

### INTRODUCTION

This Application Note describes how to interface the RCS Communicating Thermostats (RCS TR16 and TR40) to RCS CommStar controllers (CS30/CS308/CS48).

**The Thermostats must be RS-485 models** and will connect to the CommStar RS485 network.

Support for RCS Communicating Thermostats requires Version 3.00 (or later) Firmware/Software for the RCS CommStar controller. Up to 32 individual HVAC zones are supported.

There are two methods of connecting the thermostats to a CommStar control unit RS485 port. CS30 and CS48 control units have a single RS485 connection. Up to 32 Thermostats can be connected in a daisy chain method on a single multi-drop 4000 ft cable run.

Alternately, thermostats can be connected to a CommStar RS485 Star wiring hub. This allows individual homerun wiring for thermostat. The CS308 includes a built-in 8 Channel RS485 Star Hub. External RS485 Star Hubs, Model 8AH485, can be connected to the single RS485 port on the CS30 and CS48 to enable the Star wiring topology.

### RS485 Wiring Terminology

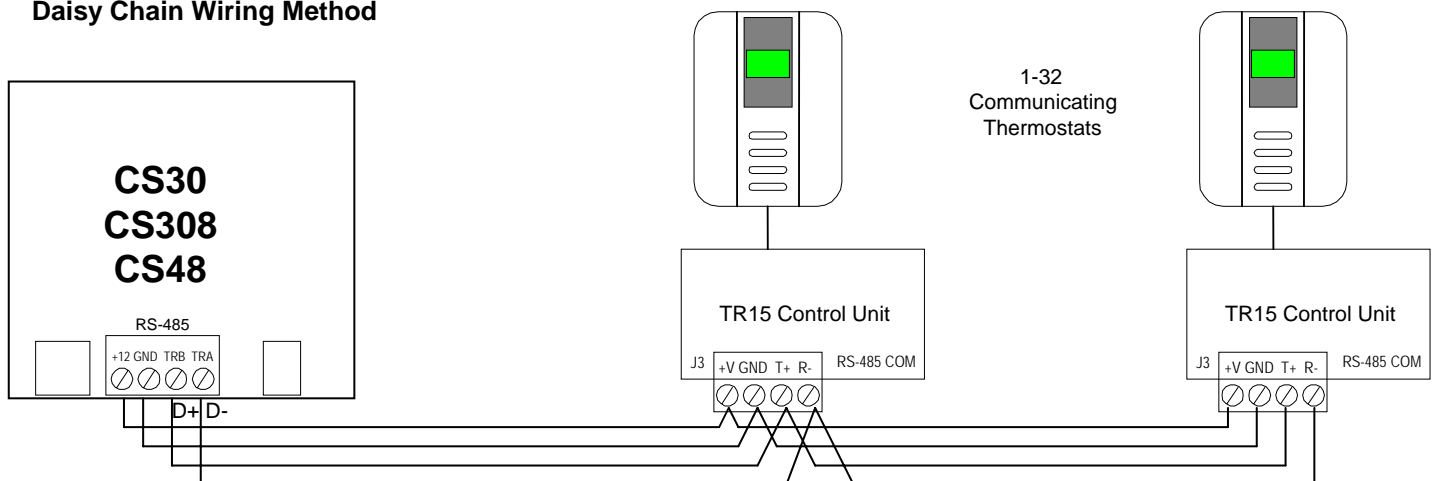
RS485 network wiring has Data+ and Data- connections. These are referred to by various labels on CommStar Controllers, Thermostats and other network devices.

Data+ = D+ = B+ = T+ = TRB

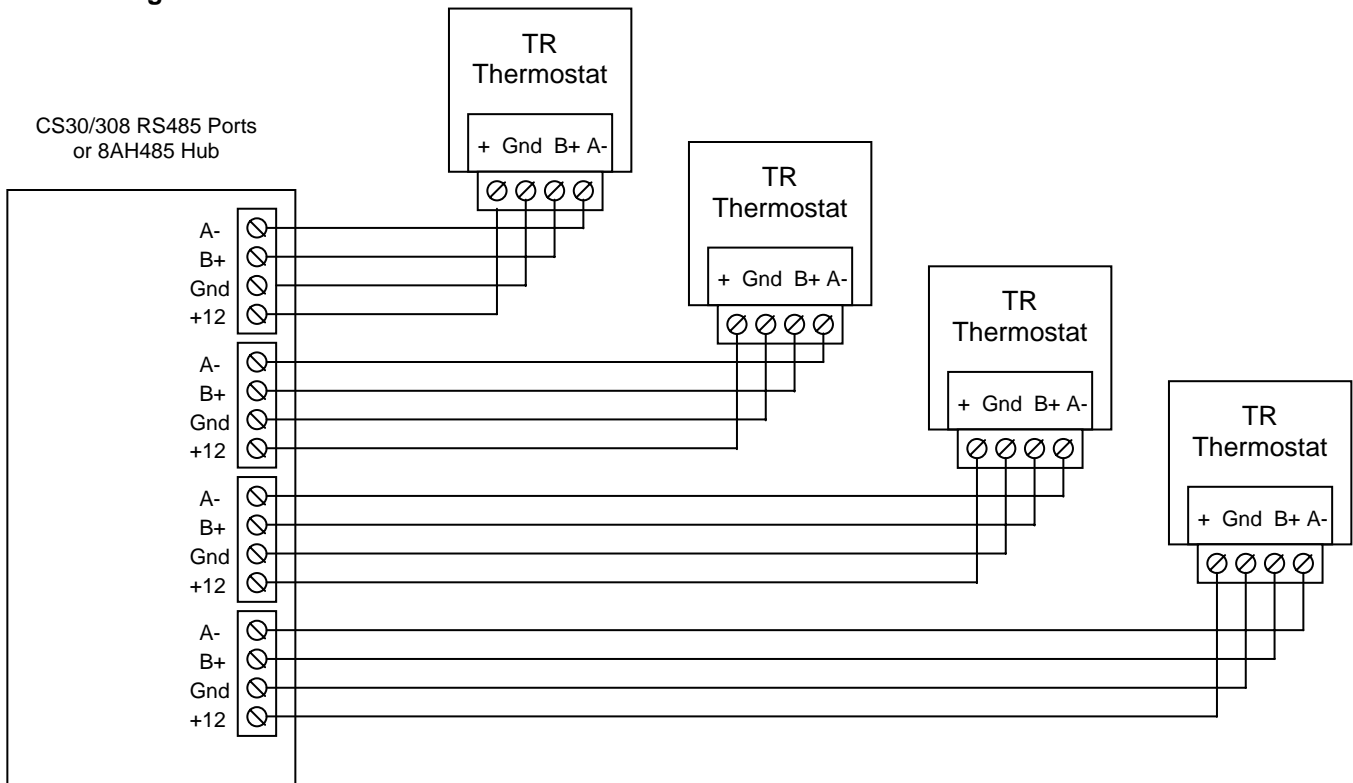
Data- = D- = A- = R- = TRA

Always connect + to + and – to – on device terminals.

### Daisy Chain Wiring Method



## Star Wiring Method



## INSTALLATION

### Hardware

1. Install and test the RCS Communicating Thermostat. Follow the installation instructions included in the RCS documentation.
2. Determine if the Thermostats will be powered from their own power source or if they will be powered from the RS485 network. One pair of wires is required for RS485 communications only, or two pair if power is also provided.
3. Although any 22/24Ga Twisted Pair Cable can be used to connect to the Thermostats, it is recommended and common practice to use CAT-5 cable to connect the RS485 network devices. It is also recommended that you follow the wiring connection diagram for CAT-5 wiring on the previous page.
4. Connect one end of the communications cable to the CommStar Controllers RS-485 terminal block.
5. Connect the other end of the cable to the RCS Communicating Thermostat.
6. **CAUTION.** Double check your wiring. Wiring errors that put power on the communications (B and A) terminals may damage the controller and the thermostat.
7. For multiple Thermostats, continue wiring according to your communications network wiring method, daisy chain or Star homerun wiring.
8. After double checking the wiring connections, power up the controller and thermostats.
9. Set network addresses on the thermostats after power up.

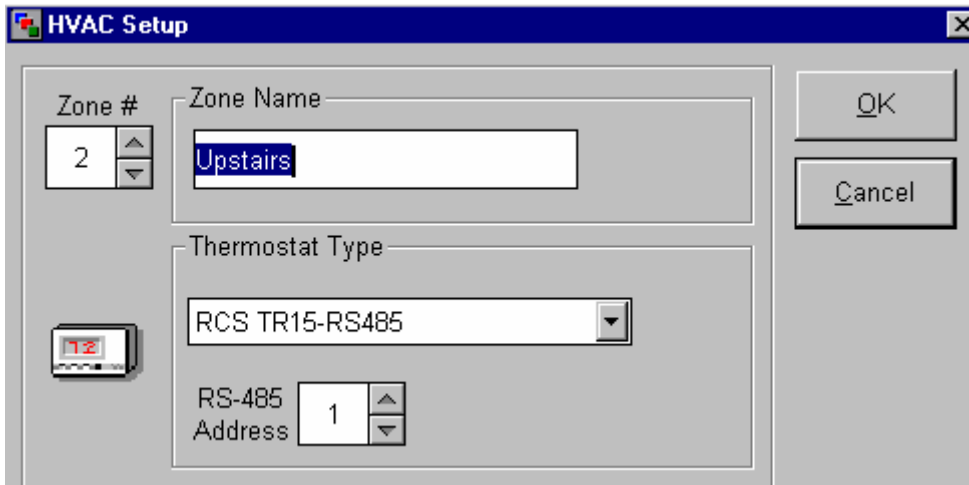
## CommStar and WinEVM SOFTWARE

Update your controller with the latest version (3.00 or later) of Firmware and WinEVM Software. This update is available on the RCS web site: [www.resconsys.com](http://www.resconsys.com). Follow the instructions in the readme.txt file if you are not familiar with the update procedure.

Connect your PC to the CommStar controller Com1 port. Download the new firmware (if needed) into the CommStar control unit.

After you have updated the CommStar control unit, open WinEVM and define each Thermostat being used as follows:

1. Select Define – HVAC from the main WinEVM menu bar and the HVAC setup window will open as shown below.



2. Select the zone number and enter the following parameters:
  - Zone Name: any name (e.g.: Upstairs, Downstairs, Master Bedroom, etc).
  - Select Thermostat Type: RCS TR15-RS485 or specific model if in drop down menu.
  - RS-485 Address. This must match the address setting on each attached Thermostat.
3. Press the OK button. This downloads all HVAC parameters into the controller.

## TESTING

- 1) Power up at least one RCS Thermostat and verify Wall Display Unit operation. Set network address.
- 2) Connect to the CommStar Control Unit.
- 3) Connect CommStar control unit to PC. Open WinEVM and open the MegaController.
- 4) Click the "Logging Messages" checkbox (directly above the activity log). Make sure the HVAC checkbox is selected. If not, the HVAC screens will not update with current temperature, setpoint, mode or fan status.
- 5) Click on the MegaController HVAC button. A window with appears with the temperature & setpoint for each defined zone shown.

To manually adjust a zone, click on the 'More...' button for the zone to be adjusted.

Adjust Setpoint, Fan or Mode settings, verify Thermostat updates accordingly.

Change settings at the Thermostat (Setpoint/Mode/Fan) and verify changes in the MegaController

## TROUBLESHOOTING

### TIMEOUTS

If a thermostat does not respond to commands sent by the controller, the MegaController will display the following message in the activity log: "**HVAC: zonename TIMEOUT**". The controller waits approximately 5 seconds for a lack of response before a timeout is logged.

If this occurs, verify the following:

- HVAC Setup correct for type and zone number.
- Verify RS-485 addresses match those in the HVAC Definitions.
- Verify thermostat address settings.
- All Cables/Connections are correct
- Thermostat is powered up.

If you are still unsuccessful in getting communication to the CommStar control unit working, it is recommended that you verify thermostat operation by connecting the unit directly to a PC and test it using an ASCII terminal program (such as hyper terminal) or the RCS demo program as described in the RCS thermostat documentation.

Note: You will need a RS232 to RS485 converter to connect a PC directly to a thermostat. These are available from RCS. PN: 001-00374.

## REFERENCES

Residential Control Systems  
11460 Sunrise Gold Circle Suite A  
Rancho Cordova, CA 95742  
(916) 635-6784  
(916) 635-7668 (fax)  
e-mail: [support@resconsys.com](mailto:support@resconsys.com)  
internet: [www.resconsys.com](http://www.resconsys.com)