D6000 MesCom Workshop Manual

(for MesCom release 2)

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1 Description

The MesCom is a basic low cost remote telemetry unit with 4 universal inputs and 2 open collector outputs.

Communication and configuration with the MesCom is via SMS messages from your mobile phone avoiding the need for a service or monthly subscription.

MesCom2 devices have additional functionality to allow reporting to a server and configuration from the Dycon MesCom configuration manager website.

Inputs accept 0-3V signals with an internal pull up/down resistor and can be configured as analogue or digital signals.

A variety of sensor types can be connected to the MesCom: Volt-free contact, 4-20mA, transistor logic, 3v analogue, 30v analogue with the minimum of external components.

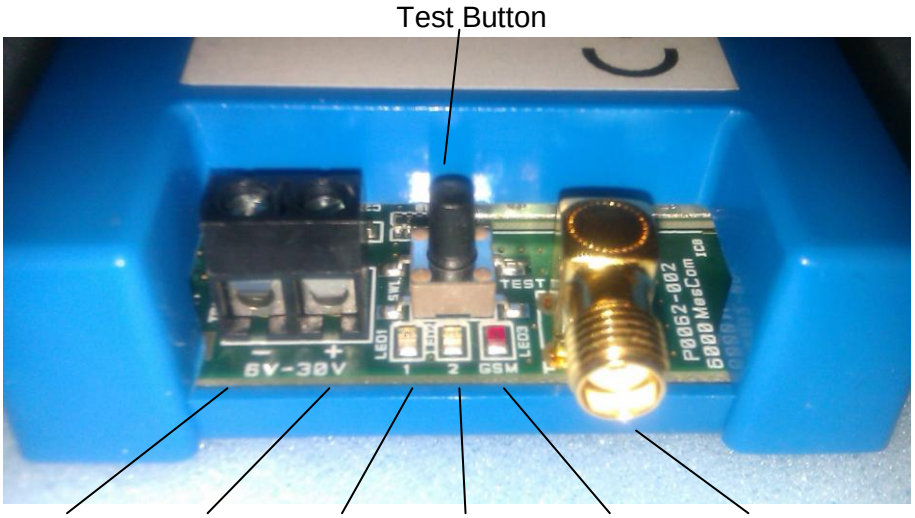
Outputs are open collector outputs to ground with back EMF protection for use with small inductive loads (eg relays) with a maximum 100mA load.

Internal monitoring of temperature, battery voltage, supply voltage, and radio module state is also performed. The board temperature sensor has an accuracy ±2°C and is measuring the board temperature, not the ambient temperature.

All ports, with the exception of the antenna and battery, are 30v tolerant.

All input and output can be configured to suit the user’s application.

2 Hardware



0V Power supply connector 9-30Vdc 500mA*

+V

LED1 LED2 GSM Status Indication see section 4.1

SMA Antenna

OP2 OP1 **Open collector outputs** 100mA 30V max

OV **Ground** OP & IP common

IP4 IP3 IP2 IP1 **Inputs; Voltage or volt-free contact** 3V max (30V overvoltage protected)

2.1 Antenna

The MesCom can be fitted with an antenna with an SMA connector suitable for GSM/GPRS use covering the frequencies in use by your selected network. In Europe this is 900MHz and 1800MHz. It is recommended that a stub antenna connected directly to the MesCom be avoided for all but the best signal strength areas.

2.2 Power Supply

The MesCom MUST be supplied with DC between 6V and 30V and will require a maximum current of 500mA (3W). It typically will use less than 50mA.

MesCom inputs are designed to interface with a wide variety of low-voltage devices, relays and contacts, typically as used by monitoring sensors and alarm systems.

The MesCom power input is suitable for connection to a Dycon 1A power supply unit, or a similar power source, which delivers a protected 6-30VDC voltage. It is not designed for connection to industrial power sources without the provision of additional anti-surge protection. Care should be taken to ensure correct polarity.

To avoid unnecessary notifications, all connection to inputs and outputs should be done before powering the MesCom (alternatively use engineer-on-site mode, see sections 4.3).

2.3 Battery

The battery is a 3,7v 640mAh Li-ion battery with built-in protect circuit and JST ZHR-2 connector.

See section 3.1 for how to connect the battery to the MesCom.

2.4 Indicators

The MesCom has 3 LED indicators to show the current status and mode of operation - see section 4.1 for more detail.

2.5 Inputs

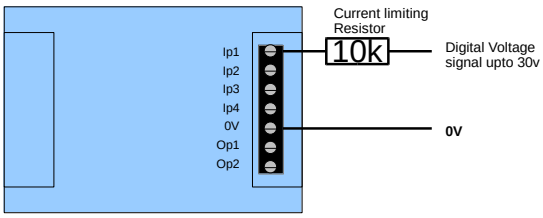
Inputs can measure up to 3V signals and can withstand voltage up to 30V. Voltage above 30V will damage the inputs.

Inputs can be configured as digital or analogue - see section 7.4 for more detail.

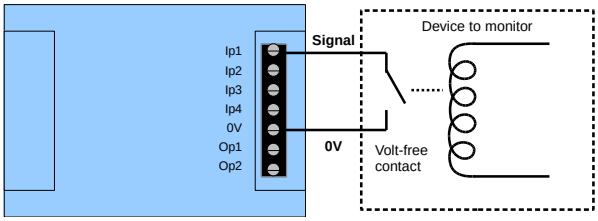
2.5.1 Digital Input Wiring Options

Eg. Signal from panels, switches and contacts etc.

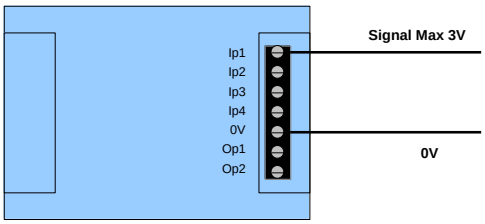
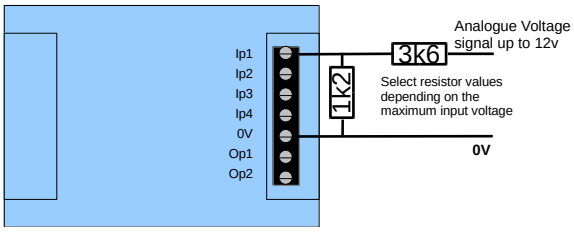
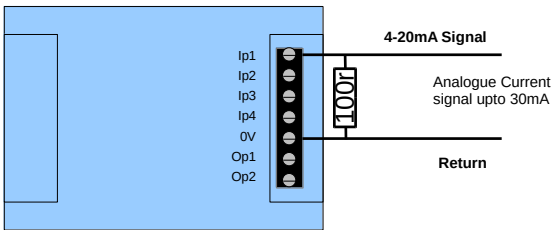
Voltage present / absent	Pull down resistor
High going low	Pull down resistor
Low going high	Pull up resistor
Limiting resistor for safety only	
Examples	Alarm panel signals Flood sensor



Volt-free contact	Pull up resistor
Open collector	Pull up resistor
SO, FET or Opto-couple	Pull up resistor
Examples	Switch contacts and relays Energy meter pulse output Float switch



2.5.2 Analogue Input Wiring Options

Analogue signal with a maximum of 3V or less can be connected directly to the MesCom.	Pull up or down	
Examples	Low voltage analogue sensors Including: temperature, pressure, weight, tank depth, flow rate	
Analogue voltage inputs above 3V need to be scaled with resistors to give a maximum of 3V to the MesCom input. The MesCom can then be configured to scale them back again. R1 ≈ 1KΩ R2 = (max voltage/3 – 1) × R1	Pull up or down	
Examples	Supply voltage monitoring Battery voltage monitoring Analogue sensor. Including: Temperature, pressure, weight, tank depth, flow rate	
4-20mA Current inputs Convert to a voltage with a resistor. R = 3/max current	Pull up or down	
Examples	4-20mA Sensors Including: Oil pressure, temperature, strain and stress.	
Sender units and thermistors can also be connected to the MesCom but these sensors are non-linear so should be used with caution.	Pull Up resistor	Connection dependant on individual sensor and beyond the scope of this manual.

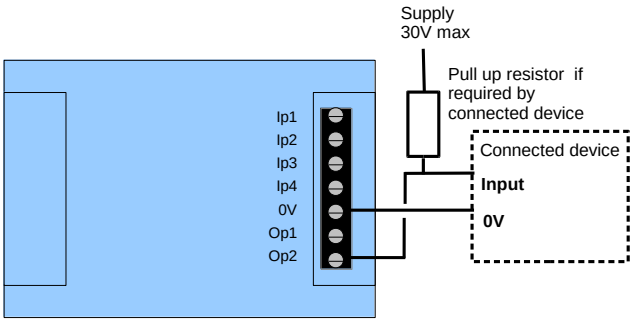
2.6 Outputs

Outputs have a maximum switching capacity of 30v 100mA and are open drain type.

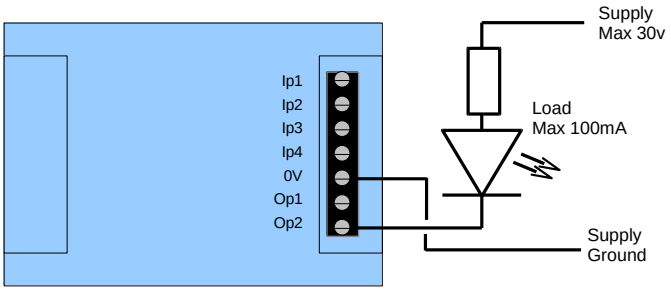
2.6.1 Output Wiring Options

MesCom outputs can be connected directly to any device input that accepts open drain/ open collector signals.

For inputs requiring a voltage signal, a pull up resistor will be required.



Small load of no greater than 30V 100mA can be connected directly to the MesCom open drain output.

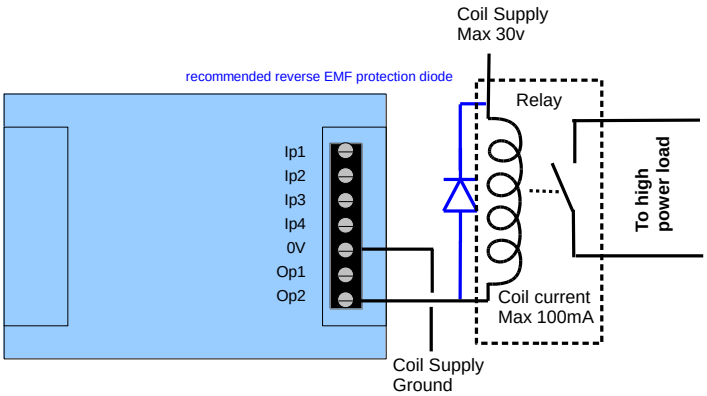


For higher power loads the output will need to be connected to a relay.

The MesCom output is protected against back EMF but we recommend fitting an additional reverse EMF protection diode for added protection, as shown.

The relay can be of any type; traditional, optical or solid state.

Using a relay also isolates the MesCom from the load and is recommended with cable runs of longer than 1 metre.



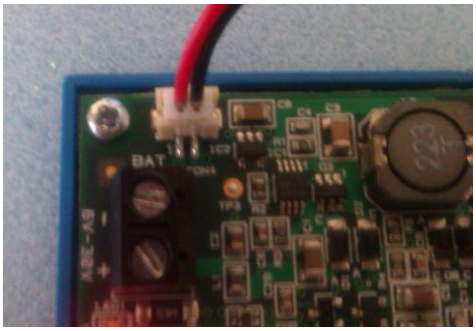
3 Commissioning

3.1 Connect and Power-up

Having found a suitable position to install the MesCom:

- Connect to system sensors/relay etc. See connection details in section 2.5.
- Connect the supplied stub antenna or any suitable GSM antenna with SMA connector.
- Remove the lid by pulling a corner, being careful not to pull the battery if already connected.
- Insert SIM card as shown.
- Make a note of the IMEI (product serial number) which is required for the web configuration manager.

- Connect the battery to the small white 2 pin connector near the power connector as shown on the right.
- The LED indicators should start to flash indicating the unit is working. If the LEDs don't flash it may be that the battery is discharged, providing external power will switch the MesCom on and charge the battery.



Before connecting a supply, ensure it is the correct voltage / current rating and the polarity is correct.

The MesCom is not fitted with a fuse or overvoltage / polarity protection, incorrectly connecting a PSU will damage the device.

Connect a suitable supply to the power terminals being careful to observe polarity. Switch the supply on.
After the MesCom has registered on a network, the LEDs give an indication of signal strength - see section 4.2.2 for details of LED meaning.

3.2 Configure

The MesCom is supplied with a default configuration (see section 8 for more details). For MesCom2 devices, the best way to change this configuration is via the web configuration service at http://www.dyconconfig.com/ (see section 13). Before using the configuration service you will need to set the MesCom APN correctly. For the SIM card fitting, see section 16 for list of common APN settings.

```
Example:
9876 OPTION APN internet web web
```

Where 9876 is your password, the default password for a new MesCom is the last 4 digits of the IMEI number. The response to this command will be ADDNUM successful/failed)

If your network doesn't give a password/username leave them off the command.

Alternatively you can manually configure any/all parameters on a MesCom by SMS (see section 5 for more details).

4 Operation

4.1 General

The primary function of the MesCom is to send a message when inputs change state. The MesCom must know how to determine a change of state and where to send the message.

The MesCom can support 6 contacts to which it can send messages via SMS, GSM (data) or GPRS, in various predefined formats. For more detail see section 5.

The MesCom is supplied in un-administered mode with no contacts pre-configured. In this mode the MesCom will accept SMS commands from any phone number. **The default password is the last 4 digits of the IMEI number**. To exit un-administered mode you must add at least one contact with administrator level access, see section 4.4.

Contacts can be configured not to receive messages, for maintenance users or while on holiday etc…

GPRS/GSM contacts can be a “send and forget” (eg uploading to web based data concentration services see section 11) or connection based hosts - for more detail on reporting, see section 12.

Points (inputs and outputs) can be configured to send messages to SMS contact, GPRS/GSM contact or both.

Points can be configured to record their state at routine intervals and/or record every change of state (section 7.4)

4.2 LEDs and Test Button

4.2.1 Power-up

On power-up the LED1 and LED2 (yellow and green respectively) will switch ON blinking every 2 seconds (until the power sequence is complete).

Holding the TEST button while powering the MesCom allows you to perform some useful tasks:

Hold for less than 5 seconds* – Clear the event log.
LED1 (yellow) will flash (2Hz).

Hold for more than 5 seconds* – Call configuration server (get most recent configuration).
LED2 (green) will flash (2Hz).

Release and press within 5 seconds* – Reload factory defaults (remove users and clear log).
LED1 (yellow) will flash quickly (10Hz).

* Time starts from when LED1 starts flashing and LED2 is off.

4.2.2 Normal Operation

LED1 and LED2 indicate the GSM signal strength and device status:

LED2 (Green)	LED1 (Yellow)	Status
Off	Off	Power is off
On (blink)	On (blink)	Initialising (blinking off every 2s)
Off	On	Signal strength is low CSQ < 11
On	On	Signal strength is OK between 11 and 18
On	Off	Signal strength is good CSQ > 18
ignore	Flash (4Hz)	Call or notification in progress
Flash alt	Flash alt	Self-test in progress (1s each)
Flash alt	Flash alt	Fault condition (250ms each)
Blink 1min	Off	Power saving mode
ignore	Blink 10sec	Engineer on site mode
Flash sync	Flash sync (2Hz)	Test button press for between 5-10s

The signal strength thresholds (low and good) are fixed.

In normal operation the test button can be configured to do multiple things: these include entering/exiting “Engineer on site” mode, overriding power saving mode, making a call, sending a notification and sending a status report.

When TEST is pressed:

- Power saving mode will be overridden for 15 minutes
- Call to host initialled.** (POINT button CALL)
- Notification to users.**(POINT button ALARM)

Hold TEST for 5 seconds: (LED1 and LED2 flash in sync)

- Status report to all users.** (OPTION RINGMODE)
- Exit “Engineer on site” mode.** (OPTION SUPPRESS)
- Cancel the 15 minute-powered state above.

Hold TEST for 10 seconds:

- Enter “Engineer on site” mode.** (OPTION SUPPRESS)

** Feature can be disabled/enabled by configuration

4.2.3 Radio Module Status

LED3 (Red)	Status
Off	Radio module is off
Flash (1s)	Module is searching for network
Flash (3s)	Module is registered on a network
On	Module is currently in a call

4.3 “Engineer-on-site” Mode

When in this mode, the MesCom will monitor all inputs and allow outputs to be changed but will not generate notifications or trigger calls to the host. This mode should be used when any work is being performed on the system.

“Engineer on site” input can be configured to any input - see section 7.7.22.

By default “Engineer on site” mode is entered holding the test button for longer than 10 second and exiting by holding the test button for 5-10 seconds.

With the exception of configuring the input to be the TEST button (see section 4.2.2), “Engineer on site” mode will be entered when the input goes high***. The mode will exit when the input goes low or a timeout occurs.

*** The input state which activates “Engineer-on-site” mode is fixed.

The “Engineer on site” mode has a configurable maximum time; should this expire, the unit will exit “Engineer on site” mode. “Engineer on site” mode can be re-activated by repeating the entry process above.

“Engineer on site” timeout is configurable - see section 7.7.23.

“Engineer on site” mode can be activated and disabled by SMS - command OPTION SUPPRESS – see command section 7.7.22.

4.4 Useful Commands

Below are some commands that may be useful in day to day use. See section 5 for the full range of commands available. Some of these commands will need administrator level access.

4.4.1 Adding and Removing Users

```
Example:
9876 ADDNUM +447·********
```

Where 9876 is your password, the default password for a new MesCom is the last 4 digits of the IMEI number.

To remove a user you must use the REMOVE command:

```
Example:
9876 REMOVE +447·********
```

The phone number should be in international format (ie starting with a + symbol). If a number is given and not in the user list, a fail message will be returned. If the number is omitted, then the sender’s number will be removed from the user list.

4.4.2 Reading the Current Status

To find out the current status of an input or output, use the READ command.

```
Example:
9876 READ Input3
```

The command supports a request for up to 4 points at once. The keyword ALL can also be used to return a list of all enabled points. Points can be their name or number: see section 1.1 for numbering details.

4.4.3 Changing an Output

To change an output, use the SWITCH command or the PULSE command depending on the signal you want to produce.

```
Example:
9876 SWITCH OP2 ON
```

The SWITCH command supports an instruction for up to 3 points at once. Points can be their name or number. The final value will be the value to set all outputs to - this final value can be a state label for the first listed point, where Label0 = 0 and Label1..4 = threshold0..3.

The SWITCH command can also be used to reset a counter/timer input. On other input points the SWITCH command has no effect.

```
Example:
9876 PULSE OP2 ON 500 OFF
```

The PULSE requires 4 values: 1st the point name or number, 2nd initial value to set point to, 3rd delay in milliseconds before changing to final value, 4th final value to set point to. Attempting to PULSE a point that isn't an output will have no effect.

4.4.4 Disable Faulty Input

To disable an input should the sensor become faulty, you can use the DISABLE command:

```
Example:
9876 DISABLE input3
```

To reverse this action, use the ENABLE command:

```
Example:
9876 ENABLE input3
```

4.4.5 Temporary STOP/START User's Notification

The STOP command is a universal command to stop getting text messages from an automated system. This allows a person who has been accidently added to the unit to disable the text message from the unit. Please note the STOP does not need to be preceded with a password.

This command will stop you receiving any more notifications.

```
STOP
```

The STOP command also allows a user to temporarily disable messages to themselves, for example when they are out of the country.

To re-start message use the START command:

```
Example:
9876 START
```

An administrator can view if a user has messages on stop with the VIEW command. The START command can be configured to be administrator access only, forcing users to contact the administrator to re-start them.

```
Example:
9876 VIEW USER ALL
```

This will output a list of all users and their settings.

An administrator can force a START on any user:

```
Example:
9876 START +447·********
```

Additionally to conform to automated text services best practice, the REMOVE command can also be used without a password to remove the sender from the device.

This command will stop you receiving any more notifications.

```
REMOVE
```

Note: to remove users other than yourself, a password needs to be provided and you need administrator access.

5 Contacts

Contacts can be SMS users' or host/server's addresses. The MesCom supports any combination of up to 6.

A contact has a number of attributes to define how events will be transmitted to it and what commands can be received from it.

In addition to the 6 User contacts, the MesCom has some system contacts. Some OPTION commands may return ADDNUM Successful as confirmation they the command was successful not the usual option value.

All types of users are added and removed in the same way.

Please Note contacts are handled differently in MesCom2 compared to the original MesCom.

5.1 Contact Attributes

List of contact attributes. When adding a contact, the parameters can be omitted. If included the preceding parameter must also be included (for example if you want to set the access level you must set the password) - see section System Default Contact Settings for system default.

Address	Where to send the Notification. Maximum length 32 characters (no spaces)	Eg +447xxxxxxxxx joe@domain.ext
Password	The contact's password must be given when sending commands to the MesCom. Maximum length 48 characters (no spaces) *Please note: Passwords are case sensitive.*	Eg 9876
Access Level	The commands access level the user has, see below.	0 = no commands. 6 = all commands.
Format	The format of the message.	0 = no notifications. 1 = standard messages.
Transport	The method used to send the notification.	4 = SMS.
Username	Optional; may be required for connecting to computer systems. Maximum length 32 characters (no spaces)	

5.1.1 Address

Phone number for CSD host and SMS users can be in local (07xxxxxxxxx) or international format (+447xxxxxxxxx).

GPRS address is an IP address in numerical (eg 192.168.0.1) or name (eg www.dyconsecurity.com) format and can be followed by a port number (eg 192.168.0.1:80).

5.1.2 Password

Case sensitive.

Each contact has an individual password. To be prefixed to all incoming commands or authenticate with a remote host. If left blank the system default will be used. From the factory this default is the last 4 digits of the IMEI number (see label inside the MesCom).

5.1.3 Access Level

What command access level the contact has:

0	Receive - no commands are accepted from this user.
1	Read only – READ and PASSWORD commands accepted.
2	View – VIEW, READ and PASSWORD commands accepted.
3	Control – SWITCH, PULSE, VIEW, READ and PASSWORD commands accepted.
4	Service – As Administrator but without SWITCH and PULSE commands.
5	Server – All the features of Administrator but isn't added to the Admin user count.
6	Administrator – Access too all commands.

5.1.4 Message Format

The message output format. Care should be taken to select the correct one for the contact. Hosts will require a specific format and not all formats are suitable for SMS.

0	Do not use - Contact Empty.
1	No Notifications.
2	Standard message – it is recommended this format is used for SMS.
3, 4, 5, 6	Do not use.
7	Cosm/Xlivey web service.
8, 9	Do not use.
10	Fixed width text – to align display of many events on screen.
11	HTML – event will be given as a row in a HTML table.
12	Comma-separated values – for interpretation by computer.
13	Short message – without unit name or the time the event took place.

Only Formats 1,2,13 should be used with SMS; all others are for computer systems.
See section 6 for details of the different formats.

5.1.5 Transport

If omitted, this is automatically selected based on the address but you may wish to override the default TCP selection for server /host connections.

0	TCP
1	UDP
2	CSD
3	reserved
4	SMS
5	SMTP – special case, do not use.
6	APN – special case, do not use.
7	FTP – upload a file via FTP.
8	HTTP – upload events via HTTP PUT or POST methods (for Cosm etc).

5.2 New MesCom (un-administered mode)

The MesCom is supplied in un-administered mode with no contacts pre-configured. In this mode the MesCom will accept SMS commands from any phone number. **The default password is the last 4 digits of the IMEI number**. The IMEI is printed on the radio module inside the MesCom (scanning the quick code will also give you the IMEI) - see picture in section 3.1.

To exit un-administered mode, you must add at least one contact with administrator level access. Should you remove all administrators, the MesCom will revert to un-administered mode.

Once in administered mode the MesCom will only accept commands from users on the contact list. Should you wish to override this and allow any phone number to access the MesCom with the default password, see OPTION CMDMODE command.

The first user added when in un-administered mode by default will be added as an administrator. The default access level for contacts added while in administered mode is the system default (factory default view <2>).

5.3 Adding a User

The simplest method to add a new user is as follows:

```
9876 ADDNUM +447xxxxxxxxx
```

This will add the number +447xxxxxxxxx as a user with the unit's default password. With read only access unless there are no admin level users subscribed to the device.

```
9876 ADDNUM
```

Will add the sender's number as admin but this will only work if none of the users subscribed to the MesCom are admin level. – ie subsequent users cannot add themselves with this command.

```
9876 ADDNUM +447xxxxxxxxx <NewPassword> <Access> <Format> <Transport> <Username>
```

The ADDNUM command has been extended so all the attributes can be set - see section 7.2.6 for more detail.

Adding a user with the same address/phone number as a user already subscribed will replace the previous user, resetting their password; a duplicate will not be created.

5.4 Removing a User

The REMOVE command, along with the STOP command, are the only commands that do not require a password to precede them. This is to comply with best practice to electronic communication providing the users with an intuitive method to unsubscribe from automated message.

```
REMOVE
```

Should an administrator wish to remove another user, they may do so by providing their password and the address of the user. See section 7.2.5 for more detail.

```
9876 REMOVE +447xxxxxxxxx
```

5.5 Changing a Password

Passwords can only be changed by the user themselves.

```
<oldPassword> PASSWORD <newPassword> <newPassword>
```

5.5.1 Password Recovery

Should a user forget their password, an administrator can re-create the user using the ADDNUM command including a new password.

5.6 Stop Command

The STOP command sets the sender's message format to none so that they will not get any more events messages. The user will still be subscribed to the MesCom.

```
STOP
```

To reverse this command, use the START or ADDNUM command.

5.7 Start Command

The START command sets the sender's format to Human so that they will get event messages again.

```
9876 START +447xxxxxxxxx
```

Only administrators can provide the address parameter.

This command can be configured to be for administrator use only – thereby ensuring that an administrator is aware that someone has stopped themselves from getting message.

5.8 Viewing Current Contact List

Administrators may wish to see who is subscribed to a MesCom to confirm people are still getting message or to determine if there is space for extra users.

```
9876 VIEW USER ALL
```

This is an administrator only command.

5.8.1 View Response

Failed – if command is incorrect.

USER {listing of the 6 user locations}.

Each user location is either; “BlkContact” if the space in empty or
<address> <level> <format> <transport> <username>
if “username” is an empty field the text “blank” is inserted.

Eg.
MesCom: USER +447xxxxxxxxx 6 2 4 blank +447xxxxxxxxx 6 2 4 blank cloud.nimbits.com:80 0 6 0 username@gmail.com BlkContact BlkContact BlkContact

Please note passwords are not listed.

5.9 Changing a Contact’s Access Level, Format etc…

Administrators may change any of the parameters (Format, Access level, Transport) of a user by re-creating them using the ADDNUM command. This will require the users’ password to be reset. See section 7.2.6 for more detail.

5.10 System Default Contact Settings

The system defaults can be configured with the OPTION ACCOUNT command.

Factory system default

Address	NA
Password	Last 4 digits of the IMEI number
Access Level	View <2>
Format	Human <2>
Transport	TCP <0> for IP address otherwise SMS <4>
Username	Blank

6 Notifications

The primary purpose of the MesCom is to notify one or more users of a change of state. The format of the notifications can be configured on a per user basis. The type of events that generate a notification can also be configured. See section 7.5.4 for more details.

6.1 Format

1	Standard	device point [type] state [value] time `MyGarage Temperature decreased to Low(5.00C) 24-08-2013,23:45:34`
10	Fixed Width	point state [value] `Temperature  Low  5.0000C`
11	HTML	<tr><td>point</td><td>state</td><td>value</td></tr> `<tr><td>Temperature</td><td>Low</td><td>5.0000C</td></tr>`
12	CSV	point,state,value,time `Temperature,Low,5.0000C,2013-08-24T23:45:34.880`
13	Short	point [type] state [value] `Temperature decreased to Low(5.00C)`

See section 5 for more detail about setting the message format.
Where:

Device Name given to MesCom (OPTION IDENT).
Point Name given to input/output (POINT PNAME).
Type Type of event, omitted for digital input/output, increase/decrease/counter overflow.
State Label given to level/state of input/output (POINT LEVELS) or counter raw value.
Value Scaled value of input, omitted for digital input/output. See section 7.5.3.
Time Time event was detected, style dependant of format.

Routine readings are preceded with “Status” eg:

```
MyGarage Status: Temperature Normal(18.00C) 24-08-2013,23:45:34
```

System events are preceded with “System Event”.

6.2 Event Types

A point can be configured independently to generate 3 different types of event.

Alarm The value is moving away from normal, high to low or counter threshold crossed.
Restore The value is moving toward normal, low to high, or a counter has overflowed.
Routine A periodic reading of the value, useful for data logging and fault finding.
System An internal event generated by MesCom, independent of input and output status.

Alarm and Restore are controlled by the POINT ALARM parameter.
Routine are controlled by the OPTION LOGINT, POINT LOG and NLOG parameter.
System events are controlled by the OPTION SYSTEM and

SYSACT parameters.

6.3 Restricting transmission

Each point can be configured independently to determine which classes of users the event will be sent to. SMS parameter allows events to be sent to SMS users (phone number). UNSOL allows events to be sent to web-based data collection services. NLOG parameter allows routine logs to be sent to SMS users if the LOG and SMS parameters are set. All events will be available for a host to request but the CALL parameter allows an alarm or restore event to trigger a call to the host server.

7 Manual Commands

While manual configuration is available, it is recommended that you use the MesCom configuration manager http://www.dyconconfig.com/ - see section 13 for more detail.

All manual commands need to be sent to the MesCom from a subscribed user with a suitable level of access (see section 5.1.1) and must be prefixed with that user's password.

```
Example:
9876 READ ALL
```

Command		Examples
HELP	Provide help on commands and parameters available	HELP COMMAND HELP
ADDNUM	Add a user to the MesCom	ADDNUM +447xxxxxxxxx
REMOVE	Remove a user	REMOVE +447xxxxxxxxx
STOP	Stop a user receiving any messages	STOP
START	Re-start message to a user	START
DISABLE	Stop all actions related to an input/output	DISABLE Intruder
ENABLE	Re-enable an input/output	ENABLE Tank_Level
READ	Read the current status of an input/output	READ Temperature READ ALL
SWITCH	Change the state of an output	SWITCH output2 OFF
PULSE	Cause a pulse output	PULSE op1 ON 1000 OFF
POINT	Configure an input/output	POINT input1 SMS yes
OPTION	Configure a general setting in the MesCom	OPTION PSAVE 3
VIEW	View configuration	VIEW OPTION WAKE
PASSWORD	Change your password	PASSWORD new new
FETCH	Trigger the MesCom to retrieve a new configuration from the configuration service	FETCH
CLEAR	Clear all stored events	CLEAR
CALLNOW	Trigger the MesCom to make a call to a host	CALLNOW
REPORT	Trigger the MesCom to report the current status to all users	REPORT

The following commands are only permitted from the terminal connection

SHOW	Show the current input / output values	SHOW
DEFAULT	Change all internal setting to factory default	DEFAULT
ECHO	Switch local terminal character echo on/off	ECHO
DEBUG	Switch local terminal debug message on/off	DEBUG
RESET	Restart the MesCom	RESET
FTEST	Enter factory test mode	FTEST

Some commands can have multiple parameters and settings: these are READ, SWITCH, DISABLE, ENABLE, OPTION, POINT. See individual commands for more detail.

```
Example:
9876 OPTION IDENT MyGarage PSAVE 2 WAKE 180 SLEEP 60
```

Important: Each command, keyword and value MUST be separated by a space.
Important: Every parameter MUST have a value.

Passwords are case sensitive and although commands, keywords and labels are not case sensitive, labels will be displayed in the case given when set.

The command format is <password> <command> <optional variables …>

If an incorrect password is sent or the command is not recognised, including commands above a user's access level, the MesCom will not respond. The MesCom will NOT reply with an error or fail response. A lack of response should be interpreted as a failure. This is to avoid responding to messages from network operators and incorrect numbers.

7.1 Basic Configuration

7.1.1 General Configuration

MesCom settings you may wish to change are included below; see section 7.7 for a full list.

IDENT	The unit's identifying name	a string (no spaces) of up-to 24 characters
PSAVE	The power saving mode	0 – never enter power saving (least power saving) 1 – save power when battery is low 2 – save power when using battery 3 – save power whenever possible (most power saving)
WAKE	The time the MesCom keeps the radio powered after an action occurs	Number of seconds (minimum 100s, max 32767)
SLEEP	The maximum time the radio is powered off between check for new text messages	Number of minutes (minimum 5 minutes, max 32767)
LOGINT	The routine logging interval	Number of minutes (0 disables max 32767)
SYNC	The synchronisation time for routine logging	Number of minutes past midnight (eg 300 = 5am 1440 >= disabled)
PULLUP	Inputs are pulled up or down when the signal is disconnected.	UP/DOWN YES/NO TRUE/FALSE (Pull up for volt-free contacts)

```
Example:
9876 OPTION IDENT MyGarage PSAVE 2 WAKE 180 SLEEP 60
9876 OPTION LOGINT 180 SYNC 300 PULLUP YES
```

Please Note: All labels MUST contain NO spaces - we suggest underscore is used instead.

7.1.2 Configure Inputs

Inputs can be configured as Digital, Analogue, Timer or Counter.

See below for the main settings for each point; see section 7.5 for a full list.

TYPE	Point type	0 – Digital input 1 – Timer (digital input) 2 – Counter (digital input) 3 – 16bit analogue input 4 – Reserved 5 – Digital output 6+ – Reserved
DEBOUNCE	Digital debounce or analogue averaging	Number of samples (min 1, max 256)
THRES	4 values state threshold values	0.0 to 3.0 (volts) or in format #nnnnn to be ADC count
HYST	Threshold hysteresis	0.0 to 3.0 (volts) or in format #nnnnn to be ADC count
PNAME	The point identifying name	A string (no spaces) of up to 24 characters
LEVELS	5 values, the name to be applied to the point's state	A string (no spaces) of up to 16 characters
READMIN	Point scaling value, minimum input voltage	0.0 to 3.0 (volts) or in format #nnnnn to be ADC count
READMAX	Point scaling value, maximum input voltage	0.0 to 3.0 (volts) or in format #nnnnn to be ADC count
DISPMIN	Point scaling value, minimum scaled value – corresponding to VOLTMIN	Decimal number (min -9999.9999 max +9999.9999)
DISPMAX	Point scaling value, maximum scaled value – corresponding to VOLTMAX	Decimal number
SUFFIX	Suffix to add to scaled value	A string (no spaces) of up to 8 characters

```
Digital Example:
9876 POINT Input1 TYPE 0 DEBOUNCE 10 THRES 0.5 3 3 3 HYST 2
9876 POINT Input1 PNAME Door LEVELS Open Closed na na na
Analogue Example:
9876 POINT Input2 TYPE 3 DEBOUNCE 10 THRES 0.2 1.0 2.0 2.8 HYST 0.1
9876 POINT Input2 PNAME WaterLevel LEVELS Empty Low Normal High Full SUFFIX m
9876 POINT Input2 READMIN 0.4 READMAX 2.0 DISPMIN 0.0 DISPMAX 1.5
```

Repeat for Input3, Input4 as required.

Please Note: All labels MUST contain NO spaces - we suggest underscore is used instead.

7.1.3 Configure Outputs

Outputs are configured with the same command structure as inputs:

```
9876 POINT OP1 TYPE 5 DEBOUNCE 0 THRES 3.0 3.0 3.0 3.0 HYST 0
9876 POINT OP1 PNAME lights LEVELS ON OFF na na na
```

Repeat for OP2 as required.

Please Note: All labels MUST contain NO spaces - we suggest underscore is used instead.

7.1.4 Confirm Settings

Settings can be confirmed with the VIEW command:

```
9876 VIEW OPTION ALL
9876 VIEW POINT input1 ALL
```

Repeat for Input2, Input3, Input4, OP1, OP2 as required.

7.1.5 Adding Users

To add a user you must use the ADDNUM command:

```
9876 ADDNUM +447·********
```

The phone number should be in international format (ie starting with a + symbol). If there is no space in the user list for another number (max 4), a fail message will be returned. If the number is omitted, then the sender's number will be added to the user list. Adding a number that is already on the user list will not create a duplicate.

7.2 Commands

7.2.1 READ

Report the latest status of the listed points.		Access Level: Read
`9876 READ <pointA> <pointB> <pointC> <pointD>`		
<pointA>	Input or output name or number.	ALL supported: Yes
<pointB>	Optional Input or output name or number.	Up to 4 points
<pointC>	Optional Input or output name or number.	
<pointD>	Optional Input or output name or number.	

`9876 READ Input1 Battery`	Request the value of Input1 and Battery `MesCom: Input1: Clear Battery: Good(4.1V) 04/04/12,16:15:25`
`9876 READ ALL`	Request the value of all enabled inputs and outputs `MesCom: Power: On(12.04V) Battery: Good(4.1V) Button: Clear Temperature: Norm(22.12C) Input1: Clear Input2: Clear Input3: Clear Input4: Clear Op1: On Op2: Off 04/04/12,16:15:25`
`9876 READ 6 7 8`	Request the value of points 6, 7 and 8 `MesCom: Input1: Clear Input2: Clear Input3: Clear 04/04/12,16:15:25`

7.2.2 SWITCH

Change the start of an output and report the latest status of the listed points.		Access Level: Control
`9876 SWITCH <pointA> <pointB> <pointC> <value>`		
<pointA>	Output name or number.	ALL supported: No
<pointB>	Optional output name or number.	Upto 3 points
<pointC>	Optional output name or number.	
<value>	Value to set the output to, state name can also be used.	

`9876 SWITCH Op1 Op2 Off`	Set Op1 and Op2 to the Off state `MesCom: Op1: Off Op2: Off 04/04/12,16:15:25`
`9876 SWITCH Op1`	Default action toggle Op1 (if on switch off and vice versa) `MesCom: Op1: On 04/04/12,16:15:25`
`9876 SWITCH 10 11 1`	Set point 10 and 11 to a value of 1 `MesCom: Op1: On Op2: On 04/04/12,16:15:25`
`9876 SWITCH Op1 elephant`	Op1 doesn't have a state labels elephant `MesCom: Failed 04/04/12,16:15:25`

Notes	Attempting to switch an input will have no effect unless it is a timer/counter in which case it will set the input value to the given number. Outputs can be configured to notify on changes so all users will get a message, therefore when sending this command it is likely you will get multiple responses. If the last value is not a number or a valid state name for the first input, then a fail message will be returned by the MesCom. If only a single point is given with no value, the default action is to toggle the output (if on switch off and vice versa).

7.2.3 PULSE

Switch an output to a value and followed by a time delay switch an output to a second value. Report the status of the given point (this will typically be before the time delay has occurred).		Access Level: Control
`9876 SWITCH <point> <valueA> <delay> <valueB>`		
<point>	Output name or number.	ALL supported: No
<valueA>	Initial value to set the output to, state name can also be used.	1 point only
<delay>	Delay in milliseconds before changing output to <valueB> Minimum 20ms, maximum 65000ms.	
<valueB>	Final value to set the output to, state name can also be used.	

`9876 PULSE Op1 Off 1500 On`	Set point Op1 Off then 1.5 seconds later set it to On `MesCom: Op1: Off 04/04/12,16:15:25`
`9876 PULSE Op1`	Default pulse on Op1 On 1second Off `MesCom: Op1: On 04/04/12,16:15:25`
`9876 PULSE 11 0 2000 1`	Set point 11 to 0 then 2 seconds later set to 1 `MesCom: Op2: Off 04/04/12,16:15:25`
`9876 PULSE input1 0 200 1`	Input1 isn't an output point `MesCom: Failed 04/04/12,16:15:25`

Notes	Attempting to switch an input will have no effect. Outputs can be configured to notify on changes so all users will get a message. Therefore when sending this command it is likely you will get multiple responses. If any of the parameters are not valid, then a fail message will be returned by the MesCom. If only an output point is specified, then the default pulse of "On 1000ms Off" will be triggered.

7.2.4 REMOVE

Remove the sender's number from the user list.		Access Level: RECIEVE
`REMOVE`		
	Anything after REMOVE will be ignored.	ALL supported: No
`REMOVE`	Remove the sender number `MesCom: REMOVE Successful 04/04/12,16:15:25`	
`9876 REMOVE`	Remove the sender number `MesCom: REMOVE Successful 04/04/12,16:15:25`	
Notes	**This command will stop you receiving any more notifications.**	

7.2.5 REMOVE user

Remove a specified user from the subscribers' list.		Access Level: Administrator
`9876 REMOVE <address>`		
<address>	The address of the user - for SMS users this is their number phone.	ALL supported: No
		1 user per command
`9876 REMOVE +447xxxxxxxxx`	Remove the number +447xxxxxxxxx `MesCom: REMOVE Successful 04/04/12,16:15:25`	
`9876 REMOVE 07xxxxxxxxx`	Remove the number 07xxxxxxxxx `MesCom: REMOVE Successful 04/04/12,16:15:25`	
Notes	**This command will stop you receiving any more notifications.** All addresses MUST be the same as they are stored on the MesCom - use VIEW USER ALL to see how they are stored and who is subscribed. If there is no user with that address, a fail message will be returned by the MesCom.	

7.2.6 ADDNUM

Add a user to the subscribed list.		Access Level: Administrator
`9876 ADDNUM <address> <password> <level> <format> <transport> <username>`		
<address>	The address of the user - for SMS users this is their number phone.	ALL supported: No
<password>	Give the user a password default: last 4 digits of IMEI	1 user per command
<level>	Specify users access level default: Read Only	
<format>	The message output format Default: standard	
<transport>	What method to send the message on Default: dependant on address given	
<username>	Specify a username only used by some server systems	
`9876 ADDNUM`	Add the sender's number to the users list `MesCom: ADDNUM Successful 04/04/12,16:15:25`	
`9876 ADDNUM +447xxxxxxxxx newpassword 6 12`	Add the number to the contact list with a password of "newpassword", with administrator level access and the "short" message format. `MesCom: ADDNUM Successful 04/04/12,16:15:25`	
`9876 ADDNUM +447xxxxxxxxx`	Add the number to the contact list with default settings `MesCom: ADDNUM Successful 04/04/12,16:15:25`	
Notes	See User section for more detail about the parameters. The subscribed user can be viewed with the VIEW USER ALL command. The MesCom supports a limited number of users - when this limit is reached the ADDNUM command will return a failed message. If any of the parameters are not valid, then a fail message will be returned by the MesCom. All parameters can be omitted, this will add the sender's number. This will only work if no currently subscribed users have Administrators access.	

7.2.7 DISABLE

Disable the listed points, provides a quick way to stop a faulty point triggering messages.		Access Level: Administrator
`9876 DISABLE <pointA> <pointB> <pointC> <pointD>`		
<pointA>	Input or output name or number.	ALL supported: Yes
<pointB>	Optional Input or output name or number.	Up to 4 points
<pointC>	Optional Input or output name or number.	
<pointD>	Optional Input or output name or number.	
`9876 DISABLE Input1 Op2`	Disable points Input1 and Op2 `MesCom: DISABLE Successful 04/04/12,16:15:25`	
`9876 DISABLE 8 10`	Disable points 8 and 10 `MesCom: DISABLE Successful 04/04/12,16:15:25`	
Notes	If a parameter is invalid, the MesCom will stop processing the list (points before the invalid entry will be disabled). The reverse of this command is ENABLE. A point can also be disabled with the command POINT input1 ENABLED NO.	

7.2.8 ENABLE

Enable the listed points, reverses the action of DISABLE command.		Access Level: Administrator
`9876 ENABLE <pointA> <pointB> <pointC> <pointD>`		
<pointA>	Input or output name or number,	ALL supported: Yes
<pointB>	Optional input or output name or number,	Up to 4 points
<pointC>	Optional input or output name or number,	
<pointD>	Optional input or output name or number,	
`9876 ENABLE Input1 Op2`	Enable points Input1 and Op2 `MesCom: ENABLE Successful 04/04/12,16:15:25`	
`9876 ENABLE 8 10`	Enable points 8 and 10 `MesCom: ENABLE Successful 04/04/12,16:15:25`	
Notes	If a parameter is invalid, the MesCom will stop processing the list (points before the invalid entry will be enabled). The reverse of this command is DISABLE. A point can also be enabled with the command POINT input1 ENABLED YES	

7.2.9 HELP

Help function: identity device model / list point names / list commands / list point settings names/ list users / list option settings names.		Access Level: Read
`9876 HELP <category>`		
<category>	Optional category of help needed COMMAND – a list of commands OPTION – all the OPTION parameters POINT – all the POINT parameters LIST – all the point names	ALL supported: No
`9876 HELP`	Identify unit and basic help `MesCom: C003 MesCom v2.00 COMMAND OPTION POINT LIST 04/04/12,16:15:25`	
`9876 HELP COMMAND`	List commands available `MesCom: HELP STOP START REMOVE ADDNUM ENABLE DISABLE PASSWORD SWITCH POINT READ VIEW PULSE OPTION 04/04/12,16:15:25`	

7.2.10 PASSWORD

Change your password.		Access Level: Read
`9876 PASSWORD <newPassword> <newPassword>`		
<newPassword>	The replacement password, this should be entered twice.	ALL supported: No
`9876 PASSWORD 123456 123456`	Change password to 123456 `MesCom: PASSWORD Successful 04/04/12,16:15:25`	
`9876 PASSWORD 123456 12345`	Passwords do not match `MesCom: PASSWORD Failed 04/04/12,16:15:25`	
Notes	Passwords are case sensitive. If the 2 new passwords are not identical, the password will not be changed. The REMOVE keyword saves a blank password and therefore will not be required. To reinstate a password, the command should be PASSWORD newWord newWord.	

7.2.11 STOP

Stop the sender's number receiving any more notifications – number will remain in user list to allow use of start command.		Access Level: Any
`STOP`		
	Anything after REMOVE will be ignored	ALL supported: No
`STOP`	Stop receiving messages – no response from MesCom	
`9876 STOP`	Stop receiving messages – no response from MesCom	
Notes	**This command will stop you receiving any more notifications**. The reverse of this command is START.	

7.2.12 START

Re-start notifications to a user if previously stopped.		Access Level: Any
`9876 START`		
		ALL supported: No
		1 user per command
`9876 START`	restart notification to the senders number `MesCom: START Successful 04/04/12,16:15:25`	
Notes	The reverse of this command is STOP. If the sender is not a user, a fail message will be returned by the MesCom. The MesCom can be configured to restrict the START command to administrator's use only - see section 7.7.25.	

7.2.13 START user

Re-start notifications to a user if previously stopped.		Access Level: Administrator
`9876 START <address> <format>`		
<address>	The address of the user. For SMS users this is their number phone in international format ie +447…	ALL supported: No
<format>	Optional parameter to set the user's message format.	1 user per command
`9876 START +447xxxxxxxxx`	restart notification to +447xxxxxxxxx `MesCom: START Successful 04/04/12,16:15:25`	
`9876 START +447xxxxxxxxx 13`	restart notification to +447xxxxxxxxx with format 13 (short message) `MesCom: START Successful 04/04/12,16:15:25`	
Notes	see START	

7.2.14 VIEW

Read back a setting of the MesCom.		Access Level: Read
`9876 VIEW <category> <point> <parameterA> <parameterB> <parameterC> <parameterD>`		
<category>	Type of item to view; POINT – view a given points settings OPTION – view general options USER – view subscribed users (administrator level) LIST – view a list of point names COUNTER – view the call and SMS counters	ALL supported: Yes
<point>	If category is POINT; Input or output name or number. Otherwise this field should be omitted. The ALL keyword is not a valid point name.	Upto 4 parameters
<parameterA>	Parameter you wish to view.	
<parameterB>	Optional setting you wish to view.	
<parameterC>	Optional setting you wish to view.	
<parameterD>	Optional setting you wish to view.	

`9876 VIEW LIST`	View a list of all point names `MesCom: Modem Button Power Battery Temperature Input1 Input2 Input3 Input4 Op1 Op2 04/04/12,16:15:25`
`9876 VIEW USER ALL`	View a list of all (6) users (administrator level only) `MesCom: USER +447xxxxxxxxx 6 2 4 blank +447xxxxxxxxx 6 2 4 blank cloud.nimbits.com:80 0 6 0 username@gmail.com BlkContact BlkContact BlkContact 04/04/12,16:15:25`
`9876 VIEW POINT input1 TYPE`	View the TYPE parameter of input1 `MesCom: Input1: TYPE: 0 04/04/12,16:15:25`
`9876 VIEW OPTION ALL`	View all general options settings `MesCom: … 04/04/12,16:15:25`
`9876 VIEW COUNTER SMS`	The counters for SMS (today,outgoing,incoming,failed) `MesCom: SMS:2,32,1,1 04/04/12,16:15:25`
Notes	If any of the parameters are not valid, then a fail message will be returned by the MesCom. USER category requires administrator access. Response format is; <address> <level> <format> <transport> <username> “BlkContact” is inserted for each empty user slot “blank” is inserted in any blank fields.

7.2.15 POINT

Change a setting of a point. See section 7.4 for details of the parameters available.		Access Level: Administrator
`9876 POINT <point> <parameterA> <valueA> <parameterB> <valueB> <parameterC> <valueC> <parameterD> <valueD>`		
<point>	Input or output name or number The ALL keyword is not a valid point name.	ALL supported: Yes
<parameterA>	Setting you wish to view.	Up to 4 parameters
<valueA>	Value or text to be assigned to <parameterA>.	
<parameterB>	Optional setting you wish to view.	
<valueB>	Value or text to be assigned to <parameterA>.	
<parameterC>	Optional setting you wish to view.	
<valueC>	Value or text to be assigned to <parameterA>.	
<parameterD>	Optional setting you wish to view.	
<valueD>	Value or text to be assigned to <parameterA>.	
`9876 POINT input1 PNAME flame`	Change the name of input1 to flame `MesCom: flame: pname flame 04/04/12,16:15:25`	
`9876 POINT 8 TYPE 0 DEBOUNCE 10`	Change type of point 8 to 0 (digital input) and debounce to 10 samples `MesCom: Input2: type 0 04/04/12,16:15:25`	
`9876 POINT input1 ALL …`	Allows all options for a specific point to be set in one message. It is not recommended for manual commands. See HELP POINT for order of parameters	
Notes	Please Note: All labels MUST contain NO spaces - we suggest underscore is used instead. All parameters must be followed by a value; some parameters require more than one value; all values must be present.	

7.2.16 OPTION

Change a general MesCom setting. See section 7.7 for details of the parameters available.		Access Level: Administrator
`9876 OPTION <parameterA> <valueA> <parameterB> <valueB> <parameterC> <valueC> <parameterD> <valueD>`		
<parameterA>	Setting you wish to view.	ALL supported: Yes
<valueA>		Up to 4 parameters
<parameterB>	Optional setting you wish to view.	
<valueB>		
<parameterC>	Optional setting you wish to view.	
<valueC>		
<parameterD>	Optional setting you wish to view.	
<valueD>		
`9876 OPTION PSAVE 2 WAKE 120`	Enter low power mode when powered by battery, delay switching to low power for 120 seconds after every event. `MesCom: OPTION: PSAVE 2 WAKE 120 04/04/12,16:15:25`	
`9876 OPTION ALL …`	Allows all general options to be set in one message. It is not recommended for manual commands. See HELP OPTION for order of parameters.	
Notes	Please Note: All labels MUST contain NO spaces - we suggest underscore is used instead. All parameters must be followed by a value; some parameters require more than one value; all values must be present.	

7.2.17 FETCH

Connect to the configuration service and fetch the latest configuration file.		Access Level: Administrator
`9876 FETCH`		
		ALL supported: No
`9876 FETCH`	MesCom retrieve a new configuration file without error `MesCom: FETCH Successful 04/04/12,16:15:25`	
`9876 FETCH`	MesCom failed to download file or file had errors. `MesCom: FETCH failed 04/04/12,16:15:25`	
Notes	The command will take a few minutes to complete.	

7.2.18 CLEAR

Clear the event log.		Access Level: Administrator
`9876 CLEAR`		
		ALL supported: No
`9876 CLEAR`	All events in log cleared – ie will not send notifications. `MesCom: CLEAR Successful 04/04/12,16:15:25`	
Notes	The command will take several seconds to complete. The log will be cleared and a Clear Log event will be created.	

7.2.19 CALLNOW

Force the MesCom to make a call/connection to the host server.		Access Level: Administrator
`9876 CALLNOW`		
		ALL supported: No
`9876 CALLNOW`	Trigger a call to the configured host. `MesCom: CALLNOW Successful 04/04/12,16:15:25`	
Notes	The command will wait for the call to host to command and report if it was successful or failed.	

7.2.20 REPORT

Force the MesCom to report to all users the current input/output status.		Access Level: Administrator
`9876 REPORT`		
		ALL supported: No
`9876 REPORT`	Status report will be sent to all users `MesCom: REPORT Successful 04/04/12,16:15:25`	
Notes	Command creates an event that in turn will trigger a status notification to be sent to all.	

7.3 Terminal Commands

The terminal connection gives the user administrator access. The terminal interface has no password preceding the commands. All command responses exclude the device's name and date. Please contact Dycon for more details on using the terminal interface.

The following additional Terminal commands are for expert use only.

7.3.1 SHOW

Show the current point values (continuously updated).		Access Level: Terminal
`SHOW <type>`		
<type>		ALL supported: YES
`SHOW`	Show scaled values of enabled points.	
`SHOW RAW`	Show raw values of enabled points.	
`SHOW ALL`	Show raw values of all points.	
Notes	Sending any character to the terminal will exit this mode.	

7.3.2 DEFAULT

Reset the device to default settings.		Access Level: Terminal
`DEFAULT`		
		ALL supported: No
`DEFAULT`	Settings have been restored to the factory defaults.	
Notes	It is recommended to perform a RESET of the MesCom after performing this command as some settings are only loaded at power up.	

7.3.3 ECHO

Enable/disable local echo on the terminal port.		Access Level: Terminal
`ECHO <state>`		
<state>		ALL supported: No
`ECHO ON`	Characters send to the MesCom will be echoed back to the terminal.	
`ECHO OFF`	Character send to the MesCom will NOT be echoed back to the terminal.	
Notes		

7.3.4 DEBUG

Enable/disable the current debug output to the terminal.		Access Level: Terminal
`DEBUG <state>`		
<state>		ALL supported: No
`DEBUG ON`	Debug message will be displayed on the terminal.	
`DEBUG OFF`	Terminal Debug message are temporarily suspended.	
Notes		

7.3.5 RESET

Restart the MesCom without needing to remove power from the device.		Access Level: Terminal
`RESET`		
		ALL supported: No
`RESET`	No response to this command.	
Notes	No response to this command – MesCom will reboot and output version number to the terminal.	

7.3.6 LOG

Restart the MesCom without needing to remove power from the device.		Access Level: Terminal
`LOG <log position> <number of logs>`		
		ALL supported: Yes
`LOG`	Display all logs that have not yet been transmitted to a host.	
`LOG ALL`	Display all valid logs in NVM even if they have been transmitted.	
`LOG 123 10`	Display any valid logs in position 123-132 (10logs).	
Notes	Only valid logs will be displayed.	

7.4 Input and Output Types

The MesCom treats all inputs and outputs in a similar manor. They are collectively referred to as points and their specific behaviour is controlled by the individual TYPE parameter.

The options for the TYPE parameter are:-

0 – Digital input
1 – Timer (digital input)
2 – Counter (digital input)
3 – 16bit Analogue input
4 – Reserved
5 – Digital output
6 – Reserved
7 – Reserved

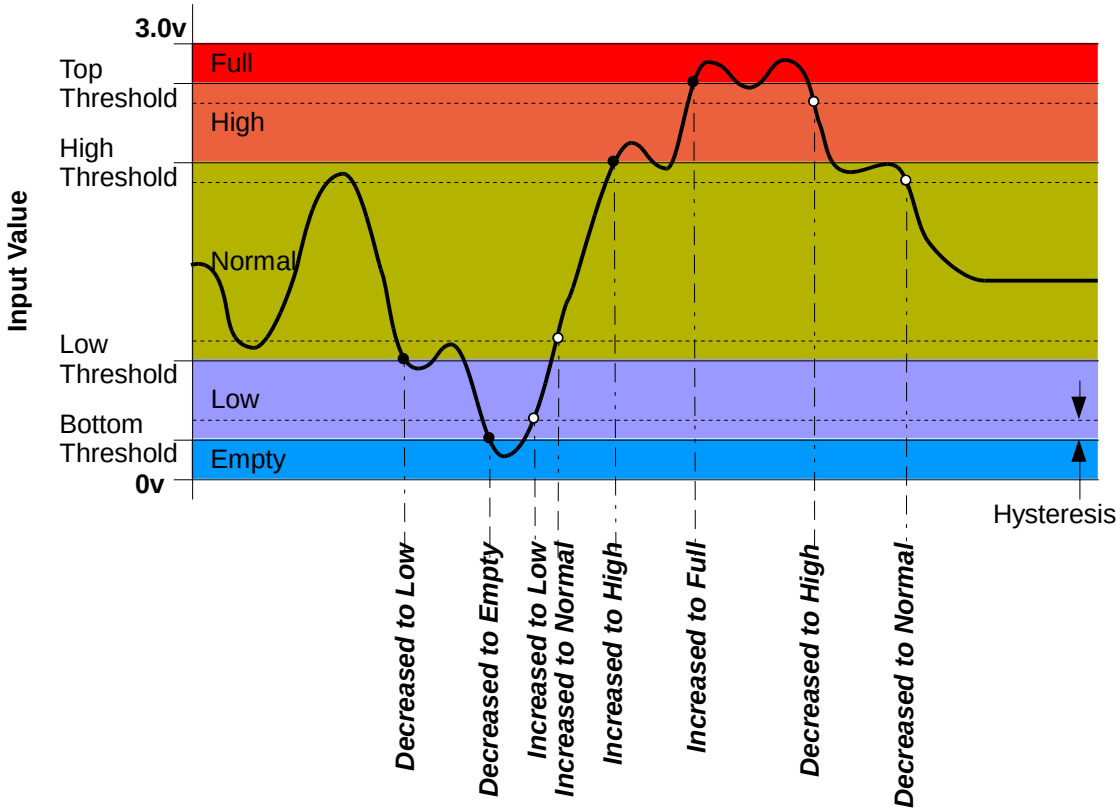
All points can be configured as any one of these types. Care must be taken to assign physical outputs as output type and inputs as input types. This flexibility is to allow for future expansion of the system.

The different types make use of the 4 threshold levels and state labels in different ways - see descriptions below.

When the TYPE parameter is set, other point parameters will be set to the default for that point type. See section 8.3 for a list of the parameters changed and what they are changed to.

Alarm messages (SMS notifications) can be suppress by the OPTION MAXSKIP setting if a point changed state multiple times without any other point changing state. This is highlight the end state of a point and reduce unwanted SMS messages, The Default if to skip up to 8 events but this can be reduced to zero should the user wish to receive all events.

7.4.1 Analogue Input



The input voltage reading is averaged* and then compared to the 4 threshold levels to determine which of the 5 states the input is in. The 5 states can be given labels - in the diagram these are Empty, Low, Normal, High, Full.

```
9876 POINT Input1 TYPE 3
9876 POINT Input1 THRES 0.2 1.0 2.0 2.8
9876 POINT Input1 LEVELS Empty Low Normal High Full
9876 POINT Input1 AVERAGE 20
```

Threshold values are input voltage values in the range 0.0000 to 3.0000.

An input can be configured to create alarm events any time the state changes, only when moving away from normal (fault), only when moving toward normal (restore) or no alarms. See diagram, black dot moving away, white dot moving toward 'Normal'.

```
9876 POINT Input1 ALARM fault
```

Hysteresis can be applied to the Threshold levels. See diagram above, hysteresis allows an input to fluctuate around a threshold with causing repeated notifications. For the 2 thresholds above 'Normal' the hysteresis is applied when the signal is dropped (toward 'normal'), in effect making the threshold (threshold – hysteresis). For the 2 thresholds below 'Normal' the hysteresis is applied when the signal is rising (toward 'normal'), in effect making the threshold (threshold + hysteresis). The hysteresis value is applied to all thresholds.

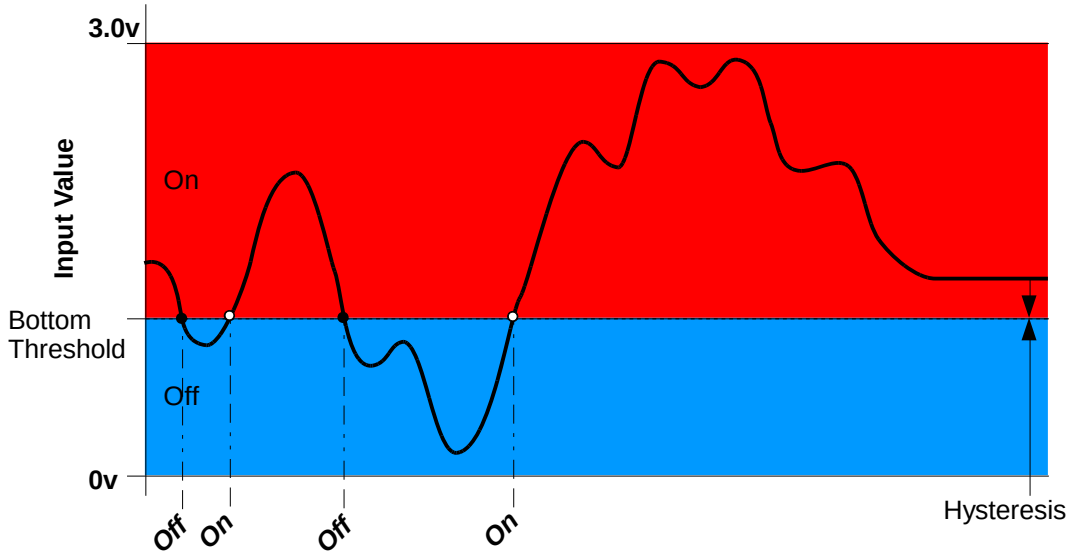
```
9876 POINT Input1 HYST 0.1
```

*Average is a moving average calculation based on the given number of samples.
InputValue = ((n-1) x oldInputValue + newReading) / n
See section 7.5 for more detail.

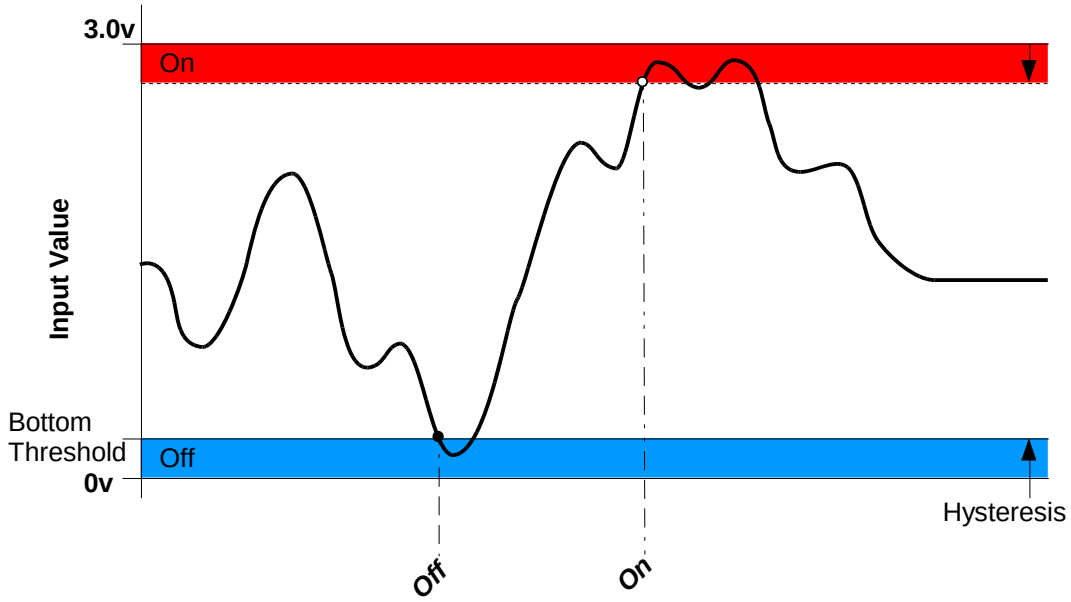
Please Note: the AVERAGE and DEBOUNCE keywords are interchangeable; a point will either use the value as number of samples to average or number of samples to debounce depending on the input type.

The LEVELS labels each have a maximum of 16 characters – no spaces.

7.4.2 Digital Input



7.4.2.1 Schmitt Input / Dead Zone Input



Input voltage reading is compared to the threshold to determine which state the input is in. The reading state is then debounced and only once the debounce criteria* is met, does the input state change.

The digital input requires one threshold but due to the universal nature of the MesCom point system, all 4 thresholds need to be configured. The first threshold is used - the others are

ignored when the input is configured as a digital input. The state labels are the first 2 labels, Off and On in the diagram.

```
9876 POINT Input2 TYPE 0
9876 POINT Input2 THRES 1.0 3.0 3.0 3.0
9876 POINT Input2 LEVELS Off On Na Na Na
9876 POINT Input2 DEBOUNCE 20
```

Threshold values are input voltage values in the range 0.0000 to 3.0000.

An input can be configured to create alarm events on any state change; only high to low (negative edge), only low to high (positive edge) or no alarms. See diagram, black dot negative, white dot moving positive.

```
9876 POINT Input2 ALARM pos
```

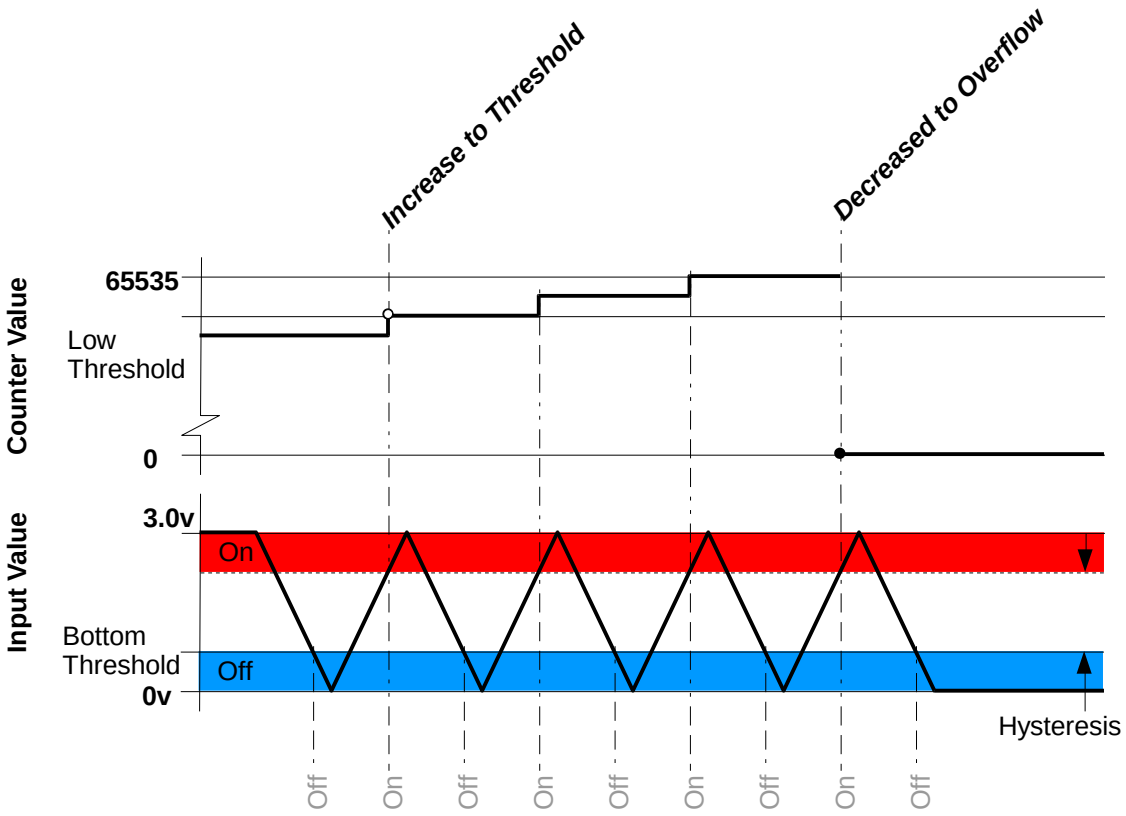
Hysteresis can be applied to the threshold level to create a digital input with a dead zone, See diagram. The Off level is the threshold value; the On value is (Threshold + Hysteresis).

```
9876 POINT Input2 HYST 0.1
```

*Debounce algorithm: the new reading has got to be in the same state for N samples before a change of state is registered. See section 7.5 for more detail.

Please Note: the AVERAGE and DEBOUNCE keywords are interchangeable; a point will either use the value as number of samples to average or number of samples to debounce depending on the input type.

7.4.3 Counter Input



Can be used to count the number of times an input has been activated. This input uses the digital input method to determine the input state. If this changes in the selected direction (positive or negative edge), then the counter is increased by 1 count.

The counter input requires three thresholds but due to the universal nature of the MesCom point system, all 4 thresholds need to be configured. The first threshold is used for digital input filter, the second is the counter threshold, and the third is the overflow threshold. Two labels are used, the first for Overflow events and second for Threshold events.

```
9876 POINT Input3 TYPE 1
9876 POINT Input3 COUNT pos
9876 POINT Input3 THRES 0.5 #2000 #5000 3.0
9876 POINT Input3 LEVELS Overflow Threshold na na na
9876 POINT Input3 DEBOUNCE 20
```

Where first value is the digital input threshold, the second value is the count threshold and the third is the overflow threshold (maximum count value).
Signifies a raw count value and not a scaled voltage value.

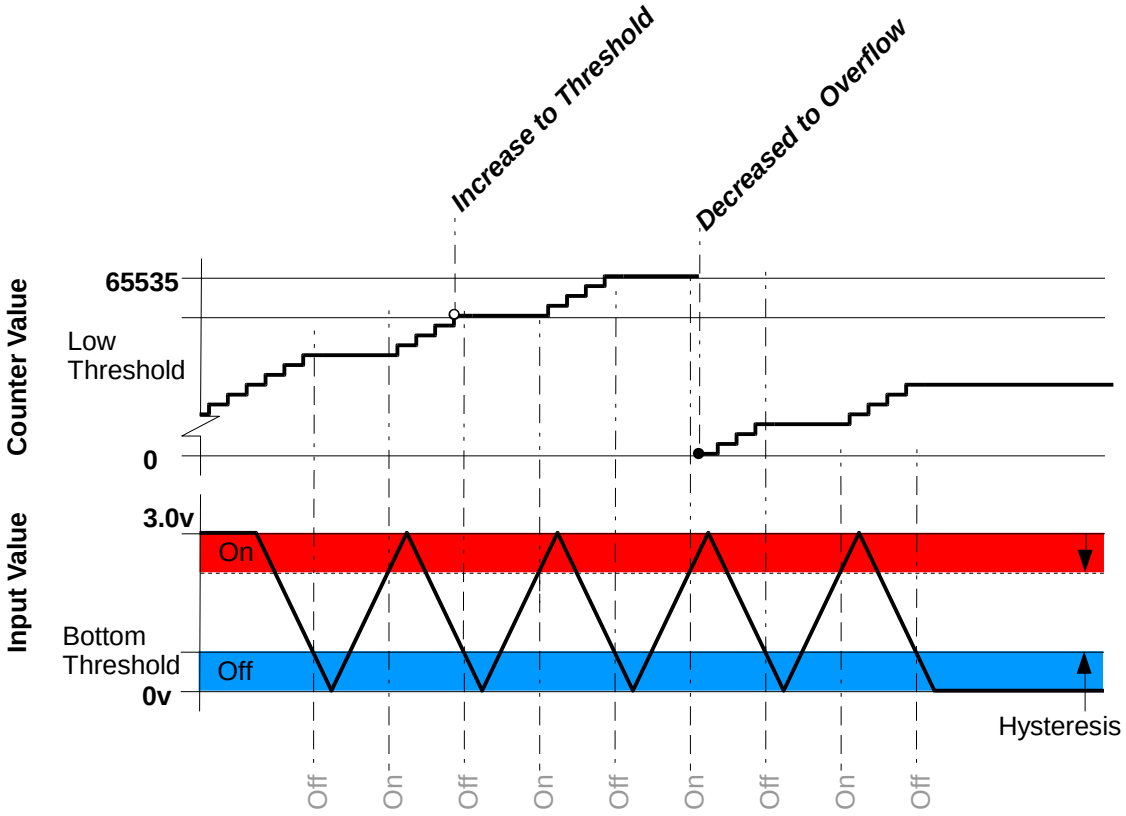
Should an increment cause the value to reach the threshold value, then a fault alarm can be created. Additional when the counter reaches the overflow value a restore alarm can be created. See diagram, black dot overflow (restore), white dot moving threshold (fault).

```
9876 POINT Input3 ALARM both
```

Hysteresis can be applied the same as digital inputs:

```
9876 POINT Input2 HYST 0.1
```

7.4.4 Timer



Can be used to time how long an input is in the specified state. This input uses the digital input method to determine the input state whenever the input is sampled, and it is in the specified state, the sample counter is increased. The Input value increases by 1 for each accumulated second the input is in the specified state.

The timer input requires two thresholds but due to the universal nature of the MesCom point system all 4 thresholds need to be configured. The first threshold is used for digital input filter the second is the timer threshold. Two labels are used the first for Overflow events and second for Threshold events.

```
9876 POINT Input3 TYPE 2
9876 POINT Input3 COUNT on
9876 POINT Input3 THRES 0.5 #65531 3.0 3.0
9876 POINT Input3 LEVELS Overflow Threshold na na na
9876 POINT Input3 DEBOUNCE 20
```

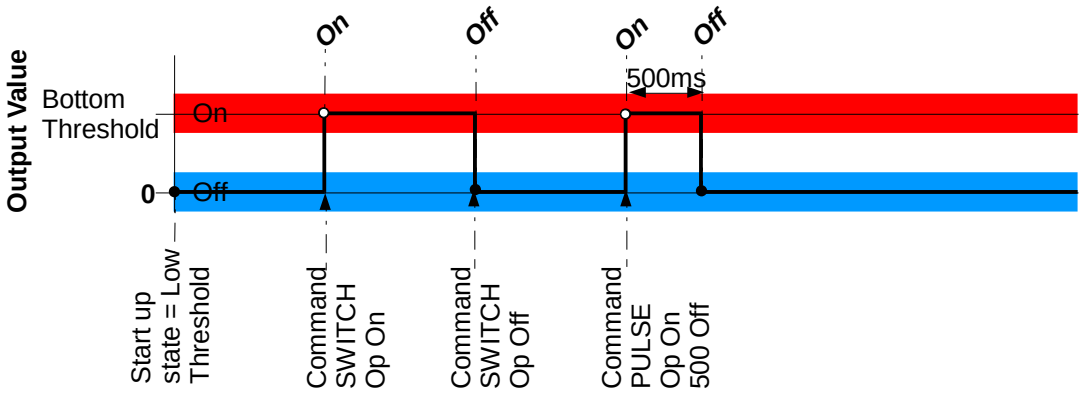
Where the first value is the digital input threshold and the second value is the timer threshold, # signifies a raw count value and not a scaled voltage value.

Should an increment cause the value to reach the threshold value, then a fault alarm can be created. Additional when the counter reaches the overflow value a restore alarm can be created. See diagram, black dot overflow (restore), white dot moving threshold (fault).

9876 POINT Input3 ALARM both
Hysteresis can be applied the same as digital inputs:

```
9876 POINT Input2 HYST 0.1
```

7.4.5 Digital Output



This is currently the only type of output supported by the MesCom. See section 0 for more details on the MesCom outputs.

The current state of an output can be read and controlled. The point configuration of an output is different. The state labels and threshold levels act as a look up table. Switching the output to state label 1 will switch the output to a value of zero. Switching the output to state label 2, 3, 4 or 5 will switch the output to the value of threshold 1, 2, 3 or 4 respectively.

Note: setting threshold 1 to 0.0 would cause both state labels 1 and 2 to cause the output to be set to zero.

```
9876 POINT Output1 TYPE 5
9876 POINT Output1 THRES 3.0 3.0 3.0 3.0
9876 POINT Output1 LEVELS Off On na na na
```

An input can be configured to create alarm events on any state change, switch off only, switch on only or no alarms. See diagram, black dot off events (neg), white dot on events (pos).

```
9876 POINT Output1 ALARM pos
```

At power up the output will set the value stored in the hysteresis setting:

```
9876 POINT Output1 HYST 0.0
```

7.4.5.1 Controlling Outputs

Output state can be controlled with the SWITCH and PULSE commands - see section 7.2.2 and 7.2.3 respectively.

```
9876 SWITCH Output1 Off
9876 PULSE Output2 On 1000 Off
```

Note: digital output can be set to a value - any value other than zero will switch the output on.

7.4.5.2 RING Control of Outputs

Outputs can be configured to be controlled by a telephone call to the MesCom.

The DEBOUNCE setting is used to determine the Outputs mode of operation, zero being Normal operation, 513 and 514 being Pulse and toggle on ring respectively.

```
9876 POINT Output1 DEBOUNCE 513
```
The MesCom will hang up and pulse the configured outputs On for 1 second.

```
9876 POINT Output1 DEBOUNCE 514
```
The MesCom will hang up and toggle the state of the configured outputs.

The calling phone number must be subscribed as an SMS user.

See section 7.7.24 for more configuration details of incoming calls.

7.4.5.3 Output Controlled by an Input State

Each output can be configured to follow a single input. In this mode the user can't change the state of the output with the SWITCH and PULSE commands.

Digital inputs are followed with or without inversion. Analogue inputs are indicated as being in the middle 'Normal' state (or not in middle state if inverted).

The DEBOUNCE setting is used to determine the outputs mode of operation, zero being Normal operation, 1 to 255 causing the output to follow the input that point number.

Input1	Point 6
Input2	Point 7
Input3	Point 8
Input4	Point 9

```
NB only points values 1-11 are supported by the current MesCom.9876 POINT Output1
DEBOUNCE 7
```
Example output will follow input 2

```
9876 POINT Output1 COUNT Neg
```
The COUNT setting is used to determine if the output is inverted.

The output directly follows one input there is no option to have a timed output due to follow more than one input on a single output.

7.4.5.4 Fault Output

Outputs can be configured as a system fault output. Similar to following outputs this disables the user control of the output. It can be configured to be Positive or Negative logic.

```
9876 POINT Output1 DEBOUNCE 256
9876 POINT Output1 COUNT Pos
```

7.5 Generic POINT Settings

7.5.1 Point Name

Each input and output can be given a name. (Maximum 24 characters – no spaces)

No spaces - we recommend you use underscore.

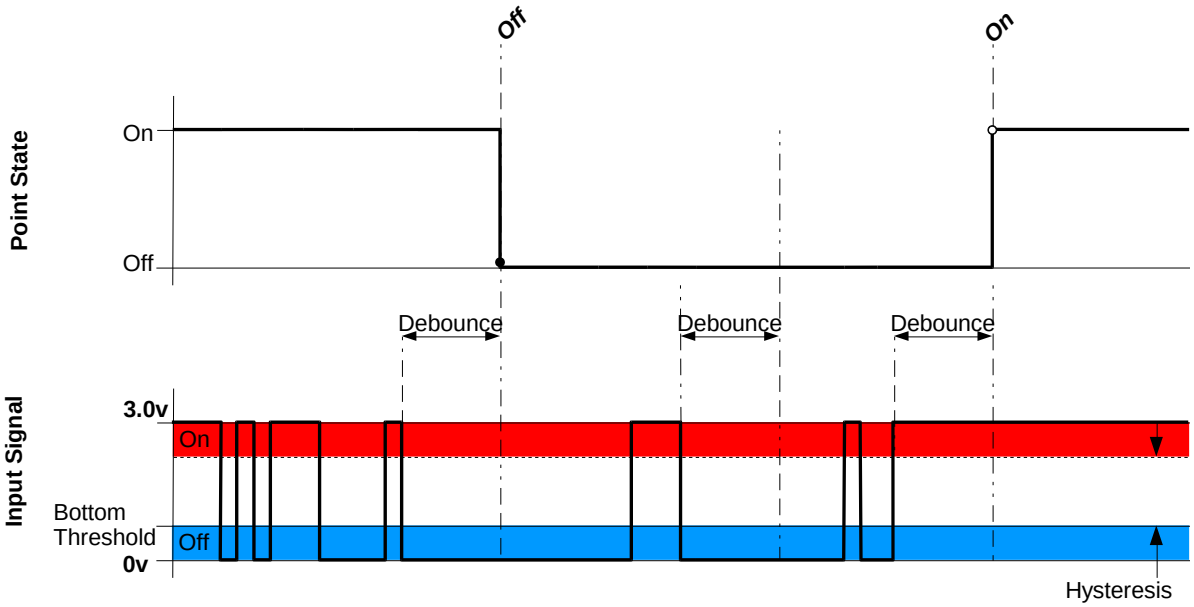
```
9876 POINT Input1 PNAME TankLevel
9876 POINT TankLevel PNAME FuelLevel
```

Use the VIEW LIST command to see a list of current points.

7.5.2 Debounce and Averaging

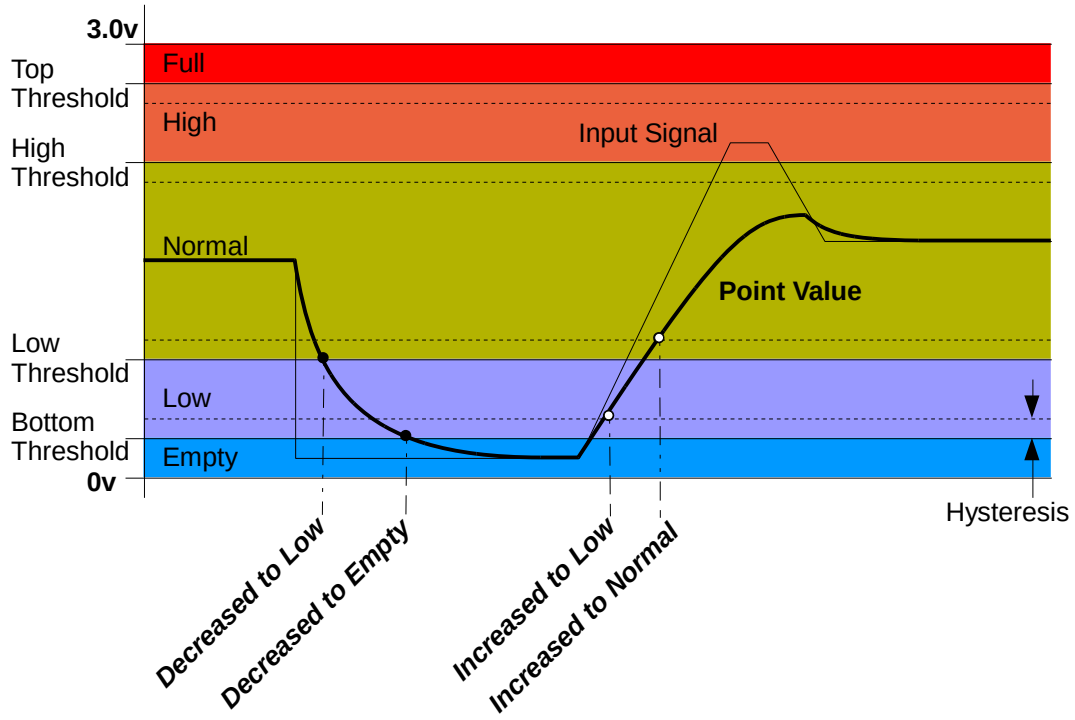
Debounce is performed on digital inputs, including counters and timers.

The input signal must be in a constant state for the defined number of samples for the state to change.



Average is performed on analogue inputs.
The input signal has a modified moving average applied to it.

$$\text{New Value} = \frac{\text{old value x (samples-1) + new reading}}{\text{samples}}$$



Value is number of samples (minimum 0 maximum 32767).
We recommended you do not use a value less than 10.

```
9876 POINT Input1 DEBOUNCE 100
9876 POINT Input2 AVERAGE 100
```

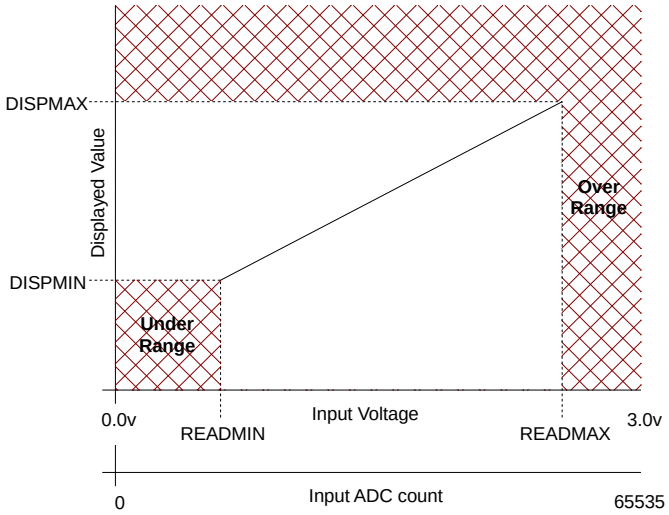
The AVERAGE and DEBOUNCE parameters are stored as the same value in the MesCom, this value being used as average for analogue inputs and debounce for all others.

7.5.3 Point Scaling

The displayed value of an input or output can be scaled to a real world value in the range from -9999.9999 to +9999.9999 with prefix and suffix (8 characters). In addition there are 2 phrases for under range and over range (12 characters).

The scaling is configured by specifying 2 points between which the value is linearly interpolated, outside which is interpreted as under or over range (12 characters).

Each point is specified by a displayed ‘real world’ value and a reading ‘electronic’ value.



```
9876 POINT Input2 READMIN 0.6 DISPMIN 12
9876 POINT Input2 READMAX 2.6 DISPMAX 42
9876 POINT Input2 PREFIX rh SUFFIX % UNLIM Shorted OVLIM OpenCircuit
```

ReadMin and ReadMax values are input voltage values in the range 0.0000 to 3.0000.

The PREFIX and SUFFIX labels each have a maximum of 8 characters – no spaces.

The UNLIM and OVLIM labels each have a maximum of 12 characters – no spaces.

7.5.4 Point Action Flags

All points have settings to determine what actions should be taken when a change is detected.

7.5.4.1 ENABLE

Allow the points status to be processed; when not set the input is disabled and no actions are taken should a change occur.

```
9876 POINT Output1 ENABLE yes
9876 POINT Output1 ENABLE no
```

7.5.4.2 ALARM

Alarm messages (SMS notifications) can be suppress by the OPTION MAXSKIP setting if a point changed state multiple times without any other point changing state. This is highlight the end state of a point and reduce unwanted SMS messages, The Default if to skip up to 8 events but this can be reduced to zero should the user wish to receive all events.
Create an event when the point changes state, you can select positive (restore)and negative (fault)edges for digital inputs and outputs, for analogue input a restore is returning to ‘normal’ middle state and fault is moving away from it.

```
9876 POINT Output1 ALARM both
9876 POINT Output1 AlARM pos
9876 POINT Output1 AlARM neg
9876 POINT Output1 AlARM restore
9876 POINT Output1 AlARM fault
9876 POINT Output1 AlARM no
```

7.5.4.3 LOG

Create a routine log of point value, the interval of which is controlled by the OPTION LOGINT command.

```
9876 POINT Output1 LOG yes
9876 POINT Output1 LOG no
```

7.5.4.4 NLOG

Send routine logs as an event notification to SMS users.

```
9876 POINT Output1 NLOG yes
9876 POINT Output1 NLOG no
```

7.5.4.5 SMS

Send events of this point to SMS users.

```
9876 POINT Output1 SMS yes
9876 POINT Output1 SMS no
```

7.5.4.6 UNSOL

Send events of this point to data collection servers.

```
9876 POINT Output1 UNSOL yes
9876 POINT Output1 UNSOL no
```

7.5.4.7 CALL

When an event occurs on this point trigger a call to the primary host.

The only primary host currently supported by the MesCom is an FTP server for HTML or CSV file upload. See section 12 for more detail.

```
9876 POINT Output1 CALL yes
9876 POINT Output1 CALL no
```

7.5.5 Routine Notifications (data logging)

Using the POINT LOG, NLOG and OPTION LOGINT, SYNC parameters allow the MesCom to be configured to create and send notifications on a periodic basis. This can be used as a data logging function or a poll notification to indicate the MesCom is still functioning.

POINT LOG - sets which points to create routine events for.

POINT NLOG - if LOG is set for the point this causes the event to be notified to SMS contact (Note: all users are sent the routine message).

OPTION LOGINT - sets the period between routine events.

OPTION SYNC - sets the time each to create a routine event synchronising the process over multiple days (minutes past midnight).

```
9876 POINT Temperature LOG yes NLOG yes
9876 OPTION Output1 LOGINT 60 SYNC 600
```

Eg. Send a temperature reading every hour on the hour.

7.6 Assigning Signals to Points

Warning the feature if for advanced use only, incorrect use could disable the MesCom.

Signals can be re-mapped to any point, this is primarily for planned development of the MesCom platform but can be used to monitor a signal input in multiple ways.

Eg. Analogue tank level with a timer input how long it is below a fixed point.

DEV parameter specifics the address of the slave device from with to get the value for the point.

DEV	definition
0	MesCom Build-in inputs and outputs
1-254	Reserved for external devices
255	Reference to defined internal point

ADDR parameter specifics the address of the input or output point within the slave device (see DEV above) from which to get the value for the point.

See right for the address of the MesCom build-in inputs and outputs (DEV = 0)

ADDR	DEV=0 definition
0,1,2	Reserved
3	Input 1
4	Input 2
5	Input 3
6	Input 4
7	Internal temperature
8	Supply voltage
9	Battery voltage
10	Radio module powered
11-63	Not defined
64	Test button
65-127	Not defined
128	Output 1
129	Output 2
130-191	Not defined
192	Radio registered
193	Signal strength
194	Reserved
195	Fault status

```
9876 POINT 6 DEV 0 ADDR 3
```

7.6.1 Internal Monitoring

Internal Temperature	Temperature of MesCom circuit board
Supply Voltage	Primary supply voltage
Battery Voltage	Battery voltage (charging voltage)
Radio Module powered	Digital: radio module on/off
Test Button	Digital: test button press/released
Radio Registered	Digital: registered on network or not
Signal Strength	GSM signal strength indicator
Fault status	Digital: MesCom in fault condition.

7.7 OPTION Command Parameters

7.7.1 IDENT

Name of device / unit's identifying name. This name will be prefixed to messages from the MesCom to help identify the source of the message should the phone number change or not be stored in the receiving phone.

Maximum of 24 characters with no spaces (we recommend you replace spaces with underscore).

Factory default: MesCom

```
9876 OPTION IDENT <name_of_device>
```

7.7.2 PSAVE

Power saving mode, when the radio module should be powered down to save power. In power saving mode the inputs will continue to be monitored and should a notification need to be sent, the radio module will be powered. Additionally the radio module will be periodically powered to check for incoming messages. Power saving mode will only be (re)entered after all messages have been processed. When the radio module is powered down, messages can't be receive so commands and output controls will not be performed promptly.

Options
0 – Never enter power saving mode / always keep radio module on.
1 – Only switch radio module off when no primary supply and battery is low.
2 – Switch radio module off when there is no primary supply (factory default).
3 – Keep radio module off as much as possible (lowest power consumption).

```
9876 OPTION PSAVE 2
```

Also see WAKE and SLEEP parameters for power saving behaviour.

7.7.3 WAKE

Amount of time to delay (re)entering power saving mode after a notification has been sent or a command has been processed. Additionally this sets the initial delay after loss of primary supply before entering power saving mode and the period of time to stay powered for when periodically checking for incoming messages.

Value in seconds: minimum 100s, maximum 32767s (approximately 9 hours).

Factory default: 120 seconds

```
9876 OPTION WAKE 120
```

7.7.4 SLEEP

Interval for periodic powering of radio module in power saving mode.

While in power saving mode with the radio module switch off the MesCom can't receive SMS command message this. This setting allows the radio module to be switch so that the MesCom and check if any SMS messages are pending and action them. Value in minutes: minimum 5 min, maximum 32767 min (approximately 22 days).

Factory default: 360 minutes

```
9876 OPTION SLEEP 180
```

7.7.5 REBOOT

Radio Module reboot period. Some mobile networks are based against fixed installations and may force a radio device that has been powered and not changed cell to disconnect from the network, to avoid this the MesCom can be configured to switch the Radio module off and back on if powered to a number of hours.

Value in hours minimum 0(disabled) maximum 32767hours (approximately 3 years).

Factory default: 72 hours

```
9876 OPTION REBOOT 72
```

7.7.6 REGINT

Interval between checks for network registration and status.

Value in milliseconds: minimum 3000ms, maximum 65535ms (approximately 1 minute).

Factory default: 2000 milliseconds

```
9876 OPTION REGINT 3000
```

7.7.7 INP

Interval between checks for SMS messages.

Value in milliseconds: minimum 5000ms, maximum 65535ms (approximately 1 minute).

Factory default: 15000 milliseconds

```
9876 OPTION INP 15000
```

7.7.8 REGFAIL

Maximum time to wait for the module to register on a network before giving up and power cycling the module to try again.

This limit is only observed if an action (call or notification) is required. If no action is pending, the module will remain powered until an action is required and if the module has still failed to register the module will be power cycled.

Value in seconds: minimum 60s, maximum 3600s (1 hour).

Factory default: 90 seconds

```
9876 OPTION REGFAIL 90
```

7.7.9 REGBOOT

Reboot the radio module if registration has been lost for a period of time.

Value in seconds: minimum 60s, maximum 32767s (approximately 9 hours).

Factory default: 300 seconds

```
9876 OPTION REGBOOT 300
```

7.7.10 IDLE

Call disconnect, idle timeout value. Disconnect a call if no data has been received or sent for a period of time.

Value in seconds: minimum 5s, maximum 65s (approximately 1 minute).

Factory default: 55 seconds

```
9876 OPTION IDLE 55
```

7.7.11 MAXLEN

Maximum total call length. Disconnect a call if it has continued for a period of time.

Value in seconds: minimum 0s, maximum 32767s (approximately 9 hours).

Factory default: 600 seconds

```
9876 OPTION MAXLEN 600
```

7.7.12 SAMPLE

Input sampling period.

Value in milliseconds: minimum 20ms, maximum 65535ms (approximately 1 minute).

Factory default: 20 milliseconds

```
9876 OPTION SAMPLE 20
```

7.7.13 PULLUP

Input resistor. Inputs can be pulled up or pulled down. It is not possible to disable the input resistor.

Options
Yes - Resistor pullup enabled (factory default).
No - Resistor pull down enabled.

```
9876 OPTION PULLUP NO
```

7.7.14 LOGINT

Routine logging interval. This can be used to trigger a periodic reading of an input (eg. temperature) to allow users to see a trend in that signal. Inputs and outputs can be individual configured to be included in the routine logging - see POINT LOG parameter.

Please note this can be used to generate a large number of events and should be used with caution. We recommend SMS only be used with a long interval.

Value in minutes: minimum 1min, maximum 32767min (approximately 22 days).

Factory default: 60 minutes

```
9876 OPTION LOGINT 60
```

Also see POINT LOG and NLOG parameters for logging behaviour.

7.7.15 HEALTH

Routine call interval. This can be used to trigger a periodic call to a host, which could be used to confirm the device is still operational.

Value in minutes: minimum 5min, maximum 32767min (approximately 22 days).

Factory default: 1440 minutes

```
9876 OPTION HEALTH 10080
```

7.7.16 SYNC

Time of day to synchronise activities. Allow routine logs and calls to be synchronised daily to assist analysis or logged data, Ie. A log will be performed at this time.

Value in minutes past midnight: minimum 0, maximum 1440
zero = midnight, 1440 and above disable the synchronisation.

Factory default: 600 minutes past midnight (10:00am)

```
9876 OPTION SYNC 600
```

7.7.17 CKINT

How often to update the clock. The MesCom has a RTC but this can be periodically synchronised with an external clock.

Value in minutes: minimum 0min (disabled), maximum 32767min (approximately 22 days).

Factory default: 60 minutes

```
9876 OPTION LOGINT 60
```

Also see CKSRC and TIME parameters for more control of MesCom clock.

7.7.18 CKSRC

Source for clock to synchronise with.

Options
0 – Manual update only, disable automatic synchronisation of clock.
1 – Use any available clock source (see below) (factory default).
2 – GSM clock directly from network or from received SMS header.
3 – Will be provided by or fetched from host on next connection.

```
9876 OPTION CKSRC 1
```

Also see CKINT and TIME parameters for more control of MesCom clock.

7.7.19 BAUD

Terminal interface.

Permitted values are; 300, 600, 1200, 4800, 9600, 19200bps.
Any other value will cause the MesCom to default to 9600bps.

Factory default: 19200bps

```
9876 OPTION BAUD 9600
```

7.7.20 XOFF

Maximum period to be in software flow control hold state before resuming (XON character assumed missing).

Value in milliseconds: minimum 1000ms, maximum 32767ms (approximately 0.5 minute).

Setting to a value of 0 will disable automatic resume (not recommended).

Factory default: 10000 milliseconds

```
9876 OPTION REGINT 10000
```

7.7.21 HOLDOFF

Pause between event happening and notification being send to allow for additional events to happen, therefore allowing for a more complete picture of the event to be sent and hopefully reducing the number of notifications caused by transient events.

Value in seconds: minimum 0s, maximum 32767s (approximately 9 hours).

Factory default: 5 seconds

```
9876 OPTION HOLDOFF 10
```

7.7.22 SUPPRESS

Input that triggers enter/exit suppress “Engineer on site” mode.

See section 4.3 for more detail on “Engineer on site”.

255 to disable “Engineer on site” mode.

Factory default: 0 (test button)

```
9876 OPTION SUPPRESS 1
```

Also see SUPPTIME parameter.

In addition to entering suppress mode, an admin user can enable/disable this mode with the START/STOP keywords.

```
9876 OPTION SUPPRESS START
```

The suppress input will still be functional and SUPPTIME will still be used to disable suppress mode after the time has expired.

7.7.23 SUPPTIME

Maximum time before exiting suppress “engineer on site” mode.

Value in seconds: minimum 0 (disables timeout), maximum 32767s (approximately 9 hours).

Factory default: 3600 seconds (1 hour)

```
9876 OPTION SUPPTIME 600
```

Also see SUPPTIME parameter.

7.7.24 RINGMODE

RING actions configuration.

The value should be the sum of the options that should be active.
Options
1 – Ignore all incoming calls and connection attempts.
2 – Reserved.
4 – Allow output changing by calling MesCom from SMS users' phone number.
8 – Respond to a call from SMS users' phone number with SMS of current input status.
16 – Hang up on incoming calls and call the programmed host.
32 – Allow incoming calls from unknown phone numbers (you are advised to set 16 also).
64 – Send status report to all users if button is held for 5 seconds.
128 – Create status report as part of routine log interval, see OPTION LOGINT.

Factory default: 28 (allow output, status and ringback)

```
9876 OPTION RINGMODE 16
```

7.7.25 CMDMODE

Command processing options.

WARNING - should you disable all command methods, the MesCom is only recoverable with a factory reset.

The value should be the sum of the options that should be active.
Options
1 – Disable commands via SMS.
2 – Reserved
4 – Do not ask for settings from data concentration servers.
8 – Disable commands from terminal.
16 – Disable commands from servers (this will disable FETCH command).
32 – Do not send a response to commands.
64 – Allow SMS from unknown numbers.
128 – Make START command administrator use only.

Factory default: 6 (allow SMS, terminal, Host)

```
9876 OPTION CMDMODE 0
```

7.7.26 MSGTIME

Packet wait time - maximum time to wait for response to a message packet in a call. The call will be aborted if this time is reached.

Value in seconds: minimum 0s, maximum 65535s (approximately 1 month).
Value of zero disables the timeout.

Factory default: 30 seconds

```
9876 OPTION CMDEXP 60
```

7.7.27 SYSACT

What action to take for system event level.

The value should be the sum of the options that should be active.
Options
1 – Send high level system events to SMS users (factory default).
2 – Reserved.
4 – Send high level system events to data concentration servers.
8 – High level system events trigger call to host.
16 – Allow bug reports to be sent to the manufacturer.
32 – Reserved.
64 – Reserved.
128 – Reserved.

```
9876 OPTION SYSACT 9
```

Also see SYSTEM and FACTORY parameter.

```
9876 OPTION ERRDELAY 1000
```

7.7.28 NUMRETRY

Should a call fail, the MesCom will attempt to retry the call. This sets the maximum number of retry quick attempts before waiting for an extending period.

Minimum 0, maximum 255.

Factory default: 3 retries

```
9876 OPTION NUMRETRY 10
```

7.7.29 RETRY

Gap between quick retries.

Value in seconds: minimum 0s, maximum 32767s (approximately 9 hours).

Factory default: 120 seconds (2 minutes)

```
9876 OPTION RETRY 120
```

7.7.30 EXTRETRY

Big gap between retries batches.

Value in minutes: minimum 0min, maximum 32767min (approximately 22 days).

Factory default: 120 minutes (2 hours)

```
9876 OPTION EXTRETRY 60
```

7.7.31 MAXSKIPS

The maximum number of consecutive events to skip. To reduce the number of SMS sent by the MesCom if consecutive stored events are for the same point, the earlier message will be skipped.

Minimum 0, maximum 255.

Factory default: 8 events

```
9876 OPTION MAXSKIPS 8
```

7.7.32 MAXUPLOAD

Maximum number of events to upload in one batch. If multiple events are to be uploaded, the time taken to send them to a server could hold up sending and receiving of SMS by the MesCom. If the responsiveness of the MesCom to SMS is important so data connections are unreliable, set this to a low number - this will cause the MesCom to end the connection, check SMS and reconnected to send more event logs.

Minimum 0, maximum 255.

Factory default: 50 events

```
9876 OPTION MAXUPLOAD 50
```

7.7.33 TIME

Allow the time to be manually set. Depending on clock settings this time could be over written when the clock is synchronised.

Time and date in the 24-hour format: dd/mm/yy,HH:MM:SS±zzzz

Where
dd – day of the month.
mm – month of the year (number eg December = 12).
yy – last 2 digits of year (eg.2021=21).
HH – hour of the day in 24 hour format (eg 1pm = 13, midnight = 00).
MM – minutes past the hour.
SS – seconds past the minute.
±zzzz – time zone in the 4 digit 24 hour format (eg 1 hour ahead of GMT is +0100).
Please note: time zone reference is always GMT (also referred to as UTC) and never daylight saving time (eg BST).

```
9876 OPTION TIME 23-01-14,13:45:45+0100
```

Also see CKSRC and CKINT parameters for more control of MesCom clock.

7.7.34 PIN

Set the PIN for the SIM card – does not change the PIN on the SIM card itself and is only used if the SIM card requires a PIN. If the stored PIN fails to unlock the SIM, the stored PIN will be deleted. (Typically this command will only be used from terminal interface.).

Factory default: 0000

```
9876 OPTION PIN 12345678
```

7.7.35 ICCID

This is a read only command for use with the VIEW OPTION command.

Display the current SIM card ICCID number.

```
9876 VIEW OPTION ICCID
```

7.7.36 IMEI

This is a read only command for use with the VIEW OPTION command.

Display the radio module IMEI number.

```
9876 VIEW OPTION IMEI
```

7.7.37 APN

Provide APN settings. The MesCom can support 2 APNs if both are set; the MesCom is unable to attach to the primary APN, the secondary APN will be used. This command can be used to set both the primary and secondary APNs. The first use will set the primary, the second use will set the secondary all subsequent uses of the command will set the primary until the REMOVE keyword is used and the secondary will be removed, and a subsequent command will then set the secondary. The primary APN can't be removed, only over written.

```
9876 OPTION APN <Access_Point_Name> <username> <password>
Eg.
9876 OPTION APN internet web web
```

See section 16 for common UK APN settings. Username and password can be left blank but no more OPTION parameters should follow in the same SMS.

To remove the secondary APN and allow a new secondary APN to be set.

```
9876 OPTION APN REMOVE
```

Follow this command with the set command above to set the secondary APN.

7.7.38 ACCOUNT

Set the default access levels and incoming authentication for unknown users and terminal access. See section 5 for more detail of user settings.

Factory default: na <imei> 1 2 0 na
Where <imei> is the last 4 digits of the IMEI number.

```
9876 OPTION ACCOUNT <address> <password> <access> <format> <transport> <username>
eg
9876 OPTION ACCOUNT ignored password 2 2 4 username
```

7.7.39 FACTORY

Set the address of the MesCom configuration server. See section 5 for more detail of user settings.

Factory default: Dycon configuration manager (http://www.dyconconfig.com).

```
9876 OPTION FACTORY ftp.mydomain.com:21 password 4 0 7 username
```

Runtime error reports can also be sent to this address - see SYSACT parameters.

7.7.40 DEBUG

Terminal debug output level - this can be set remotely but only affects the real-time debugging output to the wired terminal interface.

Minimum 0, maximum 255 (the higher the number, the more debug messages are produced) the value of zero disable debug output.

Factory default: 221 (all but the every verbose debug messages)

```
9876 OPTION DEBUG 60
```

7.7.41 SYSTEM

System event number that needs action, any general system event with a lower number than this will trigger the actions as set by

SYSACT. See section 19.1 for a list of general system events.

Minimum 0, maximum 255.
The value of zero will mean no system events actioned.

Factory default: 2 (suppress mode and system started)

```
9876 OPTION SYSTEM 60
```

Also see SYSACT parameter

8 Factory Defaults

To reset the setting to factory defaults, hold down the test button while powering up the device. When the yellow LED starts to flash quickly, release and press the test button again. See section 4.2.1 for more detail.

For general configuration defaults, see individual parameter details in section 7.7.

8.1 Default Password

The default MesCom password is the last 4 digits of the units IMEI number which is printed on the radio module label inside the MesCom. This password will only work if there are no primary users already subscribed to the MesCom.

8.2 Default System Point Configuration

Factory defaults system points. These can be confirmed with the VIEW POINT command.

Point	Definition	Type	Name	Display Minimum	Level 1	Threshold 1	Level 2	Threshold 2	Level 3	Threshold 3	Level 4	Threshold 4	Level 5	Display Maximum	Hysteresis	Debounce / Average
1	Signal Strength	Analogue	RSSI	0	Bad	4	Poor	8	OK	11	Good	18	Great	100	0	0
2	Test Button	Digital	Button	0.0V	Clear	0.5V	Press	3V	na	3V	na	3V	na	3.0V	21.5V	3
3	Supply Voltage	Analogue	Power	0V	Off	0.5V	UnderV	6.0V	On	30V	OverV	30.2V	vHigh	30.3V	0.5V	50
4	Battery Voltage	Analogue	Battery	0V	Fail	3.5V	Low	3.6V	OK	3.7V	Good	4.24V	High	6V	0.05V	200
5	Internal Temp.	Analogue	Temperature	-25°C	vLow	5°C	Cold	14°C	Norm	28°C	Hot	41°C	vHigh	125°C	0.5°C	200

Factory default action flags for system points.

Point	Point Name	Enabled	Count	Alarm	Logs	SMS	Unsol	Call
1	RSSI	Yes	Rising	No	No	No	No	No
2	Button	Yes	Rising	Press	No	Yes	No	Yes
3	Power	Yes	Rising	Yes	No	Yes	No	No
4	Battery	Yes	Rising	No	No	Yes	No	No
5	Temperature	Yes	Rising	No	No	Yes	No	No

8.3 Default User Input Output Point Configuration

Factory defaults user points. These can be confirmed with eth VIEW POINT command.

Point	Definition	Type	Name	Display Minimum	Level 1	Threshold 1	Level 2	Threshold 2	Level 3	Threshold 3	Level 4	Threshold 4	Level 5	Display Maximum	Hysteresis	Debounce / Average
6	Input 1	Digital	Input1	0.0V	Alarm	1.0V	Restore	3V	na	3V	na	3V	na	3.0V	0.0V	10
7	Input 2	Digital	Input2	0.0V	Alarm	1.0V	Restore	3V	na	3V	na	3V	na	3.0V	0.0V	10
8	Input 3	Digital	Input3	0.0V	Alarm	1.0V	Restore	3V	na	3V	na	3V	na	3.0V	0.0V	10
9	Input 4	Digital	Input4	0.0V	Alarm	1.0V	Restore	3V	na	3V	na	3V	na	3.0V	0.0V	10
10	Output 1	Digital	Output1	0.0V	Off	3.0V	On	3V	na	3V	na	3V	na	3.0V	0.0V	0
11	Output 2	Digital	Output2	0.0V	Off	3.0V	On	3V	na	3V	na	3V	na	3.0V	0.0V	0

All user points have the same factory default action flags.

Point Name	Enabled	Count	Alarm	Logs	SMS	Unsol	Call
All User points	Yes	Rising	Yes	No	Yes	No	No

Defaults loaded when using the POINT TYPE parameter to set the point's current mode of operation, parameter not listed below remain unchanged.

Type	TYPE Number	Display Minimum	Level 1	Threshold 1	Level 2	Threshold 2	Level 3	Threshold 3	Level 4	Threshold 4	Level 5	Display Maximum	Hysteresis	Debounce / Average	Count
Digital	0	0.0V	Alarm	1.0V	Normal							3.0V	0.5V	10	Rising
Analogue	3	0.0V	vLow	0.5V	Low	1.0V	Normal	2.0V	High	2.5V	vHigh	3.0V	0.05V	10	Rising
Timer Counter	1	0	Off	1.0V	On	#32767	threshold	#60000	overflow			1000	0.5V	10	Rising
Pulse Counter	2	0	Off	1.0V	On	#32767	threshold	#50000	overflow			500	0.5V	10	Rising
Output	5	0.0V	Off	3.0V	On							3.0V	0.0V	0	Rising

9 Using a Pre-Pay SIM Card

The current version has no special feature for pre-pay SIM cards - it is up to the user to ensure the account is kept in credit and that the SIM is used frequently enough to keep the account active with the service provider.

Most service providers allow the account to be registered online and the account balance to be checked from a webpage. Topping up can be performed by phone, online, in most shops and at most ATMs.

The MesCom can be configured to send a routine text message to ensure the SIM is kept active.

The example below will send a text message with the board temperature every 7days at 10am

```
9876 OPTION LOGINT 10800 SYNC 600
9876 POINT Temperature LOG yes
```

10 Using a Roaming SIM Card (TIME not set)

The MesCom will work with roaming SIM cards. When using a roaming SIM, the radio module is unable to get the time in a suitable format so the MesCom is unable to determine the current time from the GSM network The MesCom will attempt to get the current time from other sources. If this fails the default power up date is 1st January 2000 - the user can change this with the OPTION TIME command.

```
Example:
9876 OPTION TIME 25/07/13,17:52:12+0100
```

11 Using Web Based Data Concentration Services eg Xively

The MesCom has limited support for services such as Xively (aka Cosm or Pachube), Nimbits etc. Please contact Dycon for more details.

12 FTP Upload

The MesCom can use FTP in 2 ways to allow you to see the status of your MesCom via a remote server. Please contact Dycon for more details.

12.1 Remote Event log

The MesCom can be configured to create a list, on a remote FTP server, of all events that occur in the MesCom. The remote server could be configured to allow this file to be viewed from a web page or imported into spread-sheet program (eg. Excel).

12.2 Remote status page

The MesCom can be configured to create a simple status file on a remote FTP server in plain text or HTML format. The remote server would have to be configured to allow this file to be accessed from a web browser on another computer.

13 Web Configuration Service

Please note the availability of the MesCom Configuration manager service is not guaranteed.

13.1 Using the Configuration Manager

To configure your MesCom using this service you will first need to set correct APN in your MesCom. See section 16 for list or common APN settings.

```
Example:
9876 OPTION APN internet web web
```

Alternatively you can manually configure any/all parameters on a MesCom by SMS (see section 5 for more details).

This is a multi-step process; all steps must be complete successfully to re-configure your MesCom.

You will need: Your phone number, the MesCom IMEI number, printed on the metal can inside the MesCom. And the phone number of the MesCom (for you to send the FETCH command to via SMS).

Please Note: the configuration manager is to simplify the configuration of a MesCom - it **DOES NOT display current status of your MesCom or allow you to control the outputs.**

13.1.1 Step 1: Setup the MesCom

See section 3 for details on connected and power up the MesCom.

13.1.2 Step 2: Enable the MesCom

To configure your MesCom using this configuration manager service, you will first need to set the APN in your MesCom. See section 16 for a list of common network APN settings.

```
Example:
9876 OPTION APN internet web web
```

13.1.3 Step 3: Log in / create web manager account

Using the web browser on your smartphone, computer or any other internet connected device, visit http://www.dyconconfig.com/ then log in or follow the on screen instructions to create an account. You will be asked for your phone number this is so the MesCom knows the configuration has come from you when you send the FETCH command.

13.1.4 Step 4: Create configuration

Navigate to the type of configuration you wish to perform and follow the on-screen instructions. Fields marked with a red star * must be completed as these are required by the MesCom to process the configuration. All other fields are optional and only the fields you complete will be changed in the MesCom.

Please note: due to the design of the MesCom system only the previously entered configuration can be viewed. If you have changed the configuration by other means these changes will not be shown and will be overwritten next time you FETCH.

The most common changes are included on the quick configuration form, more detailed settings can be access in the advanced section but should be used with care.

13.1.5 Step 5: Submit configuration to the server

Once you have filled in all the sections you wish to make changes to, the form must be submitted to the server so the configuration can be prepared for the MesCom. At this point you will be prompted to send the FETCH command and providing you have the option selected in your account settings you will be send a copy of the configuration via email as a record of the changes.

After submitting new users always send the FETCH command as user changes are only included in the configuration for the MesCom once to avoid overwriting users passwords.

13.1.6 Step 6: Instruct MesCom to get configuration

With the configuration has been successfully submitted to the server, the MesCom can be instructed to retrieve the configuration from the server: to do this you need to send the FETCH command via SMS from your mobile phone.

```
9876 FETCH
```

13.1.7 Step 7: Wait for confirmation

The MesCom will not respond immediately to the FETCH command as it must connect to the server and update its configuration before it can reply with a success or failure message.

13.2 Re-configuring the MesCom

The MesCom can be re-configured at any time using the above method. Should you wish to re-assert the last configuration sent from the configuration manager you can either:

1. Send the FETCH command to the MesCom and it will download the last configuration setting.
2. Power up the MesCom with the test button held for 10 seconds (or until the LEDs stop flashing together) - see section 4.2.1 for more detail.

13.3 Security

The configuration manager can only have one instance of a MesCom in its system. Should you as the owner wish to allow the MesCom to be configured by another user of the system, you will need to share it with their username (email address).

The MesCom will only contact the configuration manager when it receives a FETCH command from a valid administer to its system, or when someone physically uses the power-up method detailed in section 4.2.1. The MesCom will only process the configuration from the server if the configuration is stamped with a valid administrator’s phone number.

14 Appendix 1 - Specification

Model	D6000
Dimension (h x w x d)	92 x 60 x 20mm
Weight	77g including battery + 10g antenna
Temperature	-20°C to +60°C transit / -4°C to +40°C operating
Humidity	0 – 80% non-condensing
Warranty	2 years
Radio Path	GPRS and GSM
Battery	640mAh 3.7v lithium polymer
Charger	Built-in
Power Consumption	9–30Vdc 500mA max (2A if used without a battery – not advised) Typically 50mA at 12v
Standards	
Connections	Power: 5mm screw terminals Inputs/Outputs: 5mm screw terminals Battery: JST ZHR Antenna: SMA SIM: Mini

International Radio Approval

The D6000 MesCom incorporates an independently tested and approved GSM/GPRS radio module that meets the requirements of European radio communication standards.

Approval Authority: **CE0889**

15 Appendix 2 - Glossary of Terms

Bus master	The panel is the bus master for the RS485 bus
RS485	In this document this refers to the 2 wire signalling protocol used for the Galaxy system bus
RS232	PC standard serial interface, legacy serial interface standard commonly used in communication devices
IP	Internet Protocol
TCP	Transmission Control Protocol (correctly written TCP/IP as TCP sits on top of IP)
UDP	User Datagram Protocol (correctly written UDP/IP as UDP sits on top of IP)
SIM	Subscriber Identity Module, small card supplied by network operation that, when connected to a radio module, allows the module to connect to the mobile network
GSM	Global System for Mobile communication (2G)
GPRS	General Packet Radio Service
EDGE	Extra Data-rates for Global Evolution
CSD	Circuit Switched Data
ADC	Analogue to Digital Convertor
SMA	Antenna connector
LED	Light Emitting Diode
SSN	SIM Serial Number (ICCID)
ICCID	Integrated Circuit Card Identifier
IMEI	International Mobile Equipment Identity – used as serial number for the MesCom
UART	Universal Asynchronous Receiver/ Transmitter
PIN	Personal Identification Number, a means to prevent unauthorised use of a SIM card
NVM	Non-Volatile Memory
IO	Input/output
NEC	manufacturer of microcontroller
LVI	Low Voltage detection module
TDMA	Time Division Multiple Access (technique used for GSM)
APN	Access Point Name
SMS	Short Message Service, a mobile phone text message
MBUS	Meter-BUS, low cost utility meter interface EN 13757
MODBUS	MODicon communication BUS, common interface for measurement and control devices
EEPROM	Electronically Erasable Programmable Read Only Memory, a type of NVM
FET	Field Effect Transistor, an semiconductor switch device
SO	Standard Output can be used to refer to an open collector output used on utility meters
ATM	Automatic Teller Machine, cashpoint
Optocouple	Semiconductor device used to isolate a signal, for either safety or electrical reasons.
Back EMF	Reverse voltage (Electro Motive Force) generated when an inductive load is switched off
USSD	Unstructured Supplementary Service Data, a protocol used by GSM networks to communicate with the service providers computers.

For additional explanation please refer to the internet

http://encyclopedia.thefreedictionary.com/

http://www.acronymfinder.com/

16 Appendix 3 UK GPRS Settings

This setting are provided for reference only they were correct on 1st July 2013 please check with your SIM card provided before use.

O2

Access point:	mobile.o2.co.uk
Username:	mobileweb
Password:	password

Vodafone

AP (Contract):	internet
AP (PAYG):	pp.vodafone.co.uk
AP (1GB pp):	pp.internet
AP (3GB pp):	ppbundle.internet
Username:	web
Password:	web

Orange

Access Point:	orangeinternet
AP (Old PAYG):	payginternet
AP (Inet Any):	consumerbroadband
Username:	user
Password:	pass

T-mobile

Access Point:	general.t-mobile.uk
Username :	user (alt: wapuser)
Password:	wap

3UK – Please note SIMs from this network are not work compatible with the MesCom.

Access Point:	three.co.uk
Username:	guest
Password:	guest

Tesco-Mobile

Access Point:	prepay.tesco-mobile.com
Username :	tescowap
Password:	password

Virgin Mobile

Access Point:	goto.virginmobile.uk
Username:	user
Password:	(leave blank)

GiffGaff

Access Point:	giffgaff.com
Username:	giffgaff
Password:	password

BT Mobile

Access Point:	btmobile.bt.com
Username:	bt
Password:	bt

Asda Mobile

Access Point:	asdamobiles.co.uk
Username:	web
Password:	web

Your Family Mobile (Ikea)

Access Point:	data.uk
Username:	user
Password:	wap

Talk Mobile

Access Point:	talkmobile.co.uk
Username:	
Password:	

17 Appendix 4 Network PAYG balance numbers

For the MesCom to be able to monitor PAYG credit it must be provided with a suitable USSD number for balance checks. Not all networks provide a USSD number for credit balance checking.

Credit monitoring is currently not available in the MesCom2.

Network	Credit balance number
O2	*#10#
Vodafone	*#1345#
Orange	*141*#
T-mobile	Not Supported (Text Ba to 150)
3 UK	Network not supported by MesCom
Tesco	*#10#
GiffGaff	*100#
BT Mobile	*#10#
Asda	*#1345#
TalkMobile	*#1345#
Virgin	Not Supported (Text balance to 789000)
FamilyMobile	Not Supported (Text Ba to 4532)

18 Appendix 5 Command Index

19 Appendix 6 Event descriptions

All MesCom events are stored in the same format the elements of an event log are:
<uint>Sequence Number – sequential numbering of events may be useful to identity duplicate or missing events.
<uint>Value – Instantaneous value of point or system event number.
<8bit>Point – number of point(255 for system events).
<2bit>Type – type of event (0-System, 1-Alarm, 2-Restore, 3-Rountine).
<3bit>State – current state.
<3bit>Point Type – points currently defined type or system event sub type.
<7bytes>Time – time and date of event.
<8bits>Status Flags – flags to help manage the actions relating to the log.

19.1 Appendix 6.1 System Event Descriptions

	General	Radio Module	Runtime Errors
Value	PointType = 0	PointType = 2	PointType = 1
0	Suppression mode	Failed SMS	Watchdog reset
1	System started	Failed to disconnect	Illegal instruction reset
2	Suppression mode Disabled	Module powered on	Point error
3	Brown out restart	Failed to switch module on	Unknown point type
4	NVM ID mismatch	Module off unexpectedly	Unknown point
5	New firmware detected	Module on unexpectedly	Res not defined
6	Logs erased	Failed to switch module off	State machine error
7	Initialisation failed	SMS error	NVM erase
8	Not registered		NVM write
9	Failed to register		NVM command
10	SMS received		ADC channel error
11	SMS response sent		Stack overflow
12	Routine call		
13	Carrier lost during call		
14	Radio module rebooted		
15	Corrupt log found		
16	Failed to connect		
17	Failed to attached to APN		
18	Failed unsol		
19	Invalid contact detected		
20	Call maximum length reached		
21	Message wait time reached		
22	Message Corrupt		
23	Ring-back requested		
24	Incoming call detected		
25	Failed email		
26	No SMTP server defined		
27	Restart requested		
253	Log overflow		
254	Log buffer overflow		

System event PointType = 3 are factory test reports which are not covered in this document.