# CONTENTS

# *Chapter 1 Command Summary*

## Basic AT Commands

| Command | Function |
|---|---|
| A/ | Re-execute command. |
| A | Go off-hook and attempt to answer a call. |
| B0 | Select V.22 connection at 1200 bps. |
| B1 | Select Bell 212A connection at 1200 bps. |
| C1 | Return OK message. |
| Dn | Dial modifier. |
| E0 | Turn off command echo. |
| E1 | Turn on command echo. |
| H0 | Initiate a hang-up sequence. |
| H1 | If on-hook, go off-hook and enter command mode. |
| I0 | Report product code. |
| I1 | Report computed checksum. |
| I2 | Report OK. |
| I3 | Report firmware revision, model, date |
| I4 | Report response programmed by an OEM. |
| I5 | Report the country code parameter. |
| I6 | Report modem data pump model and code revision |
| L0 | Set low speaker volume. |
| L1 | Set low speaker volume. |
| L2 | Set medium speaker volume. |
| L3 | Set high speaker volume. |
| M0 | Turn speaker off. |
| M1 | Turn speaker on during handshaking and turn speaker off while receiving carrier. |
| M2 | Turn speaker on during handshaking and while receiving carrier. |
| M3 | Turn speaker off during dialing and receiving carrier and turn speaker on during answering. |
| N0 | Turn off Automode detection. |
| N1 | Turn on Automode detection. |
| O0 | Go on-line. |
| O1 | Go on-line and initiate a retrain sequence. |
| P | Force pulse dialing. |
| Q0 | Allow result codes to DTE. |
| Q1 | Inhibit result codes to DTE. |
| Sn | Select S-Register as default. |

| | |
|---|---|
| :0 | Disable line quality monitor and auto retrain . |
| :1 | Enable line quality monitor and auto retrain . |
| :2 | Enable line quality monitor and fallback/fall forward. |
| :3 | Enable line quality monitor and auto-retrain with fast hang-up. |
| | Return received line signal level. |
| ) | Report the line signal quality. |
| | Controls break handing three states. |
| ) | Select normal speed buffered mode. |
| | Select direct mode. |
| 2 | Select reliable link mode: |
| 3 | Select auto reliable mode. |
| 4 | Force LAMP mode. |
| 5 | Force MNP mode. |
| 15 | Select modulation,(select data speed) |

## ror Correction Commands

| | |
|---|---|
| :0 | Disable data compression. |
| :1 | Enable MNP 5 data compression. |
| :2 | Enable V.42 bis data compression. |
| :3 | Enable both V.42 bis and MNP 5 compression. |
| ) | Set maximum block size in MNP to 64. |
| | Set maximum block size in MNP to 128. |
| 2 | Set maximum block size in MNP to 192. |
| 3 | Set maximum block size in MNP to 256. |
| | Send break of x 100 ms. |
| | Use stream mode for MNP. |
| | Use block mode for MNP. |
| 1 | Select direct mode. |
| 2 | Select reliable link mode. |
| 3 | Select auto reliable mode. |
| 4 | Force LAMP mode. |
| 5 | Force MNP mode. |
| 0 | Single line connect messages are controlled by X, W & S95 commands. |
| 1 | Connect messages are displayed in single line format. |



## MNP 10 Commands

| | |
|---|---|
| -K0 | Disable MNP 10 extended services |
| -K1 | Enable MNP 10 extended services |
| -K2 | Enable MNP 10 extended services detection only |
| -SEC=0 | Disable MNP 10 EC. |
| -SEC=1, [<tx level>] | Enable MNP 10 EC and set transmit level <tx level> 0 to 30 (9 dBm to -30 0 dBm). |

## Voice Commands

| | |
|---|---|
| #BDR | Select baud rate (turn off autobaud). |
| #CLS | Select data, fax, or voice. |
| #MDL? | Identify model. |
| #MFR? | Identify manufacturer. |
| #REV? | Identify revision level. |
| #TL | Audio output transmit level. |
| #VBQ? | Query buffer size. |
| #VBS | Bits per sample. |
| #VBT | Beep tone timer. |
| #VCI? | Identify compression method. |
| #VGT | Set playback volume in the command state. |
| #VLS | Voice line select. |
| #VRA | Ringback goes away timer (originate). |
| #VRN | Ringback never came timer (originate). |
| #VRX | Voice receive mode. |
| #VSD | Enable silence deletion (no function; command response only). |
| #VSK | Buffer skid setting. |
| #VSP | Silence detection period (voice receive). |
| #VSR | Sampling rate selection. |
| #VSS | Silence detection tuner (voice receive). |
| #VTD | DTMF/tone reporting. |
| #VTM | Enable timing mark placement. |
| #VTS | Generate tone signals. |
| #VTX | Voice transmit mode. |

# S -Select Modulation

xtended format command selects the modulation and, optionally, enables or disables ode, specifies the lowest and highest connection rates, selects $\mu$-law or A-law codec and enables or disables robbed bit signaling generation (server modem) or detection modem) using one to five subparameters. The command format is:

=<mode>[,[< automode >][,< min_rate >][,< x_law >][,< rb_signaling >]]]]]]<

ES:

For 14400bps and lower speeds, the Nn command and S37 register can alternatively be used, in which case the +MS subparameters will modified to reflect the Nn and S37=x settings. Use of the Nn and S37=x commands is not recommended but is provided for compatibility with existing communication software. (S37 is not updated by the +MS command. )

Subparameters not entered (enter a comma only or <CR> to skip the last subparametet) remain at their current values.

***ting Selected Options***

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

+MS?

esponse is:

+MS:<mod>,<automode>,<min_rate>,<max_rate>,<x_law>,<rb_signaling>

xample:

+MS : 56,1,300,56000,0,0 ( 56k modem default values )

+MS : 11,1,300,33600,0,0 ( 33.6k modem default values )



***Reporting Supported Options***

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

+MS=?

The response is:

+MS : (list of supported <mode> values), (list of supported <automode> values), (list of supported<mim_rate>values), (list of supported <max_rate> values), (list of supported <x_law>values), (list of supported<rb_signaling>calues)

For example:

+MS : (0,1,2,3,9,10,11,56,64,69), (0,1), (300-33600),(300-56000),(0,1), (0,1) [56k]

+MS : (0,1,2,3,9,10,11,64,69), (0,1), (300-33600), (300-33600), (0,1), (0,1) [33.6k]

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

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

To emulate issuance of the N1S37=x sequence command, specify the modulation and z

+MS=11, 1, 1200, 24000 selects automode starting at V.34 168000 bps(no comparable S37 command).

+MS=9, 1, 300, 12000 selects automode starting at V.32 bis 12000 bps (same as NS37=10).

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

<max_rate> is an optional number which specifies the highest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 14400 bps. The default is 28800 for 28800 bps.

<x-law> is an optional number which specifies the codec type. The options are:

0= $\mu$ -Law

1=A-Law

Note that ATZ will reset the <x_law> selection to 0 ( $\mu$ -Law).

<rb_signaling> is an optional number which enables or disables robbed bit signaling generation in a sever modem or enables or disables robbed bit signaling detection in a client modem. The options are:

0=Robbed bit signaling generation (server modem) or detection (client modem) disabled(default)

1=Robbed bit signaling generation (server modem) or detection (client modem) enabled



Note that ATZ will reset the <rb_signaling> selection to 0 (disabled)

Result Codes:

| | |
|---|---|
| OK | Valid subparameter string |
| ERROR | Otherwise |

# Chapter 3 Result Codes Summary

| Short Form | Long Form | n Value in ATXn | | | | | Notes |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | |
| 0 | OK | X | X | X | X | X | |
| 1 | CONNECT | X | X | X | X | X | |
| 2 | RING | X | X | X | X | X | |
| 3 | NO CARRIER | X | X | X | X | X | |
| 4 | ERROR | X | X | X | X | X | |
| 5 | CONNECT 1200 | 1 | X | X | X | X | |
| 6 | NO DIAL TONE | 3 | 3 | X | X | X | |
| 7 | BUSY | 3 | 3 | 3 | X | X | |
| 8 | NO ANSWER | X | X | X | X | X | |
| 9 | CONNECT 0600 | 1 | X | X | X | X | |
| 10 | CONNECT 2400 | 1 | X | X | X | X | |
| 11 | CONNECT 4800 | 1 | X | X | X | X | |
| 12 | CONNECT 9600 | 1 | X | X | X | X | |
| 11 | CONNECT 7200 | 1 | X | X | X | X | |
| 14 | CONNECT 12000 | 1 | X | X | X | X | |
| 15 | CONNECT 14400 | 1 | X | X | X | X | |
| 16 | CONNECT 19200 | 1 | X | X | X | X | |
| 17 | CONNECT 38400 | 1 | X | X | X | X | |
| 18 | CONNECT 57600 | 1 | X | X | X | X | |
| 19 | CONNECT 115200 | 1 | X | X | X | X | |
| 20 | CONNECT 230400 | X | X | X | X | X | Note 4 |
| 22 | CONNECT 75TX/1200RX | 1 | X | X | X | X | |
| 23 | CONNECT 1200TX/75RX | 1 | X | X | X | X | |
| 24 | DELAYED | 4 | 4 | 4 | 4 | X | |
| 32 | BLACKLISTED | 4 | 4 | 4 | 4 | X | |
| 33 | FAX | X | X | X | X | X | |
| 35 | DATA | X | X | X | X | X | |
| 40 | CARRIER 300 | X | X | X | X | X | |
| 44 | CARRIER 1200/75 | X | X | X | X | X | |
| 45 | CARRIER 75/1200 | X | X | X | X | X | |
| 46 | CARRIER 1200 | X | X | X | X | X | |
| 47 | CARRIER 2400 | X | X | X | X | X | |
| 48 | CARRIER 4800 | X | X | X | X | X | |
| 49 | CARRIER 7200 | X | X | X | X | X | |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50 | CARRIER 9600 | X | X | X | X | X | |
| 51 | CARRIER 12000 | X | X | X | X | X | |
| 52 | CARRIER 14400 | X | X | X | X | X | |
| 53 | CARRIER 16800 | X | X | X | X | X | Note 2 |
| 54 | CARRIER 19200 | X | X | X | X | X | Note 2 |
| 55 | CARRIER 21600 | X | X | X | X | X | Note 2 |
| 56 | CARRIER 24000 | X | X | X | X | X | Note 2 |
| 57 | CARRIER 26400 | X | X | X | X | X | Note 2 |
| 58 | CARRIER 28800 | X | X | X | X | X | Note 2 |
| 59 | CONNECT 16800 | 1 | X | X | X | X | Note 2 |
| 61 | CONNECT 21600 | 1 | X | X | X | X | Note 2 |
| 62 | CONNECT 24000 | 1 | X | X | X | X | Note 2 |
| 63 | CONNECT 26400 | 1 | X | X | X | X | Note 2 |
| 64 | CONNECT 28800 | 1 | X | X | X | X | Note 2 |
| 66 | COMPRESSION: CLASS 5 | X | X | X | X | X | |
| 67 | COMPRESSION: V.42 bis | X | X | X | X | X | |
| 69 | COMPRESSION: NONE | X | X | X | X | X | |
| 70 | PROTOCOL; NONE | X | X | X | X | X | |
| 77 | PROTOCOL: LAMP | X | X | X | X | X | |
| 78 | CARRIER 31200 | X | X | X | X | X | Note 3 |
| 79 | CARRIER 33600 | X | X | X | X | X | Note 3 |
| 80 | PROTOCOL: ALT | X | X | X | X | X | |
| 81 | PROTOCOL; ALT-CELLULAR | X | X | X | X | X | |
| 84 | CONNECT 33600 | 1 | X | X | X | X | Note 3 |
| 91 | CONNECT 31200 | 1 | X | X | X | X | Note 3 |
| 150 | CARRIER 32000 | X | X | X | X | X | Note 4 |
| 151 | CARRIER 34000 | X | X | X | X | X | Note 4 |
| 152 | CARRIER 36000 | X | X | X | X | X | Note 4 |
| 153 | CARRIER 38000 | X | X | X | X | X | Note 4 |
| 154 | CARRIER 40000 | X | X | X | X | X | Note 4 |
| 155 | CARRIER 42000 | X | X | X | X | X | Note 4 |
| 156 | CARRIER 44000 | X | X | X | X | X | Note 4 |
| 157 | CARRIER 46000 | X | X | X | X | X | Note 4 |
| 158 | CARRIER 48000 | X | X | X | X | X | Note 4 |
| 159 | CARRIER 50000 | X | X | X | X | X | Note 4 |
| 160 | CARRIER 52000 | X | X | X | X | X | Note 4 |
| 161 | CARRIER 54000 | X | X | X | X | X | Note 4 |
| 162 | CARRIER 56000 | X | X | X | X | X | Note 4 |
| 165 | CARRIER 32000 | X | X | X | X | X | Note 4 |

## RS-232C Connector

| Pin | Signal | Direction |
|---|---|---|
| 2 | TD | To modem |
| 3 | RD | To DTE |
| 4 | RTS | To modem |
| 5 | CTS | To DTE |
| 6 | DSR | To DTE |
| 7 | GND | |
| 8 | DCD | To DTE |
| 12 | HS | To DTE |
| 15 | TXC | To DTE |
| 17 | RXC | To modem |
| 20 | DTR | To modem |
| 22 | RI | To DTE |

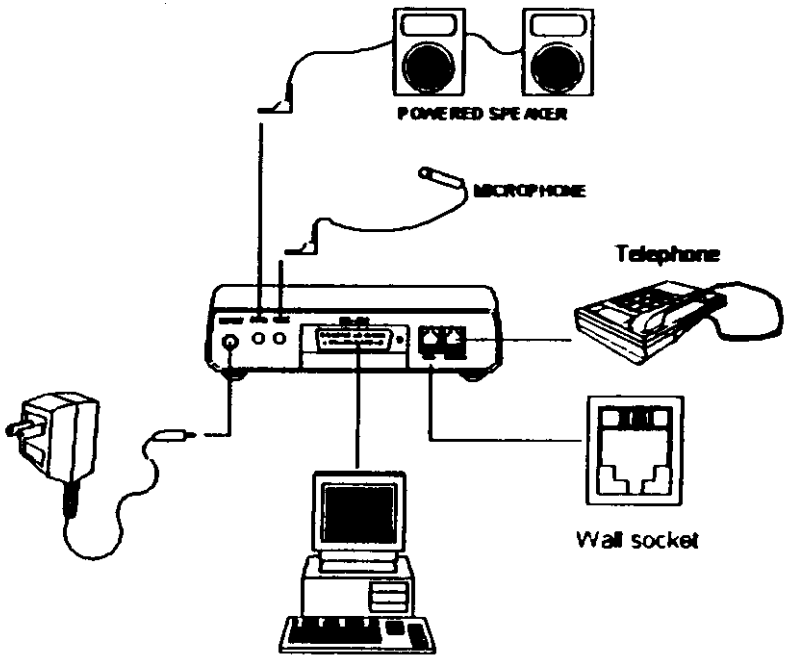
## Power switch

Power ON/OFF control.

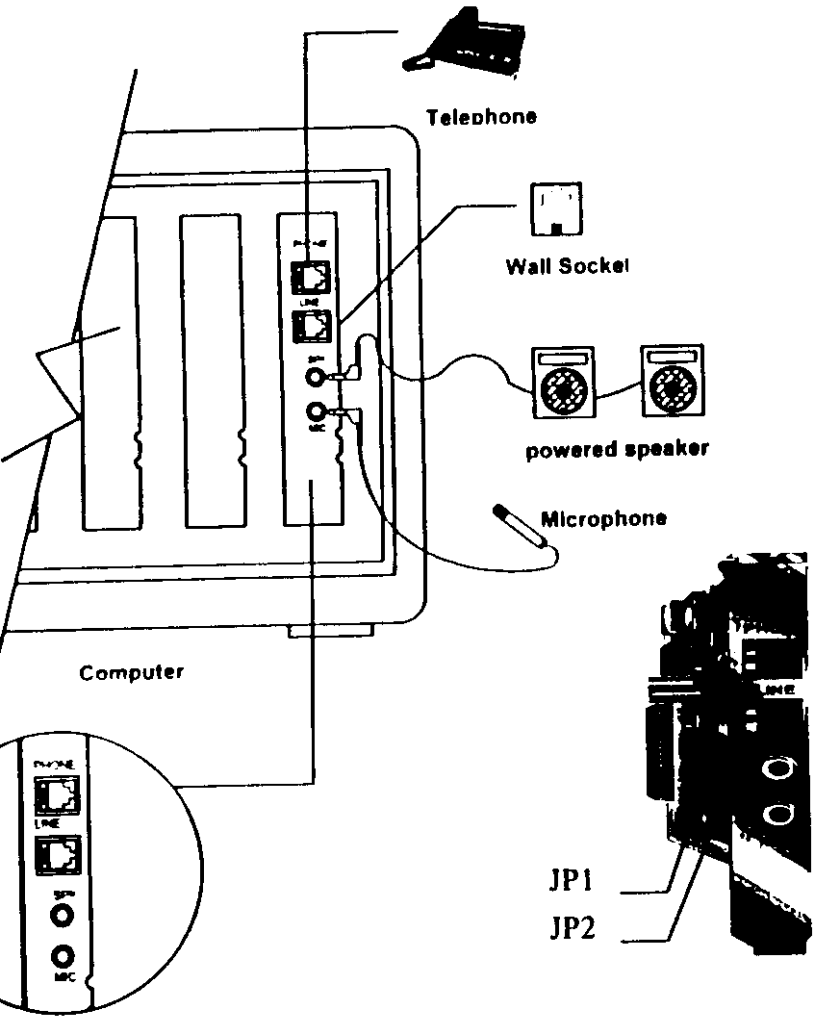
## LED Indicators

PWR : Indicates the power is on
MR : Indicates the modem is ready for using
DTR : Indicates the DTR signal is active
AA : Indicates the modem is at auto answer mode
HS : Indicates the modem is at higher speed,
OH : Indicates the line is book-off
CD : Indicates the data carrier is detected and the on-line mode
TD : Indicates the data or command is transmitting
RD : Indicates data is receiving or command is echoing






External Modem Diagram




Internal Modem Diagram



# Installation procedure for modems

1. Hardware installation

1-1. External modem

- With the computer switched off, plug the modem into an available COM port (usually COM 2) using the supplied data cable. Insert the supplied phone cord into the line jack on the rear of the modem, and the phone plug into the wall socket. Insert the power adapter into the power socket on the rear of the modem.
- Ensure that the modem powers up correctly when switched on by observing that the power light (marked PWR) on the modem lights.
- Proceed to Software installation.

1-2. Internet modem

- See addendum sheet for internal modem jumper setting.
- Remove the computer case and insert the modem card into a spare 16-bit ISA expansion slot.
- Close the case.
- Insert the supplied phone cord into the line jack on the rear of the modem, and the phone plug into the wall socket.
- Proceed to Software installation.

2. Software Installation

- There are separate installation procedures for the two different versions of Windows 95 Microsoft has released, Windows 95 4.00.950/4.00.950a and Windows 95 4.00.950b.
- The user must first determine which version of Windows is installed on the system.

the supplied driver disk in the floppy drive, and click Have Disk.

n the drive letter of the floppy driver in the box, then click OK.

your modem device from the next screen, then click Next.

Communication Port, then click Next.

reen will show Your modem has been set up successfully, then click Finished. The

should appear in the modem list.

e modem by clicking on the Diagnostics tab.

on COM port that the modem is connected to, then on the More Information button.

r communicating with the modem, the screen appears, the modem is working

y.



# *Chapter 5 Trouble Shooting*

## If you are fails to install your modem

Internal modem :

- Make sure the COM port and IRQ Setting are correctly, and it doesn't conflict with another board installed in your computer.
- If your modem is using COM 3 or COM 4, Windows might not recognize it, and you will get a message such as "Modem does not exist". The reason is that most PC don't allow COM ports to share the same IRQ line, thus if your mouse is using COM 1, but your modem is using COM 3, the conflict might arise, unless your reconfigured modem to another IRQ line (For example IRQ 5), also you need to tell windows reassigned IRQ-line to take effect.

| Standard COM Port | IRQ | Address |
|---|---|---|
| COM 1 | 4 | 3F8 |
| COM 2 | 3 | 2F8 |
| COM 3 | 4 | 3E8 |
| COM 4 | 3 | 2E8 |

External modem:

- Be sure your RS-232 Cable and Power adapter are connected properly between modem and your PC.
- Make sure AC outlet and modem power-switch is set to on-position.

If above are correctly and the modem LED are not lit, Please contact the dealer or distributor .

## Modem won't execute AT commands

- The COM port of your software or DTE perhaps set up incorrectly. For example, your software may be configured on COM 1, but your modem may be configured as another COM port (such as COM 2).
- Check RS-232 cable is connected properly ,verify modem LED "DTR" is ON, otherwise check above procedure again.
- Be sure you are sending commands at an acceptable baud rate, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200bps.
- Make sure you are using an acceptable character format. For example : 8 data bits, no parity, one stop bit.
- Type AT&F [ENTER], reset original factory default and try execute AT commands again.

# Federal Communications Commission

## Radio Frequency Interference Statement.

This equipment has been tested and found to comply with the limits for a Class B digital
pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable
ion against harmful interference when the equipment is operated in a residential
ation. This equipment generates, uses, and can radiate radio frequency energy and if not
d and used in accordance with the instruction manual may cause harmful interference to
ommunications. However, there is no guarantee that interference will not occur in a
lar installation. If this equipment does cause harmful interference to radio or television
on, which can be determined by tuning the equipment off and on, the user is encouraged
o correct the interference by one or more of the following measures:

orient or relocate the receiving antenna.
rease the separation between the equipment and receiver.
nnect the equipment into an outlet on a circuit different from that to which the receiver
connected. Consult the dealer or an experienced radio TV technician for help.

:

The changes or modifications not expressly approved by the party responsible for
compliance could void the user's authority to operate the equipment.
Shielded interface cables and AC power cord if any must be used in order to comply
with the emission limits.



# NOTICE TO NEW ZEALAND USERS

New Zealand users of this modem are advised of the following points with regard to the Telepermit of the device:

Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to bell tinkle or noise and may also cause a false answer condition. Should such problems occur ,the user should NOT contact the Telecom Faults Service.

The preferred method of dialing is to use DTMF tones as this is faster than pulse (decadic) dialing and is readily available on almost all New Zealand telephone exchanges. Further, pulse dialing on your modem is not directly compatible with the New Zealand reverse dialing standard. If pulse dialing is required for any reason, your communications software must be set up to record numbers according to the following translation table:

| Number to be dialed | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number to programme into computer | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

**Note that for DTMF dialing, the numbers should be entered normally.**

**WARNING NOTICE: No"111" or other calls can be made from this device during a mains power failure.**

Not all telephones will respond to incoming ringing when connected to the extension socket.

**For continued compliance with the requirements of the Telepermit for this equipment the user is instructed to operate the modem within the following guidelines:**

**The user should configure the host communications software such that a delay of between 1 and 8 seconds is provided between when the equipment goes off-hook and when dialing commences.**

**The number of automatic redial attempts should be restricted to 10 for each manual initiation of a call.**

**The off-line interval between automatic redial attempts should be no less than 30 seconds.**

**The user should configure the host communications software such that incoming calls are answered after a delay of between 3 and 15 seconds.**

**Telecom Access Standards**
**Level 5, North Tower**
**68 Jervois Quay**

**Telecom Corporate Office**
**Telecom Networks House**
**WELLINGTON**

e modem has a REM of 1.0.

on of REM :

t for attachment to the Public Telephone network is assessed to determine its equivalence" number (REM) The REM relates to the performace of the apparatus sed in combination with other items of apparatus. The REM is a customer guide ng approximately the maximum number of items of apparatuS that should be ed simultaneously to the line.

ine the maximum number of items of apparatus that should be connected neously to an exclusive line, the total REM obtained by summing the REM values of the items of apparatus connected to the exclusive line should not exceed the m REM value of 4 .This value includes any BT provided instrument each of which ed to have a REN value of 1.0 unless otherwise marked.

m has a REN of 1.0 and care must be taken not to use it with other telephone ent that would result in a maximum figure of 4 REN being exceeded.

f the wide spread of ringing detector characteristics, a guarantee of successful n in an installation of mixed types of ringing detectors may not be given by

G

status of the ports on this modem is as follows:
erface port-TNV
rt on Modem-SELV

nly SELV ports should be connected to other SELV ports or TNV ports to other rts Interconnection of ports with different safety status may invalidate the l. If in doubt about making such a connection, advice should be sought from a nt engineer.



# WARNING TO INTERNAL CARD USERS

The user shhould ensure that the power drawn by the modem, together with the host and any auxiliary apparatus drawing power from the host is within the rating of the power supply

The modem power requirements are: -5V @ 300 mA

The BABT assessment symbol and (where applicable) the green circle approval symbol must be applied to the modem rather than the host, ideally so as to be visible when the modem is installed.

The user should be aware that it is the modem not the host that is approved

When the modem is supplied along with a host machine, the modem user instructions must also be supplied. Failure to do so will invalidate the modem approval

It must be remembered that when connected to the public telephone system, there is direct electrical contact between the two. Inside the modem there are barrier circuits that prevent electric shock to the user, or damage to the telephone network in the event of your equipment failing. When installing the modem, every care must be taken not to compromise these circuits.

The modem introduces a 1.6V voltage drop into the loop connection between the main apparatus and the PSTN at a current of 40mA. The user should ensure that the aggregate declared voltage drops of all the apparatus together with the voltage drop introduced at 40mA by any associated writing that is used to link the items of apparatus exceeds 2.0V. Only one modem is allowed to be connected between the main apparatus and the PSTN
Difficulties may occasionally be experienced when making calls to other apparatus connected to the PSTN via the modem. Such difficulties may include :-

i) difficulty in making calls
ii) problems in telephone conversation being experienced by both parties to the call.

Note that while operation of the modem may be possible initially, changes to or modernization of the network taking place in the normal course of events may result in
the apparatus being connected to a service with which it was not designed to be compatible.
Failure of the apparatus to work under these circumstances may not be the responsibility of the network operator;

Please consult the supplier or maintainer of the modem, not the network operator, if such difficulties are experienced.

INFORMATION TO THE USER

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device. Pursant 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.

This booklet is available from the US government Printing Office *washington, DC 20402, Stock NO. 004-000-00345-4.

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