



APPLICATION NOTE: TCS Alarm Trigger Configuration

APN-1009

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Summary

This application note addresses the operation and settings related to the alarm trigger function in TCS.

Background

TCS Triggers allow the user to configure automated recording and alarm functions based upon user-established trigger conditions. Useful examples include threshold recording (where a recording starts after a threshold value is reached or exceeded), or setting off an alarm if a channel goes outside of an expected range. TCS Triggers are defined using a familiar combination of mathematical, conditional and logical expressions to establish triggering behavior; these can be applied to any channel or group of channels.

TCS Triggers are created in the Recording and Triggers screen in TCS using function key F5 (“Add TCS Trigger”). When this option is selected, the user is presented with window as shown in Figure 1. The window provides for defining trigger expressions, selecting trigger event types, specifying time parameters (optional), and selecting alarm indicators:

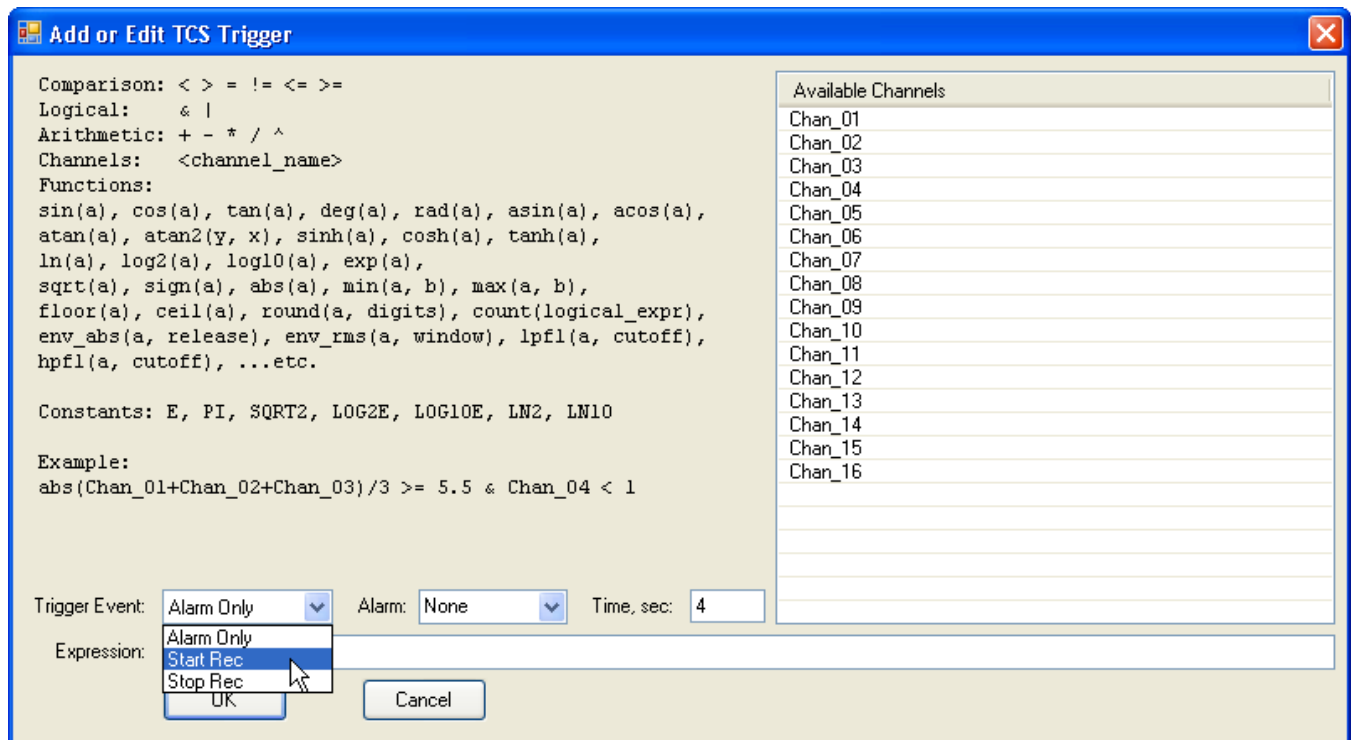


Figure 1 – The Trigger Window in TCS

Although Start Recording, Stop Recording and Alarm Only trigger functions are all specified here, this application note will focus solely on Alarm Only functions. For a description of TCS Triggers covering Start/Stop Recording functions, please consult the TCS User Manual.

NOTE: It is important to understand that the processing of TCS Triggers is performed by TCS for **local** scanning and recording only, and does not apply to **remote** (standalone) operation.

Configuring the TCS Toolbar Alarm

TCS features a visual Toolbar Alarm indicator that appears in the upper right corner of the main TCS window. To configure the Toolbar Alarm in TCS, select F5 to bring up the 'Add or Edit TCS Trigger' screen. Select 'Alarm Only' from the Trigger Event dropdown, and then select 'Toolbar' from the Alarm dropdown:

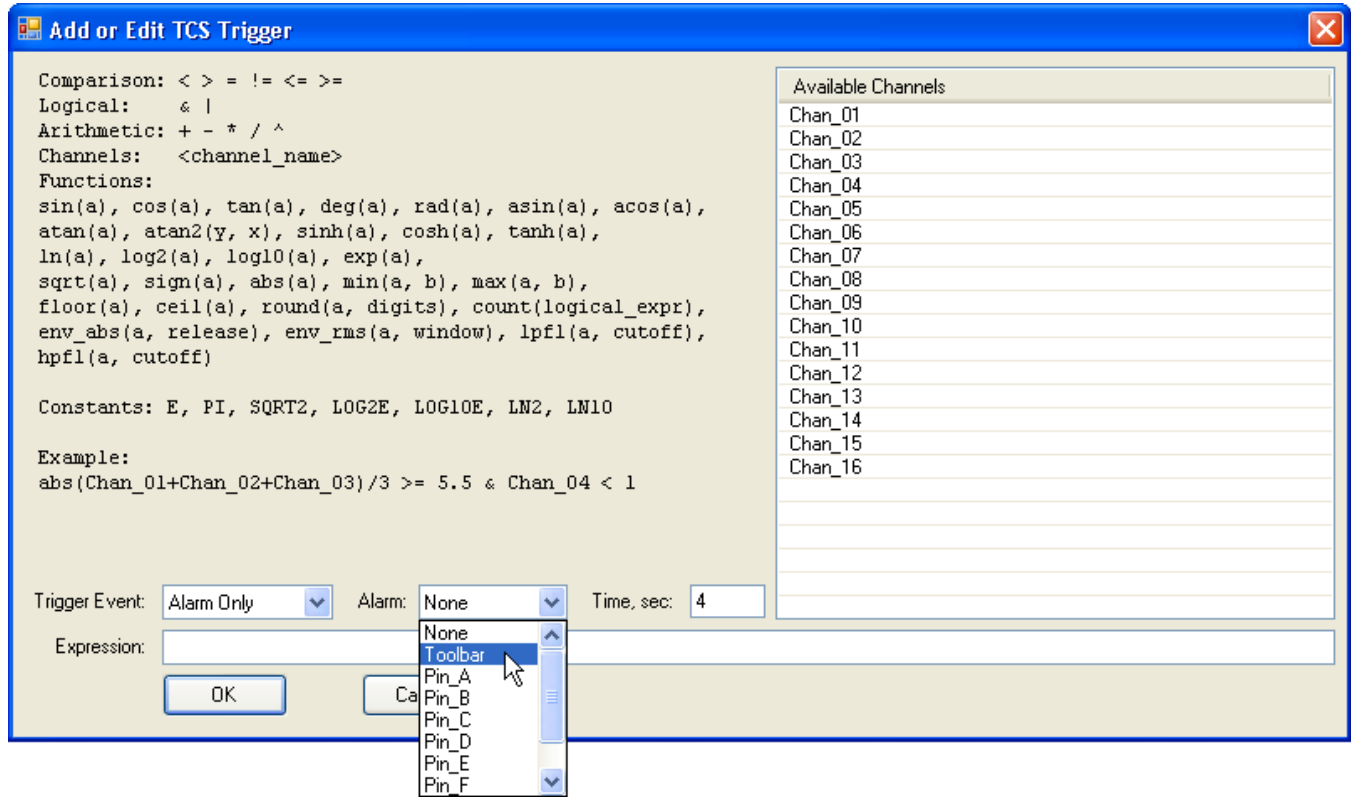


Figure 2 – Setting the Toolbar Alarm

You can safely ignore the Time parameter, as it only applies to Start/Stop Recording trigger events and has no relevance to the Alarm Only selection.

To complete the configuration, enter a trigger expression in the 'Expression' box and then click 'OK', or click 'Cancel' to cancel the configuration. In the example shown in Figure 3, the Toolbar Alarm will illuminate whenever the value of Channel_01 is greater than or equal to 4.5 volts:

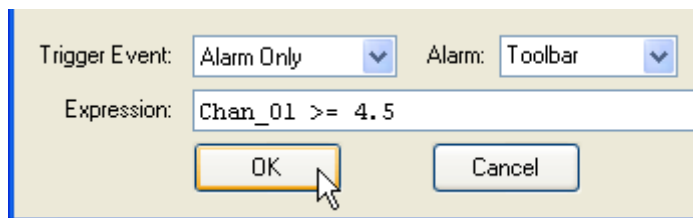


Figure 3 – Completing the Toolbar Alarm setup

NOTE: To select a channel for the trigger expression, double click on an item from the list of Available Channels, or enter the channel name manually. For manual entry, type the channel name exactly as it appears in the list. Channels that are not enabled will not appear in the list. If the expression contains an error, a message screen will appear when you click 'OK', alerting you to the nature of the error.

Correctly entered, the new Trigger Event appears in the Trigger Event grid:

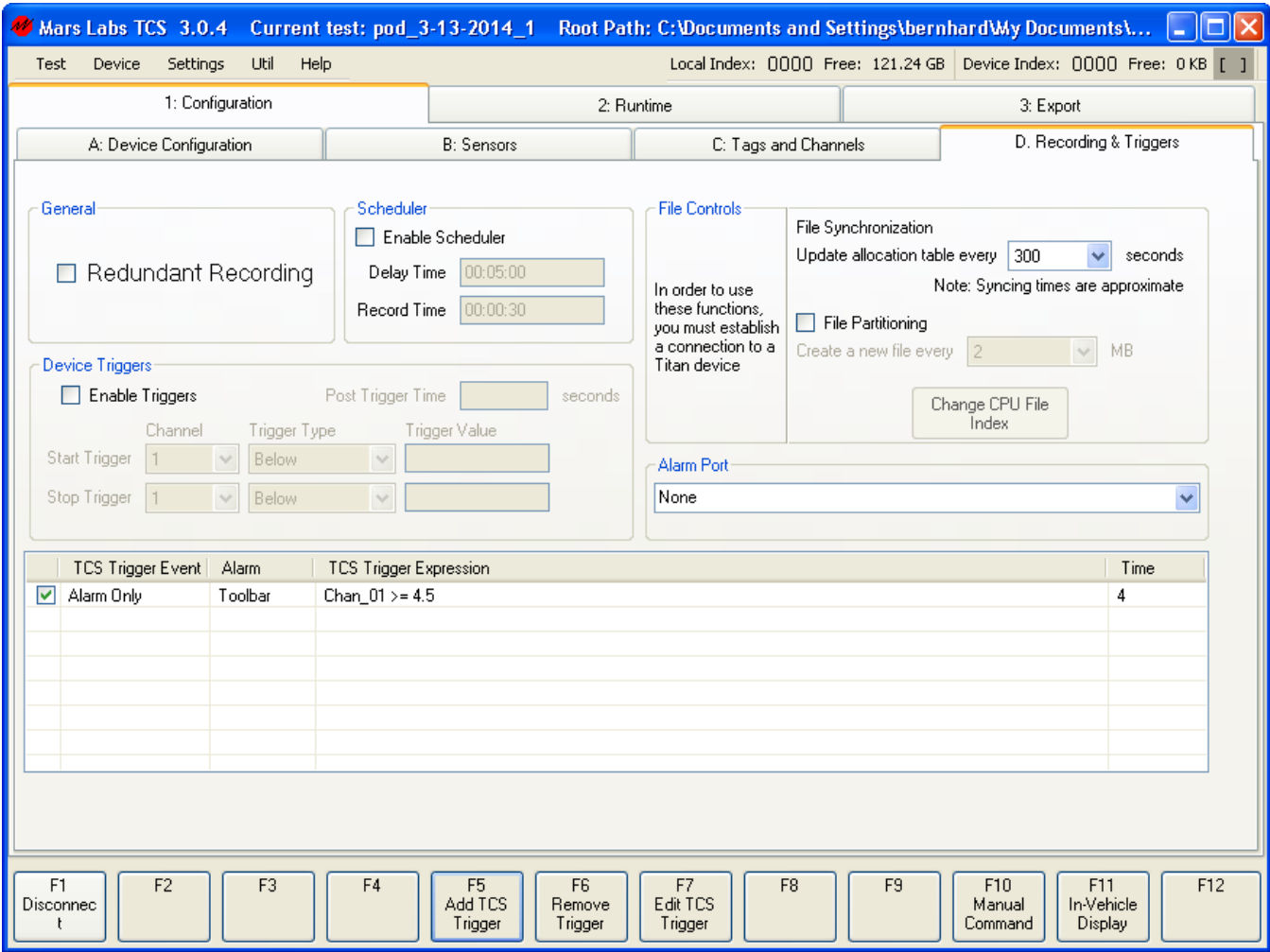


Figure 4 – A Trigger Event configuration

NOTE: Although only one Trigger is displayed in the example above, multiple Triggers can be configured for a variety of conditions, and then enabled or disabled simply by checking the box to the left of the Trigger Event name. This allows you to freely apply different trigger configurations as the need arises.

For the trigger event configuration shown, whenever the input signal on Channel 1 reaches or exceeds 4.5V when TCS is scanning or recording, the Toolbar Alarm will appear in red as shown:

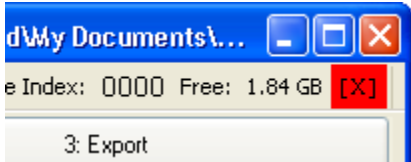


Figure 5 – An activated Toolbar Alarm

The Toolbar Alarm will revert to normal status when the input signal on Channel 1 goes below the threshold value.

Using a serial cable

TCS also supports the use of a serial cable from Future Technology Devices International (FTDI) for external monitoring and control of up to eight individual alarm conditions. The cable (pictured below) is a USB 2.0 to MPSSE device that provides 3.3 volt digital level signals on eight contact receptacles.



Figure 6 – FTDI Serial Cable (P/N C232HM-DDHSL-0 or C232HM-EDHSL-0)

This FTDI serial cable requires the installation of a D2XX driver, which is included as a part of the TCS installation. If needed, the driver can also be downloaded directly from the FTDI web site:

<http://www.ftdichip.com/Drivers/D2XX.htm>

A data sheet for the serial cable is also available here:

http://www.ftdichip.com/Support/Documents/DataSheets/Cables/DS_C232HM_MPSSE_CABLE.PDF

This cable is available from Mars Labs, FTDI, and other online electronic sources.

Configuring TCS for a Serial Cable

Configuring alarm triggers for the serial cable is a variation of setting up the Toolbar Alarm trigger. To configure the serial cable, you must select the Pin that corresponds to the desired Alarm Trigger output.

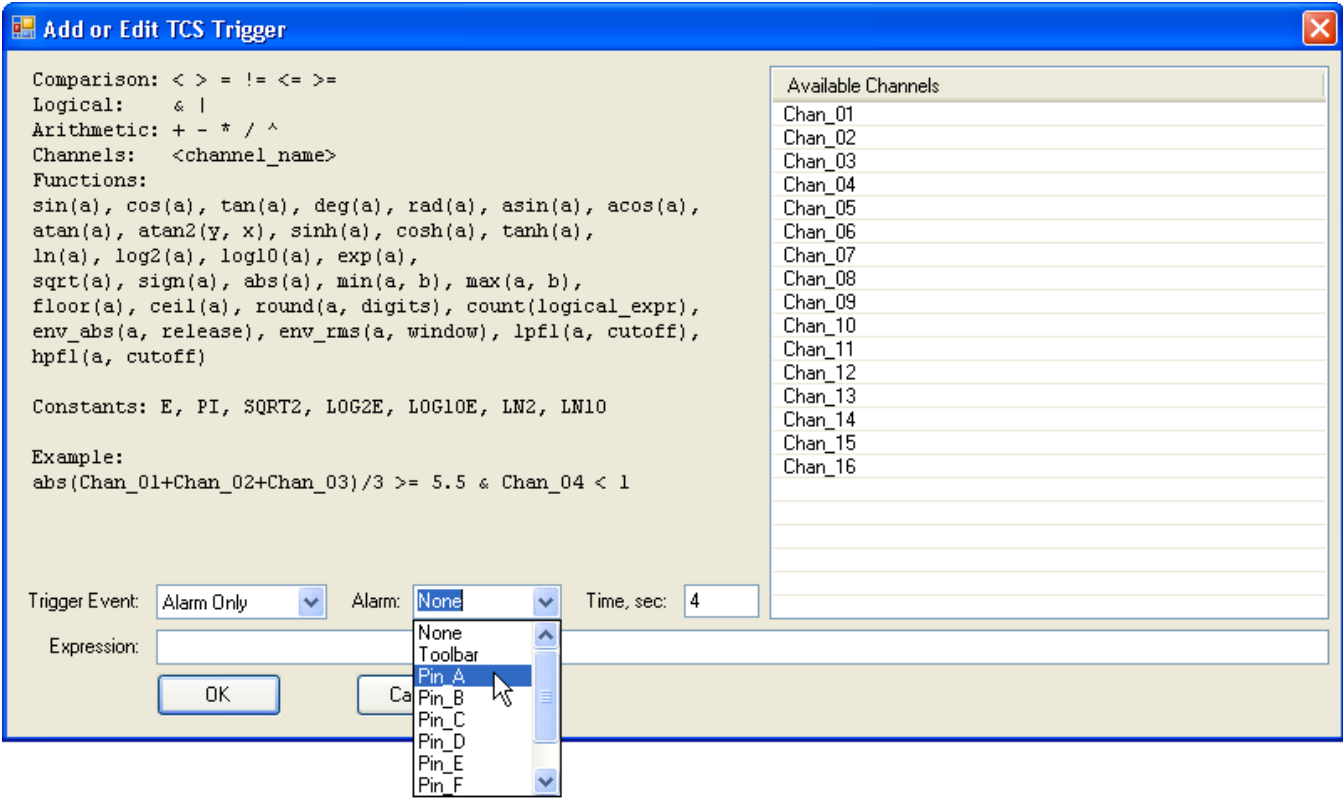


Figure 7 – Configuring Alarms for a serial cable

As before, you can safely ignore the Time parameter. Enter a trigger expression in the 'Expression' box and then click 'OK' to complete the basic trigger configuration, or click 'Cancel' to cancel the configuration. In the example shown in Figure 8, Pin_A will go to a logic high state whenever the value of Channel_01 is greater than or equal to 4.5 volts:

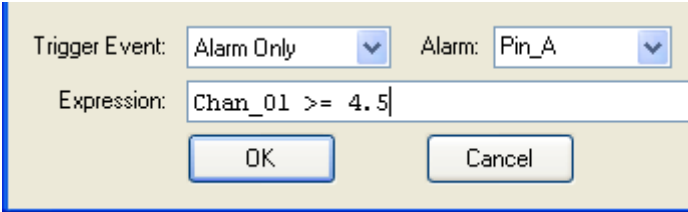


Figure 8 – The basic Trigger Alarm configuration for a serial cable

The final step is to select the serial cable from the Alarm Port dropdown. Multiple serial cables can be connected to the host computer, but only one cable can be selected to support all trigger alarms.

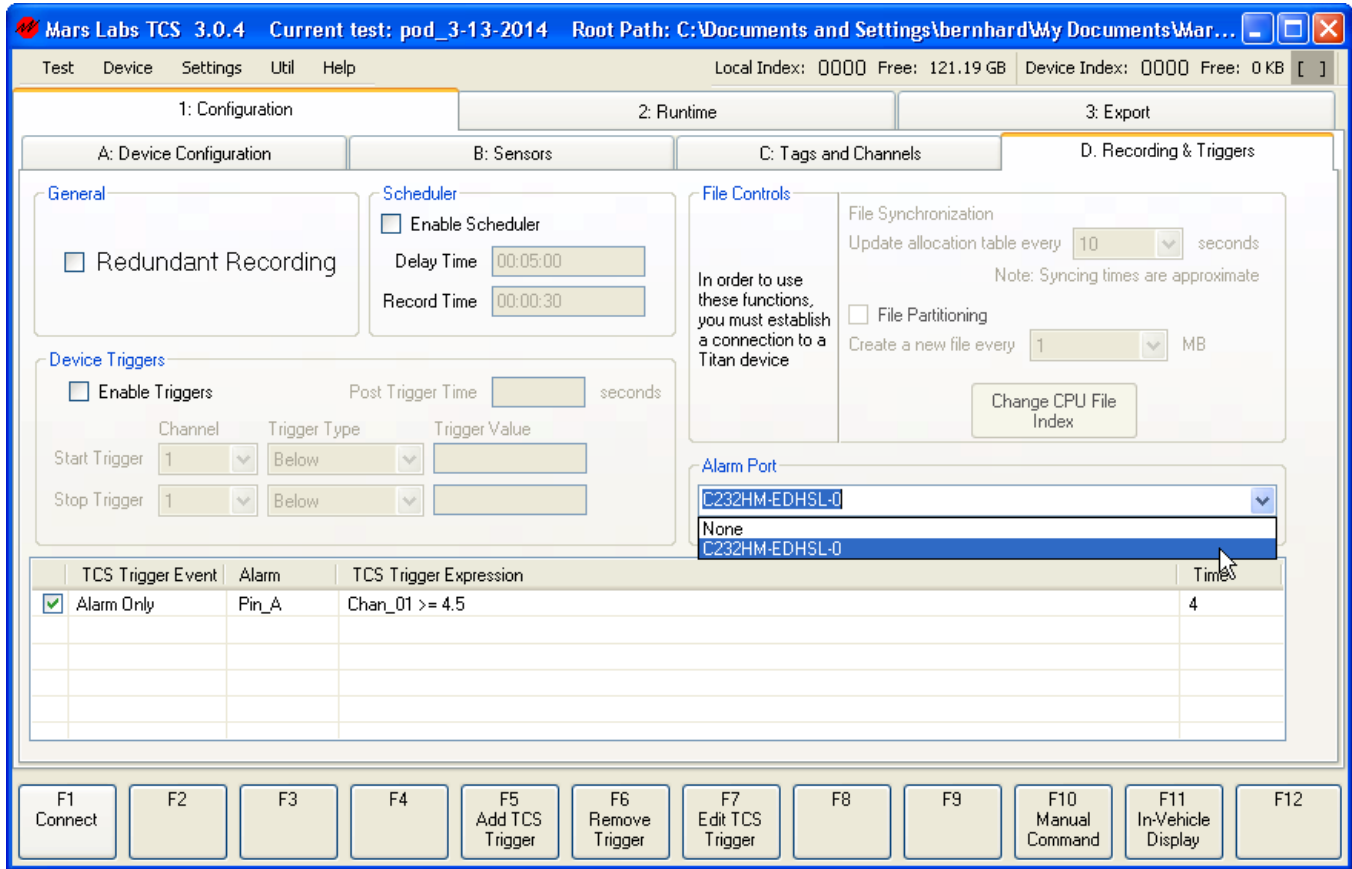


Figure 9 – Selecting the serial cable Alarm Port

NOTES:

1. The serial cable must be plugged in and recognized by the host computer in order to appear in the Alarm Port dropdown.
2. When a serial cable is initially plugged in to the host computer, the voltage on the output pins may appear in an unknown state. After TCS begins scanning, the outputs will go to a logic '0' and remain at that state unless or until triggered by an event.

A serial cable will support up to eight individual alarm outputs. Cable output connections are assigned according to the table shown.

Serial Cable Pinouts	
Pin	Color
Vcc	Red
Pin_A	Orange
Pin_B	Yellow
Pin_C	Green
Pin_D	Brown
Pin_E	Grey
Pin_F	Purple
Pin_G	White
Pin_H	Blue
GND	Black