Data Connect

V.3600UI modem

User Manual

Contents

INFORMATION TO THE USER

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device. Pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and if not installed and used in accordance with the instructions may cause harmful interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on. The user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

The shielded RS-232 cable is to be used in order to ensure compliance with FCC Part 15, and it is the responsibility of the user to provide and use shielded RS-232 cable from MODEM to personal computer.

CAUTION:	Any changes of modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

FCC REQUIREMENTS

This equipment complies with Part 68 of the FCC Rules. On the base unit of this equipment is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. IF REQUESTED, THIS INFORMATION MUST BE GIVEN TO THE TELEPHONE COMPANY.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN you should contact your local telephone company to determine the maximum REN to your calling area.

If your equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But the advance notice isn't practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, please contact the following address and phone number for information on obtaining service or repairs.

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Chapter 1
MODEM INTRODUCTION

CHAPTER 1： MODEM INTRODUCTION

1.1 Description

- The Network Series Modem are high performance, synchronous and asynchronous, full duplex multi-standard modems designed for use on 2-wire dial circuits and 2/4 wire leased lines.

  The MODEM series fully comply with ITU-T V.34、V.32bis/V.32、 V.22bis、V.22、V.23、V.21 and BELL 212A/103，speed: 115200 - 300bps Asynch，33600 - 1200bps Synchronization。

  In V.34 and V.32bis/ V.32 modes, echo concellation provides 2-wire full duplex operation over all PSTN circuits including those with satellite sections. Compatibility is also provided with Bell 212A and Bell 103 operating standard.
- V.34 mode provide full duplex operation at up to 33.6 kbps speed, with line probing, symbol rate and carrier frequency selection technologies.
- V.34 mode also use other advance technologies such as Adaptive Precoding, Non-Linear Encoding (Warping), Constellation Expansion, Multidimensional Trellis coding and Shell Mapping ,Tx power back off(Power Reduction).
- There are 10 factory default profiles and 10 user's profiles for your easiest configuration setting.
- Allow up to 16 modem cards with 16 port on a rack shelf (TRS-16).
- Allow up to 16 modem cards, with 32 port on a rock shelf (TRS-32).
- A 2 by 16 characters LCD display on the front panel with back lighted control for configuration set-up and monitoring conveniently.
- Line status monitoring including transmit/receive signal level, S/N ratio, EQM (eye quality monitoring), signal quality, frequency shift, delay, echo, retrain count, phase jitter, Tx/Rx baud rate, Tx/Rx carrier frequency, Tx/Rx DCE speed, TX power back-off ..., etc.
- Front panel lock and password protect features prevents from the operation of unauthorized person.
- Enable remote configuration through secondary channel.
- V.13& V.23 simulated carrier control for half duplex application.
- 2 wires or 4wires automatic or manual dial back-up and restore.

1.2 Technical Specifications

Modem

fully complies with ITU-T recommendations V.34, V.32bis, V.32, V.22bis, V.22, V.21, V.23, V.24, V.26bis,V.28, V.25, V.25bis, V.52, V.54, V.42, V.42bis, V.8, and BELL 212A/103 operating standards.

- Modulation type : Refer to table 1-1A,1-1B.
- Clock tolerance
  - (1) Synchronous : ± 0.01%
  - (2) Asynchronous : Basic range + 1% to - 2.5%
    Extended overspeed range + 2.3% to - 2.5%
- DTE speed
  - (1) Synchronous : 33600/31200/28800/26400/24000/21600/19200/16800 /14400/12000/9600/7200/4800/2400/1200 bps
  - (2) Asynchronous : 115200/76800/57600/38400/33600/32000/31200/28800/ 26400/24000/21600/19200/16800/14400/12000/9600/7200 /4800/3600/2400/1200/600/300 bps with speed conversion.

  Total bit length : 8, 9, 10, 11 bits
  Parity bit : odd, even, none
  Stop bit : 1, 1.5, 2 bits
- Error Correction : MNP 4/ITU-T V.42
- Data Compression : MNP 5/ITU-T V.42bis
- Flow Control : HArdware CTS/RTS, CTS only
  Software X-ON/X-OFF
- Dial Command : Extended AT and ITU-T V.25bis command set.

Table 1-1A ：Modem operating mode (4 wires/2wires L-L or D-L)

Operating Mode	MOD.	Carrier	Symbol rate	Constellation points
V.34+ 33600 V.34+ 31200 V.34 28800 V.34 26400 V.34 24000 V.34 21600 V.34 19200 V.34 16800 V.34 14400 V.34 12000 V.34 9600 V.34 7200 V.34 4800 V.34 2400	SM SM SM SM SM SM SM SM SM SM SM SM SM SM	(Table 1-1c)	(Table 1-1c)	4 to 1024 Depends on the combination of data rate, symbol rate and constellation expansion chosen.
V.32bis 14400 T	TCM	1800	2400	128
V.32bis 12000 T	TCM	1800	2400	64
V.32 9600 T	TCM	1800	2400	32
V.32 9600	QAM	1800	2400	16
V.32bis 7200 T	TCM	1800	2400	16
V.32 4800	QAM	1800	2400	4
V.26bis 2400	DPSK	1800	1200	4
V.26bis 1200	DPSK	1800	1200	4
V.22bis 2400	QAM	1200/2400	600	16
V.22 1200	DPSK	1200/2400	600	4
V.23 1200/75	FSK	1700/420	1200	N/A
V.21 0-300	FSK	1080/1750	300	N/A
BELL 212A 1200	DPSK	1200/2400	600	4
BELL 103 0-300	FSK	1175/2125	300	N/A

Table 1-1B ：V.34 Symbol Rate and Carrier Frequency

Symbol Rate (Baud)	Low Carrier (Hz)	High Carrier (Hz)
2400	1600	1800
3000	1800	2000
3200	1829	1920
3429	1959	1959

- Transmit Level Lease-Line: 0~-31 dBm 1 dB stepadjustable.
  Dial-Line: 0~-15 dBm 1 dB step adjustable.
- Line requirement : 4/2 wires L-L or D-L
- Line Impedenance : Balance 600Ω ± 10 %
- Return Loss :> 20 dB, 300 - 3400 Hz
- Longitude Balance :> 60 dB
- Dial Line Characteristics:

  Maximum Current :120 mA
  Holding Resistance : 50 ~ 220 Ω
  Holding Current : 25 ~ 110 mA
  Ring Detect Range : ON - > 27 Vrms
  OFF - < 13 Vrms
  Ring Detect Frequency : 16 - 50 Hz
  DTMF Characteristics : O/P Lowband -8 ± 1 dBm
  O/P Highband -6 ± 1 dBm
  Frequency Tolerance ≤ ± 1 %
  TONE Duration and Spacing 95 ms (adjustable)
  Pulse Per Sec : 10 ± 0.5 PPS
  Make/Break Ratio : 33/67, 39/61 ± 3 %

- Auto Answer : V.32bis/V.32/V.22bis/V.22 comply with ITU-T V.25 & V.25bis
  V.34 Comply with ITU-T V.8, V.25/V.25bis
  Answer Tone : 2100±15Hz
- Calling Tone : Comply with ITU-T V.8, V.25
- Receive Range : -12 ~ -44 dBm, -2 ~ -35 dBm
- Dynamic Range : 0 ~ -44 dBm
- Equalization : Automatic Adaptive Equalizer
- Frequency Shift : Compensation cancel at least of ± 7Hz offset

- Far-end Echo Coverage : Maximum 1.2 seconds.

- Scrambler & Descrambler : Comply with ITU-T V.34,V.32bis,V.32,V.22bis, V.22

- Data And Control Signal : Output Voltage ± (6 ~ 12)V
  (ITU-T V.28) Input Voltage ± (3 ~ 25)V
  Output Impedance ≧ 330 Ω
  Input Impedance 3000 ~ 7000 Ω

- Tx Clock Source : Internal/External/Loopback
  Freq. Tolerance : ± 0.01 %
  Duty Cycle : 50 ± 1 %

- Test Features : V.54/V.52 , LAL/DL/RDL
  Test Patterns - 511

- Power Requirement : 90 ~ 265 VAC Auto Range, 47 ~ 63 Hz
  DC Power Input : -36 ~ -72 VDC option(Chassis type)
- Operating Temperature : 0 °C ~ 50 °C
  Storage Temperature : -25 °C ~ 70 °C
  Relative Humidity : 95 % (non-condensing)
- Physical Size :
  Stand alone ⇨ W - 180mm, H - 48mm, D - 262mm, Weight 0.9kg
  Rack mount card ⇨ W - 220mm, H - 26mm, D - 328mm, Weight 0.6kg
  Rack mount shelf ⇨ W - 19", H - 6RU, D - 380mm, Weight 8kg
  Full shelf Equipped ⇨ Weight 16kg

- DTE Interface: EIA RS-232C, CCITT V.24/V.28

Pin	V.24	DESCRIPTION	Source
1	101	(PG) Protective Ground	—
2	103	(TXD) Transmit Data	DTE
3	104	(RXD) Receive Data	MODEM
4	105	(RTS) Request To Send	DTE
5	106	(CTS) Clear To Send	MODEM
6	107	(DSR) Data Set Ready	MODEM
7	102	(SG) Signal Ground	—
8	109	(DCD) Data Carrier Detect	MODEM
9		+12 VDC	MODEM
10		-12 VDC	MODEM
15	114	(TXC)Transmit Clock	MODEM
17	115	(RXC) Receive Clock	MODEM
18	141	(AL) Local Analog Loopback	DTE
20	108	(DTR) Data Terminal Ready	DTE
21	140	(RDL) Remote Digital Loopback	DTE
22	125	(RING) Ring Detect	MODEM
24	113	(XTC) External Clock	DTE
25	142	(TST) Test Mode	MODEM

CHAPTER 2
INSTALLATION

CHAPTER 2: INSTALLATION

2.1 Description

This chapter provides the information needed to install the Network Series Modem and to ensure that it is working properly. You may obtain more information about this subject for rack-mount modem shelf from the User's Manual of TRS16 or TRS32 rack-mount modem shelf.

2.2 Unpacking

Save the carton and protective packing material in which your Network Series Modem was shipped; you might need them for repackaging if you have to store or ship the modem in the future. The following items are shipped with your modem:

* One Modem User's Manual.
* One 7-feet (2.13m) modular telephone cable for connection to RJ45 8-pin jack.or one site is RJ-45 and the other site is U type(option).
* One 7-feet (2.13m) modular telephone cable for connection to an RJ11 4-pin jack.
* One 8-pin RJ-45 box for leased line application.
* One 6-feet power cord.

Rough handling during shipping causes most early modem failure; after you unpack the modem, check carefully for shipping damage. Contact the shipper if you notice any damage. Direct any additional questions about damaged or missing parts to the nearest sales representative.

2.3 Site Requirements

The FCC requires telecommunications equipment to withstand electrical surges which may result from lightning strikes; the Network Series Modem meet the requirements set forth by the FCC. Make sure the electrical service in your building is properly grounded as described in article 250 of the National Electrical Code (NEC) handbook. The following procedure outlines some common practices which can minimize the risk of damage to computer equipment from electrical surges:

* Verify that a good copper wire of the appropriate gauge, as described in Tables 250-94/95 of the NEC Handbook, is permanently connected between the electrical service panel in the building and a proper grounding device such as:

1) A ground rod buried outside the building at least 8 feet (2.44 meters) deep in the earth. Several ground rods, connected together, buried outside the building at least 8 feet (2.44 meters) deep in the earth.

2) If you are unsure whether the electrical service in your building is properly grounded, have it examined by your municipal electrical inspector.
3) Install a surge protector between the modem and AC power outlet. Any additional computer equipment you have connected to the modem (directly or through another device), such as a terminal or printer, should also be plugged into the same surge protector. Make sure that the surge protector is properly rated for the devices you have connected to it.
4) Call your telephone company and ask them if your telephone line is equipped with a circuit surge protector.
5) If you are operating the modem in an area where the risk of electrical surges form lightning is high, disconnect the modem form the telephone line at the modem's rear panel when it is not in use.

2.4 Site Selection

Locate the Network Series Modem no farther than 50 feet (15.24 meters) from your data terminal equipment (DTE) and within 6 feet (1.83 meters) of a grounded AC outlet furnishing the required power. Install the modem in a clean area that is free from environmental extremes. Allow at least 6 inch (15.24 cm) in front of the modem for access to the front panel, and at least 4 inch (10.2 cm) in back for cable clearance. Position the modem so you can easily see the front panel. Do not stack another modem on top of modem.

For more detailed information on installation Modem Shelf TRS-16 and NMC-16 installation, please refer the Rack-Mounted Modem Shelf - TRS-16 or TRS-32 User's Manual".

2.5 AC Electrical Outlet Connection

The power line associated with MODEM is about 2 meters, three pins plug. Middle cylinder is for grounding. For power source adapting, an automatic switching power supply (90 ～265VAC) is used for the device, the fuse for stand alone type is 2A, for rack-mount type is 4A. The rack-mount type is also capable for DC Source Power Supply (option) and its voltage range is -36 ~ -72VDC.

2.6 Connecting With Dial Line

To connect your modem to a permissive RJ11 voice jack and dial line, follow this procedure: On the rear panel of MODEM, there is an 8 pins RJ-45 jack used for Leased Line, beside this, there are two RJ-11 6 pins jack, one is “DIAL LINE“ and the other is "PHONE". Connect the “PHONE” jack to telephone set and then connect the telephone line to "DIAL LINE" jack.

The pin layout of the “PHONE” connector for RJ11 operation is as follows:

Pin.	*Color*	*“PHONE”pin defined*
1	No Connect	No Connect
2	Black	Not used
3	Red	Tip
4	Green	Ring
5	Yellow	Not used
6	No Connect	No Connect

The pin layout of the DIAL connector for RJ11 operation is as follows:

Pin.	*Color*	*“Dial Line”pin defined*
1	No Connect	No Connect
2	Black	Not used
3	Red	Tip
4	Green	Ring
5	Yellow	Not used
6	No Connect	No Connect

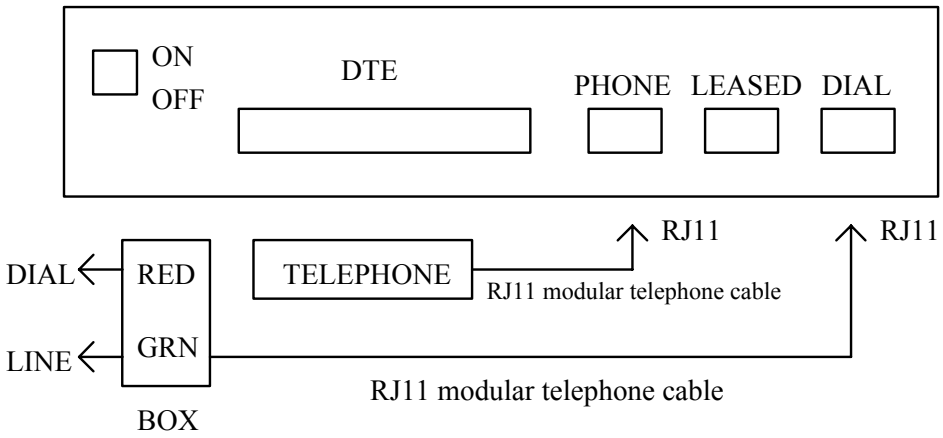


Figure 2-1 Dial Line connecting diagram

2.7 Connecting With Leased Line

For the leased line connection, you should connect the lines RJ45 connector labeled with "Leased" on the back of Modem:

	Modem Pin No.	Color	2-Wire	4-Wire
	1	Blue	TX/RX	TX
	2	Orange	TX/RX	TX
Leased Line	3	Black		RX
	4	Red	TX/RX	TX
	5	Green	TX/RX	TX
	6	Yellow		RX
	7	Brown		RX
	8	White (or Gray)		RX

When it used RJ-45 8 core wire, pin 1, 2 is a group used for 2 wires leased line application. it is TX for 4 wires leased line application. Pin 7,8 is another group, it is no used in 2 wire leased line application, it is RX for 4 wires leased line application.

When it used RJ-11 4 core wire, pin 4, 5 is TX/RX for 2 wire leased line application. If it is 4 wires leased line, the pin 4, 5 is TX, pin 3, 6 is RX.

When you connect two modems in "back-to-back" style, don't forget to interchange TX and RX lines.

A-TX ⇨ B-RX, A-RX ⇨ B-TX

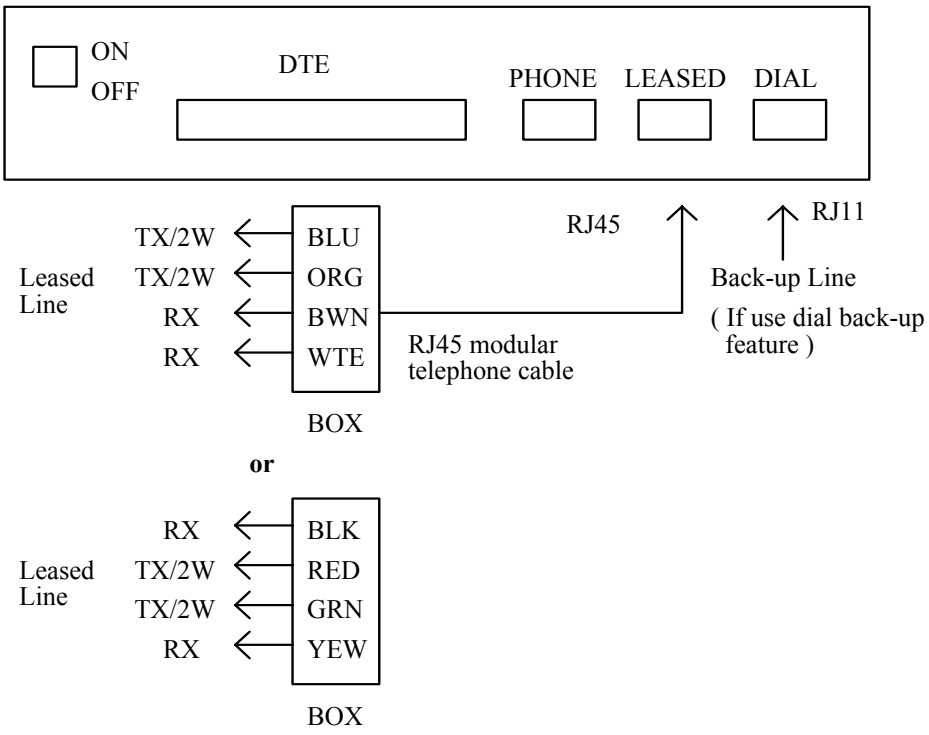


Figure 2-2 Leased Line connecting diagram

C H A P T E R 3
FRONT PANEL AND MENU TREE

CHAPTER 3 : FRONT PANEL AND MENU TREE

3.1 The Front Panel Description

There are 5 key on the front panel of Modem (VO/DA Key, Right Key, Left Key, ENTER Key and EXIT Key), one 2 x 16 LCD displayer and 10 LEDs. Through these interfaces, users are able to see the status of modem or chang the configurations as illustrated below:

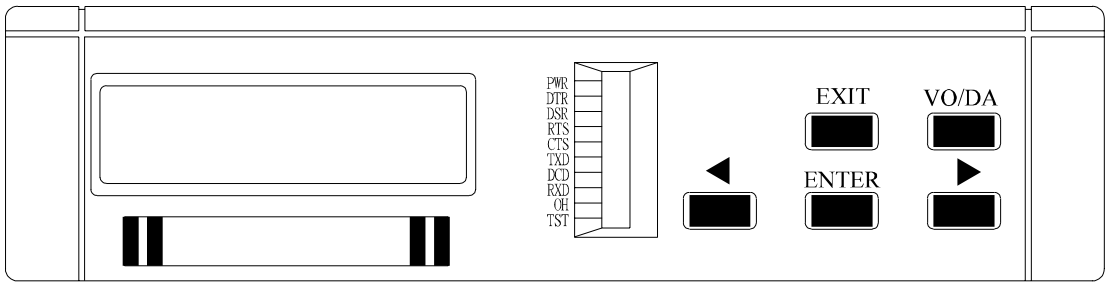


Figure 3-1 Front Panel

3.2 The Rear Panel Description

The rear panel of modem contains an IEC 320 AC Power Inlet Connector, a Power On/Off switch, a RS-232 connector (for connecting to DTE Equipment), two RJ11 telephone jack (for connecting to dial line and telephone set), and one RJ45 telephone jack (for connecting to 2-wire or 4-wire leased line), as illustrated below. For more detailed description, please refer to Chapter 2 "Installation" of this manual.

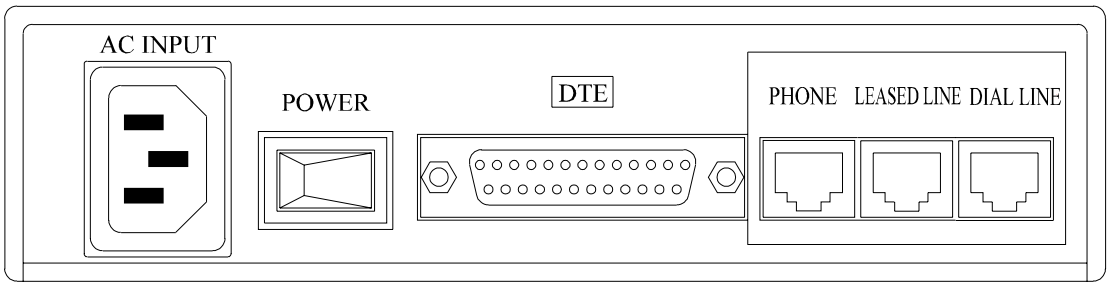


Figure 3-2 Rear Panel

3.3 Operating the Network Series Modem

1. Key: Total 5 keys, as follow:

VO/DA — It is used as the voice/data select key for dial line application, Disconnect/Reconnect selection for leased line applications, or "home" key for set-up menu to go back to the home menu.

◀ — Left key ; It is used to shift to left field.

▶ — Right key; It is used to shift to right field or next item.

ENTER — Enter key; It is used to enter the next lower level menu or confirm selections.

EXIT — Exit key; use it to go back to the upper level menu.

2. LED indicator : total 10 indicators as following:

PWR -- On for power supply ok.
DTR -- On for DTR signal present.
DSR -- On for DSR signal present.
RTS -- On for RTS signal present.
CTS -- On for CTS signal present.
TXD -- On for "0", off for "1" TXD signal present.
DCD -- On for received carrier signal (DCD) present.
RXD -- On for "0", off for "1", RXD signal present..
OH -- On for Off Hook.
TST -- On for test mode active.

3. LCD displayer :

The modem has a 2 by 16 characters LCD with auto backlight control. Some different pictures of the LCD display are shown below.

A. Top Menu

Example:

V34+ 336 V42bis
D ANS CONNECT 9

Description:

1) Modem Protocol: V34+ 336,V34+ 312,V34 288, V32b 144T, V32 96T, V22b 24,....
2) Data Protocol: V.42bis, V.42, MNP-5, Normal, Direct.
3) Line Type: D (Dial Line), L (Leased Line).
4) Mode: ANS (Answer Mode) ,ORG (Originate Mode).
5) Status: Stanby, Handshaking, Connect, Retrain, Ring...
6) SQ: Signal quality 9,8,7,6....,0

B. Menu Select

Exp 1 :

L MENU Select STATUS

Exp 2 :

L MENU Select TEST

Description:

1) In top menu, press "ENTER" key to enter this menu.
2) Select "LOCAL"or "REMOTE" first if connected and remote access function enabled.
3) The character "L" on the upper left corner stands for local.
4) You may use "▶" and "◀" keys to select menu.
5) Press "ENTER " key to enter the "MENU".
6) Press "EXIT" key to quit from this menu.
7) Note that status menu is not available before connection.

C. Menu Screen

Exp 1 :

L STATUS RX Level =-10dBm

Exp 2 :

R CONFIG MODEM TX clock

Exp 3 :

L TEST LAL (ON)

Exp 4 :

L DIAL Dial a number

Description:

1) L=Local, R=Remote.
2) Menu name: STATUS, TEST, DIAL.....
3) Status or setting: RX Level=-10dBm, LAL = ON
4) Use "▶" or "◀" keys to shift among fields; press "ENTER" key to enter the selected menu.

D. Set-up Menu

Exp 1 :

LL TX Level -10dBm ←

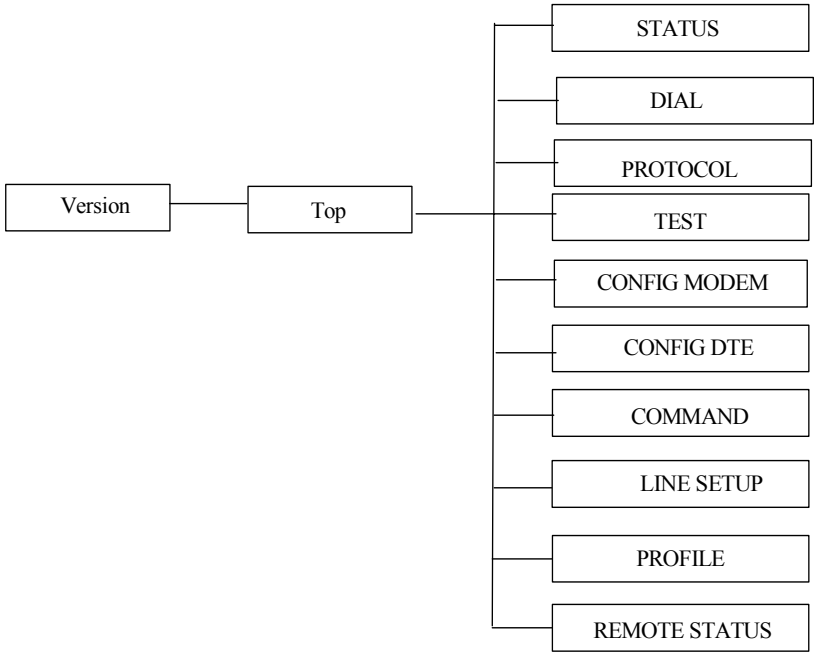
Exp 2 :

R Protocol type Auto MNP/V42 ←

1) Use "▶" or "◀" keys to shift among fields, then press "ENTER" key to confirm and wait for ← appears on the LCD screen.
2) Press "EXIT" key to quit from this menu.

3.4 The Menu Tree

Main Menu



A. STATUS MENU / REMOTE STATUS MENU

STATUS :

Tx Level = -XX dBm
Rx Level = -XX dBm
S/N. Ratio = XX dB
EQM Valueio = XXX
F-Shift = X.X Hz
F F-Shift = X.X Hz
* Delay = XXXX ms
* P jitter = X Deg.
* F Echo = XX.X dB
DTE = XXXXX ASY 10
Retrains = XXXXX
*/ RX Speed = XXXX
*/ TX Speed = XXXX
*/ RX Baud = XXXX
*/ TX Baud = XXXX
*/ RX Freq = XXXX Hz
*/ TX Freq = XXXX Hz
*/ TX PowerOff = X dB
Menu Retrain
Interface indicators = TR MR RS CS CD T

Note: The function with asterisk mark (*) is only available for V.32 and above. **The function with both (*) and (/) marks is only available for V.34.**

B. DIAL MENU

Dial a Number	#0 nnnn\#1 nnnn\...\#9 nnnn
Edit a Number	#0 nnnn\#1 nnnn\...\#9 nnnn
Ring Times	Auto ANS Off\1 Times...255 Times
Progress Tone	Basic Code\Don't Care\Dial Tone \Busy Tone\Dial+Busy Tone
Redial Delay	Immediate\1\... \255 Second
Dial Type	Tone\Pulse
SPK. Control	Until DCD on\Always on\Off when dial\Off
SPK. Volume	Low\Medium\High

C. PROTOCOL MENU

Protocol Type	Normal\ Direct\Reliant MNP \Auto \Reliant LAPM\ LAPM Normal \LAPM MNP\ MNP Normal
Discon. Method	Immediate\With Clear-down \Modem Reset
Login Check	Disable\ #0..#9\ ALL\ By NMS
Send Password	Off\ #0..#9
CallBack No.	#0..#9
CallBack Timer	Disable\ 1…255 Seconds
Connect Code	DTE Speed\DCE/EC/DTE Speed \DCE Speed
Compress	Off\On

D. TEST MENU

Clear All	Has Been Done
LAL	Off\On
DL	Off\On
RDL	Off\On
RDL Grant	Off\On
Error Count	0 ... 65535
B.E.R. Test	Off\511

E. CONFIG MODEM MENU

Modem Speed	V.34 Adaptive\V34+ 336\V34+ 312 \V34 288\V34 264 \V34 240\V34 216 \V34 192\V34 168\V34 144 \V34 120 \V34 96\V34 72\V34 48\V34 24 \V32b Adaptive\V32b 144\V32b 120 \V32 96Q\V32 96T\V32b 72\V32 48 \V26b 24\V26b 12\ V23 1200 \V22b 2400\V22 1200\BELL 212A \BELL 103 \V21 300

ORG/ANS Mode	Answer Mode\Originate Mode
Auto Retrain	On\Off
Tx Clock	Internal\External\Loopback
Retrain Threshold	High \Medium \Low
ASI Overspeed	+1%…-2.5% \ +2.3%…-2.5%
Make/Break	US (39%)\UK (33.3%)
Force Off Hook	Force a off hook activity using "Enter" key
OH by DTR	On\Off
Pump Edit	□□□:□□□□
FB\FF Ctrl	Off\On
LL Tx Level	0 dBm...-31 dBm
DL Tx Level	0 dBm...-15 dBm
Remote Access	On\Off
Dynamic Range	-12..-44dBm\ -2..-35dBm

F. CONFIG DTE MENU

DTE Speed	115200 bps\76800 bps\57600 bps \38400bps\33600 bps\31200bps \32000bps\28800 bps\26400 bps \24000 bps\21600 bps \19200 bps \16800 bps\14400 bps\12000 bps \9600 bps\7200bps\4800 bps \3600 bps\2400 bps\1800 bps \1200 bps \600 bps\300 bps
Flow Control	Off\X-On, X-Off\RTS/CTS\CTS only
DTR Off Action	Force On\Command Mode \Disconnect\Modem Reset
DTR Control	108-2\108-1
TS Control	Force On\Normal
DSR Control	Normal \ Force On
DCD Control	Force On\Normal\V.13 HDX\V.23 HDX
Data Format	ASYNC\SYNC
Total Bits	8\9\10\11
AL by 141	Off\On
RDL by 140	Off\On

G. COMMAND MENU

Command Mode	AT Command\V.25bis Command \Dumb Mode
Auto Baud	Off\On
Framing	ASYNC\HDLC\SDLC \BSC
Async Form	7-O-1 \7-E-1 \7-N-2 \8-N-1
Idle Char	Idle\Sync

H. LINE SETUP MENU

Line Type	Dial \2W Leased Line\4W Leased Line
Leased To Dial	Manual\Auto
Backup Tel	No Dial Backup\#0nnnn\#1nnnn \…\#9nnnn
Backup Speed	V34 Adaptive\V34+ 336\V34+ 312\V34 288 \V34 264\V34 240\V34 216\V34 192 \V34 168\V34 144\V34 120\V34 96 \V34 72\V34 48\V34 24\V32b Adaptive \V32b 144\V32b 120\V32 96Q\V32 96T \V32b 72\V32 48\V26b 2400\V26b 1200 \V23 1200\V22b 2400\V22 1200 \BELL 212A\BELL 103\V21 300
Dial To Leased	Manul\Auto
Dial To Leased Timer	Forver\0~255 Minutes
Dial to Dail	Off\On

I. PROFILE MENU

Load	User Profiles#0...#9 **0:**AS-DL-AT-AUTO **1:**AS-DL-AT-NONE **2:**SY-DL-V25-NONE **3:**AS-2L-ANS-V34 **4:**AS-2L-ORG-V34 **5:**SY-2L-ANS-V34 **6:**SY-2L-ORG-V34 **7:**SY-4L-ANS-V34 **8:**SY-4L-ORG-V34 **9:**AS-2L-ANS-AUTO
Power Up	User Profile #0…#9
Initial	Are You Sure?
Front Lock	Unlock\Lock
Password Edit	Input:---
Sreg Edit	BASE=DECIMAL\BINARY
Save	User Profiles#0...#9

3.5 Detailed Description of the Menu Tree

3.5.1 STATUS MENU

Item Name	Command	Description
TX LEVEL = -XX dBm	AT%S	Transmitted signal level. This value is equal to the " TX level" of config modem. Normally, for the 2w leased line and the dial line, the recommended value is between -10 and -13dBm. It can be increased of in order to obtain a more satisfactory S/N ratio (signal to noise ratio) by setting a higher level as possible, but a saturation of the active transmission equipment should be avoided. The Tx level level should be setting under -13dBm while to operating V.34 mode.
RX LEVEL= -XX dBm	AT%S	Received signal level. This value is the result of the line attenuation from the transmitted signal. Normally, the RX level of 2w leased line and the dial line is between -15 and -33dBm.
S/N. RATIO = XX dB	AT%S	Signal to noise ratio. The bigger the S/N ratio, the better quality of a line is. A higher operating speed needs a higher S/N ratio. Normally, the S/N requirement of running 14400 bps should be more than 24 dB while to operate at 9600 bps, a S/N better than 20 dB is required.
EQM VALUE=XXX	AT%S	Eye pattern quality monitoring. This value represent the quality of receiving signal.
F-SHIFT = XX Hz	AT%S	Frequency-shift (offset). It is the shift of the carrier central frequency caused by the transmission link. This shift normally should be less than + / - 7 Hz. The smaller is better.
F F-SHIFT = XX Hz	AT%S	Far end frequency-shift (offset). The frequency shift of the far end received carrier signal. It normally should be less than +/- 7 Hz. The smaller is better. The value will not accurate once level is too small from the remote site.
DELAY = XXXX ms	AT%S	Round trip delay time. This delay is caused by a round trip of a long distance line , especially in a satellite circuit. Usually, round trip of a satellite link shall create a time delay of 0.5 second (500ms). The modem will accept a maximum time delay of 1.2 seconds.
P JITTER = -X Deg	AT%S	Monitoring the phase jitter of the phone line.
F ECHO = -XX.X dB	AT%S	Far end echo. This echo is caused when the far end line impedance is not matched. A smallest far end echo level is always required. Normally,the far end echo level is between -20 dB and -55 dB
DTE = XXXXX ASY 10	AT%S	Indication of speed and data format of DTE. For examples: DTE = 19200 ASY 10 stands for 19200 bps Asynchronous 10 bits in total bit length. DTE=14400 SYN means 14400 bps synchronous.
RETRAINS = XXXX	AT%S	Total retrain count. From the total retrain count, you will find the total times of line interference occurred. This value will not be cleared automatically unless pressing the "ENTER" key or power off.

MANU RETRAIN	ATO2	Force Modem redo adapting.
RX BAUD = XXXX	AT%S	Indication of the signaling rate of received signal. For examples: RX Baud=3429 means the switching speed or number of transitions is 3429, however, one baud can be made to represent more than one bit per second. (This value is only available when operating on V.34)
TX BAUD = XXXX	AT%S	Indication of the signaling rate of transmitted signal. (This value is only available when operating on V.34).
RX FREQ = XXXXHz	AT%S	Indication of the carrier frequency of received signal. For examples: RX Freq = 1959Hz means the unique frequency used to to "carry" data is 1959 Hz. (This value is only available when operating on V.34).
TX FREQ = XXXXHz	AT%S	Indication of the carrier frequency of transmitted signal. (This value is only available when operating on V.34).
TX SPEED = XXXXbps	AT%S	Indication of the DCE speed of transmission.
RX SPEED = XXXXbps	AT%S	Indication of the DCE speed of receiving.
TX POWEROFF = XdB	AT%S	Indication of a reduction of transmit power level. For examples: TX PowerOff = 6dB means the transmit power level is requested to reduce 6 dB by the remote modem. (This value is only available when operating on V.34).
TR,MR,RS,CS,CD,T	AT%S	Indication of the RS-232 interface lead status.

3.5.2 DIAL MENU

Item Name	Command	Description
Dial a Number \#0...#9	ATDSn	Dial out a preset telephone number #n(n=0..9). This function can interact with the auto redial function or dial line auto establishment function.
Edit a Number \#0...#9	AT&Zn=xx	Edit telephone number #n (n=0..9) for up to 20 digits each group.If the "@" is included inside the number and auto-redial is ON, then it will redial next number after no answer until the number without "@". If it is still unsuccessful then retirn to the first number. Up to 10 intelligent redial group is allowed. #1 xxx@ →#2 xxx@ ... →#n xxx →#1 xxx@ →...
Ring Times	ATS0=n	Auto answer activates when detected ring count = n (default=1). **If 108.1 (DTR ON Auto Dial/Ans) is used for auto answer, it must be set to OFF and the answer shall be activated by DTR provided by DTE (default value=1 times).
Auto Ans Off	ATS0=0	/Turn off the auto answer function.
1..255 Times		/An auto answer will be given when bell rings 1..255 times.
Progress Tone	ATXn	Enable detecting of busy tone or dial tone to proceed dialing and showing the connection
Basic	ATX0	/Don't care any tone and do not show line connection speed.
Don't Care	ATX1	/Don't care any tone and show the line connection speed.
Dial Tone	ATX2	/Don't detect busy tone but show the line connection speed.
Busy Tone	ATX3	/Don't care dial tone but show the line connection speed.
Dial+Busy Tone	ATX4	/Do care dial tone, busy tone and show the extended result code (default).
Redial Delay	ATS37=n	Pause time between auto redial
Immediately	ATS37=0	/Redial Immediately
1..255 seconds	ATS37=n	/Set up redial time (/Default=2 second)
Dial Type		Select dial type
Tone	ATT	/Tone (DTMF) dialing mode
Pulse	ATP	/Pulse dialing mode
SPK.Control	ATMn	Monitoring speaker switch control.
Off	ATM0	/Keep speaker always off
Until DCD On	ATM1	/Speaker turn on until DCD ON,then turn off (default).
Always On	ATM2	/Keep speaker always on.
Off When Dial	ATM3	/Turn on speaker after dialing is completed, and then detect until to find out carrier and then turn off speaker.
SPK. Volume	ATLn	Speaker volume control.
Low	ATL0	/Set speaker volume to low.
Medium	ATL1	/Set to medium (default).
High	ATL2	/Set to high..

3.5.3 PROTOCOL MENU

Item Name	Command	Description
Protocol Type	AT\Nn	Select error correction and data compression function for async mode only. *This setting is ineffective in sync mode. It will automatically become direct mode regardless of setting made once the link established.
Normal	AT\N0	/with DTE speed conversion only.Note that the flow control function must be active.
Direct	AT\N1	/disable error correction, data compression, and DTE speed conversion.(modem speed=DTE speed)
Reliant MNP	AT\N2	/Link con be established only when MNP function is enabled on the remote modem.
Auto	AT\N3	/Automatically negotiate V42/MNP level with the remote modem. The negotiation sequence is V42bis-V42-MNP5-MNP4-NORMAL.
Reliant LAPM	AT\N4	/Link can be established only when V42 function is enabled on the remote modem.
LAPM,Normal	AT\N5	/Negotiate V42 level with the remote modem. The sequence is V42bis-V42-NOMAL.
LAPM,MNP	AT\N6	\/Automatically negotiate V42/MNP level with the remote modem. The negotiation sequence is V42bis-V42-MNP5-MNP4.
MNP Normal	AT\N7	Negotiate MNP level with the remote modem. The sequence is MNP5-MNP4-NORMAL.
Connect Code	ATWn	Select the extended CONNECT result code.
DTE Speed	ATW0	/with DTE speed
DTE/EC/DCE	ATW1	/with CARRIER, PROTOCOL, and DTE speed
DCE Speed	ATW2	/with DCE speed
Discon. method	ATS28=n	Disconnect method for V34/V32bis/V32
Immediate	(bit3,2)	/Disconnect immediately.
With clear-down		/Send clear-down sequence before disconnection (default)
Modem reset		/Reset modem after disconnection
Login Check		(this option is effective only under ANS mode). Assign the password to authenticate dial-in modem:
Disable		/Disable Login Check function.
#0..#9		/With this setting, ANS modem will authenticate dial-in modem with one of the stored phone number #0..#9, timeout for waiting password from dial-in modem is about 8 seconds; Control code '+' can be applied in #0..#9. (information about '+' is described in section 4.17).
ALL		/Authenticate dial-in modem with all stored phone number #0 to #9. Any successful match will force ANS modem to grant the access, timeout for waiting password from dial-in modem is about 8 seconds; Control come '+' can be applied in #0..#9.
By NMS		/If ANS modem is a card type modelV3600Ui, the received password will be relayed to CS V1.5x for authentication. Timeout for waiting password from dial-in modem is about 8 seconds. If ANS mdoem is a standalone model, this option will be the same as 'ALL'. (The program CS V1.5x is an additional software on CS server)
Send Password		(this option is effective only under ORG mode). Assign the stored telephone number, which will be sent out as password during dial-out connection:
Off		/Disable the action of sending password, this also disables the function of Dynamic Password assignment function.
#0..#9		/Send one of the stored phone number between #0..#9 as the

		password. Time required for sending password is about 2 seconds; Control code '+' can be applied in #0..#9.
CallBack No.		(Call back telephone number). Assign one of the stored phone number #0..#9 as the Call Back Number. Control codes such as '+', '<', '>' should not appear in phone number.
#0..#9		
CallBack Timer		The period ANS modem will delay before start Call Back procedure (from Idle to Dial). When this option is set to 'Disable', all Call Back related function will also be disabled (including Dynamic Callback assignment function).
Disable		
1…255 Seconds		
Compress	At%Cn	Control of the data compression function
Off	AT%C0	/disable data compression function (use V42 or MNP4 error correction only)
On	AT%C1	/enable data compression function (use V42bis or MNP5 data compression in addition to V42 or MNP4 error correction)

3.5.4 TEST MENU

Item Name	Command	Description
Clear All	AT&T0	Clear all the tests in one time, and a statement "Has been done" shall be shown.
LAL ON OFF	AT&T1	Local analog loop test (ON/OFF).This test is normally used to certify if the modem is in normal operation condition. Also, this test is usually carried out together with B.E.R test.
RDL ON OFF	AT&T6	For remote digital loop test (ON/OFF). This test can control remote modem to executive digital loop for BER test to find out if the modem and line of both ends are in normal condition.
DL ON OFF	AT&T3	For digital loop test (ON/OFF). This test enable the received digital data demodulated and send back to match with the far end test.
RDL Grant		Set for accepting remote digital loop(RDL) test.
ON	AT&T4	/Enable. (default)
OFF	AT&T5	/Disable.
Error Count 0..65535		Bit error count display function. Press Left or Right shift key to insert error. Press "ENTER" key to clear.
B.E.R Test	AT&T10	Set bit error rate test function.
OFF		/Disable (default).
511		/use the 511 test pattern

3.5.5 CONFIG MODEM MENU

Item Name	Command	Description
Speed	AT%Bn	Set modem speed and protocol.
V34 Adapt	AT%B0	/Set modem speed to be V.34 adaptive (multi-standard hand-shaking) mode, connectable speed from V.34 / V.32b / V.32 / V.22bis / V.22 /V.21. Only work for Dial Line.
V34+ 336	AT%B42	/Set modem speed to V34 + 33.6k bps....4DTCM(SM)
V34+ 312	AT%B41	/Set modem speed to V34 + 31.2k bps....4DTCM(SM)
V34 288	AT%B28	/Set modem speed to V34 28800 bps....4DTCM(SM)
V34 264	AT%B37	/Set modem speed to V34 26400 bps....4DTCM(SM)
V34 240	AT%B27	/Set modem speed to V34 24000 bps....4DTCM(SM)
V34 216	AT%B36	/Set modem speed to V34 21600 bps....4DTCM(SM)
V34 192	AT%B26	/Set modem speed to V34 19200 bps....4DTCM(SM)
V34 168	AT%B35	/Set modem speed to V34 16800 bps....4DTCM(SM)
V34 144	AT%B34	/Set modem speed to V34 14400 bps....4DTCM(SM)
V34 120	AT%B38	/Set modem speed to V34 12000 bps....4DTCM(SM)
V34 96	AT%B33	/Set modem speed to V34 9600 bps....4DTCM(SM)
V34 72	AT%B32	/Set modem speed to V34 7200 bps....4DTCM(SM)
V34 48	AT%B31	/Set modem speed to V34 4800 bps....4DTCM(SM)
V34 24	AT%B40	/Set modem speed to V34 2400 bps....4DTCM(SM)
V32b Adapt	AT%B47	/Set modem speed to V.32 Auto, auto detact V.32b /V.32 /V.22bis / V.22 /V.21
V32b 144	AT%B20	/ Set modem speed to V.32bis 14400 bps TCM
V32b 120	AT%B19	/ Set modem speed to V.32bis 12000 bps TCM
V32 96Q	AT%B18	/ Set modem speed to V.32 9600 bps QAM
V32 96T	AT%B17	/ Set modem speed to V.32 9600 bps TCM
V32b 72T	AT%B16	/ Set modem speed to V.32bis 7200 bps TCM
V32 48	AT%B15	/ Set modem speed to V.32 4800 bps QAM
V26b 2400	AT%B9	/ Set modem speed to V.26 2400 bps DPSK
V26b 1200	AT%B8	/ Set modem speed to V.26 1200 bps DPSK
V23 1200	AT%B7	/ Set modem speed to V.23 1200 bps FSK
V22b 2400	AT%B5	/ Set modem speed to V.22bis 2400 bps QAM.
V22 1200	AT%B3	/ Set modem speed to V.22 1200 bps DPSK
V21 300	AT%B1	/ Set modem speed to V.21 300 bps FSK
BELL 212A	AT%B4	/ Set modem speed to BELL 212A 1200bps DPSK
BELL 103	AT%B2	/ Set modem speed to BELL 103 300 bps FSK
ORG/ANS Mode	ATS14=n	Set modem as the originate or answer mode.
Originate Mode	(bit7)	/Originate site
Answer Mode		/Answer site
Auto Retrain	AT%En	The automatic adaptive equalizer can be re-adjusted via retrain procedure activated automatically when the S/N become worse than the preset threshold.
On	AT%E1	/Retrain occurs automatically according to SQ/EQM value. (default)
Off	AT%E0	/Auto retrain disable.
Tx Clock	AT&Xn	Select transmit clock source.
Internal	AT&X0	/Internal clock source, for most point to point application (default).
External	AT&X1	/External clock source, for cascade and TDM/STDM network application.
Loopback	AT&X2	/Received clock source, for used in slave side of polling networks or the modem in the most far end of a cascading network.

LL TX Level	ATS30=n	Set leased line transmit level.
0..-31 dBm		/-13dBm (default)
DL TX Level	ATS56 =n	Set dial line transmit Level.
0..-15 dBm		/-13dBm (default)
ASI Overspeed	AT%An	Select async data speed tolerance.(ITU-T V.14)
+1%	AT%A0	/Basic range +1% to -2.5% (default).
+2.3%	AT%A1	/Extended overspeed range +2.3% to -2.5%.
Make/Break	AT&Pn	Pulse dial make / break ratio selection.
UK(33.3%)	AT&P1	/33.3\66.7% (default).
US(39%)	AT&P0	/39\61%.
Force OFF Hook	ATH1	Force modem off-hooking the line to busy out the in coming calls.
OH by DTR	ATS19=n (bit 6)	Make the modem to off-hook the line when DTR being off for a period of time
On		/enable the OH By DTR function
Off		/disable the OH By DTR function (default)
RTRN.Threshold	ATS57=n (bit1,0)	Select the scaleable retrain threshold for determining the data rate of the connection.
High		/Issue a retrain or rate change in normal line condition
Medium		/Issue a retrain or rate change in poor line condition
Low		/Issue a retrain or rate change in worse line condition
Pump Edit		product designer use only.
FB/FF CTRL	AT%Gn	Auto speed fallback and fall forward
On	AT%G1	/Enable (Dial Line Default)
Off	AT%G2	/Disable (Leased Line Default)
Remote Access	ATS27=n (bit3)	Enable the modem to monitor and control the remote modem through the secondary channel
On		/enable remote access function
Off		/disable remote access function (default)
Dynamic Range	ATS28=n (bit0)	Select the dynamic range of receiving signal.
-12..-44dBm		/-12 to -44 dBm (Default)
-2 ..-35 dBm		/-2 to -35 dBm

3.5.6 CONFIG DTE MENU

Item Name	Command	Description
DTE Speed 300 bps 600 bps 1200 bps 1800 bps 2400 bps 3600 bps 4800 bps 7200 bps 9600 bps 12000 bps 14400 bps 16800 bps 19200 bps 21600 bps 24000 bps 26400 bps 28800 bps 31200 bps 33600 bps 38400 bps 57600 bps 76800 bps 115200 bps	AT	This setting is used to determine DTE speed when auto speed conversion is ON in V.42 / MNP / normal mode. *When using direct mode and all the synchronous modes, this setting will not available and DTE speed will be determined by modem speed, DTE speed = modem speed. *The throughput is improved by using data compression, enhance this set higher than the modem speed is suggested to enable more effective operation. *When use "AT" command and auto baud rate detect function "ON", this setting will be replaced by identified speed. *The Auto baud rate function can detect all the listed DTE speed. /Default = 57600 bps.
Flow Control	AT\Qn	Used to set flow control between terminal and modem when using V.42/MNP and normal mode (asynchronous mode only).
Off	AT\Q0	/No flow control
X-ON/X-OFF	AT\Q1	/Software control, used in text data.
CTS Only	AT\Q2	/Hardware control identical to RTS/CTS control, but modem send the data in spite of RTS from DTE, unilateral control.
RTS/CTS	AT\Q3	/Hardware control, bilateral, accept any type of data (default).
DTR CTL	AT%Dn	Modem action select for DTR from OFF to ON.
108-2	AT%D0	/Same as V.25 108.2 DTR operation (default).
108-1	AT%D1	/Same as V.25/V.25bis 108.1 DTR operation. When DTR is from OFF to ON,the modems will dial the designed preset telephone number or answer according to the current ring count.
DTR Off Action	AT&Dn	On originate and answer site respectively modem action select for DTR from ON to OFF.
Forced On	AT&D0	/Force DTR in ON position A power-on auto dial operation can be achieved when operating with DTR ON auto dial (default).
Command mode	AT&D1	/Return to the command mode.

Disconnect	AT&D2	/Disconnect. Normally used with 108.1.
MODEM Reset	AT&D3	/Force Modem reset.
DSR Control	AT&Sn	DSR signal control selection.
Normal	AT&S1	/DSR ON after Modem handshaking.
Forced on	AT&S0	/Force DSR in ON position.
DCD Control	AT&Cn	DCD signal control selection.
Forced on	AT&C0	/Force DCD in ON position.
Normal	AT&C1	/DCD ON means line is in connection while DCD OFF means line is OFF (default).
V.13 HDX	AT&C2	/ITU-T V.13 standard simulated carrier in half-duplex mode.
V.23 HDX	AT&C2	/ITU-T V.23 standard simulated carrier in half-duplex mode.
RTS Control	AT&Rn	RTS signal control selection.
Normal	AT&R0	/Controlled by RTS.
Forced on	AT&R1	/Keep RTS in ON position..
Data Format	AT&Mn	Data format selection in data mode.
Async	AT&M0	/Async.
Sync	AT&M1	/Sync.
Total bits	ATS19=n (bit5,4)	Total bit length for async data format (including Start, Stop, Parity, Data bits, default =10)
8/9/10/11		
AL by 141	ATS23=n (bit2)	DTE control AL through EIA RS-232 pin18
On		/Enable
Off		/Disable (default)
RDL by 140	ATS23=n (bit1)	DTE control RDL through EIA RS-232 pin21
On		/Enable
Off		/Disable (default)

3.5.7 COMMAND MENU

Item Name	Command	Description
Command Mode	ATS19=n	Intelligent function command set selection.
AT command	(bit1.0)	/Hayes compatible "AT" command set with async format.
V.25bis command		/ITU-T V.25bis command set with async, Bisync and HDLC\SDLC formats.
Dumb mode		/Dumb mode, don't accept any command. This mode is set for all leased line and most of the sync dial line to prevent modem from interference made by the data of the terminal, and protect the terminal against any malfunction caused by the return result code from the modem.
Auto Baud	AT%Un	Auto baud rate detection function control for AT command mode.
On	AT%U1	/Enable (default).
Off	AT%U0	/Disable.
Framing	ATS19=n	V.25bis command data format.
ASYNC	(bit1,0)	/Async (default).
HDLC/SDLC		\HDLC/SDLC
BSC		\Bisync/monosync
Async form	ATS19=n (bit5,4)	Select the Async data parity
7-O-1		/7 Data Bits, odd parity 1 stop bit
7-E-1		/7 Data Bits, even parity 1 stop bit
7-N-2		/7 Data Bits, none parity 2 stop bits
8-N-1		/8 Data Bits, none parity 1 stop bit (default)
Idle char.	ATS19=n (bit3)	Select the char to be transmitted for the BSC & HDLC faming
Idle		/No character to be Tx when idle.
SYNC		/SYNC char be Tx when idle.

3.5.8 LINE SETUP MENU

Item Name	Command	Description
Line Type	AT&Ln	Select line type and also set dial back-up function.
Dial Line	AT&L0	/Dial line.
2W Leased	AT&L1	/2 wire leased line.
4W Leased	AT&L2	/4 wire leased line.
Leased to Dial	ATS31=n	Auto dial back-up control while leased line is out of service.
Manual	(bit0)	\Manual control (default)
Auto		/Auto dial back-up.
Backup Tel.		Select backup telephone number #n (n=0~9)
No dial backup		/Disable backup function (default)
#0 nnnn .. to #9 nnnn		/Enable backup function and make a choice of the phone number group.
Backup Speed	ATS55=n	Select modem speed used in the auto dial backup mode.
V34 Adapt to V21 300		\(default =V.34 288)
Dial To Leased	ATS31=n	Select whether return to leased line automatically or not during dial back-up mode.
Manual	(bit1)	/Manual control (default)
Auto		/Return to the leased line automatically when leased line is recovered.
D to L Timer	ATS36=n	When operate in dial back-up mode, to select how long it will take to detect if the leased line is recovered or not.
Forever		/No dial to leased
1..255 mins.		\(default = 60 minutes)
Dial To Dial	ATS42=n (bit3)	When dial line is in use (excluding dial back-up mode), the line can be restored by auto-redial after line disconnection.
Off		/Disable (default)
On		/Any abnormal line disconnection shall automatically redial to connect.

3.5.9 PROFILE MENU

Item Name	Command	Description
LOAD	ATZn (n=0-9)	This machine provides 20 groups of load configuration profile. Among them 10 groups configuration profile which cover the most required applications for normal use. The other 10 groups are set by the user which can be revised by the user before filing for use.
User Defined : User Profile#0..#9	AT&Zn	/User defined load profile #0..#9. Through this operation, required settings can be made for the next operation when the modem is power on.
Default profile :	AT&Fn&W	Load factory profile #0..#9.
0: AS-DL-AT-AUTO	AT&F0&W	/Async, dial line, AT command, Auto reliable mode, V34 Adapt, this mode is most applicable to BBS networks.
1: AS-DL-AT-NONE	AT&F1&W	/Async, dial line, AT command, direct mode and V34 Adapt, this is a typical operating mode for Hayes compatible modem
2: SY-DL-V25-NONE	AT&F2&W	/Sync, dial line, V.25bis command, V34 Adapt, this mode is applicable to IBM AS-400 series sync dial networks.
3: AS-2L-ANS-V34	AT&F3&W	/Async, 2W leased line, answer, applicable to the most of the async, non-compressed 2 wire leased line.
4: AS-2L-ORG-V34	AT&F4&W	/Async, 2W leased line, originate, applicable to the most of the Async, non-compressed 2 wire leased line.
5: SY-2L-ANS-V34	AT&F5&W	/Sync, 2W leased, answer, applicable to the most of the Sync, 2 wire leased line.
6: SY-2L-ORG-V34	AT&F6&W	/Sync, 2W leased line, originate, applicable to the most of the Sync, 2 wire leased line.
7: SY-4L-ANS-V34	AT&F7&W	/Sync, 4W leased, answer, applicable to the most of the Sync, 4 wire leased line.
8: SY-4L-ORG-V34	AT&F8&W	/Sync, 4W leased line, originate, applicable to the most of the Sync, 4 wire leased line.
9: ASY-2L-ANS-AUTO	AT&F9&W	/Async, 2W leased line, answer, applicable to the most of the async, compressed, 2 wire leased line.
SAVE	AT&Wn (n=0-9)	Store the revised configuration in the user-defined configuration profile.
User Profile#0..#9		\/Store in the nth group in the user's configuration profile. Usually, the 0th group is provided for the working area, setting store in this area or load the factory default will change the set parameters for next power-on operation. If you want the nth group is to be used for the next power-on working profile, operate the load user profile #n.
Front Lock	ATS29=n	Front panel lock control.
Unlock	(bit4)	/No limitation for any front panel operation (default).
Lock		/Allow view the status and current setting of the modem,but can not make any changes of setting.
Password edit		For changing password, use left key-L, right key-R, enter key-E, exit key-X, Home key-V.
Input:_ _ _ _		/The password by the factory are "REEE" (right moving key, ENTER, ENTER, ENTER).
Power up User Profile#0..#9	AT&Yn	select the user profile to be used on power up.
Initial	AT&F10	Re-initialize the user profiles to the Factory

		profile#0,and flush the stored telephone numbers.
Are you sure???		/confirm the initializing action. Press enter key to confirm or any other key to quit.
Serg edit	ATSn=m	Edit the contain of the selected sreg.
Base = DEC		/Edit the value of the S-register in decimal form.
Base = Bin		/Edit the value of the S-register in binary form. After selecting the form, press Enter to starting editing S-register shown in the following format.
XX : △△△□□□□□□□□		xx: Use left key,right key and enter key to select the S-register to be edited. ΔΔΔ: Use left key, right key and enter key to edit the value of the selected S-register in decimal form. □□□□□□□□: Use lift, right, and enter key to edit the value of the selected S-register in binary form. To discard editing, press exit key.

CHAPTER 4
GENERAL INFORMATION AND FEATURES

CONTENT

CHAPTER 4: GENERAL INFORMATION AND FEATURES

4.1 Preview

In order to help you to get familiar with your Network Series Modem, this chapter introduces you some common applications. For most applications, the materials of this chapter will be enough.

4.2 Dial Line VS. Leased Line

There are two kinds of telephone lines --- dial lines and leased lines described as below.

A. Leased line provides users a dedicated communication channel. Both ends of the circuit are permanent. It offers continuous service and provides absolute security. It will not be invaded by any other circuit due to the dedication, it supports better quality and higher reliability.

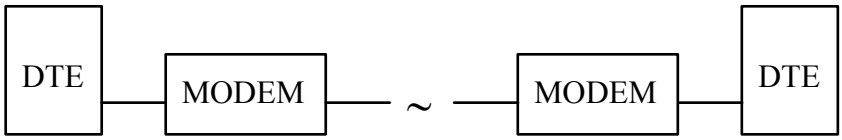


FIG. 4-1: Leased Line

B. B. Before using a dial line such as the circuits for telephone and facsimile machine, we have to dial a number. For the users who are used to communicate with different counterparts such as bulletin board system (BBS), public service network, and toll free services, this will be a better choice. Due to the time consuming dialing procedure (45-60) Sec.), the efficiency is lower than that of leased lines. It is even worse when line or destination is busy. Furthermore, the communication path is different at each dial, so the line quality is not ensured. Besides, it doesn't guarantee good security.

To make this modem operate in 2/4-wire leased line, or dial line, you need to do some settings with Line Type Selection under "LINE SETUP" menu.

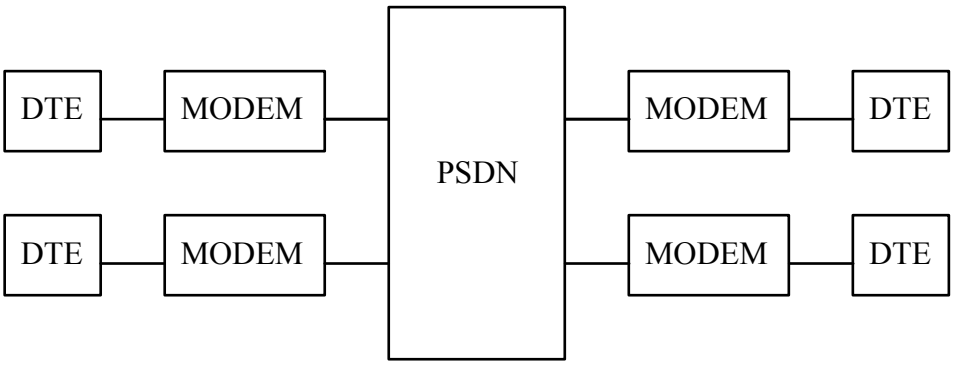


FIG 4-2: Dial Line

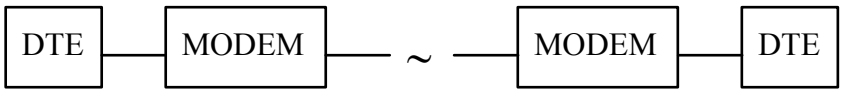
4.3 2W/4W Leased Line

We had talked modem operate in the previous section. There are two-wire leased lined and four-wire leased line.

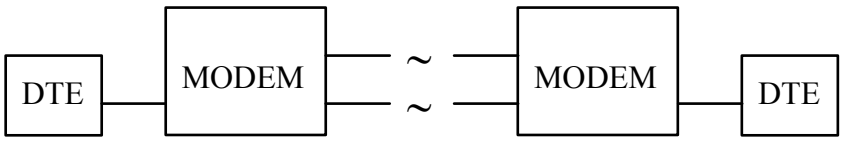
2W leased line achieves full duplex with only a pair of lines. There comes up the problem of interference. In V.21, V.22, V.22bis operating modes, the Modem used the frequency split method. Whereas, in V.32/V32bis/V.34 mode, it must provides "echo cancellation", because originate and answer modems occupy the same frequency band.

4W leased line offers two independently unilateral transmission channel, therefore, it can achieve full duplex communication with less interference.

Obviously, the line quality of 4W leased line is better than that of 2W leased line. However, the modem does an excellent job with both 2W and 4W leased lines and even dial line.



2W Leased Line



4W Leased Line

FIG. 4-3: 2W/4W leased line.

4.4 Answer Mode VS. Originate Mode

While using the dial line, there must be a modem initiating the call, once the exchange recognizes the number, it connects the circuit to the answering modem with ring signals. Answering modem can pick up the call manually or automatically. Afterward, it issues the answer tone to connect with the originate modem. Usually, we call the modem which dials the call as originate mode and the other one as answer mode. According to the role of the connection the training sequence and working frequency band of either modem is different from each other even operating with leased line.

With 2/4-wire full-duplex operation such as V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, Bell 103, and Bell 212A, there should be an originate mode and an answer mode.

You may find the information of originate/answer settings in the “ORG/ANS MODE” column of “CONGIF MODEM” MENU. Note that the modem will automatically determine either mode whenever you use the “AT” commands, front panel dialing, or auto answering.

4.5 Synchronous VS. Asynchronous

The data formats of both connecting modems must be exactly the same in order to exchange data with each other.

There are synchronous and asynchronous data formats. The common personal computers and terminals are asynchronous. Whereas, the host computers and their terminals are often synchronous.

For most multiplexes, the connecting modems should be synchronous. However, the user should know the type of the data terminal equipment (DTE) to get proper operation.

Except V.21, V.23, and Bell 103 which only can operate in asynchronous mode, other protocols can run in either mode.

About the settings of this issue, you may find it at “Data Format” column of “CONFIG DTE” menu. Note that if the asynchronous mode is selected, you need to set “Data Bits”, “DTE Speed”, as well. On the other hand, if you operate the modem with “AT” command, it will automatically determine these parameters.

4.6 Error Correction And Data Compression

The Network Series Modem supports “Error Correction” and “Data Compression” while operating in asynchronous mode. In addition to 100% error free, it also provides two to four times data compression rate to increase throughput.

MNP class 4 provides error corrections. MNP class 5 provides data compression for up to two times. On the other hand, V.42 and V.42bis are the recommendations from ITU-T V.42 to provide error correction and V.42bis provides data compression for up to four times.

Due to the improved throughput, the modem it provides DTE speed up to 115200 bps for between data terminal and modem.

During connecting, the modem automatically recognizes the protocol being used by the remote modem and set the priority order as LAPM with EC→LAPM→MNP-5→ MNP-4→NORMAL.

Under these error correction and data compression operations, there should be some kinds of flow control between modem and data terminal equipment (DTE) to avoid data loss. the hardware solution to the modem is by controlling RTS and CTS signals. The software solution is by utilizing X-on and X-off codes.

To find the setting information dealing with error correction and data compression, you may look up the “PROTOCOL” menu. In addition, “CONFIG DTE” menu gives you the guide to flow control setting.

4.7 Configuration Profile Set-Up

The Network Series Modem have various operating modes. To save your energy, it provides 10 sets of factory default settings as well as 10 sets of user setup profile which store data even the power is off. Users may choose the most similar factory default setting; make some modifications with front panel or by AT commands from terminal then save the modified setting to a user profile. From then on, once the modem is turned on, it will use this user profile as default.

You may find the “Load”, ”Save” selections in the “PROFILE” Menu where you can save the current configuration into the selected user profile or load the user or the factory profile.

Table 4.7.1 shows the default settings of each factory profiles.

Table 4.7.1 Factory Profile Default Settings

Profile #	#0	#1	#2	#3	#4	#5	#6	#7	#8	#9
SETTING ITEM	ASY-DL-AT-AUTO	ASY-DL-AT-NONE	SYN-DL-V25-NONE	ASY-2L-ANS-V34	ASY-2L-ORG-V34	SYN-2L-ANS-V34	SYN-2L-ORG-V34	SYN-4L-ANS-V34	SYN-4L-ORG-V34	ASY-2L-ANS-Auto
DATA FORMAT	ASYNC	ASYNC	SYNC	ASYNC	ASYNC	SYNC	SYNC	SYNC	SYNC	ASYNC
COMMAND	AT	AT	V25bis	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB
LINE Type	DIAL	DIAL	DIAL	2WL.L	2WL.L	2WL.L	2WL.L	4WL.L	4WL.L	2WL.L
RING Times	1	1	1	1	1	1	1	1	1	1
MODEM SPD	V.34 Adapt	V.34 Adapt	V.34 Adapt	V.34 288	V.34 288	V.34 288	V.34 288	V.34 288	V.34 288	V.34 288
ORG/ANS	ANS	ANS	ANS	ANS	ORG	ANS	ORG	ANS	ORG	ANS
Tx level	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm	-13dBm
Auto Retrain	On	On	On	On	On	On	On	On	On	On
DTE Speed	57600	57600	57600	57600	57600	57600	57600	57600	57600	57600
PROTOCOL	V42bis	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	V42 bis
FLOW CTRL.	RTS/CTS	Xon/Xoff	Off	Off	Off	Off	Off	Off	Off	RTS/CTS
RTS CTRL.	ON	ON	Normal	ON	ON	Normal	Normal	Normal	Normal	Normal
DCD CTRL	Normal	ON	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
DTR OFF	ON	ON	DISCNT	ON	ON	ON	ON	ON	ON	ON
DSR CTRL.	ON	ON	Normal	ON	ON	ON	ON	ON	ON	ON
Disconnect Method	clear down	immediate	clear down	clear down	clear down	clear down	clear down	clear down	clear down	clear down

4.8 Remote Access

For improving service loading, the modem offers a remote access function through secondry channel. It can read and write the parameter of the remote site modem from local site for well maintenance purpose.
To use this function, the "Remote Access" under "CONFIG MODEM" menu must set to be on.

4.9 Multi-standard Handshake

The modem complys with ITU-T recommendations V.34, V.32bis, V.32, V.22bis, V.22, V.21, V.8, V.42 and V.42bis operating standard.

This functions in both calling and answering mode to automatically recognize the remote modem standard and connect to it accordingly.

4.10 Auto Dial Back-Up

When you apply the modem to leased lines, no matter what protocol you are using, in case that the lines don't function well, you may allow modem dial a stored number via a dial line to rebuild the connection. This line is called "back-up line."
While using the back-up line, the modem periodically checks the recovery of leased lines to find the opportunity to go back to leased lines in order to save the charge of dial line.
To use this function, you must set "leased To Dial" and "Dial To Leased" to be "AUTO" or "MANUAL" under "LINE SETUP" menu; also fill up "Backup Tel#1" and recovery time.

4.11 Auto Fallback And Fall Forward

When auto fallback & fall forward is enabled in V.34 or V.32bis mode, the modem will automatically initial a V.34 or V.32bis rate renegotiation when the line condition changes, so that the optimum available data rate is always select with minimal interruption to user data.
To use this function, the "FF/FB control " under "CONFIG MODEM"menu must set to be on.

4.12 Line Status Monitoring

In order to let users manage transmission conditions, the Network Series
Modem provides a signal quality displayed at right lower corner of the screen. It ranges from 0 to 9. The following shows the relationship between the displayed number and bit error rate (BER).

9	--	< 10 ^ -9
8	--	< 10 ^ -8
7	--	< 10 ^ -7
6	--	< 10 ^ -6
5	--	< 10 ^ -5
4	--	< 10 ^ -4
3	--	< 10 ^ -3
2	--	< 10 ^ -2
1	--	< 10 ^ -1
0	--	NO Connect

Basically, 10^-5 to 10^-6 is the basic required bit error rate. If this condition is not achievable; leased line users should report to telephone company, however, it is better for dial line users to try the dial again.
There are some real time line condition information which may help you judge the line quality:

Examples :

1. Transmitted signal level — Tx level = -10 dBm
2. Received signal level — Rx level = -25 dBm
3. Signal to noise ratio — S/N Ratio = 35 dB
4. Received frequency shift — F-Shift = 0.2 Hz
5. Far-end frequency shift — F F-Shift = 1.7 Hz
6. Round trip delay — Delay = 560 ms

7. Phase jitter P J = 1 Degree
8. Far-end echo level F Echo = -40 dB
9. Terminal mode DTE = 19200 ASY 10
10 .Retrain count Retrains = 1

The parameters above can be found in “STATUS” menu.

4.13 B.E.R Test

In addition to the parameters stated in the previous section, the Network Series Modem also offers bit error rate test without any extra test instruments. Before using the BER test, you have to build a connection then enter "TEST" menu, set "BER Test" to be ON, select "Error count". Note that if you want to do this test with both modems, you need to do the setting described above with both modems. During test, you may press "→" or "←" key to send some error codes and observe whether the other modem received them or not. The number of error bits for each issue is from 2 to 5. At the beginning of the test, you may press “ENTER” to clear "Error Count. " Wait a period, you may get B.E.R by dividing error count by total transmitted bits. There are one test pattern, say 511, you may choose from. The selection can be done at "BER TEST" under "Test" menu. Note that the settings of both modems should be consistent.

You may execute this test even no one is at the remote site. It can be done by utilizing remote digital loopback (RDL) which makes remote modem loopback its received data. To start it, activate “RDL” in “Test” menu, then execute BER test stated above. Beware that error codes generated by local modem will be received by itself. Hence, the error count you get is the sum of that of transmitted and received routes (bilateral). You may judge whether the modem is good or not by operating local analog loopback then execute BER test. No matter how long you execute this test, the error count should be 0.

4.14 Intelligent Dial

There are some data terminal equipment such as multiplexes, controllers, and synchronous terminals can’t issue “AT” commands to dial. The modem offers you a very convenient way to dial by means of operating front panel. In addition to ten set phone number, it provides you a 108/1 auto dial function which dial pre-determined number when you turn the modem on or when DTR is turned on (off to on transition).

4.15 Front Panel Lock and Password Protect

In order to prevent from the operation of unauthorized persons, we offer you this function. After you set “Front Lock” under “PROFILE” menu to be “Lock”, even the front panel keys are still effective, all the operations affecting transmission are not allowed. You only may observe the setting and monitor the line conditions.

To release the lock, you need to enter a password. The following is the table of panel keys.

"EXIT" --- X
"ENTER" --- E
"HOME" --- V
"→" --- R
"←" --- L

The factory setting is “REEE”, and can be modified by users. Before you change the password, you need to enter the old one. So don’t forget the password you had entered.

4.16 ITU-T V.13/ V.23 Simulated Carrier Control in Half Duplex

The modem normally operates in full duplex. mode. However, some applications may requires control of a remote DCD signal by a local RTS signal. V.13/ V.23 operation allows local RTS control of remote DCD signal without on-off carrier switching in half duplex operation.
The V.13/ V.23 function apply to the SNA network and the related setting is located in "DCD control" under "CONFIG DTE" menu.

4.17 PASSWORD AND CALLBACK FUNCTIONS

4.17.1 Dynamic Password/CallBack:

Special Control codes below can be utilized to assign Dynamic Login Password or Call Back Phone Number (work with both AT command dialing string and front panel dialing operation):

a. '<' +<string>: Control code for Dynamic Password assignment. <string> after '<' will be sent to ANS modem as Password. It overrides the setting in 'Send Password', but will be ignored if 'Send Password' = 'Off'.
b. '>' +<string>: Control code for Dynamic Call Back Number assignment. <string> after '>' will be sent to ANS modem as the desired Dial Back Number. After ANS modem authenticated ORG modem, it will call back with <string>. This Control code overrides the setting of 'Call Back No.' in ORG modem. If 'Send Password' = 'Off' on ORG modem or 'Call Back No.' = 'Disable', this character will be ignored.

4.17.2 Extension Code for Stored Phone Numbers ('+'+<char>):

If the last two digits of Stored Phone Number is '+'+<char>, modem will dial current number and continue on with specific stored number as designated by <char>. <char> is the stored phone number order(#n). (any other characters after <chart> will be omitted)
For example: ATDT1234+5 will force the modem to dial 1234 and the number stored in #5. Total number in a dial string should not exceed 250 characters. The '+' Code should not appear in Call Back Number or it will be ignored when ANS modem calling back.

4.17.3 Additional Information:

a. Front Panel LCD will show "Call Back" to indicate it is under Call Back mode: When ANS modem is waiting under 'Call Back Timer' to call back.
b. When ORG modem dial with Dynamic Call Back Control Code ">"+<string> and sending Password for authentication(no matter send with 'Send Password' or Dynamic Password): ANS modem will save received Password, and send it back while Call Back link was built. And it overrides the setting in its own 'Send Password'.
c. When modem is under Call Back operation, VO/DA can be used to cancel procedure.
d. When applying Password or Call back Security function, 'PROTOCOL' setting in both modems should be identical.

e. Dynamic Password/Call Back Control Code as ">", " <" will not take effect during Login check (will be treated as part of Password).

There's no Call Back function under leased line mode.

f. Password Security by Pass through

4.18 Intelligent Dial Polling

1. Settings:
   When under Dial Modifiers setting, use "@" symbol for intelligent dial polling instead, but "=" is still "wait for quiet answer (silence).

2. Operations:
   If a "@" symbol included in the Telephone Number #0- #9, also abnormal disconnection, i.e. jumping back to Idle before connecting occurred (exception: when Originate user press the VO/DA button), then dialing will be proceeded from the telephone number with a "@" symbol and stop at the one without a "@" symbol.
   For instant: Tel #0: 12345678@
   Tel #1: 23456789@
   Tel #2: 34567890
   If dialing starts from #0, it will automatically dial from #0, #1 to #2 and stops at #2.
   Note: if user has set Dial To Dial function to "On", then the dialing will keep dialing #2.
   Also reminds that:
   a. If user is using ATDTxxxx@ command to dial, then it will start the dial polling from Telephone Number #0.
   b. If the setting of DTR is "DTR off to on (108-1)", then the "@" symbol (function) needs to be set included in #0 in order to start the dial polling function after the initial dialing.
   c. If the setting is "Dial to Dial on", then the "@" symbol (function) needs to be set included in the Backup Tel in order to start the dial polling function after the initial dialing.
   d. If the dial polling number followed by an "Empty" phone number, then the dialing will cycle back to #0. (However, if the Tel #0 is an empty number, then the dial polling will terminate.)
   e. When dial polling to #9 (or #5 when the Country Code is Beijing it will return back to #0.
   f. When during the "Dial Backup" (Leased to Dial), then the "@" function will not be working.
   g. The dial polling will terminate when a connection has been made.
   h. Before the connection, user at Originate can press the VO/DA key to terminate the dial polling.

CHAPTER 5
INSTRUCTION SETS

CONTENT

CHAPTER 5 : INSTRUCTION SETS

5.1 AT Command Set

Table 5-1: AT Command Set

Cmd	Function Description
A/	repeat the last AT command
ATA	answer command
ATD	dial command
ATEn	echo on/off 0 : echo off 1 : echo on
ATHn	hang on/off 0 : on hook 1 : off hook
ATIn	modem identification command 0 : report product code 1 : ROM checksum 2 : verify ROM checksum 3 : Report ROM components 4 : modem capabilities and version 5 : Country Code 6 : pump controller : CS 7 : pump-DSP : CS 8 : CTL/ SPX Version 9 : OK
ATLn	speak volume control 0 : Low 1 : Medium 2 : High
ATMn	speak control 0 : off 1 : untill DCD on 2 : Always 3 : off when dial
ATOn	go online 0 : go back to data mode 1 : rate change 2 : retrain
ATP	enable pulse dialing

Cmd	Function Description
ATQn	response on/off 0 : response on 1 : response off
ATS	S register read/write ATSnn? : read s register ATSnn=mm : write value mm (in decimal form) to the s register nn
ATT	enable tone dialing
ATVn	result code form (long/short) 0 : short 1 : long
ATWn	extented result code formats 0 : CONNECT with DTE speed 1 : CONNECT with CARRIER, PROTOCOL and DTE speed 2 : CONNECT with DCE speed
ATXn	result code formats / call progress options 0 : CONNECT without speed message, blind dial, no busy tone 1 : CONNECT with speed message, blind dial, no busy tone 2 : CONNECT with speed message, wait for dial tone, no busy tone 3 : CONNECT with speed message, blind dial, check busy tone 4 : CONNECT with speed message, wait for dial tone, check busy tone
ATZn	load user profile n (n=0~9) 0 : load user profile 0 n : load user profile n
AT&Cn	DCD control 0 : DCD forced on 1 : DCD normal 2 : V.13 HDX 3 : V.23HDX
AT&Dn	DTR on-to-off actions 0 : ignore 1 : recall command mode 2 : disconnect 3 : reset modem
AT&Fn	load factory profile n n = 0 .. 9

Cmd	Function Description
AT&Gn	guard tone options 0 : disabled 1 : 550 Hz 2 : 1800 Hz
AT&Kn or AT\Qn	DTE flow control options 0 : no flow control 1 : XON/XOFF flow control 2 : CTS only flow control 3 : RTS/CTS flow control
AT&Ln	line type selections 0 : dial line 1 : 2-wired leased line 2 : 4-wired leased line
AT&Mn or AT&Qn	data format options 0 : async data mode 1 : sync data mode
AT&Pn	dial pulse (MAKE/BREAK) ratio 0 : USA (39/61%) 1 : UK (33/67%)
AT&Rn	RTS/CTS options 0 : RTS normal 1 : RTS forced on
AT&Sn	DSR control 0 : DSR forced on 1 : DSR on after connect
AT&Tn	selftest commands 0 : clear all test 1 : LAL test 3 : DL test 4 : RDL grant enable 5 : RDL grant disable 6 : RDL test 7 : RDL + TP test 8 : LAL + TP test 10 : TP on
AT&Vn	view active config/user profiles/tel numbers 0 : view current active profile n : view user profile n (n=1~9)
AT&Wn	save to user profile n n = 0 to 9
AT&Xn	sync tx clock source options 0 : internal clock 1 : external clock 2 : slave (loopback) clock

Cmd	Function Description
AT&Yn	powerup user profile n (n=0~9) 0 : load user profile 0 on power up n : load user profile n on power up
AT&Zn	view/store telephone number n (n=0~9) n = 0 .. 9, the selected telephone number AT&Zn? : view tel number n AT&Zn=string : store the string to tel number n.
AT\Jn	DTE/DCE speed convert on/off 0 : enable DTE/DCE speed convert 1 : disable DTE/DCE speed convert
AT\Nn	protocol type options 0 : normal mode 1 : driret mode 2 : MNP reliable mode 3 : auto-reliable mode 4 : LAPM reliable 5 : LAPM reliable with fallback to normal mode 6 : LAPM reliable with fallback to MNP mode 7 : MNP reliable with fallback to normal mode
AT%An	async tolerance 0 : basic ASI (+1% to -2.5%) 1 : extended ASI (+2.3% to -2.5%)

Cmd	Function Description
AT%Bn	modem speed 0 : V.34_Adaptive 1 : V21_300 / FAX 300 2 : B103_300 3 : V22_1200 4 : B212_1200 5 : V22_2400 7 : V23_1200 8 : V26b_1200 9 : V26b_2400 10 : V27_2400 11 : V27_4800 13 : V29_7200 14 : V29_9600 15 : V32_4800 16 : V32b_7200 17 : V32_9600T 18 : V32_9600Q 19 : V32b_12000 20 : V32b_14000 26 : V34_19200 27 : V34_24000 28 : V34_28800 29 : V32t_16800 30 : V32t_19200 31 : V34_4800 32 : V34_7200 33 : V34_9600 34 : V34_14400 35 : V34_16800 36 : V34_21600 37 : V34_26400 38 : V34_12000 40 : V34_2400 41 : V34_31200 42 : V34_33600 43 : V17_7200 44 : V17_9600 45 : V17_12000 46 : V17_14400 47 : V32b_Adaptive
AT%Cn	data compression on/off 0 : data compression off 1 : data compression on

Cmd	Function Description
AT%Dn	DTR off-to-on actions 0 : DTR off-to-on normal (108.2) 1 : DTR off-to-on dial/ans according to ring-in(108.1)
AT%En	auto retrain control 0 : auto retrain disable 1 : auto retrain enable
AT%Sn	display current line status 0 : display local status 1 : display remote status
AT%Gn	auto fall forward/fallback enable 0 : auto fall forward/fallback disable 1 : auto fall forward/fall back enable
AT%Un	autobauding on/off 0 : autobauding off 1 : autobauding on
AT-Cn	calling tone on/off 0 : calling tone off 1 : calling tone on
AT-V	display versions
AT-Rn	read DSP ram content (for test only)
AT-Wn=mm	write DSP ram content (for test only)

5.2 Dial Modifiers

Table 5-2 Dial Modifiers for AT and V25bis command

CODE	Function Description
'T' or 't'	enable tone dial
'P' or 'p'	enable pulse dial
'0' to '9" A' to 'D' 'a' to 'd' '*', '#'	dial digit
','	pause
'!'	flash hook
'W' or 'w' or ':'	wait for dial tone
';'	return to idle after dial
'@' or '='	wait for quiet answer (silence) “@” intelligent dial polling
'R' or 'r'	reverse to the answer mode
'Sn' or 'sn'	dial stored tel number n
'+'	cascade the tel number to the next one
'-' or '(' or ')' or ' '	do nothing

5.3 Result Codes

Table 5-3 AT Command Result Codes

Short	Long form
0	OK
1	CONNECT
2	RING
3	NO CARRIER
4	ERROR
5	CONNECT 1200
6	NO DIAL TONE
7	BUSY
8	NO ANSWER TONE
9	None
10	CONNECT 300
11	CONNECT 600
12	None
13	CONNECT 1800
14	CONNECT 2400
15	CONNECT 3600
16	CONNECT 4800
17	CONNECT 7200
18	CONNECT 9600
19	CONNECT 12000
20	CONNECT 14400
21	CONNECT 16800
22	CONNECT 19200
23	CONNECT 21600

Table 5-3 Result Codes (cont.)

Short	Long form
24	CONNECT 24000
25	CONNECT 26400
26	CONNECT 28800
27	CONNECT 32000
28	CONNECT 38400
29	CONNECT 57600
30	CONNECT 76800
31	CONNECT 115200
32	CONNECT 31200
33	CONNECT 33600

5.4 V.25bis Auto call Unit

V.25bis auto call unit is used for auto calling in asynchronous and synchronous data formats.

1. V.25bis Commands

a. CRNx	- Call request - dial a phone number (x) entered on DTE keyboard.
b. CRSy	- Call request - dial a phone number stored in specified memory address (y). y=0-9.
c. PRNy;x	- Program number - store a phone number (x) in specified memory address (y). y=0-9
d. RLN	- Request list of all stored numbers.
e. CIC	- Connect incoming call. Auto answer enable.
f. DIC	- Disregard incoming call. Auto answer disable.

2. V.25bis Responses

a. INC	- Modem detects an incoming call.
b. INV	- Modem received invalid command entry.
c. VAL	- Modem received valid command entry.
d. LSN	- Modem responses LSN when received RLN command.
e. CNX	- Connection.

3. V.25bis Call Failure Responses

a. CFIET	- Busy tone had been detected
b. CFIAB	- Modem aborted a call.
c. CFIRT	- Ringback timeout.
d. CFICB	- Modem busy.
e. CFINS	- No phone number is stored.
f. CFIND	- No dial tone is detected.

CHAPTER 6
MAINTENANCE

CONTENT

CHAPTER 6 : MAINTENANCE

6.1 Description

This chapter gives you the information of maintenance and the required instruments in order to let you recover the troubles quickly.

6.2 Instruments

The only instrument you need is a mult-meter, due to the embedded digital and analog test abilities.

6.3 Periodic Maintenance

For every three months, you should do the following jobs.

(A) Turn the power off, clean the modem, check the plugs, make sure all the connectors are connected firmly.

(B) Be sure that the indicators function well.

6.4 Troubleshooting

Once the Network Series Modem malfunctions, please check and record the indicators at the moment then turn the power off. Consequently, make sure the IC's on printed circuit board are firmly sited. Try to turn the power on again, if the trouble still exists, please follow the procedures below.

1) Power Unit

- Make sure you get a proper power source. If no indicator is lighted, probably the problem is the power unit.
- Check the power fuse; if it is broken, replace it.

2) RS-232 Interface

- Do the AL (local analog loopback) test, feed some data into the modem and check if they were returned correctly.
- Please make sure the interface is connected firmly; also check if the cable is in good condition.

6.5 Return Procedures

We suggest the individuals who hold a malfunctioned the Network Series Modem would contact with your local representative or distributor of or just directly access our customer service department as soon as possible in order not to cause catastrophe. You may find the contact address and phone number in the cover sheet of this manual.

APPENDIX 1: Modem S-REGISTER TABLE

No	Default	Unit	Function Description
S0	1	times	Auto-answer Ring Count
S1	0	times	Current Ring Count (read only)
S2	43	decimal	Escape Char
S3	13	decimal	CR Char
S4	10	decimal	LF Char
S5	8	decimal	Backspace Char
S6	2	second	Pause Before Blind Dial
S7	45	second	Wait for Carrier Time
S8	2	second	Pause for Comma
S9	6	100ms	Carrier Validation Time
S10	15	1/.1s	Lost Carrier Detect Time (1 sec unit for V34/V32bis/V32) (0.1 sec unit for V22bis/V22)
S11	95	ms	DTMF Tone Duration
S12	14	100 ms	Guard Time (Escape Sequence Pause)
S13	19	binary	Bit-Mapped Options (set/clear) bit 4,3,2,1,0 - DTE Speed 0 - 300 bps 1 - 600 bps 2 - 1200 bps 3 - 1800 bps 4 - 2400 bps 5 - 3600 bps 6 - 4800 bps 7 - 7200 bps 8 - 9600 bps 9 - 12000 bps 10 - 14400 bps 11 - 16800 bps 12 - 19200 bps 13 - 21600 bps 14 - 2400 bps 15 - 26400 bps 16 - 28800 bps 17 - 32000 bps 18 - 38400 bps 19 - * 57600 bps 20 - 76800 bps 21 - 115200 bps 22 - 31200 bps 23 - 33600 bps bit 7,6,5 - reserved
S14	00001010	binary	Bit Mapped Options(set / clear) bit 0 *0 - AT-C0 calling tone off 1 - AT-C1 calling tone on bit 1 0 - ATE0 echo off *1 - ATE1 echo on bit 2 *0 - ATQ0 response on 1 - ATQ1 response off bit 3 0 - ATV0 response code *1 - ATV1 response word bit 4 - reserved bit 5 *0 - ATT Tone Dial 1 - ATP Pulse Dial
No	**Default**	**Unit**	**Function Description**

			bit 6 - reserved
			bit 7 *0 - ATA Answer
			1 - ATD Originate
S15			reserved
S16	01000000	binary	Bit Mapped Options(set / clear)
			bit 0 *0 - AT&T0 Test Pattern off
			1 - AT&T10,&T7,&T8 Test Pattern on
			bit 1 *0 - RDL off
			1 - RDL on
			bit 2 *0 - AT&T0 LAL off
			1 - AT&T1,T8 LAL on
			bit 3 0 - AT&T0 LDL off
			*1 - AT&T3 LDL on
			bit 4 *0 - AT&T0 RDL off
			1 - AT&T6,T7 RDL on
			bit 5 - reserved
			bit 7,6 - test pattern selection
			00 - reserved
			*01 - AT%T1 511 pattern
			10 - reserved
			11 - reserved
S17			reserved
S18	0	minute	Modem Test Timer(minute)
S19	00011100	binary	Bit Mapped Options(set/clear)
			bit 0,1 - V25bis character framing
			*00 - Async
			01 - HDLC
			10 - BSC
			11 - reserved
			bit 2 *1 - NRZ / 0 NRZI
			bit 3 *1 - flag idle / 0 mark idle
			bit 5,4 - word length
			00 - 7-bit data, even parity, 1 stop bit
			*01 - 8-bit data, no parity, 1 stop bit
			10 - 7-bit data, odd parity, 1 stop bit
			11 - 7-bit data, no parity, 2 stop bit
			bit 6 - DTR off cause busy out /* nothing
			bit 7 *0 - V.32bis fast training disable
			1 - V.32bis fast training enable
S20			Reserved
S21	00000101	binary	Bit Mapped Options
			bit 1,0 - DCD control
			00 - AT&C0 DCD forced on
			*01 - AT&C1 DCD on after connect
			10 - V.13 HDX
			11 - V.23 HDX
			bit 2 0 - AT&R0 RTS normal
			*1 - AT&R1 RTS forced on
			bit 4,3 - DTR on-to-off action
			*00 - AT&D0 Ignore(force on)
			01 - AT&D1 recall command mode
			10 - AT&D2 Disconnect
			11 - AT&D3 reset modem
			bit 5 *0 - CTS off in retrain (CCITT)*
			1 - CTS follows RTS (EIA)

No	**Default**	**Unit**	**Function Description**
			bit 6 *0 - AT&S0 DSR forced on
			1 - AT&S1 DSR on after connect
			bit 7 - reserved

S22	01110110	binary	Bit Mapped Options bit 1,0 - speak volume 00 - low *01 - medium 10 - high 11 - reserved bit 3,2 - speak control 00 - off *01 - speaker on until carrier detected 10 - always on 11 - off when dial bit 6,5,4 - result code and call progress 000 - ATX0 CONNECT without speed message, blind dial, no busy tone(Basic Code) 001 - reserved 010 - reserved 011 - reserved 100 - ATX1 CONNECT with speed message, blind dial, no busy tone(Dialn Tone) 101 - ATX2 CONNECT with speed message, wait for dial tone, no busy tone 110 - ATX3 CONNECT with speed message, blind dial, check busy tone(Busy Tone) *111 - ATX4 CONNECT with speed message, wait for dial tone, check busy tone(Dial+Busy Tone) bit 7 0 - AT&P0 Make/Break ration USA (39%) *1 - AT&P1 Make/break ratio UK (33.3%)
S23	00100001	binary	Bit Mapped Options (set / clear) bit 0 0 - AT&T5 slave RDL disabled *1 - AT&T4 slave RDL enabled bit 1 *0 RDL by 140 disable 1 RDL by 140 enable bit 2 *0 AL by 141 disable 1 AL by 141 enable bit 3 *0 - AT%A0 basic ASI (-2.5% to +1%) 1 - AT%A1 extended ASI (-2.5% to +2.3%) bit 5,4 - data length on direct mode 00 - 8 bits (6-N-1) 01 - 9 bits (7-N-1) *10 - 10 bits (8-N-1) 11 - 11 bits (8-Stuff Parity –1) bit 7,6 - guard tones *00 - AT&G0 Disabled 01 - AT&G1 550 Hz 10 - AT&G2 1800 Hz 11 - reserved

No	Default	Unit	Function Description
S24	01000000	binary	Bit Mapped Options bit 1,0 - DTR off-to-on control *00 - AT%D0 normal (108.2) 01 - AT%D1 dial/ans according to ring-in (108.1)

			10 - reserved 11 - reserved bit 3,2 - reserved bit 7-4 - Login check 0000..1001 - #0..#9 1010 - ALL 1011 By NMS *1100.. 1111 Disable security check
S25	00	100ms	DTR Debounce Time bit 3,2,1,0 - DTR drop detection time bit 7,6,5,4 - DTR rising detection time
S26	0	10ms	RTS to CTS Delay
S27	00001000	binary	Bit Mapped Options(set /clear) bit1,0 - data mode data format *000 - AT&Q0,&M0 async data mode 001 - AT&Q1,&M1 sync data mode 010 - reserved 011 - reserved bit 2 remote status enable / *disable bit 3 *remote access on / remote access off bit 5,4 - sync transmit clock source *00 - AT&X0 internal clock 01 - AT&X1 external clock 10 - AT&X2 slave (loopback) clock 11 - reserved bit 7,6 - line type *00 - AT&L0 dial line 01 - AT&L1 2-wired leased line 10 - AT&L2 4-wired leased line 11 - reserved
S28	00000000	binary	Bit Mapped Options bit 0 1 - -2 to -35 dBm receive dynamic range *0 - -12 to -44 dBm receive dynamic range bit 1 - reserved bit 3,2 - disconnect option *00 - send clear down before disconnect 01 - immediately disconnect 10 - reset modem on disconnect 11 - reserved bit 5,4 - ENQ/ACK control *00 - AT\H0 no ENQ/ACK 01 - AT\H1 to host (simulate peripheral) 10 - AT\H2 to peripheral (simulate host) 11 - reserved bit 6 - fix speed function bit 7 - reserved

No	**Default**	**Unit**	**Function Description**
S29	10101101	binary	Bit Mapped Options bit 1,0 - command selection 00 - dumb mode *01 - Hayes AT command mode 10 - V.25bis command mode 11 - reserved bit 2 0 Line break *1 Send continuous space bit 3 0 - AT%E0 auto retrain off *1 - AT%E1 auto retrain on bit 4 *0 - front panel unlock

			1 - front panel lock
			bit 6,5 00 - AT%G0 auto FB/FF disable
			*01 - AT%G1 auto FB/FF enable
			10 - AT%G2 Auto FF off but FB on
			11 - reserved
			bit 7 0 - AT%U0 autobauding off
			*1 - AT%U1 autobauding on
S30	13	-dBm	Leased Line Tx Level (0..-31 dBm)
S31	00000000	binary	Bit Mapped Options
			bit 0 - leased to dial
			0 - manual*
			1 - auto
			bit 1 - dial to leased
			0 - manual*
			1 - auto
			bit 2 - V.32 auto FFFB by Retrain
			bit 3 - reserved
			bit 7,6,5,4 - backup tel. (#0~9)/no dial backup
S32	0		- reserved
S33			Test time(minute)
S34			Test time(second)
S35	30	second	OH by DTR timer (default 30 seconds)
S36			D to L timer (default 60 mins)
S37	2	second	Redial delay, Immediately 1….255 Second
S38	00000000	binary	V34 Baud Rate Selection
			bit 0 - enable 2400 /disable 2400
			bit 1 - reserved (this bit always must be set)
			bit 2 - enable 2800 /disable 2800
			bit 3 - enable 3000 /disable 3000
			bit 4 - enable 3200 /disable 3200
			bit 5 - enable 3429 /disable 3429
			bit 7,6 Break type during Normal, V.42 or MNP operation
			00 AT\K0 break -0 (destructive)
			01 AT\K1 break -1(nondestructive)
			*10 AT\K2 break -2 (queue)
			11 - reserved
S39			reserved
S40			Call back time(unit : second)
			0 - Disable acll back
			1..255 - Second
S41	00000001	binary	Bit Mapped Options
			bit 1,0 - connect message display
			00 - ATW0 CONNECT with DTE speed
			*01 - ATW1 CONNECT with CARRIER, PROTOCOL and COMPRESSION
			10 - ATW2 CONNECT with DCE speed
			11 - reserved
			bit 2,3,4,5 - reserved
			bit 7,6 - DTMF level selection (Low Band / High Band)
			00 -8 / -6 dBm
			01 -10 / -8 dBm
			10 -12 / -11 dBm
			11 -11 / -9 dBm

No	**Default**	**Unit**	**Function Description**

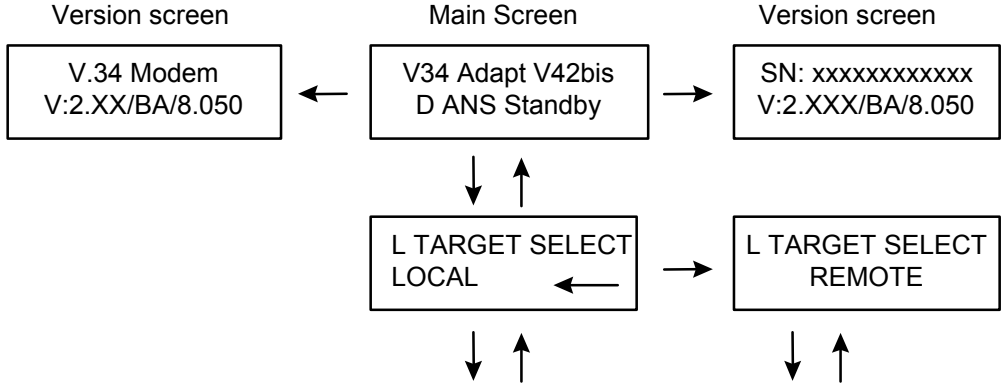
S42	00000010	binary	Bit Mapped Options bit 0 reserved bit 1 0 - receive power drop control off *1 - receive power drop control on bit 2 *0 - enable V.34 asymmetrical rate 1 - disable V.34 asymmetrical rate bit 3 *0 - disable dial to dial 1 - enable dial to dial bit 7,6,5,4 0000-1010 - Pre-Emphasis Filter Suggestions Number 0-A *1011-1111 - Ignore Pre-Emphasis Filter
S43	00000000	binary	Fast Connect Control bit 3,2,1,0 - Answer tone length (100ms time base.) 0ms-1500ms bit 4 - Fast connect on/*off (1/*0) bit 7,6,5 - reserved
S44			Reserved
S45			Reserved
S46			Reserved
S47			Reserved
S48			Reserved
S49			Reserved
S50	00000000	binary	Bit Mapped Options bit 1,0 - FAX/DATA Mode Selection *00 - (DATA mode) 01 - reserved 10 - reserved 11 - reserved bit 2 - reserved bit 7,6,5,4,3 - reserved
S51	00000011	binary	Bit Mapped Options bit 1,0 - flow control 00 - AT\Q0,AT&K0 no flow control 01 - AT\Q1,AT&K1 XON/XOFF flow control 10 - AT\Q2,AT&K2 CTS only flow control *11 - AT\Q3,AT&K3 RTS/CTS flow control

No	**Default**	**Unit**	**Function Description**
			bit 3,2 - DTE/DCE speed convert *00 - AT\J0 enable DTE/DCE speed convert 01 - AT\J1 disable DTE/DCE speed convert 10 - reserved 11 - reserved bit 7,6,5,4 - auto dial telephone number
S52	0	dec	AT%B Desired Highest DCE Speed *0 - adaptive baud rate 1 - V21_300 2 - B103_300 3 - V22_1200 4 - B212A_1200 5 - V22b_2400 6 - reserved 7 - V23_1200(1200Tx / 75Rx) 8 - V26b_1200(V26b_1200) 9 - V26b_2400(V26b_2400)

No	Default	Unit	Function Description
			10 - reserved
			11 - reserved
			13 - reserved
			14 - reserved
			15 - V32_4800
			16 - V32b_7200 TCM
			17 - V32_9600 TCM
			18 - V32_9600 QAM
			19 - V32b_12000T
			20 - V32b_14400T
			26 - V34_19200
			27 - V34_24000
			28 - V34_28800
			29 - reserved
			30 - reserved
			31 - V34_4800
			32 - V34_7200
			33 - V34_9600
			34 - V34_14400
			35 - V34_16800
			36 - V34_21600
			37 - V34_26400
			38 - V34_12000
			40 - V34_2400
			41 - V34+_31200
			42 - V34+_33600
			43 - reserved
			44 - reserved
			45 - reserved
			46 - reserved
			47 - V32b_Adaptive
S53	00010011	binary	Bit Mapped Options
			bit 3,2,1,0 protocol type
			0000 - AT\N0 normal mode
			0010 - AT\N2 MNP reliable mode
			*0011 - AT\N3 auto-reliable mode
			0100 - AT\N4 LAPM reliable
			0101 - AT\N5 LAPM reliable with fallback to normal mode
			0110 - AT\N6 LAPM reliable with fallback to MNP mode
			0111 - AT\N7 MNP reliable with fallback to normal mode
			bit 4 0 - AT%C0 data compression off
			*1 - AT%C1 data compression on
			bit 7,6,5 - reserved
S54			Bit Mapped Options
			bit 3,2,1,0 Call back telephone number
			0000..1001 - #0..#9
			1010…1111 - Off
			Bit 3-0, Call back telephone number
			bit 7,6,5,4 Send login word
			0000..1001 Send security password #0~#9
			1010..1111 - reserved
S55			backup speed V.34+ 33600 .. V.21 300
S56	13	-dBm	Dial Line Tx Level
S57	00	binary	Bit Mapped Options
			bit 1,0 - retrain threshold
			*00 - High

			01 - medium
			10 - Low
			11 - reserved
			bit 2 - reserved
			bit 3 Security password pass through
			bit 7,6,5,4 - reserved
S58			Retrain times , 0 ~ 255 (default 2)
S59			Profile Checksum
S60	0	decimal	Power-up # (AT&Yn)

APPENDIX 2: LCD MENU QUICK REFERENCE



Note 1

↓ = "ENTER" KEY
↑ = "EXIT" KEY
→ = "▷" KEY
← = "◁" KEY
Scroll item & parameter by "▷" or "◁"
Note1: Only available when connected and Remote Access function is enabled

MENU	STATUS	DIAL	PROTOCOL	TEST	CONFIG. MODEM	CONFIG. DTE	COMMAND	LINE SETUP	PROFILE
	Tx Level	Dial a Number	Protocol Type	Clear All	Speed	DTE Speed	Command Mode	Line Type	Load
	Rx Level	Edit a Number	Discon. Method	LAL	ORG/ANS Mode	Flow Control	Auto Baud	Leased To Dial	Power Up
I	S/N Ratio	Ring Times	Login Check	DL	Auto Retrain	DTR Off Action	Framing	Backup Tel	Initial
	EQM	Progress Tone	Send password	RDL	Tx Clock	DTR Control	Async form	Backup Speed	Front Lock
T	F-Shift	Redial Delay	Call Back No.	RDL Grant	RTRN. Threshold	RTS Control	Idle Char	Dial to Leased	Password Edit
	F F-Shift	Dial Type	Call Back Timer	Error Count	ASI Overspeed	DSR Control		Dial to Leased Timer	Sreg Edit
E	Delay	SPK Control	Connect Code	B.E.R Test	Make/Break	DCD Control		Dial To Dial	Save
	Phase jitter	SPK Volume	Compress		Force Off Hook	Data Format			
M	F Echo				OH By DTR	Total Bits			
	DTE				Pump edit	AL by 141			
	Retrains				FB\FF Ctrl	RDL by 140			
	Menu Retrain				LL Tx Level				
	RX Baud				DL Tx Level				
	TX Baud				Remote Access				
	RX Freq				Dynamic Range				
	TX Freq								
	RX Speed								
	TX Speed								
	Tx Power Off								
	Interface indicators								

APPENDIX 3: LCD MENU QUICK REFERENCE