

7 Technical Specification

Power Supply	12-24VDC 500mA Max. (10-15mA)
Relay Output	5A Max. CATII 220VAC
SIM	1.8/3.6V
Compliant with GSM Phase 2/2+	Class 4 (2W @850/900 MHz) Class 1 (1W @1800/1900 MHz)
Antenna	50Ω U.FL

8 SMS Command Set Summary

Command	Action			Comments
MASTER	number	.		
ADD	number	.		
REM	number	.		
LIST				
CLEARALL				also clears MASTER
CALL	LIST	ANY	NONE	
TXTRIS	DIS	EN		
CONN	NONE	CL	OP	
STAT				
INTXT	DIS	EN		
INLVL	OP	CL		
TXNUM	<master>	number	.	set by MASTER
RLYMODE	NO	TOG		
RLYTIME	<minutes>	.		default 3s
RLYTIME	<hours>h	.		relay time in minutes
CSQ				act RSSI
PRGSIM				clear SIM
DIAL	number	interval (days)	time (s)	PAYG Keep Alive
DIAL	OFF			(switch off DIAL)
ON				System on
ON	<minutes>			open for <minutes> seconds
ON	<hours>h.			open for <hours> minutes
OFF				System Off
QUERY/QNUM	number	.		find number in memory
REJECT	ALL	NEVER	OPEN	Call Handling
MUSER	ENABLE	DISABLE		Treat all users as Master
CUSTOM				Custom input message
RESET				Reset Settings to Defaults
MANUAL				Input Switch Connected
TIME	dd.mm.yy, hh:mm		?	Set/Read Time
TIMER	ON	OFF		Switch on/off Timer
TOFF				Auto Timer Off
THERM				Input Thermostat
UTL				Ultimate Time Limit
WEEKDAY	hh:mm to hh:mm		?	Set/Read Timer Settings
COPY	DAY DAY			Copy DAY (Timer)
ALL DAY				Turn Timer on All Day



QUAD Band GSM 7-Day Programmable Timer

CHT2.04

Firmware 1.12



Call/Text Controller with 7-Day Timer

for GSM850MHz, GSM900MHz
DCS1800MHz & PCS1900MHz



Developed and Manufactured by Advent Controls Ltd,
Liverpool, UK
Made in UK

www.adventcontrols.co.uk

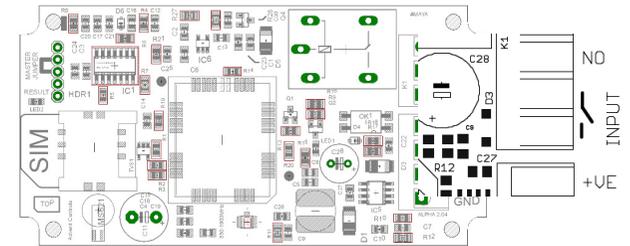
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6.2 Input Connection

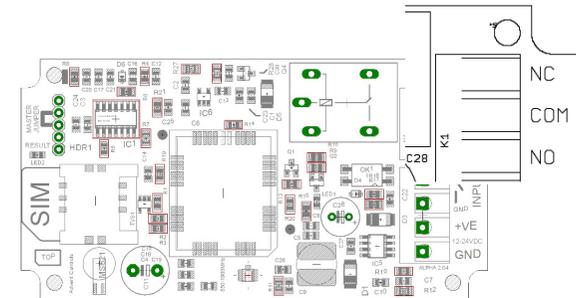
The input is optically isolated from the main circuitry and is connected to ground (GND) to become active (LOW). The two INPUT terminals can be wired to a momentary push switch for manual system activation or a thermostat.



6.3 Output Connection

The relay output has Normally Open (NO) and Normally Closed (NC) relative to COMMon (COM) connections. These can be actuated in a momentary operation or can be toggled (see **3 Setup**).

The connections are 'voltage free' with no connection to +VE or GND. The relay connections have a minimum creepage distance greater than 4mm and are CATIII rated to 220V.



6.4 Antenna Connection

The standard antenna can be used where a strong signal exists. In areas with a poor signal an external antenna is recommended connected via RG174 coaxial cable. The system uses standard SMA connectors. It is not recommended to use an extension greater than 3m in length.

6.5 Mounting

The PCB has been designed to fit into a Hammond 1591B enclosure. When mounting the unit into such an enclosure the enclosure must be modified to allow for the antenna/coaxial cable to be connected. When mounting in a metal cabinet, an external antenna must be used, connected using 50ohm impedance coaxial cable. If required, please contact support@adventcontrols.co.uk for assistance.

e.g.

TIMER ON switches the timer on
TIMER OFF switches the timer off

5.6 Switch the System on During the Day

To switch the system on from the first time set to the last time set during the day the ALL DAY command is sent to the system. In intermediate on/off periods during the day are ignored. To revert to normal timed operation the TIMER command is sent.

**ALL DAY
TIMER ON** switches on from the first timed period to the end of the last sets the system back to normal timed mode

5.7 Auto Timer Off

The TOFF command switches the timer off once the current timed period comes to an end. It is useful where the user would like the timer on for just one timed period and automatically revert to being off after this period has ended.

TOFF switches the timer off after it has finished the current period

5.8 Ultimate Time Limit

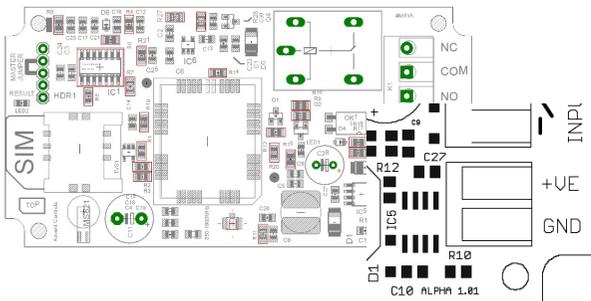
The UTL is an energy saving feature designed to limit the time the system is on for when switched on using the ON command, manual input or telephone call. The maximum time can be set from 1 hour to 23 hours. It is useful where the user may forget to switch off the system after switching on.

UTL 5 sets the maximum time the system will be on to 5 hours
UTL 0 switches off the UTL function

6 Installation

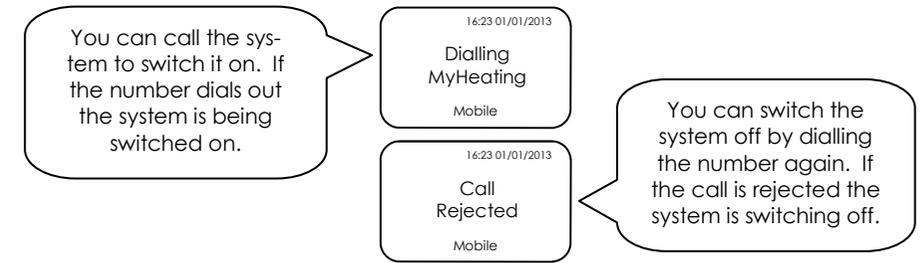
6.1 Power Connection

A fused DC power supply of between 12 and 24VDC should be used with this product. The power connection should be made to the terminals labelled +VE and GND.

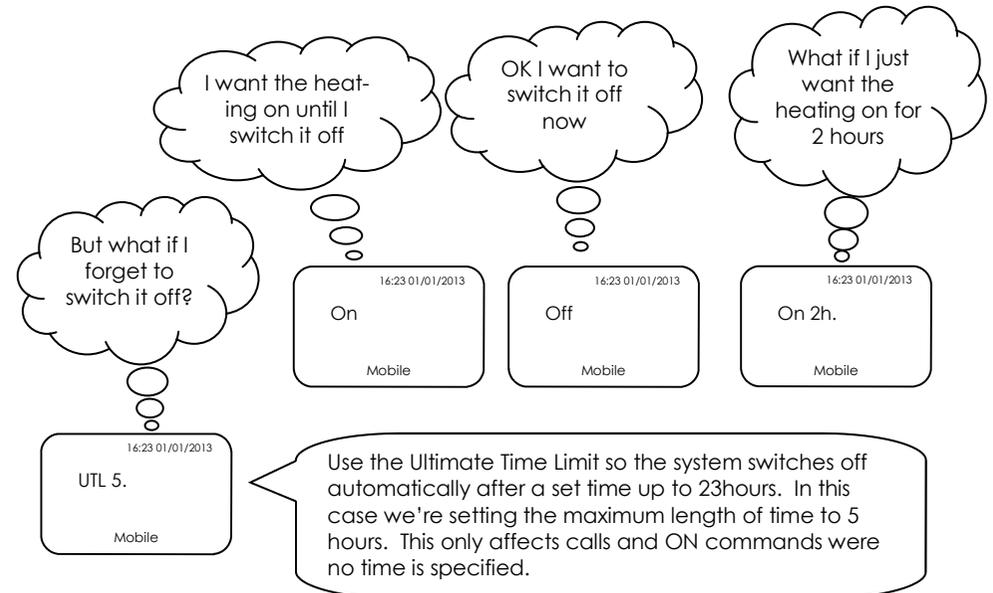


1. Quick Start Guide

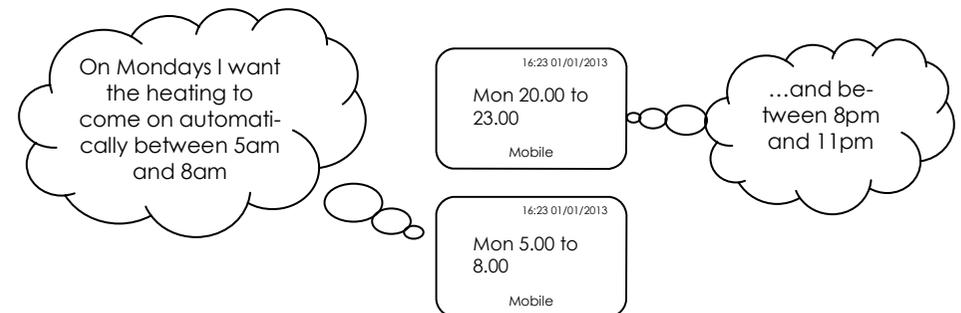
1.1 On/Off Control with a Telephone Call

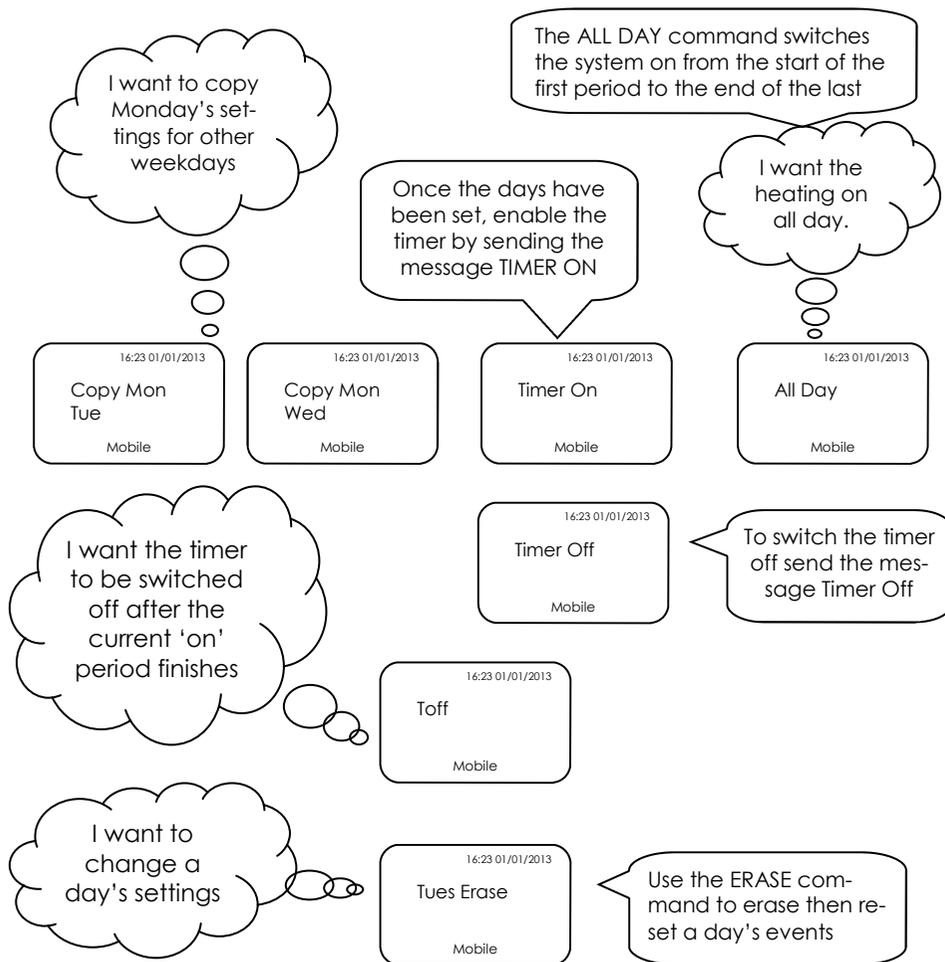


1.2 On/Off Control by SMS Text Message

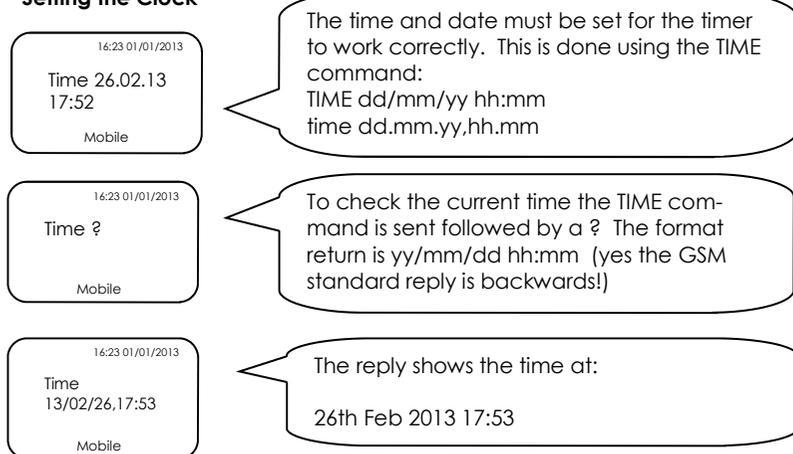


1.3 7-Day Programmable Timer





1.4 Setting the Clock



5.2 Setting the Times of Day

Each of the 7 days of the week can have its own independent timer schedule. Each day can have up to 4 separate on/off events. To set the timer for a particular day the following text message is sent:

DAY hh:mm{start} to hh:mm{end}

MONDAY 06:00 TO 09:00 this sets the system to be on from 6am to 9am on Monday
Mon 11.00 to 13.00 this sets the system on from 11am to 1pm on Monday
Mon 15.00 to 18.00 a full stop (.) can be used instead of a colon (:)
MON 21.00 to 23.59 the word 'to' is mandatory
do not exceed 23:59 in any day
any further messages for this day will be ignored (max. 4)

Also valid:

TUESday only first three letters of each day required
WEDnesday using the whole word is also valid
THURsday
FRIday
SATurday
SUNday

5.3 Erasing a Day/Changing the Timer

If a change is required the entire day must be erased and then reprogrammed as follows:

DAY ERASE

e.g.

Monday erase erases all timers scheduled for Mondays

To clear all days use the **CLEARALL** command (see Section 2.8 CLEARALL)

5.4 Copying one Day to another

To save programming each day in full, the schedule from one day can be copied to another. This is done using the COPY command as follows:

COPY DAY{day to be copied from} **DAY**{day to be copied to}

e.g.

COPY MON TUE do not put the word 'TO' in between days!
COPY MON WED

5.5 Switching the Timer On and Off

Once the times for each day have been set the timer is switched on using the TIMER ON command. To switch the timer off the TIMER OFF command is sent to the system.

4.3 Signal Strength Indicator

When setting up the system it is important to know the strength of signal for reliable operation. To receive a message showing the Received Signal Strength Indicator (RSSI) the CSQ command is sent to the system as follows:

CSQ

When the system SIM card has sufficient credit a SMS text message is sent to the master/TXTNUM number displaying the current RSSI.

e.g. >RSSI 21

The RSSI can be converted to an approximate Signal to Noise Ratio (SNR) in decibels using the following formula:

$$\text{RSSI (dBm)} = -113 + 2x(\text{CSQ value})$$

It is recommended that the minimum signal level for the installation is 20 (-73dBm) to ensure reliable operation. The system will operate below -100dBm but may become unresponsive at times.

To achieve an improved RSSI the standard antenna can be upgraded to a model with higher gain and/or the antenna should be positioned in an area with less physical obstruction. An extension lead can be attached to the SMA connector on the PCB to locate the antenna away from the control unit housing.

4.4 Purging Messages from SIM

The PRGSIM command is used to remove any unwanted messages from the SIM card or to stop the system processing any messages sent when it was switched off. The master number send the following command to purge all messages from the SIM:

PRGSIM

5 7-Day Programmable Timer

The timer function allows automatic timed activation of the system and can be set for each day of the week. Each day can have up to four timed periods. Once a day has been set it can be copied to other days of the week using the COPY command. The ERASE command is used to remove the settings for an individual day. The CLEARALL command erases all timed settings.

5.1 Setting the Clock

Before the timer can be used the clock must first be set. This is achieved using the TIME command (the date must also be set):

TIME dd/mm/yy hh:mm or TIME dd.mm.yy, hh.mm

TIME 26/01/13 07:48	26th of January 2013 7:48am
time 26.01.13,7.48	
TIME ?	returns, by SMS, the current time

The system knows which day of the week it is based on the date.

1. Introduction

The Advent Controls GSM 7-day Timer has been designed to be used as a general purpose mobile phone controlled switch and timer. The system also features an optically-isolated DC input which can be used to activate/de-activate the system, inhibit the system (thermostat input) or trigger the sending of a customisable Short Message Service (SMS) alert message.

The system can be activated by a call or SMS text from up to 512 stored telephone numbers or can be configured to activate when receiving a call from any number. When calling the system to turn it on the call will ring out, when calling to switch off the call is rejected. This allows the user to know whether the system is on or off even when it is being operated remotely.

Setup and operation is performed by simple SMS text messages including adding and removing user telephone numbers. A complete list of accepted telephone numbers can be viewed via SMS text message. The memory can also be scanned to see if it contains an individual number and the result is display by the on-board LED and (if enabled) by SMS text message.

The output relay has both Normally Open (NO) and Normally Closed (NC) with Common (COM) connections. The system can be indefinitely activated by SMS text or for a single timed actuation from either 1m to 999m or 1 to 999 hours. A time limit can be set to limit the time a call or text can activate the system; this effectively makes a call/SMS a boost function.

The system also features a 7-day programmable timer set by SMS text. Each day can have up to four timed events. Individual days can be copied to other days to assist in rapid setup.

3. Operation

3.1 Registration

A valid GSM Subscriber Identity Module (SIM) card must be present in the SIM holder for the system to operate. Immediately on power up the system will attempt to register on the SIM card on it's home network. Once registration has occurred LED1 will change from flashing approximately once every second to a momentary flash once every two seconds. If the LED1 continues to flash once every second for some time, the system cannot register the SIM on the network. The system will restart should this occur. If the problem persists check the antenna and strength of signal in your area/validation of the SIM card. Observe anti-static precautions when inserting the SIM.

The second LED, LED2 found by the 5 pin header, is used to display the result of a command. **The LED will flash twice to acknowledge the successful receipt of a command** and will light continuously for 2s to show the instruction has failed. It also illuminates during any call (valid or invalid) and lights continuously when a signal cannot be found.

3.2 Command Message Format

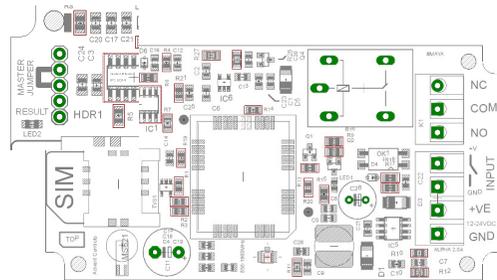
To operate the system a master GSM phone is used to send SMS text messages to the system telephone number. All message follow a similar format as follows:

COMMAND<space>action. (eg. Master 07000000000.)

The command (see Table 1) is always written first followed by a space and the action required. Although not necessary, it is useful to include a full stop immediately after the action as some mobile phones can enter superfluous characters at the end of a message, which can invalidate the message. The message is **not** cAsE sensitive.

3.3 Master Number Setup

The system is controlled by one master GSM mobile phone. The system must first be associated with this phone's number before it can be used. To do this the supplied 2.54mm jumper connector must be fitted to pins 3 & 4 on HDR1 as shown in red in Figure 1. **Do not connect the jumper to any other pins or damage may result.**



The master phone number must then be sent via a SMS text message to the system phone number as follows:

MASTER *number*.

For example, if the master telephone number is 07000 000 000:

MASTER 07000000000.

Also valid are the following:

Master 07000000000 and master 07000000000

The following messages are invalid:

master 07000 000 000. (spaces in the number)
master070000000000 (no space after 'master')

The result LED, LED2, will flash two times to indicate the master number has been successfully setup. Calling the board's telephone number with the master phone will now activate the relay.

Using the PIN for Master Setup

The Master Number can also be set up using the PIN. The PIN is the last 5 characters of the IMEI number written on the GSM module. The command is sent as follows:

Master 07000000000,37212 for module with IMEI 3550730342**37212**

To enable any user to control master commands (such as adding and removing numbers) the MUSER command is sent to the board, by the master, as follows:

MUSER ENABLE Allows any valid user number to modify settings
MUSER DISABLE Only master number can modify settings

By default MUSER is set to enable full access for all users.

3.18 Response SMS Text Number

By default the system sends unsolicited text messages to the master number. However, the response number can be changed by using the TXTNUM command. This applies to all SMS text responses. To change the response number the following SMS text message is sent to the system by the master number:

TXTNUM<space>number.

e.g. **txtnum 07000000000.**

3.19 SIM Keep Alive Call

When using a Pay As You Go (PAYG) SIM card, to avoid SIM card deactivation, the system can periodically call a telephone number to keep the SIM active. Ensure the SIM card has sufficient credit to make a call even if the call goes unanswered. To set up the Keep Alive Call function the following SMS text message is sent to the system:

DIAL<space>number,frequency,call-time.

e.g. **DIAL 07000000000,10,30.** (dial 07000000000 every 10 days for 30 seconds)

Frequency—number of days interval

Call-time—total call time including dialling & connection

4 Setup

4.1 Relay Activation Mode

When a valid call is received the relay can be set to activate for a set period of time (set by the RLYTIME command) or to toggle between states on each call. By default the relay mode is set for toggled operation. To switch to timed mode the following message is sent to the system by the master number:

RLYMODE NO relay Normally Open (NO)

To revert to toggle mode the following message is sent:

RLYMODE TOG enables toggle mode (default)

4.2 Relay Activation Time

The RLYTIME command is used to adjust the time the relay is active following a call when RLYMODE is set to NO. By default the relay time is set to 30m. The time can be set from 1 to 999 minutes or 1 to 999 hours using this command.

To change the activation time the master number sends a SMS text message as follows:

RLYTIME seconds.

e.g. **rlytime 10.** 1 minutes activation time
rlytime 250m 250 minutes activation time
Rlytime 1h. 1 hour activation time

If the user requires the system to send a status message when the input goes open (+5V) the following message is sent by the master number:

INLVL OP text when open (+5V)

The change state service becomes inactive whilst the input remains in the active state (i.e. GND for INLVL CL/+V for INLVL OP) and remains inactive for 5 seconds after returning to the idle state.

If two messages are received for one event then this indicates that the INLVL settings are incorrect and should be reversed.

3.16 Customising the Input Alert Message

The default input alert message is 'INPUT CLOSED'. This can be customised by the user using the CUSTOM command. The maximum length of the message is 128 characters and it **must** end with a full stop. The custom command is used as follows:

**CUSTOM THE TEMPERATURE IS TOO LOW.
CUSTOM THE THERMOSTAT IS SET.**

Use only text or number characters in the message. The message will end where there is a full stop. Do not use a full stop in the middle of the message.

3.17 ON & OFF Commands

The ON command is used to activate the system with a SMS text message. The OFF command deactivates the system, whether activated by the ON command or a call. When the ON command is sent without any additional instructions the system is activated indefinitely. When sent with a value and **h**(ours) or **m**(inutes) parameter the system activates for a set period of time. The maximum number length is three characters therefore the timer is limited to 999 minutes or 999 hours. If the **m** or **h** parameter is not sent then the timer value is read as the number of minutes.

When sent with additional time information the relay is activated for however many seconds or minutes specified.

e.g. ON	activates the system indefinitely
on 10.	10 minute activation time (h parameter optional)
On 250	250 minute activation time
ON 1h.	1 hour activation time
OFF	deactivates relay under all conditions

3.4 Adding a User Number

Any telephone number of at least 5 digits where caller ID is available is valid. The system only compares the last 8 digits of any calling number against the numbers stored in memory. Therefore it is not necessary to enter the international dialling code format of the telephone number.

i.e. for 070**00000000** only the characters shown in **BOLD** text are considered

The ADD command is used to add a new telephone number. To add a new number the master phone must send the following SMS text message to the system telephone number:

add<space>*number*. e.g. **Add 07000000000**.

If TXTRES is enabled the system will respond with the 'Operation Successful' message.

3.5 Removing a User Number

The REM command is used to remove an existing telephone number. To remove an existing telephone number the master phone must send the following SMS text message:

rem<space>*number*. e.g. **REM 07000000000**.

If TXTRES is enabled the system will respond with the 'Operation Successful' message. If the number is not found the 'Operation Failed' message will be sent by the system.

3.6 Viewing the Valid Number List

The system can send an SMS text message containing a complete list of valid user numbers to either the master telephone or the number set by the TXTNUM command.

To receive the list of numbers the LIST command is used. The master phone must send the following SMS text message to the system:

List

No further characters are required and are ignored if received.

The response format shows the last 8 digits of the stored number followed by a space and the next number and so on...(the master will not appear in the list but will also be valid)

e.g. 00000000 11111111 22222222 33333333 etc...

3.7 Finding a Number in the Memory

To find whether a number is stored in the memory the user send the following command to the board:

QUERY<space>*number*. or
QNUM<space>*number*

If the number is present the LED will flash 4 times and if not in the memory the LED will light twice for 2 seconds. If TXTRES is enabled an SMS text message will be sent with the result.

3.8 Clearing All Numbers

The CLEARALL command is used to erase all stored user and master numbers. To erase all numbers the following SMS text message is sent by the master number:

CLEARALL

No response is sent by the system to acknowledge the command

3.9 Enabling Any Number and Disabling Open-on-Call

The system can be setup to allow any number to operate the relay output. To enable any call the CALL command is used with the action ANY and is sent by the master phone in the following format:

Call any

To return the system to operate from only valid user numbers the LIST action is sent with the CALL command as follows:

call list

To disable activation of the system by calling the following command is sent to the board (the relay can still be activated by SMS text or by the timer; see ON & OFF commands):

CALL NONE

3.10 Result Acknowledgement Message

The system can be set up to send an SMS text message to acknowledge the result of the last command processed such as adding a new user number. The SIM card in the system must have sufficient credit for sending SMS text messages.

To enable/disable the service the following text message is sent by the master number:

txtres enable (or also valid: **TXTRES en**)

TXTRES DISABLE (or also valid: **txtres dis**)

The result message 'Operation Successful' is sent when the service is enabled

3.11 Connecting a Call

By default, when called the system is set to ring indefinitely or until the SIM card network operator transfers the call to voicemail. However the system can be set to connect a call when the input is **Open** (high/12V) or **Closed** (low/0V). This is done to allow the caller to know the state of the input even when the system has insufficient credit to send a status SMS text message. See also the REJECT command.

To change the connect mode the CONN command is sent by the master phone with the action **CL** or **OP**. To disable connect on call the **NO** action is sent.

e.g. **CONN CL** connect when input high
CONN OP connect when input low
CONN NO do not connect call

3.12 Call Reject

By default any call to the system will be allowed to ring indefinitely (or up to the host network time limit). This is to avoid calls being divert to voicemail when rejected by the system. However the system can be instructed to reject calls using the REJECT command:

REJECT ALL rejects all *valid* calls

The reject command can also be used to determine the status of the relay when in toggle mode by sending the following command:

REJECT ON rejects the call when the call is deactivating the system
allows the call to ring out when activating the system
[this is the default mode]

REJECT NONE disables all call rejection

3.13 Input/Output Status Message

To determine the current status of the input and output the STAT command is sent to the system telephone number in a SMS text message by the master phone as follows:

STAT

The system will respond with a SMS text message as follows:

SYSTEM ON (CALL), THERMOSTAT CALLING heating on and not up to temperature
SYSTEM OFF, THERMOSTAT SATISFIED heating off and room warmed up

3.14 Input Change State Message Enable

The system is able to send a SMS text message to the master number (or number specified by the TXTNUM command) when the input changes state. To enable this service the following command is sent via a SMS text message by the master telephone number:

INTXT En enables the change state text message

INTXT Dis disables the change state text message

3.15 Input Change State Level

The INLVL sets the active state of the input for sending the change state text message. For example, if the user requires a message to be sent when the input is closed (GND), then the following message is sent by the master number:

INLVL CL send status message when input closed (GND)