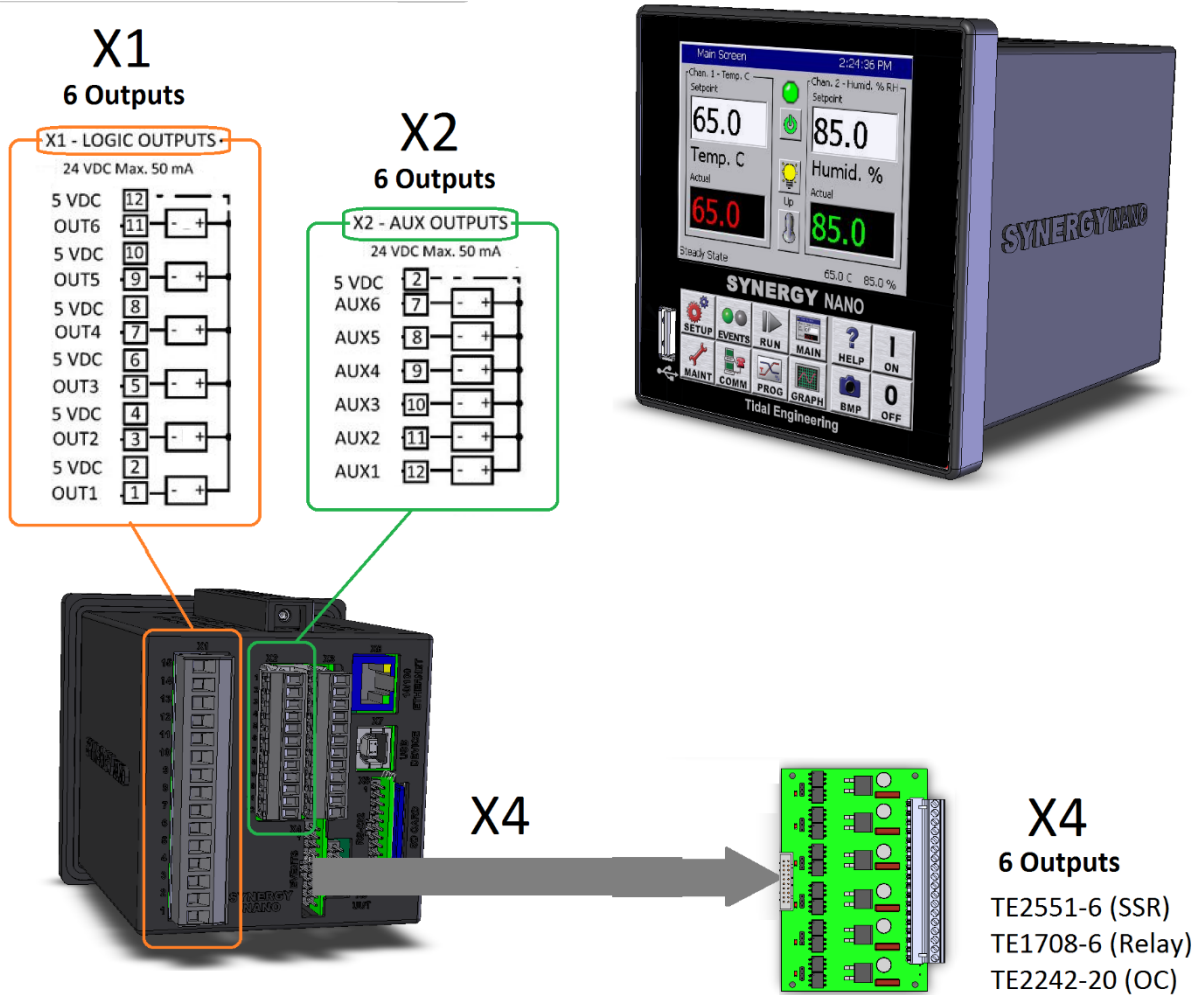


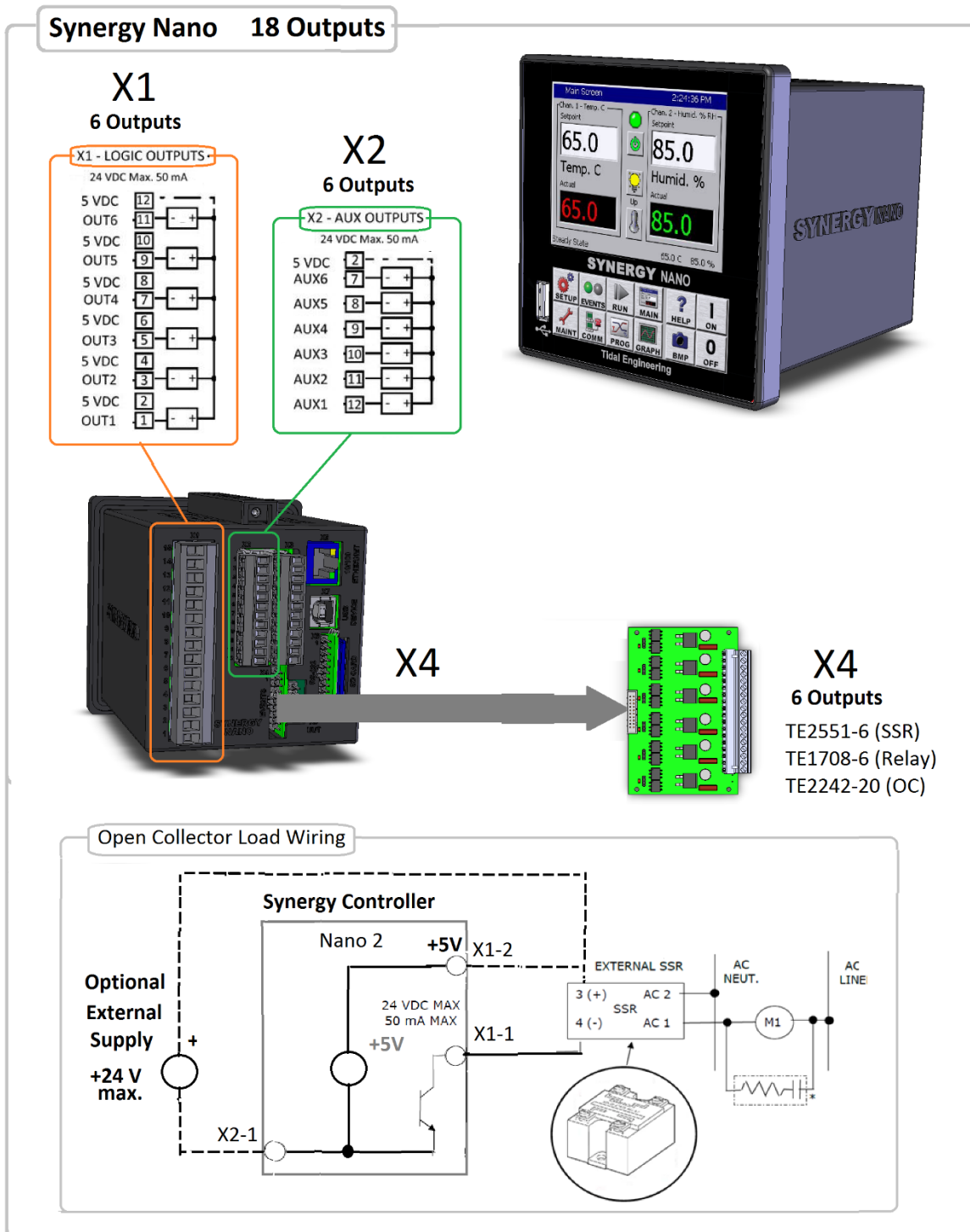
Synergy Nano Controller Output Options



A variety of output options are available for Synergy Nano controllers from Tidal Engineering Corporation. These include output systems compatible with a number of chamber manufacturers.

This application note covers the specification for these output options.

The Synergy Nano and Synergy Nano 2 with an optional X4 output board can accommodate 18 outputs. The X1 Main and X2 Auxiliary open collector outputs are wired as shown below.

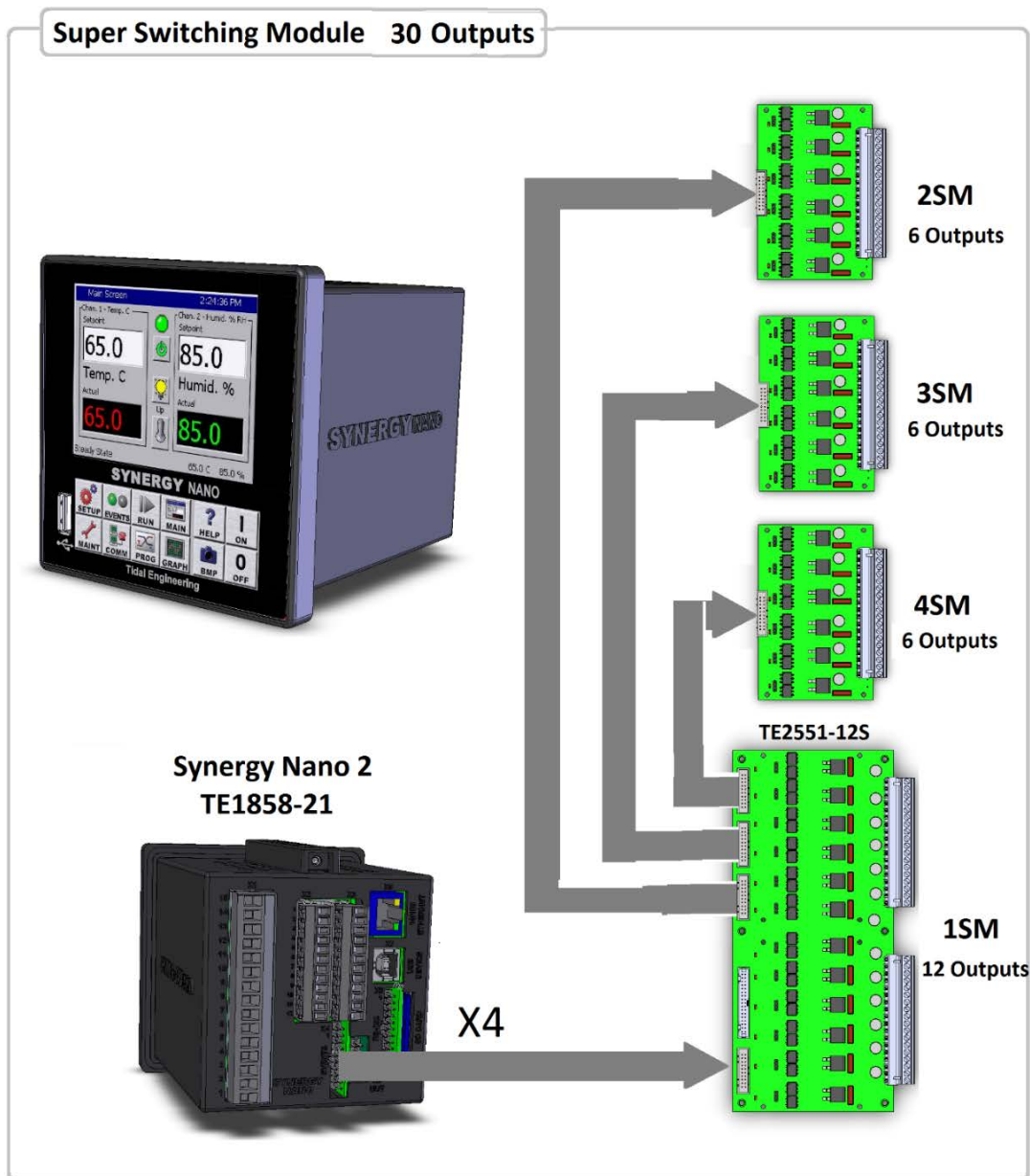


Synergy Nano and Synergy Nano 2 Expansion options for X4 connection are shown below.

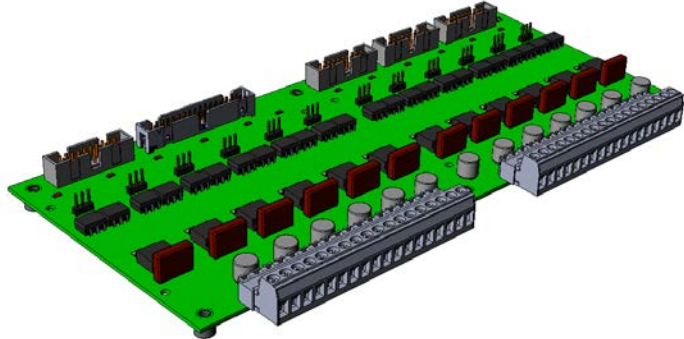
P/N	Outputs		Type	Rating
TE2551-6	6	Synergy Nano	SSR	90-240VAC, 2 Amps
TE1708-6	6	Synergy Nano	Relays	90-240VAC, 6 Amps
TE2242-20	6	Synergy Nano	Open Collector	24VDC Max, 25 mA

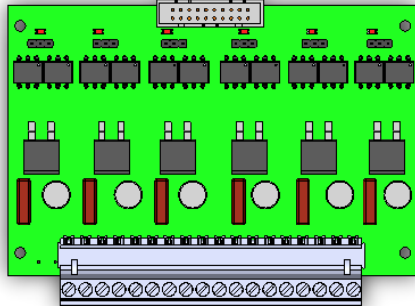
P/N	Outputs		Type	Rating
TE2551-12S	30	Synergy Nano 2	SSR	90-240VAC, 2 Amps

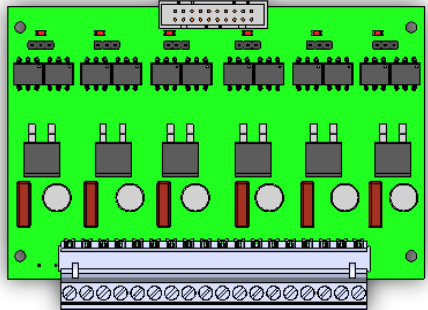
With the P/N TE2551-12S Synergy Super Switching Module, the Synergy Nano 2 is expanded to handle up to 30 Outputs using Tenney legacy style outputs boards as shown below.

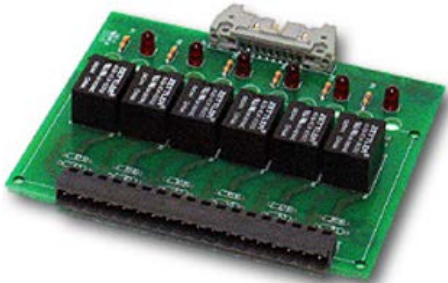


Appendix A Output Board Specifications

Parameter	Value	TE2551-12S
Part Number	TE2551-12S Super Switching Module*	
Outputs	12	
Current	3 Ampere AC	
Voltage	90 - 220 VAC	
Special Features	Individually Fused with socketed spare. Each output can also drive an external Triac for larger loads. See Appendix A	
Special Features	J2 and J3 drive 6-Channel output boards *This board expands Synergy Nano 2 controllers to 30 Outputs.	

Parameter	Value	TE2551-6S
Part Number	TE2551-6S	
Outputs	6	
Current	3 Ampere AC	
Voltage	90 - 220 VAC	
Special Features	Individually Fused with socketed spare. Each output can also drive an external Triac for larger loads. See Appendix A	
Special Features		

Parameter	Value	TE2551-6
Part Number	TE2551-6	 <p>The image shows the TE2551-6 Synergy Controller PCB. It is a green printed circuit board with six relays arranged in a single row. Each relay has a silver-colored terminal block on top and a red terminal block on the bottom. A multi-pin connector is located at the top center of the board.</p>
Outputs	6	
Current	3 Ampere AC	
Voltage	90 - 220 VAC	
Special Features	Individually Fused with socketed spare See Appendix A	
Special Features		

Parameter	Value	TE1708-6
Part Number	TE1708-6	 <p>The image shows the TE1708-6 Synergy Controller PCB. It is a green printed circuit board with six relays arranged in a single row. Each relay has a silver-colored terminal block on top and a red terminal block on the bottom. A multi-pin connector is located at the top center of the board.</p>
Outputs	6	
Current	6 Ampere AC	
Voltage	90 - 220 VAC	
Special Features	PCB locations are available on the Normally Open (N.O.) Contact of each relay for an RC Snubber.	

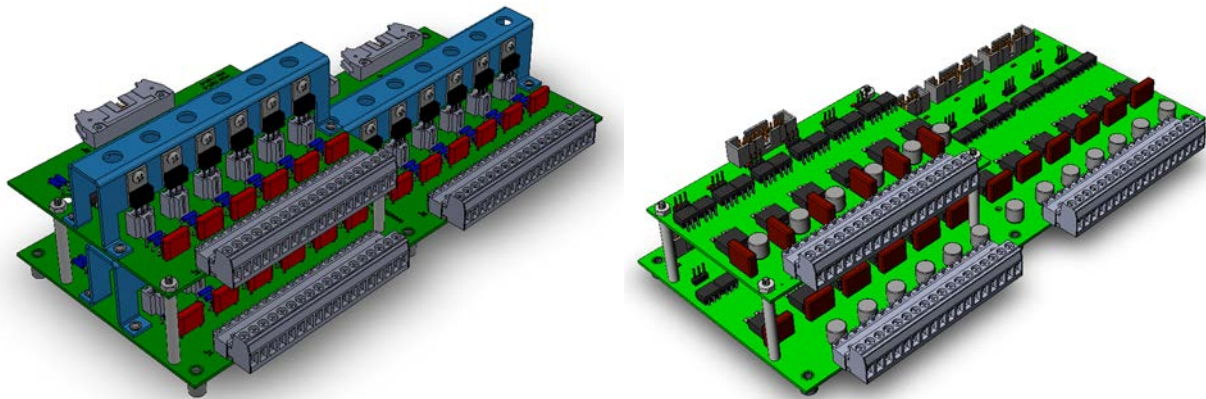
Part Number	TE2242-20																																																		
Outputs	6																																																		
Current	Open Collector, 50 mA max.																																																		
Voltage	24 VDC max																																																		
Special Features	<table border="1"> <thead> <tr> <th colspan="10">Tidal Engineering Corporation P/N TE2242-20</th> </tr> <tr> <th>1</th> <th>3</th> <th>5</th> <th>7</th> <th>9</th> <th>11</th> <th>13</th> <th>15</th> <th>17</th> <th>19</th> </tr> </thead> <tbody> <tr> <td>OUT 1</td> <td>OUT 2</td> <td>OUT 3</td> <td>OUT 4</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>+5V</td> <td>+5V</td> </tr> <tr> <th>2</th> <th>4</th> <th>6</th> <th>8</th> <th>10</th> <th>12</th> <th>14</th> <th>16</th> <th>18</th> <th>20</th> </tr> <tr> <td>OUT 5</td> <td>OUT 6</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>N/C</td> <td>+5V</td> <td>+5V</td> </tr> </tbody> </table>	Tidal Engineering Corporation P/N TE2242-20										1	3	5	7	9	11	13	15	17	19	OUT 1	OUT 2	OUT 3	OUT 4	N/C	N/C	N/C	N/C	+5V	+5V	2	4	6	8	10	12	14	16	18	20	OUT 5	OUT 6	N/C	N/C	N/C	N/C	N/C	N/C	+5V	+5V
Tidal Engineering Corporation P/N TE2242-20																																																			
1	3	5	7	9	11	13	15	17	19																																										
OUT 1	OUT 2	OUT 3	OUT 4	N/C	N/C	N/C	N/C	+5V	+5V																																										
2	4	6	8	10	12	14	16	18	20																																										
OUT 5	OUT 6	N/C	N/C	N/C	N/C	N/C	N/C	+5V	+5V																																										



Appendix B Next Generation, TE2551-x Switching Module Family (Tenney Compatible)

Part Numbers: TE2551-12S, TE2551-6S, TE2551-12, TE2551-6.

1. These boards are mechanically interchangeable with the legacy switching module family (on the left below).



2. Socketed output fuses (see specification below) protect the circuit traces on all channels. A spare fuse is provided for both 12 and 6 channel units.

Fuse Specifications:

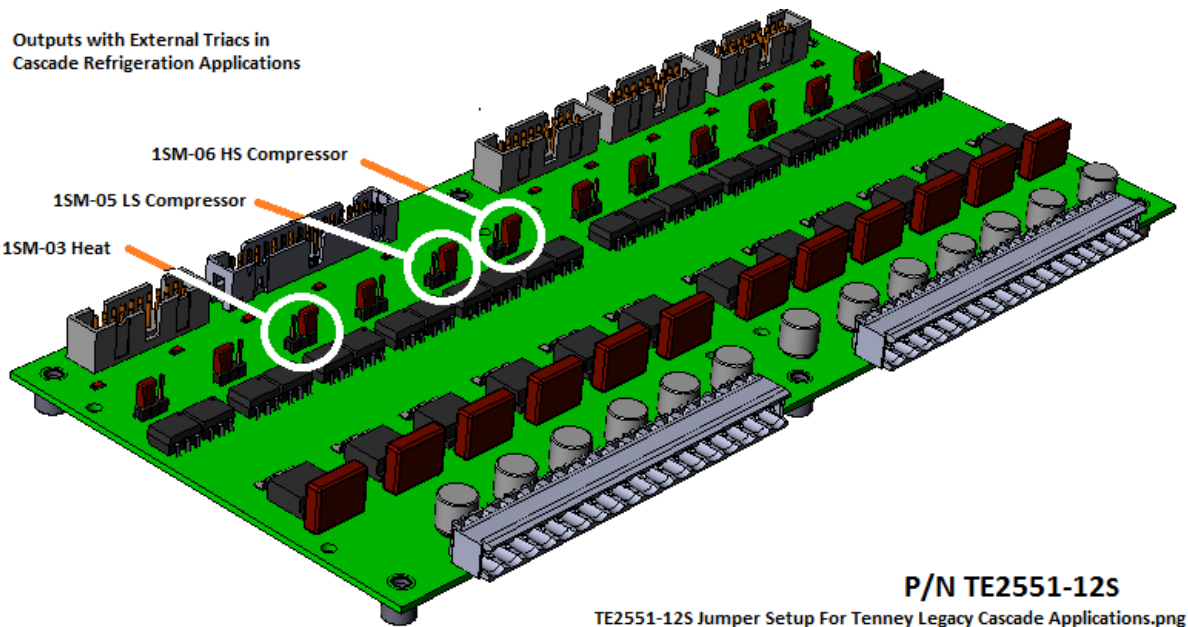
Manufacturer:	Schurter Inc.
Part Number:	0034.6620
Description:	Board Mounted Fuse, 3.15A, 250VAC 125VDC, Slow Blow
Approvals:	CCC, cURus, KC, PSE/JET, VDE

4. The TE2551-12S and TE2551-6S models can drive external triacs like the original TE1151 family switching modules. These “S” versions are required for some Tenney retrofit applications, specifically, in Tenney legacy applications that use high current triacs to control large loads including Heaters and Compressors.

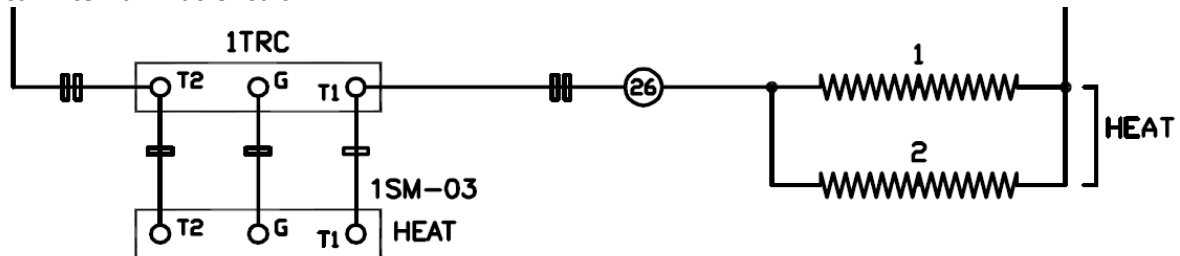
In these legacy applications, with the legacy switching modules, the installer/OEM was required to remove the on-board triac for the specific TE1151-12 and TE1151-6 channels driving these external triacs.

With the new TE2551-12S and TE2551-6S triac boards, a jumper is switched between the On Board Triac (OBT) and External Triac position as shown below.

Note that the TE2551-12 and TE2551-6 switching modules will not drive external triacs.



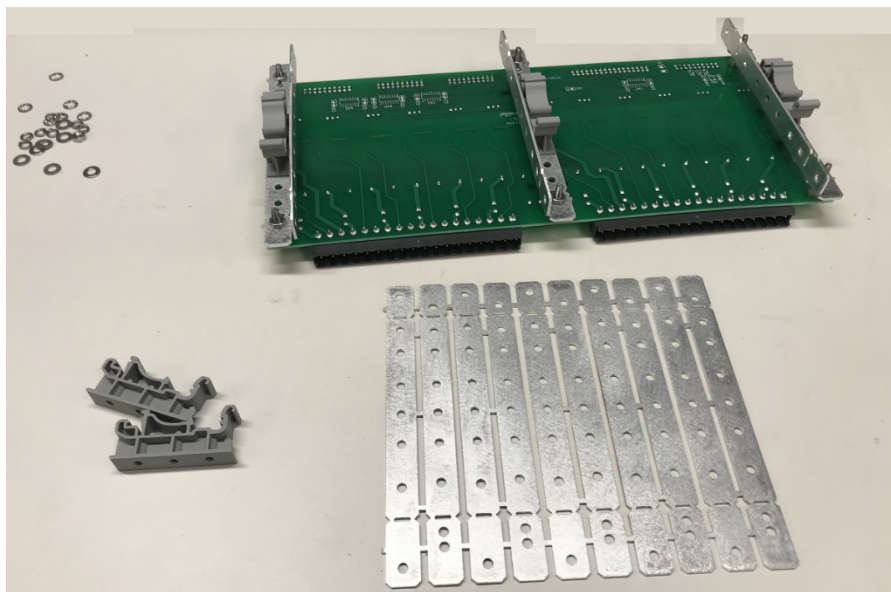
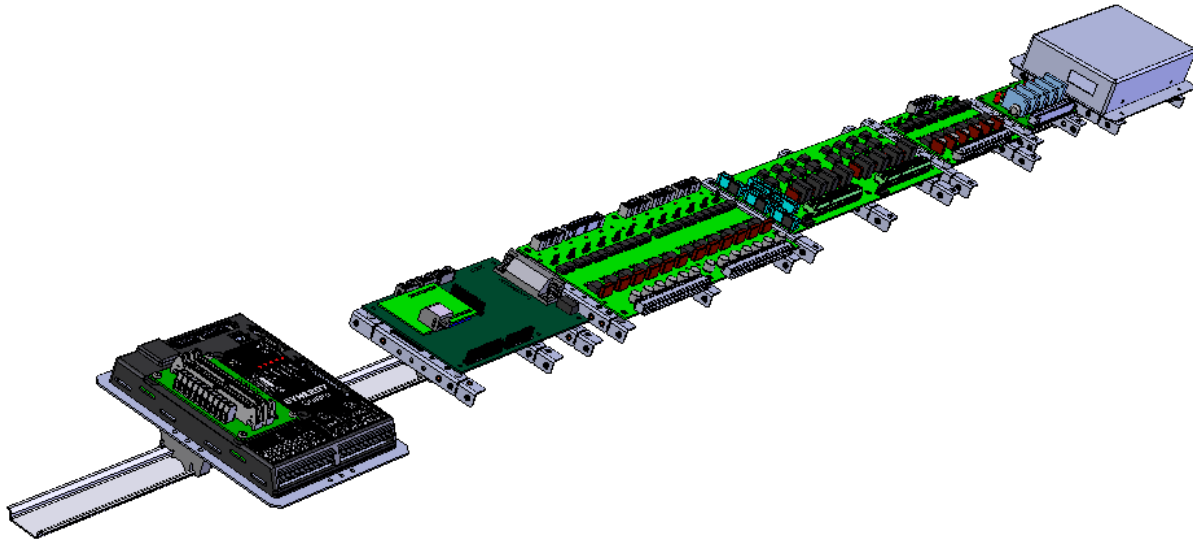
Typical External Triac Circuit



Appendix C Synergy Controller DIN Rail Mounting System

Part Number: TE2419

The DIN rail mounting system is designed to handle all Synergy Controller Output boards as well as the Grayhill 70L Output Rack systems. The kit includes ten DIN Rail brackets and required hardware.





About the Synergy Controller Family

Tidal Engineering's Synergy Controllers, both the Synergy Micro 2, Synergy Quattro, and the 1/4 DIN Synergy Nano provide state-of-the-art usability and connectivity for environmental test control and data acquisition and combine the functions of a chamber controller and a data logger. These controllers are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards.

Synergy Controller feature highlights includes:

- ➔ Color touch screen
- ➔ Ethernet, RS-232 and GPIB communications
- ➔ Built in 100 MB Data logger with USB drive support
- ➔ Data Acquisition, up to 64 T-type thermocouples (Optional)
- ➔ Built-in Web Server for remote control; WebTouch Remote™
- ➔ Compatible with Synergy Manager for PC based control, monitoring and programming.
- ➔ Built-in FTP Server for factory automation and test and measurement applications

For more information regarding these controllers please see the full Synergy Controller Technical Manual on our website at <http://www.tidaleng.com/synergy.htm>

About Tidal Engineering

Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award-winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA (Supervisory Control and Data Acquisition) systems.

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