed can only be up to 57600bps for V.32bis modem. The maximum DCE speed can only be up to 14400bps for V.32bis modem. And do NOT support the ITU-T V.8, V.FC, V.34 and MNP10 Recommendations.

CHAPTER 2

INSTALLATION

Package Contents

Carefully unpack the product package that you have received. The following is a checklist of the package:

· The modem
· A modem power cable
· Two telephone cables and one terminal box for RJ-45
· Modem manual : 33600/28800/14400bps Modem User's Manual
· Quick reference guide : LCD MENU TREE

If there is any wrong, missing or damaged part, please contact your dealer.

Modem Panel Description

Modem Front Panel

The standalone modemís front panel contains LCD display, LEDs and front panel switches, describe below:

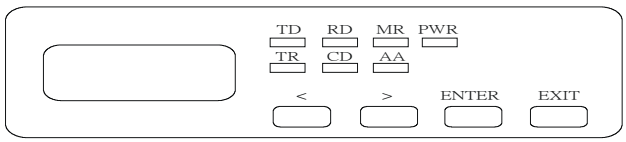

Figure 2-1 V.34/V.32bis Modem Front Panel

The standalone modem's front panel contains one 16*2 characters LCD display, seven LED indicators and four push-button switches (see Figure 2-1). The LCD display serves to display and configure the status, LED indicators serve to display the current operating status and these push button switches serve to configure the LCD controller

. The following sections describe the functions of the LCD display, LED indicators and the push-button switches:

LCD Display

There is a 16*2 characters LCD display on the left hand side of the front panel. This user friendly LCD display shows the status and configuration informations of the modem. Details on the menu tree of the LCD display are on Appendix A.

Use the front panel switches and the LCD display to configure or display the modemís status. All the commands and settings can be achieved by the LCD controller.

There are three kinds of screens on the LCD display, describe below:

1. Main Screen:

This screen shows the main status of the modem. It contains 9 fields (see Figure 2-2), describes below:

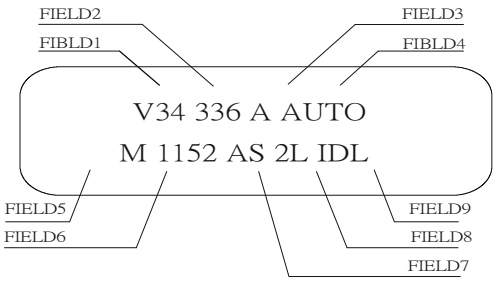

Figure 2-2 V.34 Main Screen

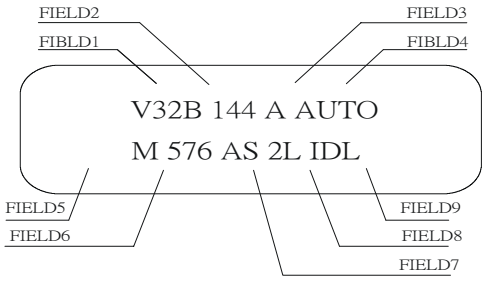

Figure 2-3 V.32bis Main Screen

Field 1

The Carrier Field. This field shows the DCE carrier protocol. The contents of this field are:

Display	Description
V21	ITU-T V.21 300bps
V22	ITU-T V.22 1200bps
V23	ITU-T V.23 1200/75bps
V22B	ITU-T V.22bis 2400bps
V32	ITU-T V.32 9600bps
V32B	ITU-T V.32bis 14400bps
V34	ITU-T V.34 33600bps
B103	BELL 103 300bps
B212	BELL 212A 1200bps

*The V.32bis modem does not support the ITU-T V.34 Recommendation.

Field 2

The DCE Speed Field. This field shows the transmit speed of the telephone line. The content of this field are:

Display	Description
3	DCE Speed 300bps
6	DCE Speed 600bps
12	DCE Speed 1200bps or 1200/75bps
1275	DCE Speed 1200/75bps
7512	DCE Speed 75/1200bps
24	DCE Speed 2400bps
48	DCE Speed 4800bps
72	DCE Speed 7200bps
96	DCE Speed 9600bps
120	DCE Speed 12000bps
144	DCE Speed 14400bps
168	DCE Speed 16800bps
192	DCE Speed 19200bps
216	DCE Speed 21600bps
240	DCE Speed 24000bps

288	DCE Speed 28800bps
312	DCE Speed 31200bps
336	DCE Speed 33600bps

*1275 and 7512 are 1200/75bps and 75/1200bps for ITU-T V.23 only.
*The maximum DCE Speed can only be up to 14400bps for V.32bis modem.

Field 3

The O/A Field. This field shows the originate or answer mode of the modem. The "O" in this field represents the originate mode and the "A" represents the answer mode.

Field 4

The Protocol Field. This field shows the error correction and data compression protocols while connected. The content of this field is:

Display	Description
AUTO	The modem is not connected and set to Auto mode
V42B	The modem is set to or connected to V.42bis
LAPM	The modem is set to or connected to V.42, LAPM
MNP5	The modem is set to or connected to MNP5
MNP4	The modem is set to or connected to MNP4
MNP10	The modem is set to or connected to MNP10
DIRECT	The modem is set to or connected to DIRECT mode
NORML	The modem is set to or connected to NORMAL mode

*The V.32bis modem does not support the MNP10 Recommendation.

Field 5

The Menu Field. This field shows the active motion that the "ENTER" key been pressed. All the other fields are status display fields, except this field. Pressing the "LEFT" or "RIGHT" key will change the content of this field. The content of this field is:

Display	Description
M	Enter Control Menu
O	Enter Originate Mode
A	Enter Answer Mode
D	Enter Dial Mode
R	Enter Redial Mode
H	Enter Hangup Mode

Field 6

The DTE Speed Field. This field shows current DTE speed that is communicating with terminal or computer. The contents of this field are:

Display	DTE Speed
3	300bps
6	600bps
12	1200bps
24	2400bps
48	4800bps
72	7200bps
96	9600bps
120	12000bps
144	14400bps
168	16800bps
192	19200bps
216	21600bps
240	24000bps
264	26400bps
288	28800bps
312	31200bps
336	33600bps
384	38400bps
576	57600bps
768	76800bps
1152	115200bps

*The maximum DTE speed can only be up to 57600bps for V.32bis

modem.

Field 7

The Sync./Async. Field. This field shows the synchronous or a synchronous operation. If the display is "AS", indicates the modem is operates in asynchronous mode; if "SY", indicates the modem is in synchronous operation mode.

Field 8

The Line Type Field. This field shows the telephone line type that the modem is using. The contents of this field are:

Display	Description
2D	2-wire dialup line
2L	2-wire leased line
4L	4-wire leased line
DB	Dial-Backup

Field 9

The Status Field. This field shows the active status of the modem. The contents of this field are described below:

Display	Description
IDL	The modem is idle now
TST	The modem is in testing mode
CNT	The modem is connecting to remote modem
RTN	The modem is retraining now
HNG	The modem is handshaking now
RNG	Ring signal is detected by the modem

2. Testing Screen

When entering the diagnostic mode, the modem shows the testing screen. There are two testing screens, depending on the test pattern. If you entering the diagnostic mode without test pattern, the testing screen will be as below:

Figure 2-4 Testing Screen

Please use the "EXIT" key to end the test, all the other switches are ignored during this screen.

If you entering the diagnostic mode with test pattern, the testing screen will be as below:

Figure 2-5 Testing Screen

When entering this screen, the modem will display the BIT ERROR COUNT on the EC field; the LOSS SYNC. COUNT on the LC field. Press the "LEFT" or "RIGHT" key will insert one error on EC field. Press the "ENTER" key to reset the EC and LC counter. To end the test, please press the "EXIT" key.

3. Menu Screen

If the Field 5 of the main screen is in îMî and press the "ENTER" key , the modem is in the MENU mode, and shows the screen like below:

Figure 2-6 Protocol Main Menu

Each menu screen controls one or some functions, press the "ENTER" key to enter that menu and "EXIT" to exit; "LEFT" or "RIGHT" key to change menu. For detail about menu tree, please refer to

Appendix A.

LED Indicators

There are seven LED indicator on the front panel. These LED indicators display the modemís status. It help the user to understand the status of the modem . The detail functions are described below:

TD (Transmit Data)
Flashes when your local DTE (Data Terminal Equipment) transmits data into the serial port of the modem.

RD (Receive Data)
Flashes when the local DTE receives data from the modem.

MR (Modem Ready Indicator)
This LED indicator indicates that the modem is ready for operation. This means that the microprocessor is working.

PWR (Power Indicator)
Lights up when the power is applied to the modem.

TR (Terminal Ready)
Lights up when the modem receive DTR(Data Terminal Ready) signal, which indicates that the computer or terminal is ready.

CD (Carrier Detected)
Lights up when carrier signal from a remote modem is detected.

AA (Auto Answer)
Lights up when auto answer enabled and flashes on the condition of receiving ring signal.

Front Panel Switches

There are four switches on the right hand side of the front panel. These switches are used to configure the LCD controller. It contains keyboard repeat function in a repeat rate of approximately 6 times

per second. The functions of the switches are described below:

Left: This switch scrolls the LCD menu to the left.

Right: This switch scrolls the LCD menu to the right.

ENTER:

This switch is chosen to enter the next level menu. If you are in the last level menu, you can use this switch to execute the command or change the setting of the particular configuration.

EXIT:

This switch is chosen to exit to the previous menu. If you are in the last menu, you can use this switch to abort executing the command, return to the previous menu or not changing the setting of the particular configuration. If in the main screen, press this switch once will display the model and version information.

Modem Rear Panel

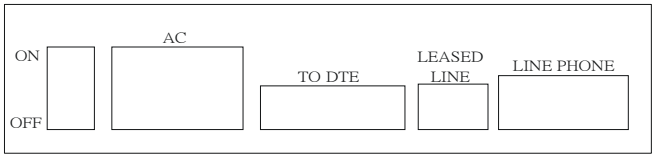

Figure 2-7 Modem Rear Panel (AC power)

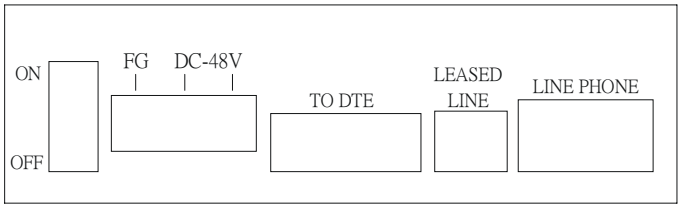

Figure 2-8 Modem Rear Panel (DC power)

The modem's rear panel contents one power switch, one power socket, one serial port (RS-232C) connector, one RJ-45 telephone jack and two RJ-11 telephone jacks. The following sections briefly describe

the functions of each part:

Power Switch:

The power switch controls the whole power of the modem. Turn the switch to "OFF" position will turn off the modem. You can also use this switch to perform power on reset and initiate the modem using an ON-OFF-ON transient.

Power Socket (AC):

The power socket is for the power cable that connects the modem to a power source. The modem comes with an AC power cable. You can use this power cable to connect the modem to the wall outlet of power source.

Power Socket (DC):

For the DC power option, there is a terminator on the rear panel. Please connect the FG to the framing ground of the power source. Connect the DC -48V to the DC power supply. The input range is from DC 35V to 73V and the connection is polarity free.

RS-232C Serial Port:

The serial port is a female DB25 connector for the RS-232C cable. This connects your modem to your local computer or terminal.

Leased Line:
This RJ-45 jack allows user to connect the 2-wire or 4-wire leased line to the modem. There are 8 contacts inside the RJ-45 connector, pleased use the pin number 4 and 5 to connect the 2-wire leased line; use the pin number 4 and 5 to connect the 4-wire transmit pair and pin number 3 and 6 to connect the 4-wire receive pair.

Line:
This RJ-11 jack allows user to connect the telephone line to the modem.

Phone:
This RJ-11 jack allows user to connect a telephone set to the modem.

Modem Installation

Installing Your Modem

1. **Look for a location for the modem.**

   A suitable location for the modem is one that is near the power outlet and close to the telephone line and your computer. It should be placed on a sturdy level surface where there is enough space for unimpeded operation.

2. **Check the modem's settings.**

   You must check the modem carefully to make sure that all the configurations are in default setting. Please refer to the sections on this manual for details on the modemís settings.

3. **Connect the modem to the telephone line.**

   The modem has two RJ-11 connectors marked "LINE" and "PHONE". The connector marked "LINE" is connected to the PSTN telephone line while the connector marked "PHONE" is connected to the telephone set. To do this, simply plug the telephone line from the wall outlet directly into the "LINE" connector on the modem , and use another telephone cable to connect the telephone set and the "PHONE" connector.

   If you are using the leased line, please connect the leased line to the jack marked "LEASED LINE". Please refer to the "Modem Rear Panel" section before for detail connection information.

4. **Connect the modem to the computer.**

   Your modem provides a 25pin RS-232C serial port connector which

is used to connect the modem to any of the serial ports on your computer or terminal. Please make sure that the computer or terminal has been turned off before you connect the modem with it.

5. Connect the modem to the power source.

Make sure the power switch of the modem is in îOFFî position and plug the power cable to the power socket of your modem. Plug the other end of the power cable into the power source.

Installation Check

Turn the power switch to "ON" position. Check the modemís front panel to determine its current operating state. The front panel LCD display will show power on self-test screens. If there is no problem with the installation, the modem will automatically enter the main menu when you turn on the power with factory default. Press the "LEFT" or "RIGHT" key, you will find the field 5 changed from M to D, A, R or H.

Another way to check if your modem has been properly installed is to use a proper communication software in terminal emulation mode to input the following commands from your computer or terminal to the modem:

<Enter>
ATZ <Enter>

If your modem is functioning properly, it will respond with the mess age "OK". However, If this message fails to appear, turn off your modem and computer or terminal, and check all the steps detailed in section "Installing Your Modem". When you are certain that the modem is correctly installed, repeat the procedure listed above. If the modem still do NOT response, please contact your dealer.

CHAPTER 3

MORE ABOUT THE MODEM

This chapter describes a few concept about the modem, the user should read this chapter carefully to avoid miss understanding or confusing about the modem's function.

The Modem Mode

The modem has three basic modes: the command mode, data mode and escape mode. In the command mode you can enter command to the modem to set registers, parameters and carry out a variety of dialing and control functions. Details about commands are given in Chapter 4.

In the data mode, you can transmit and receive data over the telephone line to another remote modem.

The data mode can be further subdivided into three modes. The first is the originate mode under which the modem originates a call; the second is the answer mode, under which the modem answers the incoming call. The third is the self-diagnostic mode, under which the transmitted data is looped back through the modem, allowing evaluation of the modemís performance and line condition.

When the modem is in data mode, if you issue the escape character (defined in S register 2) three times with the guard time (defined in S register 12), the modem will enter escape mode. In the escape mode, the modem will not drop the line but entering the command mode. Any characters that coming from the DTE will be treated as command rather than data and will be executed after "ENTER" character has been received. But some of the AT commands can not be executed during the escape mode, such as ATDn, ATA, AT&Wn etc.

The Modem Port and Serial Port

Modem port means data link between two modems, serial port means data link between computer or terminal (DTE) and modem (DCE). The modem port and serial port of the modem are independent. There are buffers between modem and serial ports, so different speeds are possible. The following sections discuss these related concepts.

Automatic Speed Matching

Automatic speed matching matches the speed of the modem port to the speed of the remote modem. A connection can be established between two modems even if the two modems are not initially set to the same speed. If the remote modem is not capable of automatic speed matching, a connection may or may not be established, depending on the speed to which both modems are set .The connection speed may be determined by the originating or the answering speed. The resulting connection speed will be shown on the terminal like below:

CARRIER 33600

PROTOCOL: LAP-M

COMPRESSION: V.42BIS

CONNECT 115200

The CARRIER 33600 means the modem is connecting to a remote modem in ITU-T V.34, which allows user to transmit or receive date at 33600bps. The PROTOCOL: LAP-M means the modem has negotiated with the remote modem and established an ITU-T V.42 connection. The COMPRESSION: V.42BIS indicates that the two modems are using ITU-T V.42bis to do data compression. Finally, the CONNECT 115200 shows that the modem is using 115200bps to communicate with the DTE. These result codes may or may not be

shown on the terminal screen depending on the setting of the modem.

The modem supports three methods of automatic speed matching:

1. Multi-mode Handshake

The multi-mode handshake (ATN1) follows the ITU-T multi-mode handshake recommendation, which can provide full range of speed to connect to the other modem. That means whatever speed (protocol) the modem is set to, the modem can connect to BELL 103/212A and ITU-T V.21, V.22, V.23, V.22bis, V.32, V.32bis, V.34 without changing speed.

This feature is convenience for the user to connect to an unknown modem.

2. ITU-T V.8 Multi-mode Handshake

The modem supports ITU-T V.8 multi-mode handshake. The V.8 will cause the answering modem to send a "ANSam" signal and if the originate modem is capable of V.8, it response with "CM". After that both modems will begin a protocol handshake to determine modulation method, error correction protocol and whether using celluar connection. When all the condition is cleared, both modem begin the preselected ITU-T handshake. This procedure makes the modems connect faster than the old ITU-T multi-mode handshake.

If the modem can not detect an "ANSam" or "CM" signal from the remote modem, the modem will abort the ITU-T V.8 handshake and using other method to connect.

3. Fix-mode Handshake

If you want to connect to the remote modem with a particular speed, then the fix-mode handshake (ATN0) is useful for you. Using the fix-mode handshake will cause the modem to use the DTE speed to make connection. The connection speed will not

exceed the DTE speed, it can only perform the auto fallback from V.34 33600bps to V.34 2400bps or V.32bis 14400bps to V.32 4800bps or V.22bis 2400bps to V.22 1200bps.

Another way to determine the connection speed is the S register 37. Setting the S register 37 to a none zero value will cause the modem to connect to particular speed regardless of the DTE speed and will also perform the same auto fallback as describes above.

Flow Control

Flow control is the ability to turn on and turn off the flow of information between transmitting devices. Most computers and terminals support flow control. However, if the terminal device does not support flow control, it (flow control) should be disabled on both the modem port and the terminal serial port. You should also operate the terminal serial port at the same speed with the actual connection speed.

The modem can receive and transmit data over the serial port at a speed different from the modem port. If the serial port operates at a speed greater than the modem port, the buffer fills to capacity. If the computer or terminal attached to the serial port of the modem supports flow control, there is no loss of data when the buffer fills.

Flow control is achieved by using two methods - software flow control and hardware flow control.

Software Flow Control

The modem supports two types of software flow control, the first is the unidirectional flow control and the second is the bi-directional flow control. In unidirectional software flow control, only the modem can control the terminalís data flow. Xoff and Xon characters are sent by the modem to the local or remote computer. The Xoff character (Determined by S register 33) signals the local or remote computer to pause the flow of data while the Xon character (Determined by S register 32) signals the

local or remote computer to resume the flow of data. The bi-directional software flow control used Xoff and Xon characters to control both the modemís and the computerís or terminalís data flow. Your modem supports software flow control on both the modem port and the serial port; it also supports hardware flow control on the serial port.

When flow control is enabled on the modem port, the serial port, an Xoff character received over the communication lines, causes the modem port to stop transmitting data from the modem buffer to the communication lines. If the local device attached to the serial port continuously sends data, the buffer eventually fills. When this happens, the modem sends an Xoff character from the serial port to instruct the local device to stop transmitting data. In effect, the local device will stop send data and will only restart sending when it receives an Xon character from the remote system.

Hardware Flow Control

The modem supports two types of hardware flow control - the unidirectional and the bi-directional hardware flow control. The unidirectional hardware flow control is similar to the Xon/Xoff unidirectional software flow control. It accomplishes flow control by turning ON and OFF of CTS (Clear-to-Send) signal. When the CTS signal is turned OFF, the local device will cease to send data to the serial port of the modem; data transmission will only be resumed when the CTS signal is turned ON.

Bi-directional flow control uses both the CTS and the RTS (Request-to-Send). The RTS signal works in the same manner as the CTS signal, i.e. the modem stops sending data to the serial port of the local device when the RTS signal is turned OFF, and resumes sending data only when RTS signal is turned ON. For most of the applications, the unidirectional hardware flow control is sufficient. Examples of these applications are systems primarily involved in downloading files. For applications that need to support file uploading and do not support Xon/Xoff flow control,

bi-directional hardware flow control is recommended so that the local device can also control the flow of data from the modem.

The modem also supports hardware flow control using DTR (Data-Terminal-Ready) and DSR (Data-Set-Ready) signal in the RS-232. The DTR signal works in the same manner with the RTS signal and the DSR signal works in the same manner with the CTS signal when setting the modem to do DTR/DSR hardware flow control.

The Modem Operating Mode

The modem operating mode determines how the modem communicates with the remote modem. The modem operating modes are: direct mode, normal mode and error correction mode. These modes are described bellow:

Direct Mode

A direct mode connection is equivalent to any standard V.34 modem connection. In a direct mode connection, the maximum throughput is equal to the connection rate, and the terminal (DTE) rate must always match the connection rate. For instance, if the DTE is set to 33600bps (CARRIER 33600), the throughput will not exceed 33600bps. On the other hand, if the DTE is set to 33600bps and the modem falls back to a 9600bps connection (CARRIER 9600), the terminal must be adjusted to operate at 9600bps, and the throughput will never exceed 9600bps.

The flow control (AT&K) command is ignored when the modem is set to direct mode. The serial port speed is always adjusted to the connection speed of the modem port.

Normal Mode

In a normal mode connection, the modem provides data buffers. This allows the terminal speed to be different from the connection speed. However, the maximum modem-to-modem throughput

continues to be equal to the connection rate. For instance, if the DTE is set to 115200bps and the modem connects at 33600bps (CARRIER 33600), then as long as the DTE does not overflow the transmit buffer, data will pass intact, and the terminal speed must remain at 115200bps. Throughput will not exceed 33600bps.

Since it is difficult to ensure that the DTE will not overflow the transmit buffer, two methods are provided to indicate to the DTE whether it can send data to the modem or not. These two methods are hardware flow control and software flow control. When hard ware flow control is enables, the RS-232 control line CTS is controlled by the modem; it indicates to the DTE whether it can send data or not. When software flow control is enabled, the modem sends control characters (Xon/Xoff) to the DTE to do flow control. Conversely, the DTE may also indicate to the modem's ability to receive data by RTS, an RS-232 control line in hardware flow control, or by Xon/Xoff software flow control characters.

Error Correction Mode

The modem support ITU-T V.42 error correction protocol. When configured to V.42, the modem looks for incoming protocol of V.42 from the remote modem and try to establish an error correction connection. The modem will provide data buffer so that the terminal speed may be different from the connection speed. It also provides error detection and error correction. Flow control must be activated when in error correction mode.

The ITU-T V.42/V.42bis

The ITU-T V.42 supports two methods of error correction: LAP-M and, as a fallback, Alternative Protocol (MNP4 compatible). The modem offers a negotiation technique for determining and establishing the best method of error correction between two modems. This technique involves two phases: the detection phase and the negotiation phase. In the detection phase, which occurs immediately after the establishment of the modem handshake, the communicating modems exchange a sequence of detection

patterns to verify that both modems support the error-correction technique. In the negotiation phase, which follows the detection phase, the communicating modem exchange configuration information to make a best connection. When the modem originates a call, it will send a detection pattern and wait for the answering modem to respond. If the answering modem responds, they will enter the negotiation phase; if the answering modem does not respond, the originating modem will send the alternative handshake pattern and try to make the alternative connection.

If the detection phase fails, or negotiation does not achieve the desired connection type, the modem can hang up, fallback to alternative protocol (MNP4), or fallback to a standard asynchronous mode. Desired action to take is selected by S register 36. Since MNP does not support a detection phase, the selection of MNP must be made as a force fallback of V.42 with S register 48 and 36.

S48 - The V.42 Negotiation Action Register

The negotiation process determines the capabilities of the remote modem. If the capabilities of the remote modem are known and negotiation is unnecessary, this process can be bypassed if desires. The following options are selectable using S register 48:

S48=7 Enables negotiation (Factory setting)

S48=0 Disables negotiation; bypass the detection and negotiation phases; and process with LAP-M.

S48=128 Disables negotiation; bypass the detection and negotiation phases; and proceed at once with the fallback actions specified in S register 36. This option can be used to force the modem to use MNP to communicate.

S36 - The V.42 Negotiation Fallback

S register 36 specifies the action to take when the desired connection cannot be made. The options are:

S36=0 Modem hangs up

S36=1 Modem stays on line and a direct mode connection is established

S36=3 Modem stays on line and a normal mode connection is established

S36=4 An MNP connection is attempted; if it fails, the modem disconnects

S36=5 An MNP connection is attempted; if it fails, a direct connection is established

S36=7 An MNP connection is attempted; if it fails, a normal connection is established

These fallback options are initiated immediately on connection if S register 48=128.

This register can be used with S register 48=128 to set the modem to MNP mode only. For example:

Modem with S48=128	Function
S36=4	An MNP is attempted; if fails, disconnects.
S36=5	An MNP is attempted; if fails, a direct mode is made.
S36=6	An MNP is attempted; if fails, a normal mode is made.

S46 - ata Compression Protocol Selection

This register selects whether the data compression is effective or not:

S46=136 Execute the error correction protocol without data compression.

S46=138 Execute the error correction protocol with data compression.

The GIII Fax Function

The modem supports the ITU-T V.27ter/V.29 and V.17 for GIII fax. It uses the EIA Class 1 and Class 2 command for compatibility of most communication software. It can support from 2400bps to 14400bps GIII Fax speed.

The Voice Function

The modem optionally supports VOICE function. The voice function include a voice pass-through mode which allows the host to transmit and receive audio signals. It uses an ADPCM voice coder and decoder for compression and decompression. It can compress and decompress voice signals to allow efficient digital storage of voice messages. Using this voice option with the voice application software to achieve the voice function such as answering machine, voice on demand, and voice mail function.

CHAPTER 4

AT COMMAND GUIDELINES

Introduction

This chapter gives you a detailed explaination of commands available. The commands include the Hayes AT command set and some other commands that control extra functions. An alphabetical listing of commands is listed below:

Command Syntax

The command must be preceded by "AT" (ATtention code) except A / and "+++" escape commands. AT can be entered as upper or lower case characters, and can NOT be deleted by backspace or delete keys. The attention code is used by the modem to determine the speed and data format of the incoming data from DTE.

More than one command can be entered in one command line and may be separated by space for readability. The command line can NOT exceed 40 characters excluding the attention code and must be ended by the ASCII character specified by S register 3. The default of the S register 3 is the decimal 13 -- "Carriage Return". A line without carriage return will be ignored. Commands following the AT are processed after receiving the "Carriage Return" character, and the space added for readability will be ignored.

Any parameters following the AT command that were ignored will be treated as equal to 0.

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AT Command Set

ATA -- Manual Answer

The modem will go off-hook and attempt to answer an incoming call if correct conditions are met. Upon successful completion of answer handshake, the modem will go on-line in answer mode. The modem will enter the connect state after exchanging carrier with the remote modem. If no carrier is detected within the period specified in S register 7, the modem hangs up. Any character entered during the connect sequence will abort the connection attempt.

ATA/ -- Repeat Last Command

There is no need to type <Return>, after the "/" has typed, the modem executes the last executed command immediately.

ATBn - Select ITU-T/BELL Mode

When the modem is configured to line speed of 300 or 1200 bps,

the modem will select BELL or ITU-T modulation according to the parameter supplied. Any other line speed will use an ITU-T modulation recommendation.

ATB0 Selects ITU-T recommendation at 300 or 1200 bps during call establishment and a subsequent connection. (Default)
ATB1 Selects BELL standard at 300 or 1200 bps during call establishment and a subsequent connection.

ATDn -- Dial

This command directs the modem to go off-hook, dial according to the string "n" entered and attempt to establish a connection in originate mode. If no dial string is supplied, the modem will go off-hook and attempt the handshake in originate mode.

The modem will have up to the period of time specified by S register 7 to wait for carrier and complete the handshake. If this time expires before the modem can complete the handshake, the modem will go on-hook with the "NO CARRIER" response. This command will be aborted in progress upon receipt of any DTE character before completion of the handshake, if the AT*K0 command is issued.

Dial Modifies

The valid dial string parameters are described below. Punctuation characters may be used for clarity, with parentheses, hyphen, and spaces being ignored.

0-9	Dialing digits 0 to 9.
*	The "star" digit. (tone dialing only)
#	The "gate" digit. (tone dialing only)
A-D	DTMF digits A,B,C, and D.
J	Perform MNP 10 link negotiation at 1200bps. (for this call only)
K	Enable power level adjustment during MNP 10 link negotiation. (for this call only)
L	Re-dial last number. The modem will re-dial the last valid telephone number. The îLî must be immediately

after the D with all the following characters ignored.

P Select pulse dialing. Pulse dial the numbers that follow until a "T" is encountered.

T Select tone dialing. Tone dial the numbers that follow until a "P" is encountered.

R This command will be accepted, but not acted on.

S=n Dial the number stored in the directory (n = 0 to 9). (See AT&Zn=m)

! Flash, the modem will go on-hook for a time defined by the value of S register 29.

W Wait for dial tone. The modem will wait for dial tone before dialing the digits following "W". If no dial tone is detected within the time specified by S register 7, the modem will abort the rest of the sequence, return on-ho ok, and generate an error message.

@ Wait for silence. The modem will wait for at least 5 seconds of silence in the call progress frequency band before continuing with the next dial string parameter. If the modem does not detect these 5 seconds of silence before the expiration of the call abort timer (S register 7), the modem will terminate the call attempt with a "NO ANSWER" message. If busy detection is enabled, the modem may terminate the call with the "BUSY" result code. If answer tone arrives during execution of this parameter, the modem handshakes.

& Wait for AT&T îbongî tone for credit card dialing before continuing with the dial string. If bong is not detected within the time specified by S register 7, the modem will abort the rest of the sequence, return on-ho ok, and generate an error message.

, Dial pause. The modem will pause for a time specified by S register 8 before dialing the digits following ",".

; Return to command state. Added to the end of a dial string, this causes the modem to return to the command state after it processes the portion of the dial string preceding the ";". This allows the user to issue additional AT commands may be placed in the original command line following the ";" and/or may be entered on subsequent command lines. The modem will enter call progress only after an additional dial command is

issued without the ";" terminator. Use ATH0 to abort the dial in progress, and go back on-hook.

^ Enable calling tone. Applicable to current dial attempt only.

ATEn -- Echo Command

The modem enables or disables the echo of characters to the DTE according to the parameter supplied.

ATE0 Disables command echo
ATE1 Enables command echo (Default)

ATHn -- Hang Up the Telephone Line

ATH0 Directs the modem to disconnect the remote modem and hang-up (Default)
ATH1 Causes the modem to go off-hook.

ATIn -- Identification Command

ATI0 Reports product code "33600".
ATI1 Reports a pre computed checksum, in the format of "CheckSum: XXX".
ATI2 Performs the calculation of ROM checksum and check with the pre computed checksum. If correct, reports "OK"; if not reports "ERROR".
ATI3 Reports firmware revision in the format of "33600 Version SA X.X".

Returns the identification code and checksum result of the modem.

REMARK: V.32bis Modem Function
For the V.32bis modem, it reports "14400" when ATI0 command is received. It reports "14400 Version SB X.X" when ATI3 command is received.

ATLn -- Speaker Volume Control

The modem uses software volume control to avoid poor contact of the volume VR. The volume is divided into 3 steps, described below:

ATL0/L1	Low speaker volume (Default)
ATL2	Medium speaker volume
ATL3	High speaker volume

ATMn -- Speaker Control

ATM0	Speaker always off
ATM1	Speaker on until the modem receives a carrier (Default)
ATM2	Speaker always on
ATM3	Speaker off while dialing, then on until the modem receives a carrier

Controls the speaker. Immediately takes effect upon execution.

ATNn -- Set Multi- or Fix- Mode Handshake

ATN0	Fix-mode handshake. The connection speed depends on the DTE speed or S register 37 speed. It can NOT connect with higher speed modem. The remote modem must have the ability to fall back if using higher speed than your modem.
ATN1	Multi-mode handshake. Follows the recommendation of ITU-T multi-mode handshake. It can automatically change the connection speed to make most efficient connection. (Default)
ATN2	Reserved
ATN3	Same as ATN1 but without V.23 mode.

This command controls the handshake method of the modem. When the modem is set to answer mode, it usually sets to multi-mode handshake (ATN1) to get the most effective connection. If the remote modemís speed is known, you can set the modem to fix-mode handshake and adjust the DTE speed to meet the remote modem's speed to reduce the time needed for handshake.

ATOn -- Return to On-Line Mode

This command determines how the modem will enter the on-line data mode. If the modem is in the escape (on-line command) mode, whether enters the on-line data mode with or without retrain. If the modem is in the off-line command mode (not connected), an "ERROR" message is reported.

ATO0	Enters on-line data mode without a retrain. Generally, if a connection exists, this command connects the DTE back to the remote modem after an escape (+++).
ATO1	Enters on-line data mode with a retrain before returning to on-line data mode.

ATP -- Set Pulse Dial

Directs the modem to use pulse dialing. This command can be used as AT command or dial modifier of the ATD command.

ATQn -- Result Code Command

ATQ0	Sends result codes to the local system. (Default)
ATQ1	Prohibits the modem from sending result codes to the local system.

Some of the central site computers do not recognize the result code of the modem, please use the ATQ1 command to disable the result code of the modem.

ATSr=n -- Change The Content of S Register

ATSr=n	" r " indicates the number of S register. " n " indicates the content of S register.
ATSr	Select S register
AT?	Read pre-selected S register
AT=n	Change the content of pre-selected S register to n.

This command can change the content of S register. The content, n , should be in decimal form.

ATSr?	Read the content of S register r

This command causes the modem to return a 3 digits decimal number indicates the content of the specified S register. The rindicates the number of the S register.

ATT -- Set Tone Dial

Directs the modem to use tone dialing. This command can be used as AT command or dial modifier of the ATD command.

ATVn -- Result Code Type

ATV0 Selects short (digit) form result codes.
ATV1 Selects long (verbose) form result codes. (Default)

The command result code is reported in two ways. The first is the long form, is reported in verbose type result code. This is easy to read for user. The second is the short form, is reported in numeric digit form. This is usefull for the software programmer to identify result codes during program application.

The result code is also devided into standard and extended result codes. The standard result code is reported while the ATX0 command is issued. The extended resulted code is reported while other ATXn parameter is issued. Some other result codes are reported upon ATW1 command issued. The detail result codes are listed below:

Short Form	Long Form	Standard	Extended
0	OK	*	
1	CONNECT	*	
2	RING	*	
3	NO CARRIER	*	
4	ERROR	*	
5	CONNECT 1200		*
6	NO DIALTONE		*
7	BUSY		*
8	NO ANSWER		*
9	CONNECT 0600		*
10	CONNECT 2400		*
11	CONNECT 4800		*
12	CONNECT 9600		*

13	CONNECT 7200		*
14	CONNECT 12000		*
15	CONNECT 14400		*
16	CONNECT 19200		*
17	CONNECT 38400		*
18	CONNECT 57600		*
19	CONNECT 115200		*
22	CONNECT 1200TX/75RX		*
23	CONNECT 75TX/1200RX		*
40	CARRIER 300		*
44	CARRIER 1200/75		*
45	CARRIER 75/1200		*
46	CARRIER 1200		*
47	CARRIER 2400		*
48	CARRIER 4800		*
49	CARRIER 7200		*
50	CARRIER 9600		*
51	CARRIER 12000		*
52	CARRIER 14400		*
53	CARRIER 16800		*
54	CARRIER 19200		*
55	CARRIRE 21600		*
56	CARRIER 24000		*
57	CARRIER 26400		*
58	CARRIER 28800		*
59	CONNECT 16800		*
61	CONNECT 21600		*
62	CONNECT 24000		*
63	CONNECT 26400		*
64	CONNECT 28800		*
66	COMPRESSION: CLASS 5		*
67	COMPRESSION: V.42 bis		*
69	COMPRESSION: NONE		*
70	PROTOCOL: NONE		*
77	PROTOCOL: LAPM		*
80	PROTOCOL: ALT		*
81	PROTOCOL: ALT-CELLULAR		*
+F4	+FCERROR		*

ATWn -- Negotiation Progress Message Command

This command controls the format of CONNECT messages.

ATW0 Upon connection, the modem reports only the DTE

speed (e.g., CONNECT 57600). Subsequent responses are disabled. (Default)

ATW1 Upon connection, the modem reports the line speed, the error correction protocol, and the DTE speed, respectively. Subsequent responses are disabled.

ATW2 Upon connection, the modem reports the DCE speed (e.g.,CONNECT 14400). Subsequent responses are disabled.

ATXn -- Extended Result Codes

ATX0 The modem ignores dialtone and busy tone when dialing. Sends standard result codes when a connection is completed regardless of connection speed.

ATX1 The modem ignores dialtone and busy tone. Sends extended result codes when a connection is made.

ATX2 The modem ignores busy tone. Sends "NO DIALTONE" if no dialtone is detected in 5 seconds of a dial attempt. Sends extended result codes when a connection is made.

ATX3 The modem ignores dial tone. Sends "BUSY" if busy tone is detected. Sends extended result codes when a connection is made.

ATX4 The modem sends "NO DIALTONE" if no dialtone is detected in 5 seconds of a dial attempt. Sends "BUSY" if busy tone is detected. Sends extended result codes when a connection is made. (Default)

ATYn -- Long Space Disconnect

This command sets the modem whether to disconnect when a space of 1.6 seconds or more is received from the remote modem or not.

ATY0 Disables the long space disconnect feature (Default)

ATY1 Enables the long space disconnect feature

ATZn -- Reset

The reset command performs the following:

1. Disconnects the telephone line.
2. Performs self-test diagnostics.
3. Clears the modem and serial port buffer.
4. Restores the profiles that stored in NVRAM.
5. Reads configuration switches.
6. Enters the command mode.

The ATZ command can also select the profile 0 to 3 to recall. Key in ATZ or ATZ0 will cause the modem to recall profile 0, ATZ1 will cause the modem to recall profile 1.

ATZ0	Recall profile 0
ATZ1	Recall profile 1
ATZ2	Recall profile 2
ATZ3	Recall profile 3

AT&Cn -- Serial Port DCD Control

AT&C0	Sets CD always ON
AT&C1	Sets CD to follow the state of carrier (Default)
AT&C2	Sets CD ON except during disconnect (3~5 sec.)

Controls the CD signal of the serial port. Use this command to achieve special effects to meet the need of central site computers.

AT&Dn -- Serial Port DTR Control

AT&D0	Assumes DTR ON.
AT&D1	Enters command mode on detecting ON-to-OFF transition of DTR.
AT&D2	Goes ON-HOOK on detecting ON-to-OFF transition of DTR. (Default)
AT&D3	Resets the modem on detecting ON-to-OFF transition of DTR.

Controls the action on detecting the ON-to-OFF transition of DTR. You can use this command to meet the special requirements for terminals or computers.

AT&Fn -- Restore Factory Setting

The factory default setting is stored on the EPROM; whatever the modem sets, you can always return to default setting by this command.

PROFILE	0	1	2	3	4	5	6	7	8	9
MODEM SPEED	V.34/33.6k	V.32/9.6k	V.32/9.6k	V.34/19.2k	V.34/19.2k	V.32b/14.4k	V.32b/14.4k	V.32/9.6k	V.32/9.6k	V.22b/2.4k
PROTOCOL	AUTO	DIRECT	DIRECT	AUTO	DIRECT	AUTO	DIRECT	DIRECT	DIRECT	DIRECT
DTE SPEED	115200	9600	9600	19200	19200	14400	14400	9600	9600	2400
DATA FORMAT	ASYNC	ASYNC.	SYNC.	ASYNC.	SYNC.	ASYNC.	SYNC.	ASYNC.	SYNC.	ASYNC.
LINE TYPE	2D	2D	2D	2L	4L	2L	4L	2L	4L	2L
ORG/ANS	ORG	ORG	ORG	ORG	ORG	ORG	ORG	ORG	ORG	ORG
FLOW CTRL	RTS/CTS	OFF	OFF	RTS/CTS	OFF	CTS/RTS	OFF	OFF	OFF	OFF
DTR OPTION	&D2	&D2	&D2	&D0	&D0	&D0	&D0	&D0	&D0	&D0
COMMAND	AT	AT	V.25BIS	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB

AT&Gn -- Select Guard Tone

AT&G0 Disables guard tone (Default)
AT&G2 Selects 1800 Hz guard tone

AT&Kn -- Serial Port Flow Control

AT&K0 Disables local flow control.
AT&K1 Enables unidirectional RTS/CTS hardware flow control.
AT&K2 Enables unidirectional XON/XOFF software flow control.
AT&K3 Enables bi-directional RTS/CTS hardware flow control. (Default)
AT&K4 Enables bi-directional XON/XOFF software flow control.
AT&K5 Enables transparent XON/XOFF software flow control.
AT&K6 Enables both RTS/CTS and XON/XOFF flow control. (Default for fax mode)
AT&K7 Enables bi-directional DTR/DSR hardware flow control.
AT&K8 Enables unidirectional DTR/DSR hardware flow control.

This command controls the type of flow control between the modem and the serial port of the computer or terminal. When the modem connects to the remote modem using normal mode, or error

correction mode, the data flow between the modem and the serial port should be controlled by flow control to avoid data loss. If the modem connects to remote modem using direct mode, this command will be ignored. Please refer to Chapter 3 for detail of flow control.

AT&Ln -- Telephone Line Type Select Command

AT&L0 Disables leased line operation, enables PSTN operation. (Default)

AT&L1 Enables 2-wire leased line operation, disables PSTN operation.

AT&L2 Enables 4- wire leased line operation, disables PSTN operation.

AT&Mn -- Asynchronous/Synchronous Mode Selection

This command determines the asynchronous or synchronous operating mode. The modem treats the &M command as subset of the &Q command.

AT&M0 Selects direct asynchronous operation. (Default)

AT&M1 Selects synchronous data mode with Async. off-line command mode.

AT&M2 Selects synchronous data mode with Async. off-line command mode. Same as &M1 except that &M2 enables DTR dialing of stored telephone number at location 0. The modem will disconnect if DTR is OFF for more than the time period in S register 25 (in units of hundredths of a second); the data connection will be synchronous.

AT&M3 Selects synchronous data mode. This mode allows DTR to act as Voice/Data switch. The call is terminated while DTR is inactive. When DTR becomes actives, the handshake proceeds in originate or answer mode according to the front panel LCDís setting.

**The modem disables the MNP and V.42bis functions automatically when you select synchronous mode.

AT&Pn -- Select Pulse Dial Make/Break Ratio

This command determines the Make/Break ratio used during pulse dialing. It has no effect in tone dialing.

AT&P0 Selects 39%-61% Make/Break ratio at 10 pulses per second.(Default)
AT&P1 Selects 33%-67% Make/Break ratio at 10 pulses per second.
AT&P2 Selects 39%-61% Make/Break ratio at 20 pulses per second.
AT&P3 Selects 33%-67% Make/Break ratio at 20 pulses per second.

AT&Qn -- Select Communication Mode

This command selects synchronous or asynchronous, error control or normal mode operation.

AT&Q0 Communicates in asynchronous mode.
AT&Q1 Communicates in synchronous mode 1 -- Async.-to-Sync.
AT&Q2 Communicates in synchronous mode 2 -- stored number dial.
AT&Q3 Communicates in synchronous mode 3 -- voice/data switch.
AT&Q5 Communicates in error correction mode. (Default)
AT&Q6 Communicates in asynchronous mode with automatic speed buffering -- for interfaces requiring constant speed between the DTE and DCE.

AT&Rn -- Serial Port RTS/CTS Option Command

AT&R0 CTS follows RTS at all time (Default)
AT&R1 Assumes CTS always on

This command selects the CTS option of the serial port. Some of

the DTE need to set different options, you can select AT&R0 or AT &R1 according to the specification of DTE. This command effects only in synchronous mode and asynchronous direct mode. In V.25 bis operation, the CTS acts according to V.25bis recommendation.

AT&Sn -- Serial Port DSR Control Command

AT&S0 DSR remains ON at all time (Default)
AT&S1 DSR follows the ITU-T recommendation
AT&S2 DSR follows carrier

AT&Tn -- Loop Test Functions

AT&T0 Ends loop test
AT&T1 Local analog loop back
AT&T3 Local digital loop back
AT&T4 Responds to remote digital loop back request (Default)
AT&T5 Ignores remote digital loop back request.
AT&T6 Initiates ITU-T remote digital loop back
AT&T7 Remote digital loop back with self-test
AT&T8 Local analog loop back with self-test

AT&Un -- Trellis Coding Modulation Selection Command

This command selects whether to use trellis coding modulation or not. Using trellis coding modulation will provide up to 4 dB of extra noise immunity improve data reliability in V.32 mode. Both the local and remote modem should be set to enable to ensure trellis coding modulation takes place.

AT&U0 Enables trellis coding modulation (Default)
AT&U1 Disables trellis coding modulation

AT&V -- View Profiles and Stored Telephone Number

This command shows the active configuration, and four user profiles.

AT&Wn -- Store Current Configuration

AT&W0 Saves current configuration at user profile 0, including commands and registers.
AT&W1 Saves current configuration at user profile 1, including commands and registers.
AT&W2 Saves current configuration at user profile 2, including commands and registers.
AT&W3 Saves current configuration at user profile 3, including commands and registers.

AT&Xn -- Select Synchronous Clock Source

Selects the source of the transmit clock for the synchronous mode operation.

In asynchronous mode, the transmit and receive clocks are turned OFF. In synchronous mode, the clocks are turned ON with the frequency of 1200 Hz or faster corresponding to the speed that is selected for modem operation.

AT&X0 Selects internal clock. The modem generates the transmit clock signal and applies it to the TXCLK output at the serial interface. (Default)
AT&X1 Selects external clock. The local DTE causes the transmit clock signal on the XTCLK input of the serial interface. The modem applies this clock to the TXCLK output at the serial interface.
AT&X2 Selects slave receive clock. The modem drives the transmit clock signal from the incoming carrier and applies it to the TXCLK output at the serial interface.

AT&Yn -- Power On Profile Selection Command

This command selects the prestored profile 0 to 3 to recall when turn ON the power of the modem. This command has NO effect when issuing the ATZ command, the user should use the ATZ0 to ATZ3 to recall profile when software reset.

AT&Y0 Recalls profile 0 when power on (Default)

AT&Y1 Recalls profile 1 when power on
AT&Y2 Recalls profile 2 when power on
AT&Y3 Recalls profile 3 when power on

AT&Zn = m -- Store Telephone Number

AT&Zn = m The "n" indicates the telephone number locations, is valid within 0 to 9. The "m" is a dial string of up to 23 characters. Valid dial string characters are 0 to 9, dial modifiers and for tone dialing #, *. Modem will ignore invalid characters and truncate dial strings longer than 23 characters. This command must be the last one on a command line.

AT%Cn -- Data Compression Protocol Selection

This command enables or disables data compression negotiation. The modem can only perform data compression on an error correction link.

AT%C0 Disables data compression
AT%C1 Enables MNP5 error correction
AT%C2 Enables V.42bis data compression
AT%C3 Enables both MNP5 and V.42bis data compression (Default)

AT%En -- Retrain and Rate Negotiation Command

AT%E0 Disables auto retrain feature
AT%E1 Enables auto retrain feature
AT%E2 Enables auto retrain and rate negotiation with fall back/forward feature (Default)

The AT%En command controls the auto retrain and rate negotiation features of the modem. Auto retrain enables the modem to monitor the line quality and request a retrain if the line quality is too poor. Rate negotiation feature enables the modem to change the line speed during the V.34, V.32bis or V.32 retrain sequence according to the line quality. If retrain is encountered, the modem will stop the data flow for a shot period of time.

AT%L -- Line Signal Level

Returns a value which indicates the received signal level. The value returned is a direct indication at the telephone line connector . For example, 009 = -9 dBm, 043 = -43 dBm, and so on.

AT%Q -- Line Signal Quality

Reports the line signal quality. The line quality shows the line noise, the distortion and the frequency shift of the telephone network. Based on the line quality, retrain or fall back/fall forward may be initiated if enabled by AT%E1 or AT%E2.

The line quality is reported in three decimal digits. The modem will return "ERROR" if not connected to the remote modem.

AT%Rn -- Ring Back Message Command

AT%R0 Disables ring back message (Default).
AT%R1 Enables ring back message

If issues the AT%R1 command, the modem will return the "RING BACK" or "102"(depending on the ATVn command) message to indicate the ring back signal.

AT%S -- Secondary Channel Control

This command controls the On/Off of the Secondary Channel. You have to turn on the Secondary Channel to achieve the Connection security and the Remote configuration of the modem.

AT%S0 Disables Secondary Channel (Default)
AT%S1 Enables Secondary Channel

AT\An -- Select Maximum MNP Block Size

The modem will operate an MNP error correction link using a

maximum block size controlled by the parameter supplied.

AT\A0	The maximum MNP block size to be 64 characters
AT\A1	The maximum MNP block size to be 128 characters
AT\A2	The maximum MNP block size to be 192 characters (Default)
AT\A3	The maximum MNP block size to be 256 characters

AT\Bn -- Transmit Break to Remote

In non-error correction mode, the modem will transmit a break signal to the remote modem with a length in multiples of 100 ms according to parameter n specified. If a number in excess of 9 is entered, 9 is used. The command works in conjunction with the S register 82.

In error correction mode, the modem will signal a break through the active error correction protocol, giving no indication of the length. The modem will return a "NO CARRIER" result code if not connected.

Note: When the modem receives a break from the remote modem, break is passed to the DTE as follows: In direct mode , the break length is passed; in normal mode and in error correction mode, a 300 ms break is passed.

AT\F -- View Stored Telephone Number

This command shows the content of the ten stored telephone numbers.

AT\Gn -- Modem Port Flow Control

AT\G0	Disables modem port flow control (Default)
AT\G1	Enables modem port flow control

If enables the modem port flow control, the modem will use the XON/ XOFF characters to do the flow control. This command only valids when the modem is in normal mode, has no effect during

error correction or direct mode connection.

AT\Kn--Break Control

Controls the response of the modem to a break received from the DTE or the remote modem or the \B command according to the parameter supplied. The default of this command is AT\K5. The response is different in three separate states, describe below:

	Break received from DTE while in connect state during on line mode	\Bn command received from DTE while in on line command state	Break received from remote modem while in connect state during non error corrected connection
\K0	Enter on line command mode, no break sent to the remote modem	Purge buffers, immediately send break to remote modem	Purge buffers, immediately send break to DTE
\K1	Clear data buffers and send break to remote modem	Purge buffers, immediately send break to remote modem	Purge buffers, immediately send break to DTE
\K2	Same as 0	Immediately send break to remote modem	Immediately send break to DTE
\K3	Immediately send break to remote modem	Immediately send break to remote modem	Immediately send break to DTE
\K4	Same as 0	Send break to remote modem with data	Send break to DTE in sequence with data
\K5	Send break to remote modem in sequence with transmitted data.	Send break to remote modem with data	Send break to DTE in sequence with data

AT\Nn -- Operating Mode

This command controls the preferred error correcting mode to be negotiated in a subsequent data connection. This command has the similar function with the S register 36 and 48 and AT&Qn command. Changing this command will affect these registers and command's content.

AT\N0 selects normal speed buffered mode (disables error-correction mode)

AT\N1 Selects direct mode and is equivalent to &M0, &Q0 mode of operation (Forces &Q0)

AT\N2 Selects reliable (error-correction) mode. The modem will first attempt a LAP-M connection and then an MNP connection. Failure to make a reliable connection results in the modem hanging up (Forces &Q5, S36=4, and S48=7)

AT\N3 Selects auto reliable mode. This operates the same as \N2 except failure to make a reliable connection results in the modem falling back to the speed buffered normal mode (Forces &Q5, S36=7, and S48=7) (Default)

AT\N4 Selects LAP-M error-correction mode. Failure to make a LAP-M error-correction results in the modem hanging up. (Forces &Q5 and S48=0)
Note: The AT-K1 command can override the AT\N4 command.

AT\N5 Selects MNP error-correction mode. Failure to make an MNP error-correction connection results in the modem 3 hanging up. (Forces &Q5, S36=4 and S48=128)

AT\Rn -- Serial Port Ring Indicator Control

AT\R0 Keeps the ring indicator ON for the duration of the telephone call

AT\R1 Turns OFF the ring indicator after the telephone call is answered (Default)

This command controls the RS-232C pin No.22 (ITU-T V.24 No.125 signal, Calling Indicator). You can set this pin to always ON or ON until answered during the telephone call.

AT\S -- Modem Status Display

This command displays the active command setting and lists the command. The following is an example of the screen display when the AT\S command is issued:

AT+MS Report:11,1,2400,33600
Protocol :11 (V.34)
Mode :1 (Auto with V.8)
Min. Speed: 2400
Max. Speed: 33600

DTE SPEED: 115200 bps, DATA BITS: 8 PARITY: NONE STOP BIT: 1

DCE SPEED: Idle

LINK LAYER PROTOCOL: Idle

COMPRESSION: Idle

LAST DIAL NUMBER=T 886 2 999-5155

CMD	DESCRIPTION	OPTION	CMD	DESCRIPTION	OPTION
B1	BELL OR ITU-T.....	.....Bell	E1	COMMAND ECHO....	.....On
L1	SPK VOLUME.....	.....Low	M1	SPK MODE.....	.....Mode 1

Press ESC to stop or press ANY KEY to continue.....

CMD	DESCRIPTION	OPTION	CMD	DESCRIPTION	OPTION
N1	MULTI MODE.....	.....On	T	DIAL MODE.....	.....Tone dial
Q0	QUIET MODE.....	.....Off	V1	VERBOSE MODE.....	.....On
W0	EC REPORT OPTION....	.....DTE	X4	RESULT CODE TYPE..	.....Mode 4
Y0	LONG SPACE DISC.....	.....Off	&C1	DCD OPTION.....	.....Follow carr
&D2	DTR OPTION.....	.....Onhook	&G0	GUARD TONE.....	.....Off
&K3	FLOW CONTROL.....	.....RTS/CTS	&L0	LINE MODE.....	.....PSTN
&P0	PULSE RATE.....	39%-61% 10pps	&Q5	CONNECT MODE.....	.....Error Correct
&R0	RTS/CTS.....	.....Follow RTS	&S0	DSR OPTION.....	.....Always on
&T4	RDL OPTION.....	.. ALLOW RDL	&U0	V.32 9600 TCM.....	.....On
&X0	SYNC CLOCK.....	.....Internal	&Y0	POWER ON PROFILE.	.....Profile 0
%A1	Asym. SPD ON/OFF....	.....On	%C3	COMPRESSION.....	.....Enable Both
%E2	AUTO RETRAIN.....	..Enable+FF/FB	%L	LINE LEVEL.....	.....Idle
%Q	LINE QUALITY.....	.....Idle	%R0	RINGBACK OPTION....	.....Off
%S0	2nd CHANNEL.....	.....Off	\A2	MNP BLOCK SIZE.....	192
\G0	MODEM FLOW CNTRL..	.....Off	\L1	MNP BLOCK XFER.....	.....Mode 1
\R1	RI OPTION.....	.....Follow ring	)M0	MNP10 PWR ADJUST.	.....Off
*E0	CALLBAK SECURITYÖ	.....Off	*H0	MNP10 LINK SPEED....	.....Hightest

Press ESC to stop or press ANY KEY to continue.....

CMD	DESCRIPTION	OPTION	CMD	DESCRIPTION	OPTION
*K0	KEY INTERRUPT.....	.....On	-K0	MNP10 EXT SERVE.....	.....Off
-R0	RTS OPTION.....	.....Normal	-Q1	MNP10 FBACK 2400.....	.....On
@M18	MNP10 XMIT LEVEL...	.....-18 dbm	:E1	COMPROM EQULIZER...	.....On
S000	RINGS TO ANSWER....	001	S001	RING COUNTER.....	000
S002	ESCAPE CHAR.....	043	S003	<CR> CHAR.....	013
S004	<LF> CHAR.....	010	S005	<BS> CHAR.....	008
S006	WAIT DIAL TONE.....	002	S007	WAIT CARRIER.....	045
S008	PAUSE TIME.....	002	S009	CARRIER RESPONSE...	006
S010	CARRIER LOS DISC.....	014	S011	DTMF DURATION.....	095
S012	ESC GUARD TIMER.....	050	S018	TEST TIMER.....	000
S020	AUTOSYNC CHAR.....	000	S024	SLEEP INACT.....	000
S025	DELAY TO DTR OFF...	005	S026	RTS TO CTS DELAY...	001
S029	FLASH DIAL TIMER...	040	S030	CONNECT INACT.....	000
S032	XON CHAR.....	017	S033	XOFF CHAR.....	019
S037	LINE CONNECT SPD....	000	S038	HANGUP DELAY.....	005
S046	COMPRESS CONTROL..	138	S048	V42 NEGO. CONTROL...	007
S082	BREAK CONTROL.....	128	S086	CALL FAILURE COD....	000

Press ESC to stop or press ANY KEY to continue.....

CMD	DESCRIPTION	OPTION	CMD	DESCRIPTION	OPTION
S091	PSTN XMIT LEVEL.....	010	S092	FAX XMIT LEVEL.....	010
S099	L.L XMIT LEVEL.....	010	S211	RESTORE TIMER.....	060
S212	BACKUP TIMER.....	060			

OK

AT*Kn -- Keyboard Interrupt Command

AT*K0 Enables keyboard interrupt during handshake (Default)
AT*K1 Disables keyboard interrupt during handshake

This command controls the keyboard interrupt function. After the modem enters the waiting for handshake state, if any character coming from the terminal to the modem before the handshake has finished, the modem will drop the telephone line and return the "NO CARRIER" result code. If your system will send characters during the handshake sequence, please use this command to disable the keyboard interrupt. This command controls only in AT command mode. If you set the modem to power on operation, V.25 bis or dumb mode, the modem will ignore AT*Kn command and act as disable keyboard interrupt.

AT-En - Asynchronous to Synchronous Interface

This command can only be used in Asynchronous direct mode. If set in Asynchronous direct mode and cannot connect to remote

modem, please set to standard range (-E1).

AT-E0/-E1 Speed drift in expandsion mode.
Speed range: +2.3% ~ -2.5% (Default)

AT-E1 Speed drift in standard mode.
Speed range: +1% ~ -2.5%

AT-Rn--Serial Port RTS Option

AT-R0 Ignore RTS signal
AT-R1 RTS action follows RS-232 definition (Default)

This command controls the RTS option of the serial port. You can select the options according to the requirement of DTE.

AT+MS - Select Modulation

This extended-format command selects the modulation, optionally enables or disables automode, and optionally specifies the lowest and highest connection rates using one to four subparameters. The command format is:

AT+MS=<mod>[,[<automode>][,[<min_rate>][,[<max_rate>]]]]
<ENTER>

Notes:

1. For 14400 bps and lower speeds, the ATNn command and S register 37 can alternatively be used, in which case the AT+Ms sub parameters will be modified to reflect the ATNn and S37= x setting. Use of the ATNn and S37=x commands is not recommended but it is provided for compatibility with existing communication software. (S register 37 is not updated by the AT+Ms command)

2. Sub parameters can be not entered (enter a comma only or <ENTER> to skip the last sub parameter) but remain at their

current values.

Reporting Selected Options

The modem can send a string of information to the DTE consisting of selected options using the following command:

AT+MS?

The response is:

<mod>,<automode>,<min_rate>,<max_rate>

For example:

11,1,300,28800

Reporting Supported Options

The modem can send a string of information to the DTE consisting of supported options using the following command:

AT+MS=?

The response is:

(list of supported <mod> values), (list of supported <automode> values), (list of supported <min_rate> values), (list of supported <max_rate> values)

For example:

(0,1,2,3,9,10,11,64,69,74), (0,1), (300-28800), (300-28800)

Sub Parameter Definitions

1. <mod>= A decimal number which specifies the preferred modulation (automode enabled) or modulation (automode disabled) to use in originating or answering a connection.

The options are:

<mod>	Modulation	Possible Rates (bps)	Notes
0	V.21	300	

1	V.22	1200	
2	V.22 bis	2400 or 1200	
3	V.23	1200	
9	V.32	9600 or 4800	
10	V32 bis	14400, 12000, 9600, 7200, or 4800	
11	V.34	33600, 31200, 28800, 26400, 24000, 21600,19200, 16800,14400, 12000, 9600, 7200, 4800, or 2400	(Default)
64	Bell 103	300	
69	Bell 212	1200	
74	V.FC	28800, 26400, 24000, 21600, 19200, 16800,or 14400	

The modem may also automatically switch to another modulation (automode), subject to the following constraints:

a. There is no standard way to switch from Bell to ITU-T in automode.
b. The DTE may disable automode operation. (see <automode> below)

c. The DTE may constrain the range of modulations available .by specifying the lowest and highest rates. (see <min_rate > and <max_rate> below)

2. <automode> is an optional numeric value which enables or disables automatic modulation negotiation using ITU-T V.8 or ITU-T multi- mode handshake. The options are:

<automode>	Option Selected	Notes
0	Automode disabled	
1	Automode enabled using V.8 or multi-mode	Default

The default value is 1, which enables automode. Note, however, there are modulations for which there is no automatic negotiation, e.g., Bell 212 (<mod>=69).

For <automode> = 0 (automode disabled, i.e., fixed modulation):

a. If <max_rate> is within the rates supported by the selected modulation, the selected rate is that specified by <max_rate>. For example:

AT+MS=9,0,1200,4800 selects V.32 4800 bps fixed rate.

b. If <max_rate> is greater than the highest speed supported by the modulation specified by <mod>, the starting rate is the highest rate supported by the selected modulation. For example:

AT+MS=9,0,2400,14400 selects V.32 9600 or 4800 bps.

c. To emulate issuance of the ATN0S37=x command sequence to select fixed mode operation, specify the <max_rate> and <min_rate> both to be the (same) requested speed, and <mod> to be the modulation for that speed. For example:

AT+MS=11,0,16800,16800 selects V.34 16800 bps fixed mode(no comparable S register 37 value).
AT+MS=9,0,12000,12000 selects V.32bis 12000 bps fixed mode (same as ATN0S37=10).

For <automode> = 1 (automode enabled, i.e., automatically select speed and modulation):

The modem connects at the highest possible rate in accordance with V.8, or multi-mode if V.8 is not supported by the remote modem.

a. If <max_rate> is greater than the highest rate supported by the modulation specified by <mod>, the modem auotmodes down from the highest rate of the selected modulation. For example:

AT+MS=10,1,1200,24000 selects automoding down from V.32bis 14400 bps.

b. To emulate issuance of the ATN1S37=x sequence command, specify the modulation and the rate to start automoding down from using <mod> and <max_rate>, respectively. Set <min_rate> to 300 to allow automoding all the way down to V.21 300 bps. For example:

AT+MS=11,1,300,16800 selects automode starting at V.34 16800 bps (no comparable S register 37 value).

AT+MS=9,1,300,12000, selects automode starting at V.32bis 12000 bps (same as ATN1S37=10).

3. <min_rate> is an optional number which specifies the lowest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 2400 bps. The default is 300 for 300 bps.

4. <max_rate> is an optional number which specifies the highest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 14400 bps. specifies the highest rate to be 14400 bps. The default is 33600 for 33600 bps.

REMARK: V.32bis modem Function

The V.32bis modem do not support the AT+MS command. To change the protocol and connect mode, please use the ATS37=m and ATNn command.

+++ -- The Escape Code

The Escape Code returns the modem to the command state from the online state, without releasing the telephone line. This command consists of an escape guard time (defined by S register 12, default 1 second) and an escape character (ASCII code of which is specified in S register 2, default î+î). The escape character must be entered three consecutive times with a guard time before and after the three characters.

The modem returns to the local command state and sends the result code "OK" without releasing the telephone line connections.

Also see the "ATOn" and "AT&D1" commands

MNP 10 COMMAND SET

AT)Mn -- Power Level Adjust Command

Enables or disables adjustment of the transmit power level to accommodate the signalling requirements of cellular telephone equipment.

AT)M0 Disables power level adjustment during MNP 10 link negotiation. The AT)M0 command will allow the transmitter adjustment if cellular operation is requested by the remote modem.(Default)

AT)M1 Enables power level adjustment during MNP 10 link negotiation.
NOTE: AT)M1 should not be used with AT*H2.

AT*Hn -- Link Negotiation Speed

This command controls the connection speed for link negotiations before upshift occurs between two MNP 10 modems.

AT*H0 Link negotiation occurs at the highest supported speed. (Default)

AT*H1 Link negotiation occurs at 1200bps; used primarily for establishing cellular connections.

AT*H2 Link negotiation occurs at 4800bps; used primarily to negotiate an MNP 10 connection on less than average quality telephone lines.

AT-Kn -- MNP Extended Services

Enables or disables conversion of a V.42 LAP-M connection to an MNP 10 connection.

AT-K0 Disables V.42 LAP-M to MNP 10 conversion. (Default)

AT-K1 Enables V.42 LAP-M to MNP 10 conversion.

AT-K2 Enables V.42 LAP-M to MNP 10 conversion; inhibits MNP Extended Services initiation during V.42 LAP-M answer modem detection phase.

AT-Qn -- Enable Fallback to V.22bis/V.22

Enables or disables fallback from MNP 10 to V.22bis/V.22.

AT-Q0 Disables fallback to 2400 bps (V.22bis) and 1200 bps (V.22). Fallback is enabled only to 4800 bps.
AT-Q1 Enables fallback to 2400 bps (V.22bis) and 1200 bps (V.22).(Default)

When the modem is connected to V.34, the AT-Q0 command cause the modem to fallback to V.34 2400 bps; the AT-Q1 command cause the modem to fallback to V.22 1200 bps.

AT@Mn -- Initial Cellular Power Level Setting

Sets the initial transmit power level for upshift at connect until line conditions can be determined. AT@M0 corresponds to -26dBm, AT@M1 corresponds to -30dBm, AT@M2 through AT@M10 correspond to -10dBm, and AT@M11 through AT@M31 correspond to -11dBm to -31dBm, respectively.

AT@M0	-26 dBm
AT@M1	-30 dBm
AT@M2 to AT@M10	-10 dBm
AT@M11	-11 dBm
.	.
AT@M18	-18 dBm (Default)
.	.
AT@M31	-31 dBm

AT:En -- Compromise Equalizer Enable Command

Enables or disables the V.32 compromise equalizer. This command can be used when the modem is attached to either a flat line or a cellular connection.

AT:E0 Disables the equalizer
AT:E1 Enables the equalizer (Default)

CHAPTER 5

REGISTERS

Introduction

This chapter describes each register and explains how to change its value. Some registers control a single function while others control several functions and are bit mapped. Bit-mapped registers are recommended for reading modem status only.

Commands to Change or Read Registers

ATSn=???	Changes the value of a register. "n" = number of register ??? = new value of register in decimal
AT = ???	Changes the value of the last referenced register. ??? = new value
AT?	Displays the value of the last referenced register.
ATSn	Points to new register. "n" = number of register to point
ATSn?	Displays the contents of the register selected with n. "n" = number of register to point.

The modem uses registers to store configuration status. Some of the registers control only one function, but some of them are called bit mapped registers which control several functions in single register.

Table 5-1 summarizes the functions of each register used by the modem:

Register	Function Description	Default	Range	Units
S0	Rings to Auto-Answer	1	0-255	Rings
S1	Ring Counter	0	0-255	Rings
S2	Escape Character	43	0-255	ASCII
S3	Carriage Return Character	13	0-127	ASCII
S4	Line Feed Character	10	0-127	ASCII
S5	Backspace Character	8	0- 32	ASCII
S6	Wait Time for Dial Tone	2	2-255	Sec.
S7	Wait Time for Carrier	45	1-255	Sec.
S8	Pause Time for Dial Delay	2	0-255	Sec.
S9	Carrier Detect Response Time	6	0-255	.1 Sec.
S10	Delay for Hanging Up after Carrier Loss	14	1-255	.1 Sec.
S11	DTMF Duration and Spacing	95	50-255	.001 Sec.
S12	Escape Code Guard Time	50	0-255	.02 Sec.
S14	Bit Mapped Register			
S16	Bit Mapped Register			
S18	Test Timer	0	0-255	Sec.
S19	Bit Mapped Option			
S20	AutoSync HDLC Address or BSC Sync. Character	0	0-255	
S21	Bit Mapped Register			
S22	Bit Mapped Register			
S23	Bit Mapped Register			
S25	Delay to DTR	5	0-255	.01 Sec.
S26	RTS to CTS Delay Interval	1	0-255	.01 Sec.
S27	Bit Mapped Register			
S28	Bit Mapped Register			
S29	Flash Dial Modifier Timer	70	0-255	.01 Sec.
S30	Inactivity Timer	0	0-255	Sec.
S31	Bit Mapped Options Status			
S32	XON Character	17	0-255	ASCII
S33	XOFF Character	19	0-255	ASCII
S36	Negotiation Fallback	7	0-7	
S37	Desired Line Speed	0	0-12	
S38	Delay before Forced Hang up	5	0-255	Sec.
S39	Bit Mapped Options Status			
S40	Bit Mapped Options Status			
S41	Bit Mapped Options Status			
S46	Data Compression Selection	138	136 or 138	
S48	Negotiation Selection	7	0,7, or 128	
S82	Break Signaling Control	(For compatibility only)		
S86	Call Failure Reason Code		0,4,5,9,12,13,14	
S91	PSTN Transmit Attenuation Level	10	0-15 dB	

S92	Fax Transmit Attenuation Level	10	0-15	dB
S95	Negotiation Message Options	0		
S99	Leased Line Transmit Attenuation Level	10	0-31	dB
S201	Cellular Transmit Level	3AH		
S211	Restore Timer	60	1-255	Minute
S212	Backup Timer	60	1-255	Sec.

Table 5-1 Modem S-registers

Register Description

S0 Number of Rings to Auto-Answer

Sets the number of rings required before the modem automatically answers a call. Setting this register to zero disables the auto-answer function.

Range: 0-255, rings
Default: 1

S1 Ring Counter

S1 is incremented each time the modem detects a ring signal on the telephone line. S1 is cleared if no rings occur over an eight seconds interval.

Range: 0-255, rings
Default: 0

S2 Escape Character

S2 holds the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII "+". A value over 127 disables the escape process, i.e., no escape character will be recognized.

Range: 0-255, ASCII decimal
Default: 43 (+)

S3 Carriage Return Character

Sets the command line and result code terminator character. Pertains to asynchronous operation only.

Range: 0-127, ASCII decimal
Default: 13 (Carriage Return)

S4 Line Feed Character

Sets the character recognized as a line feed. Pertains to asynchronous operation only. The Line Feed control character is output after the Carriage Return control character if verbose result codes are used.

Range: 0-127, ASCII decimal
Default: 10 (Line Feed)

S5 Backspace Character

Sets the character recognized as a backspace. Pertains to asynchronous operation only. The modem will not recognize the Backspace character if it is set to a value that is greater than 32. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE the Backspace character, an ASCII space character and a second Backspace character, this means a total of three characters are transmitted each time the modem processes the Backspace character.

Range: 0-32, ASCII decimal
Default: 8 (Backspace)

S6 Wait Time for Dial Tone before Blind Dialing, or after îWî Dial Modifier

Sets the length of time, in seconds, that the modem will wait before starting to dial after going off-hook when blind dialing. The "Wait for Dial Tone" call progress feature (W dial modifier in

the dial string) will override the value in S register 6.

The modem always pauses for a minimum of 2 seconds, even if the value of S register 6 is less than 2 seconds.

Range: 2-255, seconds
Default: 2 (seconds)

S7 Wait Time for Carrier after Dial, for Silence, or for Dial Tone after îWî Dial Modifier

1. Sets the length of time, in seconds, that the modem will wait for carrier before hanging up. The timer is started when the modem finishes dialing (originate), or 2 seconds after going off-hook (answer). In originate mode, the timer is reset and restart upon detection of answer tone.
2. Sets the length of time, in seconds, that modem will wait for silence when encountering the @ dial modifier before continuing with the next dial string parameter.

Range: 1-255, seconds
Default: 45 (seconds)

S8 Pause Time for Dial Delay

Sets the time, in seconds, that the modem must pause when the "," dial modifier is encountered in the dial string.

Range: 0-255, seconds
Default: 2 (seconds)

S9 Carrier Detect Response Time

Sets the time, in tenths of a second, that the carrier must be present before the modem considers it valid and turns on CD signal. As this time is increased, there is less chance to detect a false carrier due to noise from the telephone line.

Range: 0-255, tenths of a second
Default: 6 (0.6 second)

S10 Delay for Hang Up after Carrier Loss

This delay time allows the carrier to momentarily disappear without causing the modem to disconnect. Both modems should have equal values in S register 10, otherwise disconnect occurs when the lower value is reached. If the modem can NOT disconnect the line correctly, please adjust the register to a lower value. If the modem disconnects the line very often, please adjust the register to a higher value. If the modem connect to V.32 or above protocols, this register is ignored. The modem will use line quality to disconnect the telephone line.

Range: 1-255, tenths of a second
Default: 14 (1.4 seconds)

S11DTMF Duration and Spacing

This register controls the duration and spacing of DTMF tones. The content of this register representing the duration and spacing between DTMF tones generated during tone dialing.

Range: 50-255, milliseconds
Default: 95 (95 milliseconds)

S12 Escape Code Guard Time

Sets the time delay which must be present before and after entering the three characters escape code sequence (+++). Set this guard time to zero will disable the escape feature.

Range: 0-255, 1/50 of a second
Default: 50 (1 second)

S14 Bit Mapped Options Status

Indicates the status of command options.

Bit 0 -- Reserved
Bit 1 -- Command echo (En)

0 = Disabled (E0)
1 = Enabled (E1) (Default)

Bit 2 -- Quiet mode (Qn)
0 = Sends result codes (Q0) (Default)
1 = Does not send result codes (Q1)

Bit 3 -- Result codes (Vn)
0 = Digit (V0)
1 = Verbose (V1) (Default)

Bit 4 -- Keyboard Interrupt command (*Kn)
0 = Enables keyboard interrupt (*K0) (Default)
1 = Disables keyboard interrupt (*K1)

Bit 5 -- Tone (T)/Pulse (P)
0 = Tone (T) (Default)
1 = Pulse (P)

Bit 6 -- Trellis Coding Modulation selection (&Un)
0 = Enables trellis coding modulation (&U0) (Default)
1 = Disables trellis coding modulation (&U1)

Bit 7 -- Originate/Answer
0 = Answer
1 = Originate (Default)

S16 Bit Mapped Test Options Status

Indicates the test in progress status.

Bit 0 -- Local Analog Loop Back
0 = Disabled (Default)
1 = Enabled (&T1)

Bit 1 -- Reserved

Bit 2 -- Local Digital Loop Back
0 = Disabled (Default)
1 = Enabled (&T3)

Bit 3 -- Remote Digital Loop Back (RDL) status
0 = Modem not in RDL (Default)
1 = RDL in progress

Bit 4 -- RDL requested
0 = RDL not requested (Default)
1 = RDL requested (&T6)

Bit 5 -- RDL with self test
0 = Disabled (Default)
1 = Enabled (&T7)

Bit 6 -- Local Analog Loop Back (LAL) with self test
0 = Disabled (Default)
1 = Enabled (&T8)

Bit 7 -- Reserved

S18 Test Timer

Sets the length of time the modem conducts a diagnostic test. S register 18 is available only when the modem is set to 1200bps or higher. When S register 18 is set to 0, the modem will not end the test. You must enter the AT&T0 command to end the test.

Range: 0-255, seconds
Default: 0

S19 Bit Mapped Options

Defines the options for AutoSync operation (see &Q4 command). S register 19 must be set to the desired value before &Q4 is issued.

Bit 0 --	Reserved
Bit 1 --	BSC/HDLC format selection
	0 = BSC selected (Default)
	1 = HDLC selected
Bit 2 --	Address detection enable/disable
	0 = Disabled (Default)
	1 = Enabled
Bit 3 --	NRZI/NZI coding selection
	0 = NRZI selected (Default)
	1 = NZI selected
Bit 4 --	Idle indicator select
	0 = Mark idle (Default)
	1 = Flag or Sync. idle
Bits 5-7 --	Reserved

S20 AutoSync HDLC Address or BSC Sync. Character

Defines the HDLC address (S register 19 bit 1 = 1) or BSC Sync. Character (S register 19 bit 1 = 0) for AutoSync operation (see &Q4 command). S register 20 must be set to the desired value before &Q4 is issued.

Range: 0-255
Default: 0

S21 Bit Mapped Options Status

Indicates the status of command options.

Bit 0 -- Reserved
Bit 1 -- Ring indicator control (\Rn)
0 = Ring indicator ON (\R0)
1 = Ring indicator OFF after answer (\R1) (Default)
Bit 2 -- CTS behavior (&Rn)
0 = CTS tracks RTS (&R0)
1 = CTS always on (&R1) (Default)
Bits 3-4 -- DTR behavior (&Dn)
0 = &D0 selected
1 = &D1 selected
2 = &D2 selected (Default)
3 = &D3 selected
Bits 5-6 -- RLSD (DCD) behavior (&Cn)
0 = &C0 selected
1 = &C1 selected (Default)
2 = &C2 selected
Bit 7 -- Long space disconnect (Yn)
0 = Y0 selected (Default)
1 = Y1 selected

S22 Bit Mapped Options Status

Indicates the status of command options.

Bits 0-1 -- Speaker volume (Ln)
0 = Low (L0, same as L1)
1 = Low (L1) (Default)
2 = Medium (L2)
3 = High (L3)
Bits 2-3 -- Speaker control (Mn)
0 = Speaker OFF (M0)
1 = Speaker ON until connect (M1) (Default)
2 = Always ON (M2)
3 = ON during handshake (M3)
Bits 4-6 -- Limit result codes (Xn)
0 = X0 selected
4 = X1 selected
5 = X2 selected
6 = X3 selected
7 = X4 selected (Default)
Bit 7 -- Ring back message command (%Rn)
0 = Disables ring back message (%R0) (Default)
1 = Enables ring back message (%R1)

S23 Bit Mapped Options Status

Indicates the status of command options.

Bit 0 --	Grant RDL
	0 = RDL not allowed (&T5)
	1 = RDL allowed (&T4) (Default)
Bits 1-3 --	DTE Rate
	0 = 0 to 300 bps
	1 = 600 bps
	2 = 1200 bps
	3 = 2400 bps
	4 = 4800 bps
	5 = 9600 bps
	6 = 19200 bps
	7 = 38400 bps or higher
Bits 4-5 --	Assumed DTE parity
	0 = Even
	1 = Not used
	2 = Odd
	3 = None (Default)
Bits 6-7 --	Guard Tone (&Gn)
	0 = None (&G0) (Default)
	1 = None (&G1)
	2 = 1800 Hz (&G2)

S25 Delay to DTR

This register has two functions, describes below:
Normally this S register 25 defines the length of time the modem recognizes a DTR changed. The unit of S register 25 is hundredth of a second.

When sets to AT&Q1, it controls the length of time the modem waits to check DTR after establishing a connection. The unit of S register 25 is second. This allows enough time to disconnect the modem from an asynchronous terminal and attach it to a synchronous terminal without forcing it back to the command mode. After this time delay, the unit of S register 25 is changed to hundredth of a second. All the DTR status changes must last longer than the time specified by S register 25 before the modem

recognizes the DTR changed.

Range: 0-255, 1 second for synchronous mode 1 right after connect;0.01 second otherwise
Default: 5

S26 RTS to CTS Delay Interval

This register controls synchronous mode and asynchronous direct mode only, has no effect in asynchronous normal or error correction mode. When Clear-To-Send(CTS) tracks Request-To-Send (RTS) and the modem detects an OFF-to-ON transition on RTS, S register 26 sets the length of time the modem waits before turning on CTS. CTS tracks RTS when AT&R0 is set.

Range: 0-255, hundredths of a second
Default: 1 (millisecond)

S27 Bit Mapped Options Status

Indicates the status of command options.

Bits 0,1,3 --	Synchronous/asynchronous selection (&Mn/&Qn)
	0 = &M0 or &Q0 selected
	1 = &M1 or &Q1 selected
	2 = &M2 or &Q2 selected
	3 = &M3 or &Q3 selected
	4 = &Q4 selected
	5 = &Q5 selected (Default)
	6 = &Q6 selected
Bit 2 --	Reserved
Bits 4-5 --	Synchronous clock selection (&Xn)
	0 = Internal clock (&X0) (Default)
	1 = External clock (&X1)
	2 = Slave clock (&X2)
Bit 6 --	ITU-T/Bell mode selection (Bn)
	0 = ITU-T mode (B0)
	1 = Bell mode (B1) (Default)
Bit 7 --	Reserved

S28 Bit Mapped Options Status

Indicates the status of command options.

Bits 0-2 -- Reserved
Bits 3-4 -- Pulse dialing (&Pn)
0 = 39%-61% Make/Break ratio at 10 pulses per second (&P0)
1 = 33%-67% Make/Break ratio at 10 pulses per second (&P1) (Default)
2 = 39%-61% Make/Break ratio at 20 pulses per second (&P2)
3 = 33%-67% Make/Break ratio at 20 pulses per second (&P3)
Bit 5 -- Reserved
Bits 6-7 -- MNP Link Negotiation Speed (*Hn)
0 = Link negotiation at highest speed (*H0) (Default)
1 = Link negotiation at 1200 bps (*H1)
2 = Link negotiation at 4800 bps (*H2)

S29 Flash Dial Modifier Time

Sets the length of time, in units of 10mS, the modem will go on-hook when it encounters the Flash (!) dial modifier in the dial string.

Range: 0-255, 10 mS interval
Default: 70 (milliseconds)

S30 Inactivity Disconnect Timer

This register monitors the activity on the line. It specifies the time that the modem waits before hanging up while no data is received or sent. The timer is disabled when set to 0.

Range: 0-255, 10seconds
Default: 0 (Disabled)

S31 Bit Mapped Options Status

Indicates the status of command options.

For 28800bps model:

Bit 0 -- Reserved

Bits 1 -- Controls auto line speed detection (Nn)
0 = Disabled (N0)
1 = Enabled (N1) (Default)
Bits 2-3 -- Controls error correction progress messages (Wn)
0 = DTE speed only (W0) (Default)
1 = Full reporting (W1)
2 = DCE speed only (W2)
Bits 4-- 0 = N3 OFF
1 = N3 ON
Bits 5-7 -- Reserved

For 14400bps model:

Bit 0 -- 0 = N3 OFF
1 = N3 ON
Bits 1 -- 0 = Fix-mode (N0)
1 = Multi-mode (N1) (Default)
Bits 2-3 -- Controls error correction progress messages (Wn)
0 = DTE speed only (W0) (Default)
1 = Full reporting (W1)
2 = DCE speed only (W2)
Bits 4-- 0 = N2 OFF
1 = N2 ON
Bits 5-7 -- Reserved

S32 XON Character

Sets the value of the XON character for software flow control.

Range: 0-255, ASCII decimal
Default: 17 (CTL-Q)

S33 XOFF Character

Sets the value of the XOFF character for software flow control.

Range: 0-255, ASCII decimal
Default: 19 (CTL-S)

S36 LAP-M Failure Control

This value indicates what should happen upon a LAP-M failure. These fallback options are initiated immediately upon connection

if S48=128. If an invalid number is entered, the number is accepted into the register, but S36 will act as if the default value has been entered.

S36 = 0 Modem disconnects
S36 = 1 Modem stays on-line and a Direct mode connection is established
S36 = 3 Modem stays on-line and a Normal mode connection is established
S36 = 4 An MNP connection is attempted and if it fails, the modem disconnects
S36 = 5 An MNP connection is attempted and if it fails, a Direct mode connection is established
S36 = 6 Reserved
S36 = 7 An MNP connection is attempted and if it fails, a Normal mode connection is established. (Default)

S37 Desired Line Connection Speed

Desired line connection speed. If an invalid number is entered, the number is accepted into the register, but S register 37 will act as if the default value has been entered.

S37 = 0 Attempts auto mode connection (Default)
S37 = 1-3 Attempts to connect at 300 bps
S37 = 5 Attempts to connect at V.22 1200 bps
S37 = 6 Attempts to connect at V.22 bis 2400 bps
S37 = 7 Attempts to connect at V.23 1200/75 bps
S37 = 8 Attempts to connect at V.32 bis/V.32 4800 bps
S37 = 9 Attempts to connect at V.32 bis/V.32 9600 bps
S37 = 10 Attempts to connect at V.32 bis 12000 bps
S37 = 11 Attempts to connect at V.32 bis 14400 bps
S37 = 12 Attempts to connect at V.32 bis 7200 bps

S38 Delay before Forced Hang up

This register specifies the delay between the modem's receipt of the ATH0 command to disconnect (or ON-to-OFF transition of DTR if the modem is programmed to follow the signal), and the disconnect operation. Applicable to error-correction connection

only. This register can be used to ensure that data in the modem buffer is sent before the modem disconnects.

1. If S register 38 is set to a value between 0 and 254, the modem will wait that number of seconds for the remote modem to acknowledge all data in the modem buffer before disconnecting. If time expires before all data is sent, the NO CARRIER result code is issued to indicate that the data has been lost. If all data is transmitted prior to time-out, the response to the ATH0 command will be OK.

2. If S register 38 is set to 255, the modem does not time-out and continues to attempt to deliver data in the buffer until the connection is lost or the data is delivered.

Range: 0-255, seconds
Default: 5 (seconds)

S39 Bit Mapped Options Status

Bits 0-3 -- Flow control option (&Kn)
- 0 = No flow control (&K0)
- 1 = Unidirectional RTS/CTS (&K1)
- 2 = Unidirectional XON/XOFF (&K2)
- 3 = RTS/CTS (&K3) (Default)
- 4 = XON/XOFF (&K4)
- 5 = Transparent XON/XOFF (&K5)
- 6 = Both methods (&K6)
- 7 = DTR/DSR (&K7)
- 8 = Unidirectional DTR/DSR(&K8)

Bits 4-5 -- DSR option (&Sn)
- 0 = &S0 selected (Default)
- 1 = &S1 selected
- 2 = &S2 selected

S40 Bit Mapped Options Status

Indicates the status of command options.

Bits 0-1 -- MNP Extended Services (-Kn)
- 0 = Disable extended services (-K0) (Default)
- 1 = Enables extended services (-K1)
- 2 = Enables extended services (-K2)

Bit 2 -- Power Level Adjustment for cellular use ( )Mn)
0 = Auto-adjustment ( )M0) (Default)
1 = Force adjustment ( )M1)
Bits 3-5 -- Break handling (\Kn)
0 = \K0 selected
1 = \K1 selected
2 = \K2 selected
3 = \K3 selected
4 = \K4 selected
5 = \K5 selected (Default)
Bits 6-7 -- MNP block size (\An)
0 = 64 bytes (\A0)
1 = 128 bytes (\A1) (Default)
2 = 192 bytes (\A2)
3 = 256 bytes (\A3)

S41 Bit Mapped Options Status

Indicates the status of command options.

Bits 0-1 -- Compression protocol selection (%Cn)
0 = Disabled (%C0)
1 = MNP 5 (%C1)
2 = V.42 bis (%C2)
3 = MNP 5 and V.42 bis (%C3) (Default)
Bits 2,6 -- Auto retrain and fallback/fall forward (%En)
0 = Retrain and fallback/fall forward disabled (%E0)
1 = Retrain enabled (%E1)
2 = Return and fallback/fall forward enabled (%E2) (Default)
Bit 3 -- Modem-to-modem flow control (\Gn)
0 = Disabled (\G0) (Default)
1 = Enabled (\G1)
Bit 4 -- Block mode control (\Ln)
0 = Stream mode (\L0) (Default)
1 = Block mode (\L1)
Bit 5 -- Reserved
Bit 7 -- Enable fallback to V.22bis/V.22 (-Qn)
0 = Disabled (-Q0)
1 = Enabled (-Q1) (Default)

S46 Data Compression Selection

This register controls whether the data compression takes effect or not.

S46 = 136 Using error correction without data compression.
S46 = 138 Using error correction with data compression. (Default)

S48 V.42 Negotiation Action

The V.42 negotiation process determines the capabilities of the remote modem. However, when the capabilities of the remote modem are known and negotiation is unnecessary, this process can be bypassed if desired.
If an invalid number is entered, it is accepted into the S register, but S register 48 will act as if 128 has been entered.

S48=0 Disables negotiation; bypass the detection and negotiation phases; and proceed with LAP-M.
S48=7 Enables negotiation. (Default)
S48=128 Disables negotiation; bypass the detection and negotiation phases; and proceed at once with the fallback action specified in S register 36. This content can be used to force MNP.

S82 Break Handling Options

S register 82 is for compatibility purpose only, changing this register will not have any affect.

S86 Call Failure Reason Code

When the modem reports a NO CARRIER result code, a value is written to this S register to help determine the reason for the failed connection. S register 86 records the first event that contributes to a NO CARRIER message. The cause codes are:

S86=0 Normal disconnect, no error occurs.
S86=4 Loss of carrier.
S86=5 V.42 negotiation failed to detect an error-correction modem at the other end.
S86=9 The modems could not find a common protocol.
S86=12 Normal disconnect initiated by the remote modem.
S86=13 Remote modem does not respond after 10

re-transmissions of the same message.
S86=14 Protocol violation.

S91 PSTN Transmit Attenuation Level

Sets the transmit attenuation level from 0 to 15 dB for the PSTN mode, resulting in a transmit level from 0 to -15 dBm.

Range: 0 to 15, dB (Corresponding to 0 to -15 dBm transmit level.)
Default: 10 (-10 dBm transmit level)

S92 Fax Transmit Attenuation Level

Sets the transmit attenuation level from 0 to 15 dB for the fax mode, resulting in a transmit level from 0 to -15 dBm.

Range: 0 to 15, dB (Corresponding to 0 to -15 dBm transmit level.)
Default: 10 (-10 dBm transmit level)

S95 Extended Result Codes

The bits in this register can be set to override some of the ATWn command options. A bit set to a "1" in this register will enable the corresponding result code regardless of the ATWn setting.

Bit 0 --	CONNECT result code indicates DCE speed instead of DTE speed
Bit 1 --	Appends /ARQ to CONNECT XXXX result code in error-correction mode (XXXX = bps rate)
Bit 2 --	Enables CARRIER XXXX result code (XXXX = bps rate)
Bit 3 --	Enables PROTOCOL XXXX result code (XXXX = protocol identifier)
Bit 4 --	Reserved
Bit 5 --	Enables COMPRESSION XXXX result code (XXXX = compression type)
Bits 6-7 --	Reserved

S99 Leased Line Transmit Attenuation Level

Sets the transmit attenuation level from 0 to 31 dBm for the Leased Line mode, resulting in a transmit level from 0 to -31 dBm.

Range: 0 to 31, dB (Corresponding to 0 to -31 dBm transmit level.)
Default: 10 (-10 dBm transmit level)

S201 Cellular Transmit Level

The bits in this register are set by the AT@Mn and AT:En commands to support cellular connections.

Default:	3AH
Bits 0-4 --	Initial Cellular Power Level Setting (@Mn)
Bit 5 --	Compromise Equalizer Enable Command (:En)
Bits 6-7 --	Reserved

S211 Dial Back-up Restore Timer

This register defines the restore timer when dial back-up enabled. That means when leased lineís carrier is lost and the dial up line is connected successfully, this timer starts to count, and when the time is up, the modem will hold the dial up line and switch to leased line try to connect to remote modem.

Range: 1 - 255, Minutes
Default: 60 (minutes)

S212 Dial Back-up Timer

This register defines the time interval that when the modem try to change line type. When dial back-up starts (leased line is lost and try dial up line) or restore starts (dial up line is hold and try leased line), the modem will try each line type for the time interval that define by this register.

Range: 1 - 255, Seconds
Default: 60 (seconds)

CHAPTER 6

ITU-T V.25BIS OPERATION

The modem supports ITU-T V.25bis command. You can use application programs that support V.25bis command to drive the modem.

Configuration of ITU-T V.25bis

To configure your modem to operate at ITU-T V.25bis mode, please use the front panel LCD controller to configure the modem into V.25bis mode. Please refer to Appendix A for detail about the menu tree. The modem is now ready to operate at ITU-T V.25bis command mode. The AT command is no longer valid, all the actions that you want the modem to perform have to issue by V.25bis command.

ITU-T V.25bis Command Set

The V.25bis command set provides you to do dialing, storage dialing, storage of telephone number, auto answer, manual answer, etc.The command can be entered in either upper or lower cases. Detail descriptions about the command set are listed below:

CRN n Dialing Command

This command dials a telephone number specified by the parameter "n". The "n" in this command is a dial string which includes telephone number 0 to 9, and #, * for tone dialing only, dial modifiers (please refer to Chapter 4 ATD command). Any dial modifier specified in ATD command is valid here in ITU-T V.25bis command mode. There are four extra dial modifiers that V.25bis defined listed below:

: Same definition as "W" modifier in the ATD command.

< Same definition as " , " modifier in the ATD command.

& Same definition as " ! " modifier in the ATD command.

= Same definition as " ; " modifier in the ATD command.

CRS m Dialing Stored Number Command

Dials the telephone number that previously stored in memory location "m". The range of "m" is between 0 to 9. You can store these telephone numbers using AT&Z command (please refer to Chapter 4) in AT command mode or using PRN command below.

PRN m;n Stored Telephone Number in Location m

This command stores telephone number in memory location "m" for later dialing. It is identical with the AT&Z command in AT command mode. The range of "m" is between 0 to 9. The "n" is a dial string of up to 23 characters. Valid dial string characters are 0 to 9, dial modifiers, and for tone dialing #, *.

RLN Display the Stored Telephone Number

This command shows the ten (location 0 to 9) stored telephone numbers. You can use this command to verify the number that you stored.

DIC Disregard Incoming Call

The DIC command disables the auto answer function of the modem in ITU-T V.25bis operation mode.

CIC Connect Incoming Call

This command enables the auto answer function of the modem.

CNL Execute AT Command

This command allows the user to issue and execute the AT command while in the V.25bis command mode.

ITU-T V.25bis Result Code

The result code shows the result of the command been executed. Detail descriptions of the result codes are showed below:

RESULT CODE	DESCRIPTION
VAL	Command valid and executed successfully.
INV	Command error, can not be executed.
CNX m	Modem connect to the remote modem. The "m" indicate the DCE speed.
INC	Ring signal detected.
CFI m	Failure of dialing, the îmî represents the meanings below: ET Line busy RT No answer CB Local modem busy NT No carrier NS Memory location is empty, no telephone number stored. AB Receive interrupt while dialing
LSN m;n	Display the stored telephone numbers, "m" indicates the memory location of the telephone number, înî indicates the telephone number.

HDLC Sync. Operation of ITU-T V.25bis

Use the front panel LCD controller to enter "TERMINAL MENU" the n V.25bis mode. After you can enter "HDLC" from the "FRAME STRUCTURE" menu. The modem will operate at Sync. Mode and you can issue the V.25bis commands. To use the HDLC command and indications are the same as the V.25bis command above. You have to use the format of HDLC (High-level Data Link Control):

.....	Flag	Address	Control	Message	FCS	Flag	.....

Flag---------- Opening/Closing flag-------- 01111110 (7EH)
Address---------- Address Field---------- 11111111 (FFH)
Control---------- Control Field---------- 00000011 (03H)
00010011 (13H)
Message---------- Command to or Response from modem
FCS---------- Frame check-Sequence

The message is 8 bit ASCII code. The modem will ignore the parity bit when received the V.25bis command from DTE. The modem sends 7 data bits and odd parity to computer when the modem responses to DTE.

The control field of each response should be 03H, and the last response should be 13H, if the responses are multiple.

CHAPTER 7

DIAL BACK-UP OPERATION

The modem provide dial back-up function. You can use this function to ensure the data's continuity of leased line operation if your data is important. If leased line is malfunctioned, the modem will automatically dial the stored number in NVRAM, and try to connect to dial up line in order to continue data transmission.

The data transmission must stop during the process of telephone line change, flow control is essential to avoid data lose while dial back-up function is activated.

Preparation

1、Use the AT command (AT&Zn=m) or frant panel LCD controller to store the remote telephone number into the NVRAM of the modem. Upto ten telephone numbers can be stored.

2、Connect the leased line to the RJ-45 connecter and the dial up line to the RJ-11 connecter, please refer to Chapter 2 "**Modem Rear Panel**" for detail connect information.

3、Change the content of the registers S211、S212 according to the system requirement. Register S211 is the dial back-up automatically restore timer, the unit is minute and the default is 60 minutes; register S212 is the dial back-up timer, the unit is second and the default is 60 seconds.

4、Use the AT command or front panel LCD controller to activate flow control and set the modem to 4-Wire or 2-Wire leased line operation and select the Originate or Answer mode. Use the front panel LCD Controller to activate the dial back-up function.

Dial Back-up Operation

If the leased line quality is not good enough to maintain data transmitting, the modem will retrain and if retrain fails, the modem will lose carrier. The originate modem will automatically dial the stored telephone number in NVRAM, from 0 to 9. If the time interval that specified by register S212 cannot connect (Default: 60 seconds), the modem will go back to leased line and try again to connect and so on until the modem connect successfully.

If the dial up line connect successfully, the modem will begin to transmit data. If the time interval of the register S211 is achieved (Default: 60 minutes), the modem will automatically stop transmitting and change the dial up line to leased line and try to connect. The dial up line will be hold. If the leased line connect successfully, the dial back-up sequence will be ended and the dial up line will be hanged up. If the connection is failed after the time interval that specified by the register S212, the modem will go back to dial up line and await the next time interval that specified by the register S211 to achieve.

If you want the modem to manually restore to the leased line, please use the front panel LCD controller to hang-up the dial up line during dial back-up mode and entering restore sequence.

CHAPTER 8

SPECIAL FUNCTIONS

The modem includes four special functions that offer more applications and secure protections for users. These functions are only on the modem equip with EPROM version upper than 2.0. The details of four special functions are listed below:

*Connection Security
*Callback Security
*Keylock Security
*Remote Configuration

Connection Security:

This function is designed specially for people who need security connection. The connection modems have to be 33600bps modem or 14400bps modem and the same password when this function activated. (please refer to AT*PC for password setting) When the modems connect, it will confirm password each other. If the password check is passed, the modems enter data mode. If not, hang up. This action has no need to enter password, it will confirm right after connection automatically.

The AT Commands for Connection Security:

AT＊OPóSet Connection Security

This command controls the ON/OFF of the connection security. You need to enter password to turn ON or OFF the function.

Enter : AT*OP <CR>
Response : Please input OLD password:
Enter password: modem (The length is fix to 5 digits.)

Response : *****
Turn on/off ? (1=ON, 0=OFF)
Enter : 0 or 1
Response : OK

AT*PC—Change the Password of the Connection Security

The length of the password are 5 digits. You can use this command to change the password. The factory default is "modem".

Enter : AT*PC <CR>
Response : Please input OLD password:
Enter password: modem (Not necessary to press<CR>)
Response : *****
Please input NEW password:
Enter NEW password: ABCDE
Response : Please re-enter NEW password to verify:
confirm NEW password: ABCDE
Response : *****
OK

Call Back Security:

This function is designed for restricted user group. The user have to use particular phone line and password to connect. This modem can store 20 sets of password and telephone number. The length of password are 10 digits and telephone number are 20 digits. You can use colon sign " : " to separate the password and telephone number.

1.Enter password and call back telephone number and then activate call back security function at the answer modem.

2.The user dial for connection, the answer modem will ask to enter password (The terminal of the originate modem shows: ENTER PASSWORD:). After the originate user keyin the correct

password, the answer modem will hang-up and call the corresponding telephone number. (The terminal of the answer modem shows: CHECK OK and CALL BACK IN PROGRESS...)

3.If you enter wrong password, The answer modem will ask password for two more times. Each entry has a time limit of 20 seconds. The modem will hang-up automatically when the third wrong password has entered.

This function can be simplified for only password protection. To acomplish this function, enter the password follows the colon sign ":" and then <CR> using AT*S command. After entering the password, the answer modem will check for password only and will NOT hang-up and call back anymore.

AT Commands for Call Back Security:

AT*E—Set Call Back Security

This command controls the ON/OFF of call back security. Only the answer modem is needed to activate the call back security.

*E0／*E : Call back security disabled **(default)**
*E1 : Call back security enabled

Remark:

Please enter at least one set of the password before activating the call back security function to ensure the modem answers correctly.

AT*L—Call Back Security Password List

The modem will display all the passwords and telephone numbers after reception of this command.

AT*S—Store the Call Back Password and Telephone Number

This command stores the password and telephone number for call back security. The length of the password is 10 digits and the telephone number is 20 digits. The command format is listed below:

AT*Sn= <password> : <telephone number> <CR>
Where n=0 to 19

If only the password and the colon sign been input, the modem will do the password check only.

KeyLock Security:

This function locks the front panel switches to prevent unauthorized person's misoperation. This function must be activated or deactivate through front panel switches. It can't be activated through AT command.Password changing should use the AT*Y command, the length of the password is 5 digits and the default of the password is "modem". The front panel switches will be locked when this function been enabled. Press any one switches will cause the modem to ask for password, you must use the ← , → key to enter the correct password to proceed the rest operation. After activating or deactivating the Keylock function, you need to store the parameter to NVRAM using AT&Wn to ensure the Keylock status after power OFF.

Changing the Password:

The default of the password is "modem" and the length of the password is fix to 5 digits. To change the password, please use the AT*Y command. This password will store to NVRAM automatically.

Enter : AT*Y <CR>
Response : Please input OLD password:
Enter : modem <CR>
Response : *****
Please input NEW password:
Enter : ABCDE <CR> (5 digits only)
Response : *****

Please re-enter NEW password to verify:
Enter : ABCDE <CR>
Response : *****
OK

Remote Configuration:

This modem equip with the remote configuration, can access the remote modem through front panel LCD display. To perform the remote configuration, the remote modem must be the same model listed in this manual and the secondary channel must be set to ON.

1.After connect to the remote modem, select the "M" option in the <MAIN MENU>, the modem will ask for <REMOTE> or <LOCAL> configuration. Use the ← , → Key to select <REMOTE>.

2.The LCD display shows the message "LOADING REMOTE CONFIGURATION" and after the configuration data has transfered, it shows the second level menu. This menu is from the remote modem.

3.You can select any one menu and change any settings you like. When all the selection is done, press <EXIT> to return <MAIN MENU>.

4.The modem will ask for confirmation of transfer data to the remote modem. Press "YES" to confirm the data transfer and the return to the <MAIN MENU>. If press "NO", all the changes are lost and return to the <MAIN MENU>.

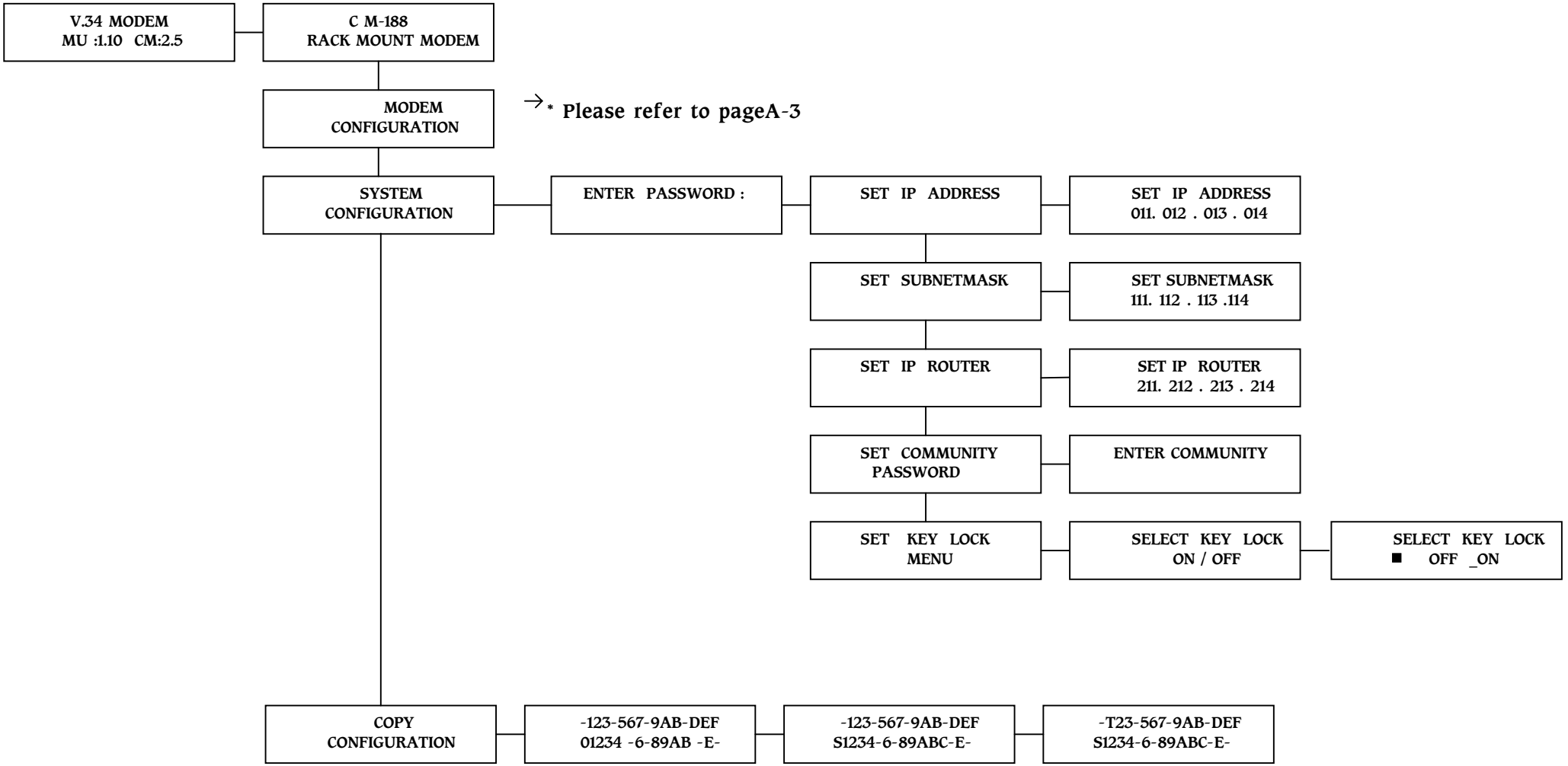
5.When you select the <SAVE PROFILE> in <PROFILE MENU>, the modem will automatically send the changed configuration data to the remote modem and store it to the NVRAM.

The ITU-T V.34/V.32bis/V.32 recommendations can offer secondary channel. When speed above 4800bps, the modem uses secondary channel to transfer configuration data and the main channel still

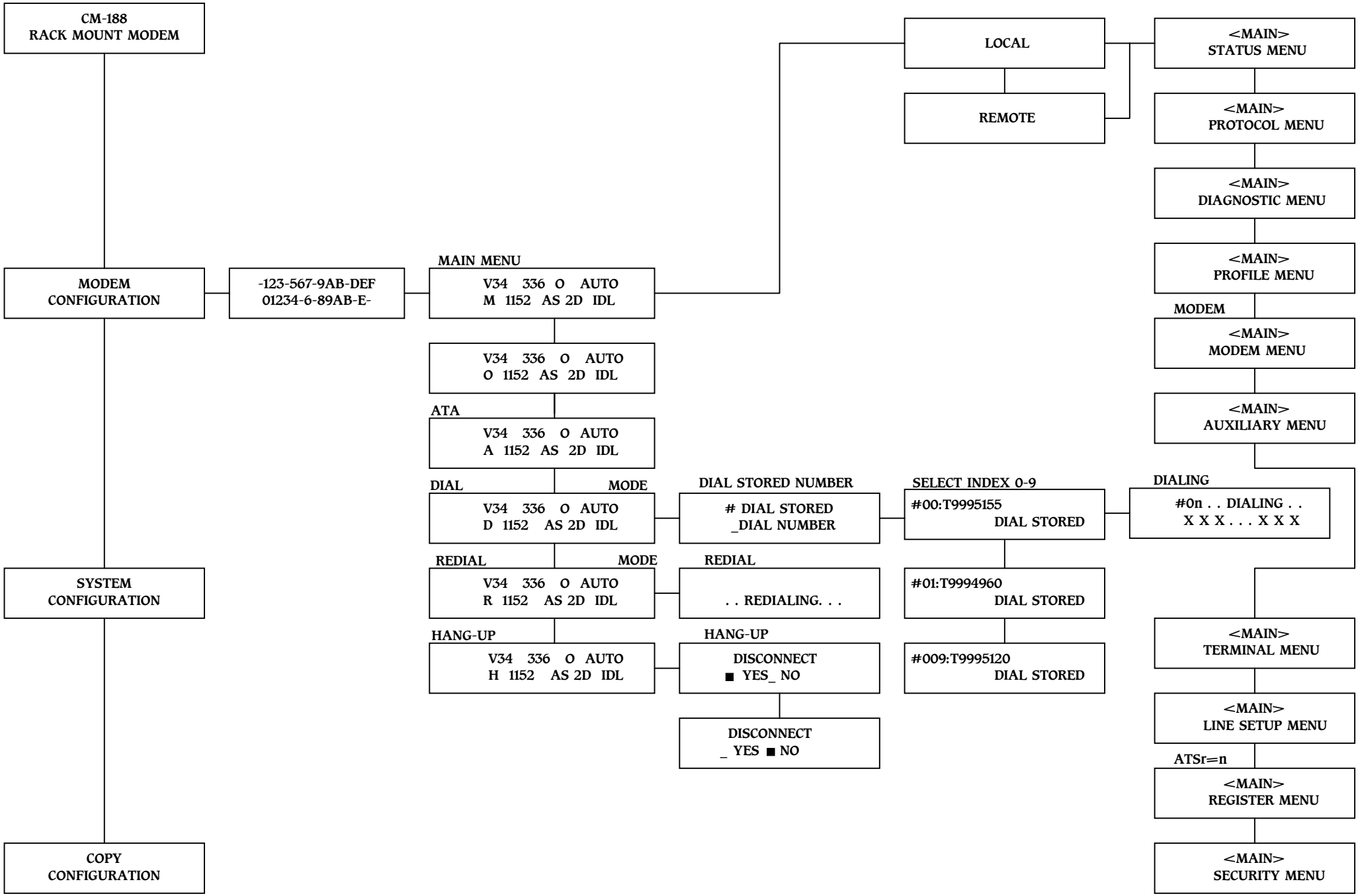
can transfer user data. But if you using the remote configuration function in ITU-T V.22bis, the modem uses the main channel to transfer configuration data and the user data must be stopped.

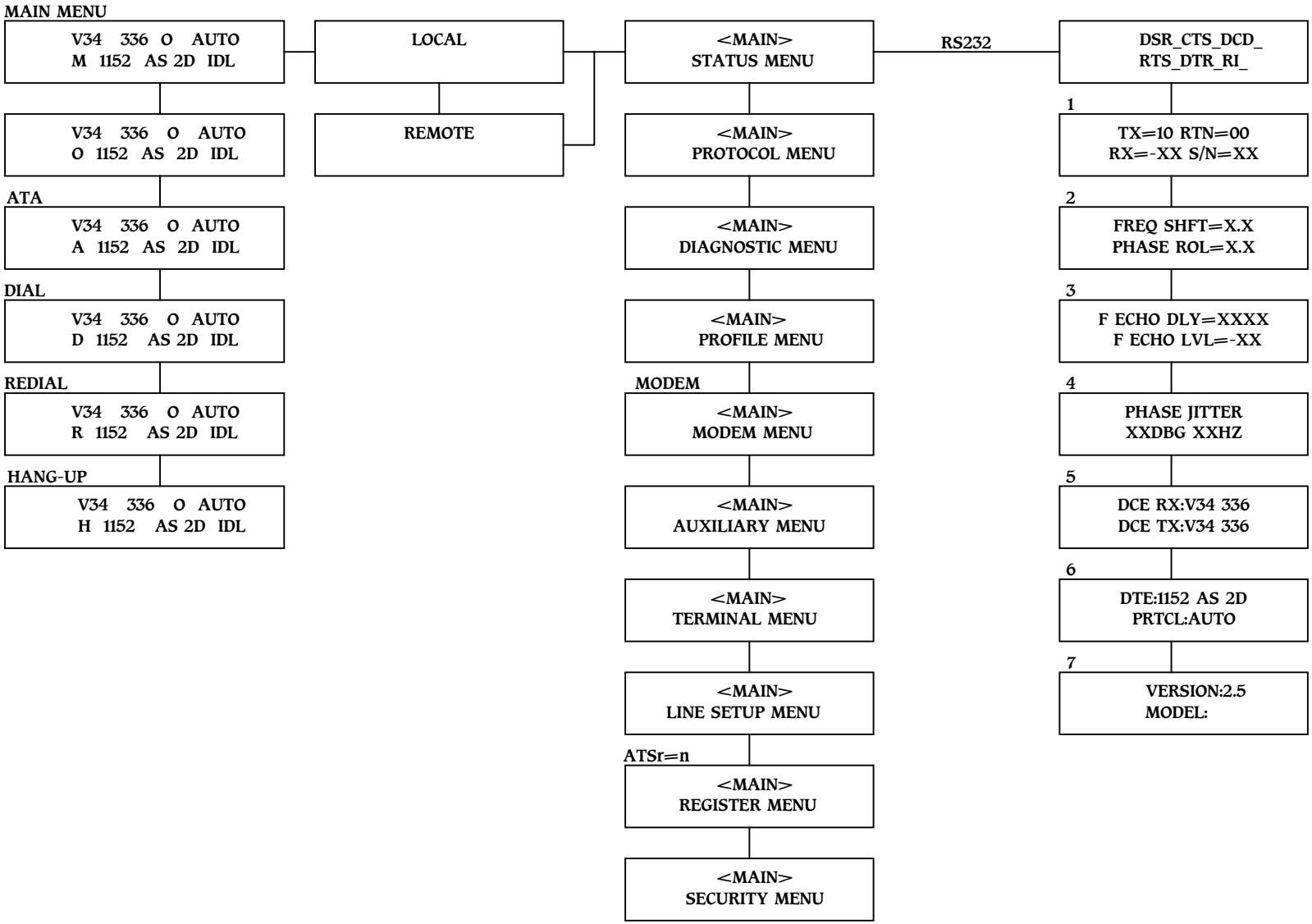
APPENDIX A
LCD MENU TREE

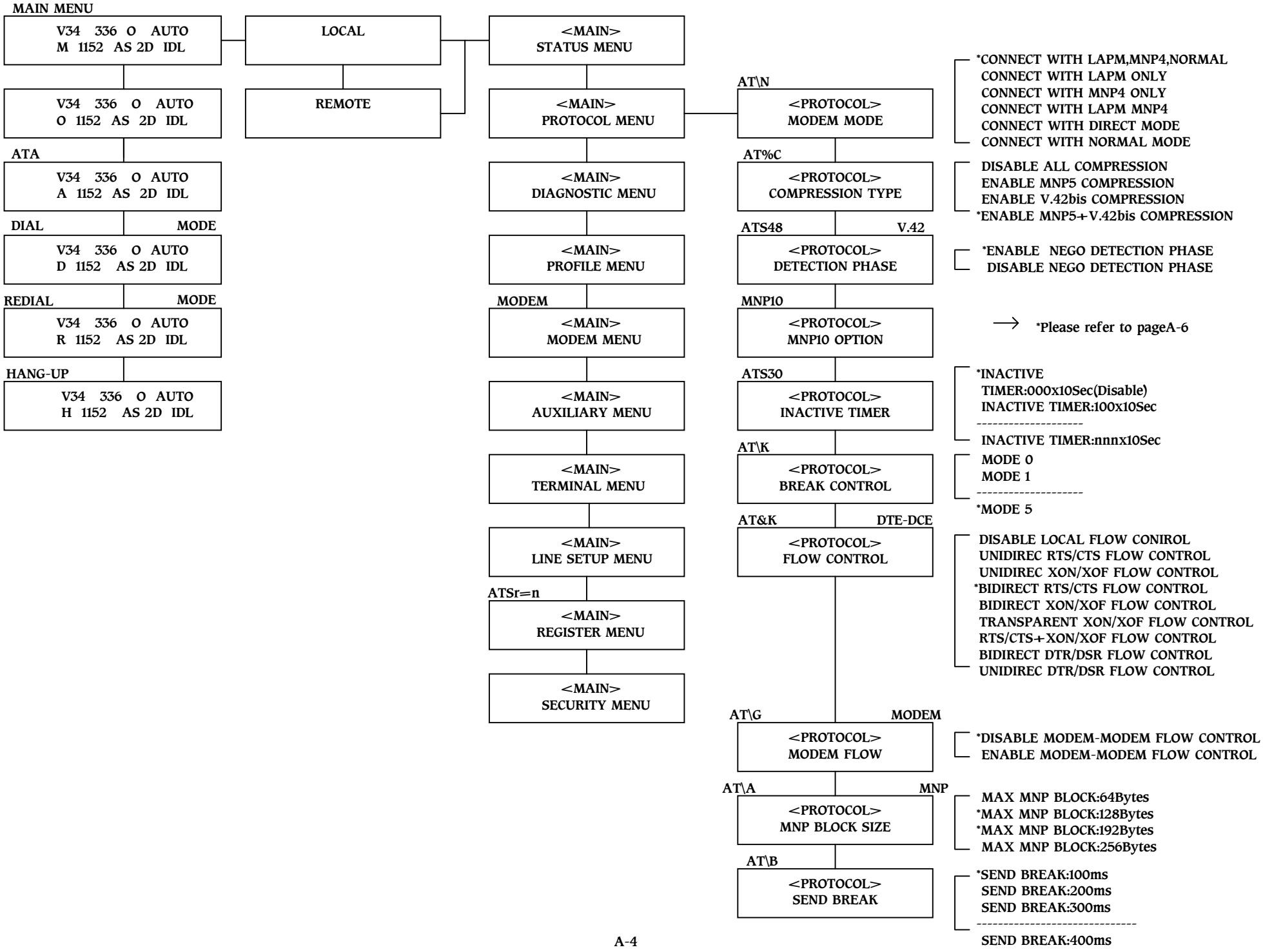
Please find enclosed LCD Menu tree for the front panel LCD controller

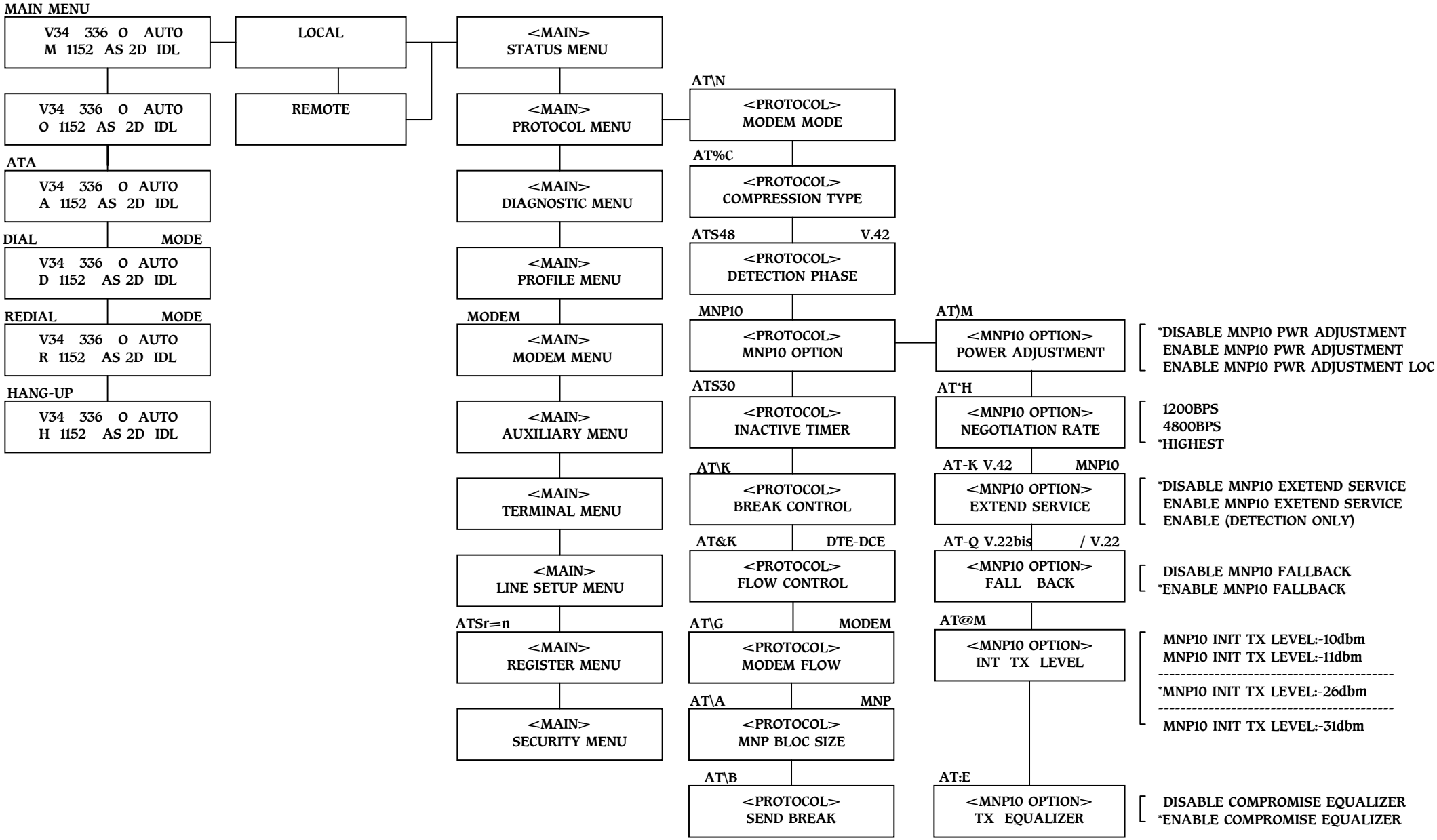


*Remark For Rack Mounted Control Module Only


CM-188
RACK MOUNT MODEM
MODEM
CONFIGURATION
SYSTEM
CONFIGURATION
COPY
CONFIGURATION
-123-567-9AB-DEF
01234-6-89AB-E-
MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
MODE
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
MODE
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
DIAL STORED NUMBER
DIAL STORED
_DIAL NUMBER
REDIAL
. . REDIALING. . .
HANG-UP
DISCONNECT
■ YES_ NO
DISCONNECT
_ YES ■ NO
SELECT INDEX 0-9
#00:T9995155
DIAL STORED
#01:T9994960
DIAL STORED
#009:T9995120
DIAL STORED
DIALING
#0n . . DIALING . .
X X X . . . X X X
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
<MAIN>
DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
<MAIN>
DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
RS232
DSR_CTS_DCD_
RTS_DTR_RI_
1
TX=10 RTN=00
RX=-XX S/N=XX
2
FREQ SHFT=X.X
PHASE ROL=X.X
3
F ECHO DLY=XXXX
F ECHO LVL=-XX
4
PHASE JITTER
XXDBG XXHZ
5
DCE RX:V34 336
DCE TX:V34 336
6
DTE:1152 AS 2D
PRTCL:AUTO
7
VERSION:2.5
MODEL:


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
MODE
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
MODE
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
<MAIN>
DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
AT\N
<PROTOCOL>
MODEM MODE
*CONNECT WITH LAPM,MNP4,NORMAL
CONNECT WITH LAPM ONLY
CONNECT WITH MNP4 ONLY
CONNECT WITH LAPM MNP4
CONNECT WITH DIRECT MODE
CONNECT WITH NORMAL MODE
AT%C
<PROTOCOL>
COMPRESSION TYPE
DISABLE ALL COMPRESSION
ENABLE MNP5 COMPRESSION
ENABLE V.42bis COMPRESSION
*ENABLE MNP5+V.42bis COMPRESSION
ATS48
V.42
<PROTOCOL>
DETECTION PHASE
*ENABLE NEGO DETECTION PHASE
DISABLE NEGO DETECTION PHASE
MNP10
<PROTOCOL>
MNP10 OPTION
→ *Please refer to pageA-6
ATS30
<PROTOCOL>
INACTIVE TIMER
*INACTIVE
TIMER:000x10Sec(Disable)
INACTIVE TIMER:100x10Sec
INACTIVE TIMER:nnnx10Sec
AT\K
<PROTOCOL>
BREAK CONTROL
MODE 0
MODE 1
*MODE 5
AT&K
DTE-DCE
<PROTOCOL>
FLOW CONTROL
DISABLE LOCAL FLOW CONIROL
UNIDIREC RTS/CTS FLOW CONTROL
UNIDIREC XON/XOF FLOW CONTROL
*BIDIRECT RTS/CTS FLOW CONTROL
BIDIRECT XON/XOF FLOW CONTROL
TRANSPARENT XON/XOF FLOW CONTROL
RTS/CTS+XON/XOF FLOW CONTROL
BIDIRECT DTR/DSR FLOW CONTROL
UNIDIREC DTR/DSR FLOW CONTROL
AT\G
MODEM
<PROTOCOL>
MODEM FLOW
*DISABLE MODEM-MODEM FLOW CONTROL
ENABLE MODEM-MODEM FLOW CONTROL
AT\A
MNP
<PROTOCOL>
MNP BLOCK SIZE
MAX MNP BLOCK:64Bytes
*MAX MNP BLOCK:128Bytes
*MAX MNP BLOCK:192Bytes
MAX MNP BLOCK:256Bytes
AT\B
<PROTOCOL>
SEND BREAK
*SEND BREAK:100ms
SEND BREAK:200ms
SEND BREAK:300ms
SEND BREAK:400ms


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
MODE
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
MODE
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
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STATUS MENU
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PROTOCOL MENU
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DIAGNOSTIC MENU
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PROFILE MENU
MODEM
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MODEM MENU
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AUXILIARY MENU
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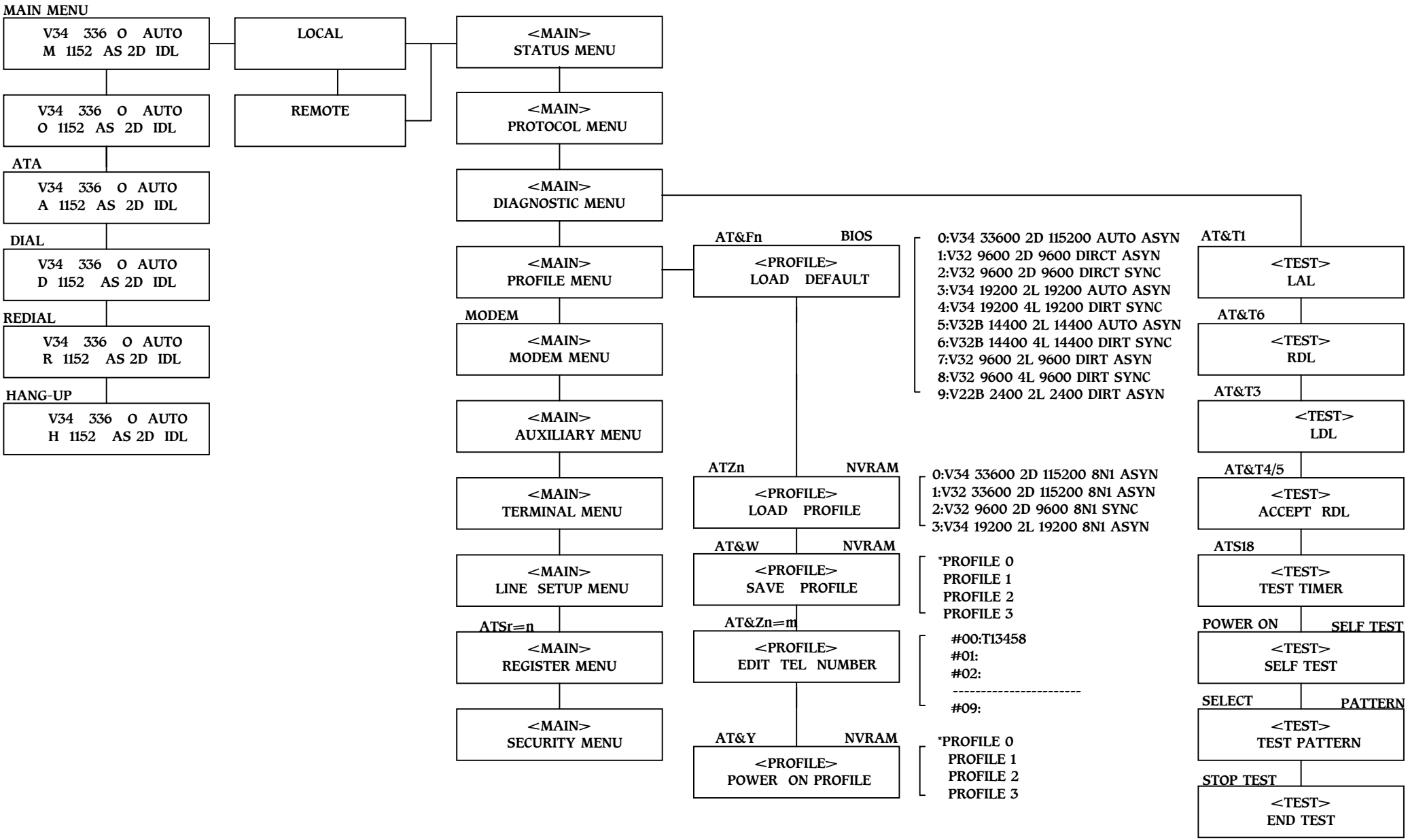
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
AT\N
<PROTOCOL>
MODEM MODE
AT%C
<PROTOCOL>
COMPRESSION TYPE
ATS48
V.42
<PROTOCOL>
DETECTION PHASE
MNP10
<PROTOCOL>
MNP10 OPTION
ATS30
<PROTOCOL>
INACTIVE TIMER
AT\K
<PROTOCOL>
BREAK CONTROL
AT&K
DTE-DCE
<PROTOCOL>
FLOW CONTROL
AT\G
MODEM
<PROTOCOL>
MODEM FLOW
AT\A
MNP
<PROTOCOL>
MNP BLOC SIZE
AT\B
<PROTOCOL>
SEND BREAK
AT)M
<MNP10 OPTION>
POWER ADJUSTMENT
*DISABLE MNP10 PWR ADJUSTMENT
ENABLE MNP10 PWR ADJUSTMENT
ENABLE MNP10 PWR ADJUSTMENT LOC
AT*H
<MNP10 OPTION>
NEGOTIATION RATE
1200BPS
4800BPS
*HIGHEST
AT-K V.42
MNP10
<MNP10 OPTION>
EXTEND SERVICE
*DISABLE MNP10 EXETEND SERVICE
ENABLE MNP10 EXETEND SERVICE
ENABLE (DETECTION ONLY)
AT-Q V.22bis
/ V.22
<MNP10 OPTION>
FALL BACK
DISABLE MNP10 FALLBACK
*ENABLE MNP10 FALLBACK
AT@M
<MNP10 OPTION>
INT TX LEVEL
MNP10 INIT TX LEVEL:-10dbm
MNP10 INIT TX LEVEL:-11dbm
*MNP10 INIT TX LEVEL:-26dbm
MNP10 INIT TX LEVEL:-31dbm
AT:E
<MNP10 OPTION>
TX EQUALIZER
DISABLE COMPROMISE EQUALIZER
*ENABLE COMPROMISE EQUALIZER


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
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PROTOCOL MENU
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PROFILE MENU
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MODEM MENU
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AUXILIARY MENU
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TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
AT&Fn
BIOS
<PROFILE>
LOAD DEFAULT
0:V34 33600 2D 115200 AUTO ASYN
1:V32 9600 2D 9600 DIRCT ASYN
2:V32 9600 2D 9600 DIRCT SYNC
3:V34 19200 2L 19200 AUTO ASYN
4:V34 19200 4L 19200 DIRT SYNC
5:V32B 14400 2L 14400 AUTO ASYN
6:V32B 14400 4L 14400 DIRT SYNC
7:V32 9600 2L 9600 DIRT ASYN
8:V32 9600 4L 9600 DIRT SYNC
9:V22B 2400 2L 2400 DIRT ASYN
ATZn
NVRAM
<PROFILE>
LOAD PROFILE
0:V34 33600 2D 115200 8N1 ASYN
1:V32 33600 2D 115200 8N1 ASYN
2:V32 9600 2D 9600 8N1 SYNC
3:V34 19200 2L 19200 8N1 ASYN
AT&W
NVRAM
<PROFILE>
SAVE PROFILE
*PROFILE 0
PROFILE 1
PROFILE 2
PROFILE 3
AT&Zn=m
<PROFILE>
EDIT TEL NUMBER
#00:T13458
#01:
#02:

#09:
AT&Y
NVRAM
<PROFILE>
POWER ON PROFILE
*PROFILE 0
PROFILE 1
PROFILE 2
PROFILE 3
AT&T1
<TEST>
LAL
AT&T6
<TEST>
RDL
AT&T3
<TEST>
LDL
AT&T4/5
<TEST>
ACCEPT RDL
ATS18
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TEST TIMER
POWER ON
SELF TEST
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SELF TEST
SELECT
PATTERN
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TEST PATTERN
STOP TEST
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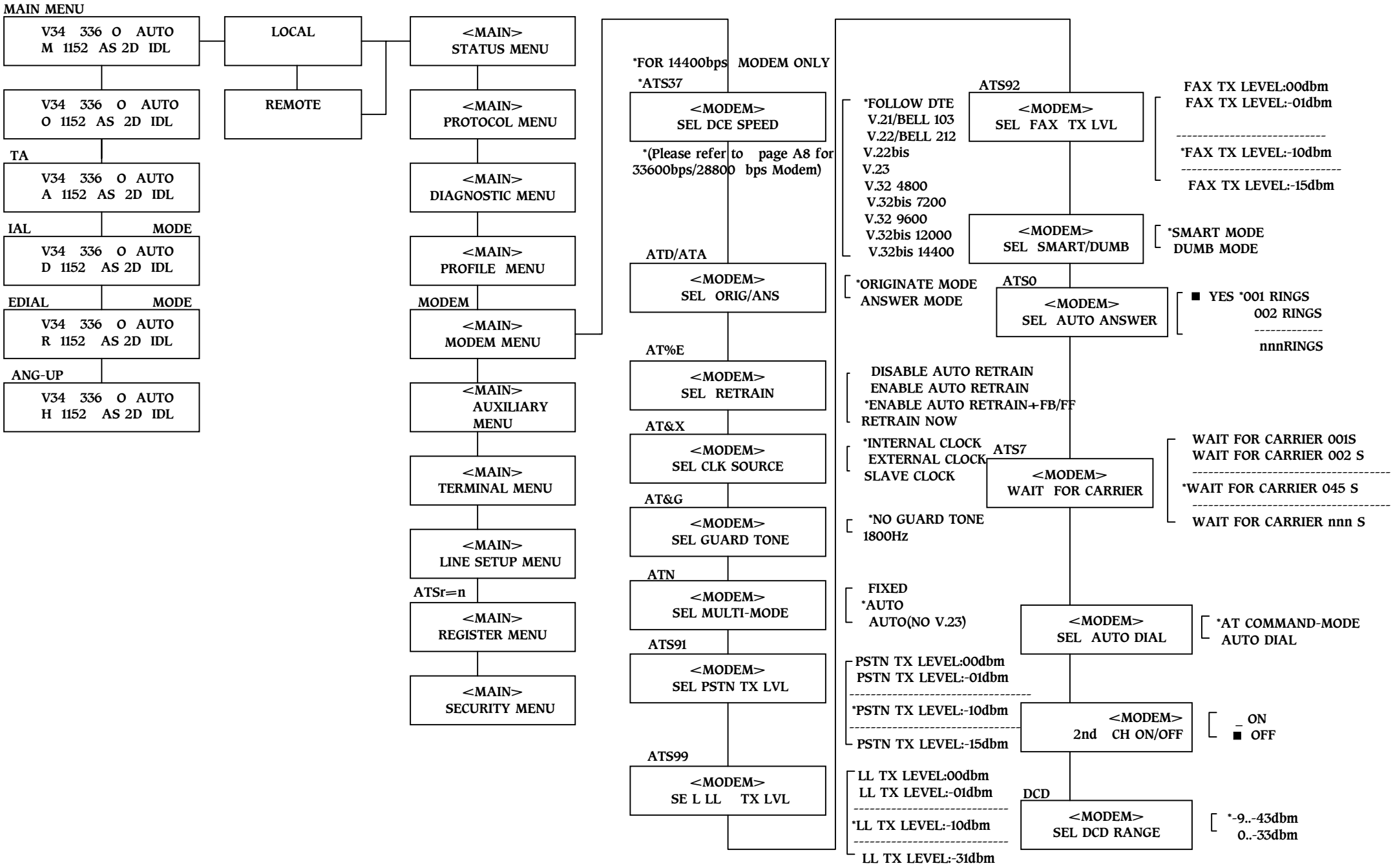
END TEST


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
TA
V34 336 O AUTO
A 1152 AS 2D IDL
IAL MODE
V34 336 O AUTO
D 1152 AS 2D IDL
EDIAL MODE
V34 336 O AUTO
R 1152 AS 2D IDL
ANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
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DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
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AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
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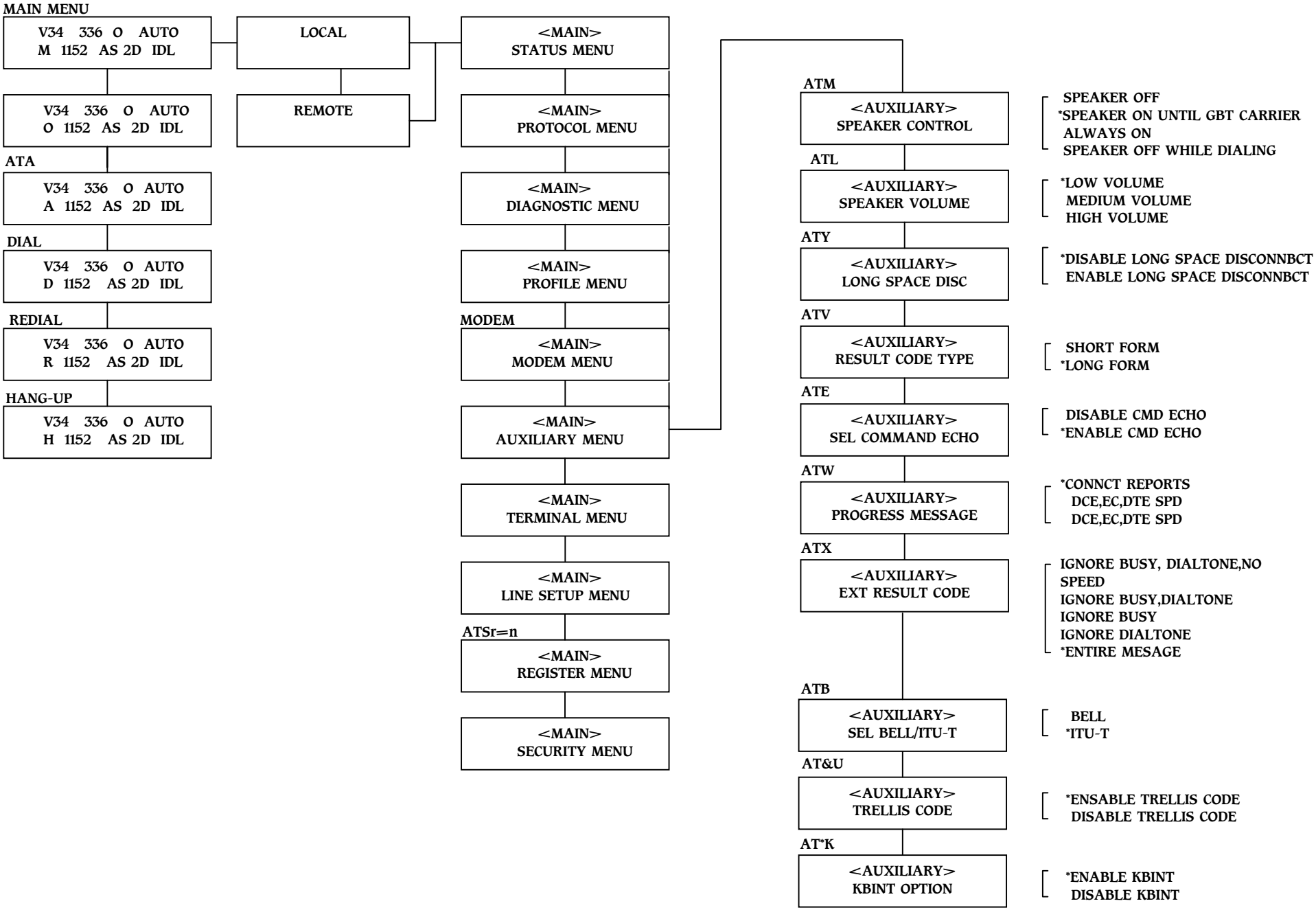
REGISTER MENU
<MAIN>
SECURITY MENU
*FOR 14400bps MODEM ONLY
*ATS37
<MODEM>
SEL DCE SPEED
*(Please refer to page A8 for 33600bps/28800 bps Modem)
ATD/ATA
<MODEM>
SEL ORIG/ANS
AT%E
<MODEM>
SEL RETRAIN
AT&X
<MODEM>
SEL CLK SOURCE
AT&G
<MODEM>
SEL GUARD TONE
ATN
<MODEM>
SEL MULTI-MODE
ATS91
<MODEM>
SEL PSTN TX LVL
ATS99
<MODEM>
SE L LL TX LVL
*FOLLOW DTE
V.21/BELL 103
V.22/BELL 212
V.22bis
V.23
V.32 4800
V.32bis 7200
V.32 9600
V.32bis 12000
V.32bis 14400
*ORIGINATE MODE
ANSWER MODE
DISABLE AUTO RETRAIN
ENABLE AUTO RETRAIN
*ENABLE AUTO RETRAIN+FB/FF
RETRAIN NOW
*INTERNAL CLOCK
EXTERNAL CLOCK
SLAVE CLOCK
*NO GUARD TONE
1800Hz
FIXED
*AUTO
AUTO(NO V.23)
PSTN TX LEVEL:00dbm
PSTN TX LEVEL:-01dbm
*PSTN TX LEVEL:-10dbm
PSTN TX LEVEL:-15dbm
LL TX LEVEL:00dbm
LL TX LEVEL:-01dbm
*LL TX LEVEL:-10dbm
LL TX LEVEL:-31dbm
ATS92
<MODEM>
SEL FAX TX LVL
FAX TX LEVEL:00dbm
FAX TX LEVEL:-01dbm
*FAX TX LEVEL:-10dbm
FAX TX LEVEL:-15dbm
<MODEM>
SEL SMART/DUMB
*SMART MODE
DUMB MODE
ATS0
<MODEM>
SEL AUTO ANSWER
■ YES *001 RINGS
002 RINGS
nnnRINGS
ATS7
<MODEM>
WAIT FOR CARRIER
WAIT FOR CARRIER 001S
WAIT FOR CARRIER 002 S
*WAIT FOR CARRIER 045 S
WAIT FOR CARRIER nnn S
<MODEM>
SEL AUTO DIAL
*AT COMMAND-MODE
AUTO DIAL
<MODEM>
2nd CH ON/OFF
_ ON
■ OFF
DCD
<MODEM>
SEL DCD RANGE
*-9..-43dbm
0..-33dbm


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
<MAIN>
DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
<MAIN>
AUXILIARY MENU
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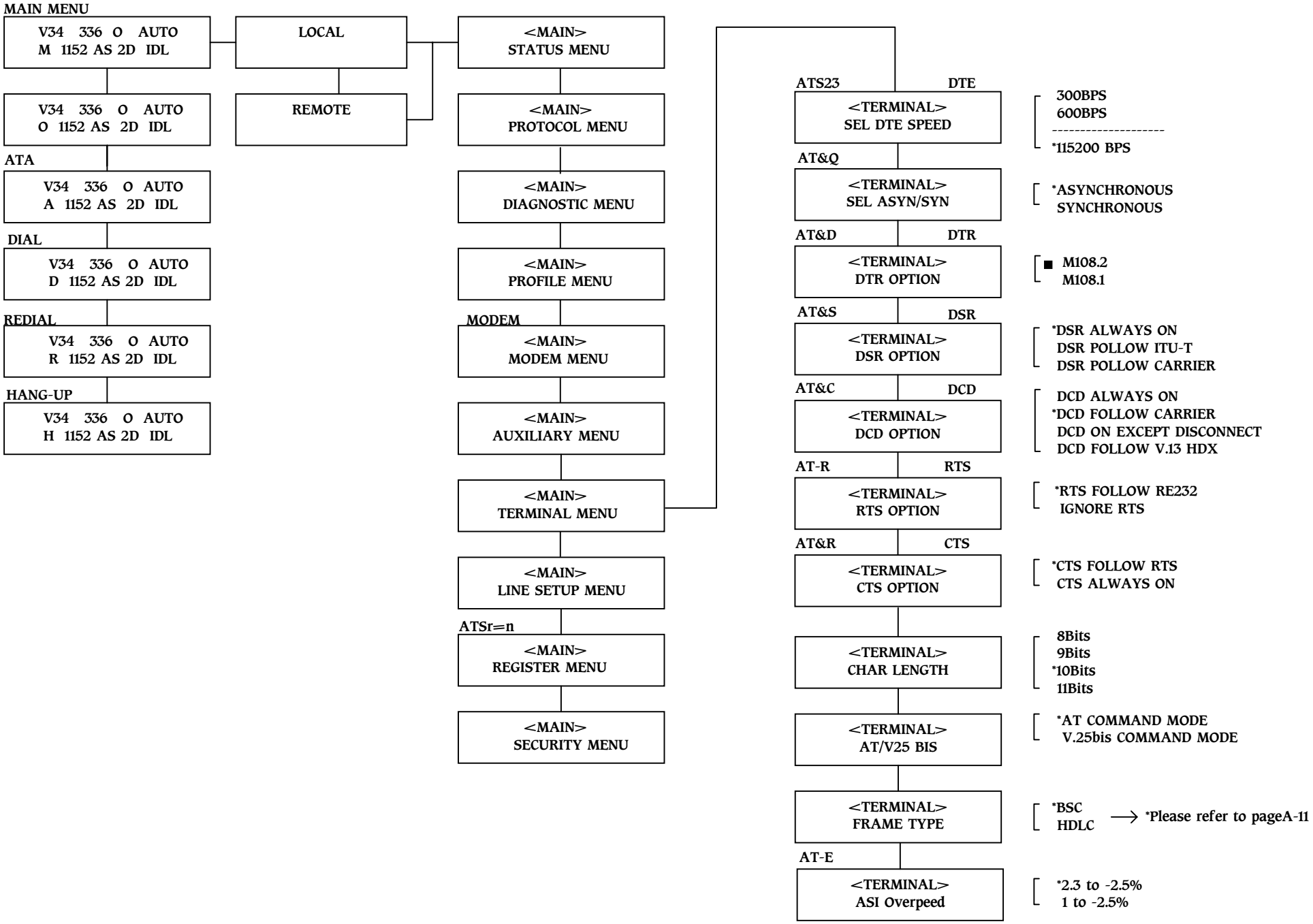
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
ATM
<AUXILIARY>
SPEAKER CONTROL
SPEAKER OFF
*SPEAKER ON UNTIL GBT CARRIER
ALWAYS ON
SPEAKER OFF WHILE DIALING
ATL
<AUXILIARY>
SPEAKER VOLUME
*LOW VOLUME
MEDIUM VOLUME
HIGH VOLUME
ATY
<AUXILIARY>
LONG SPACE DISC
*DISABLE LONG SPACE DISCONNBCT
ENABLE LONG SPACE DISCONNBCT
ATV
<AUXILIARY>
RESULT CODE TYPE
SHORT FORM
*LONG FORM
ATE
<AUXILIARY>
SEL COMMAND ECHO
DISABLE CMD ECHO
*ENABLE CMD ECHO
ATW
<AUXILIARY>
PROGRESS MESSAGE
*CONNCT REPORTS
DCE,EC,DTE SPD
DCE,EC,DTE SPD
ATX
<AUXILIARY>
EXT RESULT CODE
IGNORE BUSY, DIALTONE,NO
SPEED
IGNORE BUSY,DIALTONE
IGNORE BUSY
IGNORE DIALTONE
*ENTIRE MESAGE
ATB
<AUXILIARY>
SEL BELL/ITU-T
BELL
*ITU-T
AT&U
<AUXILIARY>
TRELLIS CODE
*ENSABLE TRELLIS CODE
DISABLE TRELLIS CODE
AT*K
<AUXILIARY>
KBINT OPTION
*ENABLE KBINT
DISABLE KBINT


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
<MAIN>
DIAGNOSTIC MENU
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PROFILE MENU
MODEM
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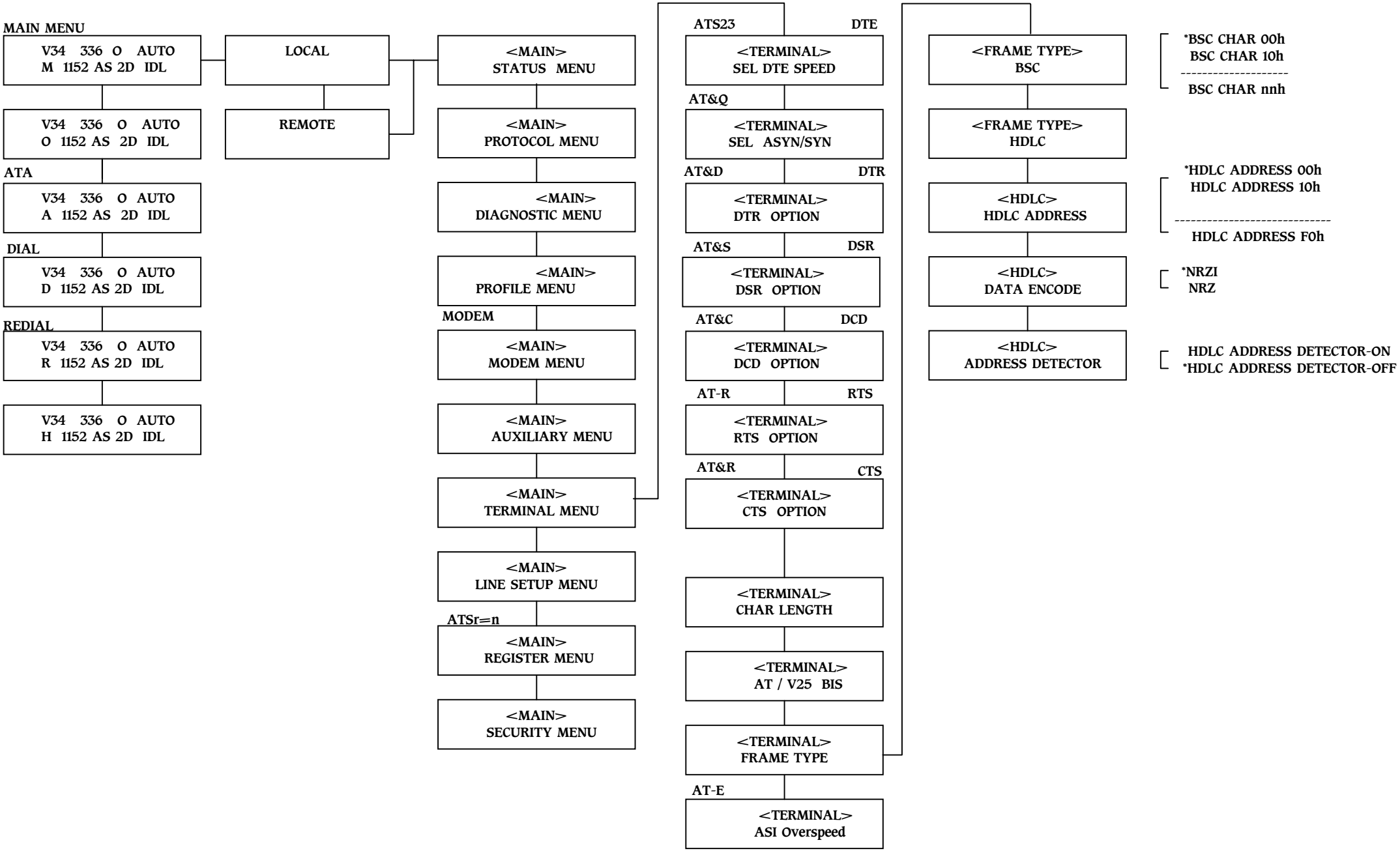
MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
<MAIN>
SECURITY MENU
ATS23
DTE
<TERMINAL>
SEL DTE SPEED
300BPS
600BPS
*115200 BPS
AT&Q
<TERMINAL>
SEL ASYN/SYN
*ASYNCHRONOUS
SYNCHRONOUS
AT&D
DTR
<TERMINAL>
DTR OPTION
M108.2
M108.1
AT&S
DSR
<TERMINAL>
DSR OPTION
*DSR ALWAYS ON
DSR POLLOW ITU-T
DSR POLLOW CARRIER
AT&C
DCD
<TERMINAL>
DCD OPTION
DCD ALWAYS ON
*DCD FOLLOW CARRIER
DCD ON EXCEPT DISCONNECT
DCD FOLLOW V.13 HDX
AT-R
RTS
<TERMINAL>
RTS OPTION
*RTS FOLLOW RE232
IGNORE RTS
AT&R
CTS
<TERMINAL>
CTS OPTION
*CTS FOLLOW RTS
CTS ALWAYS ON
<TERMINAL>
CHAR LENGTH
8Bits
9Bits
*10Bits
11Bits
<TERMINAL>
AT/V25 BIS
*AT COMMAND MODE
V.25bis COMMAND MODE
<TERMINAL>
FRAME TYPE
*BSC
HDLC
*Please refer to pageA-11
AT-E
<TERMINAL>
ASI Overpeed
*2.3 to -2.5%
1 to -2.5%


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
V34 336 O AUTO
R 1152 AS 2D IDL
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
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DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
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MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
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SECURITY MENU
ATS23
DTE
<TERMINAL>
SEL DTE SPEED
AT&Q
<TERMINAL>
SEL ASYN/SYN
AT&D
DTR
<TERMINAL>
DTR OPTION
AT&S
DSR
<TERMINAL>
DSR OPTION
AT&C
DCD
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DCD OPTION
AT-R
RTS
<TERMINAL>
RTS OPTION
AT&R
CTS
<TERMINAL>
CTS OPTION
<TERMINAL>
CHAR LENGTH
<TERMINAL>
AT / V25 BIS
<TERMINAL>
FRAME TYPE
AT-E
<TERMINAL>
ASI Overspeed
<FRAME TYPE>
BSC
<FRAME TYPE>
HDLC
<HDLC>
HDLC ADDRESS
<HDLC>
DATA ENCODE
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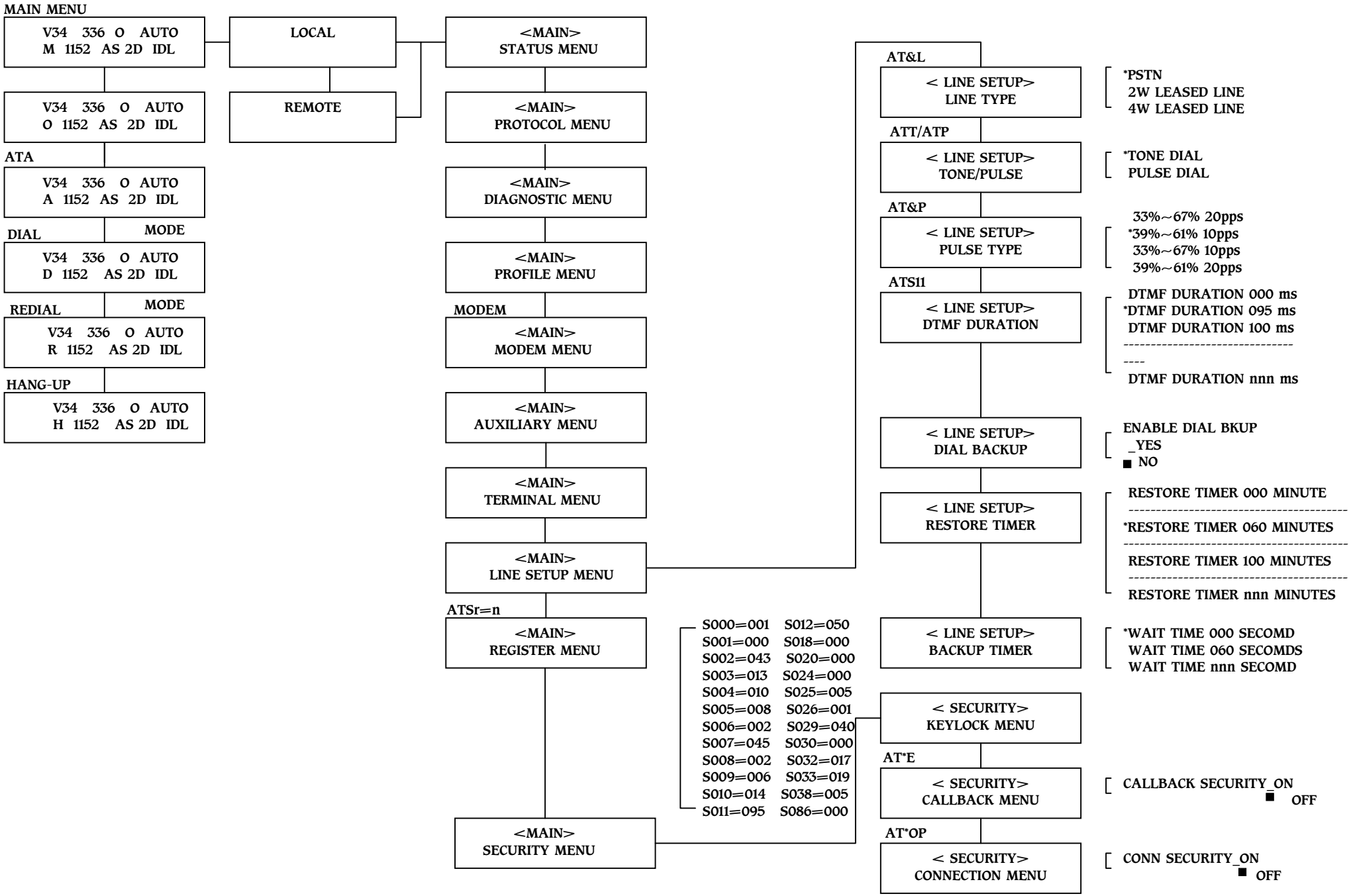
ADDRESS DETECTOR
*BSC CHAR 00h
BSC CHAR 10h
BSC CHAR nnh
*HDLC ADDRESS 00h
HDLC ADDRESS 10h
HDLC ADDRESS F0h
*NRZI
NRZ
HDLC ADDRESS DETECTOR-ON
*HDLC ADDRESS DETECTOR-OFF


MAIN MENU
V34 336 O AUTO
M 1152 AS 2D IDL
V34 336 O AUTO
O 1152 AS 2D IDL
ATA
V34 336 O AUTO
A 1152 AS 2D IDL
DIAL
MODE
V34 336 O AUTO
D 1152 AS 2D IDL
REDIAL
MODE
V34 336 O AUTO
R 1152 AS 2D IDL
HANG-UP
V34 336 O AUTO
H 1152 AS 2D IDL
LOCAL
REMOTE
<MAIN>
STATUS MENU
<MAIN>
PROTOCOL MENU
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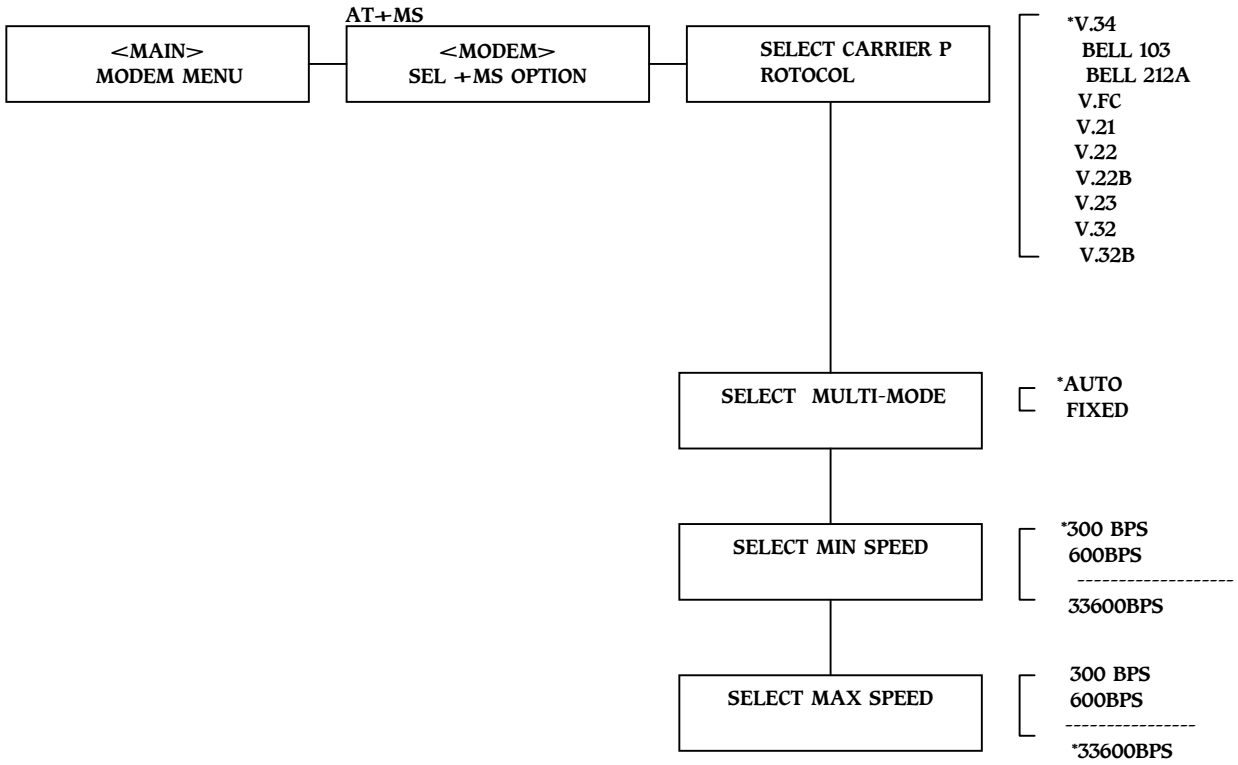
DIAGNOSTIC MENU
<MAIN>
PROFILE MENU
MODEM
<MAIN>
MODEM MENU
<MAIN>
AUXILIARY MENU
<MAIN>
TERMINAL MENU
<MAIN>
LINE SETUP MENU
ATSr=n
<MAIN>
REGISTER MENU
S000=001 S012=050
S001=000 S018=000
S002=043 S020=000
S003=013 S024=000
S004=010 S025=005
S005=008 S026=001
S006=002 S029=040
S007=045 S030=000
S008=002 S032=017
S009=006 S033=019
S010=014 S038=005
S011=095 S086=000
<MAIN>
SECURITY MENU
AT&L
< LINE SETUP>
LINE TYPE
*PSTN
2W LEASED LINE
4W LEASED LINE
ATT/ATP
< LINE SETUP>
TONE/PULSE
*TONE DIAL
PULSE DIAL
AT&P
< LINE SETUP>
PULSE TYPE
33%~67% 20pps
*39%~61% 10pps
33%~67% 10pps
39%~61% 20pps
ATS11
< LINE SETUP>
DTMF DURATION
DTMF DURATION 000 ms
*DTMF DURATION 095 ms
DTMF DURATION 100 ms
DTMF DURATION nnn ms
< LINE SETUP>
DIAL BACKUP
ENABLE DIAL BKUP
_YES
■ NO
< LINE SETUP>
RESTORE TIMER
RESTORE TIMER 000 MINUTE
*RESTORE TIMER 060 MINUTES
RESTORE TIMER 100 MINUTES
RESTORE TIMER nnn MINUTES
< LINE SETUP>
BACKUP TIMER
*WAIT TIME 000 SECOMD
WAIT TIME 060 SECOMDS
WAIT TIME nnn SECOMD
< SECURITY>
KEYLOCK MENU
AT*E
< SECURITY>
CALLBACK MENU
CALLBACK SECURITY_ON
■ OFF
AT*OP
< SECURITY>
CONNECTION MENU
CONN SECURITY_ON
■ OFF

*Note: For 336LCD/288LCD/288RM



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