



TempLinc™

X10/PLC compatible temperature sensor

Model #1625 TempLinc

SMARTHOME™
MAKING LIFE MORE CONVENIENT, SAFE AND FUN

Congratulations!

Congratulations on purchasing TempLinc™, a small power line carrier (PLC) based thermometer/thermostat that can be easily placed anywhere in any room with an AC outlet. The TempLinc offers an easy way to monitor and/or control the temperature in a room through PLC X10 communications protocol. The TempLinc can be set-up in variety of different ways depending on the project's needs. TempLinc can be programmed as follows:

- To send an updated temperature when a change in room's temperature is detected
- Send temperature when requested
- Act as a thermostat
- Operate in a combination mode that combines the thermostat mode with either a report on change or report on request

All of this can be done in either Fahrenheit or Celsius temperature scales depending on the project's requirements.

TempLinc is designed to be a general-purpose temperature sensor for home automation use. It should not be relied upon for to prevent damage that may occur if temperatures drop too low or rises too high. Because of the nature of PLC communications, there is a possibility that signals sent by TempLinc may not be received. The electrical components in TempLinc and its PowerLinc II™ powerline communications interface module may fail or lockup upon exposure to temperature extremes, even those that the TempLinc manual specifies that TempLinc can sense.

Additionally, like all home automation products, TempLinc should never be used for life saving or life-preserving situations. TempLinc is not a replacement for smoke or fire detectors and should not be relied upon as the only means of protecting a home from freezing temperatures.

Key Features

- Reports temperatures between -60°F and 131°F
- Reports temperature in Fahrenheit or Celsius
- Programmable to transmit upon temperature changes
- Programmable set point reporting
- Uses RCS-compatible temperature chart
- Small sized sensor
- Includes new PowerLinc II Interface module with pass-through AC outlet
- Compatible with Smarthome Live and Smarthome Action

Compatibility with Third Party Home Automation Programs

TempLinc uses the same translation table as the RCS family of powerline controllable thermostats. Many home automation programs already support these thermostats. When setting up the TempLinc for use with a home automation program, look for support of RCS model TX15-B (it might also be described as "Bi-Directional" or "2-Way").

Parts included with TempLinc

- The TempLinc sensor
- PowerLinc II PowerLine Interface Module
- PowerLinc II connecting cable
- Double-sided foam tape and mounting screws



Please note that this PowerLinc II interface is designed to only work with the TempLinc sensor. While it resembles our regular # 1132B PowerLinc

II interface, the two are incompatible and not interchangeable. The included PowerLinc Interface contains different circuitry and programming to support only the TempLinc sensor. The AC outlet on the front of the PowerLinc II interface is a pass-through outlet for any 120-volt electrical device. It does not have any automation functions.

Installation

Locate the TempLinc in an area that has good airflow and is located near an electrical power outlet. The TempLinc can be mounted either vertically or horizontally, for best results it is recommended that a vertical position be used. TempLinc is not weatherproof and should not be used outdoors or for measuring water temperature. Doing so may shorten the life of the sensor module.

1. The TempLinc comes with double-sided tape to secure it to the surface. Once the location is chosen, make sure the mounting surface is clean and free from dust, dirt, and debris.
2. Remove the protective sheet from one side of the double-sided tape to expose the adhesive portion and apply it to the back of the TempLinc
3. Remove the protective sheet from the other side of the double-sided tape to expose the other adhesive portion and place it over the mounting surface and press firmly to secure it.
4. With the TempLinc secured in place, connect the cable between the PowerLinc and the jack of the TempLinc.

Do not plug the PowerLinc in until instructed to do so in the programming section of this manual.

Because of the way TempLinc communicates over the AC wires, it may be difficult to have other modules on the same house code used by TempLinc. You may want to study the signals sent between the TempLinc and your home automation control program(s) to find addresses for other modules. Or, simply set-aside the entire house code for TempLinc's exclusive use.

Quick Start Instructions

1. Un-plug the PowerLinc II from the AC outlet for 10 seconds
2. Plug in the PowerLinc II into the outlet and wait three seconds
3. Within one minute of plugging in the PowerLinc II, send the following:
 - i. Send the base house/unit code of the TempLinc three times in a row
 - ii. Send the house/unit code for the Operation Mode (see Table 1 on page 7 for operating modes)
 - iii. For Thermostat modes, send the set point using unit codes

(See page 7 for more detailed instructions)

New Features in TempLinc with the PowerLinc II interface

With the changeover to the new PowerLinc II interface, we have taken some time to implement some user-suggested improvements. Since most of the brains of the TempLinc system are in the PowerLinc II interface, any TempLinc sensor and cable will have these improvements when used with the PowerLinc II interface.

(Remember, the TempLinc must be used with a specially made and programmed PowerLinc II interface.)

Status Request signals can be sent in any mode

Status Request commands are now accepted and responded to in any mode the TempLinc is programmed into. Previously, TempLinc would only respond to Status Request commands if it was programmed in the "Report on Request" mode.

PLC signals are now sent twice

To improve signal reliability, the TempLinc will send ON and OFF commands twice (when set to one of the thermostat modes). Additionally, the TempLinc will hold off transmitting if it detects signals on the powerline from other PLC transmitters. (This is sometimes called Polite Mode or Signal Collision Avoidance.) By sending the signal twice, the odds are increased that a complete transmission of data will arrive at the receiver(s).

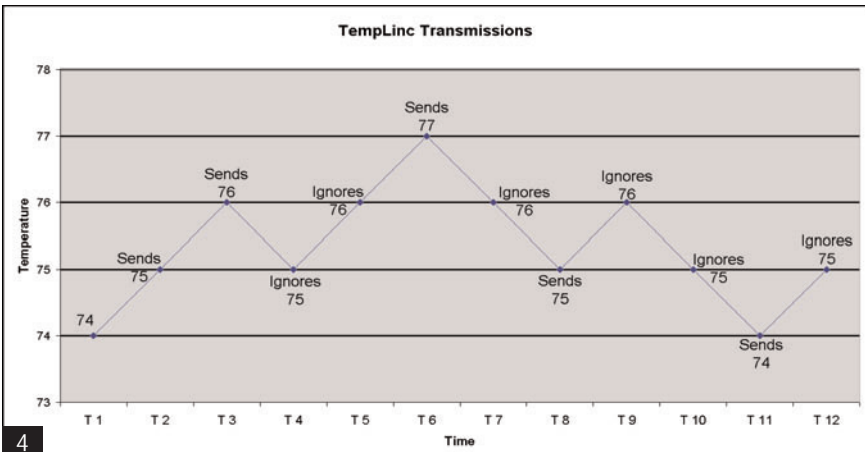
Transmissions after a power failure

When the TempLinc is powered up (for the first time or after a power failure), TempLinc will check the temperature and if it is beyond the programmed set point (in the thermostat mode), it will send a PLC signal to activate the controlled device.

Send on Change mode now ignores small temperature changes

This was an improvement suggested by many of our users. TempLinc will no longer send PLC signals if a small change in temperature is detected. Previously, when TempLinc was in the Send on Change mode, it would send a PLC signal every time a temperature change was detected. In some cases, this could cause a flood of PLC signals and unnecessary cycling of equipment controlled due to TempLinc's temperature reporting. With this improvement, the TempLinc will not send a PLC signal if the temperature changes back to the previous temperature.

See Chart below



Temperature sensing for Report on Change Modes changed

The TempLinc will now check for temperature changes every minute rather than every eight milli-seconds. This change was requested because in some cases, the TempLinc was detecting changes as a result of minor temperature disturbances. For example, someone walks by the sensor or there is a sudden gust of airflow across the sensor, the old TempLinc would have sent a flurry of PLC signals in response to every change. When in the Thermostat Mode, it will still send an ON or OFF the instant it senses a temperature change.

Programming and controlling the TempLinc

Using a Max-controller

The TempLinc will need to be programmed with a Maxi-Controller (Smarthome #4020) or an equivalent transmitter capable of sending Housecode and Unit Codes without ON or OFF commands. The buttons are separated into Addresses and Command functions, which allow it to send individual commands. Transmitters in which one button is pressed to turn a load on or off WILL NOT WORK. When using a Maxi-Controller or an equivalent transmitter, be careful when pressing the buttons. Commands will be ignored if some commands are not sent in the right sequence. "Fat-Fingering" or accidentally pressing the same button twice may prevent the programming from being accepted. This same transmitter is also used for setting scenes, addresses, and other advanced features in Smarthome plug-in modules, light switches, and KeypadLinc wall-mounted transmitters.



For more info visit: <http://www.smarthome.com/4020.html>

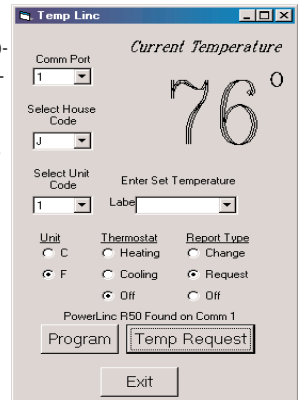
Windows-based TempLinc Program

Smarthome has created a small Windows-based PC program to help program and monitor TempLinc. It is available as a free download from the TempLinc product page on Smarthome.com:

<http://www.smarthome.com/1625.html>

It requires the use of a Serial PowerLinc interface.

The program gives you access to all the features of the TempLinc. It also includes step-by-step commands to aid in the programming of the TempLinc.



Third-party programs

As of this manual's publication, we have found that the programs below offer some support and control for the TempLinc.

- Home Control Assistant (version 4.15 and above)
- HomeSeer Home Automation Software
- Indigo Software for Mac (version 1.3.0 and above)
- Zeus Home Control (version 3.1 and above)

Please note: there are no guarantees that these programs operate flawlessly or that they will continue to include support for TempLinc. Smarthome make no guarantees or endorsements of these products.

Modes of Operations

The TempLinc can be setup in a variety of different ways depending on the project's needs. To make programming more of a simple task, decide ahead of time which mode of operation the TempLinc is to work in. There are eight operation modes that can be chosen among: Additionally, these modes can measure or report in the Fahrenheit or Celsius temperature scales.

Report on Change

TempLinc will report the new room temperature whenever a change is detected. TempLinc will send a house/unit code and preset dim (B15 - Predim6) that corresponds to the current temperature. Refer to Table 2 for a list of temperatures and their corresponding codes. It will also respond to Status Requests commands

Report on Request

TempLinc will report the room temperature whenever a status request signal is received. Sending the house/unit code plus the house code/status request (B1 - B Status Request) to TempLinc will return house/unit code and preset dim of the current temperature. Refer to Table 2 for a list of temperatures and their corresponding codes).

Thermostat (Cooling)

TempLinc will act like a thermostat in cooling mode. Set the temperature set point by sending a house/unit code combination described in the programming section. Once the temperature set point is programmed, TempLinc will send out its house/unit code and house code + "ON" (B1 - BON) if the temperature is higher than the set point or house code + "OFF" (B1 - BOFF) if the temperature is lower than the set point.

Cooling Combination 1

This combination combines the report on change feature along with the thermostat cooling mode feature.

Cooling Combination 2

This combination combines the report on request feature along with the thermostat cooling mode feature.

Thermostat (Heating)

TempLinc will act like a thermostat in heating mode. Set the temperature set point by sending a house/unit code combination described in the programming section. Once the temperature set point is programmed, TempLinc will send out its house/unit code and house code + "ON" (B1 - BON) if the temperature is lower than the set point or house code + "OFF" (B1 - BOFF) if the temperature is higher than the set point.

Heating Combination 1

This combination combines the report of change feature along with the thermostat heating mode feature.

Heating Combination 2

This combination combines the report of request feature along with the thermostat heating mode feature.

Programming

With the mode of operation determined, the TempLinc can now be programmed. Programming will require a PLC transmitter that can send separate unit and function codes. A Maxi-transmitter, Smarthome #4020 or X10 #SC503 or PHC02 is ideal for programming the TempLinc. All programmed settings are stored in an EEPROM and will not be lost if the power is removed or disrupted.

1. Put TempLinc into programming mode by plugging the PowerLinc interface module into a 120-volt wall receptacle.
2. Within one minute after plugging the PowerLinc into the wall, send the base house/unit code of the TempLinc three times in a row (D5, D5, D5).
3. Set the operating mode from the table below by sending the house and unit code (the house code is the same as the one used for the base address)

Code to Send	Operation Mode	Scale	Example
House code + "1"	Report on change	Fahrenheit	D1
House code + "2"	Report on request	Fahrenheit	D2
House code + "3"	Thermostat (cooling)	Fahrenheit	D3
House code + "4"	Report on change and thermostat cooling mode combination	Fahrenheit	D4
House code + "5"	Report on request and thermostat cooling mode combination	Fahrenheit	D5
House code + "6"	Thermostat (heating)	Fahrenheit	D6
House code + "7"	Report on change and thermostat heating mode combination	Fahrenheit	D7
House code + "8"	Report on request and thermostat heating mode combination	Fahrenheit	D8
House code + "9"	Report on change	Celsius	D9
House code + "10"	Report on request	Celsius	D10
House code + "11"	Thermostat (cooling)	Celsius	D11
House code + "12"	Report on change and thermostat cooling mode combination	Celsius	D12
House code + "13"	Report on request and thermostat cooling mode combination	Celsius	D13
House code + "14"	Thermostat (heating)	Celsius	D14
House code + "15"	Report on change and thermostat heating mode combination	Celsius	D15
House code + "16"	Report on request and thermostat heating mode combination	Celsius	D16

Table 1

Example:

If the TempLinc was to be put in the report on request mode in Celsius scale and the desired base address to be D5, send D5, D5, D5 and D10 within one minute after power-up.

For all modes, other than the thermostat mode, programming is completed and the TempLinc is ready for use.

Programming (continued)

Setting the Set Point in the Thermostat Mode

An additional step is needed for thermostat mode, programming the temperature set point. After sending the mode command, send a house/unit code combination that corresponds to the temperature set point at which the TempLinc sends ON or OFF signals. The first unit code sent is the first digit of the set point temperature and the second unit code is the second digit. Unit codes 1 through 9 represent digits 1 through 9, for 0 use unit code 10. The set point temperature is limited to a positive two-digit number between 00 and 99. If the project requires the use of set points above 99 degrees Fahrenheit, use the TempLinc in the Celsius mode.

Example:

To put the TempLinc in thermostat cooling mode with a set point of 78° in the Fahrenheit scale and the base address to be L15, send L15, L15, L15, L3, L7, and L8. The unit codes 7 and 8 will set the temperature to 78°F.

The hysteresis in thermostat mode is 2°F (1°C). In cooling mode, the thermostat will shut off about 2° lower than the set point. In heating mode, the thermostat will shut off about 2° higher than the set point.

Any time the TempLinc needs to be reprogrammed or updated, unplug PowerLinc and leave it unplugged for about 10 seconds. Afterwards, plug the PowerLinc back in and follow the programming procedure from the beginning.

TempLinc Temperature Reporting

When the TempLinc is in the Report on Change or Report on Request modes, it will transmit a house/unit code and preset dim level to represent the temperature.

Table 2 shows the temperatures that correspond to each house/unit code and preset dim. The Temperature to PLC Code Translation Table is directly supported by many home automation systems.

Decoding the Current Temperature Sensed by TempLinc

1. Look at the house and unit code that the TempLinc transmitted. The house code will match the base house code of the TempLinc and the unit code will either be 11, 12, 13, 14, 15, or 16
2. Select the column that matches the house/unit code sent by the TempLinc
3. Look at the preset dim that was transmitted by TempLinc and match it to the preset dim value in the left column
4. Once matched, follow that row to the right until house/unit code column is matched
5. The number that is in the box where the row and column meet is the temperature

Table 2 - Temperature to PLC Code Translation Table

Preset Dim Level	House Code + "11"	House Code + "12"	House Code + "13"	House Code + "14"	House Code + "15"	House Code + "16"
0%	-60	-28	4	36	68	100
3%	-59	-27	5	37	69	101
6%	-58	-26	6	38	70	102
10%	-57	-25	7	39	71	103
13%	-56	-24	8	40	72	104
16%	-55	-23	9	41	73	105
19%	-54	-22	10	42	74	106
23%	-53	-21	11	43	75	107
26%	-52	-22	12	44	76	108
29%	-51	-19	13	45	77	109
32%	-50	-18	14	46	78	110
35%	-49	-17	15	47	79	111
38%	-48	-16	16	48	80	112
42%	-47	-15	17	49	81	113
45%	-46	-14	18	50	82	114
48%	-45	-13	19	51	83	115
52%	-44	-12	20	52	84	116
55%	-43	-11	21	53	85	117
58%	-42	-10	22	54	86	118
61%	-41	-9	23	55	87	119
65%	-40	-8	24	56	88	120
68%	-39	-7	25	57	89	121
71%	-38	-6	26	58	90	122
74%	-37	-5	27	59	91	123
77%	-36	-4	28	60	92	124
81%	-35	-3	29	61	93	125
84%	-34	-2	30	62	94	126
87%	-33	-1	31	63	95	127
90%	-32	0	32	64	96	128
94%	-31	1	33	65	97	129
97%	-30	2	34	66	98	130
100%	-29	3	35	67	99	131

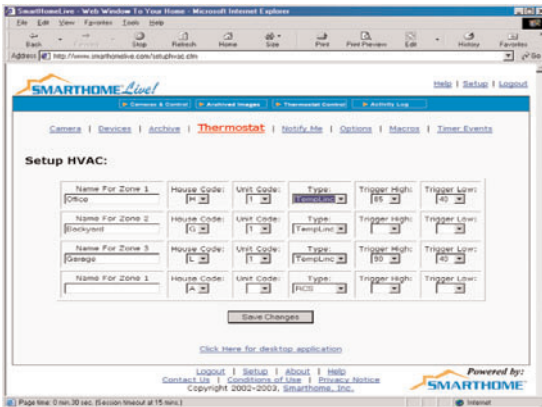
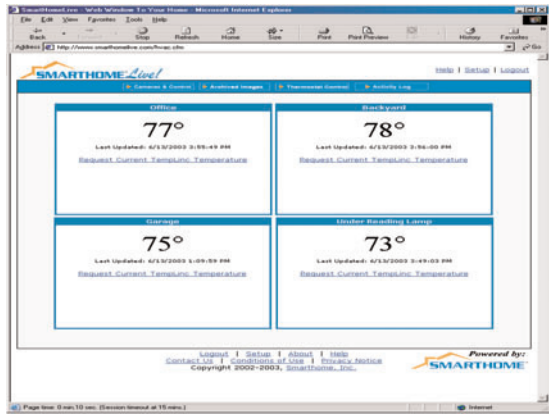
The House code is the same as the base address house code.

Temperatures are read in both Fahrenheit and Celsius. 78°F will give House Code + "15" and preset dim 32%. 23°C will give House Code + "13" and preset dim 61%.

Using TempLinc with Smarthome Live

SmarthomeLive is a full-featured monitoring and control application that lets you see inside your home, receive e-mails or text messages when motion is detected, and remotely control electronics, from anywhere in the world where you can access the Internet.

Unlike other home monitoring systems that only let you see inside your house, or provide passive alerts when motion is detected, SmarthomeLive is one of the only systems available that gives you on-command control of your electronics. For just a few dollars a month, you'll be able to control lights, turn the stereo on or off, or even tell your TiVo to record a show if you're held up at the office and won't be home in time to watch it live.



SmarthomeLive is ready to work with up to four TempLinc sensors (each on a different housecode). You can place TempLincs in temperature sensitive areas of your home. For example, place one in your basement to monitor for potential freezes. Alerts can be set up so that if the temperature sensed by any TempLinc exceeds a value you've set, an Email will be sent to you.

TempLinc Windows Desktop Application

This cool application is available to all SmarthomeLive registered users. It will display the temperatures from all your TempLincs on your Windows Desktop without having to login to SmarthomeLive. By setting the TempLincs to the "Report on Change" mode, the temperature data will be automatically routed via the Internet to your computer anywhere in the world. You may also query your thermostats to ensure your temperature is up to date. This program works for all operating systems that allow the desktop to be set as a web page.



Please note that SmarthomeLive is an evolving product. These screen captures and features described here may change. For the latest information, please visit the SmarthomeLive web site at:

<http://www.smarthomelive.com>

Using TempLinc in areas with extreme temperatures

The TempLinc sensor head can reliably measure temperatures from -60°F and 131°F. However, the PowerLinc Interface, which contains the processing electronics of the TempLinc system is only rated to work between 32°F and 120°F. If the PowerLinc Interface is exposed to temperature beyond its rated limit, the whole system may lock-up, or report erratic data. Keep the PowerLinc Interface in an area where the temperatures are between 32°F and 120°F for reliable operation. The data cable between the sensor head and the PowerLinc Interface can be reliably extended with Smarthome #1132E 12 ft. PowerLinc Extension Cable.

Having trouble....?

If you cannot resolve an issue you're having with the TempLinc;

- Search our on-line knowledge base at: <http://smarthome.custhelp.com>
- E-mail: tech@smarthome.com
- Call our Technical Support Dept. at 949-221-9200

Suggestions and product feedback are welcome

If you would like to suggest a product improvement or tell us about your experience with the TempLinc, we would like to hear from you. Our Engineering team monitors the feedback we receive at Smarthome. Please send your comments to:

beta at smarthome dot com

Please note that we will not likely be able to respond to your message.

SMARTHOME
design

Invest in better Home Automation Products

Unlike most electric items, many PLC-based products haven't changed much over the years.

Our Marketing and Customer Service teams surveyed our customers, like you, and our engineers have invented new and better wall switches and plug-in modules. We include more features, higher load handling, and better signal sensitivity for a superior user experience. While in some cases, they cost more; we hope you'll agree that not having to replace a dead module every couple years is worth the added expense and reduced aggravation. Please visit a retailer or distributor for the complete line of automation products from Smarthome Design. Check out our web site at:

<http://www.smarthome.com/smarthomedesignstore.html>



*KeypadLinc 6 with
450W integrated
dimmer*

About PowerLinc II's Certification

The PowerLinc Interface has been thoroughly tested by ITS ETL SEMKO, a nationally recognized independent third-party testing laboratory. Products bearing North American ETL Listed mark signifies that the product has been tested to and has met the requirements of a widely recognized consensus of U.S. and Canadian product safety standards, that the manufacturing site has been audited, and that the manufacturer has agreed to a program of quarterly factory follow-up inspections to verify continued conformance.



Smarthome Limited Warranty

Smarthome warrants to the original consumer purchaser of this product that, for a period of two years from the date of purchase, this product will be free from defects in material and workmanship and will perform in substantial conformity to the description of the product in this Owner's Manual. This warranty shall not apply to defects or errors caused by misuse or neglect.

If the product is found to be defective in material or workmanship or if the product does not perform as warranted above during the warranty period, Smarthome will either repair it, replace it or refund the purchase price, at its option, upon receipt of the product at the address below, postage prepaid, with proof of the date of purchase and an explanation of the defect or error. The repair, replacement, or refund that is provided for above shall be the full extent of Smarthome's liability with respect to this product.

For repair or replacement during the warranty period, call Smarthome customer service to receive an RA# (return authorization number), properly package the product (with the RA# clearly printed on the outside of the package) and send the product, along with all other required materials, to:

Smarthome
ATTN: Receiving Dept.
16542 Millikan Ave
Irvine, CA 92606-5027

SMARTHOME™
MAKING LIFE MORE CONVENIENT, SAFE AND FUN

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