intelimax+

M2M 3G Serial Modem | MA-2020

M2M 3G Serial Modem MA-2020
User Manual

maxon australia.

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CONTACT INFORMATION

In keeping with Maxon Australia's dedicated Customer support policy, we encourage you to contact us.

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RF EXPOSURE AND ELECTRICAL SAFETY COMPLIANCE

The use of this device in any other type of host configuration may not comply with the RF exposure requirements and should be avoided. During operation, a minimum of 20 cm should be maintained between the antenna, whether extended or retracted, and the user's/bystander's body (excluding hands, wrists, feet, and ankles) (to ensure RF exposure compliance.) The modem is not designed for, nor intended to be, used in applications within 20 cm (8 inches) of the body of the user. Continued compliance of the equipment relies upon it being used with an AS/NZS 60950.1 approved SELV power supply.

Caution

Change or modification without the express consent of Maxon Australia Pty. Ltd. voids the user's authority to use the equipment. These limits are designed to provide reasonable protection against harmful interference in an appropriate installation. The modem is a transmitting device with similar output power to a mobile phone. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with instructions, can cause harmful radiation to radio communication. The modem is approved for use with the antenna: **ANT-SMA**. Unauthorized antennas, modifications, or attachments could impair call quality, damage the device, or result in violation of RF exposure regulations.

There is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference in radio and television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving radio or TV antenna
- Increase the separation distance between the equipment and the receiver
- Contact Maxon Australia Technical Support for assistance.

General Safety

RF Interference Issues: Avoid possible radio frequency (RF) interference by carefully following safety guidelines below:

- Switch OFF the Modem when in an aircraft. The use of cellular telephones in aircraft is illegal. It may endanger the operation of the aircraft and/or disrupt the cellular network. Failure to observe this instruction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF the Modem in the vicinity of gasoline or diesel fuel pumps or before filling a vehicle with fuel.
- Switch OFF the Modem in hospitals and any other place where medical equipment may be in use.
- Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or in areas of blasting operations.
- There may be a hazard associated with the operation of your Modem in the vicinity of inadequately protected personal medical devices such as hearing aids and pacemakers. Please consult the manufacturers of the medical device to determine if it is adequately protected.
- Operation of the Modem in the vicinity of other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- The modem contains sensitive electronic circuitry. Do not expose the modem to any liquids, high temperatures or shock. The modem is not waterproof. Please keep it dry and store it in a cool, dry place.
- Only use original accessories or accessories that are authorized by the manufacturer. Using unauthorized accessories may affect your modem's performance, damage your modem and violate related national regulations.
- Always handle the modem with care. There are no user serviceable parts inside the modem. Unauthorised dismantling or repair of the modem will void the warranty.

* The product needs to be supplied by a limited power source or the power supply provided. Otherwise, safety will not be ensured

* Do not fixed the product in an open area where it is liable to lightning strike hazard.

Vehicle Safety

- Do not use the modem while driving.
- Respect national regulations on the use of cellular devices in vehicles. Road safety always comes first.

- If incorrectly installed in a vehicle, the operation of the modem could interfere with the correct functioning of vehicle electronics. To avoid such problems, ensure that the installation has been performed by qualified personnel.
- Verification of the protection of vehicle electronics should be part of the installation.

Note: The user is cautioned that changes or modifications not expressly approved by Maxon Australia could void the warranty.

Potentially Unsafe Areas

Posted Facilities: Turn off the device in any facility or area when posted notices require you to do so.

Blasting Areas: Turn off the device where blasting is in progress. Observe restrictions and follow any regulations or rules.

Potentially Explosive Atmospheres: Turn off the device when you are in any area with a potentially explosive atmosphere. Obey all signs and instructions. Sparks in such areas could cause an explosion or fire, resulting in bodily injury or death.
Areas with a potentially explosive atmosphere are often but not always clearly marked. They include:

- Fuelling areas such as gas or petrol stations
- Below deck on boats
- Transfer or storage facilities for fuel or chemicals
- Vehicles using liquefied petroleum gas, such as propane or butane
- Areas when the air contains chemicals or particles such as grain, dust or metal powders
- Avoid using the modem in areas that emit electromagnetic waves or enclosed metallic structures e.g. lifts.
- Any other area where you would normally be advised to turn off your engine

REVISION HISTORY

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1.00	April 2015	Initial Release Version
1.01	May 2015	LED function, AT password control, and minor GUI changes
1.02	June 2015	SNMPv3, SNMP Traps, GUI lock out and session timeout, partial firmware update, bootloader update, secure syslog
1.03	July 2015	Factory reset process, profile set and reset, secure socket connection
1.04	September 2015	SSLv3 and syslog certificate delete process, AT commands updates. GUI connection debugging.
1.05	September 2015	Simplify LED flashing tables, periodic reset explanation.
1.06	Sept 2016	Added WAN and TCP client retry settings Added some GUI function and AT commands descriptions. Added notice for AT+CNMI settings

Intelimax+ USER MANUAL

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Life support – This product is not designed for use in life support appliances or systems where malfunction of these products can reasonably be expected to result in personal injury.

Maxon Australia customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Maxon Australia for any damages resulting from such application.

Right to make change - Maxon Australia reserves the right to make changes, without notice, in the products, including circuits and software, described or contained herein in order to improve design and/or performance.

Some features outlined in this manual may require an updated firmware version and/or GUI version to work. Please contact Maxon Australia for more information.

INTRODUCTION

Overview

Breaking the industry benchmark, the top-of-the range Intelimax+ is a unique and intelligent fusion of 3G capabilities with advanced functionality of a modem/router.

Intelimax+ Features

General Features

- HSPA Wireless Module EHS6 (7.2Mbps downlink, 5.6Mbps uplink)
- Supports Packet and Circuit Switched Data
- RS232 and RS485 (half/full duplex) Software Configurable
- 2 Way SMS
- Remote SMS diagnostics & reset
- Embedded TCP/IP, UDP/IP STACK
- Programmable periodic reset and other watchdog features
- Save and restore modem configuration from a file
- FOTA - Firmware upgrade over the air
- External antenna connectivity to maximise coverage
- External LED to show Signal Strength, Data Transfer and Connection status

Extended Features

- Remote CSD to IP Changeover
- AT over IP
- FTP Client
- Programmable WAN connection scheduler
- SSH and Telnet support
- RSSI Logging
- Configurable ping checking function
- Backoff, variable periodic resets and other network friendly features
- SNMPv2 and SNMPv3
- SNTP
- Modem Emulation
- Dynamic DNS
- PPP Server

Security Features

- Encrypted access and configuration control
- Password Protected AT Commands
- SNMPv3 supports SHA and AES
- SSLv3 Encrypted Serial Socket
- Secure Syslog Client RFC5425, RFC5425 and RFC6587
- Login brute force detection and rejection
- Login activity log

Frequency Bands

- WCDMA/HSPA 800MHz, 850MHz, 900MHz, 1900MHz, 2100MHz
- GSM/GPRS/EDGE 850MHz, 900MHz, 1800MHz and 1900MHz

Data Speeds

- HSPA: UL 5.76 Mbps /DL 7.2 Mbps
- WCDMA PS: UL 384 Kbps / DL 384 Kbps
- WCDMA CS: UL 64 Kbps / DL 64 Kbps
- GPRS/EDGE: UL 236 Kbps / DL 236 Kbps
- GSM CS: UL 9.6 Kbps / DL 9.6 Kbps

Physical

- 71mm x 55mm x 26mm (without side brackets and antenna port)
- Side mounting brackets
- Normal Operation Temperature: -30 to 85 °C

Connections

- RJ45 Connection
- USB Connection
- SIM Card Holder
- Antenna connector: SMA female

LED Lights

- Power/RSSI – dual colour indicates RX data received from serial
- Data – dual colour indicates TX data sent to serial

Approvals / Compliance

- ACA (both modem and module)
- FCC (both modem and module)
- GCF (module only)

- PTCRB (module only)
- CE (module only)
- Carrier Approvals* - (Please contact Maxon Australia for more information)
- RoHS Compliant (both modem and module)

Power Source

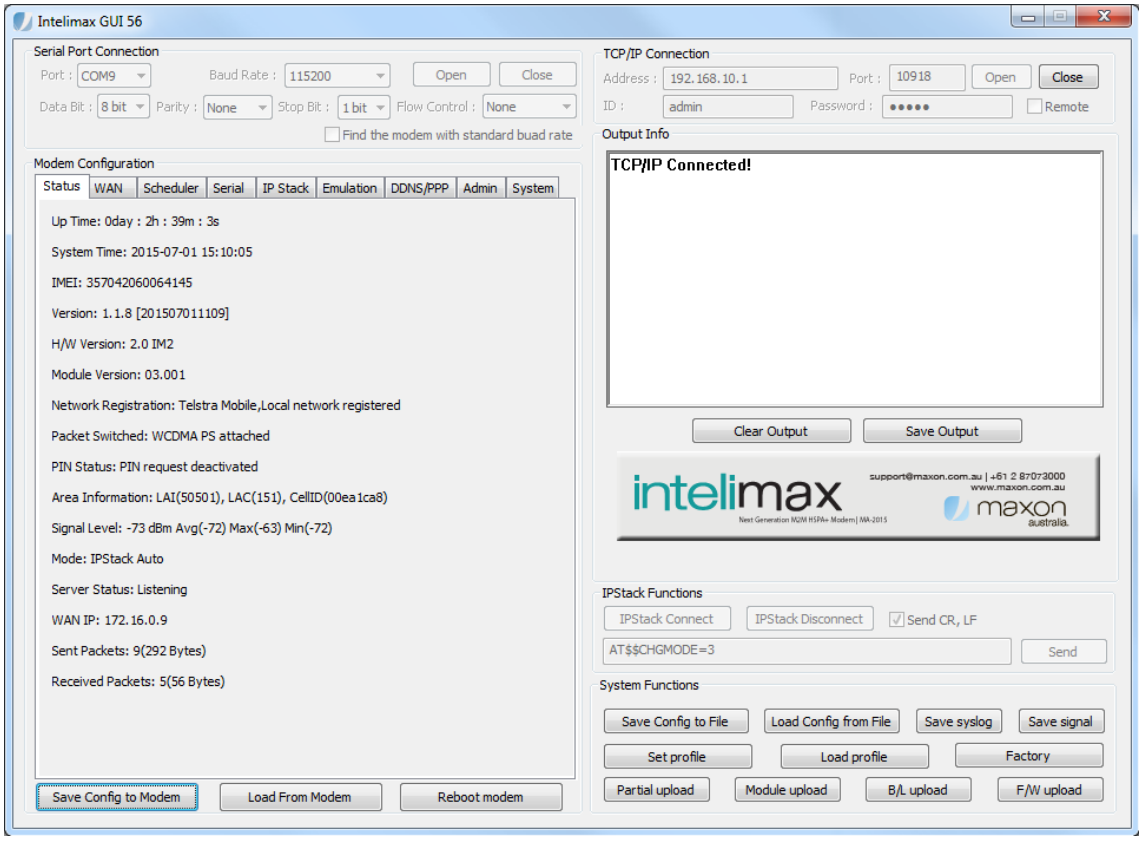
- DC Input Voltage Range: 6 to 48 VDC (±10%)
- Idle Current @ 12V: 80mA
- Maximum Current @ 12V: 150mA

Operating Systems

- Windows XP/ Vista / 7 / 8

Intelimax+ Setup

Maxon Intelimax+ serial modem supports a Windows GUI, where by you can configure the modem via serial connection or remotely via the WAN IP.



Maxon recommends using the GUI connected via a TCP/IP connection in order to utilise all the configuration settings. When connecting to the Intelimax+ using the GUI when the modem is in serial modem mode, there will be very limited functionality.

After connecting to the modem using the GUI, users can configure; WAN settings, Scheduler, IP Stack, SNMP Dynamic DNS and Admin settings.

Connecting to the Intelimax+

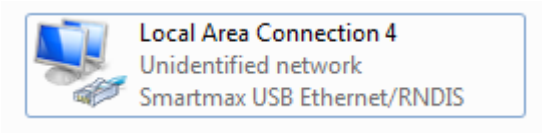
TCP/IP Connection - Recommended

Using the TCP/IP connection option allows users to connect to the modem via an IP connection. **Firmware upgrades can ONLY be done when connected via TCP/IP.**

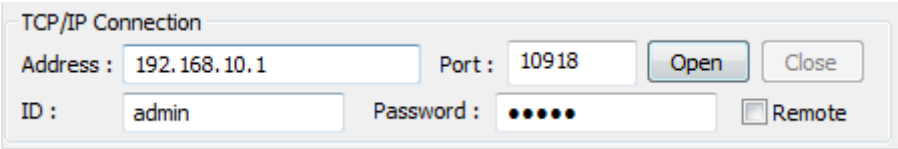
Local Connection

To use this feature locally you must follow the following steps:

1. Plug in modem RJ45 power/serial cable then mini USB cable in this order
2. Install USB/LAN drivers which can be downloaded from:
   http://www.maxon.com.au/product-supports/drivers-and-manuals.html
3. Set a static IP address to the modem:
   Once the drivers are installed you will have to set a static IP on the Intelimax+ network connection (as the Intelimax+ does not support DHCP)



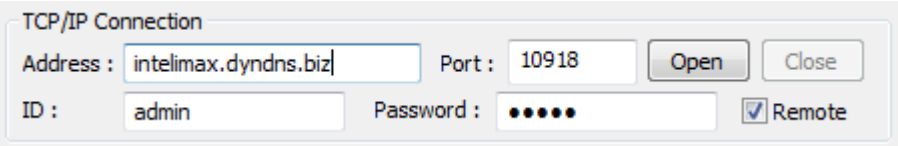
4. The default IP for the Intelimax+ is 192.168.10.1, set your IP within this range Eg.192.168.10.50
5. Open the GUI to the modem (after modem has booted ~ 1-2 minutes)
   The default settings are: Address: 192.168.10.1 (Intelimax+ LAN IP address), Port: 10918, ID: admin, Password: admin. **The password has to be re-entered when opening the GUI each time.**



Note: If all modem settings are not loaded into the GUI after connection, click the 'Load from Modem' button at the bottom to refresh the settings.

Remote Connection

Users can also access the Intelimax+ remotely via a static IP address (e.g. maXwan) or via a url (e.g. DynDNS)



Serial Port Connection

Use this section to connect to the modem using the provided RJ45 power/serial cable, the default connection settings are:

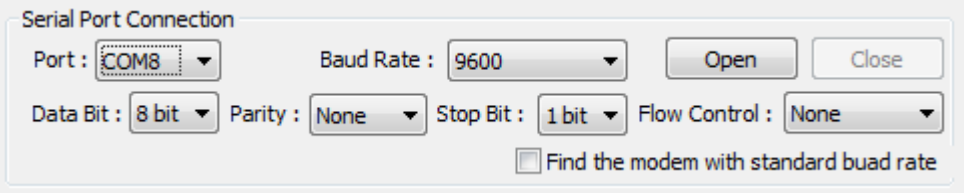
Baud Rate: 115200

Data Bits: 8 bit

Parity: None

Stop bit: 1 bit

Flow control: None



Make sure to select the correct COM port and click the open button, the Intelimax+ GUI will connect to the modem via the selected COM port. The GUI can also perform a search for the correct baud rate if it is not known.

The configuration operations available over a serial connection to the modem are limited when compared to a TCP/IP connection.

GUI Connection Debugging

1. **What if I don't know the serial interface to the modem?**

The modem has a default baud rate of 115200, if you are not able to connect via the serial interface at any baud rate, then restore the modem to factory defaults by holding down the reset button for more than 20 seconds (5 second hold is for profile reset).

2. **Why does the Intelimax GUI not connect and reports "The attempt to connect was forcefully rejected"?**

If the Intelimax GUI connection to the modem is not closed with a TCP disconnect the modem may reject connections and report with a message "The attempt to connect was forcefully rejected". This occurs until the modem TCP timeout occurs which will be either via a modem reboot or after at least 10 minutes. If the connection is local you can shorten this time by reconnecting the USB interface or under network connections, selecting the LAN interface to the modem, disabling, then enabling this interface.

3. **Why does the Intelimax GUI show that the device is discovered but not connect?**

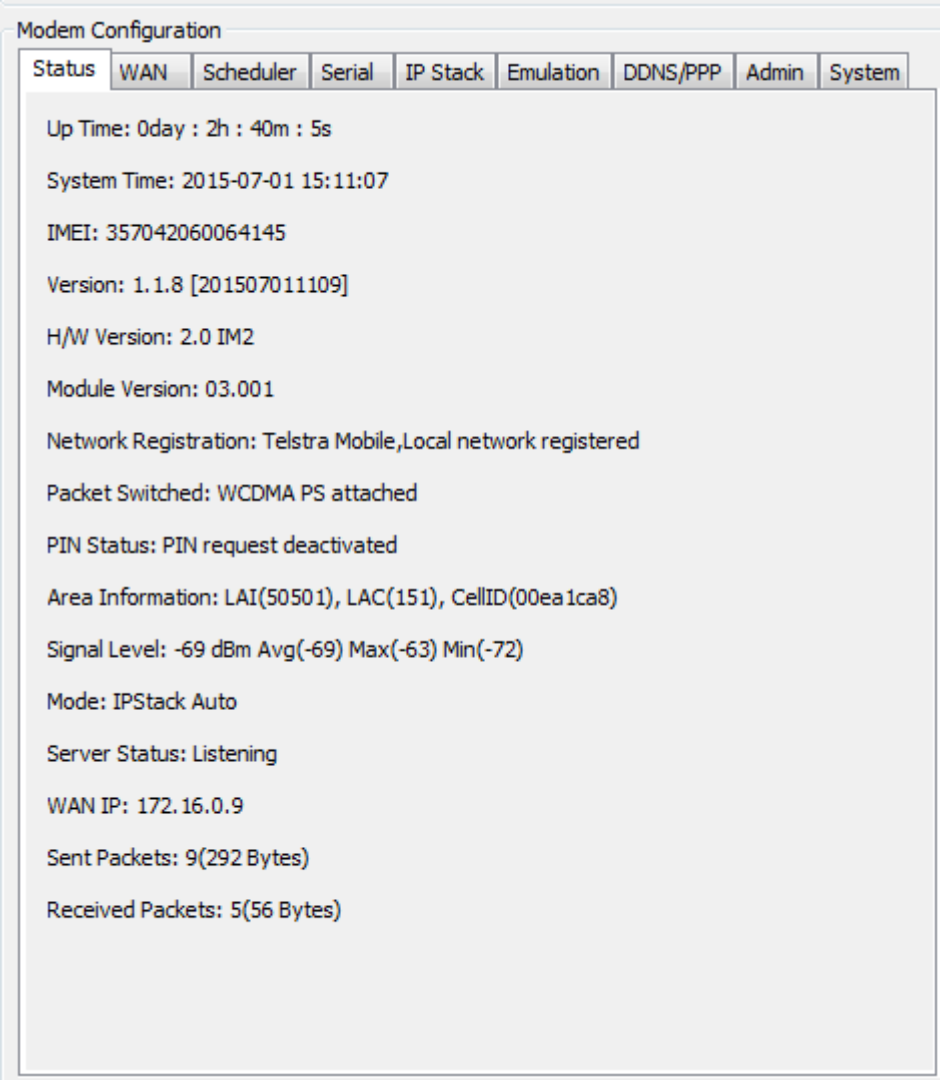
The LAN interface to the modem needs to be configured correctly. This may involve setting a static IP address to the modem, such as 192.168.10.50 or removing an incorrect address. The GUI will continue to try to connect to the modem 3 times after the 'Open' button is pressed.

4. **Why is the GUI not detecting the Intelimax?**

The Intelimax must be powered via the RJ45 connector, then the USB plugged in, after approximately 1 minute, the PC will prompt for drivers to be installed. The Intelimax requires the USB/LAN interface drivers installed to be able to talk via a TCP IP connection to the modem, which can be downloaded from the Maxon website. There are times where the RNDIS network interface is present under network connections but not when checked via a command line (ipconfig). If this is the case then the PC must be restarted as the Microsoft Windows RNDIS driver is not functioning correctly.

Modem Status Tab

The modem status page displays modem information such as network registration and WAN connectivity status.



Information displayed on the Status page is:

Up time:	Length of time since modem last rebooted (soft or hard)
System time:	Recovered from the internal cellular module (or NTP server if SNTP time client is enabled)
IMEI:	IMEI number of the Intelimax+
Version:	Firmware version output. Includes version and compile date. Ex 0.0.0 [201401061408]
H/W Version:	Product's board release version

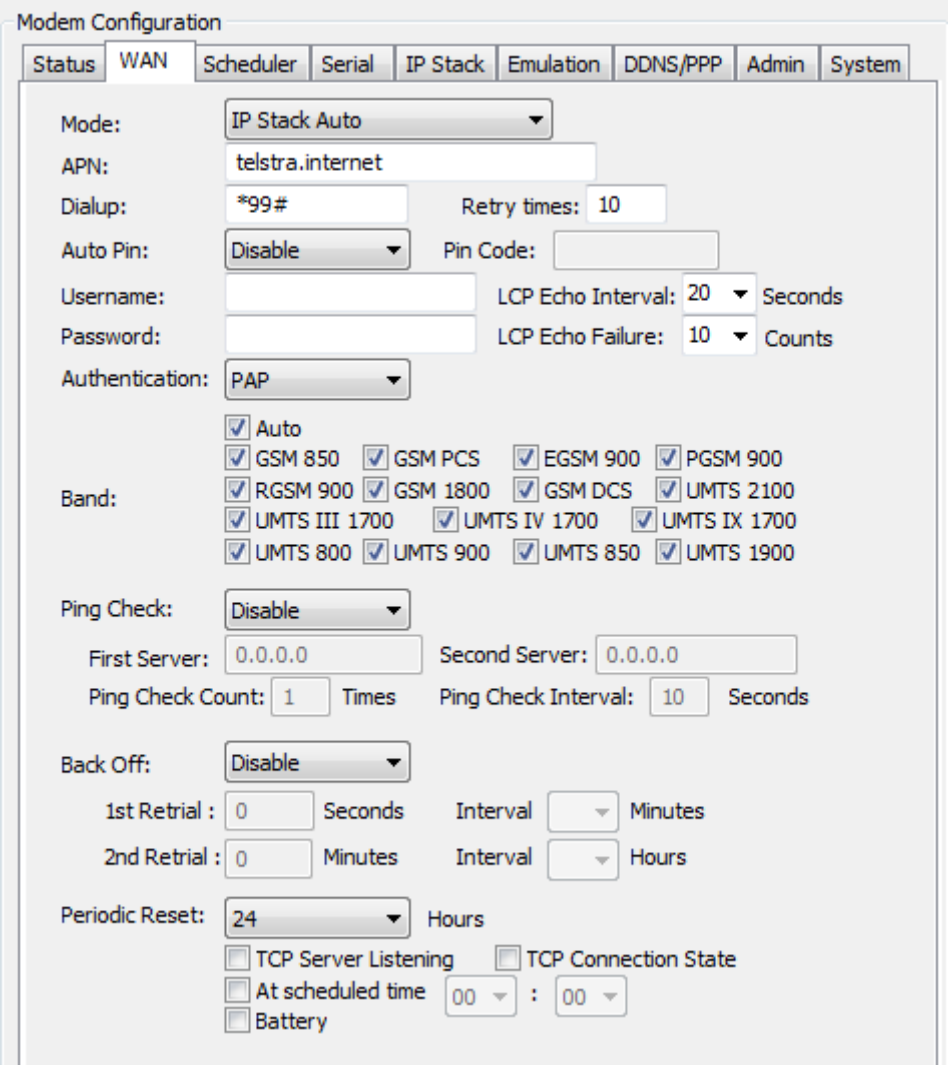
Module Version:	Cellular engine's firmware version
Network registration:	Shows registration status and carrier
Mode:	Will show if modem is in packet switched or serial modem
PIN Status:	Status of the SIM pin setting
Area information:	LAI, LAC, Cell ID
Server status:	Will display whether modem is in listening or connected states
Call status:	In serial modem mode will display whether modem is in connected call.
WAN IP:	IP address assigned by carrier
Signal Level:	Status of current signal strength (dBm). Also shows the average, max and min over the last 15 minutes (time can be modified on admin page)
Mode:	IP Stack Mode of Intelimax+. (IP Stack Auto or Manual)
Sent and received packets:	Shows the packet count and number of bytes sent and received.
Extra:	If secure socket or secure syslog certificates have been installed to the modem then they are displayed here.

WAN Configuration TAB

WAN configuration page is used to configure how the modem will connect to the 3G network. Please select the correct operation mode as this will decide if the modem will automatically connect to the network on power up or work in pass through mode.

The Intelimax supports 6 operation modes:

1. IP Stack Auto mode
2. IP Stack Manual mode
3. Serial mode (Pass-through/Transparent)
4. PPP WAN Auto mode
5. PPP WAN Conditional mode
6. PPP WAN Manual mode



IP Stack Auto Mode

When using IP STACK Auto the modem will behave as an IP Serial modem. When using this mode the modem will transfer all incoming packets via the serial port to the host and vice versa. The modem connects to the 3G networks and acquires an IP address and then runs the IP STACK server or client mode.

Intelimax+ IP Stack can be configured as a Server or Client mode. In Server mode the Intelimax+ will act as a socket server. The modem will listen on a specific TCP/UDP port waiting for an incoming client socket connection. As soon as the client drops the socket connection, the Intelimax+ will go back to socket listening mode as per IP stack configuration. On the other hand with client mode the Intelimax+ will try to establish a socket connection to a preconfigured server IP address or DNS name and port number. The client mode also supports a secondary server IP address just in case the primary server cannot be reached. The in-built IP stack feature supports smarts such as PPP link check, TCP link check, PPP link timeout, TCP link timeout and MTU settings.

Secure socket using SSLv3 can be used in both these modes as well as IP Stack Manual Mode. Further detail on how to configure secure socket is in the IP Stack tab section.

IP Stack Manual Mode

With IPStack manual mode, the modem doesn't initiate the PPP connection. The modem will rely on the host on serial port to send the PPP initiation commands and acquire a WAN IP connection.
The AT command to start the PPP session and open a socket is AT$$IPCTOS.
The AT command to close the socket and PPP session is AT$$IPCTCS.

Further AT command detail is included at the end of this manual.

Serial Modem Mode (Transparent / Pass-through)

This mode allows for the serial interface to connect through to the 3G module in the modem. In this mode the Intelimax+ processor still has some control and processing abilities over the serial AT commands and connection processes. Used for PPP pass-through or Circuit Switched Data (CSD).

Circuit Switch Data Call

Circuit switch is a legacy style of communication where the user dials in to the modem data terminating number.

Standard set of AT commands used with Circuit Switch Call:

ATD	Dial the Data number
ATA	Answer the Data Call
ATS0=n	Set auto answer where n=number of rings
+++	Escape command to enter AT command mode (1 second gap both before and after command required to distinguish from data)
ATH	Drops the data call
ATO	Can return to call if still active

To use this feature please ensure the following has been setup on the SIM:

1. Contact SIM service provider and make sure that CSD is activated on the Sim card. Generally this requires a second number (data terminating number) attached to the same service.
2. Configure the modem to auto answer the call or make sure that the equipment connect to the modem has auto answer activated to detect an incoming call and sends ATA to answer the data call.

Packet Switch Data Call

The Intelimax+ supports PPP over serial connections through the modem and utilizes standard AT commands for this purpose. It is recommended that user dial out control code executes a hang up process command before each reconnection attempt by issuing a +++ command followed by and ATH command.

Standard set of AT commands used with PPP call:

ATD	Dial the PPP number (e.g. *99#)
+++	Escape command to enter AT command mode (1 second gap both before and after command required to distinguish from data)
ATH	Drops the data call
ATO	Can return to call if still active

When using a PPP dial up connection from the modem, the following commands have to be issued before starting the connection:

AT+CGDCONT=1,"IP","apn" Set the access point name (APN).

AT^SGAUTH=1,auth_type,"userid","password"

Set the Authentication. auth_type can be: 0 - NONE, 1 - PAP, 2 – CHAP.

PPP Server Options

The Intelimax+ can be configured to act as a PPP Server over the serial interface with an independent PPP WAN connection. There are three different PPP modes the modem can operate in, these are all outlined further in the PPP Server section:

1. PPP WAN Auto mode: Modem is a PPP server over serial with the WAN IP connection automatically connected.
2. PPP WAN Conditional mode: Modem acts as PPP server with the WAN IP connection conditional on the serial PPP connection.
3. PPP WAN Manual mode: Modem acts as PPP server and the WAN IP connection can be controlled via AT over IP commands.

Invalid PPP password characters list:

“(double quotation mark)
‘(quotation mark)
?(question mark)
)(bracket)
@(at sign)
;(semi colon)
|(pipe sign)
I(upper case I)

WAN Connection Retries

The modem will reboot itself if it fails to get WAN IP after a pre-defined numbers of retries. This can be configured in Retry times field. The default times is 10 and can be set from 2 to 100. The retry times can also be set via AT command us AT$$RETRYTO.

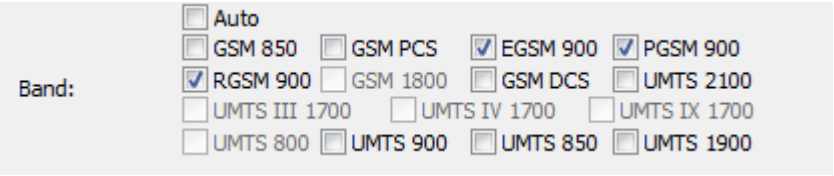
Band Change

When band changing two reboots are required. The first reboot will save the setting to the module and second reboot will apply the changes to the module so that module will register to the selected band.

Only bands which are supported by the module will be displayed in this section.

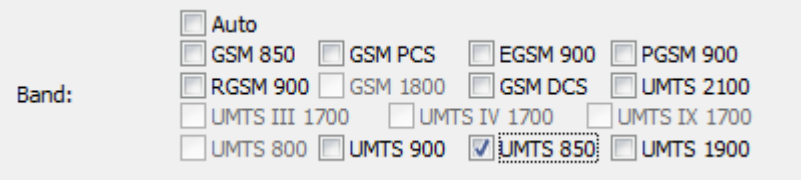
For GSM 900

The user has to tick all GSM 900 bands to be able to connect to the GSM 900 band. Double reboot is required.



For UMTS 850

The user will be able to lock to UMTS 850 network by just ticking the UMTS 850 band in the GUI. Double reboot is required.



WAN page allows configuring the following features:

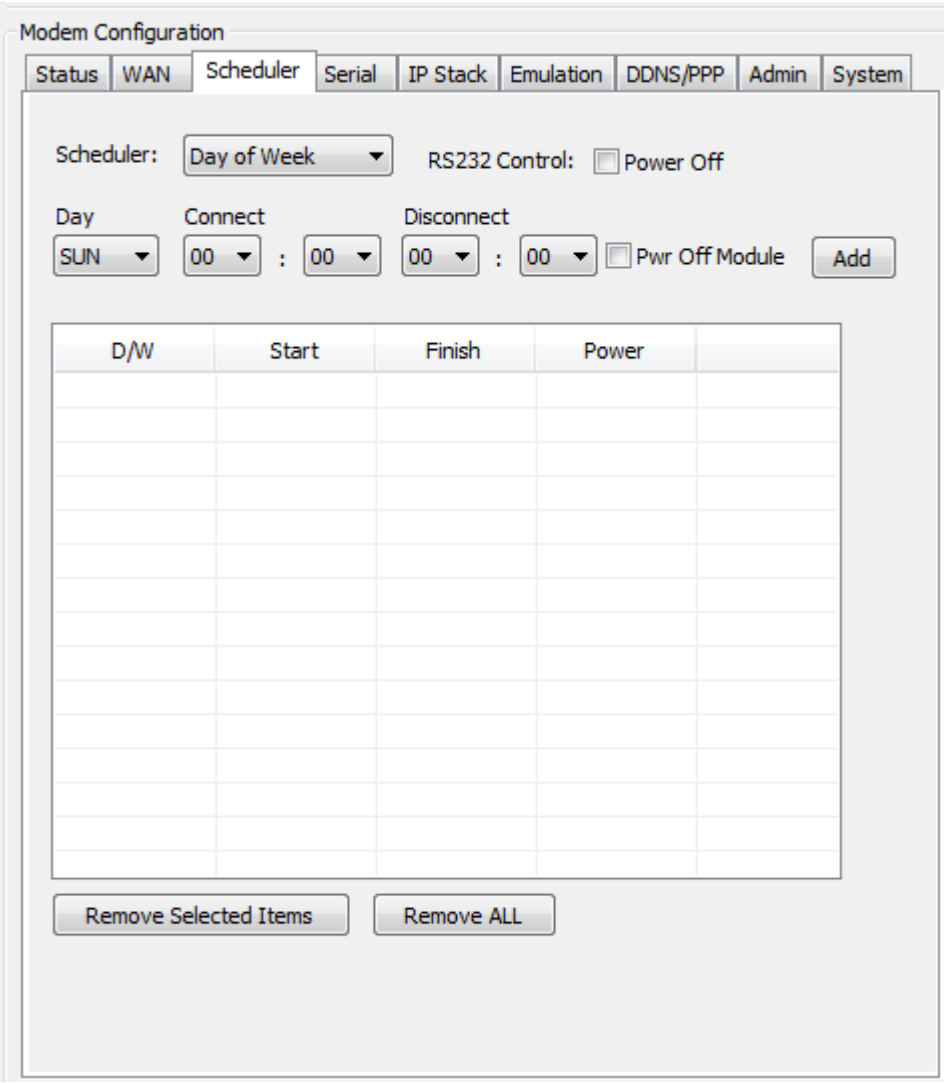
- APN and dialup string
- Username and password for IP WAN
- Auto pin settings (Intelimax+ will enter the PIN code if SIM pin is Enabled. May require a soft reboot to enable).
- Network authentication information
- Watchdog (Ping Function)
- Back off timer
- Periodic reset
    - Can be enabled or disabled
    - Configurable by number of hours between 1 and 28
- Reset state setting. Reset will happen in any state unless configured otherwise by:
    - If the modem is in serial mode and in a connected state then the modem will wait for the connection to drop before resetting.
    - If neither 'TCP Server Listening' nor 'TCP Connection State' check boxes are set, the modem will reboot in any IP state.
    - TCP Server Listening – For use in IP Stack Auto or Manual Server mode – If checked will wait until TCP connection is dropped by either server or client before performing the reset.

- TCP Connection State – For use in IP Stack Auto or Manual Client mode – If checked will wait until Intelimax+ client drops connection to a server or server drops connection before performing the reset.

- Scheduled Time
  - When ticked, the modem will reboot at the defined time whining a day. The reboot will be taken place regardless of the TCP connection status.
- Battery
  - When ticked, modem will enter idle mode (cellular module and serial port are switched off) when battery voltage is below 11.9V. Modem will be back to normal after battery voltage is over 12.3V.

Scheduler TAB

The scheduler tab allows configuring modem WAN connection schedule. The scheduler supports two methods of selection. Days of the Week (setup to come on certain days of the week) or Setting up a certain power up duration (setup to come certain during the hour).



Scheduler Day of the Week:

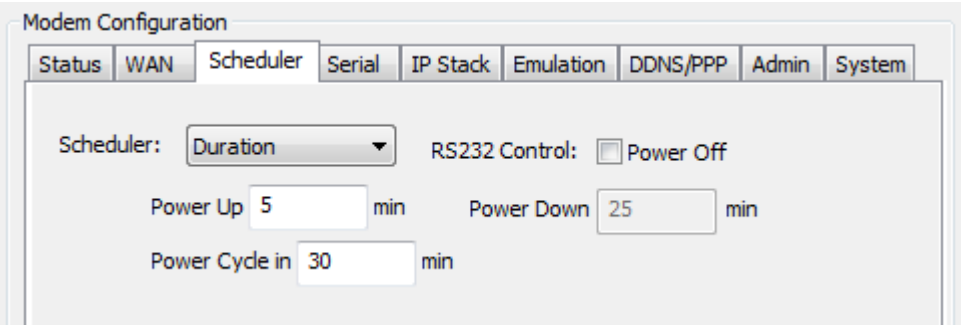
Using this option the user can specify days of the week when the modem will connect to the internet and would be online. The connection and disconnection time is in 24 hour format. While using the scheduler the RS232 and the 3G module can also be configured to shutdown to save power.

To setup Scheduler by Day of the week, select the Day with connect and disconnect times. You can also set the modem to power off itself when it disconnects, by checking the power off check box. To delete an entry click on the entry and press the Remove selected Item button, or if you want to remove all entered entries click the “Remove ALL” button.

Scheduler by Duration

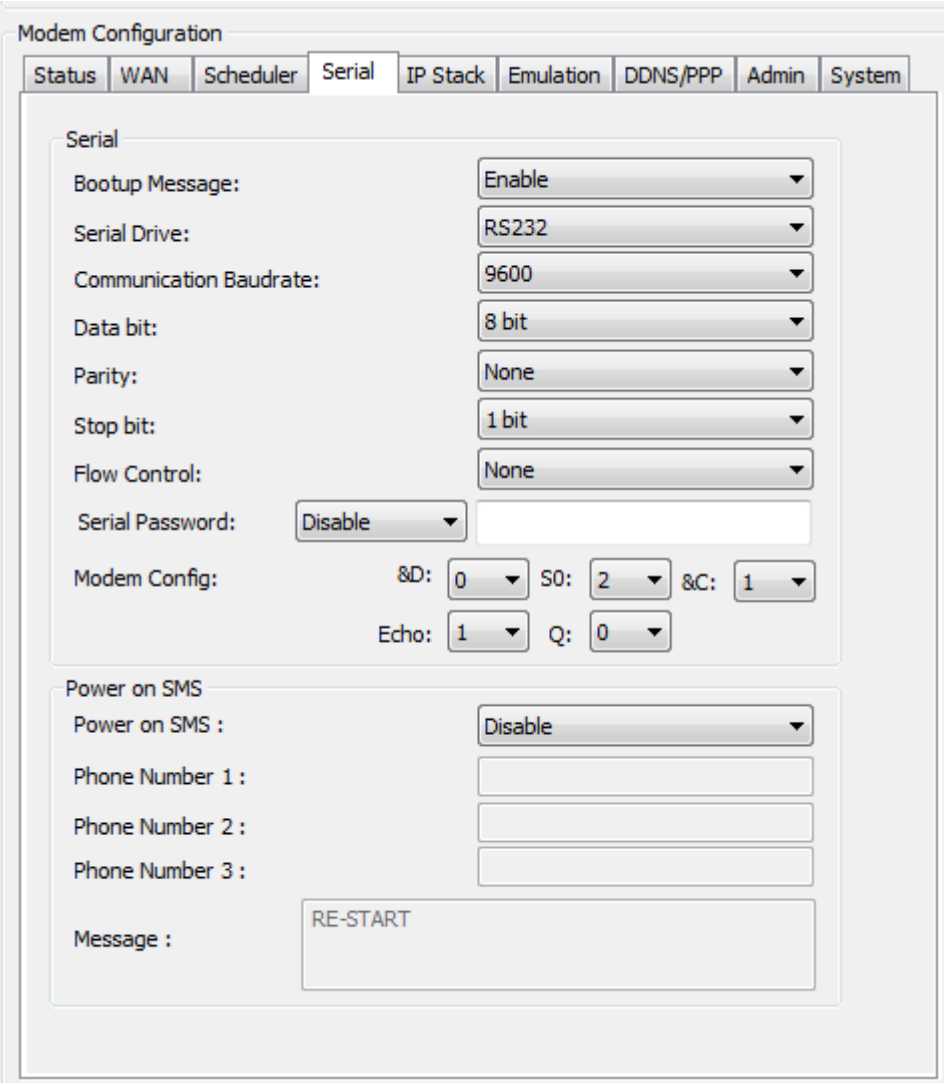
Using this method the modem will be powered up for a certain duration, then power itself down for another period of time, and the cycle repeats itself.

To setup scheduler by duration enter for how long you wish the modem to stay powered up and enter power cycle duration. The power down will be calculated by the modem. In the below example the modem will stay powered for 5 min, power down for 25 min and the cycle is repeated. (Range 0~60 minutes)



Serial Configuration TAB

The Serial configuration page is used to setup modem serial settings such as baud rate, serial messages, and SMS on boot.



Serial Port Setup:

Serial port setup includes the following

Baud rate (the modem supports 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200)

Data Bit (7Bit or 8bit)

Stop bit (1bit or 2bit)

Flow Control (None, Software or Hardware)

&D, S0, &C, Echo and Q

Serial port speed setup should be set to match host (connected via serial port) configuration. With certain applications there may be a need to fabricate a custom serial cable to work between the host and the Intelimax+. The custom serial cable depends on the equipment requirements and settings.

Serial Password – Password protected AT commands

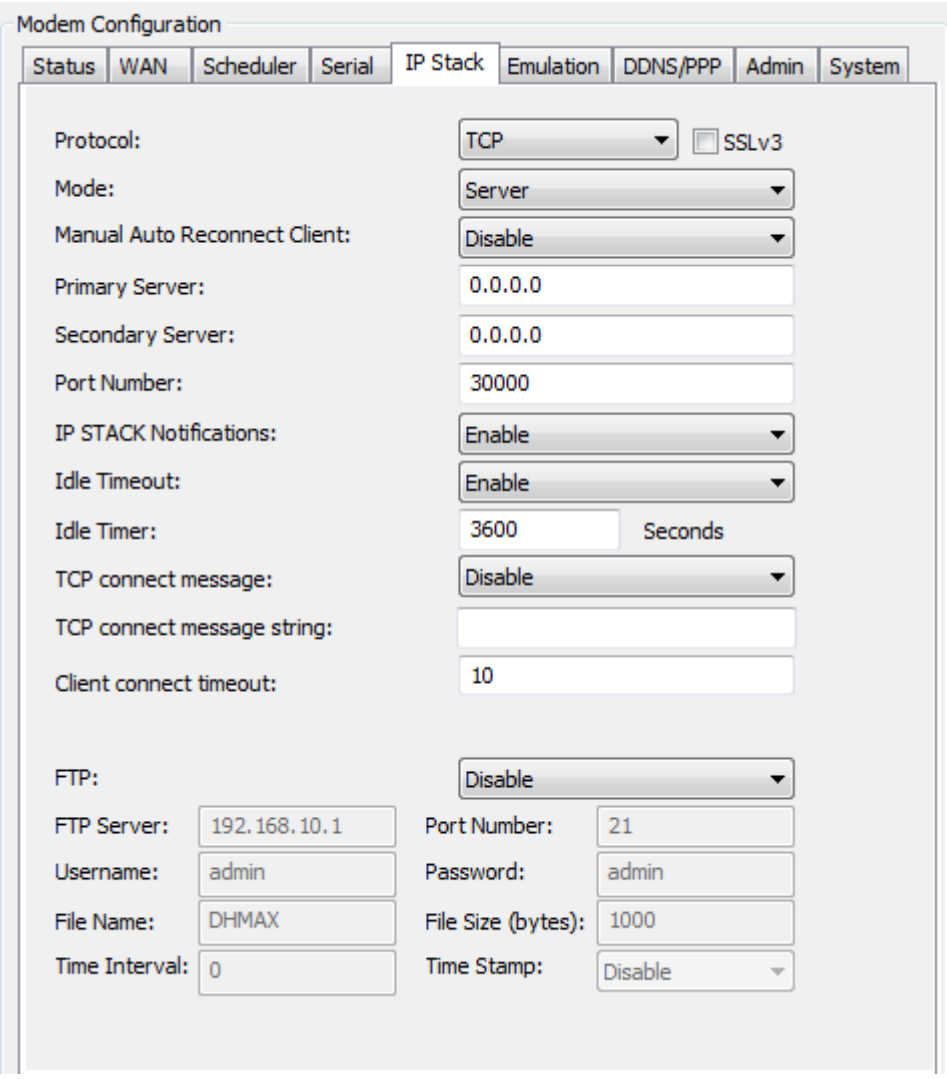
The Intelimax+ has the ability to password protect serial interface AT commands. The serial password can be set on the serial tab. If AT commands need to be entered then AT commands will return an ERROR message until the interface password is entered first with the command, AT$$PWD=<password>. Once the password is entered the access will persist for the session until the modem reboots. Further AT command detail in the AT Command Password Protection section under the Intelimax+ specific AT Commands section.

Boot up Message

The Intelimax+ boot up message “INTELIMAX READY” is a message that the modem sends to the host via serial port upon boot up after a hardware power restart event. Using this option the user can disable or enable this message.

IP Stack Configuration TAB

IP stack configuration page is used to setup modem IP STACK settings such as port number and IP address and connection timeouts.



Protocol:

IP Stack supports TCP and UDP, depending on your application requirement you can choose between TCP and UDP communication

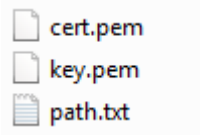
SSLv3:

If the SSLv3 check box is ticked, the Intelimax TCP/IP to serial converter applies asymmetric cryptography to the socket connection using SSLv3. When using SSLv3 all

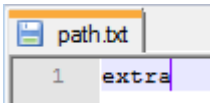
serial data transferred is encrypted in both client and server modes.

The SSLv3 certificates can be installed using the partial upload function in the GUI using the following process:

1. Create the certification file for upload to the Intelimax. The certificate files should be placed into a folder along with a path.txt file.

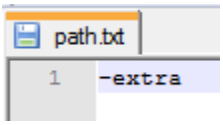


2. The path .txt file should only contain the text “extra”.



3. Zip this folder, then upload to the Intelimax using the ‘Partial upload’ button in the GUI, then reboot the modem.
4. Once the modem has rebooted the uploaded certificates can be seen on the status page under the ‘Extra’ section.

Note: To remove the certificates, upload a .zip file with one file, a path.txt file with the text “-extra”.



Note: If both SSLv3 IP Stack and secure syslog is used at the same time then the same private key and certificate are used (the ca.pem certification file is not used by SSLv3).

How to generate SSL certificates:

A SSL certificate can be generated using an application such as OpenSSL (http://slproweb.com/products/Win32OpenSSL.html, the lite version is fine).

To generate certificate for client and key for client (key.pem, cert.pem):

C:\OpenSSL-Win32\bin>openssl req -new -x509 -days 3650 -nodes -config openssl.cfg -out cert.pem -keyout key.pem

This application can be run from the command line for example: C:\OpenSSL-

Win32\bin>openssl req -new -x509 -days 365 -nodes -config openssl.cfg -out cert.pem -keyout key.pem.
The resultant 2 certificate files contained in the /bin folder and are named: cert.pem and key.pem.

Mode:

Intelimax+ supports operation of the IP Stack in either client or server modes:

- Server mode: In Server mode the modem will connect to a PPP session and will listen on a predefined port for incoming client requests
- Client mode: the modem will initiate a PPP connection and try to connect to the Primary server. If the connection to the server fails 10 times it will try the Secondary server, if the connection to the secondary server also fails for 10 times the modem will drop the PPP connection, reboot and start all over again.

Manual Auto Reconnect Client

Define whether the modem will automatically try to reconnect to TCP server if the socket connection is dropped externally.
The Auto reconnection will be disabled if a socket disconnection command (AT$$IPCTCS) is received from Serial Port.

Primary Server

Define the IP Address or DNS address of the primary server the Intelimax+ will try to connect to in Client mode, in server mode please leave this field as default.

Secondary Server

Define the IP Address or DNS name of the secondary server the Intelimax+ will try to connect to in Client mode, in server mode please leave this field as default.

Port Number

Define the TCP or UDP Port number, this port will be used in the server and client mode.

IP STACK Notifications

IP Stack notifications are by default sent out on the serial port to the connected host. With some applications this may cause issues with data transfer and using this option

the user can disable or enable the notification messages.

Idle Timeout / Idle Timer

Enabling the idle Timeout and setting an Idle Timer, will set the Intelimax+ to disconnect from a connected server (if configured as a client) or the connection from a connected client (if configured as a server) if the modem receives no data for the defined Idle Time period. Bear in mind that data could be continuously sent from the modem to the connected device, but if nothing is received back, the modem will disconnect. If the modem is connected as an auto-connect client then it will try to reconnect to the server once it has disconnected.

TCP Connect Message

The TCP connect message function allows for sending either a custom string or the IMEI number over the socket connection when it is established. If the field is left blank then the IMEI number of the modem will be sent, otherwise the custom message, up to 32 characters.

UDP Session Control

To enhance the reliability of UDP IP Stack communication within the Intelimax+, we have introduced a new configuration option, which provides Intelimax+ users with more control over the UDP activity and data communication. The user can now enable or disable keep alive in conjunction with the Network Dormant period or alternatively specify Wake up time in seconds.

Wake up feature will send dummy UDP packets prior to sending any data received via serial port to setup a channel with the network. The modem will send dummy packet twice as per timing set, followed by the actual data. This is to ensure the UDP data is not lost.

Network Dormant Period: By default, the network puts the modem in dormant or standby mode within 20 seconds of no data activity.

Keep Alive: This sends a dummy UDP packet prior to modem going dormant and this is based on the Network Dormant Period, This packet will be sent only if the modem doesn't send any data over the wireless network for the Network Dormant period.

Wake Up: Wake up feature will send dummy UDP packets prior to actual data, this wakes up the communication channel and guaranties sending the complete UDP data packet to the receiving end. Enabling this could lead to additional delay in data transfer due to modem sending a dummy packet first to initialize the UDP connection with remote site.

Client connect timeout

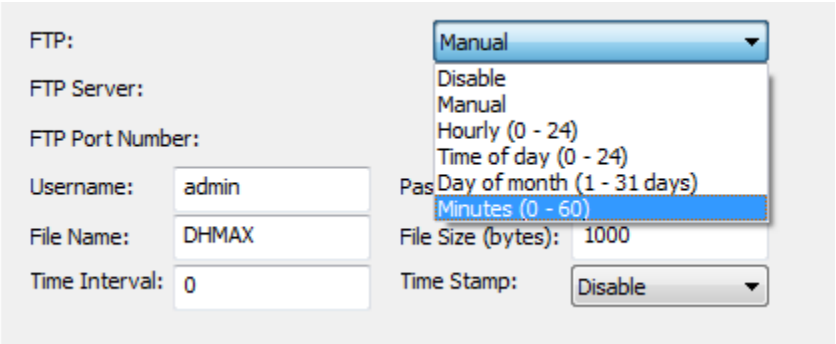
Define the number of retries for the modem to connect to a remote TCP Sever. This setting is only valid when modem is doing automatic reconnection.

FTP

The FTP functionality on the Intelimax allows for logging and uploading serial streams of data. A new line in the file is created each second and a timestamp can either be enabled or disabled.

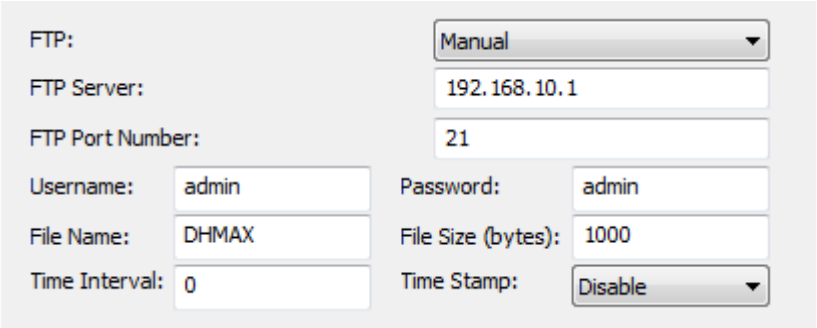
In order to use FTP on the Intelimax+, please enable 'append' on your FTP server. Also restrict the welcome message to less than 10 characters. Please save and apply settings before using.

To enable FTP on the Intelimax+ you can use either AT commands or the GUI, the AT commands are covered in the AT command section at the end of the manual. The FTP settings are on the IP Stack tab of the GUI.



Here you can configure whether to upload the FTP files manually, hourly (0-24, number of hours between uploads), by time of day (0-24, where 1 is 1AM and 13 is 1PM), by day

of month (1-31, for day of month), or by number of minutes passed (0-60, number of minutes between uploads). The time interval field is used to configure the variable applicable to each of these modes. **NOTE: when using Hourly and Minutes setting, using a time interval of 0 means never upload automatically!**



The FTP server, FTP port number, FTP server username and password can all be configured here.

- FTP Sever Host IP/Domain address with Port
- User name
- Password
- Time interval
- Header of file name (limit 10 bytes/characters)
- Size of file (Bytes) – maximum 102,400 bytes, maximum internal buffer size 10MB
- A new file will be created each time the file size is exceeded.
- Time stamp – enable (1) or disable (0) timestamp prefix (in seconds)

Each file will have a standard prefix used here with a suffix in the format DDMMYYYHHMMSS, where D is day, M is month, Y is year, H is hour in 24 hour format, M is minutes, and S is seconds. E.g. DHMAX10102014181146.csv.

A reboot is required when enabling, disabling or making changes to the FTP options.

The "size of file" parameter is used for limiting the file size of the csv file. All the input from serial port will be saved in the .csv file, and once the file size of that csv file exceed the size limit, another file will be created to hold the input. The value allowed is 1000 - 100*1000 Bytes.

Based on the configuration, the file could be uploaded to server periodically. For example:

FTP:		Minutes (0 - 60)	
FTP Server:		192.168.10.1	
FTP Port Number:		21	
Username:	admin	Password:	admin
File Name:	DHMAX	File Size (bytes):	10000
Time Interval:	30	Time Stamp:	Disable

With these settings, the modem will send a .csv file to the FTP server every 30 minutes. If the input has not exceeded limit 10K bytes (in this case), modem will send this file only, then generate another file for holding future input. If the input is more than 10K bytes, there should be more than one file generated, each file should not exceed 10K bytes, all these files will be sent to FTP server when time comes.

File uploaded with date time stamp disabled:

AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ

File uploaded with date time stamp enabled:

09/11/2012 15:44:05 AT+CSQ
09/11/2012 15:44:06 AT+CSQ
09/11/2012 15:44:07 AT+CSQ
09/11/2012 15:44:08 AT+CSQ
09/11/2012 15:44:09 AT+CSQ
09/11/2012 15:44:10 AT+CSQ
09/11/2012 15:44:11 AT+CSQ
09/11/2012 15:44:12 AT+CSQ
09/11/2012 15:44:13 AT+CSQ
09/11/2012 15:44:14 AT+CSQ

09/11/2012 15:44:15 AT+CSQ

In manual mode AT commands can be used to prompt the modem to upload the files, the AT commands themselves will also be included in the .csv file.

AT$$FTPFL

Displays the files waiting to be uploaded

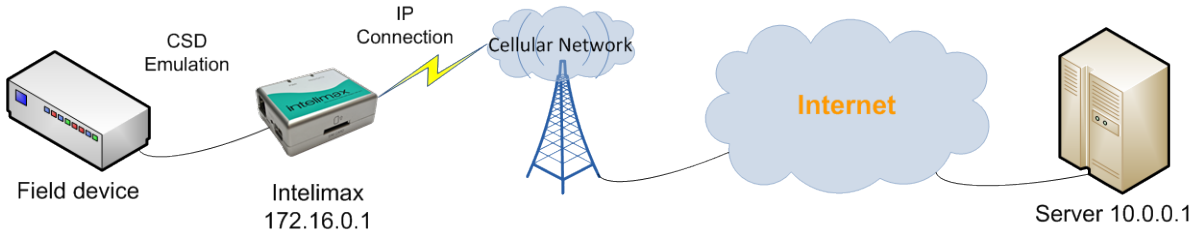
AT$$FTPSC

Will start the FTP connection and upload the files. This command can also be used to force an upload when in periodic mode. If no WAN connection is currently established (such as in IP Stack Manual mode) the Intelimax+ will establish the PPP and socket connections, upload the FTP files then drop the socket and PPP connections.

Modem Emulation TAB

Description

Modem emulation assists in the transition from Circuit Switched Data (CSD) to Packet Switched Data(PSD)/IP. If the control centre management system supports IP but the field devices only support dialling back to the control centre using CSD, then you can use the Intelimax+ to emulate the CSD modem interface. The Intelimax+ can also be configured to act as an IP stack server for incoming connections if necessary.



Dialling Process

From the perspective of the field device it will dial out a CSD data call like it always does, except the Intelimax+ will instead establish an IP stack client connection to the server. For example, the field equipment may dial the following string: 'ATDT0412123456', then wait for the connection to be established by receiving a 'CONNECT' message. The Intelimax+ can be configured to establish an IP stack client connection to one of the several different server IP addresses depending on the number dialled.

Important: for the dial command, only ONE control character, which is CR or LF, can be put immediately after the number to be dialled, e.g. ATDT0412123456<CR>.

Intelimax+ Configuration

Modem Emulation will always generate a TCP Client connection to a remote server based on the number and the associated TCP destination. The Intelimax+ must be configured in IP Stack Auto or Manual mode with IP Stack in Server mode. This configuration can be made using the Intelimax+ GUI or via AT commands. If the Intelimax+ is in IP Stack Manual mode, then it will only connect to the network when it

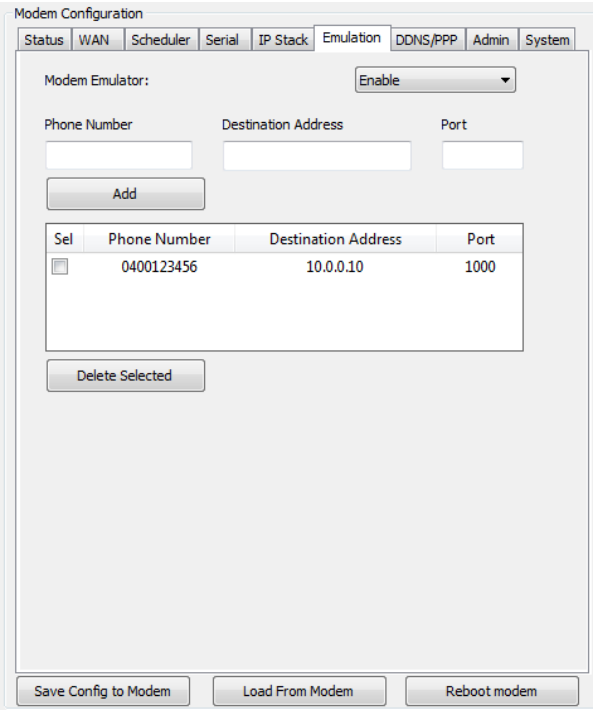
receives the ATDT command via serial and will drop the connection when the call is hung up (+++, ATH).

If the Intelimax+ is in IP stack Auto mode, then the modem will act as an IP stack server and therefore could be addressed remotely. If a remote TCP client is making connection to the modem, the modem will act as if an incoming CSD call is made and a connection will be established according to the S0 setting. If a CSD call is dial out of the modem, the IP stack server will stop listening and allow the TCP client connection assigned to the dialled number to be connecting to the remote server.

RING Message

To emulate the incoming CSD call the Intelimax will print out RING messages at a rate of 1 RING per second according the S0 setting. In order to account for this delay when dialling out through the modem, it is advisable to add a CONNECT message delay using the AT$$TCPDEL=<MS> command, e.g. AT$$TCPDEL=2000 for a 2 second delay before printing out the CONNECT message (this command can only be set via AT commands, not through the GUI).

GUI Configuration

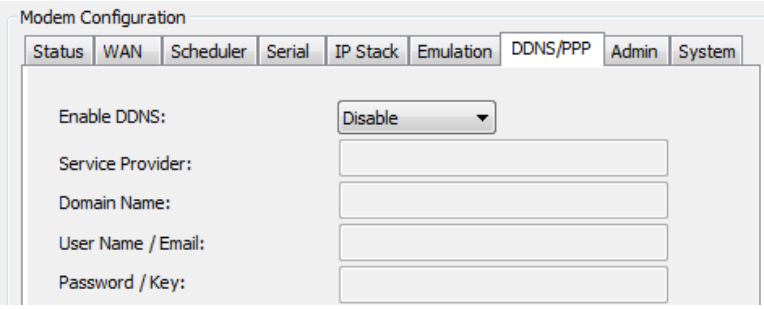


Up to 50 phone numbers can be added to match to destination IP addresses and port numbers. It is recommended that 5-10 numbers are added at a time through the GUI before saving and rebooting the modem to reduce the risk of GUI connection timeout and lost entries.

Dynamic DNS

Allows the user to configure; Username, Password and Domain name to be used by Intelimax+ when authenticating on a DDNS server.

- Enable DDNS
- Select to enable DDNS.
- Service Provider
- Link of the DDNS service web page (Server site is http://dyn.com) by default)
- Domain Name
- Set DDNS host name or Alias from DDNS server
- User Name/Email
- Input User Name for logging onto a DDNS server
- Password/Key
- Input Password for logging onto a DDNS server



PPP Server

Usually the Intelimax acts as an IP connected cellular serial server, relaying data between its serial inputs to TCP/UDP sockets. Devices connect to serial port of Intelimax, directly send data or use dial commands to set up a data transmission session. Some devices may need to use their own TCP/IP stack, in which case either serial modem mode (transparent) or PPP server can be used. The benefit of using PPP server over serial modem or transparent mode is that the modem functionality can continue to be used and it will be uniquely addressed within the system. This allows for the use of AT over IP for sending and receiving SMS messages or querying the signal strength, SNMP for remotely monitoring the status of the modem, or remote firmware upgrades to the modem if required.

* PPP, or Point-to-Point Protocol, is a protocol commonly used to establish a direct connection between two devices over a serial cable, phone line, trunk line, cellular telephone, specialized radio links, or fibre optic links.

In this working mode, the Intelimax will launch a PPP server and wait for the user device PPP client to connect. Once the PPP connection is established, the device can talk to the Intelimax through a network connection. The Intelimax then acts like a network gateway, all data traffic from the device will be routed to the WAN interface, and then be sent to the internet. In all PPP server modes, traffic from end-device to internet is masqueraded behind modem WAN IP.

The device can use any TCP/UDP port to talk to peer applications on the internet side, thus the dedicated TCP/UDP socket connection between the Intelimax and user server application is no longer needed, the user device can open socket directly.

There are WAN working modes described below that will work in this scenario:
For more information about PPP WAN modes, please refer to next chapter.

- PPP WAN Auto
- PPP WAN Conditional
- PPP WAN Manual

PPP WAN modes

PPP WAN Auto

In this mode, the WAN IP connection is always connected.

PPP WAN Conditional

In this mode, the WAN IP connection is based on the LAN PPP connection, once the LAN PPP connection is up, the WAN IP connection will be established and vice versa. This is to save data usage and device power consumption.

PPP WAN Manual

In this mode, the device needs to send commands to bring up/bring down the WAN IP connection. The command are sent over the LAN PPP connection using AT over IP to the modem (not module AT over IP).
AT$$IPCTOP to open WAN PPP connection.
AT$$IPCTCP to close WAN PPP connection.
More information about AT over IP will be given in the following chapter.

AT over IP

The user device can use AT commands to get modem/3G module information and instruct the modem to perform some actions. To use AT commands, user device should open a TCP socket on port 12522, which is configurable through GUI, and then send AT commands to this socket. Only pre-defined AT commands are supported. Please refer to the Maxon Intelimax user manual for the custom AT command format and which commands are currently supported.

There are several commands that are not needed when the Intelimax is in PPP server mode such as:

ATD or ATDT

AT$$IPCTOS

AT$$IPCTCS

AT$$TCPDEL

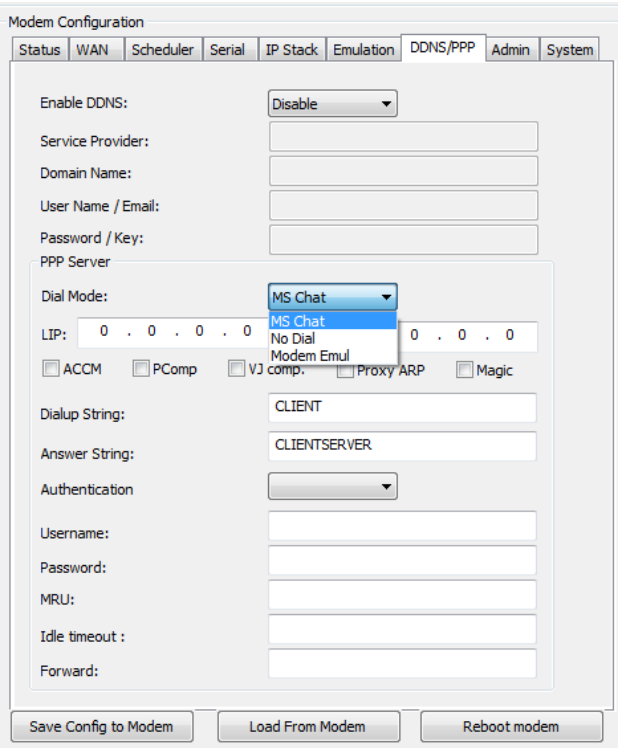
ATH

ATO

+++

All socket related commands are not supported because when the Intelimax works in PPP server mode, the TCP/UDP socket on the WAN side is no longer needed, the modem now is a gateway.

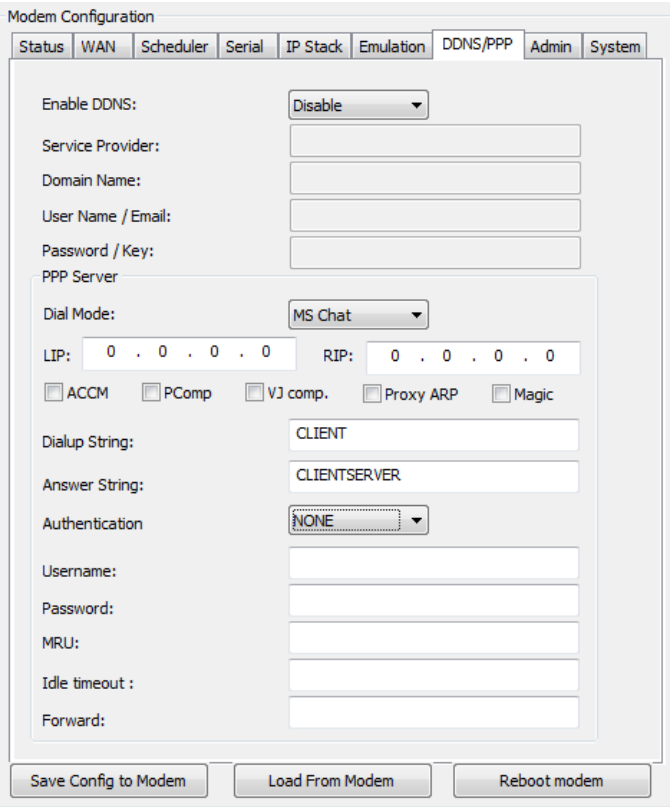
PPP Dialling Modes



Three Dial modes are supported:

- MS Chat
- No Dial
- Modem Emulation

The MS Chat Dial mode is to support Microsoft Windows PPP client. Before initiating the PPP connection, it requires the exchange of the text strings "CLIENT" (from the client) and "CLIENTSERVER" (from the serer). So in MS Chat mode, the Intelimax PPP server will expect a "CLIENT" string from the client and then send back "CLIENTSERVER".



No Dial mode means the client PPP will initiate PPP connection without any dialling string being sent prior to PPP session. THIS IS NOT CURRENTLY SUPPORTED

In Modem Emulation mode, the PPP client will send dialling strings such as ATV1; AT+CGATT=0;ATDT*99***1# etc., and user can define dialling strings to be sent to the PPP server. The user can define what string it will expect to hear back from PPP server before the PPP connection is initiated such as "cr1000dial". In this mode, either both of these response fields can be configured or just the answer string.

The standard PPP dial out process can be replicated by using modem emulation mode with the 'Dialup String' left blank and the 'Answer String' set to "CONNECT".

All AT commands for dialling should be sent before the dialup String, the special command ATDT*99***1# (or ATDT*99#) will inform the Intelimax to go into a PPP exchange string mode.

In Modem Emulation mode, before the PPP connection is established, AT commands are supported to change settings in the modem or collect information from the modem. All standard AT commands and Maxon customized AT$$ commands are supported. The command ATDT*99***1# is to notify the Intelimax to go into the PPP mode, after this command no more AT commands are supported through direct accessing of the serial port. To continue to use AT commands after PPP connection, AT over IP to port 12522 can be used.

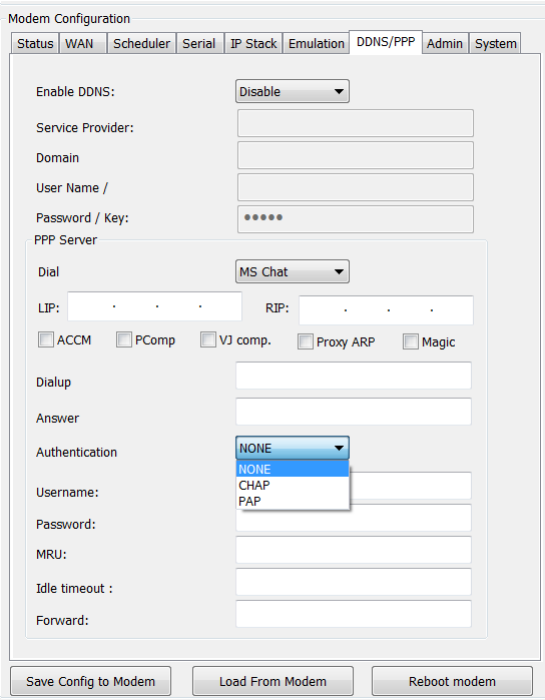
Other PPP Options

- ACCM: Async-Control-Character-Map enable or disable
- PComp: Protocol field compression negotiation enable or disable
- VJ comp: Van Jacobson style TCP/IP header compression enable or disable
- Proxy ARP: Proxy Address Resolution Protocol enable or disable
- Magic: Magic Number Negotiation enable or disable

Please see https://ppp.samba.org/pppd.html for further detail.

Authentication:

PPP server supports 3 authentication modes: None, CHAP and PAP.
Whenever CHAP or PAP authentication mode is selected, the username and password should be provided as well, otherwise, these two fields can be left blank.
The authentication is not currently supported in firmware and will be implemented in future releases.



MRU:

Maximum Receive Unit. The PPP server will ask the client to send packets of no more than [MRU] bytes. The value must be between 128 and 16384; the default is 1500.

Idle Timeout:

This is to specify that PPP server should disconnect if the PPP link is idle (No data traffic) for [Idle] seconds.

Port Forwarding

The 'Forward' section is for entering the port forwarding options with the following format:

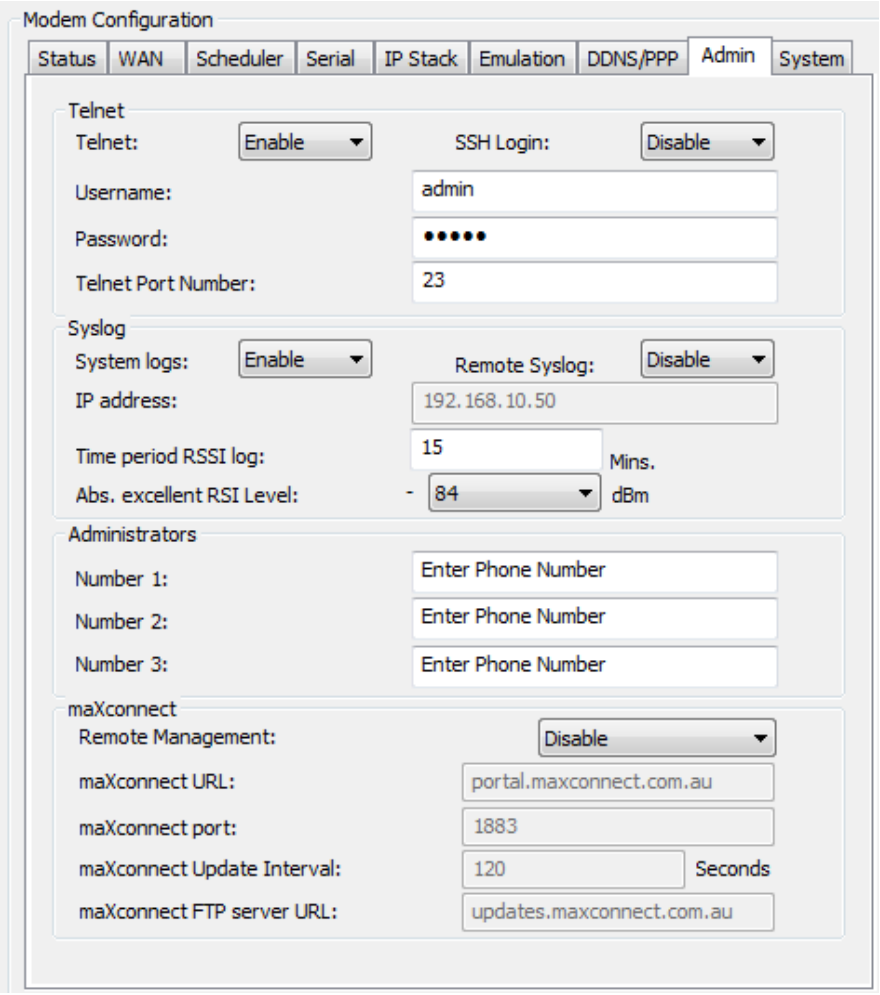
Incoming port WAN : Outgoing port LAN

e.g. 8080:80 port 8080 on the WAN interface is forwarded to port 80 on the LAN interface.

Extra port forwards are separated with a comma. Currently only individual ports can be forwarded, but port ranges will be added in future firmware release.

An additional white paper on PPP server functionality is available from Maxon.

Administration TAB



Telnet and SSH login

- User Name setting using for Telnet and TCP connection.
- Password setting using for Telnet and TCP connection.
- Enable or disable Telnet.
- Set Telnet port number to use.
- Set SSH enable or disable.

Syslog

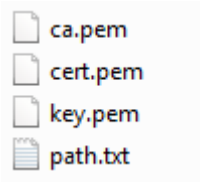
Syslog allows viewing system logs plus enabling the remote syslogs function and server IP address. The internal system logs save to a memory space of 9MB with a quad-file

circular memory buffer, when the last file is full it will delete the first.

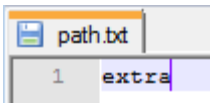
- If local system logs are used, then these can be recovered using either the GUI or via Telnet or SSH to the modem. If the system log if file is large it may take some time to extract.
- The Intelimax also send syslog data to a syslog server according to RFC5424, RFC5425 and RFC6587. The event types are: auth, authpriv, cron, daemon, kern, mark, security. The default payload size is 480 octets.
- By default, the remote system logs are without encryption. Encryption can be enabled by installing TLS certificates using the process described below. The secured syslog client uses TCP port 6514.

How to configure the secure syslog client:

1. Create the certification file for upload to the Intelimax. The certificate files should be placed into a folder along with a path.txt file.

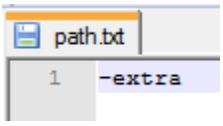


2. The path .txt file should only contain the text “extra”.



5. Zip this folder, then upload to the Intelimax using the ‘Partial upload’ button in the GUI, then reboot the modem.
6. Enable ‘Secure’ under remote syslog dropdown. If the Intelimax+ has the valid certification files, then it will change from UDP unsecure syslog (on port 514) to TCP secure syslog with TLS encryption (on port 6514).
7. Once the modem has rebooted the uploaded certificates can be seen on the status page under the ‘Extra’ section.

Note: To remove the certificates, upload a .zip file with one file, a path.txt file with the text “-extra”.



How to generate SSL certificates:

A SSL certificate can be generated using an application such as OpenSSL (http://slproweb.com/products/Win32OpenSSL.html, the lite version is fine). This application can be run from the command line for example:

- To generate root certificate (ca.pem):
  - C:\OpenSSL-Win32\bin>openssl genrsa -out ca.key 4096
  - C:\OpenSSL-Win32\bin>openssl req -new -x509 -days 3650 -key ca.key -out ca.pem
  - The passphrase for the ca.key is not critical so anything suits such as 'administrator'.

The self-signed server certificate must be generated on the machine that is running the secure syslog application. Some server applications do not check the client certificate and accept connections from any client.

- To generate certificate for client and key for client (key.pem, cert.pem):
  - C:\OpenSSL-Win32\bin>openssl req -new -x509 -days 3650 -nodes -config openssl.cfg -out cert.pem -keyout key.pem

RSSI logging and Excellent Signal Level

- Configure the time period over which the RSSI logging will be averaged (between 15 and 60 minutes). The RSSI value is measured every 10 seconds.
- The RSSI values are saved to the RSSI log every 15 minutes and a maximum 90 days of logging can be recovered via the GUI.
- Excellent Signal Level sets the level at which the RSSI signal strength will be considered high. This is the level at which the PWR LED will be solid ON.

Administrators

- Administrator phone numbers can be added to restrict the SMS remote control messages to a limit number of phone numbers.
- Administrators phone numbers in international format +61412 345 678

maXconnect

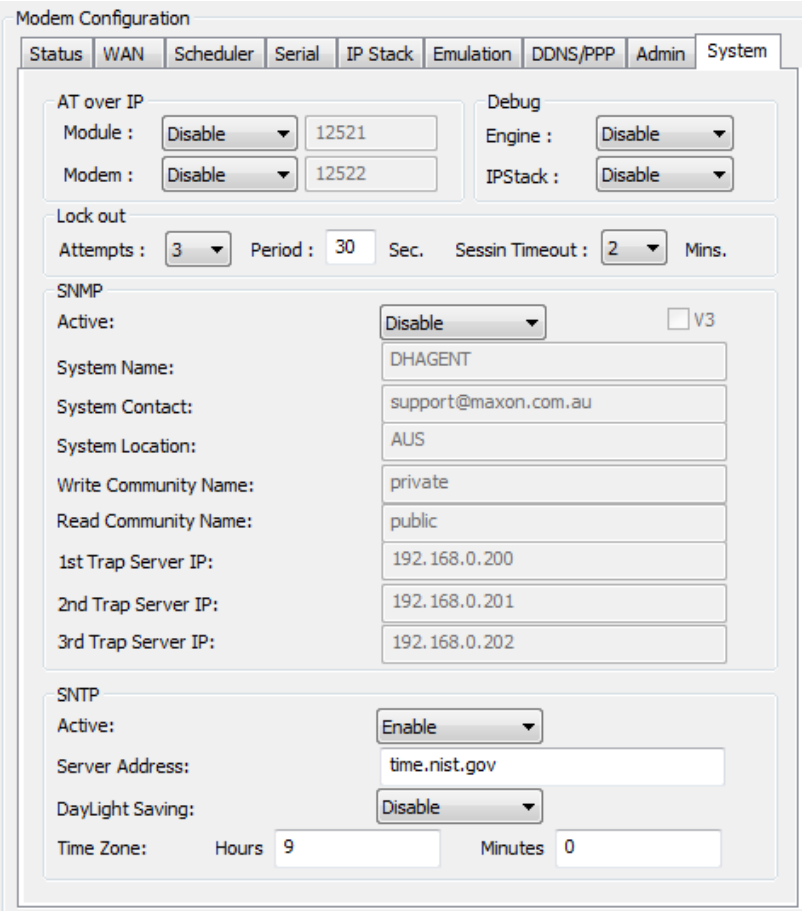
maXconnect is Maxon's cloud based M2M management portal which allows you to access, monitor and control 3G/4G Maxon devices securely. With maXconnect you can access real-time data from your devices, monitor their status and location. Utilise complete functionality by controlling your devices anywhere, anytime. This one stop portal is an access point to manage your 3G/4G assets securely and remotely.

Use within maXwan

maXconnect can be used when the device is connected to the Internet or within maXwan.

- The default settings for general internet connections are as follows:
  - maXconnect URL: portal.maxconnect.com.au
  - maXconnect port: 1883
  - maXconnect update interval: 120 seconds
  - maXconnect FTP server URL: ftp.maxconnect.com.au
- For connections to MaxConnect within MaxWAN please use the following:
  - maXconnect URL: 10.0.0.1
  - maXconnect port: 1883
  - maXconnect update interval: 120 seconds
  - maXconnect FTP server URL: 10.0.0.32

System TAB



AT over IP

AT over IP can be used to access the AT command interface of the Intelimax+ internal cellular **module** or the Intelimax specific **modem** AT commands. The AT over IP function can be used either over the local USB/LAN interface to the modem or via a remote IP connection.

This can be useful for remotely checking signal strength, sending SMS messages through the modem etc. While the AT over IP connection to the module is in use the modem cannot communicate via AT commands to the module so it is recommended to only open the port for less than a minute at a time.

Debug

The debug settings allow for additional debug levels to be set in the modem to allow for additional debugging capabilities. When these debugging settings are enabled, the syslogs (system logs) contain additional information for either the engine or IP stack. These should only be turned on for short periods of time while debugging and turned off once debugging has been completed.

Lock out

The lockout configuration configures the GUI modem access control.

- Attempts: configures the number of incorrect login attempts the modem will allow for before locking out any login attempts for the period. Between 0 and 10.
- Period: Timeout period before a login attempt can next be accepted. Between 0 and 999.
- Session Timeout: Configures the length of time a session can be held between the GUI and the modem. Between 0 and 10.

SNMP Configuration

Simple Network Management Protocol (SNMP) is the protocol governing network management and the monitoring of network devices and their functions. It is not necessarily limited to TCP/IP networks. The Intelimax+ supports SNMPv2 and SNMPv3, if the 'V3' check box is ticked SNMPv3 is used otherwise SNMPv2 is used. Inteliamx+ uses Secure SNMPv3 SHA authentication and AES privacy. The administrator password should be more than 8 characters long.

With the Intelimax+ SNMP customers can read the modem Signal Strength, registration value, ecio, rscp, IMEI, firmware and module firmware values, as well as reset the modem via SNMP MIB as shown below.

```
bjoh@bjoh-pc:~$ snmpwalk -v 2c -c public 192.168.2.1 .1.3.6.1.4.1.910
SNMPv2-SMI::enterprises.910.1.0 = INTEGER: -83
SNMPv2-SMI::enterprises.910.2.0 = INTEGER: 1
SNMPv2-SMI::enterprises.910.3.0 = STRING: "-7.0dBm"
SNMPv2-SMI::enterprises.910.4.0 = STRING: "-88dBm"
```

```
MAXON-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
        OBJECT-TYPE, MODULE-IDENTITY, Integer32, enterprises
                FROM SNMPv2-SMI
        DisplayString
                FROM SNMPv2-TC;

MaxMIB MODULE-IDENTITY
        LAST-UPDATED  "201104150000Z"
        ORGANIZATION  "DHPLAB"
        CONTACT-INFO    "support@maxon.com.au"
        DESCRIPTION     "Maxon MIB"
        REVISION     "201104150000Z"
        DESCRIPTION   "This file defines the maxon mib by dhplab."
        ::= { enterprises 0910 }
signalStrength OBJECT-TYPE
        SYNTAX Integer32 (0..105)
        MAX-ACCESS  read-only
        STATUS current
        DESCRIPTION
        "Signal strength of the modem"
        ::= { MaxMIB 1}
registrationValue OBJECT-TYPE
        SYNTAX Integer32 (0..5)
        MAX-ACCESS  read-only
        STATUS current
        DESCRIPTION
        "Registration of the modem"
        ::= { MaxMIB 2}
ecioValue OBJECT-TYPE
        SYNTAX DisplayString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "EC/IO of the modem"
        ::= { MaxMIB 3}
```

```
rscp OBJECT-TYPE
        SYNTAX DisplayString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "RSCP of the modem"
        ::= { MaxMIB 4}
imei OBJECT-TYPE
        SYNTAX DisplayString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "IMEI of the modem"
        ::= { MaxMIB 5}
boardreset OBJECT-TYPE
        SYNTAX Integer32 (0..1)
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
        "Board reset"
        ::= { MaxMIB 6}
firmware OBJECT-TYPE
        SYNTAX DisplayString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "Firmware version of modem"
        ::= { MaxMIB 7}
firmwareModule OBJECT-TYPE
        SYNTAX DisplayString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
        "Firmware version of module"
        ::= { MaxMIB 8}
```

END

The following SNMP trap events are also supported:

- Authentication incorrect password
- Authentication incorrect username
- Maximum session timeout expired

Note: SNMP events are reported in SNMPv2, however SNMP access can be either SNMPv2 or SNMPv3.

SNTP

SNTP can be used to update the time of the Intelimax+. The modem will by default take its time from the network. When SNTP is enabled, the modem will query a network-based NTP server using the SNTP protocol and pull the time from it. The timezone can be configured depending on where in the world the modem is used. If the daylight savings setting is configured the modem will add an additional 1 hour to the system time setting. If SNTP is not configured correctly or the server is not available then it can cause the system logs to incorrectly record as they are referenced to system time. The minutes configuration can only be set to 30 minutes.

Other GUI functions

Output Info

- Output Information for receiving Intelimax+'s data in serial or remote access.
- When syslog are requested, this is where they are printed before being saved to a file.

Clear Output

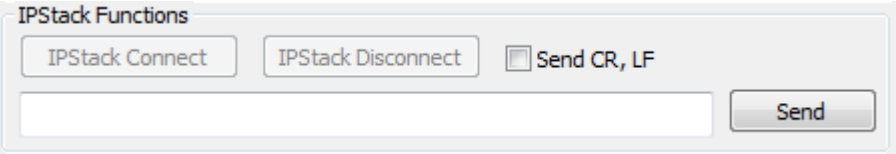
Clear all information in the 'Output Info' window.

Save Output

Save Output Info information to a .txt file.

IP Stack Functions

These options are available when connected to the modem via serial.



IP Stack Connect Button

When IP Stack is Manual Mode, connect without AT Command input. Sends the appropriate AT command ('AT$$IPCTOS') to the modem via the serial port.

IP Stack Disconnect Button

When IP Stack is Manual Mode, disconnect without AT Command input. Sends the appropriate AT command ('AT$$IPCTCS') to the modem via the serial port.

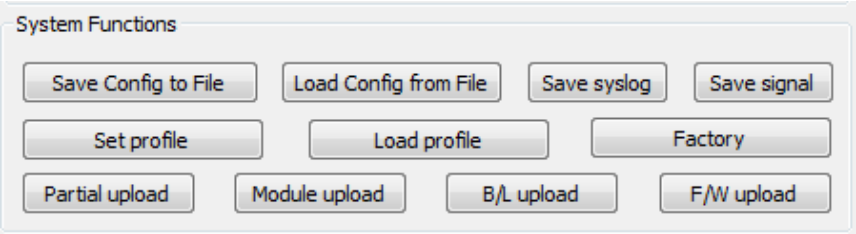
Send CR, LF

Add Carriage Return and Line Feed message when data is sent. Use for AT Command sending via the GUI. It is recommended that this check box is used as it emulates pressing the 'Enter' key on your keyboard.

Send Button

Send AT Command and Data.

System Functions



Save Config to file

Save modem configuration as an encrypted .dat file.

Load Config from file

Load modem .dat configuration file.

Save syslog

If remote syslog is not enabled, this will print out the internal system logs to the 'Output Info' window. Depending on the size of the internal syslog file, this may take several minutes. Once this is completed a 'LogFile' will be saved in the same location as the GUI .exe or it can be saved using the 'Output Info', 'Save Output' button.

Save signal

This will output the profile of signal strength from the modem over the previous 90 day period to a signals.log file and to the 'Output Info' screen. The output file has the following per-line format: "[Sun Jan 2 14:19:09 UTC 2000],69,69,70", where the final three numbers are average, min, and maximum signal strength over the preset period.

Set Profile

Sets the modem profile, which is also recovered by holding down the reset button for between 5 and 20 seconds. The modem can therefore have 3 different configurations, the current running configuration, which is saved to the modem with the 'Save Config to Modem' button, the profile configuration, which is saved using the 'Set profile' button, and the factory settings.

Load Profile

Recovers the modem profile. Is also achieved by holding down the modem reset button for between 5 and 20 seconds.

Factory

Resets the Intelimax+ to firmware factory settings. This will wipe all the settings on the modem, including the configured saved profile settings. This can also be achieved by holding down the modem reset button for between 20 and 60 seconds.

Partial upload

Allows for partial/incremental firmware updates to the modem, rather than updating the entire firmware file. The file format is a .zip file of the partial firmware component and the internal path for installation. This is especially useful in conserving network limited data when using conservative network data plans. Partial upload is also used to upload secure socket and secure syslog keys and certificates to the modem.

Module upload

Updates the internal cellular module firmware using module .usf file format.

B/L upload

Allows for modem bootloader update.

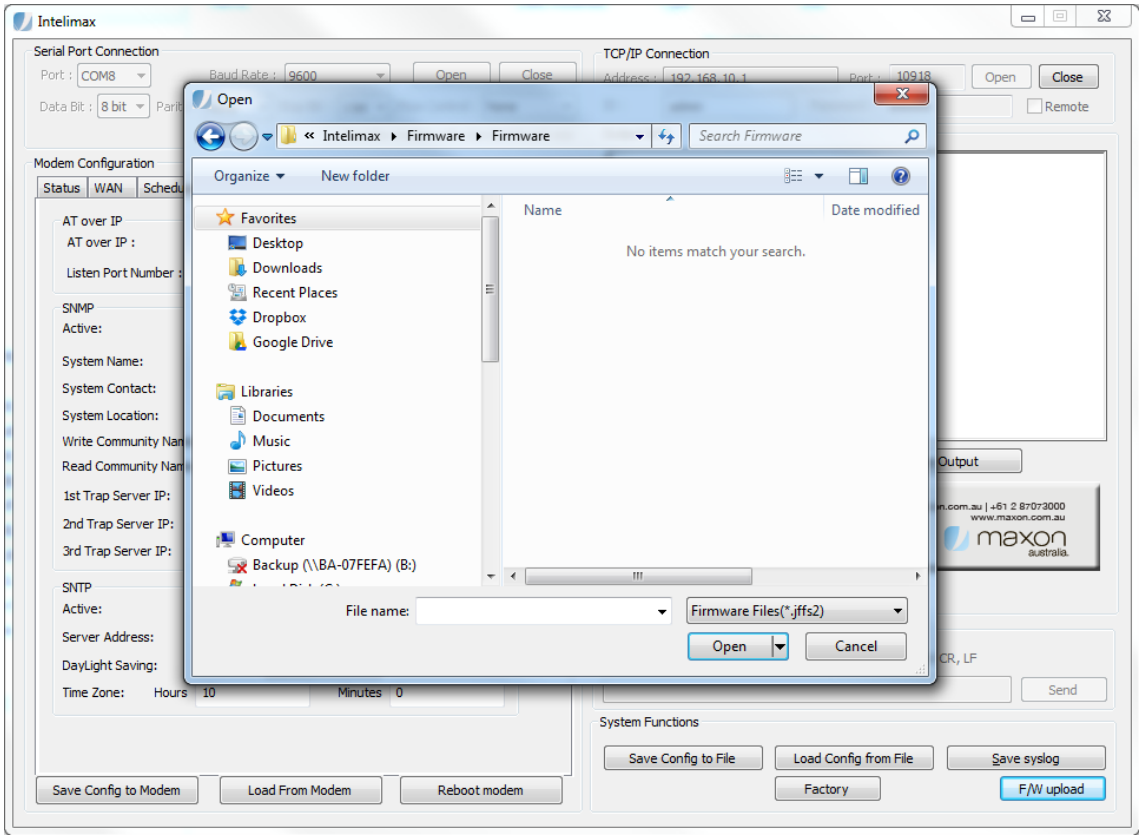
F/W upload – FOTA

Update the modem full firmware file.

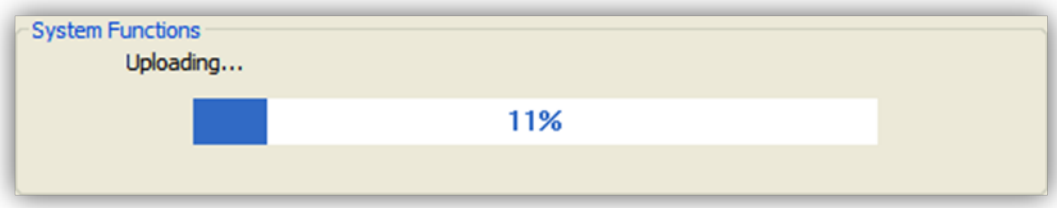
Note: Any update should only be attempted with the assistance of Maxon.

Firmware Upgrade

Upgrade the Intelimax+'s firmware



Click 'Firmware Upgrade' button and select firmware file. And open the file, the uploading process will begin after a short delay.



Do not remove Intelimax+'s cable or turn off the power until upgrade finishing. The modem will reboot and come back online once the firmware upgrade process has completed.

SMS Commands (IP modes)

The Intelimax can be used to send and receive SMS messages through standard SMS AT commands with an internal buffer of 100 messages. In addition to this the Intelimax supports a number of custom SMS messages for which can be used to check and modify some settings remotely.

There are a number of symbols that are not interpreted correctly through the cellular module. When configuring a username or password the modem will correctly interpret the special character but the response may not match. For example the '@' symbol will be interpreted correctly, but the response may show a '¡' symbol as the response even though the '@' symbol has been correctly received by the modem.

Following SMS commands can be used to change the APN, ID, Password, Authentication and even rebooting Intelimax+. Also after changing the APN, ID, Password, Authentication, Intelimax+ will send a confirmation SMS after applying the change.

- Change APN (e.g. telstra.extranet)
  SMS Syntax: INTELIMAX.PARK.APN telstra.extranet

- Change Username, Password and Authentication (e.g. Username: maxon@maxon.com.au, Password: maxon, Authentication: chap)
  SMS Syntax: INTELIMAX.PARK.AUTH maxon@maxon.com.au:maxon:chap

  Note: Please see above regarding special characters such as '@'.

- Check Settings and IP address
  SMS Syntax: INTELIMAX.PARK.WANIP

- Reboot Intelimax+
  SMS Syntax: INTELIMAX.PARK.REBOOT

- RSSI Info
  SMS Syntax: INTELIMAX.PARK.RSSI

- DDNS configuration change by SMS

SMS Syntax:

INTELIMAX.PARK.DDNS1 <mode 1-enable 0-disable>(,<host address>)

e.g. INTELIMAX.PARK.DDNS1 1,dyn.com

INTELIMAX.PARK.DDNS2 <domain name>,<user id>,<user password/key>

e.g. INTELIMAX.PARK.DDNS2 inte.dyndns.biz,maxon,max@123

- Change mode via SMS

  SMS Syntax:

  INTELIMAX.PARK.CHGMODE <1(IPStack Auto)/2(IPStack Manual)/3(Serial Modem)>

  e.g. INTELIMAX.PARK.CHGMODE 1

  Reply message syntax: Mode Change To <mode>

  e.g. Mode Change To IPStack Auto

The modem will automatically reboot after sending the response.

SMS Commands (Serial modem modes)

The Reboot Intelimax+ SMS command can be used to act on Intelimax+ specific SMS messages when in serial modem mode. For this to happen the modem must be told to intercept the SMS messages using the AT$$STEALTHSMS command.

AT$$STEALTHSMS?

$$STEALTHSMS: 0

OK

AT$$STEALTHSMS=0 – disable modem interception of SMS messages

OK

AT$$STEALTHSMS=1 – modem to intercept SMS message

OK

- Reboot Intelimax+

  SMS Syntax: INTELIMAX.PARK.REBOOT

- RSSI Info

  SMS Syntax: INTELIMAX.PARK.RSSI

  Reply message syntax: RSSI <value> e.g. RSSI -57

- Change mode via SMS

  SMS Syntax:

  INTELIMAX.PARK.CHGMODE <1(IPStack Auto)/2(IPStack Manual)/3(Serial Modem)>

  e.g. INTELIMAX.PARK.CHGMODE 1

  Reply message syntax: Mode Change To <mode>

  e.g. Mode Change To IPStack Auto

  The modem will automatically reboot after sending the response.

IMPORTANT:

Modem firmware requires +CNMI=2,1 settings for getting notified when new SMS is available. Due to cellular module's behaviour on +CNMI command, any +CNMI write command via the modem serial port would break the modem SMS command function and the change cannot be saved if modem reboots. So please be cautious in using the AT+CNMI write command over the serial port.

Remote change from CSD mode to IP mode

The Intelimax+ has the unique in-built feature of being able to change between modes and configure settings remotely over a CSD call. This is especially useful if you have a modem in the field that you need to remotely configure using remote AT commands or the Intelimax+ GUI but are currently using CSD to talk to this modem. Using these commands lets you change to an IP connection for easy access to the device over an IP connection. This feature is available from firmware versions 0.1.67 onwards.

It is very important to ensure that you can access your modem once this is done which means either using a static IP address (private IP WAN or similar) or a public dynamic IP address such as telstra.extranet the WAN IP of which can be found via SMS.

Dialing Process

Dial out to the modem via a command line terminal session to your data modem using the data number of the SIM card in the Intelimax+. The sting will be as follows: ATDT0400123456. Once the 'CONNECT' message has been displayed you are connected.

Intelimax+ Remote Configuration Commands

The following commands can be used to change the settings of the Intelimax+:

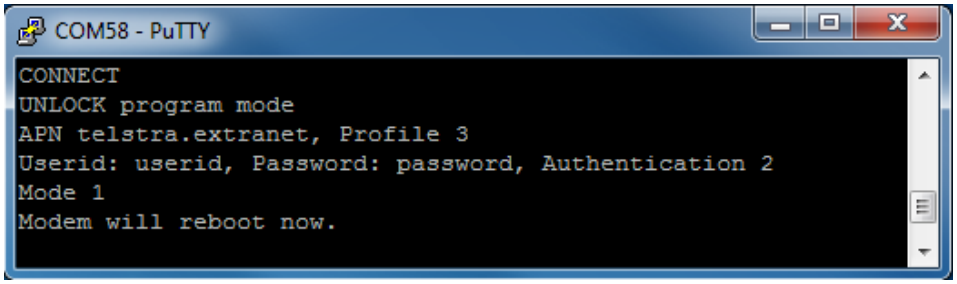
Unlock the CSD programming interface: program.maxon.unlock=admin:admin
admin:admin are the default username and password, if you have changed these update this command with the appropriate values in the order username:password.

Update the cellular APN: program.maxon.apn=telstra.extranet
Update the CPN username, password and authentication:
program.maxon.auth=userid:password:chap/pap/none

Change the mode of the modem: program.maxon.mode=1
Where:
IP Stack Auto mode – auto connect IP
IP Stack Manual mode – manual connect IP
Serial modem mode – for CSD or when end device controls connection

Apply all the settings and reboot: program.maxon.lock

Once the commands have been received by the modem it will display 'Modem will reboot now' and the call will be dropped as the modem reboots:



Once the modem reboots (approximately 2 minutes) if a public dynamic IP address has been used it can be found using the following SMS to the phone number (not data number) of the SIM in the modem: **INTELIMAX.PARK.WANIP**

LED Functionality

The below is the default LED flashing sequences. On the Administrator tab of the GUI the excellent RSSI Level setting can be modified (-84dBm is the default value) to suit application needs. All other levels are set based on the excellent level setting and evenly divided into 5 levels.

Signal Strength	PWR/RSSI LED
SIGNAL > -84dBm (or excellent RSSI setting)	SOLID ON
-91dBm < SIGNAL ≤ -84dBm	200ms OFF 800ms ON
-98dBm < SIGNAL ≤ -91dBm	400ms OFF 600ms ON
-105dBm < SIGNAL ≤ -98dBm	600ms OFF 400ms ON
SIGNAL ≤ -105dBm	800ms OFF 200ms ON
SIM Not Registered	600ms OFF 400ms ON

Connection Status	Data LED
IP STACK IDLE / SERIAL MODEM IDLE	OFF
IP STACK ONLINE / SERIAL MODEM CONNECTED	1s ON 1s OFF

Data Transfer Indication

In addition to the below LED flashing sequence the Intelimax+ will also display TX and RX activity on the LEDs. When data is received on the serial port and sent over the WAN the green LED in the PWR/RSSI side will flash. When data is received over the WAN and sent over the serial port the green LEN on the DATA side will flash. The result of this flashing will either be a green or an orange depending on current RED LED state.

During the boot sequence the Intelimax+ PWR/RSSI LED will turn on for 10 seconds, then off for 10 seconds, before going into the nonregistered state. Registration typically takes another 30-40 seconds depending on signal strength.

Device Operation Checking / Debugging

In order to check that the Intelimax is operating correctly both locally and remotely please follow the below procedures.

Local Checking:

In order to verify that the modem is operating correctly locally follow the below steps:

1. Check that modem Power LED is either solid on or mostly on. The better the signal strength the more time the Power LED will stay on.
2. In serial modem mode:
    a. Connect to modem with GUI via USB interface and check the registration and signal strength of the modem. The status page will show whether the modem is currently registered as well as showing the signal level in dBm, which should be better than -93dBm.
    b. Trigger a connection through the modem (either CSD or PPP connection) and ensure that the data light will correctly flash to indicate data transfer through modem.
3. In IP Stack auto mode:
    a. Connect to modem with GUI via USB interface and check the registration and signal strength of the modem. The status page will show whether the modem is currently registered as well as showing the signal level in dBm, good levels are better than -81 dBm.
    b. Ensure that the modem has a data connection which should be automatically set up by the IP auto modem connection function. If the data LED is flashing then this connection has been established.

Remote Connection Checking:

In order to verify that the modem is correctly operating when the modem is remotely located please follow the below steps:

1. In serial modem mode with CSD connection, dial into the modem data number:
    a. If the response is 'BUSY' then the SIM card is not correctly provisioned.
    b. If the response is 'NO CARRIER' immediately then the SIM card is off line and not registered.
    c. If the response is 'NO CARRIER' after some time, then the modem auto answer is not working correctly but the SIM card is registered.

d. If you are able to connect to the modem (response is 'CONNECT', then you can remotely check the settings on the modem by changing to an IP mode and making a connection to the modem using the configuration GUI.

2. In IP Stack modes:
   a. Open the GUI with an IP connection to the modem and log in.
      i. Check that the settings are correct for the equipment that you are wanting to connect to, including the serial baud rate etc.
      ii. Check that the signal strength is of a good level, better than -81 dBm.
   b. Use an SNMP viewer to connect to the modem SNMP server.
      i. Check signal strength, good levels are better than -81 dBm.
      ii. Check that the modem settings are correct.
3. In either mode send an SMS to the modem to perform the following:
   a. Check RSSI: By sending INTELIMAX.PARK.RSSI to the modem the modem will respond with the RSSI which should be better than -81 dBm.
   b. Check APN and WAN connection using: INTELIMAX.PARK.WANIP. The response is: "IP:<IP.IP.IP.IP>,APN:<APN>,ID:<ID>,PW:<PW>,Auth:<PAP, CHAP,BOTH>,Reg:<0,1>,Sig:<CSQ>"
   c. If neither command work then reboot the modem using: INTELIMAX.PARK.REBOOT

Telnet / SSH Commands

Using Intelimax+ Telnet / SSH commands allows you to configure the modem remotely, also you can send diagnostic commands here is summary off of tasks that you can perform

1. Stat : Used to display sys log, system info and DNS settings
2. Setup: using this menu you can setup system settings, Dynamic DNS, operation mode, SNMP and SNTP settings
3. Send Direct AT commands to the modem module
4. Check signal strength t+
5. Use Ping command
6. Check system up time
7. Set the modem to factory default
8. Reboot the modem

Connecting to the modem via telnet

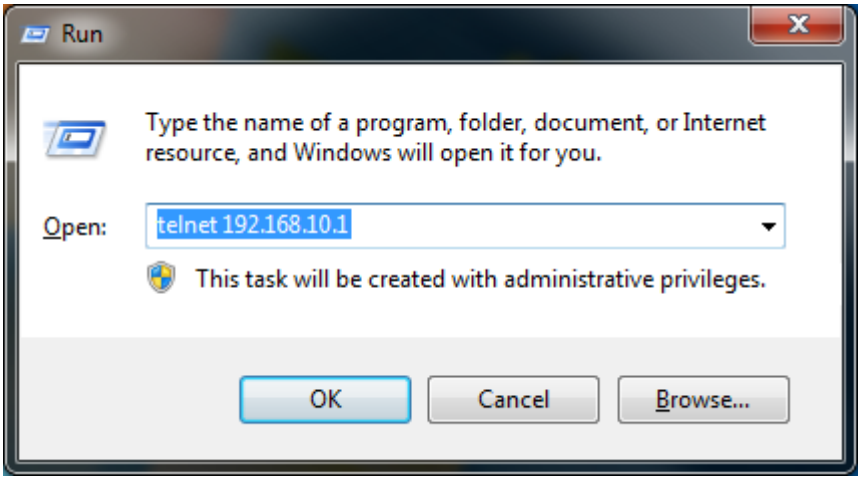
To access the modem via Telnet or SSH you will need the following

1. A Telnet or terminal software you can use windows telnet
2. Telnet needs to be enabled on the Intelimax+
3. Modem IP Address or Dynamic DNS URL
4. Modem Username and Password

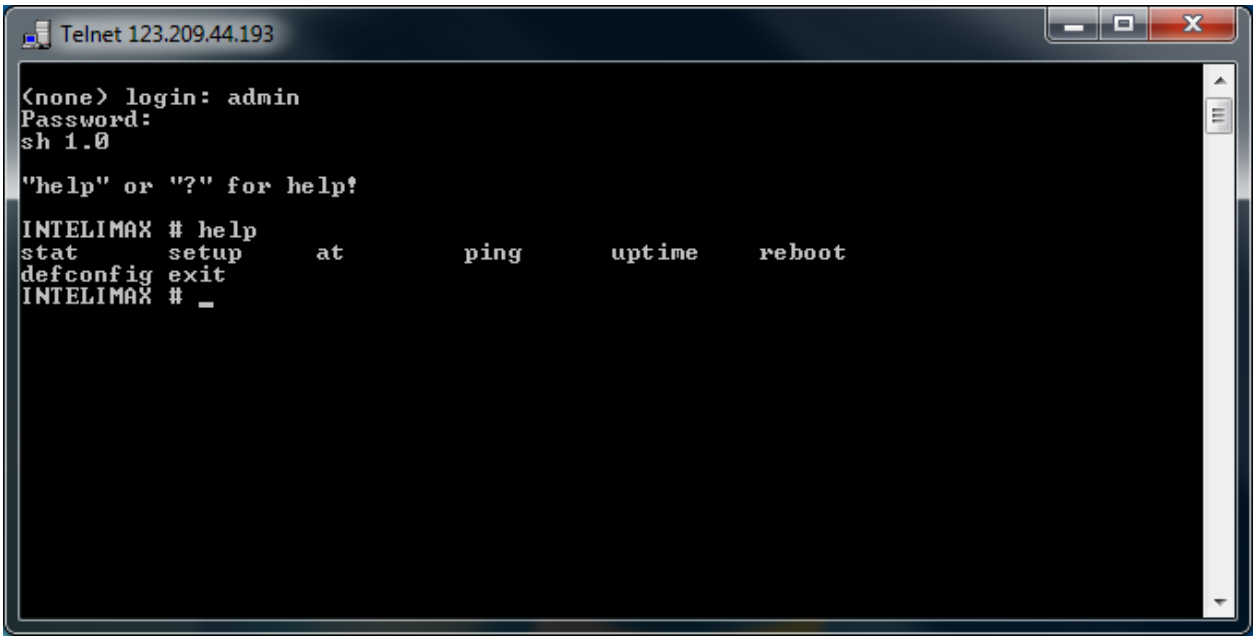
Connection Steps

1. Run your telnet software and put the modem IP address or URL
2. Enter your username and password
3. Type help to display all available configuration commands

Screen Shoots showing the different telnet commands



Once you log in to telnet. You can choose whether to start telnet service, set up configuration, Configure via AT command, use ping function, show uptime reboot and reset the modem remotely to factory default using option provided i.e stat, setup, at, ping, uptime, reboot and defconfig respectively.



Stat

- Status of INTELIMAX+

```
Telnet 123.209.44.193
stat        setup       at          ping        uptime      reboot
defconfig exit
INTELIMAX # stat
dns         sysinfo     log
INTELIMAX # stat dns
====================== + ====================
 1 DNS Address          ¦ 10.4.182.20
 2 DNS Address          ¦ 10.4.81.103
====================== + ====================
INTELIMAX # stat sysinfo
====================== + ====================
S/W Version             ¦ 0.0.74 [201208311303
System Time             ¦ 2012-09-12 09:32:34
IP Address              ¦ 123.209.44.193
====================== + ====================
INTELIMAX # stat log
Sep 12 09:32:37 (none) user.info syslog: payload length 568
Sep 12 09:32:07 (none) user.info syslog: payload length 568
Sep 12 09:31:37 (none) user.info syslog: payload length 569
Sep 12 09:31:07 (none) user.info syslog: payload length 569
Sep 12 09:30:37 (none) user.info syslog: payload length 569
Sep 12 09:30:07 (none) user.info syslog: payload length 568
Sep 12 09:29:37 (none) user.info syslog: payload length 568
Sep 12 09:29:07 (none) user.info syslog: payload length 568
Sep 12 09:28:37 (none) user.info syslog: payload length 569
```

Log	Shows the syslog information if it is not set as remote syslog
Sysinfo	Shows F/W version and system Time and IP Address of Intelimax+
DNS	Display Primary DNS and secondary DNS address of Intelimax+

SETUP

1. SYSTEM	Users can change Admin password, telnet port, Enable/Disable Remote Syslog and can enter up to three phone number for SMS
2.DDNS	Users can configure Dynamic DNS using this command. Currently only support settings for Dyn DNS Service.
3.MODE	Intelimax+ support IP stack and Serial mode only, using this option(Mode) users can configure WAN scheduler, UART/Serial port setting and IP stack setting
4.SNMP	Users can enable/disable this feature that allows network monitoring
5.SNTP	Users can enter server address, Activate and De-activate day light saving and even change time zone

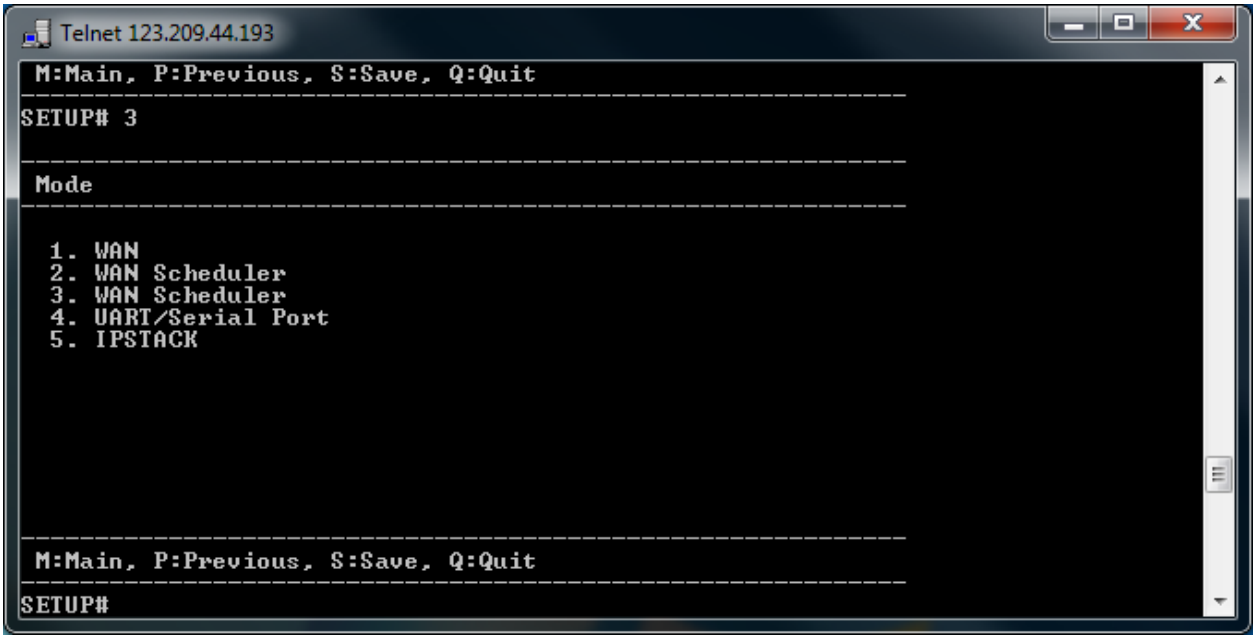
SYSTEM

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 1

-------------------------------------------------------------
 SYSTEM
-------------------------------------------------------------

  1. Admin Name                  : admin
  2. Admin Password              : *****
  3. Telnet Daemon               : Enable
  4. Telnet Port                 : 23
  5. Syslog Daemon               : Enable
  6. Remote Syslog               : Disable
  7. R-Syslog Server             : 192.168.10.50
  8. Secure SHell                : Disable
  9. Admin Phone 1               : Enter Phone Number
  10.Admin Phone 2               : Enter Phone Number
  11.Admin Phone 3               : Enter Phone Number


-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

DDNS

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 2

-------------------------------------------------------------
 DDNS
-------------------------------------------------------------

  1. Domain                      : maxon.dyndns.org
  2. Name                        : maxon
  3. Password                    : *****
  4. Dynamic DNS                 : Enable
  5. Provider                    : dyndns@dyndns.org





-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

MODE



1.WAN	This command will allow users to select operating mode, configure users name and password, enter APN, Enable/Disable Auto PIN function, enter PIN code and configure WAN scheduler.
2.WAN Scheduler	This command will allow users to control WAN connection in a specified time. Day of week[0~6], Start hour[0~23], Start Minutes[0~59], Start hour[0~23], Start Minutes[0~59], Engine power [0, 1] E.g.: Scheduler 1: 0,0,0,23,59,1 ➔ Sunday from 0:)0 to 23:59 scheduler with engine power off
4. UART/Serial Port	This command allows users to configure serial setting e.g. baud rate, data bit, stop bit, parity, and flow control
5.IPSTACK	Modem will be configured to use onboard IPSTACK. This option allows changing IPSTACK Protocol (TCP/UDP), IPSTACK Port and configuring client and server IP address.

WAN

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 1

-------------------------------------------------------------
 WAN
-------------------------------------------------------------

  1. Operating Mode              : IPStack Auto
  2. Username                    :
  3. Password                    : *****
  4. Dialup                      : *99#
  5. APN                         : telstra.extranet
  6. Auto PIN                    : Disable
  7. PIN Code                    :
  8. WAN Scheduler               : Disable
  9. WAN Sch DUR cycle time      : 30
  10.WAN Sch DUR Power up time   : 5



-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP#
```

WAN Scheduler

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 2

-------------------------------------------------------------
 WAN Scheduler
-------------------------------------------------------------

  1. Scheduler  1                : 0, 0, 0, 0, 0, 0
  2. Scheduler  2                : 0, 0, 0, 0, 0, 0
  3. Scheduler  3                : 0, 0, 0, 0, 0, 0
  4. Scheduler  4                : 0, 0, 0, 0, 0, 0
  5. Scheduler  5                : 0, 0, 0, 0, 0, 0
  6. Scheduler  6                : 0, 0, 0, 0, 0, 0
  7. Scheduler  7                : 0, 0, 0, 0, 0, 0
  8. Scheduler  8                : 0, 0, 0, 0, 0, 0
  9. Scheduler  9                : 0, 0, 0, 0, 0, 0
  10.Scheduler 10                : 0, 0, 0, 0, 0, 0
  11.Scheduler 11                : 0, 0, 0, 0, 0, 0
  12.Scheduler 12                : 0, 0, 0, 0, 0, 0

-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

UART/Serial Port

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 4

-------------------------------------------------------------
 UART/Serial Port
-------------------------------------------------------------

  1. UART Baudrate              : 115200
  2. UART Data bits             : 8
  3. UART Parity                : None
  4. UART Stop bits             : 1
  5. UART Flow control          : None









-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

IPSTACK

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 5

-------------------------------------------------------------
 IPSTACK
-------------------------------------------------------------

  1. IPStack Sock Mode          : Server
  2. Notify Boot MSG            : Enable
  3. Notify IPs MSG             : Enable
  4. IPStack Protocol           : TCP
  5. IPStack IP1                : 0.0.0.0
  6. IPStack IP2                : 0.0.0.0
  7. IPStack Port               : 30000
  8. TCP/UDP Idle Timeout       : Enable
  9. TCP/UDP Idle Timeout Timer: 300
  10.Custom PING                : Disable
  11.PING Dest 1                : 0.0.0.0
  12.PING Dest 2                : 0.0.0.0

-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP#
```

SNMP

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 4
-------------------------------------------------------------
 SNMP
-------------------------------------------------------------

  1. General
  2. Trap

-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP#
```

General

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 1
-------------------------------------------------------------
 General
-------------------------------------------------------------

  1. Activate                  : Disable
  2. Read Community Name       : public
  3. Write Community Name      : private
  4. System Name               : DHAGENT
  5. System Contact            : support@maxon.com.au
  6. System Location           : AUS

-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP#
```

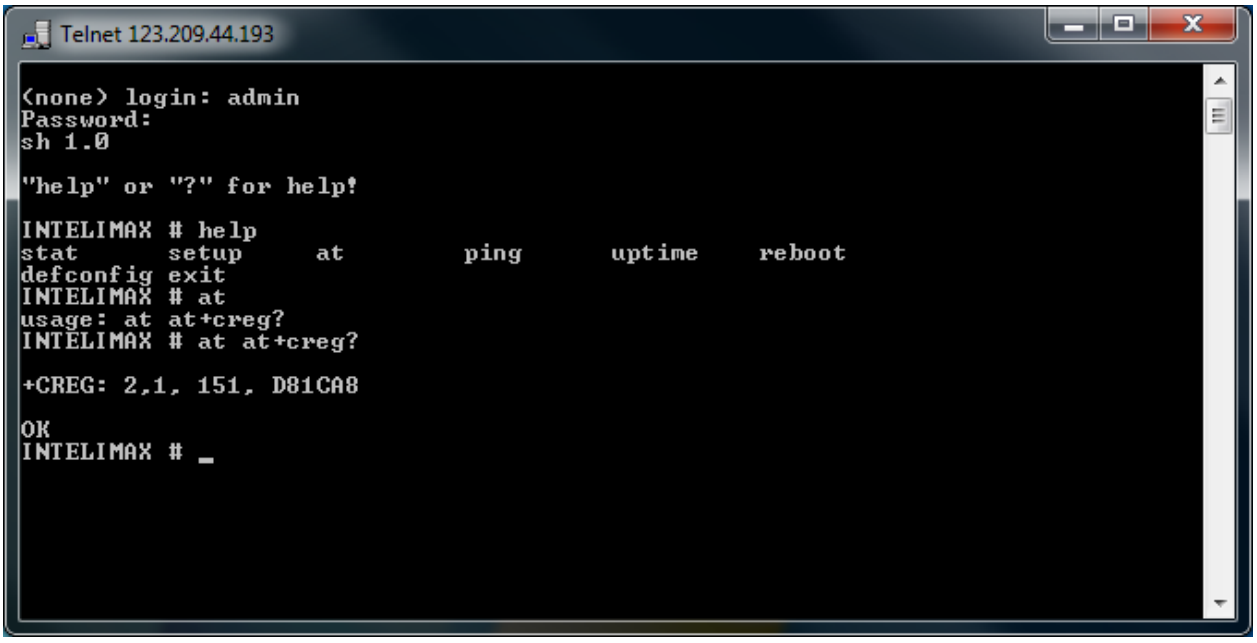
Trap

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 2

-------------------------------------------------------------
 Trap
-------------------------------------------------------------

  1. First Trap Server IP       : 192.168.0.200
  2. Second Trap Server IP      : 192.168.0.202
  3. Third Trap Server IP       : 192.168.0.202









-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

SNTP

```
Telnet 123.209.44.193
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# 5

-------------------------------------------------------------
 SNTP
-------------------------------------------------------------

  1. Activate                   : Disable
  2. Server Address             : time.nist.gov
  3. Daylight Saving            : Disable
  4. Time Zone                  : 0:0









-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# _
```

AT command direct to Module



Signal Strength Check

To check signal strength use “at at+csq?” command. Refer to the screen shot below:

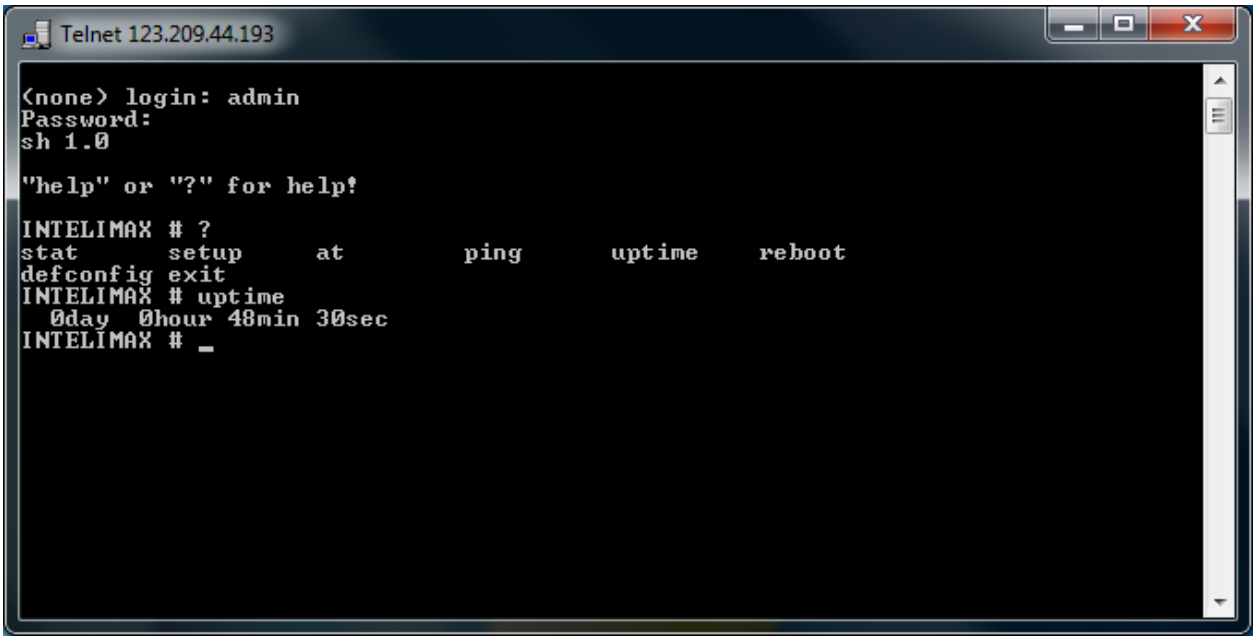
```
Telnet 123.209.44.193

-------------------------------------------------------------
 M:Main, P:Previous, S:Save, Q:Quit
-------------------------------------------------------------
SETUP# q
INTELIMAX # ?
stat      setup     at        ping      uptime    reboot
defconfig exit
INTELIMAX # at
usage: at at+creg?
INTELIMAX # at at+csq

+CSQ: 24,99

OK
INTELIMAX #
```

PING command

```
Telnet 123.209.44.193

OK
INTELIMAX # ?
stat      setup     at        ping      uptime    reboot
defconfig exit
INTELIMAX # ping
usage: ping ipaddress
INTELIMAX # ping 202.191.62.239
PING 202.191.62.239 (202.191.62.239): 56 data bytes
64 bytes from 202.191.62.239: icmp_seq=0 ttl=53 time=448.3 ms
64 bytes from 202.191.62.239: icmp_seq=1 ttl=53 time=433.8 ms
64 bytes from 202.191.62.239: icmp_seq=2 ttl=53 time=457.0 ms

--- 202.191.62.239 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 433.8/446.3/457.0 ms
INTELIMAX #
```

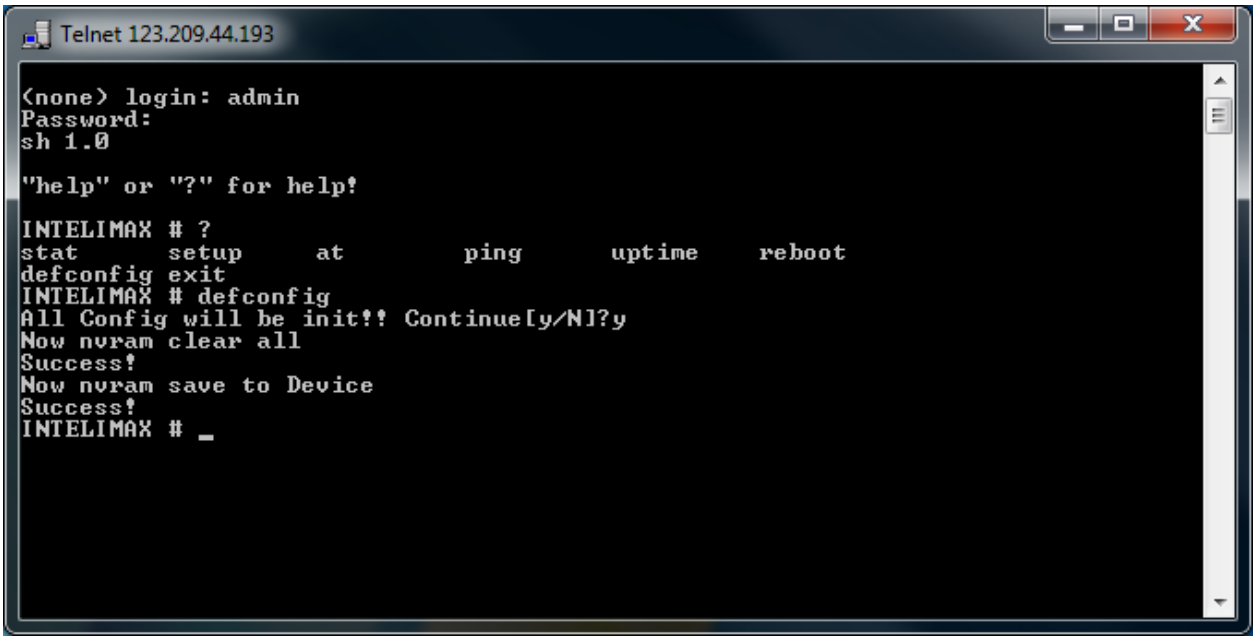
System uptime check.

The command uptime shows you the connection time as shown in the screen shot below.



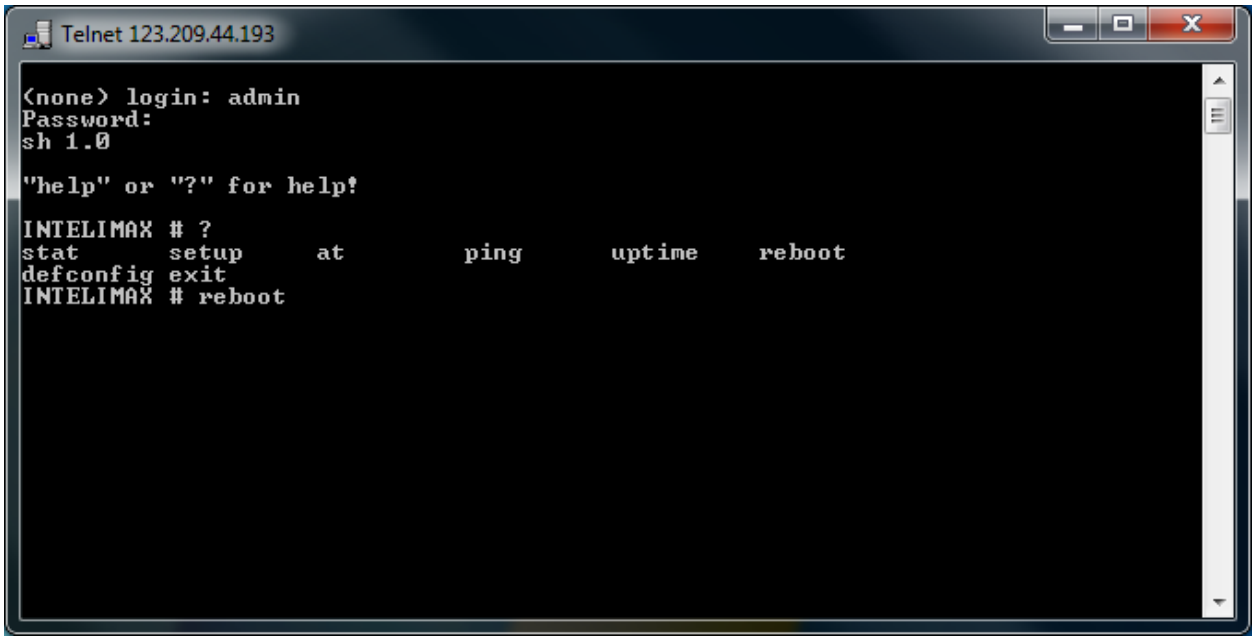
Set to Factory

Use defconfig to clear all the setting which will configure the modem to factory default state.



Reset the INTELIMAX+

Intelimax+ can be power rebooted using the reboot command after logging into the Intelimax+ remotely



Extended / Intelimax+ Specific AT Command Set (IP Stack Modes)

Device Information

ATI

Manufacturer: Maxon Australia Pty Ltd

Model Number: MA-2020

Product Name: Intelimax+

F/W Revision: 0.0.0 [201201130929]

H/W Version: 1.0

Module F/W Revision: 11.810.09.05.00

LAI: 50506

LAC: 4eeb

CellID: 00cb63b3

IMEI: 354283040117446

OK

AT+CGMI

Maxon Australia Pty Ltd

AT+CGMR – Firmware version

+CGMR: 2.0.8 [201409230653]

AT+CGSN – IMEI number

354283049080793

AT Command Password Protection

This AT command process will protect the changing or monitoring of any AT command unless the interface password is entered first. Once enabled, any AT command will return an ERROR response.

AT$$SERIALPWD=<0,1>,<PWD> - disable, enable and set password

Once the command has been entered, a save (AT&W) and reboot (AT$$RESET) is required.

To disable the password protection for a session, enter the following, this will persist until the modem reboots:

AT$$PWD=<PWD>

WAN Extension Functions

AT$$WANSE?

$$WANSE:

PINGCHECK:Enable,0,0,0.0.0.0,

BACKOFF:Disable,0,0,0,0

OK

Parameters

$$WANSE: X,X,X,X,X,X

0,1 PINGCHECK,BACKOFF

0,1 Disable/Enable both expansion PINGCHECK and BACKOFF

1~60 PINGCHECK Interval (seconds) / 40~59 Seconds of 1st retrial interval of BACKOFF

1~60 PINGCHECK Fail count / 2~10 Minutes of 1st retrial duration of BACKOFF

IP address of 1st server for PINGCHECK / 10~59 Minutes of 2nd retrial interval of BACKOFF

IP address of 2nd server for PINGCHECK / 2~10 Hours of 2nd retrial duration of BACKOFF

OK

WAN Authentication

AT$$WANSA?

$$WANSA: 1,telstra.extranet,0,,,*99#,0,,0,0,0,0,00:00,0

OK

Parameters

$$WANSA: X,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X

1,2 IPStack Auto/Manual

Access Point Domain Name

0,1,2 NONE/PAP/CHAP

Username

Password

Dialup number

0,1 Auto PIN Disable/Enable

PIN code

0 ~ 28 Hours of Periodic reset

0,1 Disable/Enable Reset (TCP Server Listening) – Server – If enabled will wait until client drops connection

0,1 Disable/Enable Reset (TCP Connected State) – Client – If enabled will wait until Intelimax+ client drops connection to a server or server drops connection

0,1 Disable/Enable Reset (At scheduled Time)

HH:MM for Reset (At scheduled Time, 24 hour format)

Battery Level for Module Deregistration (12.3 volts ON, 11.9 volts OFF)

0,1~20 LCP Echo Interval (seconds)

0,1~10 LCP Echo Failure (counts)

OK

Note: The Dialup Number cannot be left blank.

Periodic reset

AT$$RESET=24 (setting between 1 and 28 hours)

$$RESET: 24

OK

Parameters

$$RESET: X

0 ~ 24 Hours of Periodic reset

WAN scheduler

AT$$WANSS?

$$WANSS: 0,Disabled

OK

Parameters

$$WANSS:

0,1 RS232 line driver power down

0,1,2 Disable/Day of Week/Duration

0,1 Delete/Add schedule/5~59 Minutes of power up

0~28 Entry number of day of week [Delete]/0,1, 2,3,4,5,6 Day of week[Ddd]/5~59 Minutes of power cycle

0~23 Hours of start

0~59 Minutes of start

0~23 Hours of finish

0~59 Minutes of finish

0,1 Engine power down

OK

IP Stack setting

AT$$WANSI?

$$WANSI: 1,1,1,0,0.0.0.0,0.0.0.0,30000,1,300,20,0,0

OK

Parameters

$$WANSI: X,X,X,X,X,X,X,X,X,X,X,X

0, 1,2 None/Server/Client

0,1 Disable/Enable Notify Boot Message

0,1 Disable/Enable Notify IPStack Message

0,1 TCP/UDP

xxx.xxx.xxx.xxx Primary IPAddress

xxx.xxx.xxx.xxx Secondary IPAddress

0 ~ 65535 Port Number

0,1 Disable/Enable Keep Alive

1 ~ 3600 Seconds Keep Alive Interval

5 ~ 60 Seconds Network Dormant Period UDP

0,1 Disable/Enable UDP Keep Alive

0,1,2 ~ 60 Disable/Handshake/Seconds UDP Wake Up

OK

SNMP

AT$$SNMPS?

$$SNMPS:
Disable,public,private,DHAGENT,support@maxon.com.au,AUS,192.168.0.200,192.168.0.201,192.168.0.202
OK

Parameters

$$SNMPS: X,X,X,X,X,X,X,X,X
0,1 Disable/Enable
Read community
Write community
Name
Contact
Location
Trap 1 IP address
Trap 2 IP address
Trap 3 IP address
OK

DDNS

AT$$DDNSS?

$$DDNSS: Disable,,,
OK

Parameters

$$DDNSS: X,X,X,X
0,1, 2, 3 Disable/DynDNS/MsDNS/Custom DNS
DomainName
UserName
Password
Service Provider
OK

System

AT$$SYSTS?

$$SYSTS:

admin,admin,Enable,23,Enable,Disable,192.168.0.50,Disable,+61427933242,+61427933242,+61427933242
OK

Parameters

$$SYSTS: X,X,X,X,X,X,X,X,X,X,X
UserName
Password
0,1 Telnet Disable/Enable
Telnet Port Number
0,1 Syslog Disable/Enable
0,1 Remote syslog Disable/Enable
Remote syslog server address
0,1 SSH Disable/Enable
Phone number of Administrator
Phone number of Administrator
Phone number of Administrator
OK

maXconnect

To enable maXconnect on the Intelimax+ either use the GUI or enter the following commands when the modem is in IP Stack Auto mode.

$$MAXCNT: 0,120,portal.maxconnect.com.au,1883,updates.maxconnect.com.au
OK
AT$$MAXCNT=?
$$MAXCNT: X,X,X,X,X
0,1 Disable/Enable
Refresh Interval
Broker URL
Broker Port
FTP update server URL
OK

Serial (UART) port

Serial port settings including number of data bits, parity, and stop bits must be set using this command, but other commands can also be set using standard AT commands such as AT+IPR, AT+IFC etc.

AT$$SPORT?

$$SPORT: 115200,8,N,1,None,0,0

OK

Parameters

$$SPORT: X,X,X,X,X,X,X

1200,2400,4800,9600,19200,38400,57600,115200 Baud rate

7,8 Data bits

N,E,O None/Even/Odd

1,2 Stop bits

None, Software, Hardware Flow control

0 Don't Care

0,1,2 RS232, RS485FullDuplex, RS485HalfDuplex

OK

Engine Band

AT$$BAND?

$$BAND: 40000000

OK

Parameters

$$BAND:

1: GSM 850

2: GSM DCS SYSTEMS

4: GSM EGSM 900

8: GSM PGSM 900

10: GSM RGSM 900

20: GSM PCS

40: WCDMA I IMT2000

80: WCDMA II PCS1900

400: WCDMA V 850

1000: WCDMA VIII 900

40000000: AUTO

OK

Examples:

/ GSM 850/900/1800/1900

AT$$BAND=3f

$$BAND: 0000003f

OK

The AT commands on the module can be set and checked directly using AT$$DIRAT.

AT$$DIRAT="at^syscfg=2,2,380380,1,2" – make sure module band is set

OK

AT&W

OK

AT$$RESET

OK

// WCDMA 850

AT$$BAND=400

OK

AT$$DIRAT="AT^SYSCFG=2,2,4000000,1,2"

OK

AT&W

OK

AT$$RESET

OK

Check IP address of the WAN side

AT$$WAN

$$WAN: IP,X
OK
IP: the WAN IP address acquired from Cellular Network. If no WAN connection, it will return “No PPP”.
A number will appear after the IP address if DDNS is enabled, and a none zero value will indicate a successful DDNS registration.

FTP

To use FTP on the Intelimax+ allow for append on the FTP server.
Also restrict the welcome message to less than 10 characters.
Please save and apply settings before using.

AT$$FTPCS?

AT$$FTPCS: 1,192.168.10.1:21,maxon,maxon,0,INTELIMAX+,1000,1
OK

Parameters
$$FTPCS: X,X,X,X,X,X,X,X
0 - Disable
1 - Manual
2 - Hourly (0 - 24)
3 - Time of day (0 - 24)
4 - Day of month (1 - 31 days)
5 – Minutes (0 - 60)

- Host IP/Domain address with Port
- User name
- Password
- Time interval
- Header of file name (limit 10 bytes/characters)
- Size of file (Bytes) – maximum 102,400 bytes, maximum internal buffer size 10MB
- A new file will be created each time the file size is exceeded.

- Time stamp – enable (1) or disable (0) timestamp prefix (in seconds)

A reboot is required when enabling, disabling or making changes to the FTP options.

Examples:

AT command to upload every 1 hour.

AT$$FTPCS=**2**,20.19.62.23:21,maxon,maxon,**1**,FILEHEADER,10000,0

AT command to upload every 30 minutes.

AT$$FTPCS=**5**, 20.19.62.23:21,maxon,maxon,**30**,FILEHEADER,10000,0

AT command to upload every day at 8PM.

AT$$FTPCS=**3**, 20.19.62.23:21,maxon,maxon,**20**,FILEHEADER,10000,0

AT command to upload every 15th day of the month.

AT$$FTPCS=**4**, 20.19.62.23:21,maxon,maxon,**15**,FILEHEADER,10000,0

1. In the example above file size is 10000 bytes.
2. The modem would create a text file using name specified above (in the example I have used “fileheader” as the filename)
3. The last setting 0 or 1 decides if the data is time stamped. 0 will only log data in the text file. 1 will stamp all data logged with date and time.

The "size of file" parameter is used for limiting the file size of the csv file. All the input from serial port will be saved in the .csv file, and once the file size of that csv file exceed the size limit, another file will be created to hold the input. The value allowed is 1000 - 100*1000 Bytes.

Based on the configuration, the file could be uploaded to server periodically. For example,

AT$$FTPCS=5,192.168.10.50:21, maxon, maxon, 30,FILEHEADER,10000,0

with this setting, the modem will send out .csv file to FTP server every 30 minutes. If the input has not exceeded limit 10K bytes (in this case), modem will send this file only, then generate another file for holding future input. If the input is more than 10K bytes, there should be more than one file generated, each file should not exceed 10K bytes, all

these files will be sent to FTP server when time comes.

File uploaded with date time stamp disabled.

AT$$FTPCS=2,20.19.62.23:21,maxon,maxon,1,FILEHEADER,10000,0

AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ
AT+CSQ

File uploaded with date time stamp enabled.

AT$$FTPCS=2,20.19.62.23:21,maxon,maxon,1,FILEHEADER,10000,1

09/11/2012 15:44:05 AT+CSQ
09/11/2012 15:44:06 AT+CSQ
09/11/2012 15:44:07 AT+CSQ
09/11/2012 15:44:08 AT+CSQ
09/11/2012 15:44:09 AT+CSQ
09/11/2012 15:44:10 AT+CSQ
09/11/2012 15:44:11 AT+CSQ
09/11/2012 15:44:12 AT+CSQ
09/11/2012 15:44:13 AT+CSQ
09/11/2012 15:44:14 AT+CSQ
09/11/2012 15:44:15 AT+CSQ

AT$$FTPFL

Displays the files waiting to be uploaded

AT$$FTPSC

OK

Will start the FTP connection and upload the files. Can be used to force an upload when in periodic mode. If no WAN connection is currently established (such as in IP Stack Manual mode) the Intelimax+ will establish the PPP and socket connections,

upload the FTP files then drop the socket and PPP connections.

Signal Strength

AT+CSQ?

+CSQ: 25,99

OK

Open PPP connection

AT$$IPCTOP

Close PPP connection

AT$$IPCTCP

Open TCP/UDP Socket

AT$$IPCTOS

Close TCP/UDP Socket

AT$$IPCTCS

Change Remote Server IP address

AT$$IPCTRIP=0,ip,ad,dr,ess,<port>

Eg. AT$$IPCTRIP=0,123,456,789,01,30000

Change client/server mode

AT$$IPCFL=4,<0,1> where 0 for server, 1 for client

Eg. AT$$IPCFL=4,0 sets modem to server mode

IPStack Connection Settings

AT$$IPSCFG?

$$IPSCFG: 30,100,300

OK

AT$$IPSCFG=?

$$IPSCFG: X,X,X

IPSTACK SEND DELAY: 1 ~ 2000 msec

IPSTACK BUFFER SIZE: 32 ~ 1450 bytes

IPSTACK SOCKET TIMEOUT: <0,10~3600> sec

PPP DISCONNECT TIMEOUT: <0,30~3600> sec

OK

AT$$IPSCFG=30,100,200,301

OK

AT$$IPSCFG?

$$IPSCFG: 30,100,200,301

OK

Retry Settings

AT$$RETRYTO=<item>,<num>

item: 1 – TCP Client

2 – WAN

num: Number of retries, ranges 2 ~ 100

AT$$RETRYTO?

$$RETRYTO:

1,10

2,10

OK

Change modem mode

AT$$CHGMODE=

1 – IP Stack Auto

2 – IP Stack Manual

3 – Serial Modem

at$$chgmode=1

OK

Save and Reboot

AT$$RESET

At$$reset

OK

Factory Reset

AT$$FACTORY

OK

Profile Save

AT$$PFSET

Save the modem's profile default settings

Profile Set

AT$$PFRST

Reset to the modem to use the profile default

AT over IP on IPStack

Only 12521 can be used for AT over IP.

AT$$OVERIP=?

$$OVERIP: X,X,X

0,1 Disable/Enable

Listen Port Number

Session Timeout (0 ~ 3600 seconds).

OK

at$$overip?

$$OVERIP: 1,12521,120

OK

at$$overip=0

Require Save and System Reboot

OK

at$$overip?

$$OVERIP: 0,12521,120

OK

at$$overip=1,12521

Require Save and System Reboot

OK

at$$overip?

$$OVERIP: 1,12521,120

OK

Modem Emulation

The Intelimax+ modem emulation can be configured using the following AT commands:

To enable modem emulation and add a data number to IP address and port number emulation to the list

at$$emul=1,phone_number,IP_address,port_number

e.g. at$$emul=1,01044204414,10.0.0.1,5000

To check current emulation list (must have already enabled emulation)

at$$emul?

$$EMUL: 1,3

0,01044204412,192.168.101.2,3000

1,01044204411,192.168.101.2,30001

2,01044204414,10.0.0.1,5000

OK

To Enable/Disable Modem Emulation – this must be enabled on the server Intelimax+ for CONNECT message

at$$emul=0,0 – disable

at$$emul=0,1 - enable

To delete a rule from the list

at$$emul=2,list_number

e.g. at$$emul=2,1

OK

at$$emul?

$$EMUL: 1,2
0,01044204412,192.168.101.2,3000
1,01044204414,211.232.22.1,500001
OK

It is recommended to add a TCP delay to the client connect message to account for the incoming RING messages on the server side. These server RING messages take 2 seconds to complete. This can be achieved using the AT$$TCPDEL=2000 command.

It is also recommended to turn off the IP Stack notification messages as these may confuse the client or server, this can be achieved using the AT$$WANSI command.

Modmax Compatibility Mode

This changes the IP Stack responses from Intelimax+ style responses to Modmax style responses.

Intelimax+ Mode (Mode 0)	Modmax Mode (Mode 1)
$$TCP_Connect_To: 125.181.12.34 [01/24/2014 08:00:36]	[18:57:55 28 JAN 2014] $$TCP_Connect_To: 192.168.10.50
[01/24/2014 08:05:36] [Connection_Close_By_Timed_Out]	[08:31:12 24 JAN 2014] TCP connection disconnected

AT$$SPC?

$$SPC: <mode>
OK

<mode>:
0: mode 0 (Default)
1: mode 1
2: mode 2

AT$$SPC=<passcode>

$$SPC: <mode>
OK

<passcode>:

857653: mode 0

356758: mode 1

TCP Delay between 'trying to connect' socket and 'CONNECT' message

Some older systems working with the Modmax cannot handle the speed between messages, this delay allows for these legacy systems to handle this delay.

AT$$TCPDEL=?

$$TCPDEL: X

Delay between try and connect range from 200 to 1000 mili seconds.

OK

AT$$TCPDEL=200

OK

AT$$TCPDEL?

$$TCPDEL: 200

OK

Prepare modem for hard shutdown

This function is highly recommended when using the modem with an external, controlled power supply. If the modem is going to have its power dropped regularly this AT command allows for the processor to perform housekeeping duties to ensure that the shutdown process does not damage the modem or internal cellular module. Wait for at least 4 seconds after issuing the command before dropping power to the modem.

AT$$RTD

OK

SMS on Boot

The Intelimax+ can be configured to send an SMS at boot time using the following AT commands:

at$$pwronsms=?
$$PWRONSMS=1,0/1 enable/disable
$$PWRONSMS=2,1/2/3,Phone Number up to 3 phone numbers
$$PWRONSMS=3,Message

Extended / Module Specific AT Command Set (IP and Serial Modes)

Save settings and reset/restart modem

AT&W – Saves AT command settings

AT%RESET=1 (Serial Modem mode)

AT$$RESET (works in both Serial and IP Stack modes)

Applies saved AT commands with a reboot

Standard AT Commands for serial interface

Parameter	Description	
[E0]	Do not echo command set in command state or online command state.	
E1	Echo command set in command state or online command state.	
[Q0]	Return result codes.	
Q1	Do not return result codes.	
[&C0]	DCD line always ON.	
&C1	DCD line is ON during a circuit switched call. In IP Stack mode, the behaviour is the same as &C0.	
&C2	DCD line is normally ON and will toggle OFF for 1 second when the circuit switched call is disconnected. In IP Stack mode, DCD line will be always OFF.	
&C3	DCD line is normally OFF and will be ON when modem has successfully established a PPP Data (packet switched) call (only applies to IP STACK mode). In Serial Modem mode, DCD line will be always OFF.	
&C4	DCD line is normally OFF and will be ON when modem has successfully established a PPP Data and opened a socket with remote server (only applies to IP STACK mode). In Serial Modem mode, DCD line will be always OFF.	
[&D0]	Ignore DTR line signal.	
&D1	Enter online command state following ON-to-OFF transition of DTR line while retaining the data connection.	
&D2	Disconnect the data connection following ON-to-OFF transition and change to command state after back to ON state. In Serial Modem Mode, during OFF state of the DTR line, the auto-answer function (see S0) is disabled. During the transition, DTR line has to be in OFF state for at least one second for the modem to respond.	
S0	[2], <1 to 255> 0	Automatic answering. [Enable automatic answering after (Value) x 6 seconds.] 0: No auto- answering

Note.1 : [ ] indicates default value.

Note .2 : &D option only valid when Serial Port is using no flow control. DTR signal will be used together with CTS/RTS as Hardware Flow Control signals.

SMS Commands

AT commands for SMS support is slightly different between operational modes. In Serial Modem Mode, most standard SMS AT commands (Cellular Module dependant) are supported. Under IP stack modes, only those commonly used commands are currently supported: AT+CMGF, AT+CMGS, AT+CMGL, AT+CMGR, and AT+CMGD.

Single AT command SMS AT+MMC SMSMO

AT+MMC SMSMO <Phone number> <message><CR>
Eg. AT+MMC SMSMO 0400123456 Boiler Temperature Too High!<CR>
Maximum length of message is 160 characters.
Some characters are not supported: \, [,], ^, ~, `

Prepare modem for hard shutdown

This function is highly recommended when using the modem with an external, controlled power supply. If the modem is going to have its power dropped regularly this AT command allows for the processor to perform housekeeping duties to ensure that the shutdown process does not damage the modem or internal cellular module.

AT$$RTD
OK

SMS on Boot

The Intelimax+ can be configured to send an SMS at boot time using the following AT commands:

at$$pwronsms=?
$$PWRONSMS=1,0/1 enable/disable
$$PWRONSMS=2,1/2/3,Phone Number up to 3 phone numbers
$$PWRONSMS=3,Message

Tripple Plus (+++) Control using AT$$TPSW

The Intelimax supports two different methods for +++ control when in serial modem mode. If the connection to or from the modem is over CSD then it is recommended that the AT$$TPSW=0 is configured so that the internal module controls triple-plus switching. If the connection from the modem is a PPP dial out connection (e.g. ATDT*99***1#) then it is recommended that the +++ control is handled by the separate CPU, in which case AT$$TPSW=1 should be configured. After each configuration save and reboot using AT&W and AT$$RESET.

AT$$TPSW=0 – Triple-plus switching handled by internal module
AT$$TPSW=1 – Triple-plus switching handled by the modem

Serial Port Settings

The follow AT commands are supported in both IP and Serial Modem modes to change the serial baud rate and flow control:

Baud Rate: AT+IPR

AT+IPR=9600
OK

Flow Control: AT+IFC

AT+IFC=0,0 - no flow control
OK

AT+IFC=2,2 - hardware flow control
OK

CSD and PSD/PPP dial out commands (Serial mode only)

Command	**TE2**	**→**	**MT2**	
Command	TE2	→	MT2	ATD<phone_number>
Notify	TE2	←	MT2	CONNECT (Data call connected) Connect <Speed> if connect_baud is set. NO CARRIER (Data call failure)
Value	phone_number: for Packet Switched Data: *99# (Australia – requires authentication) for Circuit Switched Data: You will need a data number (Code 2620 activated on the SIM account)			

Notify	**TE2**	**←**	**MT2**	**AT: RING**
Command	TE2	→	MT2	ATA (answer data call)
Notify	TE2	←	MT2	CONNECT (Data call connected) CONNECT <SPEED> if connect_baud is enabled. NO CARRIER (Data call failure)
Call State				
Command	TE2	→	MT2	+++ (escape command to go to off-line command state) ATH (release call)
Notify	TE2	←	MT2	NO CARRIER

Periodic Reset (Serial mode only)

at$$preset=2

OK

at$$preset?

$$PRESET: 2

OK

To configure periodic reset in IP Stack modes use the AT$$RESET command

Auto Recovery from CSD/PPP Call (Serial mode only)

at$$autocover=2

OK

At$$autorecover?

$$AUTORECOVER: 2

OK

The command will set up a time delay for the modem to perform a reboot if there is no CSD/PPP call is made after the previous call or modem boot up.

The configurable time delay is 1 to 24 hours. If “0” is set, the auto recover will be disabled.

If auto recover is enabled and there is an incoming CSD call, the modem will perform a reboot in 20 minutes (non-configurable) if there is no active CSD/PPP Calls.

Getting S0 value (Serial mode only)

Please use ATS0? Command to get the S0 value. AT&V command will give you an incorrect S0 Value:

ATS0=2

OK

ATS0?

2

OK