

Industrial Modem

Designed for unattended sites

- Designed to survive harsh environmental conditions for unattended operation, such as remote monitoring.
- Dual Watchdog Timers which can restart the modem if the modem crashes, starts executing invalid code or has a power interruption.
- Fully customisable.
- A unique voice messaging system that can be used as a voice mail box or answering machine.
- Dial & Talk Alarm feature.
- Automatic Power Off when modem is not used.
- No internal batteries for non-volatile storage ensuring a long life.
- Small rugged packaging.

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Australian Customer Information

Austel (The Australian Telecommunications Authority) requires you to be aware of the following information and warnings:

Users may experience minor audio distortion when using this product. This distortion may be generated by the low bit rate for voice sampling.

Some of the modem default settings have been selected to comply with Austel technical specifications. If you intend to change any default settings you must comply with the following rules:

1. The modem must not answer an incoming call less than two seconds after the first ring signal. As a rule-of-thumb your modem should be set so it answers incoming calls after the second ring (ATS0=2).
2. If Busy signal detection is switched off, the modem must not attempt more than two automatic redials and must wait at least two seconds before redialling.
3. If Busy signal detection is switched on, the modem must not attempt more than nine automatic redials and must wait at least two seconds before redialling.
4. If, after redialling the maximum number of times, the modem is still unable to establish a connection you must wait 30 minutes before attempting to redial.
5. The use of Bell standard 103 and 212A is not permitted in Australia. Use of these modes will cause your modem to lose its permit status.

Changing the default values of the modem, in such a way as to cause your modem to operate in a non-compliant manner when connected to a telecommunications network operated by a carrier, is contrary to the Telecommunications Act 1991 and may result in penalties of \$12,000.

New Zealand Customer Information

New Zealand Telecom requires you to be aware of these important warnings:

This equipment may not necessarily provide for the effective hand-over of a call to or from a telephone connected to the same line.

The operation of this equipment on the same line as telephones or other equipment with audible warning devices or automatic ring detectors will give rise to bell tinkle or noise and may cause false tripping of the ring detector. Should such problems occur, the user is not to contact Telecom Faults Service.

The telephone associated with the authorised apparatus must be permitted for connection to the New Zealand public telephone network.

The transmit level from this device is set at a fixed level and because of this there may be circumstances where the device does not give its optimum performance. Before reporting such occurrences as faults, please check the line with a standard Telepermitted telephone, and do not report a fault unless the telephone performance is impaired.

If your modem ever suffers physical damage that causes its internal parts to become exposed, it should be disconnected from the phone line immediately. The modem must then be repaired before reconnection to the phone line is permissible.

Should it be necessary to physically move your modem, disconnect it from the phone line or earthing lead before disconnecting the power connection. When reconnecting your modem, reconnect the power or earthing lead before reconnecting it to the phone line.

Some parameters required for compliance with Telecom's PTC Specifications are dependent on the equipment connected to the RS 232 port. The connected equipment shall be set to operate within the following limits for compliance with Telecom Specifications:

1. Equipment connected to the RS 232 port shall be certified to meet the requirements of Reg. 18 of the New Zealand Wiring Regulations 1976.
2. When the user manually initiates a call, via equipment connected to the RS232 port, the equipment shall operate within the following restrictions:
 - a. Not more than 5 call attempts shall be made to the same number within a one hour period.
 - b. There shall be at least 60 seconds between call attempts.
 - c. Not more than a total of 10 call attempts shall be made to the same number for any single manual call initiation.
 - d. Automatic calls to different numbers shall be not less than 5 seconds apart.

FAILURE TO MEET THE ABOVE REQUIREMENTS MAY NEGATE THE USER RIGHTS UNDER THE TELECOM TERMS OF SERVICE.

When operating in V.22bis or V.22 mode over some older telephone exchanges, it may be necessary to issue the &G2 command.

Setting the S0 register (auto-answer) to S0 = 1 or to values greater than 5 will render this equipment non-compliant with the Telepermit requirements.

This equipment does not provide a guard tone with the V.22 and V.22bis answer modes. In some circumstances this could cause interference with the telephone network signalling systems, and could result in lost calls. Telecom will not accept responsibility should such problems occur. Such occurrences will be rare.

The preferred method is to use DTMF tones (ATDT...) as this is faster than pulse (decadic) dialling, and is available on most New Zealand telephone exchanges. Where DTMF is not available and decadic must be used, your communications software must be set up to record numbers according to the following translation table as the modem is not directly compatible with the New Zealand (10-N) Reverse dialling standard.

| Number to be dialled | Number to program into computer |
|----------------------|---------------------------------|
| 0 | 0 |
| 1 | 9 |
| 2 | 8 |
| 3 | 7 |
| 4 | 6 |
| 5 | 5 |
| 6 | 4 |
| 7 | 3 |
| 8 | 2 |
| 9 | 1 |

Note that where DTMF dialling is used, the numbers should be entered normally.

Introduction

This manual provides a brief introduction to the Industrial SmartModem and gives an overview of the features and commands available.

The IG6000 Industrial SmartModem has a SmartModem 336 core with additional features that make it suitable for industrial and unattended operation. Particular attention has been paid to ensuring that the modem restarts reliably in the event of power interruption or internal malfunction. The modem uses the latest generation Rockwell DSP which will enable new features to be soft-uploadable when they become available.

Modem Controls and Indicators

Links (Internal controls)

| | | |
|-------------|------|--------------------------------------|
| LK1 | 1 | Set factory defaults |
| | 2 | Normal |
| LK2 | 1 | Reserved |
| LK3 | 1 | Reserved |
| LK4 | 1 | Reserved |
| LK5 | | Reserved |
| LK6 | | Reserved |
| LK7 | | Reserved |
| LK8 | 1 | Power down disabled |
| | 2 | DTR wakeup enabled |
| | None | DTR wakeup disabled |
| LK9 | | Link connects RS232 shield to ground |
| PSTN | IN | PSTN |
| | OUT | Leased Line |

LEDS

DCD - Data Carrier Detect (Inner LED)

LED will glow when the modem detects a valid carrier signal from a remote modem.

PWR - Power (Outer LED)

LED will glow to indicate when the modem is turned on. LED will be off when the modem is in power down mode.

Modem Features

Power Down Feature

S119 can be set with the number of seconds of no activity before the modem shuts down. The modem will not shut down if DTR is asserted, if the modem is connected, any key on the keyboard is pressed or an alarm switch is on.

The modem will wake up if:

- DTR is raised
- there is a Ringing signal or
- an alarm switch is asserted.

S119 defaults to 0 (power down disabled).

The modem draws almost no power when powered down.

Dial and Talk Feature

This feature enables a modem to alert, by spoken word, that an alarm situation at a remote site needs attention. The modems can be configured to dial up to 10 preset numbers and speak a stored message when one of two external switches are closed.

These switches will connect to pins 12 and 7 (alarm 1) and pins 13 and 7 (alarm2) of the RS232 connector. An alarm condition is recognised when a short circuit is applied across either pair of pins, eg by use of a relay.

By default to modem will ring stored number 0 if either alarm switch is closed.

To set stored number 0 type:

`AT&Z0 = nnnnnnnnn` where nnnnnnnnn is the phone number.

You may store up to 10 numbers using &Z0 to &Z9.

The numbers to ring for each alarm can be specified by the AT#ALM command:

`AT#ALM1=1,4,8,3`

Means that if alarm switch 1 is pressed the modem should ring the stored numbers 1 then 4 then 8 then 3.

`AT#ALM2= 9`

Means that if alarm switch 2 is pressed dial stored number 9.

Voice Messaging System

This feature can be installed into an IG6000 by downloading a vocabulary file to the modem to enable it to respond to DTMF tones from a remote modem.

If this feature is enabled by using the #MEM command:

AT#MEM1 Modem will answer in voice mode after S110 rings if DTR is low
AT#MEM2 Modem will answer in voice mode after S110 rings regardless of DTR
AT#MEM0 All voice features off

Dial the modem and wait for it to answer. After the number of rings specified by S110 (default 4) the modem will answer the call and respond with "Leave a Message after the Beep". If you key in a DTMF digit during the time this message is played, the message will stop and you can complete entering the PIN number. The factory default PIN number is 1234. This can be changed by using the new #PIN command.

AT#PINnn...nnn

where nn...nnn is the pin number. Up to 10 digits of PIN number can be specified

If you key in the correct PIN number the modem will say "OK" and ask for a command. You may key in 0 for a menu of available functions.

Functions Available using DTMF keys

1-9 Play back stored message 1 to 20
*1 Record a new welcome message to replace "Leave a Message after the Beep"
*2 Record a new message
*3 Playback the current welcome message
*4 Report number of stored messages and the state of the alarm switches (ON or OFF)
*5 Play all messages
*6 Enable / disable answering machine record function
*9 Erase stored messages but retain the welcome message
*0 Erase all stored messages including the welcome message (return to factory default message)
Hang up

Messages 1 and 2 are used by the alarm switches. Other messages can be stored and used as a voice mail box which can be shared by a group of people who know the PIN number.

If no pin number is entered the user can leave a message after the welcome message beep.

+ To avoid recording a lot of silence the messages can be terminated with the # DTMF key.

About 8 minutes of voice storage in a maximum of 20 individual messages is available.

How to Load the Voice Alarm Messages

If you have not downloaded a vocabulary file use the following procedure:

1. Connect the modem to a PC running a terminal program (like Hyperterm).
2. Type AT S119=0 to stop modem going to sleep.
3. Type AT#MINI and wait for EPROMs to erase. The modem will beep when ready.
4. Type AT#MEM2 to put the modem into voice answering mode.
5. Connect modem to phone line and using a touch tone phone dial the modem. The modem will answer with a brief message "Leave a message after the beep!"
6. Record your message into the modem for Alarm Condition #1, leaving 2 seconds of silence after the beep before speaking.

7. Press the # button on the phone when your message is finished.
8. Hang up the phone wait a few seconds.
9. Ring the modem again and record a second message for Alarm #2 following steps 8 and 9. Your messages are now recorded.
10. Reconnect modem to a terminal program and type AT#MCD to display the stored messages. The duration of the 2 messages you have recorded should be visible.
11. If you wish the modem to answer calls in data mode type AT#MEM0&W in a terminal program to turn off the voice answering function or AT#MEM1 if you want the voice answering function only when DTR is low.

To redo the messages, erase the EPROMs using AT#MINI and record the messages again.

Remote Voice Setting of Alarm Messages

If you have installed the vocabulary file, use the procedure detailed in the VOICE MESSAGING SYSTEM to enter the modem PIN number then use DTMF command *2 the record the first message then enter *2 again to enter the second message. You may playback the messages immediately by keying DTMF 1 and DTMF 2 to verify that they sound OK.

Hang up by keying ##.

Operating Modes

Asynchronous Mode

Asynchronous Mode is the normal default mode of the modem. Control and monitoring is performed by executing the AT commands using a PC fitted with suitable communications software.

Synchronous Operation

Your modem supports two synchronous modes. Mode 1 allows operation with computers which support asynchronous and synchronous communication on a single RS-232 port. Mode 2 allows your modem to be operated with dedicated synchronous terminals.

Although your modem can only operate over a single two-wire connection, it will still perform full-duplex synchronous communication. Half-duplex operation could be simulated by controlling the state of the RTS and CTS signals.

Terminal Speeds

Your synchronous terminal or host should use the clock signals provided by the modem to synchronise transmit and receive data. The clock speed will represent the actual connection speed of the modem.

+ When synchronous mode is selected, your modem cannot operate in constant speed mode or use the error correction or data compression facilities of the modem. Only variable speed mode is available in synchronous connections (this refers to the modem's terminal speed).

Line Speeds

Your modem supports a number of synchronous line speeds.

When operating in synchronous mode, your modem should always be configured with a locked, non-auto-ranging B setting (this refers to modem line speed).

For V.34, the B setting only sets the maximum speed. The modem will automatically determine the highest usable speed for the line.

Synchronous Mode 1

Synchronous mode 1 is selected with the &M1 command.

- Type: AT&M1 <E>

Your modem will enter synchronous mode whenever it successfully connects to a remote modem.

You should also:

- Type: AT&D2 <E>

This allows hang up via your computer's DTR signal.

To return to asynchronous operation:

- Type: AT&M0 <E>

Synchronous Mode 2

Synchronous mode 2 is selected with the &M2 command.

- Type: AT&M2 <E>

Your modem will enter synchronous mode whenever it successfully connects to a remote modem.

You should also:

- Type: AT&D2 <E>

This allows you to dial and hang up.

When the terminal asserts the DTR signal (DTR makes an OFF-ON transition), your modem will dial stored phone number zero. The phone number may contain dial modifiers.

To return to asynchronous mode:

- Type: AT&M0 <E>

Your modem will remain in asynchronous mode.

Leased Line Operation

A leased line, or private line, is a telephone line that permanently connects two or more locations. The leased line does not have any switching equipment associated with it.

Leased-line operation with the modem is selected with the &L command.

If you select leased line operation with the &L1 command, you must issue the ATA command to answer a call, and the ATD command to initiate a call.

If you use &L2 or &L3 to select Auto leased line operation, you do not need to issue the ATA or ATD commands; &L2 selects Originate mode automatically and &L3 selects Answer mode automatically. To dial or answer, raise DTR; to hang up and return to local command state, lower DTR.

+ You will require a special phone cable (available from your dealer) to connect your modem to a leased-line socket. The phone cable supplied with your modem is suitable for use with normal, dial-up, voice (PSTN) lines.

Before commencing leased-line communications, it is recommended that a non-auto-ranging B setting be specified.

+ If error correction is required, select a Reliable mode, not an Auto-Reliable mode. (See the \N command.)

Auto-ranging and fallback are disabled in leased-line mode. Your modem will only attempt to connect using the communications standard specified by the B command and the terminal speed.

Once a connection has been established, if your modem detects a loss of carrier it will continuously attempt to re-establish the connection.

If the modem is in auto leased-line operation and this configuration has been stored in memory using the AT&W command, a timeout period of 10 seconds is available after power up to disable the leased-line mode via the AT&O command. Alternatively, this command can be sent with DTR low.

Modem AT Commands

Your Industrial Modem ^a has a number of specific commands that control and enhance its operation. To access and change these commands open a local terminal connection with your modem using your preferred communications software, such as WinFax Pro, and type the letters AT followed by the specific command and press <Enter>. The AT commands are case insensitive and may be entered in either lower or capital letters.

■ indicates the default settings

Commands

| Command | Description |
|---------|---------------------|
| A | Answer call |
| D | Dial number |
| H | Hang up modem |
| O | Enter On-line state |

Dial Modifiers

| | |
|-------------|--|
| Dial Digits | 0-9, A, B, C, D, #, * |
| , | Pause while dialling |
| F or ^ | Disable calling tones |
| J | Initiate MNP 10 at 1200 bps (V.22) |
| K | MNP 10 cellular power level adjustment for this call |
| L | Redial last number |
| M | Initiate MNP 10 at 4800 bps (V.32) |
| P | Pulse dial number |
| R | Switch to answer mode |
| S=n | Dial stored number ÔnÕ (where n=0-9) |
| T | Tone dial number |
| W | Wait for dial tone |
| ; | Return to Local command state |
| ! | Hook flash |
| @ | Wait for quiet answer |

General Commands

| | | |
|-----|---|--|
| +++ | | Escape Sequence |
| ? | | Displays help. May be followed by the command(s) or a keyword for which help is needed |
| A/ | | Repeat Command |
| B0 | ■ | Auto-Connect |
| B1 | | Auto-Connect |
| B2 | | Auto-Connect |
| B3 | | V.21 - 300 bps |
| B4 | | Bell 103 - 300 bps |
| B5 | | V.23 - 1200/75 bps |
| B6 | | V.22 - 1200 bps |
| B7 | | Bell 212A - 1200 bps |
| B8 | | V.22bis - 2400 bps |
| B9 | | Auto-Connect |
| B10 | | V.32 - 4800 bps |
| B11 | | V.32bis - 7200 bps |
| B12 | | V.32 (Non-TCM) - 9600 bps |
| B13 | | V.32 - 9600 bps |
| B14 | | V.32bis - 12000 bps |
| B15 | | V.32bis - 14400 bps |
| B16 | | V.34/V.Fast Class - 14400 bps |
| B17 | | V.34/V.Fast Class - 16800 bps |
| B18 | | V.34/V.Fast Class - 19200 bps |
| B19 | | V.34/V.Fast Class - 21600 bps |
| B20 | | V.34/V.Fast Class - 24000 bps |
| B21 | | V.34/V.Fast Class - 26400 bps |
| B22 | | V.34/V.Fast Class - 28800 bps |
| B23 | | V.34 31200 bps |
| B24 | | V.34 33600 bps |
| E0 | | Local command state echo off |
| E1 | ■ | Local command state echo on |
| H0 | | Go on-hook |
| H1 | | Go off-hook |
| I0 | | Numeric firmware identity |
| I1 | | Checksum of firmware - return checksum |
| I2 | | Checksum of firmware - return OK/ERROR |
| I3 | | Modem Model |
| I4 | | Firmware Version and date |
| I5 | | Manufacturer ID |
| I9 | | Verbal firmware identity |
| I10 | | Display modem statistics |
| L0 | | Lowest volume level |
| L1 | | Low volume level |
| L2 | ■ | Medium volume level |
| L3 | | Highest volume level |
| M0 | | Speaker is always off |
| M1 | ■ | Speaker on when connecting, off when connected |
| M2 | | Speaker always on |
| M3 | | Speaker off when dialling or after connection established |

| | | |
|------|---|--|
| M4 | | Speaker on during dial, answer, retrain or rate change |
| O1 | | Enter On-line state and force communication retrain (V.22bis and V.32bis only) |
| O2 | | Retrain, don't go on-line (V.22bis & V.32bis) |
| O3 | | Change line speed to 4800 bps (V.32 & V.32bis) |
| O4 | | Change line speed to 7200 bps (V.32 & V.32bis) |
| O5 | | Change line speed to 9600 bps (V.32 & V.32bis) |
| O6 | | Change line speed to 12000 bps (V.32 & V.32bis) |
| O7 | | Change line speed to 14400 bps (V.32 & V.32bis) |
| P | | Pulse dialling |
| Q0 | ■ | Modem returns response codes |
| Q1 | | Modem does not return response codes |
| Q2 | | Modem does not return RINGING or response codes when answering |
| R9 | | 9600 bps (locked terminal speed - no autobaud) |
| R14 | | 14,400 bps (locked terminal speed - no autobaud) |
| R19 | | 19,200 bps (locked terminal speed - no autobaud) |
| R28 | | 28,800 bps (locked terminal speed - no autobaud) |
| R38 | | 38,400 bps (locked terminal speed - no autobaud) |
| R57 | | 57,600 bps (locked terminal speed - no autobaud) |
| R115 | | 115,200 bps (locked terminal speed - no autobaud) |
| R230 | | 230,400 bps (locked terminal speed - no autobaud) |
| Sn? | | Display value in S Register n |
| Sn=x | | Place x in S Register n |
| T | ■ | Tone dialling |
| V0 | | Numeric response codes |
| V1 | ■ | Verbal response codes |
| W0 | | CONNECT message reports the terminal speed |
| W1 | | CONNECT message reports the terminal speed |
| W2 | ■ | CONNECT message reports the line speed |
| X0 | | Basic response codes (codes 0-4,8) |
| X1 | | Extended response codes (codes 0-5,8,10-12,30-40,60-62) |
| X2 | | Extended response codes (codes 0-6,8,10-12,30-40,60-62) |
| X3 | | Extended response codes (codes 0-5,7,8,10-12,30-40,60-62) |
| X4 | | Extended response codes (codes 0-7,10-12,30-40,60-62) |
| X5 | ■ | Extended response codes (codes 0-7,10-13,30-40,60-62) |
| X6 | | Extended response codes (codes 0-5,7-8,10-13,30-40,60-62) |
| Zn | | Restore configuration profile n (n=0,1,2,3) |
| &B0 | | 8 bit character length |
| &B1 | | 9 bit character length |
| &B2 | | 10 bit character length |
| &B3 | | 11 bit character length |
| &B4 | ■ | 10 or 11 bit character length determined by autobaud |
| &C0 | | DCD signal always asserted |
| &C1 | ■ | DCD signal responds to remote modem |
| &C2 | | DCD signal always on, pulses low on disconnect |
| &C3 | | DCD asserted during voice session |
| &D0 | | Ignore DTR |
| &D1 | | Return to Local command state if DTR goes low |
| &D2 | ■ | Hangup & return to Local Com if DTR goes low, disable auto-answer until DTR asserted |
| &D3 | | Initialise with values in &Y profile if DTR goes low |
| &F0 | | Restore factory defaults |

| | | |
|---------|---|--|
| &F1 | | Restore non-error correction factory defaults |
| &F. | | Reset modem (clear security database/Telephone numbers) |
| &G0 | ■ | No guard tone generated |
| &G1 | | 550 Hz guard tone generated |
| &G2 | | 1800 Hz guard tone generated |
| &K0 | | Flow control disabled |
| &K3 | | RTS/CTS flow control |
| &K4 | | XON/XOFF flow control |
| &K5 | | Transparent XON/XOFF flow control |
| &K9 | ■ | Failsafe flow control |
| &M0 | ■ | Asynchronous mode |
| &N0 | | Abort dial character disabled |
| &N1 | ■ | Abort dial character enabled |
| &P0 | | 39/61 make/break ratio (USA) |
| &P1 | ■ | 33/67 make/break ratio (Aus/UK) |
| &S0 | | DSR signal always asserted |
| &S1 | ■ | DSR signal asserted at start of handshake |
| &S2 | | DSR signal asserted at end of handshake (before CONNECT message) |
| &T0 | | Terminate current test |
| &T1 | | Local Analogue Loopback test |
| &T3 | | Local Digital Loopback test |
| &T4 | ■ | Grant Remote Digital Loopback test |
| &T5 | | Deny Remote Digital Loopback test |
| &T6 | | Remote Digital Loopback test |
| &T7 | | Remote Digital Loopback with Self-test |
| &T8 | | Local Analog Loopback with Self-test |
| &V | | View active configuration profile |
| &Vn | | View stored profile (n=0-3) |
| &V8 | | View differences between active and default |
| &Wn | | Save current configuration into stored profile n (n=0,1,2,3) |
| &Yn | | Select stored profile n for Power on and &D3 |
| &Zn=x | | Store x as phone number n (x=0-9) |
| #A0 | | Prevent Remote Access |
| #A1 | | Allow remote access |
| #A2 | ■ | Allow remote access with security password |
| #ALMn=x | | Dial number/s x (x=0-9 in &Z) for remote alert n |
| #B0 | ■ | In 1200bps originate mode B0=V.23, B2=V.22 |
| #B1 | | In 1200bps originate mode B0=V.22, B2=V.23 |
| #C0 | | V.25 calling tones disabled |
| #C1 | ■ | V.25 calling tones enabled |
| #J0 | | Assume V.42 compatibility |
| #J1 | ■ | Check V.42 compatibility |
| #K0 | | Disable MNP 10 |
| #K1 | ■ | Enable MNP 10 |
| #K2 | | Enable MNP 10 for Cellular links |
| #MEM0 | | All voice features off |
| #MEM1 | ■ | Voice mode after S110 rings if DTR is low |
| #MEM2 | | Voice mode after S110 rings regardless of DTR |
| #MINI | | Erase Voice mode alarm message |
| #M0 | ■ | AT command operation |
| #O0 | ■ | Characters ignored if modem buffers overflow |

| | | |
|--------|---|--|
| #O1 | | Disconnects if terminal buffer overflows |
| #O2 | | Disconnects if line buffer overflows |
| #O3 | | Disconnects if either buffer overflows |
| #PIN=n | | Pin Number where n is the pin number |
| #R0 | | Remote Control Mode |
| #V0 | | Command and S Register verifier off |
| #V1 | ■ | Command and S Register verifier on |
| %B0 | ■ | S0=0 setting after AT&F |
| %B1 | | S0=2 setting after AT&F |
| %C0 | | Compression disabled |
| %C1 | | MNP 5 compression enabled |
| %C2 | | V.42bis data compression enabled |
| %C3 | ■ | V.42bis data compression enabled with fallback to MNP 5 |
| %Dn | | Set disconnect delay to n seconds (default %D0) |
| %E0 | | Disable auto-retrain |
| %E1 | ■ | Enable auto-retrain |
| %E2 | | Automatic Speed Stepping |
| %H0 | ■ | Use B setting for initial MNP 10 connection speed |
| %H1 | | Initial connection is made at 1200 bps (MNP 10) |
| %H2 | | Initial connection is made at 4800 bps (MNP 10) |
| %H3 | | Initial connection is made at 9600 bps (MNP 10) |
| %H9 | | Use B setting for connection but do not upshift (MNP 10) |
| %K0 | ■ | CTS operates normally |
| %K1 | | CTS off during dial and handshake |
| %L0 | | Report current received signal level (-dBm) |
| %Ln | | Set transmit level (n=11 to 19; -11dBm to -19dBm) |
| %M0 | ■ | Mode LEDs indicate connection speed |
| %M1 | | Mode LEDs indicate line quality, V.42/MNP errors & flow ctrl |
| %N0 | ■ | Standard Baud Rates |
| %N1 | | Standard to 14400 then 20800, 31200, 41600 and 62400 |
| %N2 | | Standard to 38400 then 51200 |
| %P0 | ■ | CONNECT message appears before DCD asserted |
| %P1 | | CONNECT message appears after DCD asserted |
| %Q | | Report current line quality (EQM) (0=perfect) |
| %R0 | ■ | &R command determines state of CTS |
| %R1 | | CTS always follows RTS (not reset by &F) |
| %R2 | | CTS follows DTR when offline (not reset by &F) |
| %S0 | ■ | DSR is not overridden |
| %S1 | | DSR mimics the state of DTR (not reset by &F) |
| %T0 | ■ | DCD always follows state of carrier |
| %T1 | | DCD is always high (not reset by &F) |
| %U0 | ■ | Standard error correction response codes |
| %U1 | | V.42 response codes when V.42 connection established |
| %U2 | | V.42 response codes for V.42 connections, MNP 2,4,10 compression |
| %W0 | ■ | Disable welcome message |
| %W1 | | Send message specified by *W to remote modem after connect |
| \A0 | | MNP block size = 64 |
| \A1 | | MNP block size = 128 |
| \A2 | | MNP block size = 192 |
| \A3 | ■ | MNP block size = 256 |
| \Bn | | Send Break sequence to remote modem (default \B3) |

| | | |
|------------|---|--|
| \J0 | ■ | Fallback to direct mode disabled |
| \J1 | | Fallback to direct mode enabled |
| \Kn | | Received Break control (default \K5) |
| \N0 | | Constant speed mode |
| \N1 | | Variable speed mode |
| \N2 | | MNP reliable mode |
| \N3 | ■ | V.42/MNP auto-reliable mode |
| \N4 | | V.42 reliable mode |
| \N5 | | V.42 auto-reliable mode |
| \N6 | | V.42/MNP reliable mode, fallback to MNP reliable mode |
| \N7 | | MNP auto-reliable mode |
| \Q0 | | Flow control disabled |
| \Q1 | | XON/XOFF flow control from modem and computer |
| \Q2 | | CTS flow control |
| \Q3 | | CTS-RTS flow control (same as &K3) |
| \Q4 | | Modem-only XON/XOFF flow control |
| \Q5 | | CTS flow control (CTS low until connection) |
| \Q6 | | CTS-RTS flow control - CTS low until connect |
| \S | | Display active configuration with detailed description |
| \Tn | | Set inactivity timer to n seconds (Default \T0) |
| \V0 | ■ | Disable reliable response codes |
| \V1 | | Enable reliable response codes |
| \V8 | | Extended response codes |
| \V9 | | Extended response codes with diagnostic information |
| \X0 | ■ | XON/XOFF pass through disabled |
| \X1 | | XON/XOFF pass through enabled |
| *C0 | ■ | Enable V.34 |
| *C1 | | Disable V.34 use V.FC |
| *Wttt...tt | | Specify welcome message text used by %W1(ttt...tt = text use for new line) |

Modulation Setting

| | |
|------------|--|
| +MS? | Report selected options |
| +MS=? | Report list of supported options |
| +MS= | <mod>,<automode>,<min_rate>,<max_rate><E> |
| <mod> | see table |
| <automode> | =0 (automode disabled, fixed modulation) |
| <automode> | =1 (automode enabled, auto select speed/mod) |
| <min_rate> | =lowest rate for modem connection |
| <max_rate> | =highest rate for modem connection |

| <mod> | Modulation | Possible Rates (bps) |
|-------|------------|---|
| 0 | V.21 | 300 |
| 1 | V.22 | 1200 |
| 2 | V.22bis | 2400 or 1200 |
| 3 | V.23 | 1200 |
| 9 | V.32 | 9600 or 4800 |
| 10 | V.32bis | 14400, 12000, 9600, 7200, or 4800 |
| 11 ■ | V.34 | 33,600, 31,200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400 |
| 64 | Bell 103 | 300 |
| 69 | Bell 212 | 1200 |

Distinctive Ring

The Industrial Modem is able to discriminate between three different types of rings. This is useful if you purchase the Telstra Duet service. With Telstra Duet, two phone numbers are shared for one telephone line. One number can be used for Voice and the other number can be used for your Modem. To enable the modem to answer only when your modem number is dialled, issue the command: AT-SDR=4 S0=2&W.

| | |
|------------|--|
| AT-SDR=n,x | where n=0 to 7, default=0, x=0 Disable Distinctive Ring response suffix; x=1 Enable Distinctive Ring response suffix (default) |
| AT-SDR=0 | Any ring detected and reported as "RING" |
| AT-SDR=1,1 | Single ring detected and reported as "RING1" |
| AT-SDR=1,0 | Single ring detected and reported as "RING" |
| AT-SDR=2,1 | Double ring detected and reported as "RING2" |
| AT-SDR=2,0 | Double ring detected and reported as "RING" |
| AT-SDR=3,1 | Single and double ring detected and reported as "RING1"or"RING2" |
| AT-SDR=3,0 | Single and double ring detected and reported as "RING" |
| AT-SDR=4,1 | Triple ring detected and reported as "RING3" |
| AT-SDR=4,0 | Triple ring detected and reported as "RING" |
| AT-SDR=5,1 | Single and triple ring detected and reported as "RING1"or"RING3" |
| AT-SDR=5,0 | Single and triple ring detected and reported as "RING" |
| AT-SDR=6,1 | Double and triple ring detected and reported as "RING2"or"RING3" |
| AT-SDR=6,0 | Double and triple ring detected and reported as "RING" |
| AT-SDR=7 | Any ring detected and reported as "RING1"or "RING2"or"RING3" |

+ Use AT-SDR=4 for Telstra's Duet service. Do not set Auto Answer below 2 when Distinctive Ring is enabled.

Response Codes

| Num | Verbal | Description |
|-----|---------------|---------------------------------|
| 0 | OK | Command accepted |
| 1 | CONNECT | Connection established |
| 2 | RING | Incoming call detected |
| 3 | NO CARRIER | Carrier not detected |
| 4 | ERROR | Command error |
| 6 | NO DIALTONE | Dial tone has not been detected |
| 7 | BUSY | The number dialled is busy |
| 8 | NO ANSWER | Silence not detected |
| 13 | RINGING | The number dialled is ringing |
| 5 | CONNECT 1200 | Connected at 1200 bps |
| 10 | CONNECT 2400 | Connected at 2400 bps |
| 11 | CONNECT 4800 | Connected at 4800 bps |
| 32 | CONNECT 7200 | Connected at 7200 bps |
| 12 | CONNECT 9600 | Connected at 9600 bps |
| 30 | CONNECT 12000 | Connected at 12000 bps |
| 31 | CONNECT 14400 | Connected at 14400 bps |
| 33 | CONNECT 16800 | Connected at 16800 bps |
| 34 | CONNECT 19200 | Connected at 19200 bps |
| 35 | CONNECT 21600 | Connected at 21600 bps |
| 36 | CONNECT 24000 | Connected at 24000 bps |
| 37 | CONNECT 26400 | Connected at 26400 bps |
| 38 | CONNECT 28800 | Connected at 28800 bps |
| 95 | CONNECT 31200 | Connected at 31200 bps |
| 97 | CONNECT 33600 | Connected at 33600 bps |

A full list of response codes is provided in your SmartModem Reference Guide included on the NetComm CD ROM.

S Registers

| <i>Reg</i> | <i>Range</i> | <i>Def</i> | <i>Unit</i> | <i>Function</i> |
|------------|--------------|------------|-------------|---|
| 0 | 0-255 | 00 | rings | Rings Before Answer |
| 1 | 0-255 | 00 | rings | Ring Count |
| 2 | 1-255 | 43(+) | ASCII | Escape Sequence Character |
| 3 | 0-127 | 13 | ASCII | Carriage Return Character |
| 4 | 0-127 | 10 | ASCII | Line Feed Character |
| 5 | 0-127 | 08 | ASCII | Backspace Character |
| 6 | 4-7 | 04 | secs | Wait for Dial Tone |
| 7 | 1-60 | 30 | secs | Wait for Carrier |
| 8 | 1-7 | 04 | secs | Delay for Pause Modifier |
| 9 | 1-255 | 06 | 0.1secs | Carrier Detect Response Time |
| 10 | 1-255 | 18 | 0.1secs | Lost Carrier/Hang Up Delay |
| 11 | 70-254 | 95 | msecs | Touch Tone Timing |
| 12 | 3-255 | 50 | 0.02secs | Escape Sequence Guard Time |
| 16 | 0-8 | 00 | | Test in Progress (read only) |
| 18 | 0-255 | 00 | secs | Test Timer |
| 25 | 0-255 | 05 | 0.01secs | DTR Loss Detection Time |
| 26 | 0-255 | 00 | 0.01secs | RTS-CTS Delay |
| 27 | 0-255 | 00 | secs | Delay Before Security Dial-back |
| 29 | 10-100 | 50 | 0.01secs | Hook Flash Duration (also sets S100) |
| 30 | 0-255 | 00 | 10secs | Inactivity Timer (data mode) |
| 33 | 0-255 | 03 | | EQM Threshold for V.32/V.32bis |
| 38 | 0-255 | 00 | secs | Disconnect Delay |
| 42 | 0-255 | | | Modem Disconnect Reason |
| 43 | 0-255 | 15 | msecs | Break Sequence Length |
| 45 | 0-255 | 98 | | EQM Threshold - V.22/V.22bis/212A |
| 47 | 1-255 | 08 | secs | Auto-Range Time |
| 62 | 0-255 | 75 | 0.01secs | V.42 detection timer |
| 69 | 0-255 | 60 | secs | Command line timeout |
| 74 | 0-255 | | | Modem Disconnect Reason (Previous Call) |
| 80 | 1-19 | 15 | 5% | Flow Control High Water Mark |
| 81 | 1-19 | 03 | 5% | Flow Control Low Water Mark |
| 82 | 1-255 | 60 | | Failsafe Flow Control Overrun |
| 95 | 0-63 | 0 | bitmap | Extended Result Codes |
| 96 | 1-255 | 80 | | Help Page Width |
| 97 | 1-255 | 24 | | Help Page Length |
| 100 | 1-10 | 5 | 100msecs | Hook Flash Duration (also sets S29) |
| 105 | 0-255 | 30 | secs | Voice-mode ÓDead-manÓ timer |
| 110 | 0-255 | 4 | rings | Voice-mode Rings before Answer |
| 119 | 0-255 | 0 | secs | Power Down Feature |

Use AT? to see the Command Set supported by your modem's version of code.

Specifications

Dimensions

- Height: 31mm
- Length: 218mm
- Width: 122mm

Communications

- ITU-T 33600bps
- ITU-T 31200bps
- ITU-T V.34 (2400-33600bps)
- ITU-T V.32bis (14400bps)
- ITU-T V.32bis (1200bps)
- ITU-T V.32 (9600bps)
- ITU-T V.32 (7200bps)
- ITU-T V.32 (4800bps)
- ITU-T V.22bis (2400bps)
- ITU-T V.22 (1200bps)
- ITU-T V.23 (1200/75bps)
- ITU-T V.21 (300bps)
- Bell 212A (1200bps)
- Bell 103 (300bps)
- ITU-T V.17 (fax 12,000-14,400bps)
- ITU-T V.29 (fax 7200-9600bps)
- ITU-T V.27ter (fax 2400-4800bps)

Terminal Speeds

- 300bps - 230,400bps

Power

- Plug Pack: 15VAC 6VA supplied
- Will operate directly from 6.0 to 14.5 V DC

Caller ID

- Austel TS 030
- Bellcore MDMF message format

Command Sets

- AT commands
- EIA Class 1 &2 fax commands, V.25bis commands

Data Formats

- Synchronous,
- Asynchronous: 7/8 data bits

Flow Control

- RTS/CTS, XON/XOFF and Transparent XON/XOFF (async mode only)

- Error Correction
- V.42, MNP 2-4, MNP10

Data Compression

- V.42bis, MNP 5

Encryption

- DES 64-bit Cypher Feedback (Aust only)
- SuperSecure
- Failsafe Feature
- Hardware and firmware watchdog circuitry resets modem in the event of a lockup condition

Environmental

- Operating: -10_i to +50_i C

Humidity

- Up to 95% non-condensing

Build Options

- 9-38 V DC operation
- HOST interface TTL levels via 20 way dual row pinstrip connector.

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