

Summary: This Study Guide will continue where we left off last week. What I mean is, we are going to just take what we learned last week and expand on it a little bit to get into more detail on how to configure the ConsoliDator+.

As with last week, following along with the recorded session is strongly recommended, and you can also follow along with the [ConsoliDator+ Configuration Software](#) and a [ConsoliDator+ Demo](#) Unit if you have one (if not, let's talk)!

Programming “Soft Keys”: The first thing we will work on in this session is learning how to program those “Soft Keys” we heard so much about in our previous sessions, and find out exactly what those keys can do for us!

When you create a new “Screen”, you’ll remember that at the bottom of that setup page there are 4 boxes corresponding to the F1, F2, F3 and F4 keys that are on the front of the actual ConsoliDator+ unit.

Simply choose which key you want to edit and click on the box. The below screen will appear.

Screen 1

Title: 1. NAME YOUR SCREEN!
Name for the screen, 23 characters max.

Select User Function

- None
- ▶ Screens
- ▶ Simulate
- ▶ Horn
- ▶ mA Output
- ▶ Relay

F1: Previous Screen
F2: Next Screen
F3: Scan / Stop
F4: Ack Alarm - All

Save Cancel

Just like we have different “categories” for our engineering units and channel “Functions”, we have different categories for the Soft Keys.

Below is a brief description of each category:

None: Select this if you want the function key to have NO operation at all

Screens: This category will allow the soft key to manipulate screens in various ways

Simulate: Will allow you to simulate any of the objects you have on the screen (as in, you can manually adjust the objects without any actual input from a 4-20 mA signal, or any other input type).

Horn: This will allow you to perform functions of the built-in alarm horn

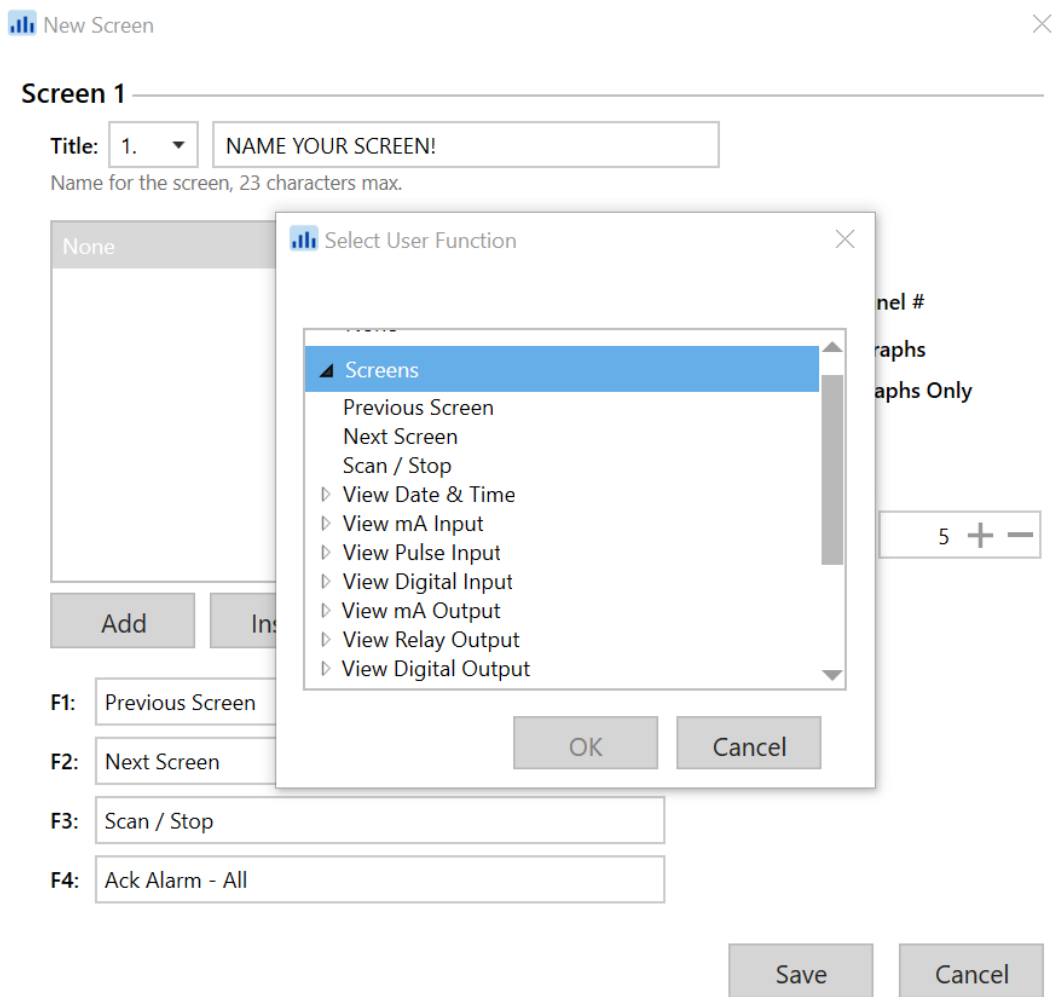
mA Output: This will allow you to perform functions using the analog outputs

Relay: This will allow you to perform functions using any of the relay outputs

To keep things simple for this session, we will only take a look at a couple of these categories, and dive into exactly what the soft keys can help us with.

For example, in what kinds of ways can we use a soft key to manipulate the screens?

Well, take a look below at what happens when we choose the “Screens” category.



New Screen

Screen 1

Title: 1. NAME YOUR SCREEN!
Name for the screen, 23 characters max.

None

Select User Function

- None
- Screens**
 - Previous Screen
 - Next Screen
 - Scan / Stop
 - View Date & Time
 - View mA Input
 - View Pulse Input
 - View Digital Input
 - View mA Output
 - View Relay Output
 - View Digital Output

OK Cancel

Add Ins

F1: Previous Screen

F2: Next Screen

F3: Scan / Stop

F4: Ack Alarm - All

5 + -

Save Cancel

Well, would you look at that! It gives us even more categories from which we can choose, but these are much more specific, and I'll explain why that is.

Basically, this category allows the ConsoliDator+ to show you things on the screen that would normally require you to navigate through the programming and setup menus. Or, it can also be assigned to control the “Screens” you have programmed on the unit (previous screen, next screen, scan/stop).

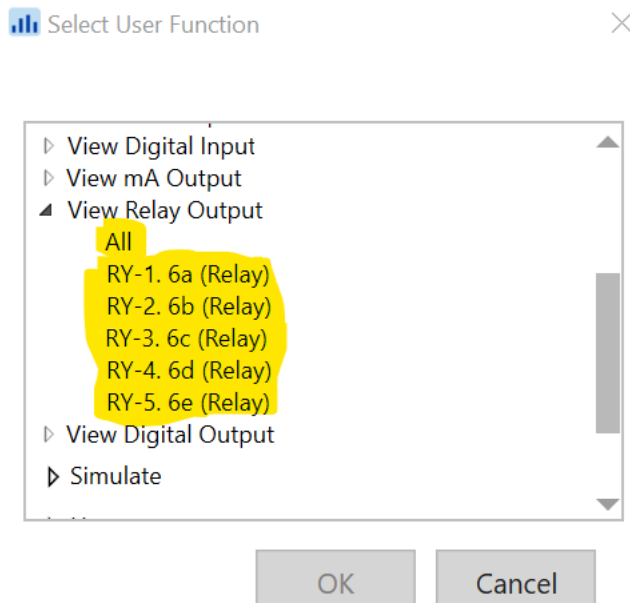
But, let's take a look at the information it can show you that would normally require you to navigate through the setup menus.

For example, let's say you want to be able to see that status of every relay output that is on the ConsoliDator+. Well, you could easily press “Menu” and just go through the setup menus one by one and look at each relay status.

Or, you could program a soft key that will bring you right to a screen that will show you the status of ALL relays on the unit, in one spot.

To do that, you just select the “View Relay Outputs” category, and then there will be a few additional options from which you can choose.

You can choose to only see a specific relay's status, or you can choose to see ALL of them at once.



The exact same options will be available if you were to choose to view ANY of the inputs or outputs. You can either choose to see ALL of them, or just pick one of them in particular.

I am going to use this as an opportunity to remind you about how important it is to NAME EVERYTHING YOU CAN. With only 5 relays, sure, it's easy to keep track of them. But, what if we had 20 relays in that dropdown with NO names? Yeah, you can imagine it would be pretty difficult to figure out exactly which relay you are wanting to choose.

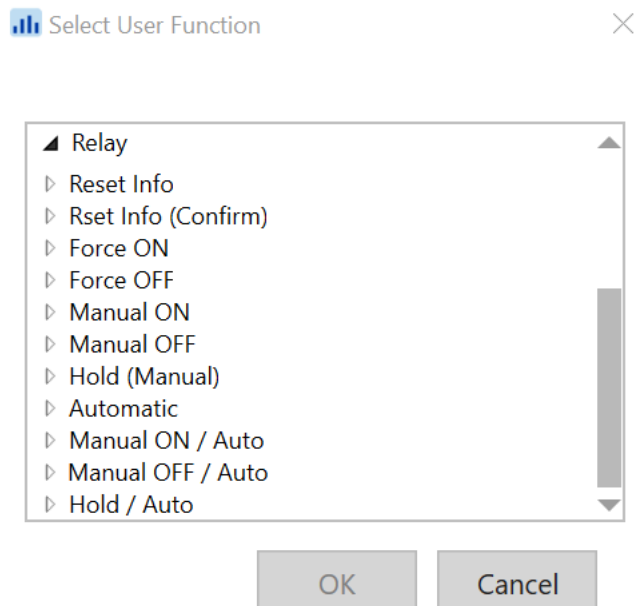
Okay, so that's how the soft keys can be used to view different things, but what if I actually want to control something using a soft key?

Well, we can use a soft key to control a mA output if we want, and we can use it to drive a digital output as well! But, more times than not, folks are going to want to control a relay, so let's take a look at that!

With the “Relay” category, we get a LOT more functionality, and it’s much more useful in my opinion.

In fact, our legacy product, the [ProVu](#), had the same soft key feature, but with limited options. Believe it or not, using them to control relays was probably THE most common use of the soft keys.

That said, let’s take a look at the different options we have available to us through the “Relay” category:



Here’s basically how it works.

The list you see is basically a list of functions. It’s a list of actions the ConsoliDator+ can take when you press the function key. Once you select the action you want, you simply select that category and just choose WHICH relay you want to control. Or, yes, you CAN control all of them at once, with one button!

Below is a brief description of each “Action” that can be performed with the relay outputs.

Reset Info: When you turn a relay into a channel, and then add that channel to a screen, you will notice that the object shown on the screen will have “Cycle Count” and “Runtime” displayed. This “Action” allows you to reset that info with the press of a button!

Reset Info (Confirm): Same action, but it forces the user to confirm their action before the info is reset.

Force On: This will force a relay to change to its “energized state” only while the button is being pressed. Once you let go of the button, the relay will return to its “normal state”.

Force Off: The inverse of the above action. This will force the relay to change to its “de-energized state” – again, only as long as the button is being held.

Manual On: This will force a relay to change to its “energized state”, and will ONLY return to its “normal state” when the button is pressed again. The user does not have to hold the button down to keep the relay on

Manual Off: The inverse of the above action

Hold (Manual): This action will force a relay to hold its state, regardless of process conditions. If a relay is in its “de-energized state” and you’d like it to stay that way no matter what, use this function. The relay will return to normal operation when the relay is reset using the “Alerts!” screen.

Manual On (Auto): Similar to the action of “Manual On” except the relay will return to its “de-energized state” once the alarm condition is cleared (basically, you force the relay on and walk away, but the relay will automatically return to its normal state when the process conditions allow).

Manual Off (Auto): Inverse of the above action.

Hold (Auto): Similar to the “Hold” action, except the relay WILL automatically respond to process conditions.

The MOST commonly used “Soft Key” in regard to relay control is the “Force On/Off” and “Manual On/Off”.

Most of the time, it’s because folks want to be able to trigger a relay based on some outside process, or they want to be able to control the relays manually. The other actions are certainly useful in certain circumstances, but they aren’t all used.

How to Configure Alarms (the BEST way): I have mentioned this before, but it never hurts to repeat yourself, yeah? There are SEVERAL different ways to accomplish something on the Consolidator+. That’s just a result of this unit being SO flexible and customizable.

The same is true for programming alarms. There are about 3 or 4 different ways to have an alarm trigger on this unit, but there is really one way that makes the most sense!

So, let’s say we have a very basic level reading of 0-100% of full capacity.

When the level gets to 90% full on that tank, we want an alarm. The first thing we do is go to the left side of the software window, and find “Alarms”

Below is what it looks like when we want to create a new alarm:

Alarm: 1

Display Tag: A1.
Name for the Alarm, 15 characters max.

Type: Single Source

Input: None

Color Scheme: Default

- Sound Horn
- Alert!
- Automatic
- Ack Anytime

Break: Alarm Off

Set Pt: 7000.0

Reset: 4000.0

On Delay: 0.0

Off Delay: 0.0

Save Cancel

The very first thing you can do is name the alarm. Now, I won't go on about naming your alarms because those will be rather easy to figure out without naming them, but go ahead and name it anyway!

After that, we have several fields and checkboxes we can fill out (noticing a pattern here? Once you get the basics, programming anything with the software is rather intuitive) so let's take a look at what these fields are all about!

The "Type" is almost the same thing as the "Function" of a channel. We are basically telling the Consolidator+ what kind of alarm this is going to be.

We have a few different choices for alarm types:

Single Source: This means the alarm is only going to be triggered by ONE event from ONE object. This is as basic as it gets for alarming!

Multi-Source: This means the alarm can trigger based on ONE event from several objects. For example, if you have four tanks of the same size, and you want to alarm if ANY of them get to 90% full, this is the alarm type for you!

Interval: This means we can actually configure an alarm based on an interval of time. You choose the interval of time in between alarms, and also tell it how long you want the alarm to remain active before it turns off again.

Alarms OR: This is the exact alarm type I use when I need to configure one of our "Common Alarms". This type of alarm is actually going to combine OTHER alarms you have created. Sort of like the "Multi-Source" type, except it's other alarms that are going to be tied to this alarm type.

Alarms AND: This is similar to the "Common Alarms" type, except this alarm will ONLY be true if ALL of the alarms tied to this one are true. Let's say you have three alarms for three tanks. If you wanted to create an "AND" alarm for those, EACH of the alarms would have to be true in order for the "AND" alarm to trigger.

Day & Time: That's right, we can actually trigger an alarm based on a day and time. You can literally have the alarm trigger every single day at a specific time for a specific duration, or you can choose individual days of the week!

The next thing we do is choose our "Input". As with everything else, almost anything that is configurable on the Consolidator+ can be used as an input to an alarm, but for the most part, the input is almost always going to be a channel that was created.

So, for simplicity's sake, let's just take a look at an example of a simple "Single Source" alarm type, and see how we actually set these things up!

After I choose my alarm "Type", I select my input by clicking on "Input" and selecting one of the compatible inputs. In this example, we'll just use our "Tank 1" channel that is scaled from 0-100% full capacity.

After we choose the correct "Input" (in this case, channel – I know, it gets confusing but you'll get it!) the next thing we need to do is tell the alarm WHEN to trigger, and when to go away. We do that by filling in the "Set" and "Reset" fields at the bottom of the window.

Set Pt: At which point within your scaled range the alarm should trigger.

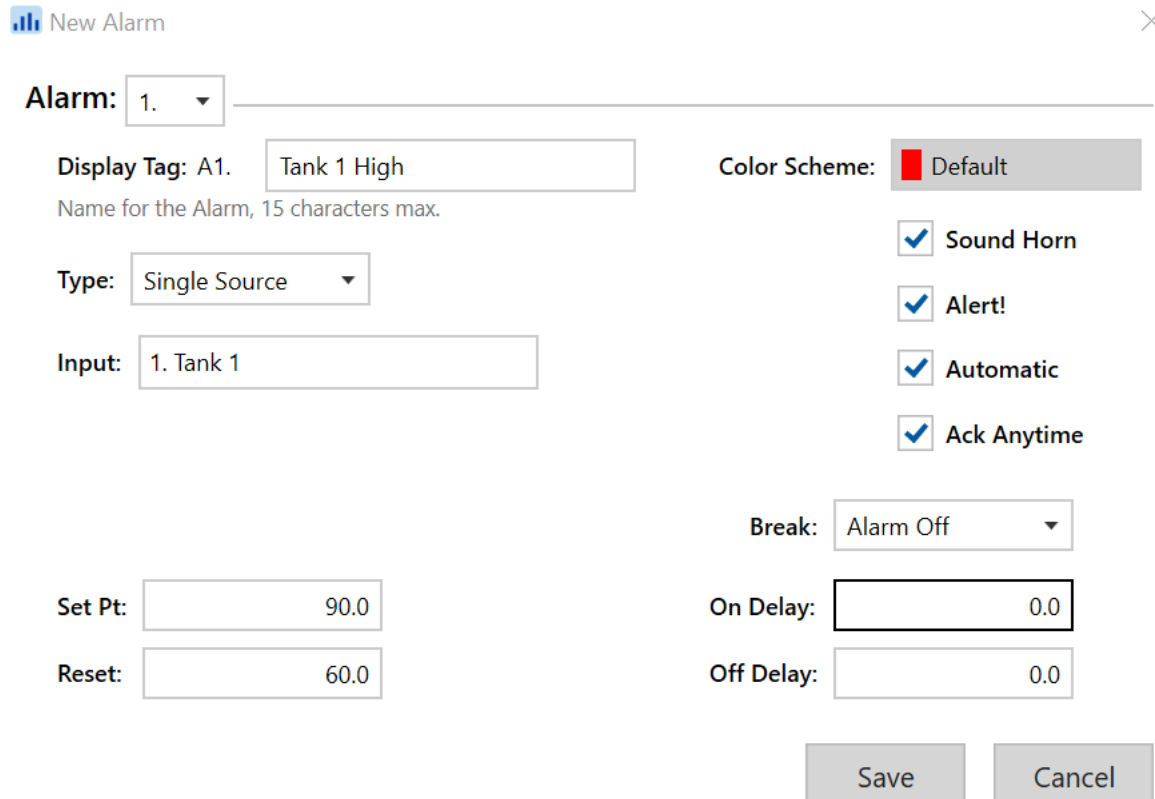
Reset: At which point within your scaled range the alarm should clear.

NOTE: *Unlike other brands, our products do not require you to tell the device if it's a high or low level alarm. If the set is higher than the reset, it's a high alarm. If the reset is larger than the set, it's a low alarm!*

Since we want the alarm to trigger when our tank is at 90% capacity, I want my “Set” to equal 90.

For the sake of argument, let’s just say we want the alarm to clear when the tank gets down to 70%. Then I will make my “Reset” equal to 70.

Here’s what that will look like when it’s filled in:



The screenshot shows the 'New Alarm' configuration window. It includes the following fields and options:

- Alarm:** 1. (dropdown)
- Display Tag:** A1. (text) **Tank 1 High** (input field)
- Name for the Alarm:** 15 characters max.
- Type:** Single Source (dropdown)
- Input:** 1. Tank 1 (input field)
- Color Scheme:** Default (dropdown)
- Options (checked):** Sound Horn, Alert!, Automatic, Ack Anytime
- Break:** Alarm Off (dropdown)
- Set Pt:** 90.0 (input field)
- Reset:** 60.0 (input field)
- On Delay:** 0.0 (input field)
- Off Delay:** 0.0 (input field)
- Buttons:** Save, Cancel

Now that we have told the alarm when to behave, and which channel it should be reacting to, there are a few other options we have available to us in the form of check boxes.

Below is a brief description of each checkbox:

Sound Horn: The Consolidator+ has an internal horn that can be triggered with an alarm. If this box is checked, the alarm will make the horn sound (only if the horn has not been disabled from the “System” setup menu).

Alert!: Remember the “Alerts!” screen we looked at during one of our first classes? Well, those are triggered by alarms. You can choose to have an alarm NOT make the “Alerts!” screen appear by simply unchecking this box.

Automatic: With this box checked, the alarm will clear automatically once the “Reset” point is reached. If the box is unchecked, an operator will have to physically “Acknowledge” the alarm before the alarm will clear.

Ack Anytime: With this box checked, an operator can acknowledge an alarm at any point, regardless of process conditions. If you uncheck this box, the alarm condition MUST be cleared (Reset point is reached) before an operator can acknowledge the alarm.

Break: This means if there is signal loss on the input channel to your alarm, the alarm can do a few different things. The alarm can “Stay as Is” when the signal is lost, it can “Turn On” or “Turn Off”. (Most people will use a completely separate alarm for signal break, but it’s an option nonetheless).

On Delay: When the “Set Point” is reached, we can actually have a slight delay before the alarm is triggered. This is to make sure the process condition is ACTUALLY in an alarm state before the alarm is triggered (imagine sloshing in a tank throwing an alarm on and off until the liquid finally settles).

Off Delay: The inverse of the “On Delay”. We can make it so that even when the “Reset Point” is reached, the alarm stays triggered for a specific amount of time before clearing.

How to Tie a Relay Output to an Alarm: Everything we just went over in that previous section is the majority of the configuration needed for alarms, but with one thing missing.

The alarms we setup in the previous section are STRICTLY VISUAL. Without a relay tied to that alarm, all we are doing is telling the ConsoliDator+ how to SHOW an operator an alarm is triggered.

But, let’s say the alarm we just created for our tank is also supposed to be tied to a pump. So, when the tank gets to 90%, we get the alarm, but we also turn on a pump to drain the tank.

Well, without actually telling the ConsoliDator+ to control a relay based on that alarm, nothing will happen except the ConsoliDator+ will be flashing and letting the operator know the tank is too full.

The first thing we are going to do is find the “Outputs” section on the left side of the software window and select “Relay Output”. After that, select WHICH relay you would like to have tied to the alarm.

When you select the relay you want, the following dialog box will appear:

6a : Relay Output _____

Display Tag: RY-1.

Name for the relay output channel, 15 characters max.

Input:

Fail-Safe

So, go ahead and name your relay something meaningful – if you want.

After that, we need to select our “Input”. In this case, our Input is going to be the “Tank 1 High” alarm that we JUST created a few minutes ago.

That is basically it! That’s all you need to do to tie a relay output to an alarm that you created.

Now, you may be wondering where all the relay functions are like latching, or set points and reset points. However, we literally did ALL of that when we configured our alarm. The alarm is the object that is doing all the thinking. The relay is simply just following orders from the configured alarm.

So what is one of the “wrong” ways to create an alarm?

Well, as I mentioned, there are several different ways to configure an alarm, and we just went over the BEST way to do it.

Another way you COULD do it is by selecting the “Tank 1” channel as the input and tell the relay when to turn on and off. However, if you do that, then it’s just a relay turning on and off. There will be no visual que that an alarm is triggered because we didn’t configure an actual alarm!

Or, if you wanted to, you could make the actual mA input the “input” to this relay, and then tell it at which mA value to turn on and off.

Both of these ways WILL get you a relay output to trigger when a process condition is met. However, there will be NO visual alarms on the screen, and having that visual on the screen is really what makes the Consolidator+ a great product!

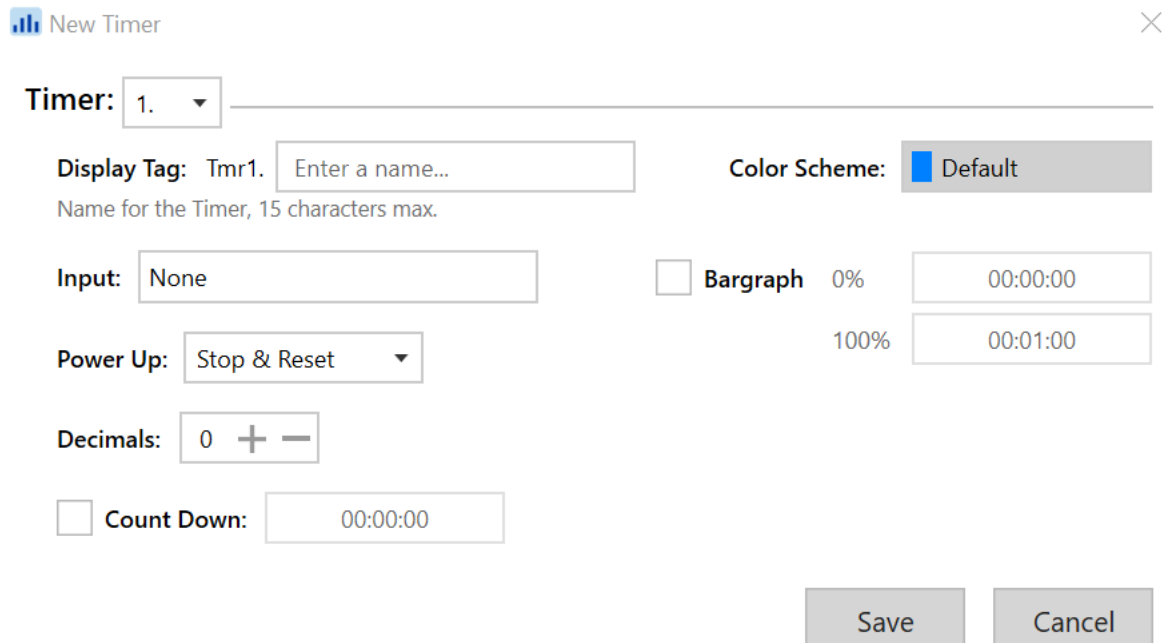
Again, because of the flexibility of this device, there are several different ways to achieve a goal. However, there are only a couple that really allow your customers to take full advantage of this powerful product!

How to Create Timers: During our last applications class, I briefly went over some of the timer and scheduling features of the Consolidator+, so let’s quickly take a look at how these timers are configured.

It’s actually extremely simple, and I’d be willing to bet at this point you could just figure it out without my help!

That said, look for “Timers” on the left side of the software window, and click on “New”.

The below dialogue box will appear:



Timer: 1. **Color Scheme:** Default

Display Tag: Tmr1. Name for the Timer, 15 characters max.

Input: None **Bargraph** 0%
100%

Power Up: Stop & Reset

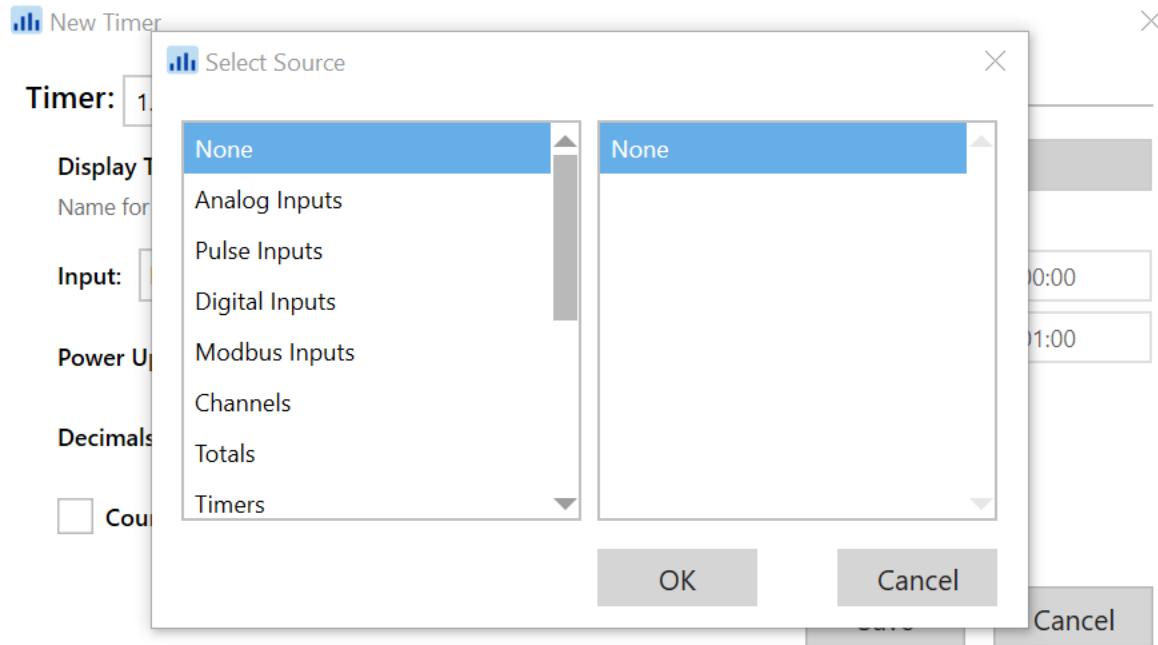
Decimals: 0

Count Down:

As always, you can name the timer, just like with any object you create on this unit.

Just like with any other object we create, a timer must have an input. Well, it doesn’t NEED an input if you just want a timer that counts when you press a button. However, the timer functionality on this unit is useful because we CAN tie channels and alarms to them.

That said, let's take a look at what we can use as an input to this timer.



Believe it or not, the list actually continues and I couldn't fit the entire thing into one screen shot.

So, below is a list of the input possibilities for a timer and a brief description where applicable.

None: You can use this if you want a timer to be controlled by a "Soft Key"

Analog Inputs: The raw analog input can be the input to a timer

Pulse Inputs

Digital Inputs

Modbus Inputs

Channels

Totals

Timers: Yes! Even other timers can be an input to a timer!

Alarms:

Clock: The "System Clock" can be the input to a timer

Analog Outputs

Relay Outputs

Digital Outputs

Modbus Outputs

To keep things simple, we will just take a look at what happens when we choose our "Tank 1 High" alarm as the input to a timer!

In fact, having an alarm for an input to a timer is my favorite way to use timers on this device because we can control based on time AND process conditions!

The screenshot shows a 'New Timer' configuration window. At the top left, it says 'New Timer' with a close button 'X' at the top right. The 'Timer:' dropdown is set to '1.'. The 'Display Tag:' is 'Tmr1.' and the text input field contains 'Alarm Timer'. The 'Color Scheme:' is set to 'Default'. Below this, the 'Input:' field contains 'A1. Tank 1 High'. To the right, there is a 'Bargraph' checkbox which is unchecked, followed by a percentage field '0%' and a time field '00:00:00'. Below that, '100%' is shown with a time field '00:01:00'. The 'Power Up:' dropdown is set to 'Stop & Reset'. Below that are four dropdown menus: 'Error:' set to 'Stay As Is', 'Reset:' set to 'None', 'Start:' set to 'None', and 'Stop:' set to 'None'. There is a 'Decimals:' field with '0' and '+' and '-' buttons. At the bottom, there is a 'Count Down:' checkbox which is unchecked, followed by a time field '00:00:00'. At the bottom right, there are 'Save' and 'Cancel' buttons.

The rest of the fields that can be filled out in here are basically how and when the timer starts, stops, and resets. Because we are basing this timer off of an alarm we configured, the timer is going to be based on the alarm being true or false (on or off). Moreover, the actual “setpoint” of the alarm will be the actual trigger to start this timer.

For example, for the “Reset”, “Start” and “Stop” fields, the options are the same for each, and they are as follows:

None: Nothing will trigger the timer to reset/start/stop

Rising: The timer will reset/start/stop as the process condition approaches the alarm setpoint from below.

Falling: Timer will reset/start/stop as the process condition approaches the alarm setpoint from above.

Rising and Falling: Timer will reset/start/stop as the process condition approaches the alarm setpoint from above AND below.

The next field you notice is a checkbox for “Count Down”. When this box is NOT checked off, the timer is just going to start at 00:00:00 and start counting up. You will also notice that having the timer count up is the default setting of the Consolidator+.

When that checkbox is checked, you can then type in a time from where the timer will count down. So, if you only want a timer to be on for ten minutes when the alarm triggers, you can just enter in 00:10:00 into that box, and the timer will begin at that mark, and count down to 00:00:00 and stay there until the timer is reset back to 00:10:00 again!

You can also choose to have a bar graph for this timer displayed on a screen, but I don't usually use that since you can see the time counting down right on the screen.

Now, a timer does NOT need to be on a screen for it to work or operate. A timer, or any object for that matter, can still operate in the background without being placed on a screen.

That said, if you'd like to put the timer on a screen, you have the option to show a bar graph, and change the color palette to whatever you want.

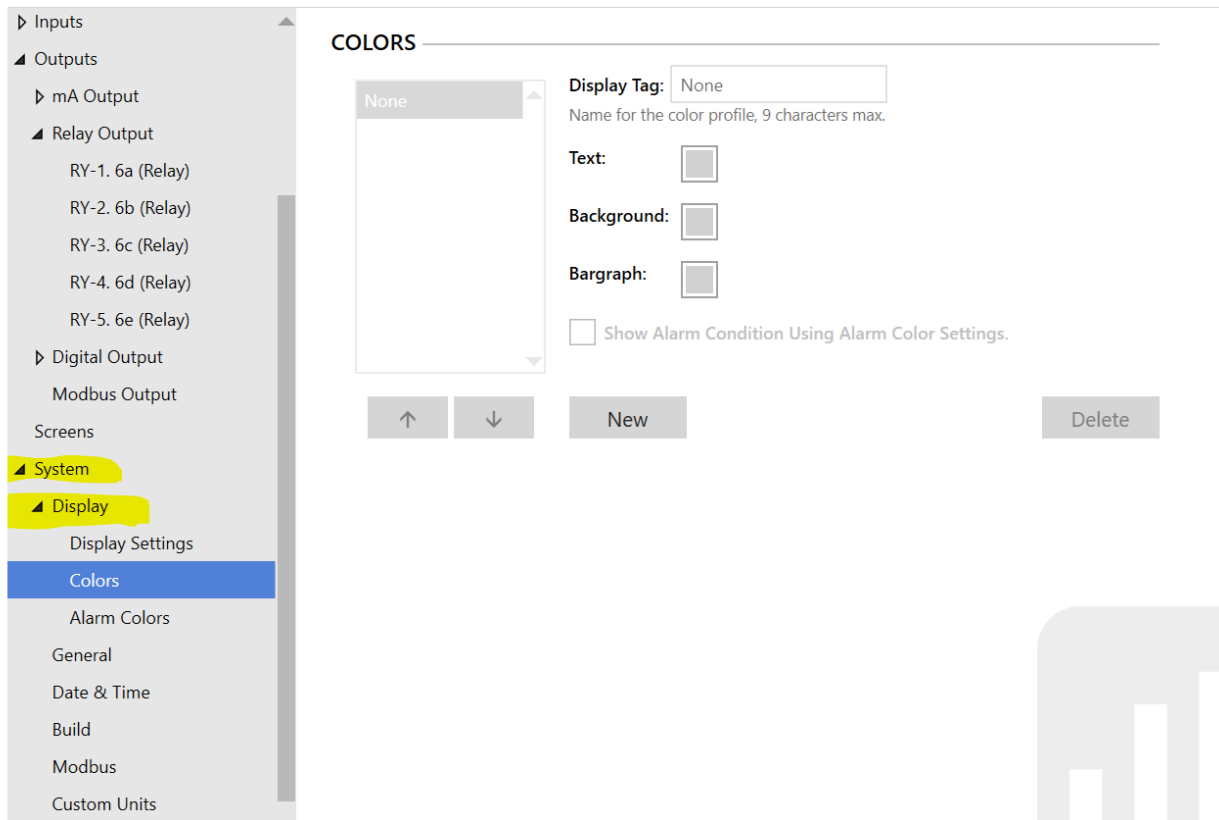
And that brings us to the last section of this MasterClass Session.

How to Create Color Palettes: As you have seen in previous sections, we can create a new color palette “on the fly” when we are creating new objects like timers, channels, and alarms.

There is absolutely nothing wrong with that approach, but there is another way to do it that will allow you to make several palettes at once.

Also note that “Alarms” and all other objects have two completely sets of color palettes. A color palette you make for a Channel will NOT be available for an Alarm unless you create it for the Alarm.

So, the first step is to find the “System” option on the left side of the window, and then find the “Display” option right below that. You can use the screen shot below as a guide:



Under the “Display” option, you will notice that there are two fields for colors. One is just “Colors” and the other is “Alarm Colors”. As I mentioned, alarms and all other objects have separate color palettes, and that is why there are two options for colors.

Regardless of which type of palette you want to create, the process is the same, and it’s extremely simple to do!

There are three objects within a channel or alarm that can have its own assigned color.

Text

Background

Bargraph

You simply click on the object and change its color to whatever you want.

Keep in mind, some colors do not blend that well, so be mindful of your color choices if you are changing the color scheme of a channel.

When setting up colors for a channel or other object, there is checkbox at the bottom of the window. With that box unchecked, your channel will NOT change color under alarm conditions. If you’d like the channel or object to change colors and/or flash in alarm, that box must be checked!

NOTE: When you setup “Alarm Colors” a few more checkboxes appear, and they are simply how you can make a channel or object FLASH (in addition to changing colors) when in alarm mode. Either the Text, Background or Bargraph and be programmed to flash or not.

Once you create a color palette and save it, that color scheme will always be available to you when you create a new channel or alarm. All you have to do is go to the “Color Scheme” field when creating a new channel, and just select your color palette from the list of options!

Now that you have gone through the Intermediate Configuration portion of this session, we are going to start taking a look at how we actually link these different objects we create to configure the device for an actual application.

The first step I wanted to take was to show you the most common objects that are configured with the Consolidator+, and then we will learn how to actually use and apply these different objects!

Next week we are going to take what we learned in the last two sessions and learn how to use them to configure:

- Duplex/Triplex pump controllers
- Configuring leak detection screens
- How to make an annunciator panel
- How to make and USE “Common Alarms”

Sincerely,

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