

HomeSaver 6004 Installation and Operation

Introduction

Congratulations on your purchase of the new HomeSaver from Q Systems Engineering. Relax and enjoy the peace of mind afforded by remote site monitoring, with no monthly service fees. The HomeSaver will also allow you to control critical systems of your property remotely by telephone, including:

- Heating and cooling systems, setback thermostats
- Hot water heaters, boilers and furnaces
- Hot tubs and pool heaters
- Lighting for security and safety
- Fans and dampers for greenhouses and animal buildings
- Valves and controls for water shut-off



The advanced monitoring and control features of the HomeSaver make it ideal for use in residential, commercial, government, agricultural and veterinary applications - where alarm notifications are required even during a power failure.

*X10 control upgradeability will soon provide remote control capability of lights, appliances, X10-capable thermostats, and many other X10-compatible devices via a free firmware update in the near future

HomeSaver provides a wealth of features

- **Six inputs** which are capable of reading **either analog or digital** (i.e. on or off) input states; this provides the unit with the ability to monitor a variety of input sources including temperature sensors, water/moisture sensors, door/window switches, motion detectors, glass-breakage detectors, etc.
- **Four switched outputs** allow remote control of systems on the property, enabling the user to turn up the heat/turn on the hot water heater, etc.
- **Automatic setup** feature scans all of the inputs and automatically determines whether a temperature sensor, a normally open switch/sensor, a normally closed switch/sensor or nothing is connected and configures each input accordingly, greatly reducing the time and effort required to configure the unit during setup and installation
- **Built-in rechargeable battery-backup** system allows the unit to function for up to 50 hours during power failures, and recharge itself once power is restored
- **Detects power failures** and notifies you after the power has been out for a user-configurable amount of time, or even when it comes back on
- Separate user-configurable **high and low temperature alarm** setpoints for each of the six inputs allow the unit to function as a freeze alarm and simultaneously monitor refrigerated or controlled-environment spaces such as greenhouses or animal buildings
- **Calls up to 8 telephone numbers** to report an alarm condition, up to 62 digits each
- **Programmable redial** call out interval from 0 to 255 minutes
- Programmable to answer after any number of rings, from 1 to 9
- Ring once call back feature for compatibility with answering machines and voicemail systems
- Remote access to programming/setup and current status
- Accessible from anywhere in the world that you have a phone
- Unit may be **accessed locally with an extension phone** or by plugging a standard phone into the front-panel jack
- Responds to all commands and reports current status in a clear and pleasant female voice
- LED status indicators show current operating mode and all output states
- **Programmable speech volume level**
- **Programmable security code** prevents unauthorized access
- **Displays temperatures on any standard Caller ID** on Call Waiting-capable telephone or display on demand, ideal for the hearing-impaired
- Audio monitoring feature allows you to **remotely listen-in on the property**, helping to determine if a real problem exists. A microphone is built-in to the unit and an external mic jack is provided to allow the use of a remote microphone if desired

Setup and Installation

Connecting the unit

When unpacking the unit from the box, ensure that you have received the following:

1. HomeSaver unit
2. AC power adapter
3. Telephone line cord
4. Instruction manual

1) Plug the AC power adapter plug into the external power jack on the rear panel and into an AC outlet, (preferably one equipped with a surge protector). We recommend the use of a combination surge protector, which can protect the phone line as well. 2) Plug one end of the telephone line cord into the modular jack on the rear panel marked "Telco" and plug the other end into a modular

telephone wall jack.* If you are using a telephone line surge protector, refer to the instructions that came with it. Normally the surge protector will be connected between the HomeSaver unit and telephone wall jack.

Once the unit has been plugged in, the amber "Pwr" indicator will be lit continuously and the green status indicator will start blinking after a short self-test, which flashes or "rolls" all of the status LEDs. Once this has completed, the unit is waiting for a call.

If you will only be using the unit to monitor the temperature of the room it will be located in and/or to detect power failures, no additional connections will need to be made and the rest of the setup may be performed remotely. All that remains to be done in this case is to 1) enable the alarm for the built-in temperature sensor, 2) change the upper and lower temperature limits if desired (defaults are 118 and 45 degrees, respectively), and 3) program the numbers you wish the unit to call to report an alarm. Go to "Quick Setup" below for detailed instructions on these three steps. If you wish to control systems or appliances in your home, monitor temperatures in additional locations such as outside your home, or monitor door/window or other switches, additional connections will need to be made between the unit and the target sensors or systems and we'll cover how to do that later on in this manual.

*Please note that this unit works with normal analog telephone service (POTS) found in most residential installations, not digital extension lines provided by a Private Branch Exchange or PBX, found in many business installations. Connection to a digital line should not harm the unit since the telephone interface is over-current protected but it will not function. If you will be using the unit behind a PBX, contact your telephone services group and let them know that you will require an analog or POTS line for the telephone connection.

Many cable and Internet Service Providers are now offering VOIP, or Voice-over-IP telephone service which routes telephone calls over your existing Internet connection, often as part of a 'Triple Play' service option and the HomeSaver employs a special software algorithm to deal with the short dropouts which may interfere with proper touch-tone decoding when using this service. However, be aware that VOIP-based telephone services often go down when the power fails since the subscriber is no longer connected to the central office's battery-backed switch by conventional telephone lines. Some VOIP-based services include local battery backup on the customer's premises, but they often run only for a couple of hours before backup power is exhausted.

To ensure that the HomeSaver unit will be able to reach you in the event of an emergency, please be sure that your telephone service continues to function during a power-failure, and set a power-failure alarm time that is **SIGNIFICANTLY LESS** than the expected battery backup time.

It would be advisable to call and 'check-in' with the unit from time to time - especially during periods of severe inclement weather, in order to verify that your telephone service is up and everything is working. If the phone lines were brought down by an ice storm, for example; the unit would be unable to reach you to report a problem.

Quick setup

Once all of the input connections have been made to the various sensors and/or switches (see page 4), the autoconfigure feature (option 5 on the configuration menu) will automatically detect and set them up for you. The autoconfigure feature eliminates the complexity of configuring individual inputs as digital or analog, setting allowed digital states, etc. We'll discuss how to do this in the next section. In order to access the unit, you will either need to call it from another telephone line, pick up an extension phone on the same telephone line, or plug any standard telephone set into the **Local PGM** jack on the front panel. ****DO NOT PLUG A TELEPHONE LINE INTO THIS JACK!** If you are accessing the unit from another telephone line, simply dial the number of the line the unit is plugged into, and it should answer after the configured number of rings (default: 2). When accessing the unit locally from an extension telephone* or a telephone plugged into the front panel jack, pick up the phone and hold down the '#' key for about 1 second before releasing it. You will hear two short bursts of dial tone, indicating that the unit has acknowledged you. If no password has been programmed, the unit will then begin reporting the status of power, all inputs and any active alarms by default, unless that feature has been disabled by command **81** under Menu 3. The unit will then start prompting the user for commands by default ("Press 1 to read temperatures, 2 for outputs", etc), unless that feature has been disabled by command **82** under Menu 3. If menu prompting has been disabled, the unit will simply say, "Ready". If nothing is heard after the two short bursts of dial tone, then a password has been previously programmed and the unit will wait a total of 45 seconds for a correct password to be entered. Enter the password and press '#' (the '#' key is like an "Enter" key, it is always entered after a command and lets the unit know that you have finished with your entry while the '*' key is used to clear the current entry and start over). If the password was correct, the unit will respond with "Ready". If the password was incorrect, the unit will tell you by saying "Fail" and will then give you two more attempts to enter the correct password within the time remaining.

*Note that when accessing from an extension telephone, your telephone company's central office will also be responding to any touch-tones you initially enter on the line. Usually pressing the '#' key once or twice will cause a fast-busy signal to be heard, and the central office will then ignore any additional digits. You may then continue issuing commands to the unit but you will continue to hear this fast-busy signal in the background. If this is too distracting, either use the front panel jack option or call the unit from another telephone line. There is a 45-second inactivity timeout when accessing the unit locally, if no commands are entered for 45 seconds, the unit will terminate the local access session and resume scanning for alarm conditions and waiting for calls. Each time a command is issued to the unit, the timer is reset. The unit will not answer calls while in local access mode.

Configuring the inputs

Once you've successfully logged-in (see above), dial **9#** or **92#** to access the configuration sub-menu; the unit should respond with "Menu 2", and begin prompting for commands by default. The unit comes pre-configured for use with the internal temperature sensor; enabling you to monitor the temperature of the room the unit is in. If this is all you're doing and you haven't hooked up any

additional sensors, skip to the “Setting temperature limits” section below. Otherwise, make sure all of the additional sensors/switches are connected and all switches are in their secure or non-alarmed state (i.e. doors and windows equipped with switches are closed, motion detectors are not detecting motion, etc). Dial **5#** to invoke the automatic configuration function. The unit will respond with “Press five pound to auto-configure, star to cancel”. At this point, press ‘**5#**’ to continue with automatic configuration, or ‘*****’ to cancel. The HomeSaver scans each input and determines if a temperature sensor, a normally closed (NC) switch/sensor, a normally open (NO) switch/sensor or nothing is connected, making the appropriate configuration setting for each one. The whole process takes only a fraction of a second and the unit will respond by saying, “Ready” when it has completed. Information on manually configuring each input is covered in a later section but should not be necessary when the autoconfig function is used.

Connecting external sensors

External sensors and switches are connected to the HomeSaver unit via the terminal block on the rear panel. The internal temperature sensor is connected to Input number 1 by default, but may be disabled by way of an internal jumper if desired. If you plan to use the internal temperature sensor, do not connect anything to Input 1 on the terminal block and start connecting your additional sensors starting with Input number 2. If you wish to use Input 1 with an external sensor, disable the unit’s internal temperature sensor by removing the small jumper located at the bottom of the printed circuit board inside the unit (Please refer to the ‘**Inside the Unit**’ section below).

Inside the unit

The temperature select jumper, rechargeable backup batteries, and coin cell battery to supply the unit’s configuration memory are easily accessible on the HomeSaver’s circuit board.

If you need to open the unit, perform the following steps:

- Remove the two outside screws on the rear panel
- Pull on the rear panel bezel to slide the entire panel and circuit board assembly out of the case (it is not necessary to remove the detachable terminal block to open the unit)
- Locate the jumper, which is at the bottom and located just to the left of the coin cell battery (see illustration below). If you wish to use all 6 inputs for external sensors and therefore need to disconnect the internal temperature sensor from Input 1, remove the jumper and replace it on only one of the terminals so that it no longer makes the connection between the two terminals but will still be there for possible future use, this will keep the jumper from becoming lost.
- The rechargeable AA NiMH batteries should last for many years but if you need to replace them, remove the tape securing them in the holder for transport, remove and replace them **ONLY** with AA NiMH rechargeable batteries with a capacity of 2000mAh or better and re-secure them with tape. We recommend that you take the batteries to a recycling center or retailer who will accept them for recycling.
- If the unit loses the date and time or configuration information (input type, alarm settings, etc.) when the power fails and the backup batteries are exhausted, then the coin cell battery needs to be replaced. Replace it with one (1) **CR2032** Lithium coin cell. The supplied coin cell should last for 5-10 years.
- Slide the circuit board and rear panel assembly back into the case, taking care to position the circuit board into the tracks before replacing it. Hold both ends of the unit and press firmly on both the front and rear panels (as if to squeeze them together), to be certain the LEDs and other front panel features are properly seated in the panel holes before tightening the rear panel screws.

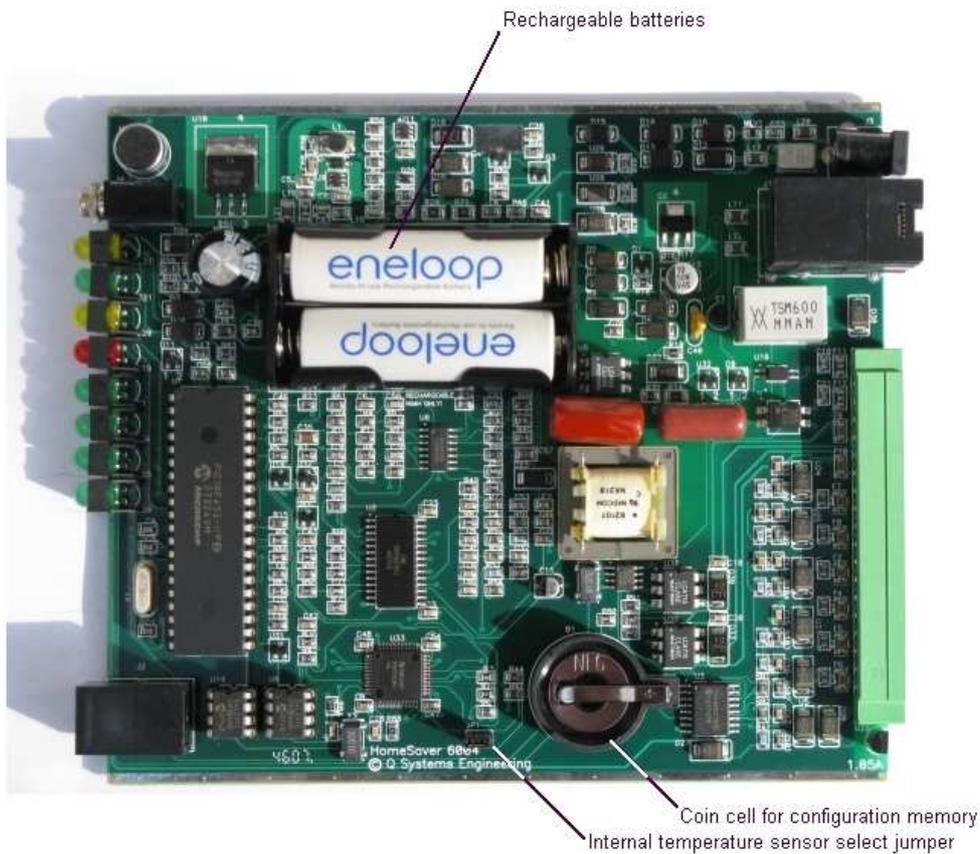


Figure 1

Setting temperature limits

The upper and lower temperature limits default to 118 and 45 degrees, and may be individually set for each input connected to a temperature sensor (the temperature sensor which is built-in to the unit is on input number 1). As long as the temperature stays within these limits, no alarm will be reported. If the default limits are acceptable, you may skip to the next section below. Command **4** is used to set temperature limits and we're still in the configuration menu so if you wish to change them, dial **4 x #**, where 'x' is the input number you wish to program; valid input numbers are 1 to 6. So to reprogram the temperature limits for input number 1, you would dial **4 1 #**. The unit will now prompt you to enter the upper and lower temperature limits for that input, remember to press the '#' key after each entry. As an example, the procedure to enter an allowable temperature range of 48 to 115 degrees for input number 3 is as follows:

Caller enters: **"43#"**
 Unit response: "Upper limit"
 Caller enters: **"115#"**
 Unit response: "Lower limit"
 Caller enters: **"48#"**
 Unit response: "Ready"

To verify the setting for a particular input, enter “**3 x #**” where ‘x’ is the input number you wish to verify. To verify the setting we just programmed:

Caller enters: “**33#**”

Unit response: “Upper limit 3 is 115 degrees, lower limit 3 is 48 degrees”

This verifies not only that the temperature limits were set properly, but also indicates that particular input is configured for an analog temperature sensor. If the input were configured for a digital switch the response would be “3 OFF” or “3 ON” instead, depending upon its programmed allowable or no-alarm state.

To enter a negative temperature limit, simply press the * key when entering the number. To enter a lower limit of –10 degrees, you would enter “***10#**”.

Setting alarms

All alarms are initially disabled by default, and will need to be enabled if you wish the unit to call to report an alarm condition. Alarms are numbered from 1 to 7; there is an alarm for each of the six inputs, while input number 7 is for reporting when the AC power is off (by default), or even when it comes back on. Alarms should only be enabled for inputs which have been connected to a sensor or switch and properly configured; otherwise an immediate alarm condition may result. Command **1** is used to enable and disable alarms. To enable an alarm, dial **1x1 #** where ‘x’ is the number of the alarm you wish to enable, to disable an alarm, dial **1x0 #**. To enable the alarm for input number 1 (the internal temperature sensor), dial **111#**. The unit will respond with “Alarm 1 ON”. To enable the alarm for a power failure, dial **171#**. The unit will respond with “Power alarm ON”. You may wish to change how long the power must be off before the unit calls to let you know about it, changing this setting is covered in another section.

Programming alarm callout telephone numbers

Next we need to program the telephone numbers HomeSaver will call to report an alarm; up to 8 different numbers may be entered. Each telephone number is called in order until someone is successfully contacted and acknowledges the alarm. As an example: if you are using the unit to monitor your vacation home, you might want to have it call your primary residence first, then your cell phone, then a family member or neighbor near the location being monitored if no one else could be reached. In order to program these numbers, we’ll need to access another sub-menu, the telephone configuration menu. Dial **9#** or **93#** to access the sub-menu, the unit will respond with “Menu 3”. The first telephone number to be called should be programmed into location number 1. To program a telephone number into the unit, dial **1 x #**, where ‘x’ is the location or slot the telephone number will be stored into, valid slot numbers are 1 to 8. So in order to program a telephone number into location number 1, you would dial **1 1 #**. The unit will respond by saying “Enter phone number”. Now enter the area code and telephone number to be dialed, exactly as you would normally dial it; remembering to include a ‘1’ if it’s a long distance call, followed by the ‘#’ key to complete the entry. The unit will respond with “Ready”. Time for an example: let’s say you want to the first call to go to (800) 555-1212 and it’s a long-distance call from the HomeSaver-equipped location:

Caller enters: “**11#**” on the telephone keypad

Unit response: “Enter phone number”

Caller enters: “**18005551212#**” on the telephone keypad

Unit response: “Ready”

Next, we should verify that the telephone number was programmed correctly, the procedure is the same as entering a number except you just press the “#” key without entering the telephone number and the presently stored number will be read back. The procedure to read back the telephone number stored in the above example is as follows:

Caller enters: “**11#**” on the telephone keypad

Unit response: “Enter phone number”

Caller enters: “#” on the telephone keypad

Unit response: “**18005551212**”

Program any additional telephone numbers you wish the unit to call. Remember to specify the correct slot number in the command when programming additional telephone numbers. To clear a telephone number from a particular slot, press the “#” key twice quickly without entering a telephone number and the presently stored telephone number will be cleared. More details on this command, including the entry of * and # digits as well as pauses during dialing, may be found in the detailed command descriptions section.

Setting the number of rings

Next we should set the number of rings the HomeSaver will wait for before answering the telephone, the default is 2 rings but any number may be set from 1 to 9. This setting is also made from the telephone configuration sub-menu and we’re already there, so simply dial **5 x #**, where **x** is the number of rings. To set the unit to answer after 4 rings, the command string would be **5 4 #**. Note that if you call the unit, hang up after 1 or 2 rings and call back, the unit will then answer on the first ring regardless of the ring setting. This enables the unit to be used with answering machines or voice mail systems. If you are using the unit with an answering machine or voice mail system, set the number of rings to at least 1 or 2 rings greater than the answering system will answer on. This way the unit will not interfere with normal calls or messages, making it transparent to outside callers. If you need to access the unit, call and let it ring once, then hang up and call back.

Alarm Reporting

When an alarm condition occurs, the HomeSaver will begin its callout sequence to report the alarm(s). Starting with slot number 1, each telephone number is called in order until someone is successfully contacted and acknowledges the alarm by pressing the “#” key. If no acknowledgement has been received by the time the list of programmed telephone numbers is exhausted, the unit will wait a programmable number of minutes (*set by Command 65*), before starting at the top of the list again.

After dialing a number, the HomeSaver will play a two-tone sequence and will then say, “Alarm”, “Power Alarm” or “Temperature Alarm”, depending on what type of alarm is being reported. This continues until either the recipient of the call acknowledges the alarm, or call timeout occurs. At this point, the unit will identify the alarm and report the condition(s), (i.e. “Temperature 4 is 39 degrees”, “Power is off”) and will then either hang up or say, “Ready” and wait for commands; depending on whether a call timeout or acknowledgement occurred. This way, if the unit reaches an answering machine, the message left will contain information about what caused the alarm.

If an acknowledgement is received, the unit remembers this for all alarms that were active and reported at the time the acknowledgement occurred and stops its callout sequence until a new alarm is tripped, or one of the acknowledged alarms clears and is subsequently tripped again. This eliminates the need for disabling alarms while they’re active and then having to remember to re-enable them once the alarm condition has cleared. Note that command **1** on the main menu will report any alarm conditions that currently exist, even if they have already been reported and

acknowledged.

Panel indicators and connections



Figure 2

On the front panel of the HomeSaver unit, you will find the following:

1. The built-in microphone for monitoring sounds in the vicinity of the unit
2. The external microphone jack (bypasses the unit's internal microphone)
3. "Pwr" LED lights to indicate that external power is being supplied to the unit
4. Three status LEDs indicate operating mode and proper unit operation at a glance
5. Four LEDs; one for each output, light when the corresponding output has been turned ON
6. Programming jack allows a standard telephone to be plugged in for unit setup without a phone line

Depending on the current state of operation, the three status LEDs will blink, wink, or glow steadily to indicate the operating mode:

- Blink (or flash): normally dark, the indicator lights briefly at regular intervals like a turn signal in an automobile
- Wink (opposite of blink): normally lit, the indicator extinguishes briefly at regular intervals

During normal standby operation with external power, the "Pwr" indicator will be lit continuously and the green status indicator will blink at approximately 5-second intervals. During a call with external power supplied, the green status indicator will be lit, winking off at approximately 5-second intervals.

During standby operation with no external power (as during a power failure), the "Pwr" indicator will be dark and the red status indicator will blink or flash very briefly at 5-second intervals. The brief flash is to extend backup-battery operating time, while verifying that the unit is still functioning normally under standby power.

During an incoming call, the red status indicator will light with each incoming ring.

When a caller activates audio monitoring and the microphone is active, the amber status indicator will be lit continuously until the monitoring feature has been turned off.



Figure 3

On the rear panel of the HomeSaver unit, you will find the following:

1. 18 position terminal block with 6 input, 6 ground, and 6 output connection terminals
2. Dual modular jacks for X-10 power-line signaling and telephone line connections
3. AC/DC external power input jack (2.1mm)

The HomeSaver features a high-quality terminal block for all input and output connections. To make a connection to the terminal block, ensure that the fastening screw has been loosened and insert the stripped wire end into the block; having approximately ¼” of insulation stripped from the end of the wire should be sufficient to make a good connection. If too little insulation has been removed, the terminal will clamp the insulated section and not make a good connection. If too much insulation has been removed, there is the possibility that the exposed wires could touch each other and cause a short, leading to erroneous sensor readings or other problems. Take care to insert the wire **above** the metal terminal that’s visible inside the wire hole when looking directly into it. When the wire is fully inserted, there should be almost no bare wire exposed. If this is not the case, cut the wire end back until the bare portion just disappears from sight when fully inserted into the block. Once the wire has been properly inserted, tighten its corresponding fastening screw for a secure connection. *

Temperature sensors are powered devices and must be connected to the input terminals with the correct polarity. The positive wire from the sensor connects to the appropriately numbered input terminal while the negative or ground wire connects to one of the ground terminals provided next to each input. The positive terminal will normally be a solid color, often red. The negative terminal will be striped or a different color (e.g. black), depending on the sensor.

Four outputs are available and two different types are provided to more easily interface with a variety of external circuit types:

- Outputs 1 and 2 are optically-isolated “dry contact” switches and therefore require two terminals each; when the output is on, the switch is closed and current is able to flow between the two terminals. These switches can handle a maximum of 60 volts at 1 amp each and are handy for applications where you want to switch power to an external circuit.
- Outputs 3 and 4 are TTL or relay-driver outputs which supply 5 volts at up to 250mA when on and 0 volts when off and are handy for driving external relays or logic inputs.
- All outputs will safely handle inductive loads.

*If you're comfortable with setting up a home stereo system, you'll probably be able to install the unit yourself in most cases. Some applications may require professional installation however, especially if you're trying to control a heating/cooling system or other devices, which could expose you to hazardous line voltages. If you're not comfortable with wiring and installing home automation equipment, you should ask a professional contractor for help. There are many contractors who specialize in home automation installation; if you're having trouble finding one, call us to see if we can make a recommendation in your area.

A few things to keep in mind when going over the HomeSaver's command list: many of the commands have optional parameters, the HomeSaver will parse the command and determine what action to take based on whether or not an optional parameter was entered and if so, the parameter value(s). All commands must be entered by pressing the '#' key after the command, the '#' key serves as an "Enter" key. The '*' key will clear a command entry in progress, allowing you to start over. Pressing '*' clears the command buffer for re-entry of the desired command, unless you're in the process of entering a call-out telephone number.

When changing menu levels, the unit will report which menu you've just entered by number. If you go to the third menu level for example, the unit will respond with "Menu 3".

Since the HomeSaver is able to perform so many different functions, there are quite a few commands. To make things a little easier, the HomeSaver commands are grouped into different menus by function. General usage commands, such as for querying inputs and switching outputs; are on the main menu since they will be used most often. Other commands relating mainly to initial setup and configuration are accessible through sub-menus since they will be used less often. It's really pretty easy once you get the hang of it. Now, on to the command list!

On the main menu (Menu 1)

Command **1** reads the inputs; an optional parameter specifies which input to read. If no parameter is entered, command one will read the status of external power, every input, and report any current alarm conditions - making it a convenient way to read the temperatures/states of all inputs, and whether or not a power-failure has occurred. To read input number 4, you would enter **'1 4 #'** on the telephone keypad. If the input has been configured as an analog (temperature) input: the unit will read back the temperature being reported by the sensor connected to that input. If the input is configured as a digital (ON/OFF) input, the unit will read back the state of the switch connected to that input; if the switch is closed the state is read as "ON", an open switch is considered to be "OFF". For an analog temperature input, pressing the '#' key twice quickly instead of once will instruct the unit to read back the temperature of that sensor on a CallerID display instead of speaking it. Using the same example above: if you want to read input number 4 on your CallerID display, you would enter **"1 4 ###"** on the telephone keypad.

Command **2** reads and sets the output states, if no additional parameters are specified the unit will read back the currently configured states (ON/OFF) of all outputs in sequence. If an output number parameter is specified, the unit will read back the current state of that output. If an output number plus a state parameter (**'0'** or **'1'** for OFF or ON) is entered, the specified output will be switched OFF or ON accordingly.

Command **3** reports the status of external power to the unit. In most installations an AC power adapter will supply the external power directly from a wall outlet, so the status of the AC or mains power supply will be reported as being either OFF or ON. As an example: if the power is off then the unit will report, "Power is OFF".

Commands **4** and **5** are X10 power-line signaling control commands and will be implemented in a future firmware update.

Command **7** allows the caller to listen in on the premises using the internal microphone, which is built-in to the unit or through an external microphone plugged into the jack on the front panel. Monitoring will continue until either the caller presses the '#' key or hangs up. The normal 5-minute inactivity timeout is extended to 90 minutes while in listening mode.

Command **9** is used to access the configuration sub-menu. Regardless of what menu you are in, command **9** is always used to access the sub-menu below it. This command also takes an optional argument, a number from 1 to 3. The additional argument allows you to access any menu level directly, by entering its number. **91#** will always access the top-level menu, regardless of what menu you're in. **93#** will take you to menu 3.

Command **0** always returns to the previous menu. In this case there is no previous menu to return to and command **0** merely sends a few test tones.

On the configuration menu (Menu 2)

Command **1** allows the user to enable and disable alarms for each input and external power, as well as read whether they are enabled or disabled. If no additional parameters are specified the unit will read back the currently configured states (ON/OFF) of the alarm for each input in sequence. If an alarm or input number parameter is specified, the unit will read back the current state (enabled/disabled) of that alarm. If an alarm number plus a state parameter (**'0'** or **'1'** for OFF or ON) is entered, the specified alarm will be switched OFF or ON accordingly. Alarms 1-6 monitor inputs 1-6, while alarm 7 monitors external or AC power and can be used to alert the user if the power fails or even when it comes back on.

Command **2*** (NOT YET IMPLEMENTED – Future command) reads and sets dynamic output switching based on alarm conditions. This allows the unit to turn on an output when an alarm condition occurs. Any input alarm can activate any output or combination of outputs. The command format is as follows:

2xyz – 2 is command digit, **x** is optional output #, **y** is optional alarm #, **z** is optional setting 0 or 1. Omitting the 0 or 1 parameter means the connections will only be read.

If no additional parameters are specified (**2#** is entered), the unit will read back the entire matrix of input/output connections in sequence.

This can get complicated, so here are a few examples of how this command may be used:

2 451 # - enable connection between output 4 and alarm 5

2 450 # - disable connection between output 4 and alarm 5

2 xy # - read connection info between output x and alarm y. "Output x on alarm y On/Off"

2 x # - read all connections for one output. "Output x on alarm 2 3 5"

2 # - read connections for all outputs. "Output 1 on alarm 1 2 4 5, output 2 on alarm 3 6, output 4 on alarm 2"

As a practical example: If a motion detector is connected to input 2, you might want to have it trigger a strobe light or siren attached to one of the outputs. In this case, we'll assume the light/siren is attached to output 4. To have the unit enable output 4 when an alarm occurs on input 2, you would enter **2 421 #**. The unit will respond with "Output 4 on alarm 2 on". Now when an alarm condition exists on input 2, output 4 will be turned on. Once the alarm condition has been acknowledged, output 4 will be turned back off.

You could also use this feature with a moisture sensor and an electrically actuated solenoid valve to shut off the main water supply in the event of a water leak.

Any input alarm can be made to turn on any output and there is no limit to the number of connections that can be made between inputs and outputs. A single input can activate one or more outputs and multiple inputs can activate the same output or multiple outputs.

When an alarm condition has been acknowledged, the connected output(s) will be turned off until another alarm connected to that output becomes active or the alarm condition clears and re-occurs. This will override any manual output setting.

Command **3** reads the allowable (no alarm) states or temperature limits for each input. If the specified input is configured for analog temperature reads, then the upper and lower temperature limits will be read back. If the specified input is configured for digital state reads, then the allowable state (ON/OFF) for that input will be read back. If no parameter is specified, then the caller will be prompted for the input number. For example: let's say that input two has been configured to read a temperature sensor while input three is configured for a normally-closed (NC) door or window switch.

Entering '**3 2 #**' would evoke a response from the unit similar to the following:

"Upper limit 2 is 115 degrees"

"Lower limit 2 is 41 degrees"

Entering "**3 3 #**" would evoke the following response:

"3 On"

Command **4** allows the user to enter upper and lower temperature limits for each analog input. If no parameter is specified, then the caller will be prompted for the input number. For example: to enter the temperature limits for input number 1 you would enter '**4 1 #**' on the keypad. The unit would first respond with: "Upper limit" and wait for you to enter the upper temperature limit. To enter an upper limit of 110 degrees, you would enter '**110 #**' on the telephone keypad. Next the unit will respond with "Lower limit" and wait for the lower temperature limit to be entered. To

enter a lower limit of 45 degrees, enter **'45 #'** on the telephone keypad. To enter a negative temperature limit, simply press the * key when entering the number. To enter a lower limit of -10 degrees, enter **"*10#"**.

Temperature limits have now been configured for that input and command **3** can be used to verify that the limits have been set. Note that limits can be entered for an input currently configured for digital state reads but they will be ignored until that input is configured for analog temperature reading.

Command **5** is used to configure inputs as analog for reading temperature sensors or as digital for reading switches or other sensors, which present a digital (ON/OFF) state. If an input number plus a type parameter (**0, 1, or 2**) is entered, the specified input will be configured accordingly. A type parameter of **0** specifies a digital input with an allowable (no alarm) state of normally open (NO) or OFF. Type **1** specifies a digital input with an allowable (no alarm) state of normally closed (NC) or ON. Type **2** specifies an analog input. So in order to manually configure input number 3 as an analog input, you would enter **'5 3 2 #'** on the keypad. The easiest way to take care of this, however, is to use the auto-configure feature. If no parameter is specified (**'5 #'** is entered), the HomeSaver will prompt to scan and autoconfigure all inputs based on the states of any switches or sensors currently connected to them. The unit will respond, "Press five pound to auto-configure, star to cancel" and wait for the user to enter **'5#'** to confirm and proceed with the operation, or **'*'** to cancel it. Inputs, which are either connected to an open switch or are unconnected when they are scanned, will be configured as digital inputs with an allowable (no alarm) state of NORMALLY OPEN or "OFF". Inputs shorted to ground or connected to a closed switch will be configured as digital inputs with an allowable state of NORMALLY CLOSED or "ON". Inputs connected to a temperature sensor will automatically be configured as analog inputs. The process takes only a fraction of a second and the unit will respond with "Ready" when complete.

Command **7** allows the caller to reset the alarm callout, it is equivalent to pressing **'#'** to acknowledge an alarm when the unit calls you. This is useful if you've dialed in and want to stop the unit from calling out to report an alarm but you're not at one of the destination numbers programmed into the unit. This reports any existing alarms and stops the alarm callout until either a new alarm condition appears or the existing alarm clears and then becomes active again.

Command **9** with no argument specified is used to access the telephone configuration sub-menu.

Command **0** returns to the main menu.

On the telephone configuration menu (Menu 3)

Command **1** allows the user to enter telephone numbers that the HomeSaver will call when reporting an alarm condition. An additional parameter specifies which of the 8 'slots' that the telephone number will go into. If no parameter is specified, the caller will be prompted for the slot number. The procedure to enter the number "410-555-1212" into slot 1 is as follows:

Caller enters: **"11#"** on the telephone keypad
Unit response: "Enter phone number"
Caller enters: **"4105551212#"** on the telephone keypad
Unit response: "Ready"

To verify the telephone number for a particular slot, just press the **"#"** key without entering a telephone number and the presently stored number will be read back. The procedure to read back the number stored in the above example is as follows:

Caller enters: **"11#"** on the telephone keypad
Unit response: "Enter phone number"
Caller enters: **"#"** on the telephone keypad

Unit response: “**4105551212**”

To clear a number from a particular slot, press the “#” key twice quickly without entering a telephone number and the presently stored number will be cleared. The procedure to clear the number stored in the above example is as follows:

Caller enters: “**11#**” on the telephone keypad

Unit response: “Enter phone number”

Caller enters: “**##**” on the telephone keypad

Unit response: “Ready”

On an alarm callout, the unit will dial each number in order until it receives a response.

This is all you need to know to enter a normal telephone number. If you have a need for the unit to dial Star and Pound for long-distance services or pagers, or include a pause in the dialing string, read on. Otherwise, you can skip to the next section.

The * and # keys are normally used to clear and enter a command, respectively. When entering a telephone number however, the Star key serves as an ‘Attention’ or ‘Escape sequence’ digit, signaling that the following digit has a different meaning, as shown by the following table:

- * * enters a * into the dialing string
- * # enters a # into the dialing string
- * 0 enters a 2-second pause into the dialing string
- * 9 cancels and aborts the entry, leaving the presently programmed dialing string unchanged

So the following entry:

9 *0 3015551212 *# *0 4 ** 2 *# #

Would cause the unit to dial the following during an alarm callout:

9 PAUSE 301-555-1212 # PAUSE 4 * 2 # (the last # in the string above serves as an ‘Enter’ key, finishing the entry, since there is no * immediately in front of it)

If you have a need for special dialing strings and are having trouble, call us toll-free at (866) 969-8002.

Command **41** sets the speech volume level from 1-6. The command takes one argument or parameter, the volume level. If no parameter is specified, the caller will be prompted for the volume level. The default level is 4.

Command **42** allows adjustment of the gain control block for DTMF reception while the unit is off-hook (during a call). This command configures how sensitive the unit is to touch-tones and should only be adjusted if telephone line conditions are such that the unit is having trouble recognizing digits. Configuring DTMF receiver gain should not be necessary under normal conditions and this command is provided only to allow the unit to operate under a wider-range of unusual or substandard line conditions. Incorrectly configuring DTMF receiver gain can render the unit unresponsive, so the user is prompted to enter the digits 0 through 9 while the unit listens for them at the new gain setting to reduce the possibility of being locked-out of the unit. Incorrect entry of this “challenge” sequence will cause the gain to revert to the previous setting. The default level is 5.

Command **43** allows adjustment of the gain control block for DTMF reception while the unit is on-hook or hung-up. This is the same as Command **42** above, but applies when the unit is being programmed through the front panel programming jack or when an extension phone is being used to access the unit. This value should normally not be changed. The default level is 4.

Command **5** sets the number of rings before the HomeSaver will answer the phone, from 1-9. The command takes one argument or parameter, the number of rings. If no parameter is specified, the caller will be prompted for the number of rings.

Command **61** reads back the current time from the unit's internal real-time clock.

Command **62** reads back the current date from the unit's internal real-time clock.

Command **63** sets the time on the unit's internal real-time clock. The procedure is as follows:

Caller enters: "**63#**" on the telephone keypad

Unit response: "Enter hour, minute"

Caller enters: "HHMM" in 24-hour format, followed by the # key. 9:30pm would be entered as "**2130#**".

Command **64** sets the date on the unit's internal real-time clock. The procedure is as follows:

Caller enters: "**64#**" on the telephone keypad

Unit response: "Entry"

Caller enters: "MMDDYY", followed by the # key. 11/8/2009 would be entered as "**110809#**".

Command **65** sets how long the power must be off (or on) in minutes before generating an alarm condition. The time may be set from 0 (immediate alarm) up to 255 minutes; the default setting is 1 minute. For example, to set this parameter to 90 minutes:

Caller enters: "**65#**" on the telephone keypad

Unit response: "Enter Minutes"

Caller enters: "**90#**"

Command **66** sets how many minutes the unit will wait after an unsuccessful attempt to reach all of the destination numbers in the callout number list during an alarm callout before starting at the top of the list and attempting to redial them again. The procedure to change the setting is identical to command **65** above. The default is 30 minutes.

Command **71** reports the number of callers since the unit was initially powered up. A power failure will not reset this number unless the backup battery system has been exhausted.

Command **77** currently sends a series of test tones from the telephone signaling processor. The tones are, in order:

Rolm 9751 dial tone

Standard RBOC dial tone

Standard busy signal

Command **78** is for testing purposes only and presently causes the internal speech processor to generate a 1KHz test tone for 10 seconds.

Command **80** sets the password or PIN used to gain access to the system. The user will be prompted to enter the password twice; if the two entries match then the password will be changed. If no password is entered twice then the system password will be cleared and callers will be given immediate access to the system without being prompted for a password. Passwords can be any length, up to 15 digits.

If you forget your password, you can reset it from a telephone plugged in to the front panel jack or through an extension phone on the same line as the HomeSaver. When the unit is waiting for a password during login, enter the sequence **98985454** followed by the # key. The unit will prompt you to enter the new password. Once the password has been entered, the unit will ask you to

confirm the password by re-entering it. If the entries match, the password will be changed. Note that this feature will only work locally, if you attempt to invoke a blind password reset remotely with this sequence, the unit will immediately hang up.

Command **81** configures whether or not to report all inputs and power status immediately upon login. The command takes one numeric argument, **0** to disable or **1** to enable. If no argument is entered, the caller will be prompted for it. This feature is enabled by default.

Command **82** configures whether or not menu prompting is enabled. The command takes one numeric argument, **0** to disable or **1** to enable. If no argument is entered, the caller will be prompted for it. This feature is enabled by default.

Command **87** configures tone or pulse dialing for alarm callouts. The command takes one numeric argument, **0** for pulse dialing, **1** for tone dialing. Tone dialing is enabled by default.

Command **0** returns to the config menu.

Graphical representation of the HomeSaver menu command structure for reference

Main		-- 1 (read temp/input state of all inputs)
-- Menu 1 (root) --		-- 1x (read temp/input state of input x)
		-- 2 (read current output states)
		-- 2x (read state of output x)
		-- 2xy (set output state x=output number, y=0 or 1 for off/on)
		-- 3 (report external AC power status off/on)
		-- 4xx1 (issue "On" cmd for X10) *
		-- 4xx0 (issue "Off" cmd for X10) *
		-- 5xx (issue extended "Dim" cmd for X10) *
		-- 7 (listen to room, "#" to abort, configurable timeout)
		-- 8 (1KHz test tone from speech processor for 10 secs)
		-- 9x (argument x optional; access config menu below or menu x directly)
		-- 1 (read enabled/disabled alarm state on all inputs)
		-- 1x (read enabled/disabled alarm state on input x)
		-- 1xy (enable/disable alarm for input x, y=0 or 1)
		-- 2 (read all outputs to be switched on alarms) *
		-- 2x (read all alarms that will switch output x (0-4) *)
		-- 2xy (read connection info between output x and alarm y) *
		-- 2xy1 (enable connection between output x and alarm y) *
		-- 2xy0 (disable connection between output x and alarm y) *
-- Menu 2 (config) --		-- 3 (prompt for input, then read allowed state/limits)
		-- 3x (read allowable (no alarm) input state/limits)
		-- 4 (prompts for input, then temp upper/lower limit)
		-- 4x (prompts for temp upper/lower bound, # keeps old)
		-- 5 (prompt to autoconfig inputs based on their states)
		-- 5xy (configure input state/type, y=0,1-off/on, 2-analog)
		-- 7 (reset alarm callout in case it's not calling you)
		-- 9x (access telephone config menu below or menu x directly)
		-- 0 (return to previous menu)
-- Menu 3 --		-- 1 (enter callout phone #, prompts for slot #)
Telephone cfg/advanced		-- 1x (enter/readback callout # in slot #x)
		-- 41x (enter speech volume level 1-6)
		-- 42x (off-hook rcvr gain control block adjust (0-7))
		-- 43x (on-hook rcvr gain control block adjust (0-7))
		-- 44x (revert to old DTMF detect routine (x=0,1-enable))
		-- 5x (enter # of rings to answer 1-9)
		-- 61 (report time - hhmm)
		-- 62 (report date - mmddyy)
		-- 63 (set time - hhmm)
		-- 64 (set date - mmddyy)
		-- 65 (set pwrfail timeout - 0-255 mins)
		-- 66 (set call timer redial time - 0-255 mins)
		-- 71 (reports number of callers since pwrupinit)
		-- 77 (test tones from telephone signaling processor)
		-- 78 (1KHz test tone from speech processor for 10 secs)
		-- 79 (HomeSaver CID test msg)

	-- 80	(set/change PIN) (enter twice)
	-- 81x	(configure report all upon login x=0,1-off/on)
	-- 82x	(configure menu prompting x=0,1-off/on)
	-- 83x	(configure report unit ID upon callout x=0,1-off/on) *
	-- 84x	(configure report unit ID upon login x=0,1-off/on) *
	-- 85x	(configure login prompt x=0,1-beep/voice) *
	-- 87x	(configure tone/pulse dialing x=0,1-pulse/tone)
	-- 9x	(direct access to menu x)
	-- 0	(return to previous menu)

* Future command – not yet implemented and may be changed

Important safety and compliance information

This equipment complies with FCC rules and the requirements adopted by the ACTA. On the back of this equipment is a label that contains, among other information, a product identifier in the format **US:AAAEQ##TXXXX**. If requested, this number must be provided to the telephone company.

This equipment connects to the telephone network via an RJ11C modular jack on the rear panel, if you have any questions regarding connection to your telephone network; please consult the equipment manufacturer or the telephone company.

The plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA, and should be 26 AWG or larger to avoid the possibility of fire. A compliant telephone cord and modular plug is provided with this product. It should be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The Ringer Equivalence Number, or REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format **US:AAAEQ##TXXXX**. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

If the HomeSaver terminal equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with the HomeSaver unit; for repairs or warranty information, please contact your dealer or Q Systems Engineering:

Q Systems Engineering, Inc.

(866) 969-8002

<http://www.qsystemsengineering.com>.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

User-serviceable components inside the unit are limited to the rechargeable and lithium coin-cell batteries and the internal temperature sensor select jumper. Please refer to the '**Inside the Unit**' section of the user manual for more information.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your home has specially wired alarm equipment connected to the telephone line, ensure that the installation of the HomeSaver does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Warranty, repair information, and limitations of liability

The HomeSaver unit is intended as an aid to reasonable and prudent property surveillance. Q Systems Engineering has gone to great lengths in design, testing, and the use of quality components to make the HomeSaver unit as reliable and safe as reasonably possible. While we believe that most users will not have any problems with the unit, failures can and sometimes do occur which could prevent the unit from reaching the property owner or other relevant person(s) during an alarm. This could be due to a failure of the unit, telephone line or other communications equipment failures or compatibility problems, errors made by the user during equipment setup and telephone number programming, or other unforeseen circumstances beyond our control. For this reason, it must be clear that Q Systems Engineering is not insuring your premises or other property and will not be liable for any injury or damage to person or property during use, or as a result of using this product. Our liability, if any, shall be limited to the original cost of the unit only, and the use of this product is at your own risk. If you are not comfortable with the warranty conditions or limitations or dissatisfied with the product for any reason, return it with all included accessories in new condition within 30 days for a full refund.

WARRANTOR'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THIS PRODUCT ONLY. THIS WARRANTY DOES NOT COVER PAYMENT OR PROVIDE FOR THE REIMBURSEMENT OF PAYMENT FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

In the event that any portion of these Terms and Conditions is held to be unenforceable, the unenforceable portion shall be construed in accordance with applicable law as nearly as possible to reflect the original intentions of the parties and the remainder of the provisions shall remain in full force and effect. This agreement shall constitute the entire agreement between Q Systems Engineering, Inc. and Purchaser and shall be governed, enforced and construed in accordance with the laws of the State of Maryland. Any action or proceedings brought by you under or relating to this Agreement shall be brought in a state or federal court located in the State of Maryland.