

**TAINET**

**Network Series Modem**

**T-336Cx**

**User's Manual**

FCC ID K5KT-336CX

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**Federal Communications Commission (FCC) Statement**

This Equipment has been tested and found to comply with the limits for a Class B 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 can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that 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.

**Warning:**

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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## CHAPTER 1 TAINET NETWORK SERIES MODEM

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- 1.1 Description
- 1.2 Technical Specifications
- 1.3 Ordering Information

TABLE 1-1A : Modem Protocol (Applicable to 2/4 wire L-L or D-L)

Operating Mode (Data Mode)	Mod.	Carrier	Symbol Rate	Constellation points
V.34 +	SM	(Table 1-1c)	(Table 1-1c)	4 to 1024
V.34 +	SM			Depends on the combination of data rate, symbol rate and constellation expansion chosen.
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.34	SM			
V.32bis	TCM	1800	2400	128
V.32bis	TCM	1800	2400	64
V.32	TCM	1800	2400	32
V.32	QAM	1800	2400	16
V.32bis	TCM	1800	2400	16
V.32	QAM	1800	2400	4
V.22bis	QAM	1200/2400	600	16
V.22	DPSK	1200/2400	600	4
V.23	FSK	1700/420	1200	N/A
V.21	FSK	1080/1750	300	N/A
BELL 212A	DPSK	1200/2400	600	4
BELL 103	FSK	1175/2125	300	N/A

TABLE I-1B : Modem Protocol (Applicable to fax)

Operating Mode (Fax Mode)	Mod.	Creeter	Symbol Rate	Constellation points
V.29 9600	QAM	1700	2400	16
V.29 7200	QAM	1700	2400	8
V.27 ter 4800	DPSK	1800	1600	8
V.27 ter 2400	DPSK	1800	1200	4
V.21 ch2 300	FSK	1750	300	N/A
V.17 14400	TCM	1800	2400	128
V.17 12000	TCM	1800	2400	64
V.17 9600	TCM	1800	2400	32
V.17 7200	TCM	1800	2400	16

Notes: TCM : Trellis Code Modulation  
 QAM : Quadrature Amplitude Modulation.  
 DPSK : Differential Phase Shift Keying.  
 FSK : Frequency Shift Keying  
 SM : Stoll Mapping with 4 Dimensional Trellis Coded Modulation

TABLE I-1C : V.34 Symbol Rate and Carrier Frequency

Symbol Rate (Baud)	Low Carrier (Hz)	High Carrier (Hz)
2400	1600	1800
2800	1680	1867
3000	1800	2000
3200	1829	1920
3429	1959	1959

- Transmit Level : 0~31 dBm adjustable by 1 dB step for leased-line application.  
0~15 dBm adjustable by 1 dB step for dial-line application.
- Line Requirement : 2/4 wire Leased Line & Dial Line
- Line Impedance : Balanced 600 ohms  $\pm$  10 %
- Return Loss : > 24 dB, 300 - 3400 Hz
- Longitude Balance : > 60 dB
- Dial Line Characteristics:
  - Maximum Current : 120 mA
  - Holding Resistance : 50 ~ 220  $\Omega$
  - 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  $\pm$  1 dBm  
O/P Highband -6  $\pm$  1 dBm  
Frequency Tolerance  $\leq$   $\pm$  1 %  
TONE Duration and Spacing 95 ms (adjustable)
- Pulse Per Sec : 10  $\pm$  0.5 PPS
- Make/Break Ratio : 33/67, 39/61  $\pm$  3 %
- Auto Answer : Comply to ITU-T V.25 & V.25bis  
Answer Tone: V.34 meets V.8, V.32bis/V.32/V.22 2100 $\pm$ 15Hz
- Calling Tone : Comply to ITU-T V.8, V.25
- Receive Range : -4 ~ -43 dBm, 0 ~ -33 dBm
- Dynamic Range : 0 ~ -43 dBm
- Equalization : Automatic adaptive equalizer
- Frequency Shift : Compensation cancel at least of  $\pm$  7Hz offset
- Far-end Echo Coverage : The Near-End and Far-End Echo Canceller can handle a round trip delay up to 1.2 sec.
- Scrambler & Descrambler : Comply to the ITU-T V.34, V.32bis, V.32, V.22bis, V.22
- Data And Control Signal : Output voltage  $\pm$  (6 ~ 12)V

(ITU-T V.28) : Input voltage  $\pm$  (3 ~ 25)V  
 Output impedance  $\geq$  330  $\Omega$   
 Input impedance 3000 ~ 7000  $\Omega$

• Tx Clock Source : Internal/External/Loopback  
 Freq. Tolerance :  $\pm$  0.01 %  
 Duty Cycle : 50  $\pm$  1 %  
 • Test Features : V.54/V.52, LAL/DL/RDL  
 Test Pattern - 511

• Power Requirement : AC source: 90 ~ 265VAC, auto range, 47 ~ 63Hz  
 DC source: -36 ~ -72 VDC option (for rack)

• Operating Temperature : 0  $^{\circ}$ C ~ 50  $^{\circ}$ C  
 Storage Temperature : -25  $^{\circ}$ C ~ 70  $^{\circ}$ C  
 Relative Humidity : up to 95 % (non-condensing)

• Physical Size:  
 Stand alone version  $\Rightarrow$  W - 180mm, H - 48mm, D - 262mm, Weight 0.9kg  
 Rack Mount Card  $\Rightarrow$  W - 220mm, H - 26mm, D - 328mm, Weight 0.6kg  
 Rack Mount Shelf  $\Rightarrow$  W - 19", H - 6RU, D - 380mm, Weight 8kg  
 Full Shelf Equipped  $\Rightarrow$  Weight 16kg

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

NO	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		+12VDC	MODEM
10		-12VDC	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 1 : THE TAINET NETWORK SERIES MODEM

### 1.1 Description

• The TAINET Network Series Modem T-336Cx 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 TAINET Network Series Modem fully comply with ITU-T V.34 recommendation as well as being compatible with ITU-T Recommendations V.32bis/V.32, V.22bis, V.22, V.23 and V.21 international standards, operating at speeds of 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 600 and 300bits per second.

In V.34 and V.32bis/V.32 modes, echo cancellation 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 providing full duplex operation at up to 33.6 kbps with line probing, symbol rate and carrier frequency selection.
- A range of performance enhancing techniques are available for V.34 mode, including Adaptive Precoding, Non-Linear Encoding (Warping), Constellation Expansion, Multidimensional Trellis coding, Shell Mapping and 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 on a rack shelf (TRS-16).
- 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, EQM (S/N), 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.
- Remote configuration through secondary channel.
- V.13 simulated carrier control for half duplex application.
- Automatic or manual dial back-up and restore.

1.3 Ordering Information

- T-336Cx Stand alone V.34 33.6Kbps modem
- T-336Nx Rack-mounted V.34 33.6Kbps modem (for TRS16)
- NMC16 NMS Control unit used with TRS16
- TRS16 19" width rack for up to 16 modem cards
- PW-130AC 90 ~ 265 VAC power unit for rack
- PW-130DC -36 ~ -72 VDC power unit for rack

1.2 Technical Specifications

The T-336Cx fully comply with ITU-T recommendations V.34, V.32bis, V.32, V.22bis, V.22, V.21, V.23, V.24, V.28, V.25, V.25bis, V.52, V.54, V.42, V.42bis, V.8, and BELL 212A/103 operating standards.

- Modem Protocol : Please refer to table 1-1A, 1-1B.
- Clock Tolerance : ± 0.01%
- (1) Synchronous : Basic range + 1% to - 2.5%  
Extended overspeed range + 2.3% to - 2.5%
- (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 bit
- 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.

- G3 Fax Modulation and speed (option)
  - V.17 --14400, 12000, 9600, 7200 bps
  - V.29 --9600, 7200 bps
  - V.27ter --4800, 2400 bps
  - V.21 channel 2 --300 bps



CHAPTER 2  
INSTALLATION

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CONTENT

2.1 Description

2.2 Unpacking

2.3 Site Requirements

2.4 Site Selection

2.5 AC Electrical Outlet Connection

2.6 Connecting With Dial Line

2.7 Connecting With Leased Line

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## CHAPTER 2 : INSTALLATION

### 2.1 Description

This chapter provides the information needed to install the TAINET 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 TAINET rack-mount modem shelf.

### 2.2 Unpacking

Save the carton and protective packing material in which your TAINET 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 T-336Cx Modem User's Manual.
- \* One 7-foot (2.13m) modular telephone cable for connection to an RJ45 8-pin jack.
- \* One 7-foot (2.13m) modular telephone cable for connection to an RJ11 4-pin jack.
- \* One 8-pin box for leased line application.
- \* One 6-foot 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 TAINET Network Series Modem meet the requirements set forth by the FCC. The following procedure outlines some common practices which can minimize the risk of damage to computer equipment from electrical surges.

- 1) Make sure the electrical service in your building is properly grounded as described in article 250 of the National Electrical Code (NEC) handbook.
- 2) 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:
  - ☛ 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.

- A wire (see tables 250-94/95 of the NEC handbook for gauge) that surrounds the outside of the building and is buried at least 2.5 feet (.76 meters) deep in the earth. Note: The three grounding devices described above should be firmly placed in the earth. Soil conditions should not be dry where the device is buried.
  - A metal water-supply pipe connected to the water main in the street or a metal cased well. The water pipe used must not have plastic piping between the ground connection and the water main (or the well). The connection should be made where the pipe enters the building. The water meter must be shunted by a copper strap.
- 3) If you are unsure whether the electrical service in your building is properly grounded, have it examined by your municipal electrical inspector.
  - 4) 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.
  - 5) Call your telephone company and ask them if your telephone line is equipped with a circuit surge protector.
  - 6) If you are operating the modem in an area where the risk of electrical surges from lightning is high, disconnect the modem from the telephone line at the modem's rear panel when it is not in use.

**2.4 Site Selection**

Locate the TAINET 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 the another modem on top of TAINET modem.

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

**2.5 AC Electrical Outlet Connection**

Check the label on the bottom of the modem for the unit's power requirements. Once you are certain the power requirements specified on the label match those of your electrical outlet, plug the power cable into the outlet.

**2.6 Connecting With Dial Line**

To connect your modem to a permissive RJ11 voice jack and dial line, follow this procedure:

- 1) Connect the 4-pin modular to 4-pin modular cable provided to connect your modem to telephone set via an RJ11 jack for manual dial operation or voice transmissions.
- 2) Connect one end of the 4-pin to 4-pin modular cable to the DIAL connector on the modem rear panel and the other end to the telephone line modular jack.

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

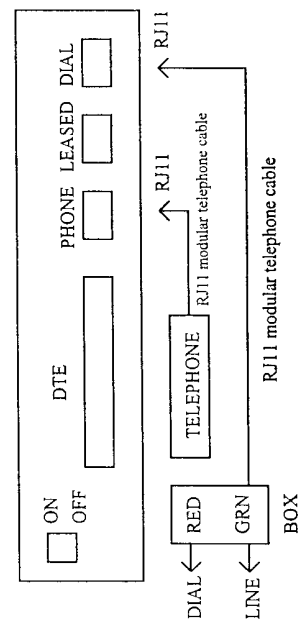
Modem Pin No.	Color	Function
1	N/C	N/C
2	Black	Not Used
3	Red	Tip
4	Green	Ring
5	Yellow	Not Used
6	N/C	N/C

Phone

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

Modem Pin No.	Color	Function
1	N/C	N/C
2	Black	Not Used
3	Red	Tip
4	Green	Ring
5	Yellow	Not Used
6	N/C	N/C

Dial Line



**Fig 2-1 : Dial Line Connection**

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 T-336Cx.

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

For 2-wire applications, only pin 1, 2 or pin 4, 5 are required. Whereas, You need to connect pin 1,2,7, 8 or pin 4, 5, 3, 6 in 4-wire applications.

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

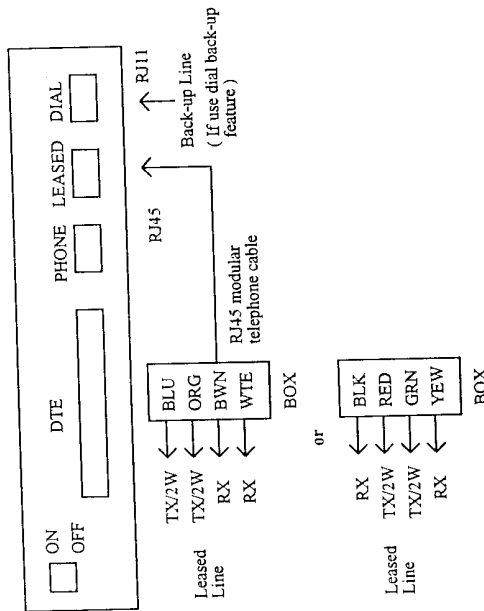


Fig 2-2 : Leased Line Connection.

CONTENT

- 3.1 The Front Panel Description
- 3.2 The Rear Panel Description
- 3.3 Operating The TAINET Network Series Modem
- 3.4 The Menu Tree
- 3.5 Detailed Description of The Menu Tree

## CHAPTER 3 : FRONT PANEL LCD AND MENU-DRIVEN

### 3.1 The Front Panel Description

The front panel of TAINET T-336Cx modem contains five touch switches (VO/DA Key, Right Key, Left Key, ENTER Key and EXIT Key) for direct operation, one 2 x 16 characters LCD display and ten LED indicator lights providing a visual check of the modem's status, as illustrated below.

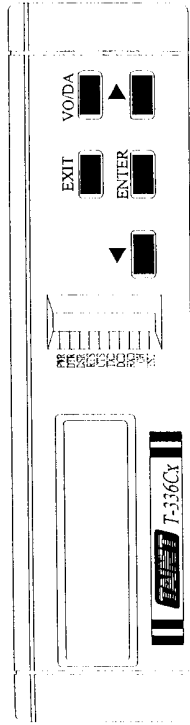


Figure 3-1 T-336Cx Front Panel

### 3.1.2 The Rear Panel Description

The rear panel of TAINET T-336Cx 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.

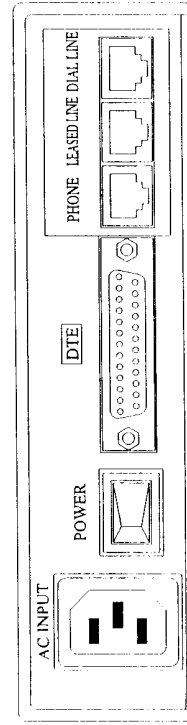


Figure 3-2 T-336Cx Rear Panel

**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**

Example 1 :

L STATUS RX Level =-10dBm	R CONFIG MODEM TX clock
------------------------------	----------------------------

Example 3 :

L TEST LAL (ON)	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**

Example 1 :

LL TX Level -10dBm	R Protocol type Auto MNP/V42 ←
-----------------------	-----------------------------------

Example 2 :

**Description:**

- 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.

**3.3 Operating The T-336Cx Series Modem**

**1. Keypads :** It consists of 5 touch switches.  
 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.
- 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 : 10 LED bar**

- 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 Display :**

The T-336Cx 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 V.42bis	D ANS CONNECT 9
------------------	-----------------

**Description:**

- 1) Modem Protocol: V.34+ 336, V.34+ 312, V.34 288, V.32b 144T, V.32 96T, V.22b 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: Standby, Handshaking, Connect, Retrain, Ring...
- 6) SQ: Signal quality 9,8,7,6,....,0

**B. Menu Select**

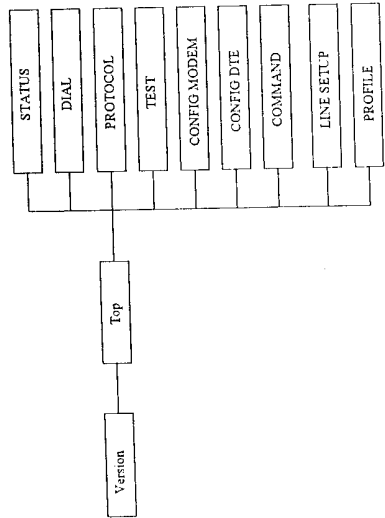
Example 1 :

L MENU Select	L MENU Select
---------------	---------------

Example 2 :

3.4 The Menu Tree

Main Menu



A. STATUS MENU

- Tx Level = -XX dBm
- Rx Level = -XX dBm
- S/N Ratio = XX dB
- EQM Value = 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.XX
- Retrans = XXXXX times
- \*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 = TR MR RS CS CD T
- Interface indicators =

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 Time...\255 Times
- Progress Tone Basic Code\Don't Care\Dial Tone
- Dial Type \Busy Tone\Dial+Busy Tone
- SPK Control Tone\Pulse
- SPK Volume Until DCD on\Always on\Off when dial\Off
- Low\Medium\High

C. PROTOCOL MENU

- Protocol Type Normal\Direct\Reliant\MNP\Auto
- Security check \Reliant L\APM\L\APM Normal
- Discon. Method \L\APM\MNP\MNP Normal
- Connect Code off\By modem\By NMS
- Compress Immediate\With Clear-down\Modem Reset
- DTE Speed\DCE\EC\DC\TE Speed
- Clear All \DCE Speed
- LAL Off\On
- DL Off\On
- RDL Off\On
- RDL Grant Off\On
- Error Count 0...65535
- B.E.R. Test Off\511

D. TEST MENU

- Has Been Done
- Clear All
- 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 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 144 \V32b 120 \V32 96Q \V32 96T \V32b 72 \V32 48 \V23 1200 \V22b 2400 \V22 1200 \BELL 212A \BELL 103 \V21 300

→ ORG/ANS Mode  
 → Auto Retrain  
 → Tx Clock  
 → Retrain Threshold  
 → ASI Overspeed  
 → Make/Break  
 → Force Off Hook  
 → OH By DTR  
 → Pump edit  
 → LL Tx Level  
 → DL Tx Level  
 → FB/VFF Cirl  
 → Remote Access  
 → Dynamic Range

Answer Mode\Originate Mode  
 On\Off  
 Internal\External\Loopback  
 Less Aggressive \Medium \More  
 Aggressive  
 +1%.....-2.5% \ +2.3%.....-2.5%  
 US (39%)\UK (33.3%)  
 Force a off hook activity using "Enter" key

On\Off  
 □□□ : □□□□  
 0 dBm...-31 dBm  
 0 dBm...-15 dBm  
 off\on  
 On\Off  
 -4 ~ -43dBm \ 0 ~ -33dBm

#### F. CONFIG DTE MENU

→ DTE Speed  
 115200 bps \76800 bps \57600 bps  
 \38400bps \32000 bps \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 \33600 bps \31200 bps  
 Off\X-On, X-Off\RTS/CTS/CTS only  
 108-2\108-1  
 Force On\Command Mode  
 \Disconnect\Modem Reset  
 Force On\ Normal  
 Normal\Force On  
 Force On\Normal\13 HDX  
 ASYNC\SYNC  
 8/9\10\11  
 Off\On  
 Off\On

#### G. COMMAND MENU

→ Command Mode  
 Command Mode  
 Auto Baud  
 Framing  
 Async Form  
 Idle Char

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

#### H. LINE SETUP MENU

→ Line type  
 → Leased to Dial  
 → Backup Tel  
 → Backup Speed  
 Dial\2W Leased Line\4W Leased Line  
 Manual\Auto  
 No Dial Backup#\0nnnn#\Innnn.....#\0nnnn  
 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 144 \V32b 120 \V32 96Q \V32  
 96T \V32b 72 \V32 48 \V23 1200  
 \V22b 2400 \V22 1200 \BELL 212A  
 \BELL 103 \V21 300  
 Manual\Auto  
 Forever\0 ~255 Minutes

→ Dial to Leased  
 → Dial to Leased Timer

#### I. PROFILE MENU

→ Load  
 User Profile #0  
 \User Profile #1.....\User Profile #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-ANS-V34  
 \9:AS-2L-ANS-AUTO  
 User Profile #0.....\User Profile #9  
 Are You Sure?  
 Unlock\Lock  
 Input:----  
 BASE=DECIMAL\BINARAY  
 User Profiles#\0.....\User Profile #9

→ Power Up  
 → Initial  
 → Front Lock  
 → Password Edit  
 → Sreg Edit  
 → Save



## 3.5 Detailed Description of the menu tree

## 3.5.1 STATUS MENU

ITEM NAME	COMMAND	DESCRIPTION
TXLEVEL=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 should be setting under -13dBm while to operating V.34 mode.
RXLEVEL=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=X.X 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=X.X 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

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.

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.

Indication of the signalling 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).

Indication of the signalling rate of transmitted signal. (This value is only available when operating on V.34).

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).

Indication of the carrier frequency of transmitted signal. (This value is only available when operating on V.34).

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).

Indication of the DCE speed of transmission.

Indication of the DCE speed of receiving.

Force modem to issue a retrain action.

Indication of the RS-232 interface lead status.

DTE=XXXXX ASY 10 AT%S

RETRAINS=XXXX AT%S

RX BAUD=XXXX AT%S

TX BAUD=XXXX AT%S

RX FREQ=XXXXHz AT%S

TX FREQ=XXXXHz AT%S

TX POWEROFF=XdB AT%S

TX SPEED=XXXXbps AT%S

RX SPEED=XXXXbps AT%S

MANU RETRAIN ATO2

TR, MR, RS, CS, CD, T AT%S

ITEM NAME	COMMAND	DESCRIPTION
<b>3.5.2 DIAL MENU</b>		
<b>DIAL A NUMBER</b>	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.
→ #0.....#9	AT&Zn=xx	Edit telephone number #n (n=0..9) for 30 digits each group.
<b>EDIT A NUMBER</b>		
→ #0.....#9	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).
<b>RING TIMES</b>		
→ 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.
<b>PROGRESS TONE</b>	ATXn	Enable detecting of busy tone or dial tone to proceed dialing and showing the connection.
→ BASIC CODE	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 care any tone and show the line connection speed.
→ BUSY TONE	ATX3	/Don't care dial tone and show the line connection speed.
→ DIAL + BUSY TONE	ATX4	/Do care dial tone, busy tone and show the extended result code (default).
<b>DIAL TYPE</b>		
→ TONE	ATT	/Tone (DTMF) dialing mode
→ PULSE	ATP	/Pulse dialing mode
<b>SPK. CONTROL</b>	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.
	ATT	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 PROTOCOL TYPE	COMMAND ATn	DESCRIPTION
→ NORMAL	ATN0	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.
→ DIRECT	ATN1	/with DTE speed conversion only. Note that the flow control function must be active.
→ RELIANT MNP	ATN2	/disable error correction, data compression, and DTE speed conversion. (modem speed=DTE speed)
→ AUTO	ATN3	/Link can be established only when MNP function is enabled on the remote modem.
→ RELIANT LAPM	ATN4	/Automatically negotiate V42/MNP level with the remote modem. The negotiation sequence is V42bis-V42-MNP5-MNP4-NORMAL.
→ LAPM: NORMAL	ATN5	/Link can be established only when V42 function is enabled on the remote modem.
→ LAPM: MNP	ATN6	/Negotiate V42 level with the remote modem. The sequence is V42bis-V42-NOMAL.
→ MNP NORMAL	ATN7	/Automatically negotiate V42/MNP level with the remote modem. The negotiation sequence is V42bis-V42-MNP5-MNP4.
CONNECT CODE	ATWn	/Negotiate MNP level with the remote modem. The sequence is MNP5-MNP4-NORMAL.
→ DTE SPEED	ATW0	Select the extended CONNECT result code.
→ DTE/EC/DCE	ATW1	/with DTE speed
→ DCE SPEED	ATW2	/with CARRIER, PROTOCOL, and DTE speed
DISCON. METHOD	ATS28=n (bit3,2)	/with DCE speed
→ Immediate		Disconnect method for V34/V32bis/V32
→ With Clear-down		/Disconnect immediately
→ Modem Reset		/Send clear-down sequence before disconnection
SECURITY CHECK	ATS31=n (bit3,2)	/Reset modem after disconnection
→ NONE		Control of the security check function.
		/disable security check by modem

→ BY MODEM		/enable security check by modem
→ BY NMS		/enable security check by NMS
COMPRESS	AT%Ch	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	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.
→ ON		
→ OFF		
RDL	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.
→ ON		
→ OFF		
DL	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.
→ ON		
→ OFF		
RDL GRANT	AT&Tn	Set for accepting remote digital loop(RDL) test.
→ ON	AT&T4	/Enable (default).
→ OFF	AT&T5	/Disable.
ERROR COUNT		Bit error count display function.
→ 0...65535		/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
→ V34	ADAPT	/Set modem speed to be adaptive (multi-standard hand-shaking) mode, connectable speed from V.34 / V.32b / V.32 / V.22bis / V.22 / V.21.
→ V34+	336	/Set modem speed to V34+ 33600 bps...4DTCM (SM)
→ V34+	312	/Set modem speed to V34+ 31200 bps...4DTCM (SM)
→ V34	288	/Set modem speed to V34 28800bps...4DTCM (SM)
→ V34	264	/Set modem speed to V34 26400bps...4DTCM (SM)
→ V34	240	/Set modem speed to V34 24000bps...4DTCM (SM)
→ V34	216	/Set modem speed to V34 21600bps...4DTCM (SM)
→ V34	192	/Set modem speed to V34 19200bps...4DTCM (SM)
→ V34	168	/Set modem speed to V34 16800bps...4DTCM (SM)
→ V34	144	/Set modem speed to V34 14400bps...4DTCM (SM)
→ V34	120	/Set modem speed to V34 12000bps...4DTCM (SM)
→ V34	96	/Set modem speed to V34 9600bps...4DTCM (SM)
→ V34	72	/Set modem speed to V34 7200bps...4DTCM (SM)
→ V34	48	/Set modem speed to V34 4800bps...4DTCM (SM)
→ V34	24	/Set modem speed to V34 2400bps...4DTCM (SM)
→ V32b	144	/Set modem speed to V.32bis 14400 bps TCM.
→ V32b	120	/Set modem speed to V.32bis 12000 bps TCM.
→ V32	96Q	/Set modem speed to V.32 9600 bps QAM.
→ V32	96T	/Set modem speed to V.32 9600 bps TCM.
→ V32b	72T	/Set modem speed to V.32 7200 bps TCM.
→ V32	48	/Set modem speed to V.32 4800 bps QAM.
→ V23	1200	/Set modem speed to V.23 1200 bps FSK.
→ V22b	2400	/Set modem speed to V.22bis 2400 bps QAM.
→ V22	200	/Set modem speed to V.22 1200 bps DPSK.
→ V21	300	/Set modem speed to V.21 300 bps FSK.
→ BELL	212A	/Set modem speed to BELL 212A 1200 bps DPSK.
→ BELL	103	/Set modem speed to BELL 103 300 bps FSK.

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<b>ORG/ANS MODE</b>	ATS14=n (bit7)	Set modem as the originate or answer mode. /For V.34/ V.32/ V.32bis/ V.22bis/ V.22/ V.21/ V.23 / BELL-212A / BELL103 in 2-wire FDX operation. It must be set in different mode on each side.
<b>→ORIGINATE MODE</b>		
<b>→ANSWER MODE</b>		
<b>AUTO RETRAIN</b>	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.
<b>→ON</b>	AT%EI	/Retrain occurs automatically according to SQ/EQM value. (default)
<b>→OFF</b>	AT%EO	/Auto retrain disable.
<b>TX CLOCK</b>	AT&Xn	Select transmit clock source.
<b>→INTERNAL</b>	AT&X0	/Internal clock source, for most point to point application (default).
<b>→EXTERNAL</b>	AT&X1	/External clock source, for cascade and TDM/STDM network application.
<b>→LOOPBACK</b>	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.
<b>LL TX LEVEL</b>	ATS30=n	Set leased line transmit level.
<b>→0..-31 dBm</b>		/-13dBm (default)
<b>DL TX LEVEL</b>	ATS56=n	Set dial line transmit level.
<b>→0..-15 dBm</b>		/-13dBm (default)
<b>ASI OVERSPEED</b>	AT%A n	Select async data speed tolerance (ITU-T V.14)
<b>→+1%</b>	AT%A0	/Basic range +1% to -2.5% (default).
<b>→+2.3%</b>	AT%A1	/Extended overspeed range +2.3% to -2.5%.
<b>MAKE/BREAK</b>	AT&Pn	Pulse dial make / break ratio selection.
<b>→UK (33.3%)</b>	AT&P1	/33.3/66.7% (default).
<b>→US (39%)</b>	AT&P0	/39/61%.
<b>FORCE OFF HOOK</b>	ATH1	Force modem off-hooking the line to busy out the in coming calls.
<b>OH BY DTR</b>	ATS19=n (bit 6)	Make the modem to off-hook the line when DTR being off for a period of time
<b>→On</b>		/enable the OH By DTR function
<b>→Off</b>		/disable the OH By DTR function (default)

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<b>RETRAIN THRESHOLD</b>	ATS57=n (bit 1,0)	Select the scaleable retrain threshold for determining the bit rate of the connection.
<b>→ Less aggressive</b>		/Make the modem less aggressive on determining the bit rate of connection with block error rate less than 10 <sup>-4</sup> (default)
<b>→ Medium</b>		/Allow good connect rate with block error rate less the 10 <sup>-3</sup>
<b>→ More aggressive</b>		/Make the modem more aggressive on determining the bit rate of connection with block error rate less than 10 <sup>-2</sup>
<b>PUMP EDIT</b>		product designer use only.
<b>FBUFF CTRL</b>	AT%Gn	Auto speed fallback and fall forward
<b>→ON</b>	AT%G1	/Enable (Dial Line Default)
<b>→OFF</b>	AT%G0	/Disable (Leased Line Default)
<b>REMOTE ACCESS</b>	ATS27=n (bit 3)	enable the modem to monitor and control the remote modem through the secondary channel
<b>→On</b>		/enable remote access function
<b>→Off</b>		/disable remote access function (default)
<b>DYNAMIC RANGE</b>	ATS28=n (bit 0)	Select the dynamic range of receiving signal.
<b>→-4..-43 dBm</b>		/-4 to -43 dBm (Default)
<b>→0..-33 dBm</b>		/0 to -33 dBm

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3.5.6 CONFIG DTE MENU

ITEM NAME	COMMAND	DESCRIPTION
DTE SPEED	AT	This setting is used to determine DTE speed when auto speed conversion is ON in V.42 / MNP / normal mode.
→ 300bps		
→ 600bps		
→ 1200bps		
→ 1800bps		*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.
→ 2400bps		
→ 3600bps		
→ 4800bps		
→ 7200bps		*The throughput is improved by using data compression, enhance this set higher than the modem speed is suggested to enable more effective operation.
→ 9600bps		
→ 12000bps		
→ 14400bps		
→ 16800bps		
→ 19200bps		*When use "AT" command and auto baud rate detect function "ON", this setting will be replaced by identified speed.
→ 21600bps		
→ 24000bps		
→ 26400bps		*The Auto baud rate function can detect all the listed DTE speed.
→ 28800bps		/Default = 57600 bps.
→ 32000bps		
→ 31200bps		
→ 33600bps		
→ 38400bps		
→ 57600bps		
→ 76800bps		
→ 115200bps		
FLOW CONTROL	ATQn	Used to set flow control between terminal and modem when using V.42/MNP and normal mode (asynchronous mode only).
→ OFF	ATQ0	/No flow control
→ X-ON, X-OFF	ATQ1	/Software control, used in text data.
→ CTS ONLY	ATQ2	/Hardware control identical to RTS/CTS control, but modem send the data in spite of RTS from DTE, unilateral control.
→ RTS/CTS	ATQ3	/Hardware control, bilateral, accept any type of data (default).
DTR CTRL	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.
→ FORCE 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).

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→ 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.
→ FORCE 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.
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
→ 8		/Total bit length includes start, stop, parity and data bits (default = 10)
→ 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)

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## 3.5.8 LINE SET UP MENU

ITEM NAME LINE TYPE	COMMAND	DESCRIPTION
→ Dial	AT&L <sub>n</sub>	Select line type and also set dial back-up function.
→ 2W Leased Line	AT&L0	/Dial line.
→ 4W Leased Line	AT&L1	/2 wire leased line.
→ LEASED TO DIAL	AT&L2	/4 wire leased line.
→ Manual	ATS 31= <sub>n</sub> (bit0)	Auto dial back-up control while leased line is out of service.
→ Auto		/Manual control dial back-up (default).
BACKUP TEL.		/Auto dial back-up.
→ No dial backup		Select backup telephone number # <sub>n</sub> ( <sub>n</sub> =0-9)
→ #0 nnnn...to #9 nnnn		/Disable backup function (default)
BACKUP SPEED	ATS55= <sub>n</sub>	/Enable backup function and make a choice of the phone number group.
→ V34 Adapt... V21 300		Select modem speed used in the auto dial backup mode.
DIAL TO LEASED	ATS31= <sub>n</sub> (bit 1)	/(default = V.34 288).
→ Manual		Select whether return to leased line automatically or not during dial back-up mode.
→ Auto		/Manual control (default).
D TO L TIMER	ATS36= <sub>n</sub>	/Return to the leased line automatically when leased line is recovered.
→ Forever		When operate in dial back-up mode, to select how long it will take to detect if the leased line is recovered or not.
→ 1...255 mins.		/No dial to leased /(default=60 mins)

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## 3.5.7 COMMAND MENU

ITEM NAME COMMAND MODE	COMMAND	DESCRIPTION
→ AT COMMAND	ATS19= <sub>n</sub> (bit1,0)	Intelligent function command set selection.
→ V.25bis COMMAND		/Hayes compatible "AT" command set with async format.
→ DUMB MODE		/ITU-T V.25bis command set with async, Bisync and HDLC/SDLC formats.
AUTO BAUD	AT%U <sub>n</sub>	/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.
→ ON	AT%AU1	Auto baud rate detection function control for AT command mode.
→ OFF	AT%U0	/Enable (default).
FRAMING	ATS19= <sub>n</sub> (bit1,0)	/Disable.
→ ASYNC		V.25bis command data format.
→ HDLC/SDLC		/Async (default).
→ BSC		/HDLC(SDLC).
ASYNC FORM	ATS19= <sub>n</sub> (bit5,4)	/Bisync/monosync.
→ 7-O-1		Select the Async data parity
→ 7-E-1		/7 Data Bits, odd parity 1 stop bit
→ 7-N-2		/7 Data Bits, even parity 1 stop bit
→ 8-N-1		/7 Data Bits, none parity 2 stop bits
IDLE CHAR.	ATS19= <sub>n</sub> (bit3)	/8 Data Bits, none parity 1 stop bit (default)
→ Idle		Select the char to be transmitted for the BSC & HDLC framing
→ SYNC		/No character to be Tx when idle.
		/SYNC char be Tx when idle.

## FRONT PANEL LCD AND MENU-DRIVEN

## 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 Profile #0-#9		/User defined load profile #0..#9. Through this operation, required settings can be made for the next operation when the modem is power on.
FACTORY PROFILES	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 AS-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.

## FRONT PANEL LCD AND MENU-DRIVEN

→ 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 (bit4)	Front panel lock control.
→ UNLOCK		/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	AT&Yn	select the user profile to be used on power up.
→ USER Profile #0-#9		Re-initialize the user profiles to the Factory profile #0, and flush the stored telephone numbers.
INITIAL	AT&F10	/confirm the initializing action. Press enter key to confirm or any other key to quit.
→ Are you sure???		Edit the contain of the selected streg.
SERG EDIT	ATSn=m	/Edit the value of the S-register in decimal form.
→ Base = DEC		/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.
→ Base= Bin		xx: Use left key, right key and enter key to select the S-register to be edited.
→ xx : ΔΔΔ□□□□□□□□□□		ΔΔΔ: Use left key, right key and enter key to edit the value of the selected S-register in decimal form.
		□□□□□□□□□□: Use left, 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

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CONTENT

- 4.1 Preview
- 4.2 Dial Line VS. Leased Line
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- 4.5 Synchronous VS. Asynchronous
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- 4.14 Intelligent Dial
- 4.15 Front Panel Lock And Password Protect
- 4.16 ITU-T V.13 Simulated Carrier In Half Duplex Mode
- 4.17 G3 Fax Send/Receive

**CHAPTER 4: GENERAL INFORMATION AND FEATURES**

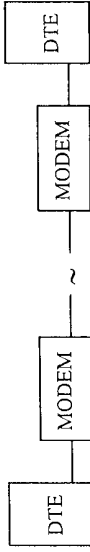
**4.1 Preview**

In order to help you to get familiar with your TAINET 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.

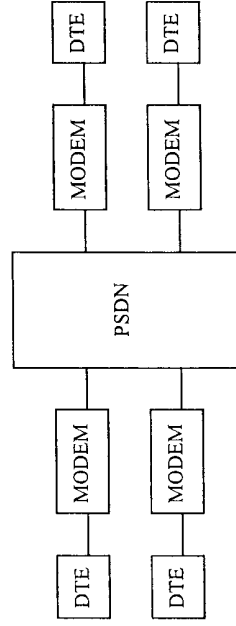
A. Leased line provides users a dedicated communication channel. Both ends of the circuit are permanent. It offers continuous service and provides absolute security. It will not be invaded by any other circuit due to the dedication, it supports better quality and higher reliability.



**FIG. 4-1: Leased Line**

B. 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

4-2 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 T-336Cx used the frequency split method. Whereas, in V.32/V.32bis/V.34 mode, it must provide "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 T-336Cx does an excellent job with both 2W and 4W leased lines and even dial line.

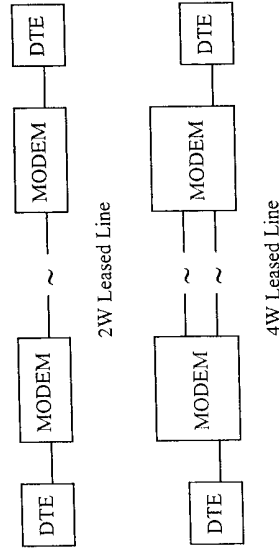


FIG. 4-3: 2W/4W leased line.

**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 "CONFIG 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 TAINET 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 T-336Cx 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 TAINET 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

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 TAINET 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 <sup>-9</sup>
8	--	< 10 <sup>-8</sup>
7	--	< 10 <sup>-7</sup>
6	--	< 10 <sup>-6</sup>
5	--	< 10 <sup>-5</sup>
4	--	< 10 <sup>-4</sup>
3	--	< 10 <sup>-3</sup>
2	--	< 10 <sup>-2</sup>
1	--	< 10 <sup>-1</sup>
0	--	NO Connect

Basically, 10<sup>-5</sup> to 10<sup>-6</sup> 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

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 T-336Cx 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-ORG-V34 ASYNC	ASY-2L-ORG-V34 ASYNC	SYN-2L-ORG-V34 ASYNC	SYN-2L-ORG-V34 ASYNC	SYN-4L-ORG-V34 ASYNC	SYN-4L-ORG-V34 ASYNC	ASY-2L-ANS-Auto
DATA FORMAT	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC
COMMAND	AT	AT	V25bis	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB	DUMB
LINE Type	DIAL	DIAL	DIAL	2WLL	2WLL	2WLL	2WLL	4WLL	4WLL	2WLL
RING Times	1	1	1	1	1	1	1	1	1	1
MODEM	V.34	V.34	V.34	V.34	V.34	V.34	V.34	V.34	V.34	V.34
SPD	Adapt	Adapt	Adapt	Adapt	Adapt	Adapt	Adapt	Adapt	Adapt	Adapt
ORG/ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	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	V.42bis	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
FLOW	RTS/CTS	Xon/Xoff	Off	Off	Off	Off	Off	Off	Off	Off
CTRL	ON	ON	Normal	ON	ON	Normal	Normal	Normal	Normal	Normal
DCD CTRL	Normal	ON	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
DIR 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	immediate	clear	clear	clear	clear	clear	clear	clear	clear
	down	down	down	down	down	down	down	down	down	down

**4.8 Remote Access**

For improving service loading, the T-336Cx offer a remote access function through secondary 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 T-336Cx 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 T-336Cx 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

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 TAINET 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

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 Simulated Carrier In Half Duplex Mode**

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 operation allows local RTS control of remote DCD signal without on-off carrier switching in half duplex operation.

The V.13 function apply to the SNA network and the related setting is located in "DCD control" under "CONFIG DTE" menu.

**4.17 G3 FAX Send/Receive**

The TAINET Network Series Modem offers G3 fax Send and Receive function and EIA-TIA Class 1 commands.

Table 4.17.1 Fax Class Command Sets

Command	Summary
-FCLASS?	Capabilities Identification And Control
+FCLASS=?	Service Class Indication
+FCLASS=	Service Class Capabilities
D	Service Class Selection
A	Service Class 1 Action Commands
+FTS=n	Originate a call
+FRS=n	Answer a call
+FTM=<MOD>	Stop transmission and pause. (10 ms intervals. n=0-55)
+FRM=<MOD>	Wait for silence. (10 ms intervals n=0-255)
+FTH=<MOD>	Transmit data with <MOD> carrier
+FRH=<MOD>	Receive data with <MOD> carrier
	Transmit HDLC data with <MOD> carrier
	Receive HDLC data with <MOD> carrier

The MOD parameter may take on the following values :

Value	Modulation	& Speed
3	V.21 ch.2	300
24	V.27 ter	2400
48	V.27 ter	4800
72	V.29	7200
73	V.17	7200 (long train)
74	V.17	7200 (short train)
96	V.29	9600
97	V.17	9600 (long train)
98	V.17	9600 (short train)
121	V.17	12000 (long train)
122	V.17	12000 (short train)
145	V.17	14400 (long train)
146	V.17	14400 (short train)

Refer Appendix 2 for more detailed FAX function descriptions.

CHAPTER 5  
INSTRUCTION SETS

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CONTENT

- 5.1 AT Command Set
  - 5.2 Dial Modifiers
  - 5.3 Result Codes
  - 5.4 V.25bis Auto Call Unit
-

## 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 5-8 : OK
ATLn	speak volume control 0 : Low 1 : Medium 2 : High
ATMn	speak control 0 : off 1 : until DCD on 2 : Always 3 : off when dial
ATOn	go online 0 : go back to data mode 1 : rate change 2 : restrain
ATP	enable pulse dialing
ATQn	response on/off 0 : response on 1 : response off

INSTRUCTION SETS

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
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.
ATUn	DTE/DCE speed convert on/off 0 : enable DTE/DCE speed convert 1 : disable DTE/DCE speed convert

INSTRUCTION SETS

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	extended 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 on after connect 2 : V.13 HDX
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
AT&Gn	guard tone options 0 : disabled 1 : 550 Hz 2 : 1800 Hz
AT&Kn or ATQn	DTE flow control options 0 : no flow control 1 : XON/XOFF flow control 2 : CTS only flow control 3 : RTS/CTS flow control



AT\Nh	<p>protocol type options</p> <p>0 : normal mode</p> <p>1 : driret mode</p> <p>2 : MNP reliable mode</p> <p>3 : auto-reliable mode</p> <p>4 : LAPM reliable</p> <p>5 : LAPM reliable with fallback to normal mode</p> <p>6 : LAPM reliable with fallback to MNP mode</p> <p>7 : MNP reliable with fallback to normal mode</p>
AT%An	<p>async tolerance</p> <p>0 : basic ASI</p> <p>1 : extended ASI</p>

AT%Bn	<p>modem speed</p> <p>0 : adaptive baud rate</p> <p>1 : V21_300 / FAX 300</p> <p>2 : B103_300</p> <p>3 : V22_1200</p> <p>4 : B212_1200</p> <p>5 : V22_2400</p> <p>7 : V23_1200</p> <p>10 : V27_2400 / FAX 2400</p> <p>11 : V27_4800 / FAX 4800</p> <p>13 : V29_7200 / FAX 7200</p> <p>14 : V29_9600 / FAX 9600</p> <p>15 : V32_4800</p> <p>16 : V32b_7200</p> <p>17 : V32_9600T</p> <p>18 : V32_9600Q</p> <p>19 : V32b_12000</p> <p>20 : V32b_14000</p> <p>26 : V34_19200</p> <p>27 : V34_24000</p> <p>28 : V34_28800</p> <p>29 : V32t_16800</p> <p>30 : V32t_19200</p> <p>31 : V34_4800</p> <p>32 : V34_7200</p> <p>33 : V34_9600</p> <p>34 : V34_14400</p> <p>35 : V34_16800</p> <p>36 : V34_21600</p> <p>37 : V34_26400</p> <p>38 : V34_12000</p> <p>40 : V34_2400</p> <p>41 : V34_31200</p> <p>42 : V34_33600</p> <p>43 : V17_7200/FAX 7200</p> <p>44 : V17_9600/FAX 9600</p> <p>45 : V17_12000/FAX 12000</p> <p>46 : V17_14400/FAX 14400</p>
AT%Cn	<p>data compression on/off</p> <p>0 : data compression off</p> <p>1 : data compression on</p>
AT%Dn	<p>DTR off-to-on actions</p> <p>0 : DTR off-to-on normal (108.2)</p> <p>1 : DTR off-to-on dial/ans according to ring-in(108.1)</p>
AT%En	<p>auto retrain control</p> <p>0 : auto retrain disable</p> <p>1 : auto retrain enable</p>

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'	dial digit
'A' to 'D'	
'a' to 'd'	
'*', '#'	
','	pause
'!'	flash hook
'W' or 'w'	wait for dial tone
or '!''	
','	return to idle after dial
'@' or '='	wait for quiet answer (silence)
'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 '!''	do nothing
or '!''	

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=num	write DSP ram content (for test only)

5.3 Result Codes

Table 5-3 AT Command Result Codes

Short	Long form
0	OK
2	RING
3	NO CARRIER
4	ERROR
6	NO DIAL TONE
7	BUSY
8	NO ANSWER TONE
9	CONNECT
10	CONNECT 300
11	CONNECT 600
12	CONNECT 1200
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. CFJET - Busy tone had been detected
- b. CFJAB - Modem aborted a call.
- c. CFJRT - Ringback timeout.
- d. CFJCB - Modem busy.
- e. CFJNS - No phone number is stored.
- f. CFJND - No dial tone is detected.

#### CONTENT

- 6.1 Description
- 6.2 Instruments
- 6.3 Periodic Maintenance
- 6.4 Troubleshooting
- 6.5 Return Procedure

## 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 multimeter, 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 TAINET 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 TAINET Network Series Modem would contact with your local representative or distributor of Tainet, 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.

T-336Cx S-REGISTER TABLE

APPENDIX 1: T-336Cx 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) (.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 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
S14	00001010	binary	bit 7,6,5 - reserved Bit Mapped Options bit 0 bit 1 bit 2 bit 3 bit 4 bit 5
			*0 - AT-C0 1 - AT-C1 0 - ATE0 *1 - ATE1 *0 - ATQ0 1 - ATQ1 0 - ATV0 *1 - ATV1 - reserved *0 - ATT 1 - ATP
			calling tone off calling tone on echo off echo on response on response off response code response word Tone Dial Pulse Dial

T336Cx S-REGISTER TABLE

No	Default	Unit	Function Description
S15	01000000	binary	reserved Bit Mapped Options 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 - AT%T0 none *01 - AT%T1 511 pattern 11 - reserved
S17		reserved	Modem Test Timer
S18	0	minute	Bit Mapped Options
S19	00011100	binary	bit 0,1 *00 - Async 01 - HDLC/SDLC 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	Bit Mapped Options
S21	00000101	binary	bit 1,0 00 - AT&C0 DCD control *01 - AT&C1 DCD forced on 10 - AT&C2 V.13 HDX 11 - reserved 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 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)

T-336Cx S-REGISTER TABLE

No	Default	Unit	Function Description
S22	01110110	binary	bit 6 *0 - AT&S0 DSR forced on 1 - AT&S1 DSR on after connect bit 7 - reserved Bit Mapped Options bit 1,0 - speak volume *00 - low 01 - reserved 10 - medium 11 - high bit 3,2 - speak control 00 - off *01 - until DCD on 10 - always on 11 - off when dial - result code and call progress 000 - ATX0 CONNECT without speed message, blind dial, no busy tone 001 - reserved 010 - reserved 011 - reserved 100 - ATX1 CONNECT with speed message, blind dial, no busy 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 *111 - ATX4 CONNECT with speed message, wait for dial tone, check busy tone bit 7 0 - AT&P0 Make/Break ratio USA (39%) *1 - AT&P1 Make/break ratio UK (33.3%)
S23	00100001	binary	Bit Mapped Options bit 0 0 - AT&T5 slave RDL disabled *1 - AT&T4 slave RDL enabled bit 1 *0 RDL by 140 disable 1 RDL by 141 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 01 - 9 bits *10 - 10 bits 11 - 11 bits bit 7,6 - guard tones *00 - AT&G0 disabled 01 - AT&G1 550 Hz 10 - AT&G2 1800 Hz 11 - reserved

T336Cx S-REGISTER TABLE

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 - ring off time - 2 seconds - 3 seconds - 4 seconds - 5 seconds - TX compromise equalizer (default 4 dB) bit 7,6,5,4 DTR Debounce Time 100ms bit 3,2,1,0 - DTR drop detection time bit 7,6,5,4 - DTR rising detection time RTS to CTS Delay 10ms Bit Mapped Options bit 2,1,0 - data mode data format *000 - AT&Q0.&M0 async data mode 001 - AT&Q1.&M1 sync data mode 10 - reserved 010 - reserved 011 - reserved *remote access on / remote access off bit 3 - sync transmit clock source bit 5,4 *00 - AT&X0 internal clock 01 - AT&X1 external clock 10 - AT&X2 slave (loopback) clock 11 - reserved - line type bit 7,6 *00 - AT&L0 dial line 01 - AT&L1 2-wired leased line 10 - AT&L2 4-wired leased line 11 - reserved Bit Mapped Options bit 0 0 0 to -33 dBm receive dynamic range *1 -4 to -43 dBm receive dynamic range bit 1 - reserved bit 3,2 *00 - disconnect option 01 - send clear down before disconnect 10 - immediately disconnect 11 - reset modem on disconnect bit 5,4 11 - reserved - ENQ/ACK control *00 - ATV0 no ENQ/ACK 01 - ATV1 to host (simulate peripheral) 10 - ATV2 to peripheral (simulate host) 11 - reserved bit 6 *0 - disable V32 turbo for V34 adaptive mode 1 - enable V32 turbo for V34 adaptive mode bit 7 - reserved

T-336Cx S-REGISTER TABLE

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 - reserved 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 5 0 - AT%G0 auto FB/FF disable *1 - AT%G1 auto FB/FF enable bit 6 - reserved bit 7 0 - AT%U0 auto bauding off *1 - AT%U1 auto bauding on Leased Line Tx Level (0..-31 dBm) Bit Mapped Options bit 0 - leased to dial 0 - manual 1 - auto bit 1 - dial to leased 0 - manual 1 - auto bit 3,2 - security check *00 - disabled 01 - by modem 10 - by NMS 11 - reserved bit 7,6,5,4 - backup tel. (#0-9)/no dial backup bit 3,2,1,0 - retrain times bit 7,6,5,4 - reserved reserved S33 reserved S34 OH by DTR timer (default 30 seconds) S35 D to L timer (default 60 mins) S36 reserved S37 reserved S38 reserved S39 reserved S40 reserved S41 Bit Mapped Options bit 1,0 - connect message display speed 00 - ATW0 CONNECT with DTE speed *01 - ATW1 CONNECT with CARRIER_PROTOCOL and DTE speed 10 - ATW2 CONNECT with DCE speed 11 - reserved bit 7,6,5,4,3,2 - reserved Bit Mapped Options bit 0 *0 - far echo canceler off 1 - far echo canceler on bit 1 0 - receive power drop control off



T-336Cx S-REGISTER TABLE

No	Default	Unit	Function Description
			18 - V32_9600 19 - V32b_12000 20 - V32b_14000 26 - V34_19200 27 - V34_24000 28 - V34_28800 29 - V32i_16800 30 - V_32i_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
S53	00010011	binary	Bit Mapped Options bit 3,2,1,0 protocol type 0000 - ATN0 normal mode 0010 - ATN2 MNP reliable mode *0011 - ATN3 auto-reliable mode 0100 - ATN4 LAPM reliable 0101 - ATN5 LAPM reliable with fallback to normal mode 0110 - ATN6 LAPM reliable with fallback to MNP mode 0111 - ATN7 MNP reliable with fallback to normal mode 0 - AT%CO data compression off *1 - AT%C1 data compression on
S54			bit 4
S55			bit 7,6,5 reserved
S56	13	-dBm	backup speed Dial Line Tx Level (-6..-15dBm)
S57	00	binary	Bit Mapped Options bit 1,0 - retrain threshold *00 - less aggressive 01 - medium 10 - more aggressive 11 - reserved
S58			bit 7,6,5,4,3,2 reserved
S59			EEPROM Checksum (read only)
S60	0	decimal	AT&Yn Power-up user Profile

T336Cx S-REGISTER TABLE

No	Default	Unit	Function Description
S43			*1 - receive power drop control on
S44			*0 - enable V.34 asymmetrical rate
S45			1 - disable V.34 asymmetrical rate
S46			- reserved
S47			bit 7,6,5,4,3 reserved
S48			reserved
S49			reserved
S50	00000000	binary	Bit Mapped Options bit 1,0 - FAX/DATA Mode Selection *00 - AT+FCLASS=0 FAX disabled (DATA mode) 01 - AT+FCLASS=1 FAX Class I mode 10 - AT+FCLASS=2 FAX class II mode 11 - reserved *0 - AT+FAA0 data auto answer mode 1 - AT+FAA1 data/fax auto answer mod
S51	00000011	binary	bit 7,6,5,4,3 reserved Bit Mapped Options bit 1,0 - flow control 00 - ATV0,AT&K0 no flow control 01 - ATV1,AT&K1 XON/XOFF flow control 10 - ATV2,AT&K2 CTS only flow control *11 - ATV3,AT&K3 RTS/CTS flow control - DTE/DCE speed convert *00 - ATV0 enable DTE/DCE speed convert 01 - ATV1 disable DTE/DCE speed convert 10 - reserved 11 - reserved - auto dial telephone number
S52	0	dec	bit 7,6,5,4 AT%B Desired Highest DCE Speed *0 - adaptive baud rate 1 - V21_300 / FAX 300 2 - B103_300 3 - V22_1200 4 - B212_1200 5 - V22_2400 7 - V23_1200 10 - V27_2400 / FAX 2400 11 - V27_4800 / FAX 4800 13 - V29_7200 / FAX 7200 14 - V29_9600 / FAX 9600 15 - V32_4800 16 - V32b_7200

**APPENDIX 2: AUXILIARY SUMMARY FOR FAX FUNCTION**

The DTE-facsimile DCE communications link shall provide full duplex character data at rates fast enough to accommodate the transfer of synchronous T.30 Phase C data. 12,000 bit/s is the minimum rate needed to support 9600 bit/s V.29 Phase C data. 19,200 bit/s is sufficient to support V.29 signaling at 9600 bit/s. With flow control, it is not necessary, and not recommended, to change the DTE-DCE communications link data rate during facsimile operation.

Flow control is necessary to match the DTE-DCE data rate to the line signaling rate and to the requirements of Group 3 data transmission. (For example, provision must be made for minimum scan line times.) In band unidirectional DC1/DC3 (XON/XOFF) flow control is mandatory; flow control using V.24 circuits 106 and 105 is optional. In the verbose format, result code responses are preceded by the ASCII characters <CR><LF>, and followed by <CR><LF>. In the non-verbose format, result code responses are preceded by no characters, and followed by a single <CR>.

The ASCII <DLE> character (hex \$10) is used as a special character, to shield special characters. The <DLE><ETX> character pair (hex \$10, hex \$03) is used to mark the end of a stream. The following patterns are used:

any data	<DLE>	<ETX>	end of stream
any data	<DLE>	<DLE>...	single \$10 in data stream
any data	<DLE>	<not DLE or ETX>	delete both <DLE> & next character

**A2.1 Command Summary**

All of these commands, except +FTS and +FRS, must be the last command on the command line. The commands are:

<u>Command</u>	<u>Description</u>
+FTS=<Time>	Stop transmission and pause,(10 ms intervals 0-255)
+FRS=<Time>	Wait for silence,(10 ms intervals 0-255)
+FTM=<MOD>	Transmit data with <MOD> carrier
+FRM=<MOD>	Receive data with <MOD> carrier
+FTH=<MOD>	Transmit HDLC data with <MOD> carrier
+FRH=<MOD>	Receive HDLC data with <MOD> carrier

The MOD parameter may take on the following values:

<u>Value</u>	<u>Modulation &amp; Speed</u>
3	V.21 ch.2 300
24	V.27 ter 2400
48	V.27 ter 4800
72	V.29 7200
73	V.17 7200 (long train)
74	V.17 7200 (short train)
96	V.29 9600
97	V.17 9600 (long train)
98	V.17 9600 (short train)
121	V.17 12000(long train)
122	V.17 12000 (short train)
145	V.17 14400 (long train)
146	V.17 14400 (short train)

**A2.2 Capabilities Identification and Control**

**A2.2.1 Service Class Indication, +FCLASS?**

The current Service Class setting of a facsimile DCE is interrogated by the "+FCLASS?" command. The information text response is a single value:

- 0 indicates a data modem
- 1 indicates a Service Class 1 facsimile DCE
- 2 indicates a Service Class 2 facsimile DCE
- other values are reserved

**A2.2.2 Service Class Capabilities, +FCLASS=?**

The Service Classes available from a facsimile DCE are probed by the "FCLASS=?" command. The information text response is a list of values, separated by commas. For example, a DCE that supported data communication and facsimile Service Class 1 would respond: "0,1".

**A2.2.3 Service Class Selection, +FCLASS=<value>**

The Service Class may be set by the DTE from the choices available (see above), using the "+FCLASS=<value>" command. To configure a DCE for Service Class 1, the DTE issues the command: "AT+FCLASS=1".

### A2.3 Service Class 1 Action Commands

#### A2.3.1 Stop Transmission and Wait, +FTS=<Time>

The command +FTS=<Time> causes the DCE to stop any transmission. The DCE then waits for the specified amount of time, and then sends the OK result code to the DTE. The value <Time> is in 10 millisecond intervals.

#### A2.3.2 Receive Silence, +FRS=<Time>

The command +FRS=<Time> causes the DCE to listen, and to report back an OK result code when silence has been present on the line for the amount of time specified. The value <Time> is in 10 millisecond intervals. The command will terminate when the required amount of silence on the line is detected or the DTE sends the DCE another character, which is discarded. In either event, the OK result code will be returned to the DTE.

#### A2.3.3 Facsimile Transmit, +FTM=<MOD>

The command +FTM=<MOD> causes the DCE to transmit data using the modulation selected in <MOD>. <MOD> may have the values shown in section 1.1.

The DCE returns the CONNECT result code and transmits the proper training sequence in the selected mode, followed by constant 1 bits, until data is received from the DTE.

The DCE buffers data in this mode. The configured flow control method will be used by the DCE as necessary to pause the DTE.

If the DCEs transmit buffer becomes empty and the last transmitted character is ASCII NUL (00), the DCE shall continue to transmit NULs until the DTE sends more data or 5 seconds elapses. After 5 second elapse with an empty transmit buffer, the DCE will turn off transmit carrier and return to command state, returning the ERROR result code.

NOTE: 00 replication is useful for generating TCF (1.5 seconds of 0s) and zero-fill within lines.

When the DCEs transmit buffer becomes empty and the last transmitted character was not NUL, the DCE shall turn off transmit carrier, return to command state and send the OK result code to the DTE.

#### A2.3.4 Facsimile Receive, +FRM=<MOD>

The command +FRM=<MOD> causes the DCE to enter receive mode using the modulation specified in <MOD>. <MOD> may have the values shown in section 1.1

When the selected carrier is detected, the DCE will send the CONNECT result code to the DTE.

The DCE shall return to command state upon loss of carrier, and send the NO CARRIER result code to the DTE.

The DCE shall obey the configured flow control from the DTE. If the DTE sends any character to the DCE other than DC1 or DC3 while the DCE is in this mode, the DCE shall enter command state and send the OK result code to the DTE.

#### A2.3.5 HDLC Transmit, +FTH=<MOD>

The command +FTH=<MOD> causes the DCE to transmit data framed in HDLC protocol using the modulation mode selected. <MOD> may have the values shown in section 1.1.

The DCE will send the CONNECT result code to the DTE, and transmit signal converter training (if required) followed by flags until the first byte of data is sent by the DTE.

When the buffer becomes empty the DCE shall compute and append the Frame Check Sequence (FCS) and a closing flag to the frame. The DCE will insure that the minimum number of flags required by T.30 are sent before the data from the DTE begins to be transmitted.

The DCE shall check the Final Frame bit in the control field of each frame; this is the 5th received bit of the second byte of each frame. If the Final Frame bit is 1, the DCE shall cease transmitting after the frame is sent, return to command state, and send the OK result code to the DTE. If the Final Frame bit is 0, the DCE shall send the CONNECT result code to the DTE and continue to transmit flags until one of the following actions is taken by the DTE:

- \* If the DTE sends additional data, the DCE shall transmit another frame.
- \* If the DTE sends only <DLE> <ETX> (a null frame), the DCE shall turn off transmit carrier and send the OK result code to the DTE.
- \* If 5 seconds elapses from the time when the DCE reported the CONNECT result code without any additional data transmitted from the DTE, the DCE shall turn off transmit carrier, return to command mode, and send the ERROR result code to the DTE.

The DCE performs HDLC transparency functions and FCS generation while in this mode.

The DCE buffers data in HDLC transmit mode. The DCE will use the configured method of flow-control to pause the DTE as necessary.

**A2.3.6 HDLC Receive, +FRH=<MOD>**

The command +FRH=<MOD> causes the DCE to receive HDLC framed data using the modulation mode selected in <MOD>, and deliver the next received frame to the DTE. <MOD> may have the values shown in section 1.1.

If the DCE detects the selected carrier with an HDLC flag, the DCE shall send the CONNECT result code to the DTE. The DCE will return to command state upon loss of carrier, sending the NO CARRIER result code to the DTE.

The DCE strips flags, and receives and buffers frames. The received data, starting with the first non-flag byte and continuing through the last FCS byte shall be transferred to the DTE. The DTE should ignore the value of the FCS bytes. The DCE performs HDLC zero-bit deletion and error checking.

After the FCS bytes are transferred, the DCE shall mark the end of the frame with the characters <DLE><ETX>, and report the status of the frame reception to the DTE:

If the frame was received correctly (FCS is OK), the DCE shall return the OK result code.

If the frame was received in error (FCS is not OK, or carrier lost, or data lost due to data overflow), the DCE shall return the ERROR result code; the DTE should discard the frame.

After the status result code, the DCE shall accept new commands from the DTE.

The DCE shall obey the configured flow control from the DTE. If the DTE sends any character to the DCE other than DC1 or DC3 while the DCE is in this mode, the DCE shall enter command state and return the OK result code.

After sending the result code indicating that frame reception is complete, the DCE shall continue to receive and buffer data in the selected mode. If the DTE issues another +FRH=<MOD> command, the DCE shall return another CONNECT result code and continue with HDLC reception. If the DTE issues any command that changes modulation, the DCE shall stop the receive process; any buffered data will be discarded and the command will be obeyed.

**A2.4 Calling Sequence, Transmitting a Single Page Facsimile**

DTE commands	DCE responses	Local DCE action	Remote Station Action	Notes
AT+FCCLASS=1	OK	Set Class 1		
ATD+string>		Dial & send CNG Look for V.21 Detect flags	Answers Sends CED, V.21 Send HDLC flags  Sends NSF Frame	AT+FRH=3 implied by dialing with +FCCLASS=1
AT+FRH=3	CONNECT <NSF frame> <DLE><ETX> OK	Detect flags get CSI get FCS accept FCS	Send CSI Frame check FCS	frame status OK
AT+FRH=3	CONNECT <DIS frame data> <DLE><ETX> accept FCS OK NO CARRIER	Detect flags get DIS get FCS send FCS detect loss of carrier	Send DIS frame DTE must detect final frame bit drop carrier	to anticipate loss of carrier
AT+FTH=3	CONNECT  CONNECT  OK	send V.21 carrier send flags send TSI frame send FCS send flags send DCS frame send FCS flags drop carrier	detect carrier detect flags get TSI frame  get DIS frame	Final frame bit clear tells the DCE to expect another frame Final frame bit set tells the DCE not to expect another frame
AT+FTS=&+FTM=96	CONNECT  OK	wait 80 ms send V.29 carrier send TCF data drop carrier	detect carrier get TCF data	
AT+FRH=3	CONNECT <CFR frame data> <DLE><ETX> OK NO CARRIER	detect carrier detect flags get CFR frame check FCS accept FCS detect loss of carrier	send V.21 carrier send flags send CFR frame send FCS drop carrier	Final frame bit set frame OK
AT+FTM=96	CONNECT  OK	send V.29 carrier send page data drop carrier	detect carrier receive page	
AT+FTSS+FTH=3	CONNECT  OK	wait 80 ms send V.21 carrier send flags send EOP frame send FCS drop carrier	detect carrier detect flags receives EOP	final frame

**A2.5 Answering and Receiving a Single Page Facsimile**

DTE commands	DCE responses	Local DCE action	Remote Station Action	Notes
AT+FRH=1	OK RING<	Set Class 1 detect Ringing	Dials [,send CNG]	
ATA		off hook, send CED, send V.21 carrier send flags send CSI data drop carrier	get CED, detect carrier detect flags receive CSI	AT+FRH=3 implied by answering with +FCLASS=1 not final frame
<CSI frame data> <DTE><ETX>	CONNECT OK			
AT+FRH=3	CONNECT OK	send DIS data send FCS drop carrier	receive DSI	final frame
AT+FRH=3	CONNECT <TSI frame data> <DLE><ETX> OK	detect carrier detect flags receive TSI receive FCS accept FCS	sends V.21 carrier send flags send TSI frame send FCS	frame OK
AT+FRH=3	CONNECT <DSC frame data> <DLE><ETX> OK	receive DCS receive FCS accept FCS	send DCS frame send FCS	final frame bit set frame OK
AT+FRH=3	NO CARRIER	detect loss of carrier	drop carrier	DTE didn't check final frame bit and issued +FRH=3 command again
AT+FRM=96	CONNECT <TCF data> <DLE><ETX> NO CARRIER	detect carrier receive TCF detect loss of carrier	wait 75 ms send V.29 carrier send TCF data drop carrier	
AT+FRH=3	CONNECT <CFR frame data> <DLE><ETX>	send V.21 carrier send flags send CFR frame send FCS drop carrier	detects carrier detects flags receives CFR	final frame
AT+FTM=96	CONNECT <page-image data> <DLE><ETX> NO CARRIER	detect carrier receive page detect loss of carrier	send V.29 carrier send page data drop carrier	
AT+FRH=3	CONNECT <EOP frame data> <DLE><ETX> OK	detects carrier detects flags receives EOP receive FCS accept FCS	waits 75 ms sends V.21 carrier send flags send FCS drop carrier	frame OK

**A2.4 Calling Sequence, Transmitting a Single Page Facsimile (cont.)**

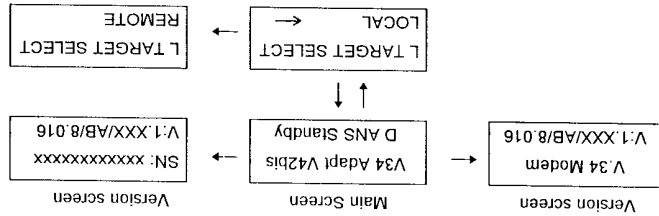
DTE commands	DCE responses	Local DCE action	Remote Station Action	Notes
AT+FRH=3	CONNECT <MCF frame data> <DLE><ETX> OK NO CARRIER	detect carrier detect flags get MCF frame check FCS accept FCS detect loss of carrier	send V.21 carrier send flags send MCF frame send FCS drop carrier	Final frame bit set frame OK
AT+FRH=3	CONNECT OK	send V.21 carrier send flags send DCN frame send FCS drop carrier	detects carrier detects flags receives DCN	final frame
ATH0	OK	Hang Up	hang-up	

A2.5 Answering and Receiving a Single Page Facsimile (cont.)

DTE commands	DCE responses	Local DCE action	Remote Station Action	Notes
AT+FTH=3 <MCF frame data> <DLE><ETX>	CONNECT  OK	send V.21 carrier send flags send MCF frame send FCS drop carrier	drop carrier	final frame
AT+FTH=3	CONNECT <DCN frame data> <DLE><ETX> OK	receives carrier detect flags receives DCN receives FCS accepts FCS	send V.21 carrier send flags send DCN frame send FCS	
AT+FRH=3	NO CARRIER	detect loss of carrier	drops carrier	
ATH0	OK	hang up		end of session

APPENDIX 3. LCD Menu Quick Reference

336Cx LCD MENU QUICK REFERENCE



MENU	STATUS	DIAL	PROTOCOL	TEST	CONFIG. MODEM	CONFIG. DTE	COMMAND	LINE SETUP	PROFILE
	Tx Level Rx Level S/N Ratio EQM F-Shift F-Shift Delay Phase Jitter F Echo DTE Retrans RX Speed TX Speed RX Baud TX Baud RX Freq TX Freq TX PowerOff Menu Retrain Interface indicators	Dial a Number Edit a Number Ring Times Progress Tone Dial Type SPK Control SPK Volume	Protocol Type Security check Discon. method DL RDL Connect Code	Clear All LAL DL Auto Retrain Tx Clock Retrain Threshold Error Count B E R Test	Modem Speed ORGANSMxbs Auto Retrain Tx Clock Retrain Threshold AS1 Overspeed Make/Break Force Off Hook OH By DTR Pump edit LL Tx Level DL Tx Level FBVF CMI Remote Access Dynamic Range	DTE Speed Flow Control Auto Baud Framing Async form Idle Char RTS Control DSR Control DCD Control Data Format Total Bits AL By 141 RDL By 140	Command Mode Auto Baud Framing Async form Idle Char RTS Control DSR Control DCD Control Data Format Total Bits AL By 141 RDL By 140	Line Type Leased To Dial Backup Speed Backup Tel Dial to Leased Dial to Leased Timer	Load Power Up Initial Front Lock Password Edit Seg Edit Save