

## Synergy Controller Analog Retransmit Applications



### Circular Chart Recorder and Proportional Control Valves

#### Introduction

Each Synergy Controller model including Synergy Nano, Synergy Quattro, and Synergy Micro 2 incorporates two analog outputs called Analog Retransmit 1 and Analog Retransmit 2 that can drive various process and control parameters. These outputs can be graphed on a chart recorder, transmitted to other systems including PLCs and data acquisition systems, or used to control proportional valves for steam heat, chilled water, cooling dampers, or proportional valves for Vacuum and Vent for Altitude chambers.

Since the circular chart recorders are often purchased with environmental test chambers, they are probably the most commonplace application for analog outputs. Chart recorders can plot chamber data such as temperature, humidity, and pressure over time and provide a hardcopy record.

Note that the Synergy Controller's built-in logging and network plotting features (See application note 90) are making circular chart recorders obsolete.

This application note provides the typical wiring and setup procedures for chart recorders and control applications.

## Retransmit Setup for Chart Recorder Applications

To configure the analog retransmit outputs for a chart recorder, press the **Setup** button on the Synergy Controller and navigate to the Setup\Special Functions\Analog Retransmit 1 folder.

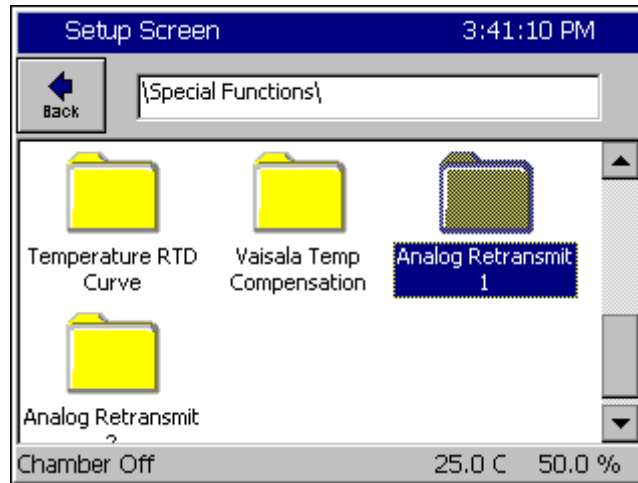


Figure 1 Analog Retransmit 1 Folder

Select the desired output variable and press the **Accept** button. Repeat this process for Analog Retransmit 2 if required.

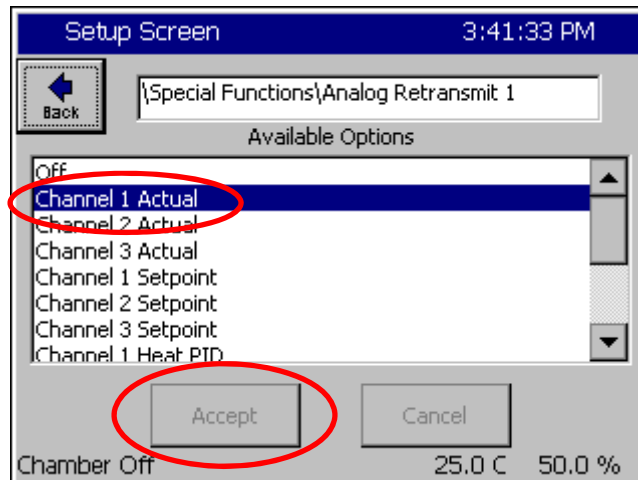
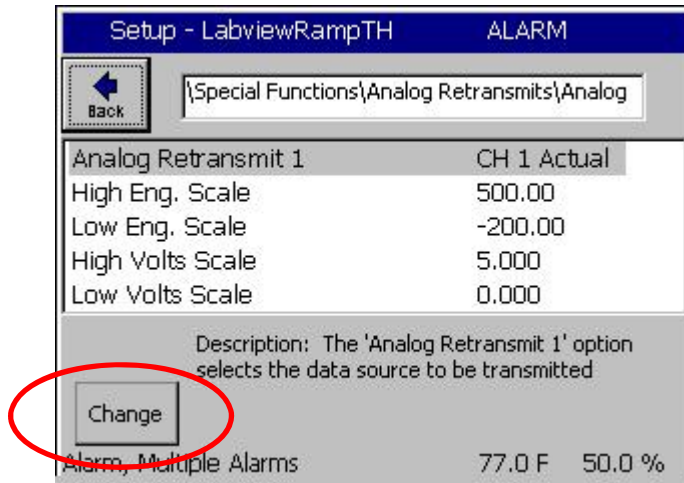


Figure 2 Data Output Selection

## Retransmit Output Scaling For Chart Recorders

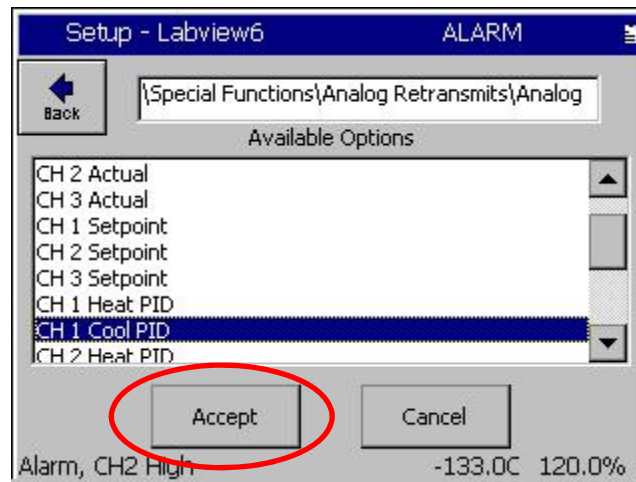
The analog retransmit outputs operate over the range of 0 to 5 Volts DC. The scaling to engineering units is programmable and can accommodate any chart recorder range. See screenshot below.



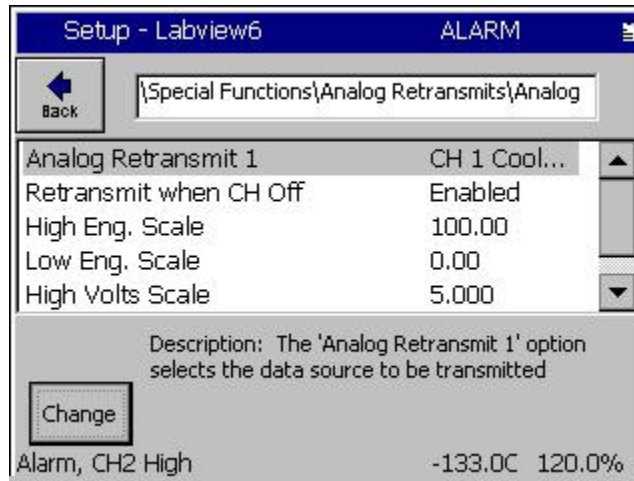
## Retransmit Application for Process Control Setup

As mentioned above, retransmitted PID control variable can be used to operate proportional valves including for heating, cooling, humidify, dehumidify, vent and vacuum.

To begin, select the parameter variable from the list and press **Accept**.



As mentioned above, the analog retransmit outputs are 0 to 5 Volts DC and they can be scaled to engineering units as required. For most control applications, the engineering scale is set to 0 to 100% and the voltage is 0 to 5.0 VDC.



## Analog Retransmit Wiring for Synergy Micro and Micro 2

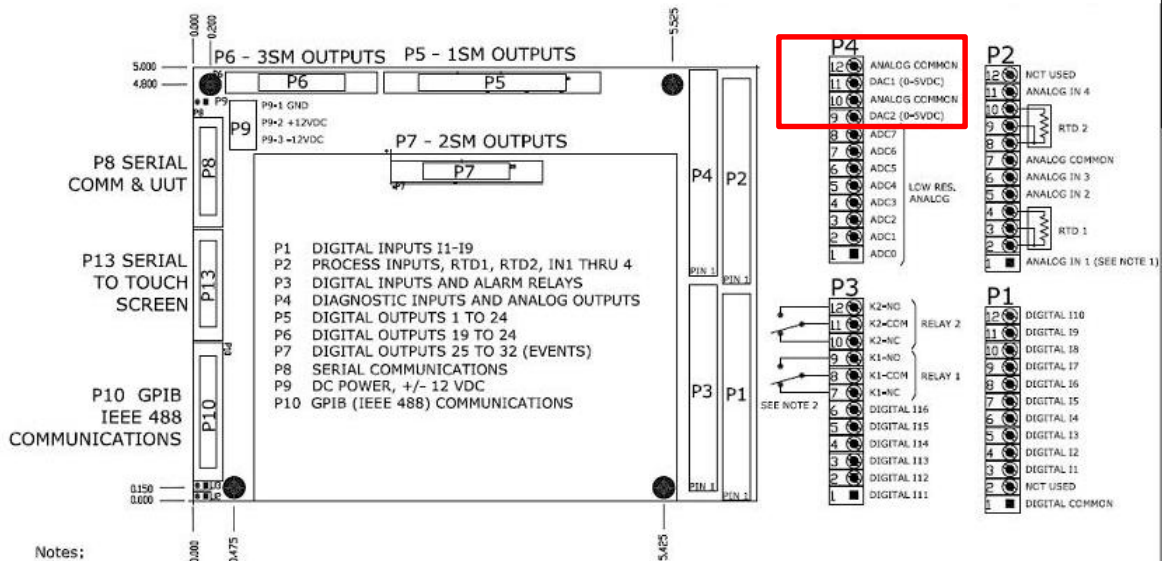
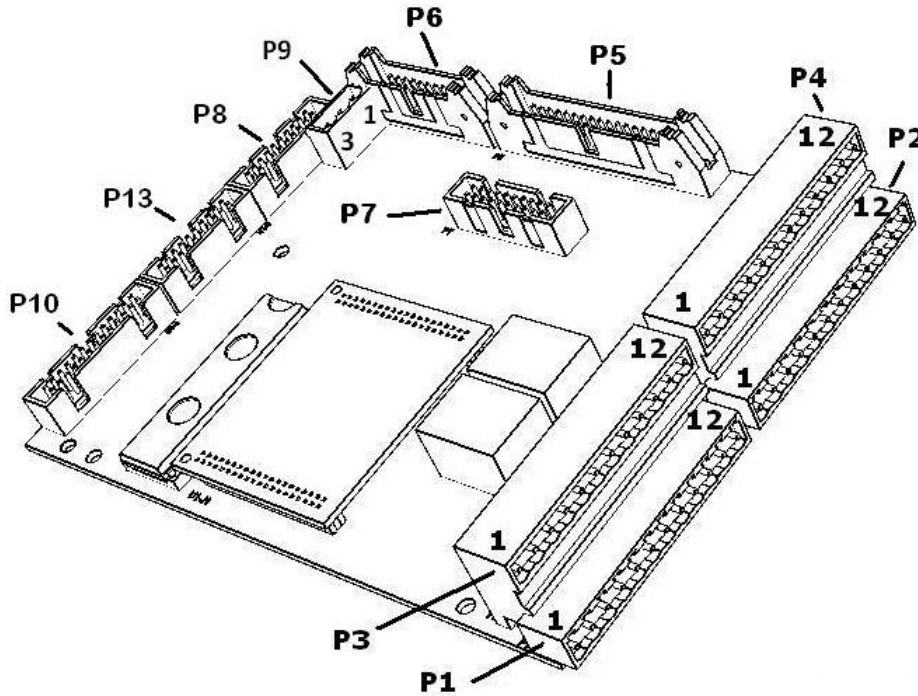
The following table shows the connector and pin numbers for the Synergy Micro's two analog retransmit outputs.

Signal	Connector & Pin Number
Analog Retransmit 1	P4-Pin 9
Return	P4-Pin 10
Analog Retransmit 2	P4-Pin 11
Return	P4-Pin 12

The figure on the following page can be used to identify the connector locations.

Note that the analog retransmit output voltages are accurate to within 0.2% with loads down to 1K ohms. The analog retransmit outputs can drive loads down to 200 ohms and maintain +/-0.5% accuracy.

revisions			
ltr	description	date	appr'd
C	CORRECTED DIGITAL I10 TO I16	11-FEB-10	CDB



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		SYNERGY CONTROLLER OLYMPIC PCB ASSY	
C. BORAX	sz	ident no.	drawing no. 1155
20 DEC 2006		scale 1:1	rev C
next assy used on application		sheet 1 of 1	

## Synergy Nano Connections

The following table shows the connector and pin numbers for the Synergy Nano's two analog retransmit outputs.

Signal	Connector & Pin Number
Analog Out 1	X3-Pin 9
Analog Common	X3-Pin 4
Analog Out 2	X3-Pin 10
Analog Common	X3-Pin 8

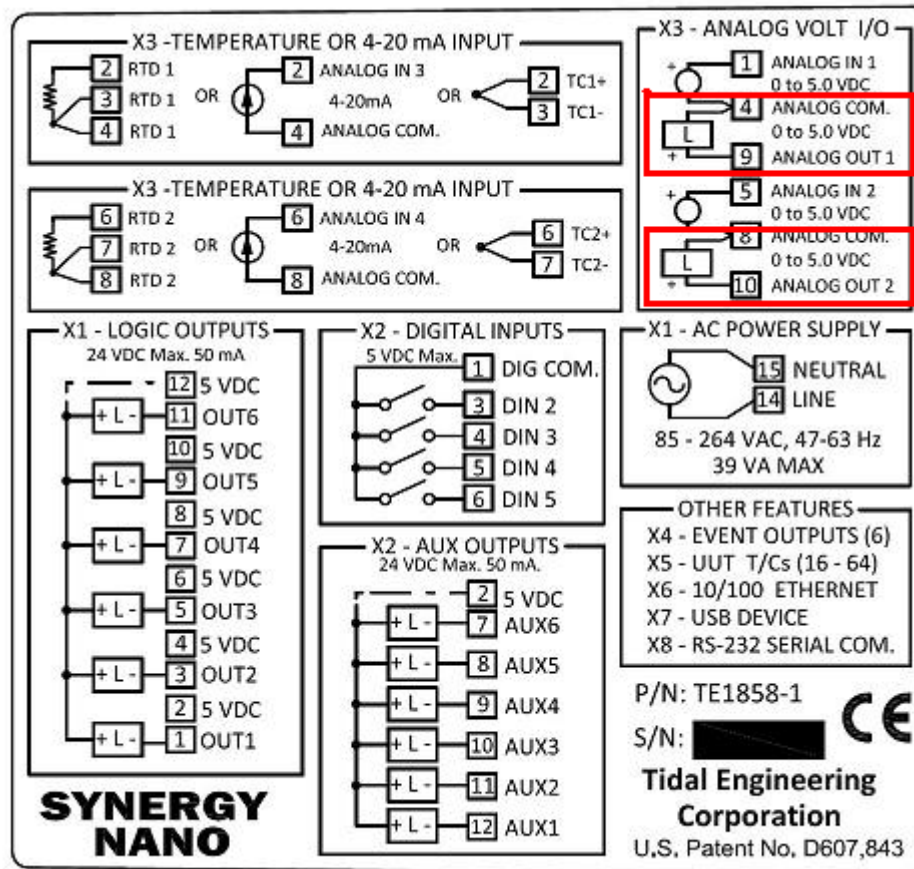
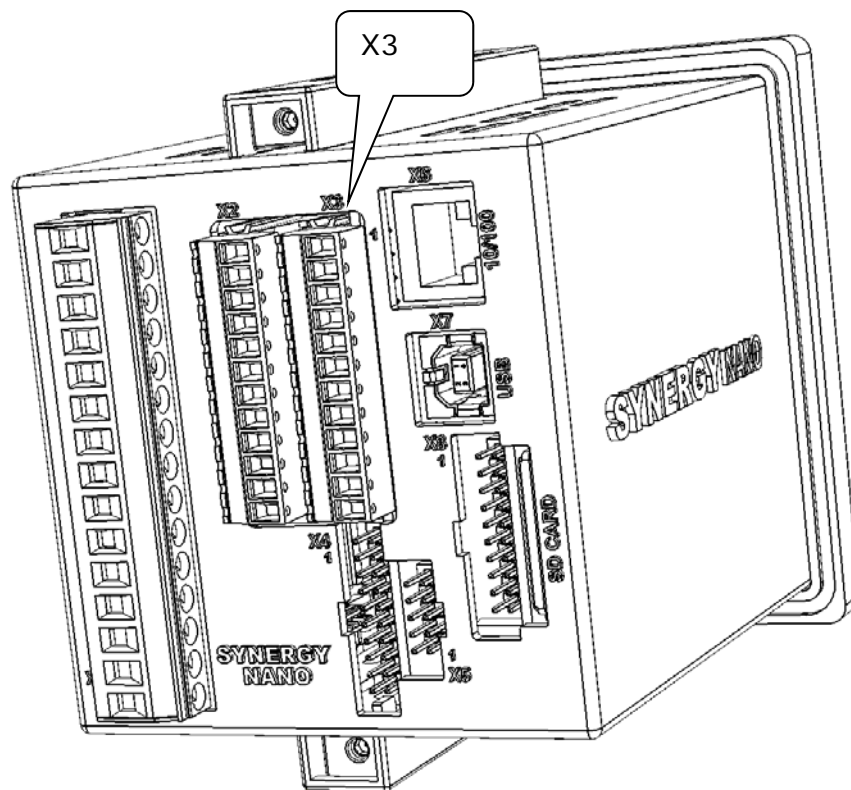


Figure 5 Synergy Nano Connections



The X3 connector is identified in the figure below.



## Synergy Controller Retransmit Signal Conditioner

For applications that require 4-20mA outputs, galvanic isolation, or other voltage or current levels, the TE1803 Signal Conditioner can provide a range of isolated output signals including: 0-10 V, 0-20 mA and 4-20 mA. TE1803 is DIN rail or side mountable with selectable input/output ranges. TE1803 provides 1500 VDC isolation and converts the Synergy Controller's retransmit signals from 5VDC Full Scale to 4-20 mA, 0-10 VDC or 0-5VDC. The TE2198 DIN rail mounted 24-volt power supply can be used to power the signal conditioner.

See "Synergy\_Controller\_App\_Note\_10\_Retransmit\_Signal\_Conditioner\_Rev\_A" for installation and setup instructions for the signal conditioner.



Figure 6 TE1803 Retransmit Signal Conditioner



## About the Synergy Controller Family

Tidal Engineering's Synergy Controllers, including the Synergy Micro 2, Synergy Quattro, and the ¼ 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. They 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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