

# ELK-M1XSP Serial Port Expander

## Supplementary Instructions & Release Notes

### for

## Firmware Version 70.X.X

This version provides M1 Integration to:  
**HAI OmniStat Series 2 and Series 1 Thermostats**

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Firmware and/or bootware releases contain enhancements and/or resolutions for issues found in previous releases.  
For the latest Updates refer to the Elk Website. <http://www.elkproducts.com>

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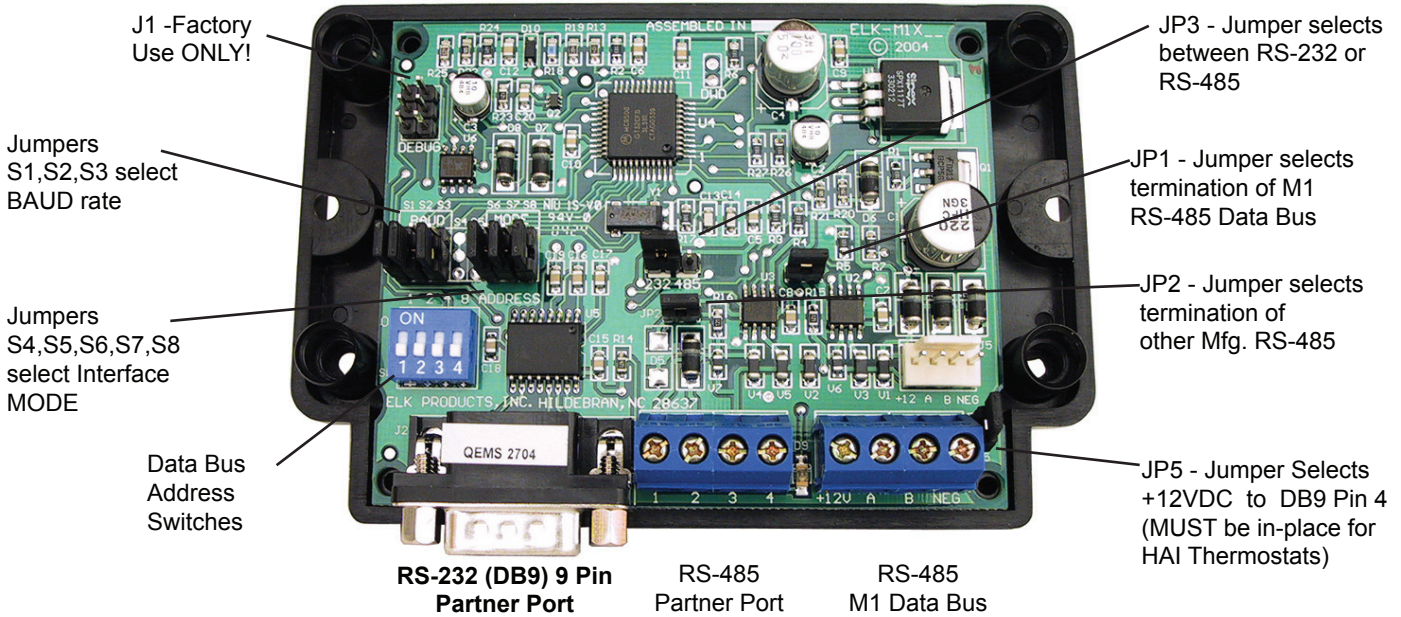


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# M1XSP Installation and Setup

## INSTALL UNIT \* SET ADDRESS AND OPTION JUMPERS \* ACTIVATE M1 BUS ENROLLMENT PROCESS



### M1XSP Diagnostic LED indicator

Slow blink (1/2 sec.) = Normal communication with M1.

Fast flicker = Communicating with other equipment (Thermostat, Lighting Controller, PC, etc.)

No blink = No communication with M1. Unit might be unplugged or powered off.

1. The M1XSP operates on the M1 Keypad data bus and may therefore be remoted near the equipment being interfaced.
2. Before making any wiring connections, turn Off the M1 Master Power Switch.
3. Connect terminals +12V, A, B, and Neg from the M1XSP to the M1's Keypad Data Bus (terminals +VKP, Data A, Data B, & Neg). **NOTE: Refer to the M1 Installation Manual and the M1DBH information in this manual about proper connections of data bus devices with multiple homerun cables.**
4. There are 4 address switches, each with a position of OFF or ON (binary value 0 or 1) and a decimal equivalent value of (1, 2, 4, or 8). The total decimal value of the "ON" switches equates to the data bus address. As a rule, the first M1XSP should be set to address 1. If more than 1 M1XSP is installed, set each one to a unique (sequential) address (2, 3, etc).

Table 1: Data Bus Address Switch Settings				LEGEND
<p>Address 1</p>	<p>Address 2</p>	<p>Address 3</p>	<p>Address 4</p>	<p>ON</p> <p>OFF</p> <p><b>M1XSP Data Bus Terminating Jumper</b> JP1 Used to engage a 120 Ohm resistor for terminating the M1 RS-485 Data Bus. See Data bus wiring instructions before use.</p>
<p>Address 5</p>	<p>Address 6</p>	<p>Address 7</p>	<p>For an M1XSP the only valid Data Bus Addresses are 1 thru 7 since the max. number of M1XSPs is 7.</p>	

**IMPORTANT: Only data bus addresses 1, 2, 3, or 4 are valid when interfacing with HAI Thermostats.**

**Data bus address 1 MUST be selected for HAI Thermostats numbered 1 thru 4.**

**Data bus address 2 for HAI Thermostats numbered 5 to 8.**

**Data bus address 3 for HAI Thermostats numbered 9 to 12.**

**Data bus address 4 for HAI Thermostats numbered 13 to 16.**

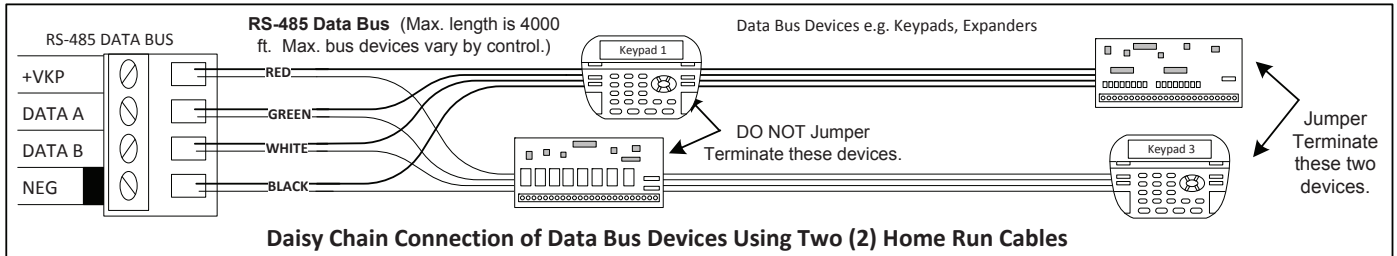
5. Set the "Mode", "Baud", and other necessary jumpers according to the Installation diagrams on previous pages.
6. After all connections are complete, turn On the M1 Master Power Switch.
7. Enroll the M1XSP into the M1 Control. From the Keypad access the Installer level programming and select Menu 01-Bus Module Enrollment. Press the right arrow key to start the enrollment. Once enrollment has completed, press the right arrow key to view results. Enrolled M1XSPs will show up as type 5 (T5) followed by the specific address number.

# Elk-M1 Data Bus E.O.L. Termination

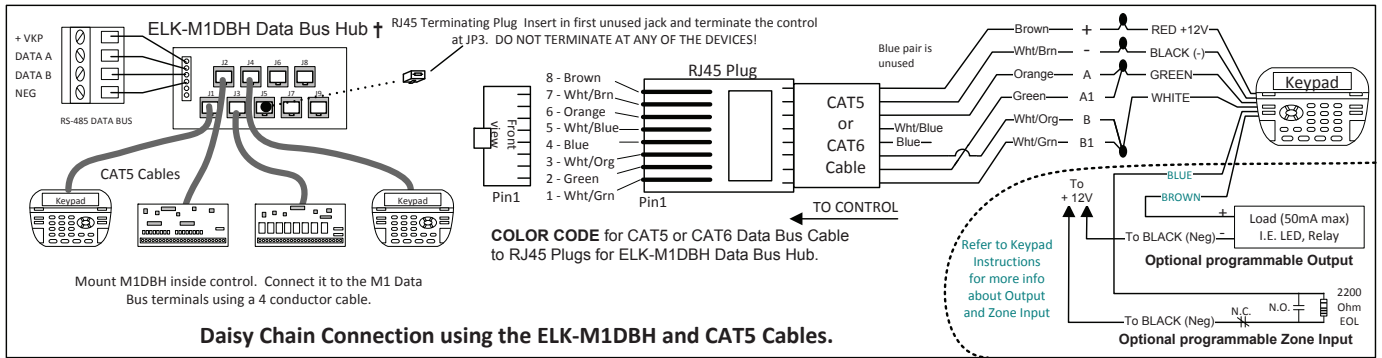
## VERY IMPORTANT!

The control uses a RS-485 “differential” data bus operating at 38,400 bits per second. This is relatively high speed by industry standards and ensures fast, accurate communications. EOL data bus terminating resistors are strongly suggested to eliminate the possibility of reflection errors due to varying cable lengths. Every device; keypad, expander, etc. and the control has a built-in bus terminating resistor (120 Ohm) which can be activated via a 2 pin jumper (2 Gold Pins). Two black shorting caps are included in the hardware pack. When one of the shorting caps is placed on the two gold pins, it activates the 120 Ohm terminating resistor across Data Lines A & B. Terminating resistors are marked JP2 on the keypads and JP1 on the expanders. From the factory, no terminating resistors are installed (activated).

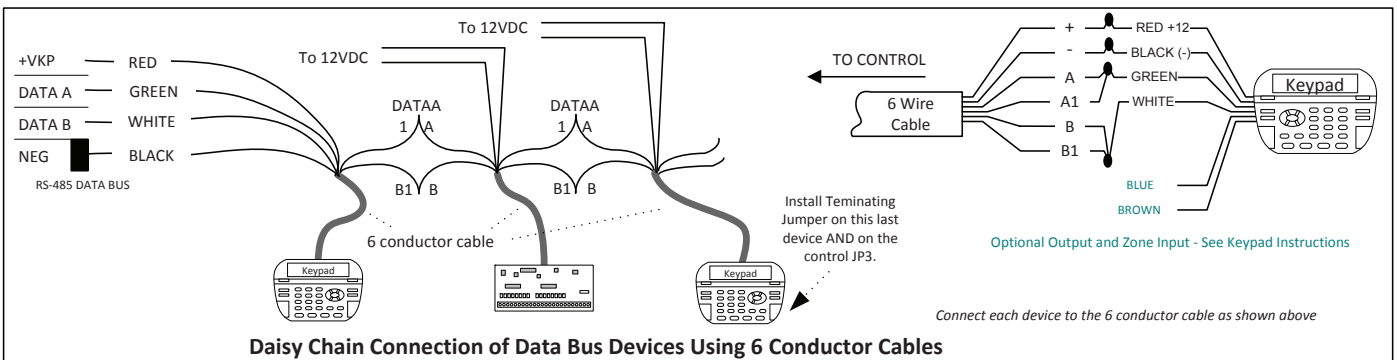
**WARNING! The RS-485 Data Bus must NEVER have more than 2 terminating resistors header/jumpers installed.**



The M1 should have no more than 2 home run cables but devices can be daisy chained along each. The last device on each home run SHOULD be terminated via the gold 2 pin terminating header/jumper. Placing a shorting cap on the pins will engage a 120 Ohm resistor across data lines A & B. If there is only 1 data bus home run cable then place shorting cap on JP3 of Main Board. See other hookups below.



The optional ELK-M1DBH † Data Bus Hub is suggested if the job must have more than 2 home runs. The M1DBH accepts CAT5 or CAT6 cable with RJ45 plugs. It keeps wires more organized while also providing easy bus termination. Essentially, the M1DBH circuit board daisy chains the devices by series connecting the DATA lines A & B. An plug-in RJ45 terminator is supplied for use in the first unused jack.



Another option for wiring multiple home runs is with 6 conductor cable. This allows devices to daisy chained by making an in and out connection, basically a 3 way splice of the data A (Green) wire to 2 wires of the 6 conductor cable (designated A and A1). Do the same for the data B (White) wire. At the control splice the A1 and B1 wires to the A and B wires going to the next device. Terminate the last wired device and the control JP3 ONLY! The data wires will be in series, but the POS (+) and Neg (-) power wires should be parallel wired to the +VKP and Neg terminals or to an auxiliary Power Supply if the combined current draw exceeds the rated current available from the Control.

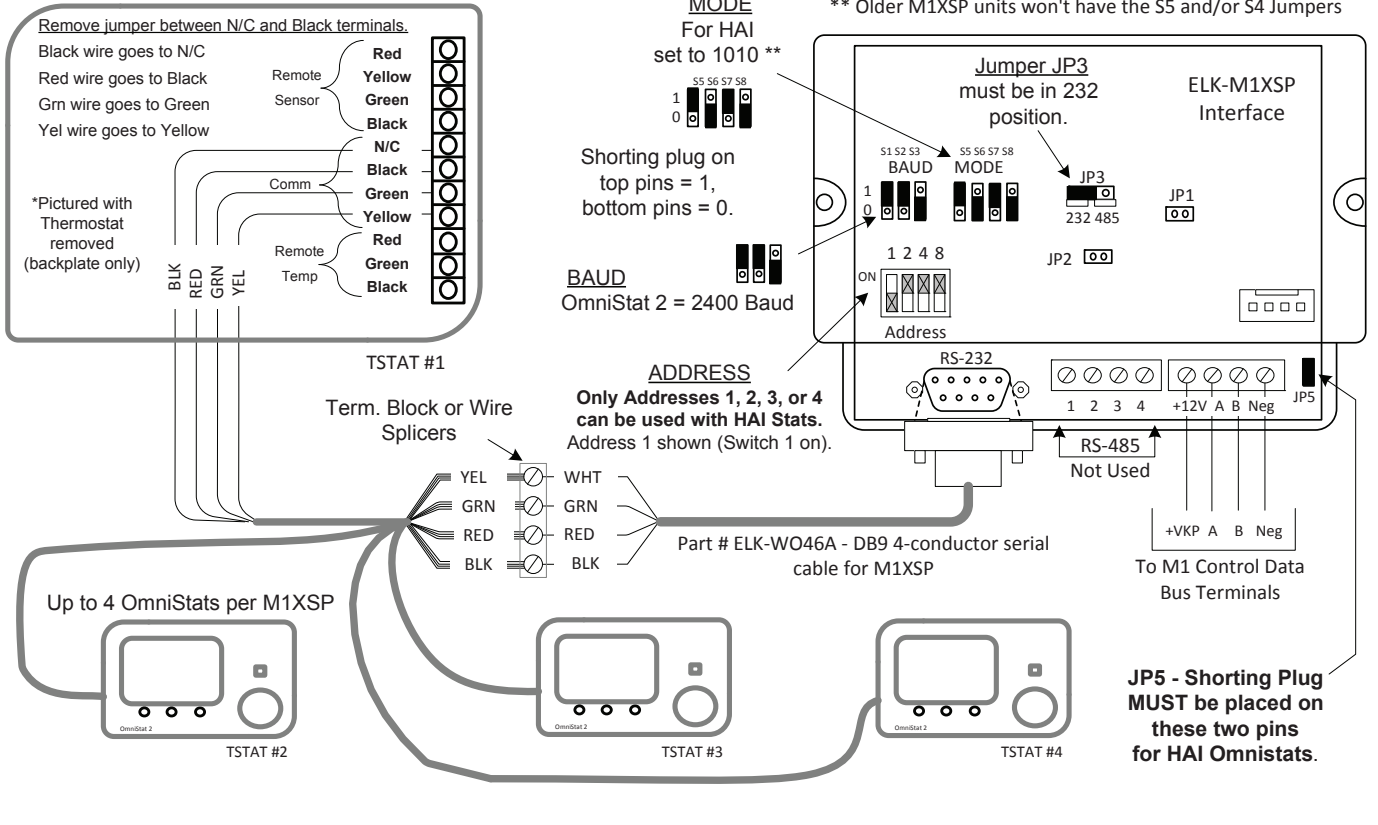
## HAI OmniStat 2 Series (RS-232) Thermostats

1. Install the ELK-M1XSP and set its data bus address from 1 to 4 using the 4-position dip switch. M1 can interface with 4 OmniStats using a single M1XSP. Up to 16 OmniStats can be interfaced using 4 M1XSPs. The data bus address of each M1XSP must be coordinated with the OmniStat addresses. See below. Note: If some other M1XSP address conflicts with one of the 4 addresses needed for the OmniStats then it must be changed to a higher address in order for that address to be used for the OmniStat(s).
  - If the OmniStat address is 1,2,3, or 4 the M1XSP data bus address MUST be set to 1.
  - If the OmniStat address is 5,6,7, or 8 the M1XSP data bus address MUST be set to 2.
  - If the OmniStat address is 9,10,11, or 12 the M1XSP data bus address MUST be set to 3.
  - If the OmniStat address is 13,14,15, or 16 the M1XSP data bus address MUST be set to 4.
2. Set the M1XSP MODE jumpers to: S5=1, S6=0, S7=1, & S8=0 If the M1XSP has jumper S4, set it to =1.
3. Set the M1XSP BAUD jumpers to match the baud rate setting that is in the Omnistat Thermostat(s).
  - For 300 baud set S1=1, S2=0, S3=0
  - For 1200 baud set S1=0, S2=1, S3=0 **Note: We recommend setting the slower 300 Baud rate in both the Omnistat and the M1XEP if any communications issues are experienced.**
  - For 2400 baud set S1=1, S2=1, S3=0
4. Set Jumper JP3 to the **“232”** position. Make certain that Jumper JP5 is ON. **THIS IS VERY IMPORTANT!**
5. Splice the ELK-W037A serial cable (supplied) with a four conductor cable running to the OmniStat. Max. length is 500ft.
6. At the OmniStat Series 2 Thermostat remove the factory jumper between terminals N/C and Black. Refer to the wiring diagram on the next page and connect the four conductor cable coming from the M1XSP and W037A cable as follows:
  - BLACK wire to terminal labeled “N/C”
  - RED wire to terminal labeled “Black”
  - GREEN wire to terminal labeled “Green”
  - WHITE wire to terminal labeled “Yellow”.**Be sure to REMOVE Jumper J8 from the back side of the OmniStat 2 unit (if present). THIS IS VERY IMPORTANT!**
7. Plug the 9-Pin ELK-WO46A cable into the 9-Pin connector on the M1XSP.
8. Apply power to the M1XSP and M1 Control.
9. Perform a M1 data bus enrollment. Verify the address setting shown for the M1XSP Serial Expander is correct.
10. **Update the firmware in the M1XSP to Version 70.0.2 (or the latest 70.x.x version).**
11. Connect the OmniStat 2 Series to the HVAC system according to the instructions provided with the Thermostat. Apply power to the HVAC and OmniStat 2, then enter the Installer Setup Mode (see the HAI manual) and program as follows:
  - A. Set the Thermostat’s network address”.** Note: A maximum of 4 stats may be connected to a single M1XSP. The first unit should be address 1. If multiple thermostats are installed then set each to a consecutive address, starting at 1.
  - B. Set the “Communications Mode” to 2400 Baud.**
  - C. Set the “System Options” to the option appropriate to the type of heat/cool system being connected.**
  - D. Set the “Program Options” to either “None” or “Occupancy”.** This disables the thermostat’s internal setback time schedules so they do not override the M1 Automation commands from the M1XSP.
  - E. Set the “Cool Setpoint Limit” and “Heat Setpoint Limit” if desired. Effectively, the thermostat will ignore any setpoint commands sent to it that are outside these limits.**
12. Using the ELK-RP Software, program steps a, b, & c below. Then test and verify operation using steps d and e.
  - a. Select Automation > Thermostat and program a name for each valid Thermostat. This is MANDATORY!
  - b. Select Automation > Task and program two tasks: Name the 1st Task “Economy Mode” and the 2nd “Comfort Mode”.
  - c. Select Automation > Rules and create the following 4 rules.

Whenever [Area Name] Armed State Becomes Armed Away Then Activate [Economy Mode] (Task 1)	Whenever [Economy Mode] (Task 1) Is Activated Then Set [Thermostat 1] (TStat 1) Cooling Desired Temp to 85 degrees
Whenever [Area] Armed State Becomes Disarmed Then Activate [Comfort Mode] (Task 2)	Whenever [Comfort Mode] (Task 2) Is Activated Then Set [Thermostat 1] (TStat 1) Cooling Desired Temp to 70 degrees
13. On the M1 Keypad PRESS the ELK key followed by the RIGHT arrow key for Menu 1 - View/Control Automation Fncts. Press 6 for the Thermostat Temperature sub-menu, followed by RIGHT arrow key.
  - The Keypad should now display the Name and current temperature from Thermostat (T01).
  - Press ELK and 1 for Tasks, then select Task 1 (Economy Mode).
  - Press the # key to activate.
  - The thermostat cooling setpoint should go to 85 degrees.

# Wiring Diagram for OmniStat 2 Series

**\*\* IMPORTANT: Remove Jumper J8 ON back of Omnistat 2 (if present)**



## HAI OmniStat RC Series “Original” RS-232 Thermostats

1. Install the ELK-M1XSP and set its data bus address from 1 to 4 using the 4-position dip switch. M1 can interface with 4 OmniStats using a single M1XSP. And up to 16 OmniStats can be interfaced using 4 M1XSPs. The data bus address of each M1XSP must be coordinated with the OmniStat addresses. See below. Note: If the address of some other M1XSP conflicts with one of the 4 addresses needed for the OmniStats then it must be changed to a higher address in order for that address to be used for the OmniStat(s).
  - If the OmniStat address is 1,2,3, or 4 the M1XSP data bus address MUST be set to 1.
  - If the OmniStat address is 5,6,7, or 8 the M1XSP data bus address MUST be set to 2.
  - If the OmniStat address is 9,10,11, or 12 the M1XSP data bus address MUST be set to 3.
  - If the OmniStat address is 13,14,15, or 16 the M1XSP data bus address MUST be set to 4.
2. Set the M1XSP MODE jumpers to: S5=1, S6=0, S7=1, & S8=0 If the M1XSP has jumper S4, set it to =1.
3. Set the M1XSP BAUD jumpers for **300 baud**: S1=1, S2=0, S3=0
4. Set Jumper JP3 to the “232” position. Make certain that Jumper JP5 is ON. THIS IS VERY IMPORTANT!
5. Splice the ELK-W037A serial cable (supplied) with a four conductor cable running to the OmniStat. Max. length is 500ft.
6. At the Thermostat splice the four conductor cable to the Black, Red, Green, and Yellow four pin flying lead cable and plug this cable into the Thermostat.
7. Plug the 9-Pin ELK-WO46A cable into the 9-Pin connector on the M1XSP.
8. Apply power to the M1XSP and M1 Control.
9. Perform a M1 data bus enrollment. Verify the address setting shown for the M1XSP Serial Expander is correct.
10. **Update the firmware in the M1XSP to Version 70.0.2 (or the latest 70.x.x version).**
11. Connect the OmniStat RC Series to the HVAC system according to the instructions provided with the Thermostat. After re-applying power to the HVAC and OmniStat enter the Installer Setup Mode (see the HAI manual) and program as follows:
  - A. Set the Thermostat’s network address”.** Note: A maximum of 4 stats may be connected to a single M1XSP. The first unit should be address 1. If multiple thermostats are installed then set each to a consecutive address, starting at 1.
  - B. Set the “Communications Mode” to 300 Baud.**
  - C. Set the “Display Options” to one of the options designated as “non-programmable.” (4 thru 7)** This disables the thermostat’s internal setback time schedules so they do not override the M1 Automation commands from the M1XSP. Another method is to disable specific schedules by setting their time values to “---” (1 step past the 11:45pm set).
  - D. Set the “Cool Setpoint Limit” and “Heat Setpoint Limit” if desired. Effectively, the thermostat will ignore any setpoint commands sent to it that are outside these limits.**
12. Using the ELK-RP Software, program steps a, b, & c below. Then test and verify operation using steps d and e.
  - a. Select Automation > Thermostat and program a name for each valid Thermostat. This is MANDATORY!
  - b. Select Automation > Task and program two tasks: Name the 1st Task “Economy Mode” and the 2nd “Comfort Mode”.
  - c. Select Automation > Rules and create the following 4 rules.

Whenever [Area Name] Armed State Becomes Armed Away  
Then Activate [Economy Mode] (Task 1)

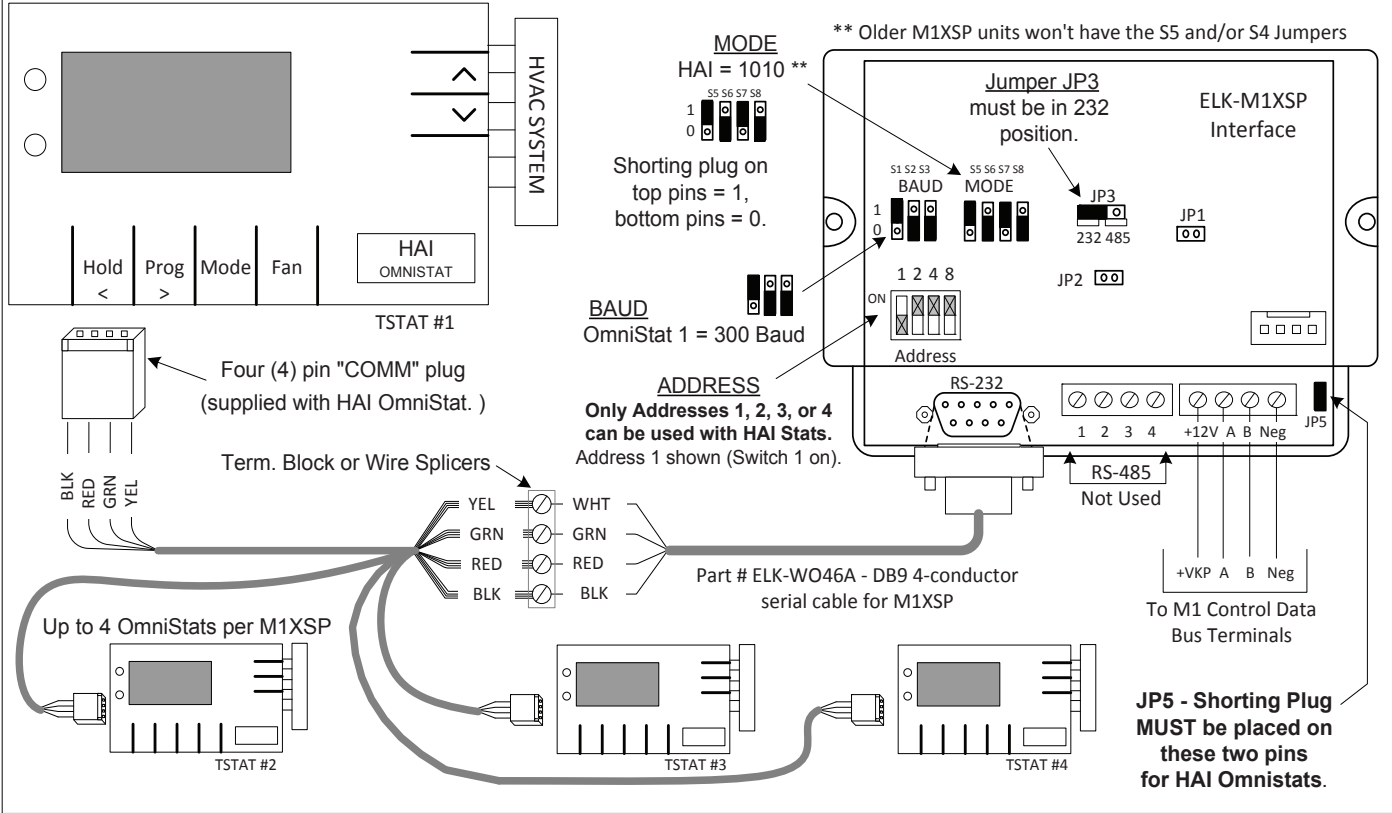
Whenever [Economy Mode] (Task 1) Is Activated  
Then Set [Thermostat 1] (TStat 1) Cooling Desired Temp to 85 degrees

Whenever [Area] Armed State Becomes Disarmed  
Then Activate [Comfort Mode] (Task 2)

Whenever [Comfort Mode] (Task 2) Is Activated  
Then Set [Thermostat 1] (TStat 1) Cooling Desired Temp to 70 degrees

13. On the M1 Keypad PRESS the ELK key followed by the RIGHT arrow key for Menu 1 - View/Control Automation Fncts. Press 6 for the Thermostat Temperature sub-menu, followed by RIGHT arrow key.
  - The Keypad should now display the Name and current temperature from Thermostat (T01).
  - Press ELK and 1 for Tasks, then select Task 1 (Economy Mode).
  - Press the # key to activate.
  - The thermostat cooling setpoint should go to 85 degrees.

# Wiring Diagram for OmniStat RC Series



## Updating/Replacing Firmware in the ELK-M1XSP

The M1XSP stores its operating firmware in "Flash" memory. This state-of-the-art memory allows electronic field updates and eliminates the old fashion method of changing IC chips or shipping boards back to the factory. As new firmware updates become available, they will be posted on ELK's website found at [www.elkproducts.com](http://www.elkproducts.com). **NOTE: Firmware updating can only be done through the M1 Control using a Direct to PC Com port connection or an optional Ethernet Network connection. Dial-up connections cannot be used to perform firmware updates.**

### How to Update:

1. Physically connect the Computer and Control using either the RS-232 Serial Port 0 or the M1XEP Ethernet Interface.
2. Open ElkRP and the account belonging to the control. Click on the Connection menu icon and establish a connection. Use either the **Direct using Com\_ OR Network** options.
3. On the Send/Rcv menu icon there is a selection that allows the firmware to be updated.
4. Select the device to be updated. In this case it is a Serial Expander. Select the update firmware option.
5. Display will show: Device name, current Firmware, Hardware, and Bootware version, and a pull down window for selecting the update firmware. NOTE: All update (.bin) files downloaded or received should be stored in a directory on your computer. Refer to the Options tab under the Setup menu in RP. It will indicate what directory is used for the update files.
6. Click on the check box for "Update". If "Reprogram" or "Rollback" is displayed the firmware file is the same as OR older that what is in the control. Reprogramming with the same firmware is a waste of time but was included for factory testing purposes. Rollback is not recommended except under the guidance of Elk Technical Support.

## Firmware Release Notes

### Version 70.0.2 - released Oct 27, 2008

This release added the ability to interface an M1 Control with the new HAI OmniStat 2 Series Thermostats. It also supports interfacing with the older Omnistat RC Series Thermostats.

NOTE: Firmware 70.x.x should be downloaded and flashed into any M1XSP that is to be interfaced with HAI Thermostats. It completely replaces or outdates the support previously provided by the M1XSP Factory Firmware Version 1.0.xx.

This release supports the following stats: Omnistat series 1 (RC80, RC90, etc.), Omnistat series 2 (RC-1000 & RC-2000).