

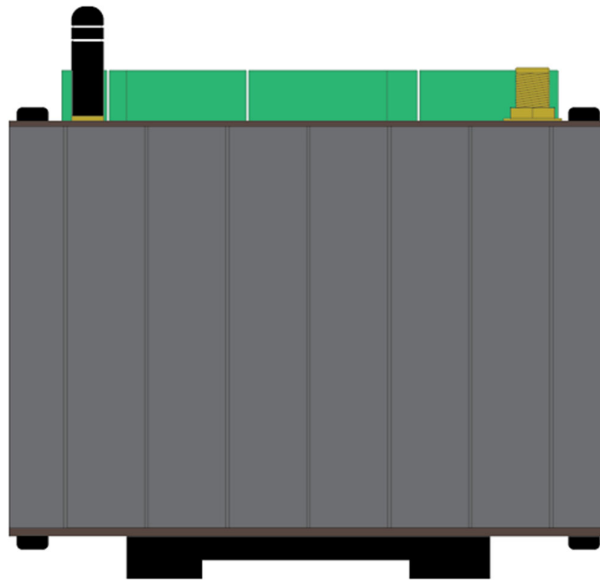


Cellular M2M devices
with the flexibility to
connect to almost
ANYTHING

Manual

For

MIO alerta v2 CatM/NB IoT



SMS Alarm & Control Device

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manual mio alerta v2 catm nbiot 202412rv01



User Manual

MIO alerta v2 CatM/NB IoT



Overview

The MIO alerta v2 device is primarily intended as a cellular, SMS or MQTT, alarm and control solution for remote applications. The device is capable of basic data logging, logic and timing functions. Customisation of the units' operation, by modification of code in the device, is possible – please contact Australis M2M for further information.

The device consists of a Digi XBee Cellular Modem, connected to our MIO v2 Intelligent IO Board, fitted into a DIN Mount enclosure.

Configuration of the unit is possible by:

- Bluetooth using Android phone Application
- Serial Cable using Windows Application
- SMS, assuming unit is connected to network and can send/receive SMS
- MQTT, assuming unit has a suitable IP connection via mobile network

This document will cover the following areas:

- Hardware installation and connection
- Logging & Alarm Functionality
- Use of Windows Application
- Use of Android Application
- Use of SMS to make changes to configuration

For more detailed information on the MIO v2 Intelligent IO Board please refer to MIO v2 Intelligent IO Board Manual.

Hardware Installation & Connection

Safety Precautions and SAR Requirements

The following safety precautions must be observed when operating, servicing or repairing any cellular modem, router or gateway product. Failure to comply with these precautions violates the safety standards of the design, manufacture and intended use of the product.

Cellular terminals emit radio frequency energy while switched on. Interference can occur if used close to TV sets, radios, computers or inadequately shielded equipment. Follow any special regulations and always switch off the cellular terminal or mobile wherever forbidden, or when you suspect that it may cause interference or danger.



Cellular devices should not be operated on board an aircraft, make sure the device is switched off, and cannot be inadvertently turned on, prior to be placed in an aircraft. Check the local laws and regulations prior to use of cellular devices in the vicinity of operating aircraft.



When in hospitals or other health care facilities, observe the restrictions on the use of cellular devices. Switch off the cellular device if instructed to do so. Medical equipment may be sensitive to RF energy. The operation of cardiac pacemakers, other implanted medical equipment and hearing aids can be affected by interference from cellular devices.



Do not operate the cellular terminal or mobile in the presence of flammable gases or fumes. Switch off the cellular terminal when you are near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard



IMPORTANT! Cellular devices operate using radio signals and cellular networks. Connections cannot be guaranteed, at all times, under all conditions. Therefore, you should never rely solely upon any wireless device for essential communications, for example emergency SMS alarms. Remember, in order to make connections/calls the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.



There are different guidelines and standards around the world that govern the permitted levels of radio frequency exposure for the general population. The Specific Absorption rate (SAR) is a measure of the rate at which radio frequency energy is absorbed by the body when exposed to radio frequency electromagnetic fields.

This cellular device is approved for use in applications where the antenna is placed more than 25cm from the body. For other applications, the integrator is responsible for compliance with local SAR requirements.

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Technical Description & Operating Limits

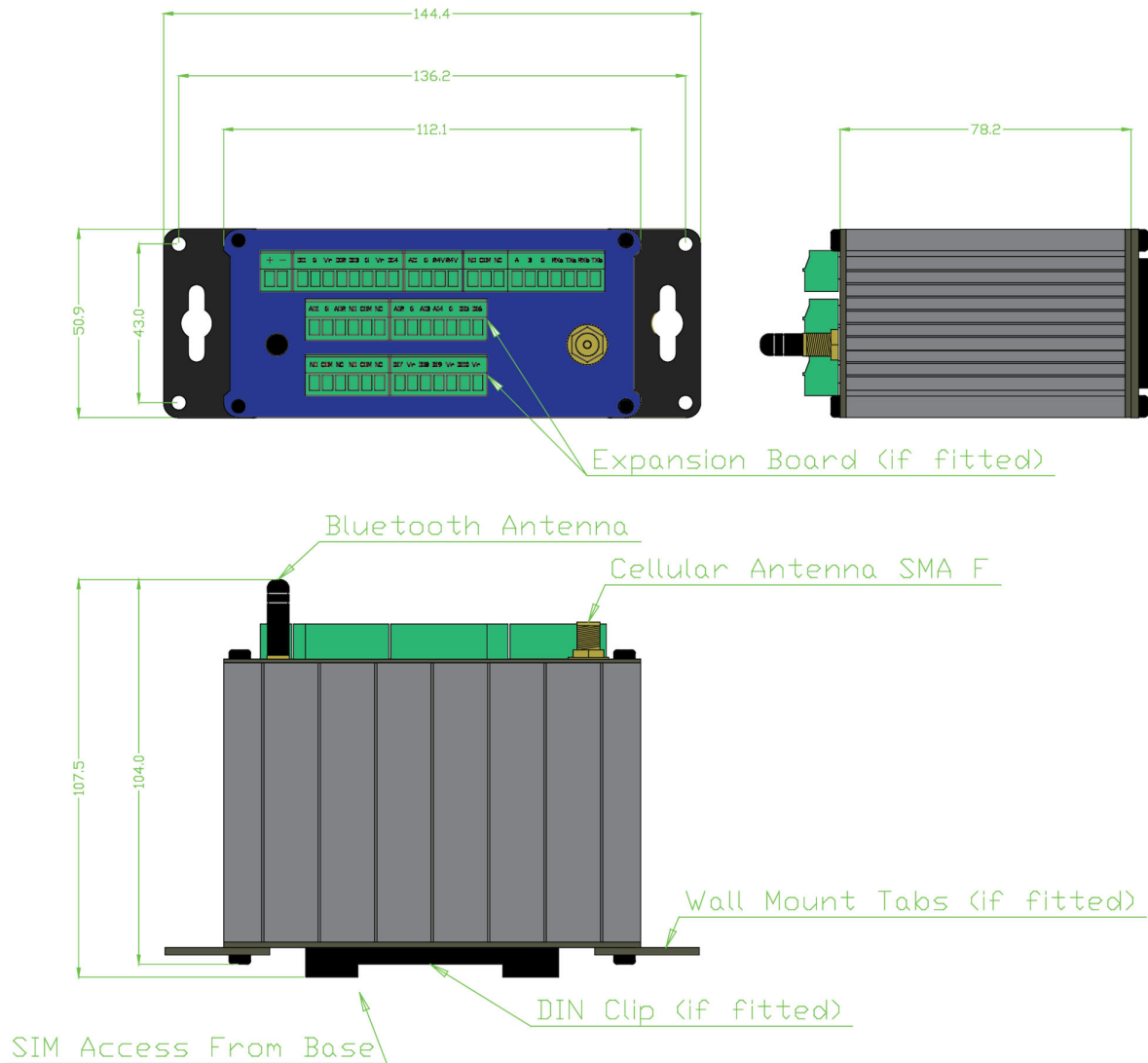
The MIO alerta v2 is intended to be installed indoor with environmental conditions as stated below. The unit is fitted to an Aluminium Enclosure with detachable (optional) mounting accessories including a DIN clip and/or wall mounting tabs.

Specifications	
Device Model	MIO alerta v2
Cellular/BLE/GPS Module Used	Digi XB3-C-GM2-UT-001 Contains cellular module Telit ME310G1-WW
Cellular Connectivity	Dual Mode LTE-M/NB-IoT LTE: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85; 2G: B2, B3, B5, B8 (Disabled for Australia)
Cellular Downlink/Uplink Speeds	CatM: Up to 588 kbps downlink, up to 1 Mbps uplink NB-IoT: Up to 120 kbps downlink, up to 160 kbps uplink
Bluetooth	Bluetooth Low Energy (BLE)
Lora (Optional)	RAK3172-9SM-I Lora Module 9XX MHz for US915/AU915/KR920/AS923
SMS	Yes (Network Dependant)
TCP/IP	Yes
MQTT	Yes
Dimensions	112 x 108 x 51mm
Weight	340g
Power Supply	7-30VDC
Power Consumption	Min 10W Power Source Recommended Idle Connected to Network Typically <160mA at 12VDC Rated Current CatM/NB-IoT 550mA at 12VDC Sleep Modem <1mA at 12VDC
Operating temperature range	-20°C to 70°C
Antenna Connector, Cellular	SMA F
Antenna Bluetooth	Whip Antenna, Radome Material PE, Height 21mm
Alarm Channels (SMS)	8 for Digital IO or Logic Triggered 4 for Analogue IO or Modbus Triggered
Digital Inputs	4 (Expandable to 10) Max 30VDC OFF or Logical State 0 <0.5V ON or Logical State 1 >2.5V
Analogue Inputs	1 (Expandable to 4) 0-10V or 0-20mA/4-20mA Scan Rate Configurable Fastest is 15s
Analogue Outputs	0 (Expandable to 2) 0-10V Update Rate Configurable Fastest is 15s
Relay Outputs	1 (Expandable to 4) Latched Relays NO and NC Contacts Contact Rating 1A at Max 30VDC
Serial Port 1	RS232 For Programming
Serial Port 2	RS232 Spare (Future Use)
Serial Port 3	RS485 (Modbus, limited functionality) Scan Rate Configurable Fastest is 15s

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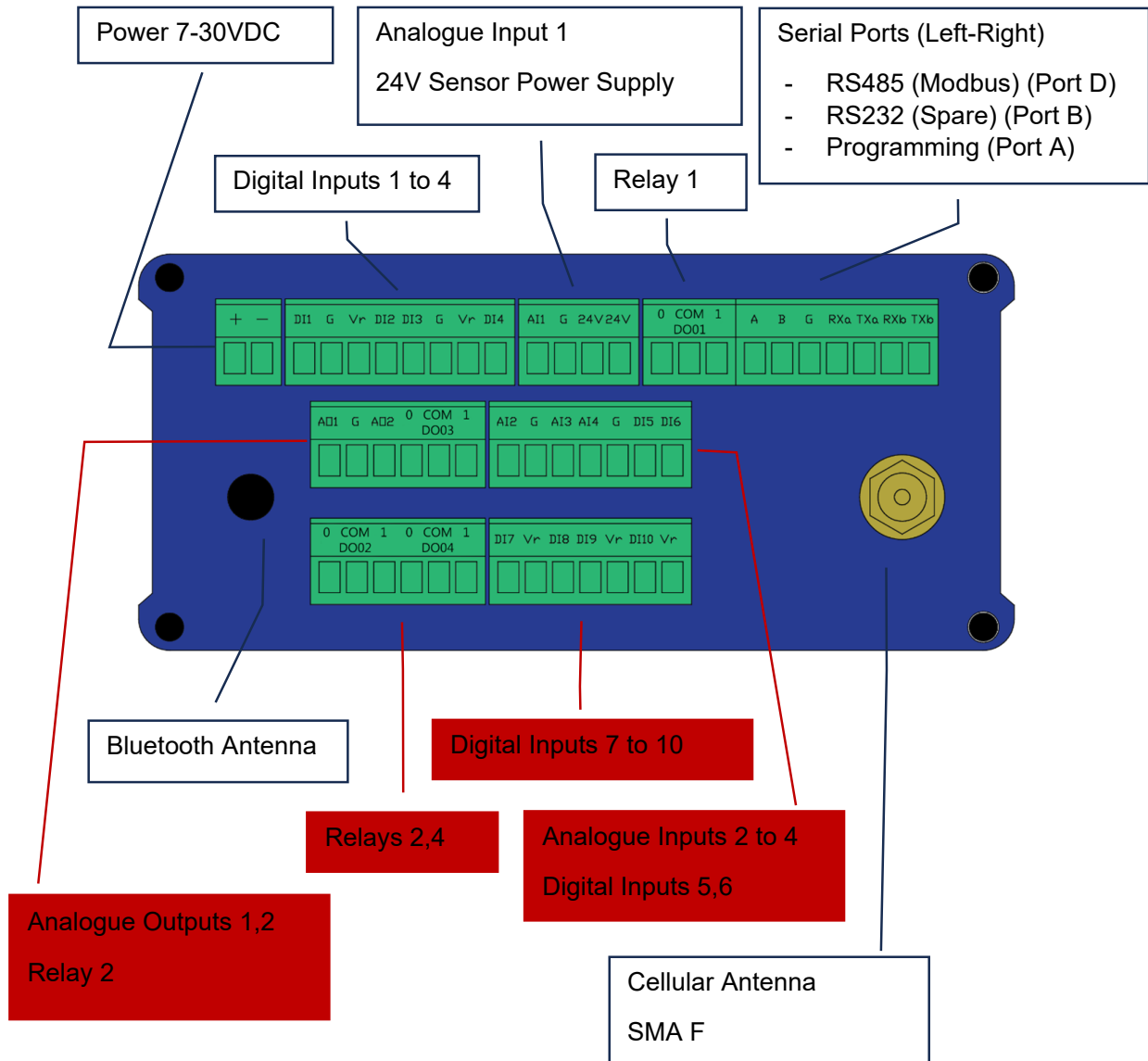
Unit Dimensions



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Interfaces



Items in **RED** are on optional expansion board, it is possible to fit the expansion board at a later date if not fitted when purchased.

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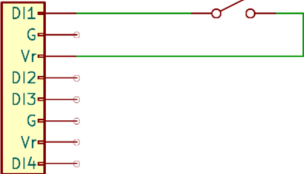
MIO alerta v2 CatM/NB IoT



Power Input	Type	Rating	Value At 12VDC
	+	Unit can be powered by any suitable 7-30VDC Power Supply, Solar Mains via AC/DC Power Supply or Primary Battery	Modem on but idle, sensor power supply and relays off ^{1,2}
			Peak CatM/NB IoT Peak 2G (N/A for Australia)
	-	Unit is capable of Sleep Mode Operation for applications requiring very low power consumption	Sleep Mode ³
			<160mA 540mA 830mA <3mA

1. When idle there will be short spikes of higher current draw associated with network activity such as checking for messages.
2. Power consumption can be optimised by improving signal and or turning off some features, such as Bluetooth – contact Australis M2M for more information.
3. For sleep mode settings and guidance contact Australis M2M

Digital Inputs

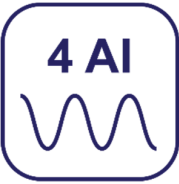
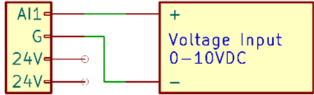
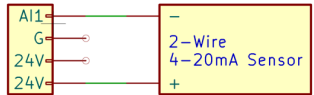
Digital Inputs	Type Setting	Rating	Suggested Connection	
	DI1	Max 30VDC OFF or Logical State 0 <0.5V ON or Logical State 1 >2.5V		
	DI2			
	DI3			
	DI4			
	DI5	Vr is a reference voltage to facilitate connection of volt free contacts. It is linked to +ve of device incoming power by one 12kΩ Resistor for each Vr terminal. Do not connect more than 3 digital inputs to any Vr terminal as voltage may drop to a level below 2.5V		
	DI6			
	DI7			
	DI8			
	DI9			
	DI10			

Items in **RED** or **PURPLE** are on optional expansion board.

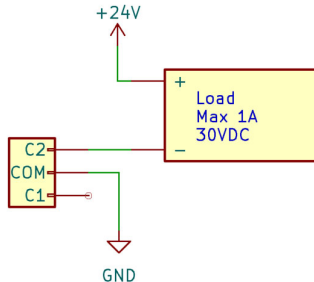
Items in **PURPLE** cannot be used to trigger alarms directly – for application information contact Australis M2M Pty Ltd.

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Analogue Inputs	Type Setting	Rating	Suggested Connection
	AI1	0-10 Volts 0-20/4-20mA	0-10V Analogue Input 
	AI2	Voltage – 1V Current – mA	
	AI3	These values can be scaled	Loop Powered Sensor 4-20mA Using Sensor Power Supply 
	AI4	Alternatively a 500Ω resistor can be connected between the input and G terminals	

Items in **RED** are on optional expansion board.

Relay Outputs	Type Setting	Rating	Suggested Connection
	DO1	Latching Relays	
	DO2	On Power up or reset of MIO Board the relay will be in the state it was in when reset/powering down	
	DO3		
	DO4		

Items in **RED** are on optional expansion board.

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Analogue Outputs	Type Setting	Rating	Suggested Connection
	AO1	Analogue Outputs Current Or Voltage	
	AO2		

Items in **RED** are on optional expansion board.

Serial Port B	Type Setting	Rating	Programming Adapter
	G	RS232 Baud Rate: 115200 Data Bits: 8 Parity: None Stop Bits: 1	
	Rxb		
	Txb		

A serial cable or USB-Serial cable will be needed to complete required programming hardware when using a Windows PC with Window Configuration tool. Programming adapters can be made up as required or purchased from Australis M2M.

Serial Port A	Type Setting	Rating	Suggested Connection
	G	Spare	N/A
	Rxa		
	Txa		

Serial Port D	Type Setting	Rating	Suggested Connection
	A	RS485 Baud Rate: 1200, 9600, 19200, 38400 Data Bits: 7, 8 Parity: None, Even Stop Bits: 1,2	
	B		
	G		

A serial cable or USB-Serial cable will be need

BLE Antenna	Type	Notes
	Whip Antenna, Radome Material PE, Height 21mm	If device is installed in a metal enclosure, and the door is closed BLE connection may not function, open door to facilitate connection If it is desired to have an external BLE antenna then the supplied antenna can be replaced with a suitable SMA connector – contact Australis M2M Pty Ltd

A serial cable or USB-Serial cable will be need

Cellular Antenna	Type	Notes
	SMA Female	Antenna selection and placement is very important for satisfactory performance, refer Application Note Antenna Installation and Signal Data 202103RV01.pdf for more details. Australis M2M Pty Ltd stocks a range of antennas from basic Magnetic Base to High Gain Whip antennas.

Logging & Alarm Functionality

Log and Alarm Channels

The device has 12 “Log and Alarm Channels” (LCXX) which can be configured/linked to various hardware, Modbus inputs or Logic Functions. The last two channels LC11 and LC12 are usually assigned to the supply voltage and the backup battery voltage (if fitted, contact Australis M2M Pty Ltd).

Allowable use of each channel is as follows.

LCXX	Default Configuration Linked Input	Input Type	Alternative Configurations
LC01	DI01	State ON/OFF 1 or 0 Interval Pulse Count (Scalable) Cumulative Pulse Count (Scalable)	Any DI or Logic Function that outputs a logic state
LC02	DI02		
LC03	DI03		
LC04	DI04		
LC05	DI05		
LC06	DI06		
LC07	DI07		
LC08	DI08		
LC09	AI01	0-10V or 0-204-20mA (Scalable)	Any AI or Valid Modbus Read
LC10	AI02		
LC11	Supply Voltage	0-30VDC Normal range 7-30VDC	
LC12	Backup Voltage (if fitted)	0-6VDC Normal Range 3.0-4.3VDC	

Where is Log or Alarm Data Sent

The unit can have up to 10 phone numbers in its phone book, any alarm can be sent to any combination of phone numbers. In addition alarms can be sent by MQTT.

Log data can be sent by MQTT, for alternative methods of sending log or alarm data contact Australis M2M Pty Ltd.

Unit only logs the LCXX channels, any hardware IO or Modbus values not linked to an LCXX channel are not logged.

Data Retention

Log Data and pulse counts are normally retained in RAM memory and as such are lost after a power cycle/reset. If it is important to save data then a backup power supply can be fitted, contact Australis M2M Pty Ltd. This supply will power the MCU and digital input counting functions, however analogue inputs will be deactivated and modem will be powered down.

RAM memory will allow for 2880 records to be stored, oldest records will be overwritten first. So if 15 minute logging interval is set the unit can hold 30 days of data, if 60 minute log interval then the unit will hold 120 days of data.

Configuration settings are retained in flash memory and will be saved irrespective of power loss.

It is possible to save Log data to Flash, however this requires changes to the device FW, contact Australis M2M Pty Ltd.

SMS Alarm Sending Capabilities

The device will attempt to send all alarms triggered to all set phone numbers, however once an excessive quantity of SMS messages are attempted the unit may experience issues trying to deliver all messages. For this reason, please pay attention to settings for input alarm delay times and alarm repeat/escalation times.

SMS Alarm Limit

Note that there is an SMS alarm limit function that stops sending SMS alarms if more than a daily limit (configurable) is exceeded. This limit can be reset by power cycling the unit.

Allowable Phone Number List

To send a command to the unit your phone number needs to be in the phone book which forms an allowed phone listing. This allowable list can be edited by SMS as long as the sender is already in the list. A phone number can be in the phonebook but not used for any alarm sending if required.

Other Alarm Sending Issues

Please make sure and phone numbers entered into the unit are correct as bad phone numbers can cause the device continuously re-attempt to send to a phone number that results in an error, this includes blank phone numbers.

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Windows Configuration Tool

To start using/programming the device you will need:

- A PC with a serial connection or USB/serial adaptor
- A copy of the MIO SMS Config Tool installed on your PC
- Suitable power supply connected to the device, 7-30VDC minimum 10Watt
- A suitable SIM fitted to the modem, by default the modem is set with an APN of telstra.m2m, all 4G devices require appropriate APN, username & password settings to match the SIM used

Step 1 – Open tool, Connect Serial Cable and Start Configuration Tool

Connect the serial cable, see picture on page 2.

Open the tool and navigate to “Start Here”.

The screenshot shows the MIO Configuration Tool interface. The 'Time and Date Settings' dialog box is open, showing options for 'Local time' and 'Offset from UTC'. The 'Terminal Window' displays responses from the connected unit. The 'Configuration File' section shows a list of settings. Annotations point to various parts of the interface:

- COM Port, RS232 115200 Baud Rate, Use “Test COM Port” to check the COM Port is working correctly** (points to the 'Test COM Port' button)
- Setting Date and time should be done first note unit will update time automatically from the modem** (points to the 'Time and Date Settings' dialog box)
- Terminal window shows responses from MIO/Modem** (points to the 'Terminal Window' text)
- Note that from time to time commands and responses between MIO Board and Modem will be shown** (points to the 'Terminal Window' text)
- Shows current configuration file** (points to the 'Configuration File' section)
- This dialog box allows for custom strings to be sent to the MIO board/modem** (points to the 'Configuration File' section)

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System Settings Tab

Unit ID/Name

Unit ID currently being used is “Default Unit” – this will appear in SMS alarm messages and can be used to identify the site/project being monitored.

Basic Modem Settings

By default, the modem is set without a SIM Pin and with an APN of telstra.internet, these settings may need to be changed depending on the SIM used.

4G devices need the APN and if applicable Username and Password to be correct for the SIM being used.

For these settings to take effect the modem must be re-started – please remember to reset the modem after making these settings, the restart process may take up to 3 minutes to complete.

Check Signal and Connectivity

Monitor Levels will request the signal strength and quality every 15 seconds and plot, for satisfactory performance both signal strength and quality are important. For more information on antenna selection and placement contact Australis M2M.

More Details will provide signal data such as:

- signal strength and quality
- Registration status
- IP address (if available)
- Mobile country and network codes
- EARFCN/UARFCN

...this information may be helpful in diagnosing connectivity issues.

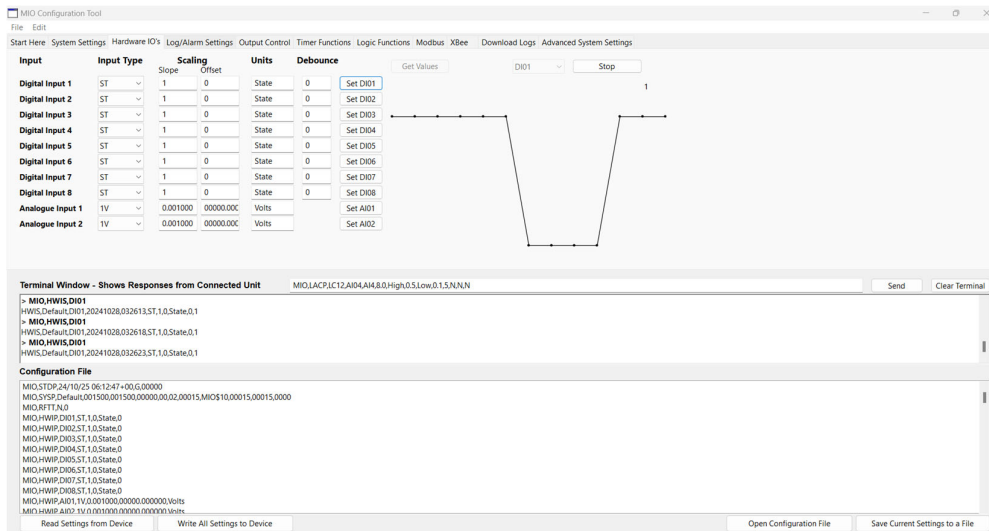
Send Test SMS is useful in checking that the system can send an SMS, ie SIM setup/authorisation is correct.

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Hardware IO's



These settings allow for the function type of each input channel to be set.

The channels that monitor the devices power or backup battery cannot be changed however its status can be viewed by clicking the “Power Supply Settings/Status” button.

Input Type

Sets the input type:

ST – input will be treated as a state 0 low 1 high

PC – accumulating count, note if power is reset, without backup batteries being present, then the count will reset to 0

PI – interval counter resets to 0 after each log is taken

Scaling, Slope and Offset

Channel value if PC, PI, 1V or MA – will be = $mx + b$

Where:

m = slope factor

b = offset

Only straight line, scaling can be handled by the device.

Get Values

Get the current value of each input. Note that analogue inputs relay on the device scan period, minimum 15s, and as such they may take 15s to update.

Monitor

Select the input to be monitored, the tool will then request the value every 15 seconds and plot the value on a basic graph.

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DI (Digital input) Alarm Settings

The screenshot shows the MIO Configuration Tool interface. The 'Settings for LC01' section is active, showing 'Source: DI01' and 'Name: Input1'. The 'Alarm Trigger' is set to 'High'. The 'High Alarm Text' is 'Ing1AlmH' and the 'Low Alarm Text' is 'Ing1AlmL'. The 'Total Character Count' is 22 / 85. The 'Delay' is 5. There are checkboxes for 'Fast Logging' and 'Fast Sending'. The 'LC01 Alarm Settings' section shows 'Select phone numbers to send to' with a list of phone numbers and 'Set' buttons. The 'Phone numbers' section shows a list of phone numbers and 'Set' buttons. The 'Terminal Window' shows responses from the connected unit. The 'Configuration File' section shows the current configuration file content.

IO Alarm Settings

Note that there are “Set” buttons for each section:

- Settings for each channel LCXX
- Settings for Which Phone Numbers Apply to the Selected Channel
- Settings for the Phone Book Itself

...each “Set” must be Set for changes to take effect.

IO Name

Name of IO, this will appear in the SMS sent, you can leave this blank if you like.

Message High and Message Low

Message to be sent for either a High or Low alarm, for example:

If you have a Pump Motor Alarm you might set the IO Name to be “Pump Motor” and the High Alarm Message to be “Alarm”.

Note – it is possible to set alarms for pulse counts, contact Australis M2M if this functionality is required.

Analogue Inputs can be used as digitals to send both High and Low Alarms – Digital Inputs can only currently send either High or Low alarms (this feature will be added to future units).

High and Low Setpoints or Triggers

If using Physical Channels 9 or 10 (analogue Inputs 1 or 2) then:

- both the High and Low levels alarms can be used as appropriate. This might be useful for an input that requires both an “Alarm” and an “OK” message.

If using Power Supply Settings then:

- Default high and low settings are 21V and 13V based on the assumption that a 12V SLA battery backup power system is being used.

Hysteresis

This is designed to be used with analogue inputs to reduce the chance of small fluctuations around an alarm setpoint causing multiple alarms to be sent. So if, for example, we have:

an analogue input set to 0-100oC and a High Setpoint of 8oC with a hysteresis of 0.5, then once the alarm has triggered at 8oC it cannot re-trigger until the value has dropped to <7.5oC.

Delay

Digital inputs are continuously scanned and as such it is possible to set a delay of 0 for Digital Inputs, however, we strongly suggest a delay 5 seconds or greater to avoid excessive sending of alarms due to unstable/varying input states.

Note that the delay corresponds to sending an alarm, if the alarm clears before a message is sent then no message gets sent. Also note that a channel will be in "Alarm" as soon as the state/value occurs/is detected irrespective of any delay set. As such if using an alarm in a logic function the value will be in alarm as soon as set irrespective of the delay.

Fast Log and Fast Send

Contact Australis M2M if you believe that you need to use these settings.

Reset Message

Sends a message when input returns to the non-alarm state.

Ph Book Matrix

Phone Book numbers are linked to individual alarms by the "Ph Book Matrix".

Repeat or Escalation Timer

A timer that allows for alarms to be repeated or if Escalation is set then step through the list of phone numbers with delay between each number.

Escalation

Step through ph book numbers with alarm sent to each number in order using delay/timer above between each number. Note if alarm clears then repeat and escalation actions are halted.

Phone Book

The Phone book, Phone1 through Phone10 is repeated on the DI Alarm Setting and AI Alarm Setting tabs all phone numbers should start with the country code eg +61 (Australia).

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Output Control

The screenshot shows the 'MIO Configuration Tool' window. The 'Output Control' tab is selected. It displays four digital outputs (DO01 to DO04) with dropdown menus for 'Source/Trigger' and 'Set Output' buttons. Below these, there are four parameter input fields (Parameter 1 to Parameter 4) with 'Set Output' buttons. A 'Terminal Window' at the bottom shows responses from a connected unit, including MQTT log messages and a configuration file. The configuration file lists various settings for the MIO board, including MQTT topics, system parameters, and output states.

The unit can have 4 relay outputs each output can be controlled by the state of a Parameter, an Alarm Channel, a timer Function or a logic function, it is also possible to have a Parameter or an Alarm Channel trigger a Timer Function that then controls an output.

Note that the relays are “Latching” type so stay in the nominated position to definitively set to a new position irrespective of a loss of power.

Source/Trigger

The trigger for control of the output (relay). If controlled by an Alarm channel then the output will be ON when the Alarm Channel is in alarm. If controlled by a Timer function then the settings of the Timer Function will determine whether the Output is ON or OFF.

Parameter

Allows the state/value of a parameter to be changed a value of 0 will cause the output to be OFF, a value of 1 will cause the output to be ON.

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Timer Functions

Timer No.	Source/Trigger	Start Time HHMMSS	ON Period Seconds	OFF Period Seconds	Repeat	Active Days(s)
TPC1	PAR1	000000	0	0	☐ Y ☒ N	☐ M ☐ T ☐ W ☐ T ☐ F ☐ S ☐ S
TPC2	PAR2	000000	0	0	☐ Y ☒ N	☐ M ☐ T ☐ W ☐ T ☐ F ☐ S ☐ S
TPC3	PAR3	000000	0	0	☐ Y ☒ N	☐ M ☐ T ☐ W ☐ T ☐ F ☐ S ☐ S
TPC4	PAR4	000000	0	0	☐ Y ☒ N	☐ M ☐ T ☐ W ☐ T ☐ F ☐ S ☐ S

Timer functions can only occur after the MIO board has received a time and date setting, it can get this either from the attached modem or when the time and date is set via the button on the “Start Here” tab.

Source/Trigger

The trigger to activate a Timer Function If controlled by an Alarm Channel then the Timer will be Active when the Alarm Channel is in alarm. If controlled by a Parameter the Timer Function will be active when the Parameter is 1 and inactive when the Parameter is 0.

Start Time (HHMMSS)

This is the time of day when the timer cycle will start, for this to be correct you must enter in the format HHMMSS, with midnight being 000000 and say 3minute and 45 seconds after midnight being 000345.

ON Period (Seconds)

The time in seconds from the start time (above) that the timer will be active.

OFF Period (Seconds)

The time in seconds after the end of the ON period that the timer will be off – this setting is only relevant if Repeat is set to Y.

Repeat

This causes the time cycle to repeat

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Logic Functions

The screenshot shows the 'MIO Configuration Tool' window. The 'Logic Functions' tab is selected. It displays two columns of logic function settings, each with a 'Function' dropdown, 'Source 1' and 'Source 2' dropdowns, and a 'Set' button. The functions listed are LF01 through LF16. Below the settings is a 'Terminal Window' showing responses from the connected unit. At the bottom, there is a 'Configuration File' section with a text area containing configuration data and buttons for 'Read Settings from Device', 'Write All Settings to Device', 'Open Configuration File', and 'Save Current Settings to a File'.

Math functions returning a logical output. These take floating point numbers and return a logic state

- EQ Compares two floats and returns a logic TRUE if equal.
- LT Logic TRUE if Arg 1 < Arg 2
- LE Logic TRUE if Arg 1 <= Arg 2
- GT Logic TRUE if Arg 1 > Arg 2
- GE Logic TRUE if Arg 1 >= Arg 2

Logical Functions returning a logical output. These take logical inputs and return a logic state

- AND Logic TRUE if Arg 1 and Arg 2 are both TRUE
- OR Logic TRUE if Arg 1 or Arg 2 are TRUE
- NOT Complement of Arg 1
- NOR Logic TRUE if Arg 1 and Arg 2 are FALSE
- XOR Logic TRUE if Arg 1 is the complement of Arg 2

Math functions that return a floating point result

- MIN Returns the lesser of Arg 1 and Arg 2
- MAX Returns the greater of Arg 1 and Arg 2
- SUB Returns the result of Arg 1 minus Arg 2
- ADD Returns the sum of Arg 1 and Arg 2
- MUL Returns the product of Arg 1 and Arg 2
- DIV Returns the product of Arg 1 and the reciprocal of Arg 2

Additional Notes / Do's and Don'ts for Logic Functions:

1. If no function is to be set, or the logic function deactivated then set the applicable logic function to:
MIO,LFCP,LFxx,NONE,NONE,NONE
2. Do not use floating point arguments to logical functions. For example:
MIO,LFCP,LF01,AND,AI01,AI02
Would be an illegal operation since it isn't possible to logically AND two real numbers
3. Do not use logical arguments to math functions. For example:
MIO,LFCP,LF03,MUL,DIO2,DIO3
Would be an illegal operation since multiplying boolean is not possible.
4. Results from previous LFCP functions may be used as inputs to following ones. For example:
MIO,LFCP,LF01,GT,AI02,MDB3
Will return a logic TRUE if analogue input 1 is > modbus input 3
MIO,LFCP,LF02,AND,LF01,DIO2
Will return a logical true if analogue ip 1 > modbus ip 3 AND DIO2 is true.
This can be used as an input to an alarm or timing function.

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Modbus Functions

MIO Configuration Tool

File Edit

Start Here System Settings Hardware IO's Log/Alarm Settings Output Control Timer Functions Logic Functions Modbus XBee Download Logs Advanced System Settings

Baud Rate: 19200 Data Bits: 8 Stop Bits: 1 Parity: E Set

Read/Write Command	Modbus Address	Modbus Register	Number of Words	Source Channel	Scaling m	Scaling b	Data Type	Units	Get Current Values	
MBR1	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR2	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR3	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR4	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR5	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR6	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR7	NONE	001	0001	1	LC00	1	0	D	State	Set
MBR8	NONE	001	0001	1	LC00	1	0	D	State	Set

Straight line scaling:
 $y = mx + b$
where x is the raw value of the hardware channel.
Scaling is applied to both Read and Write actions, to modify the values being read or written to the attached modbus device.

Terminal Window - Shows Responses from Connected Unit

Send Clear Terminal

Configuration File

Read Settings from Device Write All Settings to Device

Open Configuration File Save Current Settings to a File

It is possible to connect Modbus RTU (RS485) devices to the unit and have the device log and/or alarm based on reading of modbus registers. It is also possible to write to modbus registers. For more information on using Modbus functionality contact Australis M2M Pty Ltd.

XBee

MIO Configuration Tool

File Edit

Start Here System Settings Hardware IO's Log/Alarm Settings Output Control Timer Functions Logic Functions Modbus XBee Download Logs Advanced System Settings

Alarm Reformatting ☒ MIO20 ☒ Unit ID ☒ Date ☒ Time ☒ Input Name ☒ Alarm Text ☒ Value ☒ Units of Measurement Set

Terminal Window - Shows Responses from Connected Unit

Send Clear Terminal

Configuration File

Read Settings from Device Write All Settings to Device

Open Configuration File Save Current Settings to a File

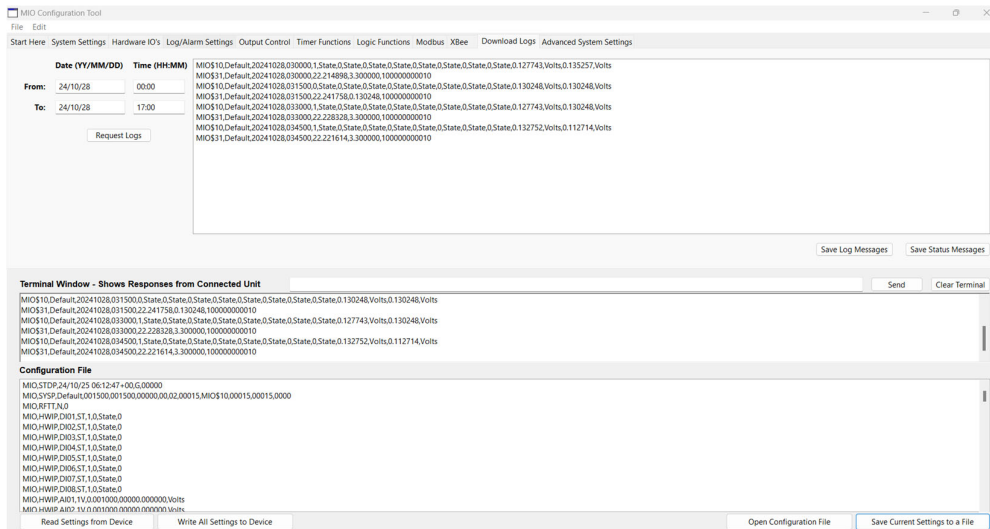
This tab allows for special functions to be added, currently the only special function is one which “cleans” outgoing SMS messages. This function allows the user to select which parts of the standard SMS format are sent thereby allowing messages to be simplified.

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Download Logs



Allows for standard log data, if available, to be downloaded from the unit, you can copy and paste from the screen to say Excel to work on the data.

Note that the “Request Logs” command may take some time to resolve depending on what the device is doing at the time and how many logs are requested.

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Advanced System Settings

For standard SMS applications these settings should normally never be changed.

Logging functions are linked to sending functions so unless there is a destination for sending logged data then these settings are not applicable.

Network Settings

For SMS applications this should be set to LTE-M Only.

Base Log Rate (HHMMSS)

Log rate, note that setting should contain 6 values eg for 5 minute logging use 000500.

Fast Log Rate (HHMMSS)

Alternate log rate can be triggered by an alarm state.

Awake Time (Minutes)

Time in minutes that unit will be awake if set the unit will sleep for a period determined by the Send Rate settings and be awake for at least as long as the Awake Time setting – note that depending on sending tasks the unit may remain awake for longer.

Analogue Scan Interval (Seconds)

How often analogue values will be scanned, note that the unit will not start scanning until a time setting is made either manually via the “Start Here” tab or obtained from the connected modem. Minimum setting is 15 seconds note that as a result analogue alarm delays of <15 seconds make no sense.

This setting is useful for minimising power consumption of attached sensors. The unit includes a 100mA 24VDC switched sensor power supply and the frequency at which a sensor is switched on is dependant on the logging rate and analogue scan interval.

Send Format

Currently only MIO\$10, in future other send formats may be made available.

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Base Send Rate (Minutes)

Rate at which log data, if any, is sent out the serial port. Note log data is sent line by line with a carriage return at the end of each line and a delay.

Fast Send Rate (Minutes)

Alternate send rate can be triggered by an alarm state.

MQTT Settings to Enable Log Sending

These settings can be used to enable sending by MQTT/MQTTS, HTTP/HTTPS or FTP – for assistance on using these settings contact Australis M2M Pty Ltd.,

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Configuration - Android App

TBC

Changing Settings Using SMS or MQTT

Settings in the MIO alerta v2 unit can be changed by sending SMS messages to the unit.

Settings may also be changed in the same manner via MQTT.

A list of common commands is attached as well as expected responses.

Example Change a Ph Number in the Phone Book

The applicable commands are to be sent by SMS is:

MIO,ADDP,AD01,+61411111111

Note that this will only work if the phone number from which the command is sent is already in the phone book.

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MIO alerta v2 CatM/NB IoT



Common Commands

Command	Notes/Response
AT^SMONI	Returns Signal Data/Status
MIO,HWIS,XXYY	XX is either DI for Digital Input or AI for Analogue Input Returns the current settings and status of the input
MIO,ADDP,ADXX,+YYYYYYYYYYY	XX is the position in the phone book 01, 02 ...10 +YYYYYYYYYYY is the phone number Sets a phone number in the phonebook
ATC\$AT^GETPARAM,ALLOWED_numbers	ATR\$ALLOWED_numbers: +YYYYYYYYYYY List of allowed numbers can be up to 10, must be separated by , No blank spaces in allowed number list
ATC\$AT^SETPARAM,ALLOWED_numbers,+610000000000,+610000000000,+610000000000,+610000000000	ATR\$AT^SETPARAM,ALLOWED_numbers,+610000000000,+610000000000,+610000000000,+610000000000 ATR\$OK List of allowed numbers can be up to 10, must be separated by , No blank spaces in allowed number list

There are many other commands, to find a specific command the Configuration Tool can be used, as long as a serial cable is connected and the port open but not connected to a device, to see the format of any command and replicate as an SMS.

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Known Bugs Issues

Issue	Description	Status	Possible Countermeasure
1	Configuration Tool does not currently cater correctly for all additional expansion inputs.	Configuration Tool update expected late Dec 2024	Settings can be issued "manually" from command send window, refer page 13
2	Relay outputs mis-labelled on hardware, as they are latching type it is more useful to identify contacts by which output state (0 or 1) the output is currently set to.	New Product labels due late Dec 2024	Refer this manual page 6
3	Android App does not allow for new features such as reset message for digital alarms.	Update expected end Dec 2024	Use Windows tool