

Synergy Watchdog Timers



The Synergy Controller includes GPIB, Ethernet and serial communication ports. These three options provide support for virtually all test environments. Synergy Controller commands are available for programming, monitoring and control thru these ports.

The Synergy watchdog timers can be used to protect against product and/or test chamber damage due to communications failure by detecting a communications drop out and providing the user with several response options.

The Synergy Watchdog Timer (SWAT) can detect a break in communications due to hardware conditions such as a cable failure or disconnection, network failure, monitoring equipment hardware/software failure or a controller failure. The controller provides several timeout response options including network reset, chamber shutdown, and chamber set points. Additional responses can be programmed thru the user alarm system including the generation of a log file entry, chamber control, and alarm relay activation.

This application note describes the features and use of the SWAT watchdog timer and provides examples.

Watchdog Timer Setup

Each communication port can have its own watchdog timer. Each watchdog timer is enabled with the "WDTIMER" command. The command takes three parameters; the communication port, the time out delay in seconds, and the timeout response. The command syntax is:

= WDTIMER [**Communication Port**] [**Timeout Delay**] [**Response**].

Communication Port can be any of the following:

- 0 – All communication ports are monitored, any activity resets this timer
- 1 – RS-232 port is monitored, only activity on this port resets this timer
- 2 – RS-485 port is monitored, only activity on this port resets this timer
- 3 – GPIB port is monitored, only activity on this port resets this timer
- 4 – TCP/IP (Ethernet) port is monitored, only activity on this port resets this timer.

Timeout Delay is in seconds. A value of 0 seconds disables the watchdog timer. The watchdog Timeout Delay value can be up to 604800 seconds (1 week). If no communications are detected within this time period, the specified response is triggered. The watchdog timer will not reset and another watchdog timeout will not occur until after the next message is received in the port.

Response can be any of the options listed below. If more than one action is desired, the numbers are added together, and the resulting sum is passed as the action parameter. The possible responses are:

- 0 – No Action. Note that a User Alarm can still be programmed to act on the Watchdog timeout if this Response parameter is set to 0.
- 1 – Stop the Chamber. This choice will immediately turn off all outputs when a watchdog timeout occurs, regardless of the current set points or whether the controller is running a profile or in steady state operation.
- 2 – Reset Communications port. For TCP/IP communications, when this response is triggered the TCP/IP server is disabled and re-enabled.
- 4 – Watchdog setpoints are loaded for all channel. When this response is triggered, any currently running profile will stop and all the channel set points are load with the WDsetpoints values. This is useful if an external program is driving the chamber through a series of setpoint commands, and communications are lost between the Synergy controller and the remote software. This will ensure the chamber is returned to safe levels for the equipment inside.

Examples:

= WDTIMER 0 60 1

Enable the watchdog timer on all communication ports, with a 60 second timeout, and stop the chamber if a timeout occurs.

= WDTIMER 4 60 2

Enable the watchdog timer on the TCP/IP Ethernet port, and reset the TCP/IP Ethernet server if 60 seconds passes without any communications.

= WDTIMER 4 60 6

Enable the watchdog timer on TCP/IP Ethernet port, and reset the TCP/IP Ethernet server, and load the WDSSETPOINTS.

WDTIMER Query

This watchdog timer query is used to obtain the controllers watchdog timer settings as follows:

? WDTIMER [**Communication Port**]

Communication Port can be any of the following:

- 0 – All communication ports are monitored
- 1 – RS-232 port is monitored.
- 2 – RS-485 port is monitored.
- 3 – GPIB (IEEE 488) port is monitored.
- 4 – TCP/IP (Ethernet) port is monitored.

Response

[**Communication Port**] [**Timeout**] [**Response**] [**Current Timer Value**].

For example:

After the watchdog timer is set as follows: = WDTIMER 0 60 1

The query “? WDTIMER 0” generates the following response:

“0 60 1 x” where x is the running value of this watchdog timer in seconds. A value of “x” greater than the timer setting indicates that this watchdog timer has been triggered.

Disabling the a Watchdog Timer

To disable a watchdog timer, send the command with the appropriate Communication Port with a 0 (zero) timeout parameter.

Example:

```
= WDTIMER 4 0 0
```

This example disables the watchdog timer on the Ethernet TCP/IP Communication Port:

Setting the SetPoints for a Watchdog Timer

The = WASETPOINTS command is used to set the timeout setpoints for the Watchdog Timer the command. The WASETPOINTS command takes four parameters, the setpoints for Channel 1, Channel 2, Channel 3 and Channel 4. For unused channels, a 0 is sent for the setpoint value. These setpoint values are used when the "Goto preset channel setpoints" option is specified as part of the watchdog timer response.

The syntax for the WASETPOINTS command is:

```
= WASETPOINTS [CH1 SP] [CH2 SP] [CH3 SP] [CH4 SP]
```

The default is CH1=25, CH2=25, CH3=25, CH4=25

Example:

```
= WASETPOINTS 25.5 50 0 0
```

The CH1 and CH2 Setpoints are set to 25.5 and 50 %RH when a watchdog is triggered(assuming a Temp/Humidity chamber):

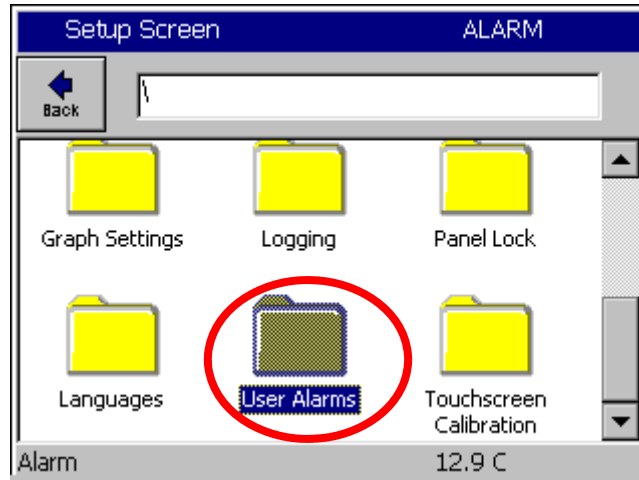
? WASETPOINTS query response for this example is 25.5,50,0,0.0,0.0

If a communication timeout occurs and the Go to Preset Channel Setpoints response (action 4) is specified in the WDTIMER command, then the controller Channel 1 and Channel 2 setpoints will be changed to 25C and 50% RH respectively. The controller setpoints can be changed using the touch screen as soon as communications are restored.

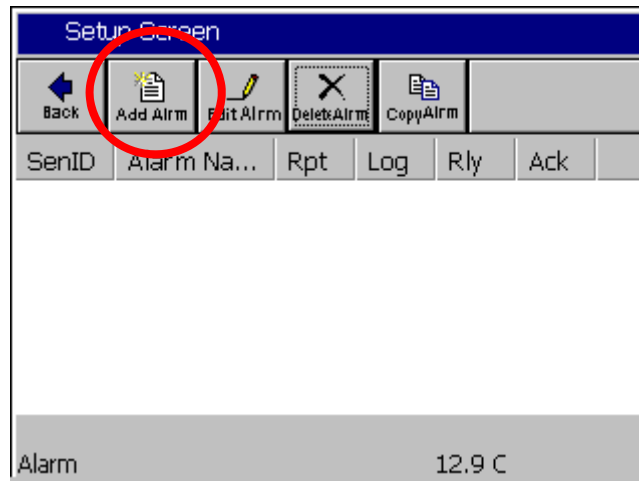
Triggering User Alarms with Watchdog Timers

Watchdog timers can be used trigger User Alarms. A brief example of the User Alarm screen is described below. (Note: Additional information regarding the User Alarm feature is available in the Synergy Controller technical manual.) User Alarms operate in addition to any response programmed for the alarm in the WDTIMER command. User alarms can be setup to generate an entry in the log file, alert the user, stop the chamber, or trigger an alarm relay. Any action allowed through the User Alarms system can be triggered when a Watchdog Timeout occurs.

To define a user alarm for a Watch Dog Timer, open the Setup Screen and press the User Alarms folder.



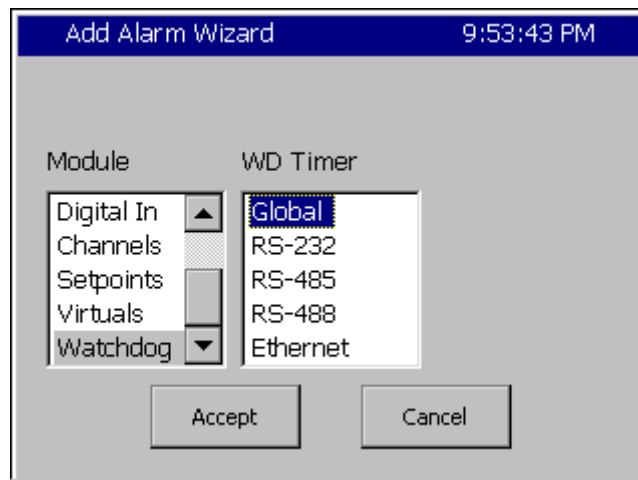
Press the Add Alarm button.



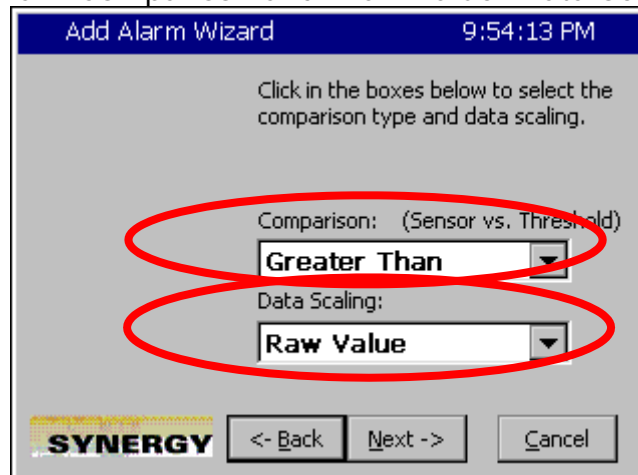
Press the Sensor box to open Sensor selection screen and select Watchdog at the bottom of the Module list.



The communication ports are shown in the WD Timer list. Select the appropriate port and press Accept.



Select the "Greater Than" Comparison and "Raw Value" Data Scaling as shown below:



Enter 1.0 in the Alarm Threshold text box.

The screenshot shows the 'Add Alarm Wizard' interface. At the top, it says 'Add Alarm Wizard'. Below that, it instructs the user to 'Click in the box below to enter the alarm threshold.' There is a text input field labeled 'Alarm Threshold:' containing the value '1.0'. At the bottom, there is a 'SYNERGY' logo and three buttons: '<- Back', 'Next ->', and 'Cancel'.

Enter the Alarm text for the log file entry and the Alarm Screen.

The screenshot shows the 'Add Alarm Wizard' interface. At the top, it says 'Add Alarm Wizard' and the time '9:54:37 PM'. Below that, it instructs the user to 'Click in the box below to enter the string that will be displayed when an alarm is active, as well as logged into the history (if selected next step).' There is a text input field labeled 'Alarm:' containing the text 'watchdog'. At the bottom, there is a 'SYNERGY' logo and three buttons: '<- Back', 'Next ->', and 'Cancel'.

Check the desired alarm actions:

The screenshot shows the 'Add Alarm Wizard' interface. At the top, it says 'Add Alarm Wizard' and the time '9:54:46 PM'. Below that, it instructs the user to 'Click the actions below that you want to occur when the alarm is triggered.' There are four checkboxes: 'Show Alarm' (checked), 'Log Alarm' (checked), 'Disable Chamber' (unchecked), and 'Activate Relay 1' (unchecked). There are also two more checkboxes: 'Activate Relay 2' (unchecked). At the bottom, there is a 'SYNERGY' logo and three buttons: '<- Back', 'Next ->', and 'Cancel'.

Then press Next-> to finish the Add Alarm Wizard.

After programming the User Alarm as described above, create one or more watchdog timers with the following command:

```
= WDTIMER 4 60 6  
= WASETPOINTS 25.5 50 0 0
```

When a communication timeout occurs on the TCP/IP Ethernet port, the Synergy Controller will respond as follows:

Watchdog Response

1. Reset the TCP/IP Server
2. Change the Channel 1 and Channel 2 setpoints to 25.5 C and 50% respectively.

User Alarm Response

1. Create a "watchdog" entry in the log file.
2. "Alarm" message blinks in the upper right hand corner of the touch screen.

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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