Partner: PHIL SOLOMONS LTD
Model: ANY
Device Type: GENERIC HVAC

GENERAL INFORMATION

SIMPLWINDOWS NAME:	GENERIC SCHEDULER v1.0
CATEGORY:	HVAC
VERSION:	1.0
SUMMARY:	This module facilitates scheduling of events in any application requiring either timed digital triggers or analog set point changes or both. It is primarily intended for HVAC systems accepting analog set point values as an input.
GENERAL NOTES:	• The module supports setting of up to 12 timers with associated set point values. Applications might use one module instance per HVAC zone, or one instance for the whole HVAC system depending on the granularity of scheduling required by the end user. • Each of the 12 timers can be set using module parameters to be active for user-settable days (e.g. using checkbox buttons) or alternatively fixed day groups like Weekday or Weekend or All days. • Applications may typically use less than 12 timers per 24 Hour period by commenting out the unwanted module signals and displaying the required number of timers on the interface page. • Set points are stored and output as value x10. e.g. 175 represents 17.5 degrees. Increments are set using a module parameter. • All 12 analog set point value changes appear on the same module output for feeding into an HVAC control. • Analog value changes are accompanied by pulses on distinct digital outputs corresponding to the 12 timers, e.g. for switching devices On or Off. • Use either digital output pulses or analog value changes or both according to application requirements. • The whole scheduler can be enabled / disabled using a toggle typically made available to users via a Scheduler On/Off button. Press & Hold to enable / disable. • Each of the 12 timers can be enabled / disabled using a toggle typically made available to users by checkbox buttons associated with each timer. Press & Hold to enable / disable. When a timer is disabled, it's time, set point and day settings are retained. • Press a timer checkbox button briefly to specify which timer you want to set before using the Hour, Minute & Set point Up/Down buttons to set timers and set points. The timer row to be edited will be highlighted. Press & Hold Up/Down buttons to change Hour / Minute / Set point more rapidly. • Times, set points, and status of scheduler on/off, timers on/off and daily checkboxes status are saved to NV RAM automatically 5 seconds after the user ceases making changes. Following Processor reboot all timer, set point values, checkboxes, and button states are restored from NV RAM.

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CRESTRON HARDWARE REQUIRED:	CRESTRON 3 Series Processor
SETUP OF CRESTRON HARDWARE:	N/A
VENDOR FIRMWARE:	N/A
VENDOR SETUP:	N/A
CABLE DIAGRAM:	N/A

TERMINOLOGY:

SCHEDULES and EVENTS		This module supports setting of up to 12 timers, each with associated set point values. Each set of time and setpoint values is referred to as a schedule. Some applications might not use the setpoint components of the schedules if they only require digital triggers. Events refer to the triggering of output digital pulses and/or output analog setpoint values, which can be fed to a target device or HVAC system. In order for events to be triggered the scheduler state must be ENABLED and one or more of the 12 schedules must be ACTIVE. The scheduler can therefor be used to trigger up to 12 events in a 24 Hour period. Additional filtering of events is determined by schedule parameters and other user-settable states which filter events according to the required days of the week.

CONTROL:

tod$	S	System Clock Input. Ensure Crestron processor clock is set to correct date and time. Use output from Clock Driver symbol to feed this input. The value of this input is compared with scheduler times and parameters to determine when to trigger an event.
SCHEDULE_MINUTE_UP	D	Pulse to increment minute value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating increments more rapidly for as long as the input is held high.
SCHEDULE_MINUTE_DOWN	D	Pulse to decrement minute value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating decrements more rapidly for as long as the input is held high.

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SCHEDULE_HOUR_UP	D	Pulse to increment hour value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating increments more rapidly for as long as the input is held high.
SCHEDULE_HOUR_DOWN	D	Pulse to decrement hour value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating decrements more rapidly for as long as the input is held high.
SCHEDULE_SETPOINT_UP	D	Pulse to increment setpoint value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating increments more rapidly for as long as the input is held high. Increment is determined by value of SETPOINT_INCREMENT parameter. e.g. value 5 represents 0.5 degrees.
SCHEDULE_SETPOINT_DOWN	D	Pulse to decrement setpoint value of currently selected schedule (selected using input SCHEDULEnn). Hold high for 1s to begin repeating decrements more rapidly for as long as the input is held high. Decrement is determined by value of SETPOINT_INCREMENT parameter. e.g. value 5 represents 0.5 degrees.
SCHEDULER	D	Hold high for 1s to toggle the overall scheduler state between enabled / disabled.
SCHEDULER_SET	D	Pulse to set the overall scheduler state to enabled.
SCHEDULER_RESET	D	Pulse to reset the overall scheduler state to disabled.
SCHEDULEnn (nn range 1-12)	D	Pulse to set the currently selected schedule for the purpose of adjusting hour, minute and setpoint values for the schedule. Hold high for 1s to toggle the specific schedule nn state between active / inactive.
SCHEDULEnn_MON (nn range 1-12)	D	Pulse to toggle schedule nn between Monday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.
SCHEDULEnn_TUE (nn range 1-12)	D	Pulse to toggle schedule nn between Tuesday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.

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SCHEDULEnn_WED (nn range 1-12)	D	Pulse to toggle schedule nn between Wednesday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.
SCHEDULEnn_THU (nn range 1-12)	D	Pulse to toggle schedule nn between Thursday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.
SCHEDULEnn_FRI (nn range 1-12)	D	Pulse to toggle schedule nn between Friday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.
SCHEDULEnn_SAT (nn range 1-12)	D	Pulse to toggle schedule nn between Saturday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.
SCHEDULEnn_SUN (nn range 1-12)	D	Pulse to toggle schedule nn between Sunday included / not included, for the purpose of triggering events for this schedule. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order to make use of this function for filtering event triggers.

FEEDBACK:

SCHEDULER_SETPOINT_RECALLED	A	The output setpoint value which changes whenever a scheduled event is triggered. In order for events to be triggered the overall scheduler state must be ENABLED and one or more of the 12 schedules must be ACTIVE. If the scheduler is enabled, all scheduled setpoint changes appear on this output at the times specified providing the schedule is active and the applicable daily filtering results in TRUE for the current day.
SCHEDULEnn_TRIGGER (nn range 1-12)	D	The output pulses high when an event is triggered for the corresponding schedule nn. Each schedule has its own digital output but they all share an analog output; There will be a corresponding change to the analog output value for SCHEDULER_SETPOINT_RECALLED if schedule setpoint values have been set.

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SCHEDULER_ON	D	High value indicates the overall scheduler state is enabled. Low value indicates the overall scheduler state is disabled.
SCHEDULEnn_ACTIVE (nn range 1-12)	D	High value indicates the specific schedule nn is active. Low value indicates the specific schedule nn is inactive.
SCHEDULEnn_HOUR (nn range 1-12)	A	The current analog value of HOUR for schedule nn. Range 0 – 23. Use to display hour component of schedule time on Touch Panel.
SCHEDULEnn_MINUTE (nn range 1-12)	A	The current analog value of MINUTE for schedule nn. Range 0 – 59. Use to display minute component of schedule time on Touch Panel.
SCHEDULEnn_SETPOINT (nn range 1-12)	A	The current analog value of SETPOINT for schedule nn. Use to display setpoint component of schedule on Touch Panel. Range is determined by module parameters SETPOINT_MIN and SETPOINT_MAX. All setpoint values are represented by the actual setpoint multiplied by 10. For example, analog output value 175 represents 17.5 degrees. Increments are determined by the value of module parameter SETPOINT_INCREMENT. e.g. value 5 represents 0.5 degree increments.
SCHEDULEnn_MON_INCLUDED (nn range 1-12)	D	High indicates Monday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_TUE_INCLUDED (nn range 1-12)	D	High indicates Tuesday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_WED_INCLUDED (nn range 1-12)	D	High indicates Wednesday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_THU_INCLUDED (nn range 1-12)	D	High indicates Thursday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.

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SCHEDULEnn_FRI_INCLUDED (nn range 1-12)	D	High indicates Friday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_SAT_INCLUDED (nn range 1-12)	D	High indicates Saturday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_SUN_INCLUDED (nn range 1-12)	D	High indicates Sunday will be included for the purpose of triggering timed events for schedule nn. The module parameter SCHEDULEnn_DAYRANGE must be also be set to SELECTABLE in order for this status to take effect in filtering event triggers.
SCHEDULEnn_Current (nn range 1-12)	D	High indicates this is the currently selected schedule for the purpose of adjusting hour, minute and setpoint values.

PARAMETERS:

SETPOINT_MIN		The minimum value limit allowed for setpoint components of the 12 schedules controlled by the module. Setpoint values are represented by the actual setpoint multiplied by 10, e.g. 150 represents a minimum setpoint of 15 degrees.
SETPOINT_MAX		The maximum value limit allowed for setpoint components of the 12 schedules controlled by the module. Setpoint values are represented by the actual setpoint multiplied by 10, e.g. 350 represents a maximum setpoint of 35 degrees.
SETPOINT_INCREMENT		The increase or decrease in setpoint applied to the currently selected schedule when SCHEDULE_SETPOINT_UP and SCHEDULE_SETPOINT_DOWN inputs are pulsed. Setpoint values are represented by the actual setpoint multiplied by 10, e.g. value 5 represents a change of 0.5 degrees.
SCHEDULEnn_DAYRANGE (nn range 1-12)		Specifies the manner in which day filtering of events is applied to the schedule nn providing the schedule is active and the scheduler is enabled. When set to SELECTABLE, the state of outputs SCHEDULEnn_MON_INCLUDED ... SCHEDULEnn_SUN_INCLUDED are used to determine on which days to trigger events specified in this schedule. When set to ALL, the scheduled events will be triggered every day. When set to WEEKDAYS, the scheduled events will be triggered on Monday

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		– Friday only. When set to WEEKEND, the scheduled events will be triggered on Saturday and Sunday only.

TESTING:

OPS USED FOR TESTING:	MC3: v1.501.0013
SIMPL WINDOWS USED FOR TESTING:	4.04.03
DEVICE DB USED FOR TESTING:	77.02.001.00
CRES DB USED FOR TESTING:	58.00.002.0
SYMBOL LIBRARY USED FOR TESTING:	1007
SAMPLE PROGRAM:	GENERIC-SCHEDULER-v1.0-Demo-MC3 The Demo application includes 3 instances of this module to illustrate the 3 modes differentiated by values selected for the SCHEDULE_DAYRANGE parameters. The 3 instances are cross-point routed to the same set of X-Panel joins, but the 3 subpages corresponding to these options use different subsets of these join interface objects. Option 1 illustrates using user selectable day of week filters. Option 2 illustrates using Weekday and Weekend filters Option 3 illustrates a simple layout for All Days applications The opening page allows you to view the output triggers and setpoint changes generated by each of the 3 scheduler modules once enabled in their respective scheduler pages.
REVISION HISTORY:	v1.0 – Initial Release

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