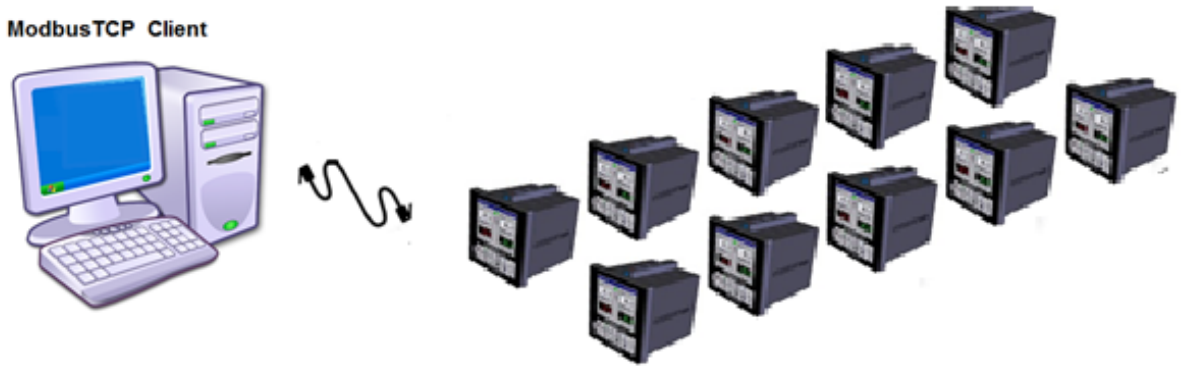
Synergy Controller ModbusTCP Server Feature

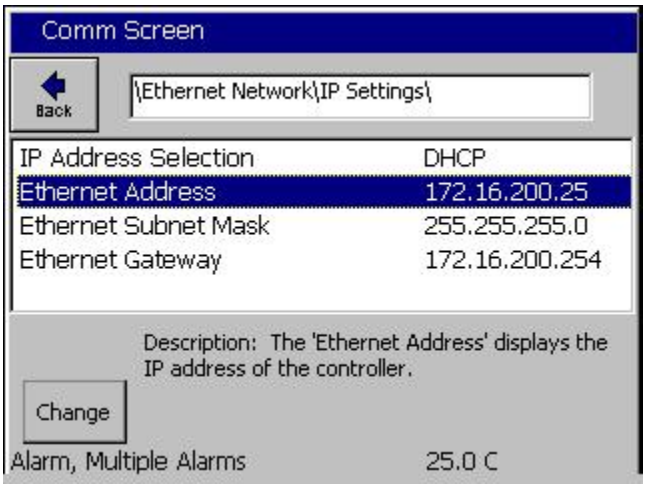


Introduction

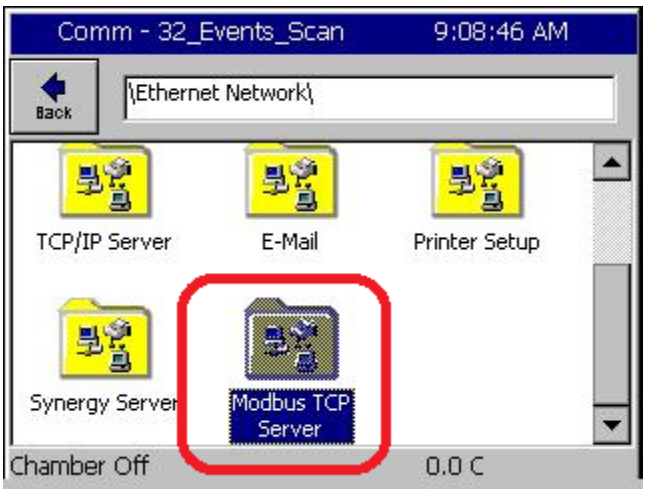
The legacy ASCII Communication Protocol supported in all prior Synergy Controller versions is now joined by the popular ModbusTCP Protocol in Software version 5.3.x.

This ubiquitous Industrial Protocol provides connectivity for applications like Ignition by Inductive Automation, and other SCADA systems that offer affordable plant wide Integration and Management. These enterprise SCADA integration systems are popular in Medical, Food. Automotive and Electronic Manufacturing environments.

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. They 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. Offering the flexibility of multiple communication ports including Ethernet, GPIB, and RS-232 make these controllers perfect for today's changing testing environments.

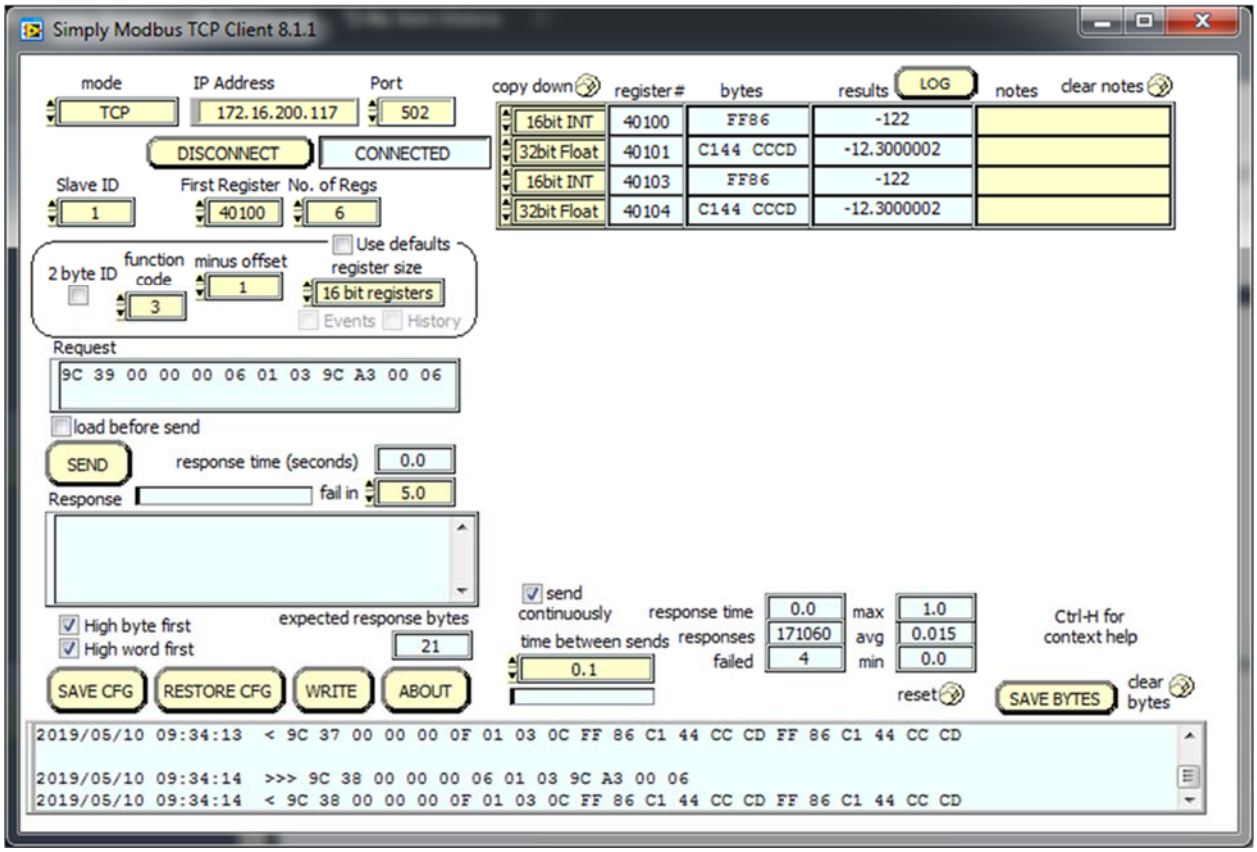


Connect all the Synergy Controllers with Ethernet cables and assign the TCPIP addresses either statically (preferred) or using DHCP. See the Synergy Controller IP Settings screen below:



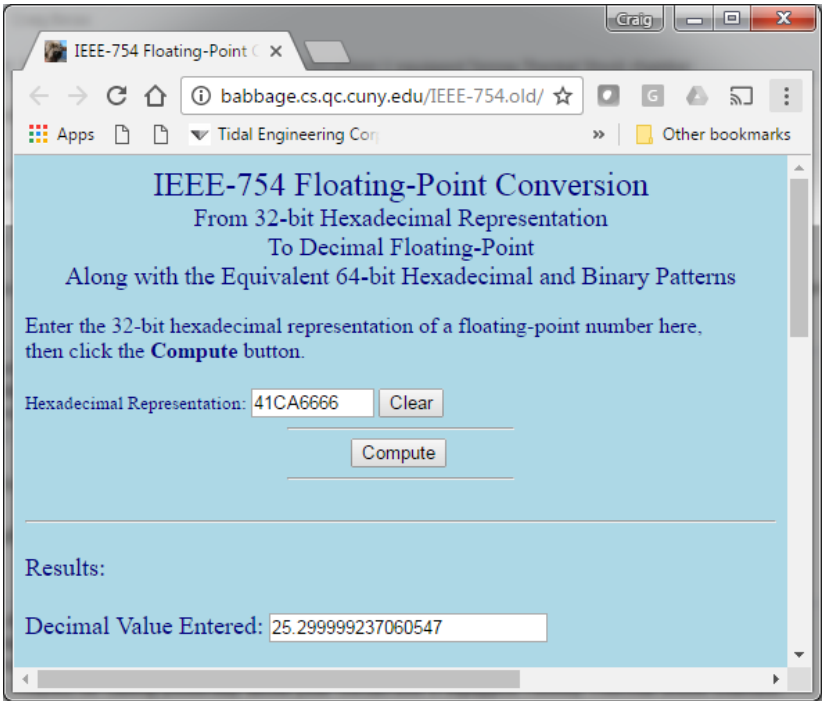
Browse to the ModbusTCP Server folder and enter the ModbusTCP Registration key.

The following screenshot shows the Modbus Register values for Channel 1



Appendix A - Converting 16 Bit Modbus Register Pairs to Floating Point Values

Most of the data points in the Synergy Controller ModbusTCP Gateway represent floating point values. In these cases, two 16-bit registers are combined into a 32-bit number that represents the floating point value in IEEE-754 Floating-Point format. See the Hexadecimal To Decimal Floating-Point conversion tool on the web here: http://babbage.cs.qc.cuny.edu/IEEE-754.old/32bit.html

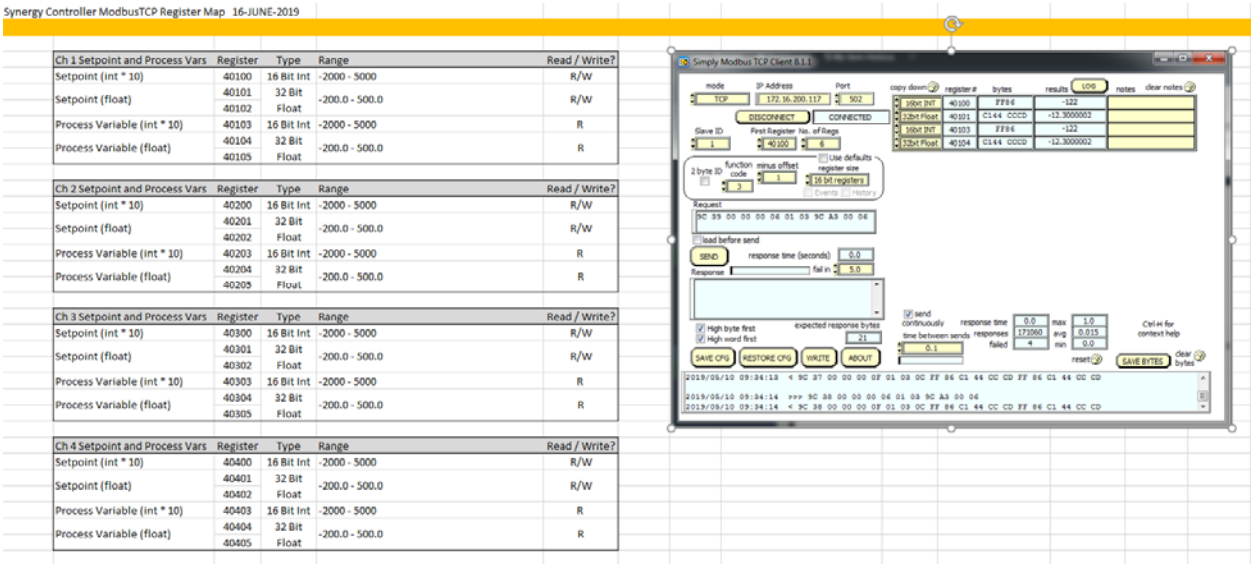


Appendix B – Synergy Controller ModbusTCP Gateway Register Map Description

The register map for the data for the Synergy Controller is available for download from the Tidal Engineering Website.

http://www.tidaleng.com/downloads/Synergy_Controller_ModbusTCP_Register_Map.pdf

The screenshot below shows an example of the Channel 1 PV and SP register mapping.



Synergy Controller ModbusTCP Register Map 16-JUNE-2019

Ch 1 Setpoint and Process Vars	Register	Type	Range	Read / Write?
Setpoint (int * 10)	40100	16 Bit Int	-2000 - 5000	R/W
Setpoint (float)	40101	32 Bit	-200.0 - 500.0	R/W
	40102	Float		
Process Variable (int * 10)	40103	16 Bit Int	-2000 - 5000	R
Process Variable (float)	40104	32 Bit	-200.0 - 500.0	R
	40105	Float		

Ch 2 Setpoint and Process Vars	Register	Type	Range	Read / Write?
Setpoint (int * 10)	40200	16 Bit Int	-2000 - 5000	R/W
Setpoint (float)	40201	32 Bit	-200.0 - 500.0	R/W
	40202	Float		
Process Variable (int * 10)	40203	16 Bit Int	-2000 - 5000	R
Process Variable (float)	40204	32 Bit	-200.0 - 500.0	R
	40205	Float		

Ch 3 Setpoint and Process Vars	Register	Type	Range	Read / Write?
Setpoint (int * 10)	40300	16 Bit Int	-2000 - 5000	R/W
Setpoint (float)	40301	32 Bit	-200.0 - 500.0	R/W
	40302	Float		
Process Variable (int * 10)	40303	16 Bit Int	-2000 - 5000	R
Process Variable (float)	40304	32 Bit	-200.0 - 500.0	R
	40305	Float		

Ch 4 Setpoint and Process Vars	Register	Type	Range	Read / Write?
Setpoint (int * 10)	40400	16 Bit Int	-2000 - 5000	R/W
Setpoint (float)	40401	32 Bit	-200.0 - 500.0	R/W
	40402	Float		
Process Variable (int * 10)	40403	16 Bit Int	-2000 - 5000	R
Process Variable (float)	40404	32 Bit	-200.0 - 500.0	R
	40405	Float		

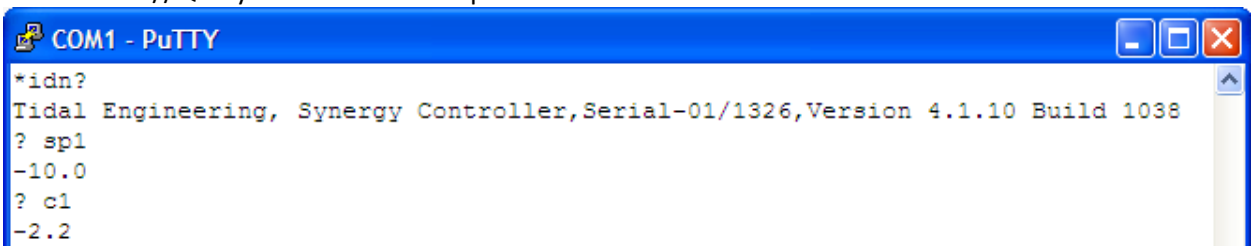
Appendix C - Frequently used Synergy Controller commands (Reference Only)

Setpoints and Process Variable Commands	**Syntax**	**Example**	**Response**
Query Channel Process Variable	? Cn where n is the channel	? C1	25.0
Query Temperature (Chan.1)	? C1	? C1	25.0
Query Humidity (Chan.2)	? C2	? C2	50.0
Set Temperature Setpoint (Chan.1)	= SP1 n	= SP1 25.0	OK
Query Temperature Setpoint (Chan.1)	? SP1	? SP1	25.0
Set Humidity Setpoint (Chan. Chan.2)	= SP2 n	= SP2 50.0	OK
Query Humidity Setpoint (Channel 2)	? SP2	? SP2	50.0
On/Off Commands	**Syntax**	**Example**	**Response**
Turn Chamber ON	= ON	= ON	OK
Query Chamber ON state	? ON	? ON	0 or 1
Turn Chamber OFF	= OFF	= OFF	OK
Event Output Commands	**Syntax**	**Example**	**Response**
Set Event Output n ON	= EVENTS n, 1	= EVENTS 1, 1	OK
Set Event Output n OFF	= EVENTS n, 0	= EVENTS 1, 0	OK
Query State of Event Outputs	? EVENTS	? EVENTS	00FF0003
Program Commands	**Syntax**	**Example**	**Response**
Query Program State	? RUN PROFILE_STATE		
Load a Program	= FILEOPEN 1 “program-name”	= FILEOPEN 1 "Product1"	OK
Start a Program	= RUN	= RUN	OK
Start a Program at a specific line	= RUNFROM n	= RUNFROM 2	OK
Query Program state	? RUN 1= Run, 2 = Pause, 3 = Steady State	? RUN	1
Alarm Commands	**Syntax**	**Example**	**Response**
Check Status of Alarms	? ALM	? ALM	1,0,00000800
Acknowledge Alarms	= ACKALM	= ACKALM	OK

For a complete list of controller commands download a technical manual from tidaleng.com/synergy.htm

The screenshot below shows the following queries:

*idn? //Query for Controller ID
? sp1 //Query for Channel 1 Setpoint
? c1 //Query for Channel 1 temperature



About the Synergy Family

Tidal Engineering's Synergy Controllers, the ¼ DIN Synergy Nano, Synergy Micro 2 and the Synergy Quattro provide state-of-the-art usability and connectivity for environmental test control and data acquisition. They combine the functions of a chamber controller and a data logger and 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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