

btModem

User's Manual

Revision 1.0

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Revision History

| Revision | Date | Changes |
|----------|------------|----------------------------|
| 1.0 | Dec.2,2005 | First Release / Kiwi Huang |
| | | |
| | | |

Related Documents or Files

- 1) BEM 001 Bluetooth Module data sheet.
- 2) SI3014 silicon DAA data sheet.
- 3) IP568x –DS-P02-010815 modem chip set data sheet
- 4) AT command sets..

Table of Contents

General Description

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General Description

The 3JTECH **btModem** is a highly integrated, low-cost, high performance, and low-power dissipation wireless modem. This module implements V.90 to achieve Internet connection rates up to 56Kbps, supporting existing V.34 data mode, Class 1 FAX mode. DTE terminal and provide reliable connection with connection rate ranging from 300bps up to 115200bps

Comply with Bluetooth specification V1.2

CSR Blue Core2 external signal chip Bluetooth System

Authentication is a mandatory feature of the dial-up networking and fax profile

Transmitter power meet Class 1 requirement

RF-Wireless Frequency 2400-2483.5 MHz

Fully 723K bps data rate speed

Support up to 7 ACL connection

RF output power -12 dBm--+10 dBm (class 1)

High receiving sensitivity (-88 dBm 0.1%BER)

System support Windows 98SE, Windows ME, Windows 2000, Windows XP

Application

Wireless modem.

Stand-alone modem

Internet Access.

Remote Access and control.

Specification

- . Data mode capabilities:
 - . ITU-T V.90
 - . ITU-T V.34
 - . ITU-T V.32bis, V.32
 - . ITU-T V.22bis, V.22
 - . ITU-T V.23, V.21
 - . Bell 212
 - . Bell 103
- . FAX mode capabilities:
 - . ITU-T V.17, V.29, V.27ter, and V.21 Ch 2
 - . TIA/EIA 578 class 1 FAX
 - . V.42 error correction (LAPM and MNP)
 - . V.42bis and MNP class 5 data compression
 - . World wide call progress tone detection
 - . TIA/EIA 602 standard for AT command set
 - . DTE speed up to 115200

Comply with Bluetooth specification V1.2

CSR Blue Core2 external signal chip Bluetooth System

Authentication is a mandatory feature of the dial-up networking and fax profile

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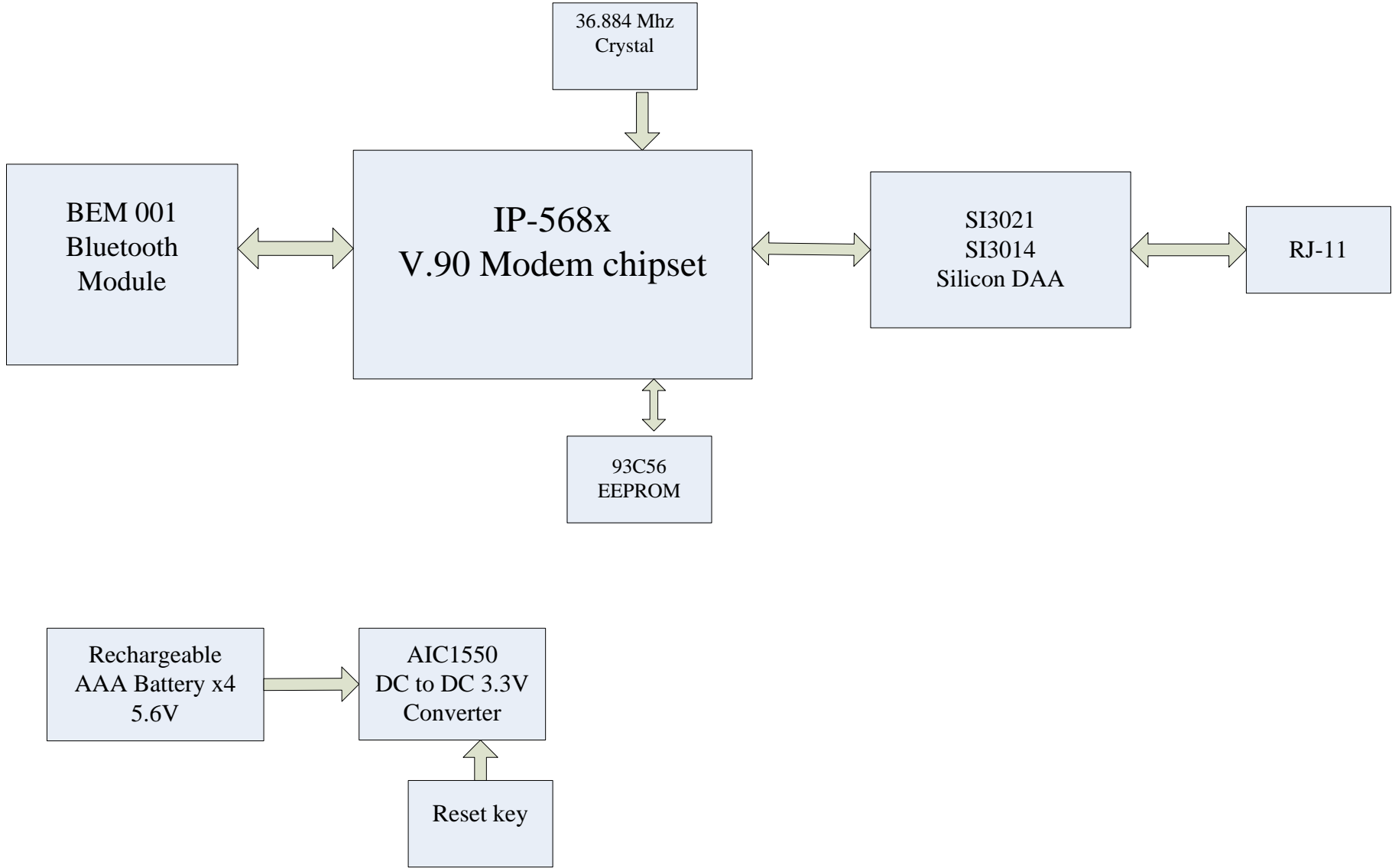
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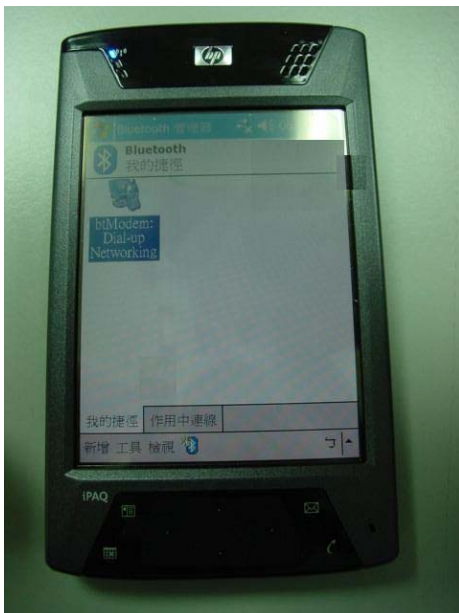
High receiving sensitivity (-88 dBm 0.1%BER)

btModem Block Diagram



Installation Guide for btModem (Pocker PC)

- 1) Please make sure your PDA and btModem are functional properly. Please keep the distance between the devices within 10 meters.
- 2) Please initiate your PDA Bluetooth function.
- 3) Setup btModem and PDA connection information, Please operate according to the following steps.:
 - A. Setup btModem for your PDA
 - i. Initiate Bluetooth manager function
 - ii. Tap the “Add Device” Button
 - iii. Select ”Search for Bluetooth Devices”
 - iv. PDA will automatically search for any Bluetooth device within the range, tap and select ”btModem”
 - v. Input btModem 4 digit PIN Code (Please type in lower cases)
 - vi. Select “Dial-Up-Network”
 - vii. Tap “finish” to complete setting.



B. How to setup dialup connection for your PDA

Dialup Setup can be done through PDA's Bluetooth manager or Dial-Up-Networking. Please operate according to the following steps :

- i. Tap "Start" button in Win CE
- ii. Tap "Settings"
- iii. Tap "Connection" Tab and select COnnections
- iv. Select "Add new modem connection" to setup your connection
- v. Please insert the desired connection name and select Bluetooth Dial-Up Modem for the modem section.
- vi. Input your ISP dial-up phone number and the user name/password
- vii. Enter "Advance" setting and change the connection speed to "57600" bps
- viii. Tapping "finish" to complete setting.

btModem

**User's Manual
AT Command Set**

Section 1. Data Mode Command

A/ Executes Last Command

When modem receives this command, modem executes the last command string entered. Do not conclude it by pressing "Enter".

A Answer Command

This command instructs the modem to go off-hook and answer an incoming call.

Bn Communication Standard Setting

This command determines ITU-T vs. Bell standard.

B0* Selects ITU-T V.22 mode when the modem is at 1200 bits/s. (Default)

B1 Selects Bell 212A when the modem is at 1200 bits/s.

Result Codes:

OK : n = 0, 1

ERROR : Otherwise

Dn Dial

This command instructs the modem to begin the dialing sequence. A dial string can be up to 40 characters long. Any digit or symbol (0-9, *, #, A, B, C, D) could be dialed as touch-tone digits. The following may be used as dial string modifiers:

P Pulse dialing.

T* Touch tone dialing (Default).

W Wait for second dial tone.

@ Wait for quiet answer. Wait for five seconds of silence after dialing the number.

! Hook flash.

, Pause during dialing.

; Return to command mode.

^ Enable data calling tone transmission.

S = n Dial a telephone number previously stored using the **&Zn = x** command (see the **&Zn = x** command for further information). The range of n is 0,1,2.

En Echo Command

ATEn command controls whether or not the characters entered from your computer keyboard are echoed back to your monitor while the modem is in command mode.

E0 Disables echo to the computer.

E1* Enables echo to the computer (Default).

Result Codes:

OK: n = 0, 1

ERROR: Otherwise

Hn Hook Control

This command instructs the modem to go on-hook to disconnect a call, or off-hook to make the phone line busy.

H0* Modem goes on-hook (Default).

H1 Modem goes off-hook.

Result Codes:

OK: n = 0, 1

ERROR: Otherwise

In Request Identification Information

This command displays specific product information about the modem.

I0 Returns product ID code.

I1 Display Firmware version and checksum on the DTE.

I2 Customer Used.

I3 Returns fix ID information for application software identification. "TP560 Data/Fax/Voice 56K Modem"

I4 Returns firmware version for data pump.

I5 Returns country code.

I6 Blacklist times

I7 Display Firmware version and date on the DTE

I8 Display Firmware version and date for data pump

I9 Return Software Speakerphone or Hardware speakerphone

I10 Checksum

Result Codes:

n = 0, 1, 2, 3, 4, 5,6,7,8,9,10

ERROR: Otherwise

Ln Monitor Speaker Volume

This command sets speaker volume to low, medium, or high.

L0 Select low volume.

L1 Select low volume.

L2* Select medium volume. (Default)

L3 Select high volume.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

Mn Monitor Speaker Mode

This command turns the speaker on or off.

M0 The speaker is off.

M1* The speaker is on until the modem detects the carrier signal. (Default)

M2 The speaker is always on when modem is off-hook.

M3 The speaker is on until the carrier is detected, except while dialing.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

Nn Modulation Selection

This command controls whether or not the local modem performs a negotiated handshake at connection time with the remote modem when the communication speed of the two modems is different.

N0 When originating or answering, this is for handshake only at the communication standard specified by **AT*In**.

N1* During handshake, Highest speed is specified by **AT*In**. Depend on line quality fallback to a lower speed may occur. (Default)

Result Codes:

OK n = 0, 1

ERROR Otherwise

On Return Online to Data Mode

OO* Exit online command mode and return to data mode (see AT Escape Sequence, +++AT). (Default)

O1 This command issues a retrain before returning to online data mode.

O2 This command issues a rate re-negotiation before returning to online data mode.

Result Codes:

OK n = 0, 1, 2

ERROR Otherwise

P Select Pulse Dialing

This command configures the modem for pulse (non-touch-tone) dialing.

Result Codes: OK

Qn Result Code Control

Result codes are informational messages sent from the modem and displayed on your monitor.

Q0* Enables modem to send result codes to the DTE. (Default)

Q1 Disables modem from sending result codes.

Result Codes:

OK n = 0, 1

ERROR Otherwise

T Select Tone Dialing

This command instructs the modem to send DTMF tones while dialing.

Result Codes: OK

Vn DCE Response Format

This command controls whether result codes are displayed as words or their numeric equivalents.

V0 Displays result codes as numeric.

V1* Displays result codes as text. (Default)

Result Codes:

OK n = 0, 1

ERROR Otherwise

Wn Result Code Option

W0 Display "CONNECT DCE speed" without V42/MNP extended.

W1 Display "CONNECT DTE speed" without V42/MNP extended.

W2* Display "CONNECT DCE speed" with V42/MNP extended. (Default)

W3 Display "CONNECT DTE speed" with V42/MNP extended.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

Xn Result Code Selection and Call Progress detection

This command enables tone detection options during dialing procedure. As these functions are chosen, the modem chip set result codes are also affected. Therefore, this command is frequently used to control the modem chip set responses and dial tone detection.

X0/X Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, and NO ANSWER result codes. Blind dialing is enabled/disabled by country parameters. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported. If dial tone detection is enforced or selected and dial tone is not detected, NO CARRIER will be reported instead of NO DIAL TONE. (Default)

X1 Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER, and CONNECT XXXX(XXXX=rate). Blind dialing is enabled/disabled by country parameters. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported instead of BUSY. If dial tone detection is enforced or selected and dial tone is not detected, NO CARRIER will be reported instead of NO DIAL TONE.

X2 Disables monitoring of busy tones unless forced otherwise by country requirements; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIAL TONE, NO ANSWER, and CONNECT XXXX. If busy tone detection is enforced and busy tone is detected, NO CARRIER will be reported instead of BUSY.

X3 Enables monitoring of busy tones; send only OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER, and CONNECT XXXX. Blind dialing is enabled/disabled by country parameters. If dial tone detection is enforced and dial tone is not detected, NO CARRIER will be reported.

X4* Enables monitoring of busy tones; send all messages. (Default)

Result Codes:

OK n = 0, 1, 2, 3, 4

ERROR Otherwise

Zn Recall Stored Profile

This command instructs the modem chip set to go on-hook and restore the profile saved by the last &W command.

Z0* Reset modem and retrieve active configuration profile from stored profile 0. (Default)

Z1 Reset modem and retrieve active configuration profile from stored profile 1.

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Cn Data Carrier Detect (DCD) Control

Data carrier detect is a signal from the modem to your computer indicating that the carrier signal is being received from a remote modem. DCD normally turns off when the modem no longer detects the carrier signal.

&C0 The state of the carrier from the remote modem is ignored. DCD circuit is always on.

&C1* DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected. (Default)

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Dn DTR Control (Data Terminal Ready)

This command interprets how the modem responds to the state of the DTR signal and changes to the DTR signal.

&D0 Ignore.

&D1 If the DTR signal is not detected while in online data mode, the modem enters command mode, issues OK result code, and remains connected.

&D2* If the DTR signal is not detected while in online data mode, the modem disconnects. (Default)

&D3 Monitor DTR signal when an on-to-off transition occurs, the modem performs a soft reset as if the ATZ command was received.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

&F Load Factory Settings

This command loads the configuration stored and programmed at the factory. This operation replaces all of the command options and the S-register settings in the active configuration with factory values.

&Gn V.22bis Guard Tone Control

This command determines guard tone frequency and is only used in V.22 and V.22bis mode. This option is not used in North America and is for international use only.

&G0* Guard tone disabled. (Default)

&G1 Sets guard tone to 550 Hz.

&G2 Sets guard tone to 1800 Hz.

Result Codes:

OK n = 0, 1, 2

ERROR Otherwise

&Kn Local Flow Control Selection

&K0 Disable flow control.

&K1 Reserved.

&K2 Reserved.

&K3* Enable RTS/CTS flow control. (Default)

&K4 Enable XON/XOFF flow control.

&K5 Enable Transparent XON/XOFF flow control.

Result Codes:

OK n = 0, 1, 2, 3, 4, 5

ERROR Otherwise

&Pn Pulse Dial Make-to-Break Ratio Selection

&P0 39/61 make-to-break ratio (10 pps).

&P1 33/67 make-to-break ratio (10 pps).

&P2 39/61 make-to-break ratio (20 pps)

&P3 33/67 make-to-break ratio (20 pps)

(The number of "n" is decided by your PTT requirement.)

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

&Rn Clear To Send Signal Select

&R0 Modem turns on the Clear To Send signal when it detects the Request To Send (RTS) signal.

&R1* Modem turns on Clear To Send signal. (Default)

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Sn Data Set Ready (DSR) Option

This command selects DSR action.

&S0* DSR always ON. (Default)

&S1 DSR comes on when establishing a connection and goes off when the connection ends.

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Un Protocol Selection

&U0* Select V.PCM (Default)

&U1 Select V.34Bis/V.34

&U2 Select V.32Bis/V.22Bis

&U3 Select Bell 103 300bps

&U4 Select V21 300bps

&U5 Select V23

Result Codes:

OK n = 0, 1, 1, 2, 3, 4, 5

ERROR Otherwise

&V View Active Configuration and Stored Profile

This command is used to display the active profiles.

Result Codes: OK

&Wn Store Current Configuration

This command stores certain command options and S-register values into the modem nonvolatile memory. The ATZ command or a power up reset of the modem restores this profile.

&W0* Stores active configuration profile in configuration profile 0. (Default)

&W1 Stores active configuration profile in configuration profile 1.

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Yn Select Stored Profile for Power On or Reset

This command does not change the behavior of the modem but is included for compatibility with applications that issue the &Y0 command

&Y0* Select stored profile 0. (Default)

&Y1 Select stored profile 1.

Result Codes:

OK n = 0,1

ERROR Otherwise

&Zn = x Store Telephone Number

This command is used to store up to three dialing strings in the modem nonvolatile memory for later dialing. The format for the command is &Zn = stored number where n is the location 0? to which the number should be written. The dial string may contain up to 31 characters. The ATDS = n command dials using the string stored in location n.

Result Codes:

OK n = 0, 1, 2

ERROR Otherwise

***In Connect Speed Selection**

*I0 Selects connect speed 1200bps

*I1 Selects connect speed 2400bps

*I2 Selects connect speed 4800bps

*I3 selects connect speed 7200bps

*I4 Selects connect speed 9600bps

*I5 Selects connect speed 12000bps

*I6 Selects connect speed 14400bps

*I7 Selects connect speed 16800bps

*I8 Selects connect speed 19200bps

*I9 Selects connect speed 21600bps

*I10 Selects connect speed 24000bps

*I11 Selects connect speed 26400bps

*I12 Selects connect speed 28800bps

*I13 Selects connect speed 31200bps

I14 Selects connect speed 33600bps (Default)

select V.pcm

*I1 Selects connect speed 28000bps

*I2 Selects connect speed 29333bps

*I3 selects connect speed 30666bps

*I4 Selects connect speed 32000bps

*I5 Selects connect speed 33333bps

*I6 Selects connect speed 34666bps

*I7 Selects connect speed 36000bps

*I8 Selects connect speed 37333bps

*I9 Selects connect speed 38666bps

*I10 Selects connect speed 40000bps

*I11 Selects connect speed 41333bps

*I12 Selects connect speed 42666bps

*I13 Selects connect speed 44000bps

*I14 Selects connect speed 45333bps

*I15 Selects connect speed 46666bps

*I16 Selects connect speed 48000bps

*I17 Selects connect speed 49333bps

*I18 Selects connect speed 50666bps

*I19 Selects connect speed 52000bps

*I20 Selects connect speed 53333bps

*I21 Selects connect speed 54666bps

I22 Selects connect speed 56000bps (Default)

Result Codes:

OK

ERROR Otherwise

***Gn User Abort Selection**

G0 Enables key abort feature (Default)

*G1 Disables key abort feature

Result Codes:

OK n = 0,1

ERROR Otherwise

***Hn Auto Retrain Selection**

*H0 Disables auto retrain

H1 Enables auto retrain (Default)

Result Codes:

OK n = 0,1

ERROR Otherwise

*NCnn Country select

This command provides customers chose the country for phone line regulation.

*NC40 Australia
*NC1 Austria
*NC2 Belgium
*NC3 Denmark
*NC4 Finland
*NC5 France
*NC6 Germany
*NC17 Greece
*NC10 Netherlands
*NC28 Iceland
*NC7 Ireland
*NC8 Italy
*NC29 Liechtenstein
*NC9 Luxembourg
*NC43 Japan
*NC26 Namibia
*NC11 Norway
*NC12 Portugal
*NC27 South Africa
*NC13 Spain
*NC14 Sweden
*NC15 Switzerland
*NC16 UK
*NC18 India
*NC19 Czech Republic
*NC20 Taiwan
*NC24 Poland
*NC25 Russia
*NC22 United States
*NC36 CTR 21 600 ohm
*NC37 CTR 21 Complex Impedance

Result Codes:

OK
ERROR Otherwise

*Tn Trellis Coding Selection

*T0 Disables Trellis coding
T1 Enables Trellis coding (Default)

Result Codes:

OK n = 0,1
ERROR Otherwise

*On Transmission Level Selection

O0 Selects output level -11dBm (Default)
*O1 Selects output level -12dBm
*O2 Selects output level -13dBm
*O3 Selects output level -14dBm
*O4 Selects output level -15dBm
*O5 Selects output level -16dBm
*O6 Selects output level -17dBm
*O7 Selects output level -18dBm
*O8 Selects output level -19dBm
*O9 Selects output level -20dBm
*O10 Selects output level -21dBm
*O11 Selects output level -22dBm
*O12 Selects output level -23dBm
*O13 Selects output level -24dBm
*O14 Selects output level -25dBm
*O15 Selects output level -26dBm

Result Codes:

OK n = 0 - 15
ERROR Otherwise

\Nn Error Control Mode Selection

This command determines the type of error control used by the modem when sending or receiving data.

\N0 Normal mode.
\N1 Direct mode.
\N2 MNP or disconnect mode. The modem attempts to connect using MNP 2-4 error control procedures. If this fails, the modem disconnects. This is also known as MNP reliable mode.
\N3 MNP, or buffer.
The modem attempts to connect using MNP 2-4 error control procedures. If this fails, the modem will connect in Normal modem
\N4 V.42 without ODP & ADP phase detection, MNP or buffer.
\N5* V.42 with ODP & ADP phase detection, MNP, or buffer (default).
The modem attempts to connect in V.42 error control mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem connects in buffer mode and continues operation. This is also known as V.42/ MNP auto reliable mode.
\N6 V.42 without ODP & ADP phase detection or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the call will be disconnected.
\N7 V.42 with ODP & ADP phase detection or disconnect.

Result Codes:

OK n = 0, 1, 2, 3, 4, 5, 6,7
ERROR Otherwise

\Vn Protocol Result Code

\V0* Disable protocol result code appended to DCE speed. (Default)
\V1 Enable protocol result code appended to DCE speed.

Result Codes:

OK n = 0, 1
ERROR Otherwise

%Cn Data Compression Control

This command determines the operation of V.42bis and MNP class 5 data compression. Online changes do not take effect until a disconnection occurs first.

%C0 V.42bis/ MNP 5 disabled. No data compression.
%C1* V.42bis/ MNP 5 enabled. Data compression enabled (Default).

Result Codes:

OK n = 0, 1
ERROR Otherwise

%Dn Blacklisting Control

%D0 Disable blacklisting.
%D1* Enable blacklisting. (Default)

Result Codes:

OK n = 0, 1
ERROR Otherwise

Section 2. Result Code

| Long Form | Short Form | n value in ATXn | | | | |
|---------------------|------------|-----------------|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 |
| OK | 0 | x | x | x | x | x |
| CONNECT | 1 | x | x | x | x | x |
| RING | 2 | x | x | x | x | x |
| NO CARRIER | 3 | x | x | x | x | x |
| ERROR | 4 | x | x | x | x | x |
| CONNECT 1200 | 5 | x | x | x | x | |
| NO DIALTONE | 6 | | x | x | | |
| BUSY | 7 | | | x | x | |
| NO ANSWER | 8 | | | | x | x |
| CONNECT 300 | 9 | x | x | x | x | |
| CONNECT 2400 | 10 | x | x | x | x | |
| CONNECT 4800 | 11 | x | x | x | x | |
| CONNECT 9600 | 12 | x | x | x | x | |
| CONNECT 7200 | 13 | x | x | x | x | |
| CONNECT 12000 | 14 | x | x | x | x | |
| CONNECT 14400 | 20 | x | x | x | x | |
| CONNECT 19200 | 21 | x | x | x | x | |
| CONNECT 38400 | 22 | x | x | x | x | |
| CONNECT 57600 | 23 | x | x | x | x | |
| CONNECT 115200 | 24 | x | x | x | x | |
| CONNECT 1200TX/75RX | 25 | x | x | x | x | |
| CONNECT 75TX/1200RX | 26 | x | x | x | x | |
| CONNECT BELL 300 | 28 | x | x | x | x | |
| CONNECT V21 | 29 | x | x | x | x | |

(Display DCE speeds by ATW0 and ATW2)

| | | | | | |
|---------------|----|---|---|---|---|
| CONNECT 16800 | 15 | x | x | x | x |
| CONNECT 19200 | 16 | x | x | x | x |
| CONNECT 21600 | 17 | x | x | x | x |
| CONNECT 24000 | 21 | x | x | x | x |
| CONNECT 26400 | 30 | x | x | x | x |
| CONNECT 28800 | 31 | x | x | x | x |
| CONNECT 31200 | 32 | x | x | x | x |
| CONNECT 33600 | 33 | x | x | x | x |

(V.90 mode)

| | | | | | |
|---------------|----|---|---|---|---|
| CONNECT 28000 | 34 | x | x | x | x |
| CONNECT 29333 | 35 | x | x | x | x |
| CONNECT 30666 | 36 | x | x | x | x |
| CONNECT 32000 | 37 | x | x | x | x |
| CONNECT 33333 | 38 | x | x | x | x |
| CONNECT 34666 | 39 | x | x | x | x |
| CONNECT 36000 | 40 | x | x | x | x |
| CONNECT 37333 | 41 | x | x | x | x |
| CONNECT 38666 | 42 | x | x | x | x |
| CONNECT 40000 | 43 | x | x | x | x |
| CONNECT 41333 | 44 | x | x | x | x |
| CONNECT 42666 | 45 | x | x | x | x |
| CONNECT 44000 | 46 | x | x | x | x |
| CONNECT 45333 | 47 | x | x | x | x |
| CONNECT 46666 | 48 | x | x | x | x |
| CONNECT 48000 | 49 | x | x | x | x |
| CONNECT 49333 | 50 | x | x | x | x |
| CONNECT 50666 | 51 | x | x | x | x |
| CONNECT 52000 | 52 | x | x | x | x |
| CONNECT 53333 | 53 | x | x | x | x |
| CONNECT 54666 | 54 | x | x | x | x |
| CONNECT 56000 | 55 | x | x | x | x |

Section 3. S Registers Definitions

S registers generally affect how the AT commands perform. Contents of the registers can be displayed or modified when the modem is in command mode.

To display the value of an S register: TYPE: ATSn?, where n is the register number.

PRESS: Enter To modify the value of an S register:

TYPE: ATSn = r where n is the register number, and r is the new register value.

PRESS: Enter

S0 Auto Answer Ring Number

This register determines the number of rings the modem will count before automatically answering a call. 0 (zero) is that asks modem don't do automatically answer at all. When disabled, the modem can only answer with an ATA command.

Range: 0-255

Default: 0

Units: rings

S1 Ring Counter

This register, ring counter, is read only. The value of S1 is incremented with each ring. If no rings occur over a 6 second interval, this register is cleared.

Range: 0-255

Default: 0

Units: rings

S2 AT Escape Character (User Defined)

This register determines the ASCII valued used for an escape sequence. The default is the "+" character. The escape sequence allows the modem to exit data mode and enter command mode. Values greater than 127 disable the escape sequence.

Range: 0-255

Default: 43

Units: ASCII

S3 Command Line Termination Character (User Defined)

This register determines the ASCII values as the carriage return character. This character is used to end command lines and result codes.

Range: 0-127, ASCII decimal

Default: 13 (carriage return)

Units: ASCII

S4 Response Formatting Character (User Defined)

This register determines the ASCII value used as the line feed character. The modem uses a line feed character in command mode when it responds to the computer.

Range: 0-127, ASCII decimal

Default: 10 (line feed)

Units: ASCII

S5 Command Line Editing Character (User Defined)

This register sets the character recognized as a backspace and pertains to asynchronous only.

Range: 0-127, ASCII decimal

Default: 8 (backspace)

Units: ASCII

S6 Wait Before Dialing

This register sets the length of time, in seconds, that the modem must wait (pause) after going off-hook before dialing the first digit. The modem always pauses for a minimum of two seconds, even if the value of S6 is less than two seconds. Waiting for dial tone call progress features (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some ATX options according to country restrictions.

Range: 3-7
Default: 6
Units: seconds

S7 Connection Completion Timeout

This register sets the time, in seconds, that the modem must wait before hanging up because carrier is not detected. The timer is started when the modem finishes dialing (originate), or goes off-hook (answer). In originate mode, the timer is reset upon detection of an answer tone if allowed by country restriction. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

Range: 1-255
Default: 60
Units: seconds

S8 Comma Dial Modifier Time

This register sets the time, in seconds, that the modem must pause when it encounters a comma (,) in the dial command string.

Range: 1-255
Default: 2
Units: seconds

S9 Carrier Detect Response Time

Register S9 sets the time the remote modem's carrier signal must be present for the local modem to recognize it. This feature ensures that your modem does not mistake a busy signal, ring, or voice for the carrier signal. The value of this register is in tenths of a second. The default value is 600 ms, although you can change it from 1 to 255. For example, entering a value 13 means that the remote modem's carrier signal must be present for 1.3 seconds for the local modem to recognize it. Setting this value higher increases the chances the modem will not mistakenly identify the carrier signal.

Range: 1-255
Default: 6
Units: 0.1 seconds

S10 Automatic Disconnect Delay after Carrier Loss

This register sets the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier loss without causing the local modem to disconnect. The actual interval the modem waits before disconnecting is the value in register S10.

Range: 1-255
Default: 14
Units: 0.1 seconds

S11 DTMF Dialing Speed

This register determines the dialing speed which is prefixed for each country.

Range: 50-255
Default: 95
Units: 0.001 seconds

S12 Escape Guard Time

This register sets the value (in 20 ms increments) for the required pause after the escape sequence (default 1 s).

Range: 0-255
Default: 50
Units: 0.02 seconds

S13 Pulse Dialing Control

This register determines pulse dialing is disabled or enabled.

ATS13=0 Disable Pulse Dialing
ATS13=1 Enable Pulse Dialing

Range: 0-1

S14 Bit-mapped Register

Bit-mapped register S14 lets you control modem echo, responses, dialing method, and the original or answer mode.

Bit Function

- 0=0 Do not echo command (E0)
- 1 Echo command (E1) – default
- 1 Reserved
- 2 Mapping to ATQn
- 3=0 Numeric responses (V0)
- 1 Verbose (Verbal) Responses (V1) – default
- 4,5=Mapping to AT&P
- 6=0 Use touch-tone dialing method (T) – default
- 1 Use pulse dialing method (P)
- 7=0 Answer incoming calls (A)
- 1 Originate calls (D) – default

S21 Bit-mapped Register

Bit-mapped register S21 lets you control certain data communication control signals.

Bit Function

- 0,1= x Undefined
- 2= Mapping to AT&R
- 3,4=0 Modem ignores the DTR signal (&D0)
- 1 Modem enters command mode after ON-to-OFF DTR transition (&D1)
- 2 Modem hangs up after ON-to-OFF DTR transition (&D2) – default
- 3 Modem resets after ON-to-OFF DTR transition (&D3)
- 5=0 CD signal always on (&C0)
- 1 CD signal on when a remote carrier signal is present (&C1) – default
- 6=0 AT&S=0
- 1 AT&S=1

S22 Bit mapped Register

Bit-mapped register S22 lets you control internal speaker and the modem responses.

| Bit | Function |
|---------|---|
| 0,1= 0 | Speaker volume off (L0) |
| 1 | Low speaker volume (L1) |
| 2 | Medium speaker volume (L2) – default |
| 3 | Loud speaker volume (L3) |
| 2,3= 0 | Speaker off (M0) |
| 1 | Speaker on until carrier detected (M1) – default |
| 2 | Speaker always on (M2) |
| 3 | Speaker on until carrier detected but off during dialing (M3) |
| 4,5,6=0 | Hayes Smart modem compatibility (X0) |
| 1 | Include CONNECT XXX responses (X1) |
| 2 | Same as 4 plus dial tone detection (X2) |
| 3 | Same as 4 plus BUSY response and blind dialing (X3) |
| 4 | Same as 6 plus dial tone detection (X4) – default |
| 7 =0 | Undefined |

S23 Bit-mapped Register

| Bit | Function |
|------------|-------------------------|
| 0,1,2,3= 0 | 0-300bps DTE data rate |
| 1 | 1200bps DTE data rate |
| 2 | 2400bps DTE data rate |
| 3 | 4800bps DTE data rate |
| 4 | 9600bps DTE data rate |
| 5 | 14400bps DTE data rate |
| 6 | 19200bps DTE data rate |
| 7 | 34800bps DTE data rate |
| 8 | 57600bps DTE data rate |
| 9 | 115200bps DTE data rate |
| 4,5= 0 | Use even parity |
| 1 | Use none parity |
| 2 | Use odd parity |
| 3 | Use mark parity |
| 6,7= 0 | Mapping to AT&G |

S25 Data Terminal Ready Delay

When Modem is on-line, it will ignore a Data Terminal Ready signal lasting less than the value of this register. In this mode, the values for this register are 0 to 255 in hundredths of a second, and the default value is 0.05 seconds. If you will be entering synchronous mode after dialing asynchronously, this register determines how long the modem waits before looking for the Data Terminal Ready signal. This lets you detach the asynchronous terminal and connect a synchronous terminal while remaining in the Data Mode. The default value is 5.
Range: 0-255
Default: 5
Units: 0.01 seconds

S26 Request To Send-to-Clear To Send Delay

This register affects synchronous operation only and applies only when you are using the &R0 command. This register determines how long the modem waits to turn on the Clear To Send signal after a Request To Send OFF-to-ON transition in 10 ms increment. The default value is 1.
Range: 0-255
Default: 1
Units: 0.01 seconds

S29

| Bit | Value | Function |
|-----|-------|-----------------|
| 0-4 | | Mapping to AT*I |
| 5-7 | | Mapping to AT&U |

S30 Inactivity Timer

S30 specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. This function is only applicable to buffer mode.
Range: 0-255
Default: 0 (Disable)
Units: minutes

S45 Timer to Control Sleep Mode

This command displays the number of seconds of inactivity (no characters sent from the DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of zero prevents standby mode.

Note: If a number between 1 and 4 is entered for this register, it will set the value to 5, and the inactivity before standby will be 5 s. This is done for compatibility with previous products which allowed time-outs down to 1 s.
Range: 0, 5-255
Default: 10

S95

| Bit | Value | Function |
|-----|-------|-----------------|
| 0,1 | | Mapping to ATWn |
| 2 | | Mapping to ATV |
| 3 | | Mapping to ATN |
| 4-7 | | Mapping to AT*O |

S96 Local Phone Status

This register tells the status of the Local Phone. It is read only.
0 = local phone on-hook
1 = local phone off-hook

S97

| Bit | Value | Function |
|-----|-------|------------------|
| 0-2 | | Mapping to ATNn |
| 7 | | Mapping to AT%Cn |

S98

| Bit | Value | Function |
|-----|-------|-----------------|
| 0,1 | | Mapping to AT*H |
| 2 | | Mapping to AT*G |
| 3 | | Mapping to AT*T |
| 4-6 | | Mapping to AT&K |

S99 Energy detection threshold

This register can use in Call Progress Mode (CPM) mode, for dial tone detection threshold. This register determines the detection threshold for Call Progress (CPM) tones. The default value is 16.

Range : 0-255

Section 4. Class 1 FAX Commands

The modem chip set supports FAX commands conforming to EIA standard 578. These commands are given here with short descriptions; complete explanations are given in the standard, available from the Electronic Industry Association.

FAX Command Set Summary

| | |
|-------------------------|-------------------------------------|
| +FCLASS? | Service class indication |
| +FCLASS = ? | Service class capabilities |
| +FCLASS = n | Service class selection (n=0,1,8) |
| +FTM = <m> | Transmit FAX data |
| +FRM = <m> | Receive FAX data |
| +FTH = <m> | Transmit HDLC data |
| +FRH = <m> | Receive HDLC data |
| +FTM = ? | Check transmit FAX modulation |
| +FRM = ? | Check receive FAX modulation |
| +FTH = ? | Check transmit HDLC data modulation |
| +FRH = ? | Check receive HDLC data modulation |
| +FMI = ? | Check manufacturer identification |
| +FMM = ? | Check product identification |
| +FMR = ? | Check version/revision information |
| +FLO = ? | Select Flow Control specified |
| +FPR = ? | Select Serial Port Rate |

+FCLASS? Service Class Indication

This command causes the modem to display the current setting. The modem can operate either as a class 0 data modem or a class 1 FAX modem.

Responses: 0 :data mode
1 if in FAX class 1
8 if in voice mode

+FCLASS = ? Service Class Capabilities

This command causes the modem to display the classes it supports.

Typical responses:
+FCLASS = ? 0, 1, 8

+FCLASS = n Service Class Selection

This command sets the modem for class n operation, where n is either a 0,1 or 8.

Parameters: 0, 1, 8
Default: 0

Command options:

+FCLASS = 0 Select data mode.
+FCLASS = 1 Select facsimile class 1.
+FCLASS = 8 Select voice mode.

+FTM = <m> Transmit FAX Data

This command causes the modem to transmit data at the modulation specified by <m>. The following table shows the values you can enter for this command and the meaning of those values.

| | |
|-------------------|--------------------------|
| +FTM = 24 | V.27ter 2400 |
| +FTM = 48 | V.27ter 4800 |
| +FTM = 72 | V.29 7200 |
| +FTM = 96 | V.29 9600 |
| +FTM = 73 | V.17 7200 |
| +FTM = 74 | V.17 (short train) 7200 |
| +FTM = 97 | V.17 9600 |
| +FTM = 98 | V.17 (short train) 9600 |
| +FTM = 121 | V.17 12000 |
| +FTM = 122 | V.17 (short train) 12000 |
| +FTM = 145 | V.17 14400 |
| +FTM = 146 | V.17 (short train) 14400 |

+FRM = <m> Receive FAX Data

This command causes the modem to receive data at the modulation specified by <m>.

| | |
|-------------------|--------------------------|
| +FRM = 24 | V.27ter 2400 |
| +FRM = 48 | V.27ter 4800 |
| +FRM = 72 | V.29 7200 |
| +FRM = 96 | V.29 9600 |
| +FRM = 73 | V.17 7200 |
| +FRM = 74 | V.17 (short train) 7200 |
| +FRM = 97 | V.17 9600 |
| +FRM = 98 | V.17 (short train) 9600 |
| +FRM = 121 | V.17 12000 |
| +FRM = 122 | V.17 (short train) 12000 |
| +FRM = 145 | V.17 14400 |
| +FRM = 146 | V.17 (short train) 14400 |

+FTH = <m> Transmit HDLC Data

This command causes the modem to transmit data framed in the HDLC protocol at the modulation specified by <m>.

+FTH = 3 V.21 Channel2 300

+FRH = <m> Receive HDLC Data

This command causes the modem to receive data framed in the HDLC protocol at the modulation specified by <m>.

+FRH = 3 V.21 Channel2 300

+FLO = <V> Flow Control Select

+FLO=0 Xon/Xoff and RTS/CTS flow control Turned off
+FLO=1 Xon/Xoff flow control
+FLO=2* RTS/CTS flow control

+FPR = <V> Serial Port Rate

Please refer AT+VPR command

Section 5. Voice Commands

| | |
|-----------------------------|---|
| +VIP | Initial voice parameter |
| +VCID=<pmode> | Caller ID pmode=0:Disable Caller ID pmode=1: Enable ,formatted caller report pmode=2:Enable ,unformatted caller report |
| +VCID? | Report current parameter |
| +VCID=? | Queries the range that DCE support |
| +VDR | Enable the distinctive ring feature |
| +VDR? | Report current parameter |
| +VDR=? | Queries the range that DCE support |
| +VGT | Setup playback gain |
| +VGT? | Report current parameter |
| +VGT=? | Queries the range that DCE support |
| +VGR | Setup record gain |
| +VGR? | Report current parameter |
| +VGR=? | Queries the range that DCE support |
| +FMI? | Report manufacturer ID |
| +FMM? | Report product information |
| +FMR? | Report product revision |
| +VIT | Enable inactive timer |
| +VIT? | Report current parameter |
| +VIT=? | Queries the range that DCE support |
| +VTD | Set the default duration for DTMF/tone generation in 10ms increments |
| +VTD? | Report current parameter |
| +VTD=? | Queries the range that DCE support |
| +VSD=<sds,sdi> | |

sds=128 Normal level of sensitivity(-40dbm)
sds>= 128 More aggressive ;ex. sds=129
is -39dbm
sds<= 128 Less aggressive :ex sds=127
is -40dbm
sdi :Specify the amount of time the modem will
report silence to DTE
+VSD? Report current parameter
+VSD=? Queries the range that DCE support
+VTS DTMF and tone generation
+VTS=? Queries the range that DCE support
ex1: AT+VTS=1 play DTMF 1 with a duration by the
+VTD command
ex2: AT+VTS=2 play DTMF 2 with a duration by the
+VTD command
ex3: AT+VTS=[1000,1300,50] play tone pair 1000Hz
and 1300hz with a duration of 50ms
ex4: AT+VTS={*,6} play DTMF * with a duration of
60ms
ex5: AT+VTS=9 play DTMF 9 with a duration by the
+VTD command
+VTX Enter voice playback mode
+VRX Enter voice record mode
+VSM=<cml>,<vsr>
cml=128 , select linear 8bit PCM
vsr =xx, Sample rate is always 8000
+VSM? Report current parameter
+VSM=? Queries the range that DCE support
+VPR=<rate> DTE/DCE rate will be equal 2400*rate , but
auto-baud if rate=0
+VPR? Report current parameter
+VPR=? Queries the range that DCE support
+VLS=<pmode>
pmode=0: DCE on-hook, local phone connected
to Telco.
pmode=1: DCE off-hook, DCE connected to Telco
pmode=2: DCE off-hook, local phone connected
to DCE
pmode=3: DCE off-hook, local phone connected
to Telco, DCE to local phone
pmode=4: Speaker connected to DCE,DCE
on-hook(playback message)
pmode=5: Speaker connected to DEC, DCE
off-hook(call screening)
pmode=6: Microphone connected to DCE, DCE
on-hook (Record greeting)
pmode=7: Microphone and speaker connected ,
DCE off-hook (speakerphone)

Section 6. AT%TTn Commands

%tt0=0 erase %TT command

%tt2=A,B,C,D Tx v34 signal parameter

A: baudrate (parameter range:0-5)

B: data rate (parameter range:1-9 if a=0)

(parameter range:2-11 if a=1)

(parameter range:2-11 if a=2)

(parameter range:2-12 if a=3)

(parameter range:2-13 if a=4)

(parameter range:2-14 if a=5)

C: Min/Exp (parameter range:0-1)

D: Preemphasis (parameter range:0-9)

example:

at%tt2=5,14,1,8

%tt3=0 : DTMF '0'

%tt3=1 : DTMF '1'

%tt3=2 : DTMF '2'

%tt3=3 : DTMF '3'

%tt3=4 : DTMF '4'

%tt3=5 : DTMF '5'

%tt3=6 : DTMF '6'

%tt3=7 : DTMF '7'

%tt3=8 : DTMF '8'

%tt3=9 : DTMF '9'

%tt3=10 : DTMF 'A'

%tt3=11 : DTMF 'B'

%tt3=12 : DTMF 'C'

%tt3=13 : DTMF 'D'

%tt3=14 : DTMF '*'

%tt3=15 : DTMF '#'

%tt3=16 : V32 9600

%tt3=17 : V32 14400

%tt3=18 : 2100HZ ANSWER TONE

%tt3=19 : 1300HZ CALLING TONE

%tt3=20 : 1100HZ CALLING TONE

%tt3=21 :

%tt3=22 : Silence

%tt4=0 : V21 Org tx mark

%tt4=1 : V21 Org tx space

%tt4=2 : V21 Ans tx mark

%tt4=3 : V21 Ans tx space

%tt4=4 : V23 Org tx mark

%tt4=5 : V23 Org tx space

%tt4=6 : V23 Ans tx mark

%tt4=7 : V23 Ans tx space

%tt4=8 : V22 org

%tt4=9 : V22bis org

%tt4=10 : V22 ans (tx guard tone if &g1 or &g2)

%tt4=11 : V22bis ans (tx guard tone if &g1 or &g2)

%tt5=0 : V27ter 2400

%tt5=1 : V27ter 4800

%tt5=2 : V29 7200

%tt5=3 : V29 9600

%tt5=4 : V17 7200 short train

%tt5=5 : V17 7200 long train

%tt5=6 : V17 9600 short train

%tt5=7 : V17 9600 long train

%tt5=8 : V17 12000 short train

%tt5=9 : V17 12000 long train

%tt5=10 : V17 14400 short train
%tt5=11 : V17 14400 long train

Federal Communication Commission Interference 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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.