Application Note - AN-122

VersaCloud M2M Setup - Getting Started

NOTICE

This application note is provided for use as a general example and a guide. Divelbiss assumes no responsibility, liability or warranty regarding this application, its use, functionality or reliability to meet application needs. User assumes all responsibility to ensure all safety precautions are taken when using this application note. This application must not be used alone in applications which would be hazardous to personnel in the event of a failure. Precautions must be taken by the user to provide mechanical and/or electrical safeguards external to this application and controllers shown.

Application Description

AN-122 demonstrates how to setup and use the VersaCloud M2M portal. This Application note will provide step by step instruction on setting up the cloud portal, descriptions of the functions required to activate a control device, instruction on the setup the VersaCloud M2M portal dash board and configuring to data to and from the VersaCloud M2M portal and dash board page.

Equipment Used

VersaCloud M2M Enabled controller or device and VersaCloud M2M Appnote program for specific controller.

Harsh Environment HEC-P5000 Series	
Controller Part #:	HEC-P5000
Programming Software:	EZ LADDER Toolkit V1.2.2.0 or newer
Digital I/O:	On -Board
Application Filename:	HEC-P5XXX AN122.dld
Programming Cable:	HEC-910 & Null Modem

P-Series Bear Bones	
Controller Part #:	ICM-BB-P13-40
Programming Software:	EZ LADDER Toolkit V1.2.2.0 or newer
Digital I/O:	On -Board
Application Filename:	ICM-BB-P13-XX AN122.dld
Programming Cable:	SI-PGM

Versatile Base - VB-2000 Series	
Controller Part #:	VB-2100
Programming Software:	EZ LADDER Toolkit V1.2.2.0 or newer
Digital I/O:	On -Board
Application Filename:	VB-2XXX AN122.dld
Programming Cable:	SI-PGM

VersaGateway	
Controller Part #:	VCG-E-X-X
Programming Software:	EZ LADDER Toolkit V1.2.2.0 or newer
Digital I/O:	On -Board
Application Filename:	VCG-E-X-X AN122.dld
Programming Cable:	SI-PGM

Prerequisites

- VersaCloud M2M Enabled Controller or Device and software (see above)
- Completed and Returned VersaCloud M2M Contract and Activated Account (Contact Divelbiss Sales for contract info).

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Input / Output Description

This Application Note does not require or use any real world Digital I/O.

Program Description

Rungs 1-2:
A quick reference group of variables to view the data and values that are being sent to and received from the VersaCloud M2M portal.

Rung 4-8:
These rungs contain the VCloud_Activate function. This function activates the controller or device on the VersaCloud M2M portal and creates the communication link. Your customized portal must be activated before this function may be used (See Prerequisites). To activate the device on your portal, double-click the ***Activate*** contact and set it to a '1' and click OK. Wait for the variable names ***Result*** to be a value of 68 or 69.

This section needs to be run once per device or controller to activate the controller or device on the VersaCloud M2M portal. During the activation, the activation data is stored and activation for the device is complete. This is a structured text function block was written for the activation of the VersaCloud on the controller or device.

This function can be copied into other programs but you must also copy the structured text in the structured text editing mode. See the P-Series EZ LADDER Toolkit Manual (Structured Text Chapter) for details.

Rungs 10-13:
The VersaCloud M2M portal supports only the REAL and INTEGER variable types. Before sending any other data to the VersaCloud M2M portal, it must be converted to either a REAL or INTEGER variable type.

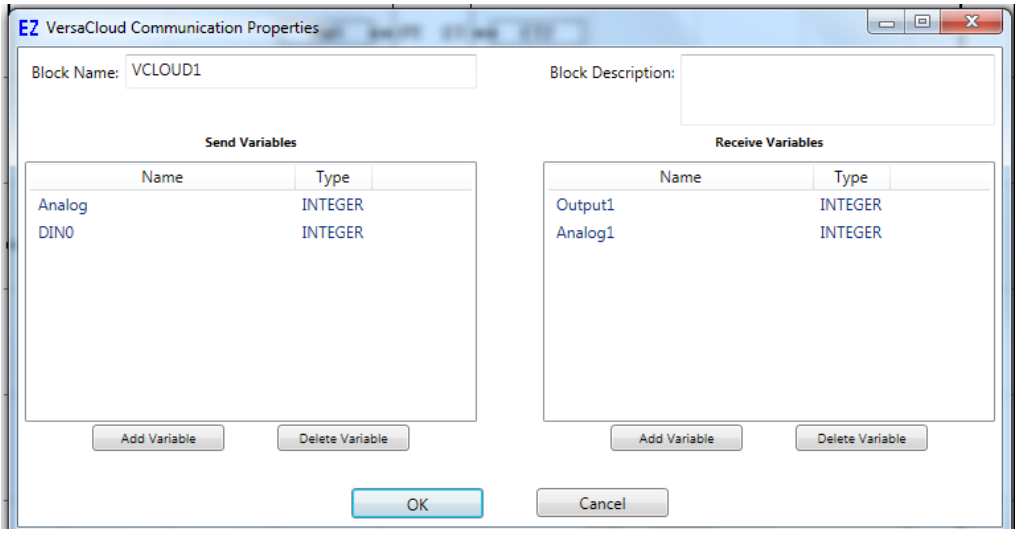
In Rungs 10-13, the variables are converted from BOOLEAN (0, 1 or OFF/ON) types to INTEGERs for communication to and from the VersaCloud M2M portal. As shown, this is how real world I/O (inputs and outputs) are converted to INTEGER variable types for communications to the VersaCloud M2M Portal.

Rungs 17-20:
These rungs provide a repeating timer for triggering communications to the VersaCloud M2M Portal. This section cycles CR3 true for one ladder diagram scan every 10 seconds. CR3 is connected to and triggers the ***Vcloud function block***. As the ***Vcloud function block*** is rising edge sensitive, it will only initiate transmit and receive on the rising edge of the CR3 transition from false to true.

This timer section is an example for the purposes of this application note as the triggering method for device to VersaCloud M2M portal communications. Communications requirements for each application will dictate the source and frequency of communications.

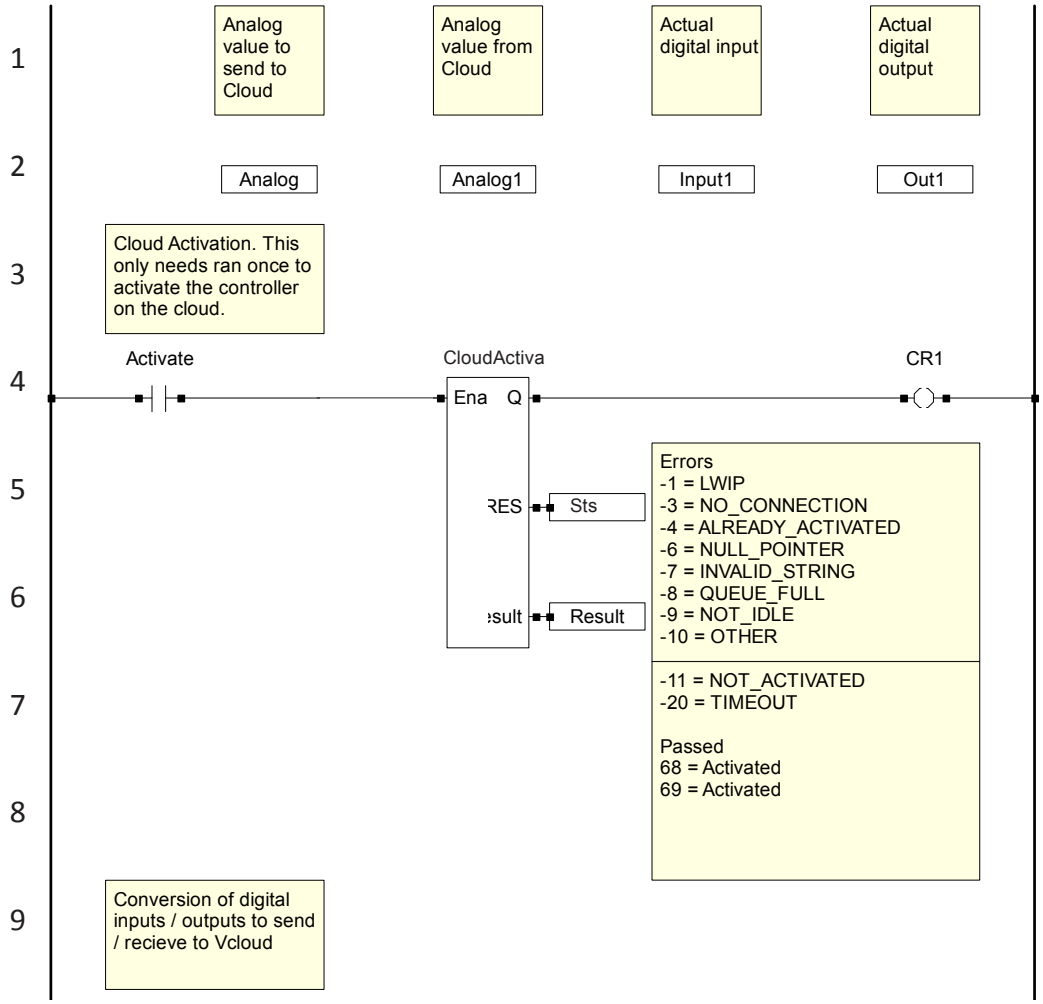
Rungs 22-24:
This section is the actual device to VersaCloud M2M port communications **VCLOUD** function block and supporting connections. The VCLOUD function block is found in the Insert functions tool bar of EZ LADDER Toolkit (VersaCloud must be enabled in the device's Project Settings). When the VCLOUD function block is placed, the data to transmit and receive is configured. For this application note, the software already includes a VCLOUD function block. To edit the transmit / receive data, double-click the VCLOUD1 function block (in EZ LADDER Toolkit's Edit Mode). This will open the VersaCloud Communications Properties dialog.

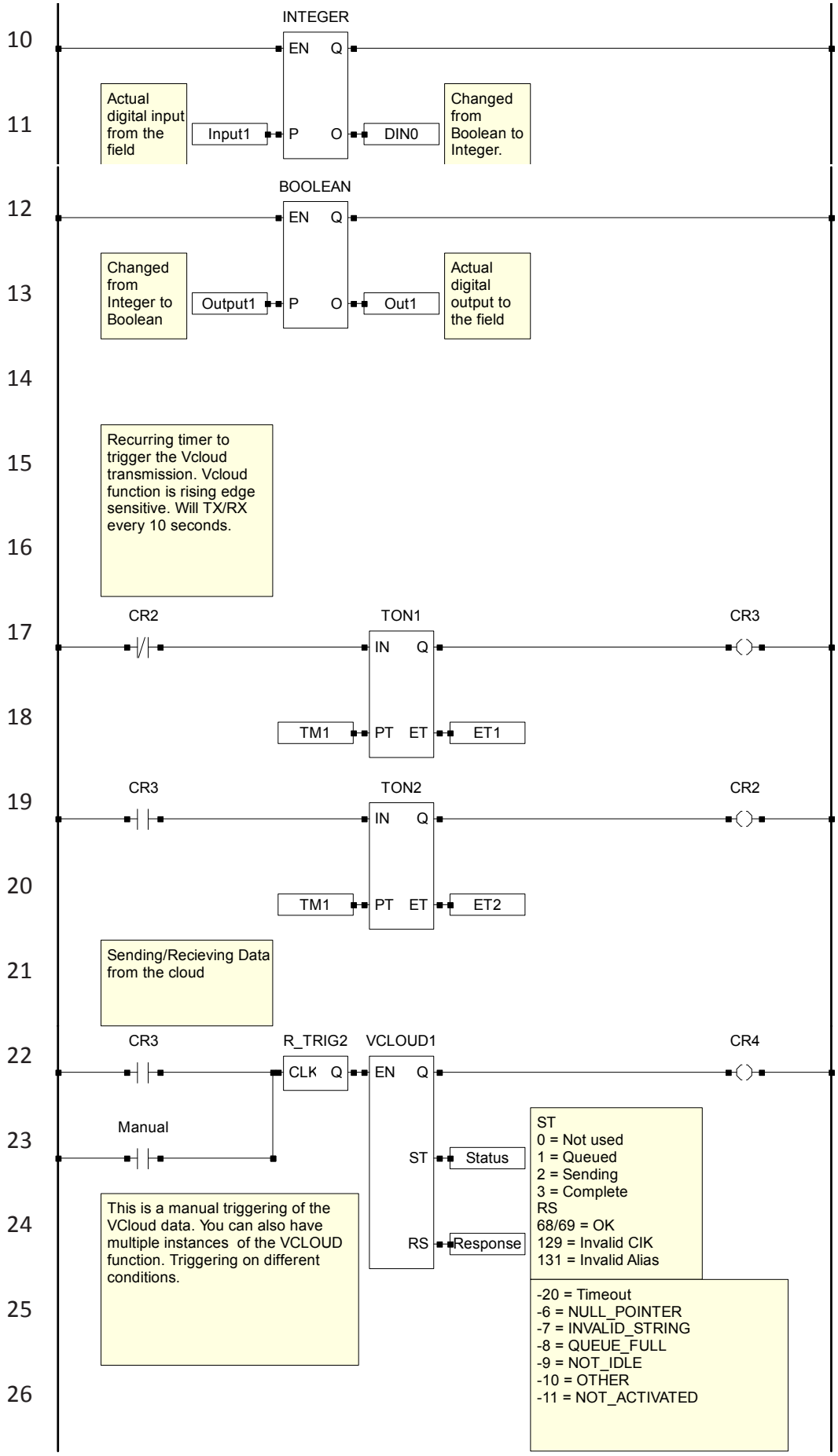
When CR3 transitions from false to true, the VCLOUD1 function block initiates a transmit / receive action between the device and the VersaCloud M2M portal. The VCLOUD1 EN input is edge sensitive. The VCLOUD1 function block has two outputs connected to variables (named Status and Response). Each variable provides feedback to the communications. A variable *Response* of 68 or 69 means identified successful communication to the VersaCloud M2M Portal. Additional codes for the Status (ST) and Response (RS) are provided in the comment / text block for reference only and are not covered in this application note.



VCLOUD function block - VersaCloud Communication Properties Dialog

Ladder Diagram




10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
INTEGER
EN
Q
P
O
Input1
DIN0
Actual digital input from the field
Changed from Boolean to Integer.
BOOLEAN
Output1
Out1
Changed from Integer to Boolean
Actual digital output to the field
Recurring timer to trigger the Vcloud transmission. Vcloud function is rising edge sensitive. Will TX/RX every 10 seconds.
CR2
TON1
CR3
IN
PT
ET
TM1
ET1
CR3
TON2
CR2
ET2
Sending/Recieving Data from the cloud
CR3
R_TRIG2
CLK
VCLOUD1
CR4
Manual
ST
RS
Status
Response
This is a manual triggering of the VCloud data. You can also have multiple instances of the VCLOUD function. Triggering on different conditions.
ST
0 = Not used
1 = Queued
2 = Sending
3 = Complete
RS
68/69 = OK
129 = Invalid CIK
131 = Invalid Alias
-20 = Timeout
-6 = NULL_POINTER
-7 = INVALID_STRING
-8 = QUEUE_FULL
-9 = NOT_IDLE
-10 = OTHER
-11 = NOT_ACTIVATED

VersaCloud M2M Portal Setup & Activation

VersaCloud M2M Portal Setup and Activation requires a completed Divelbiss Corporation Monthly Telematics Data Services Contract and a completed Divelbiss Corporation Telematics Data Services Enrollment Worksheet. Contact Divelbiss Corporation sales for more information regarding the contract and enrollment worksheet.

Red arrows indicate points of interest in images and Figures in the remaining sections of this application note.

1. With a completed contract and enrollment worksheet, your VersaCloud M2M portal will be provisioned. Go to **https://portals.versacloudm2m.com**. Log-in using the provided credentials (username and password provided by Divelbiss Corporation). Refer to Figure 1.

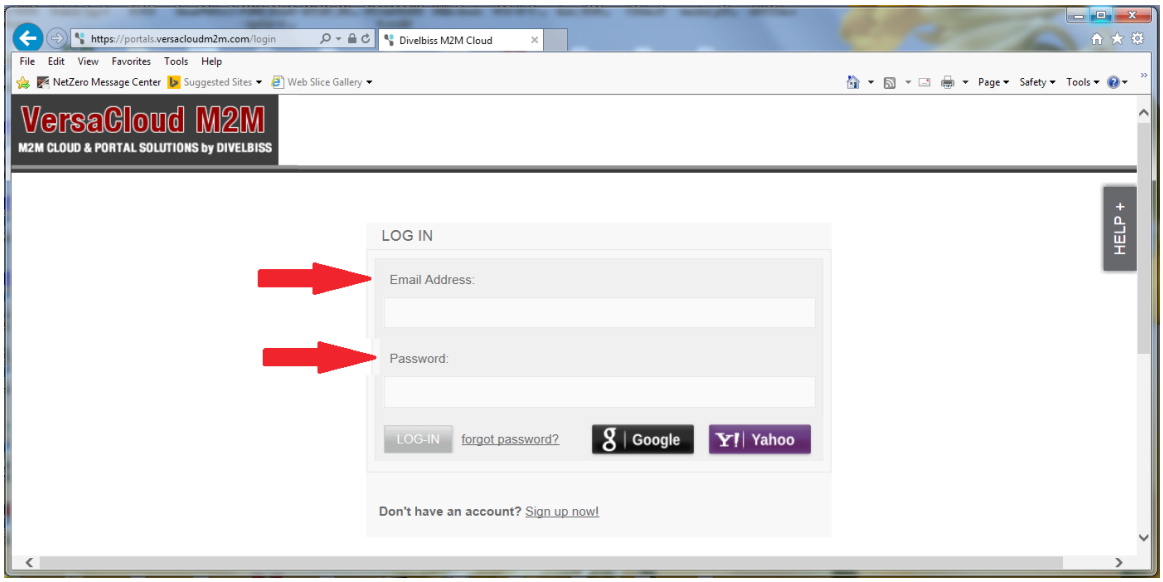


Figure 1 - Portal Log-in

With a successful log-in, you will be re-directed to your default blank dash board page. Refer Figure 2.

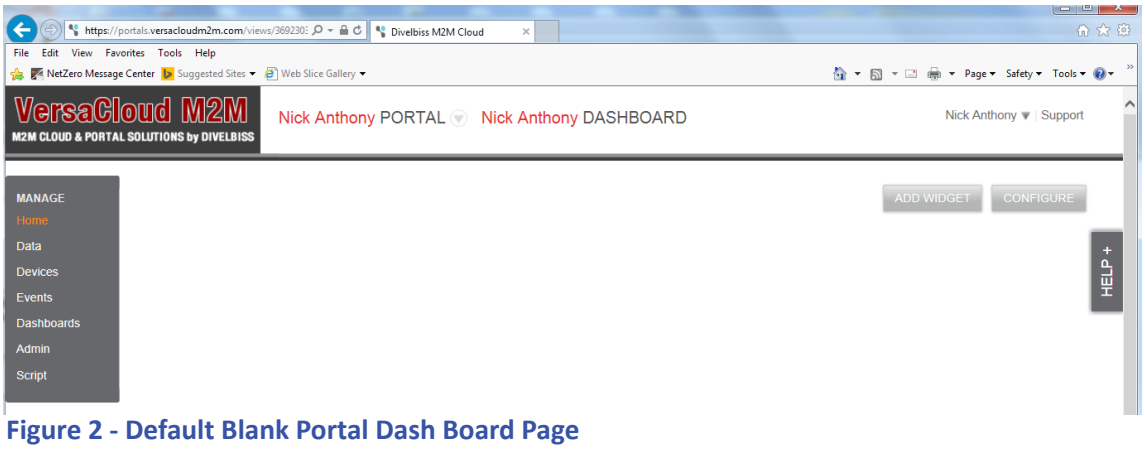


Figure 2 - Default Blank Portal Dash Board Page

2. The next step is to 'add' the device or controller that will communicate to the VersaCloud M2M and your exclusive portal. Click the **Devices** selection located on the dash board page side menu (Refer to Figure 3). The Devices page will open.

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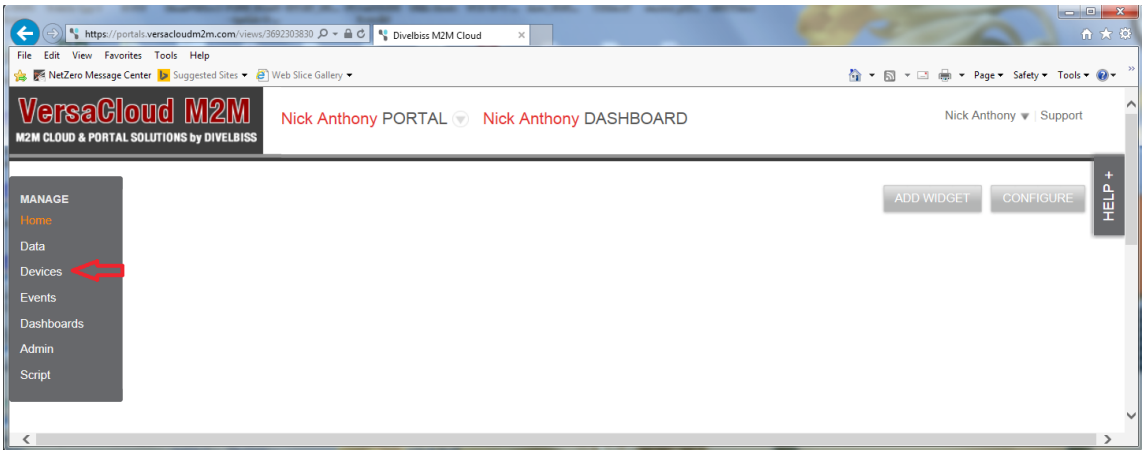

Figure 3 - Devices Selection - Side Menu

This Devices page (Refer to Figure 4) will list all the added devices your VersaCloud M2M portal. As a new portal, there are no devices listed. To add a new device, click the **Add Device** link at the top right of the page. The ***Device Setup*** dialog will open (Refer to Figure 5). Keep all the default selections. Click the **Continue** button. This will open the next dialog in the wizard (the Device Setup). Refer to Figure 6.

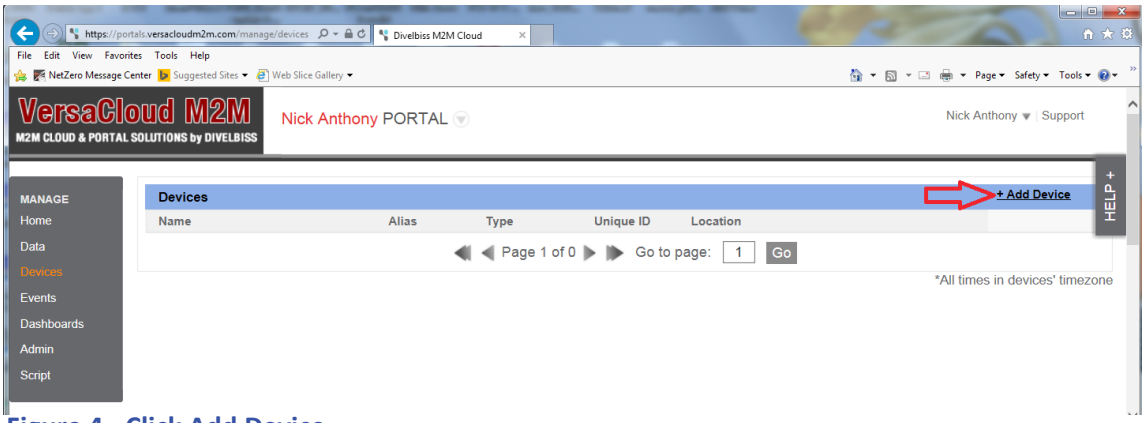

Figure 4 - Click Add Device

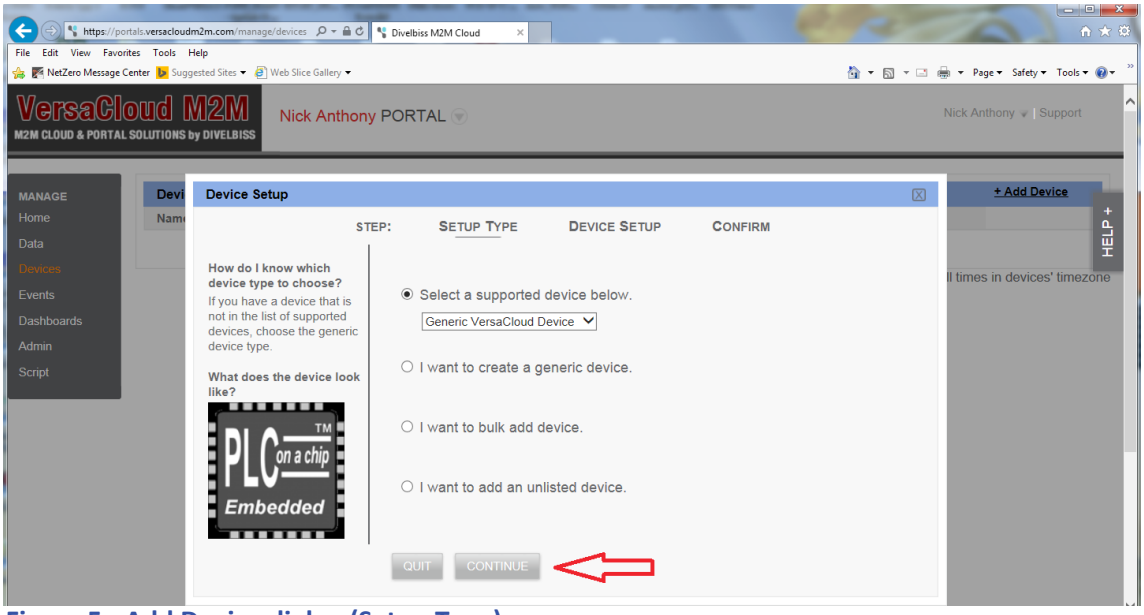

Figure 5 - Add Device dialog (Setup Type)

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The dialog's Enter Device Serial Number and Please Enter a Device Name should be completed. The Please enter a device location is an optional field for GPS location. This field will be ignored at this time.

Locate your controller / device's serial number. This is found on the outside of the device if it is mounted in an enclosure. If it is a open board type (PCB-printed circuit board) then it is located on a label on the PCB itself. The serial number is a sequence of numbers similar to 100XXXXX. Enter / type the serial number in the 'Enter Device Serial Number' field.

Enter a description for the device in the 'Please Enter a Device Name' field. This should be a description that is meaningful to help you identify this device from other devices in a list. Click the **Continue** button. This will open the next dialog in the wizard (the Confirmation). Refer to Figure 7.

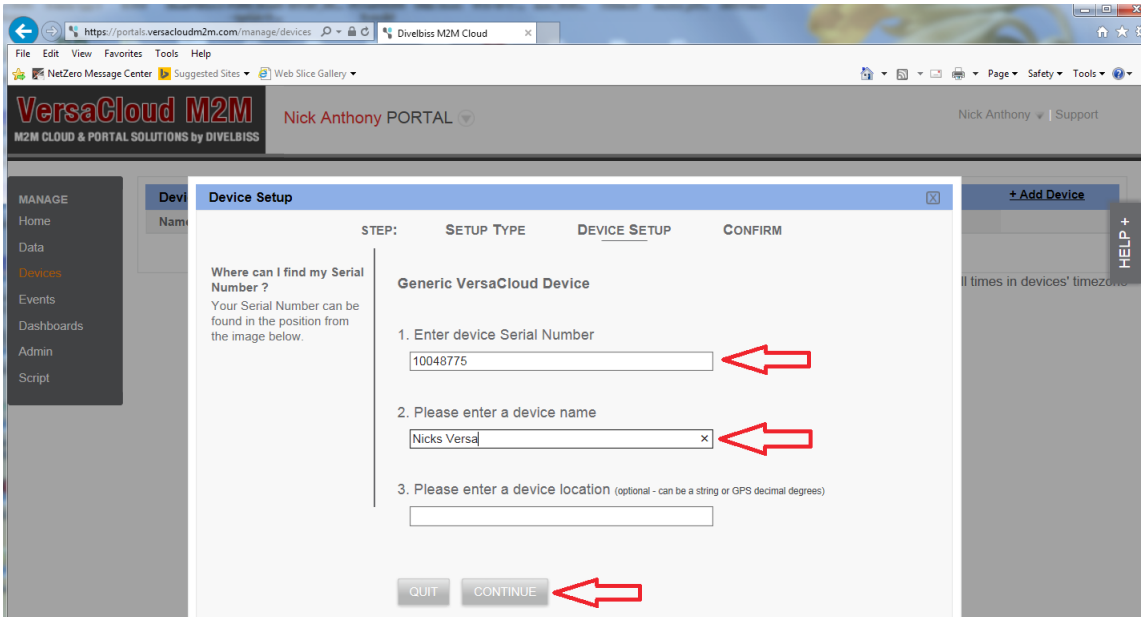

Figure 6 - Add Device dialog - Device Setup

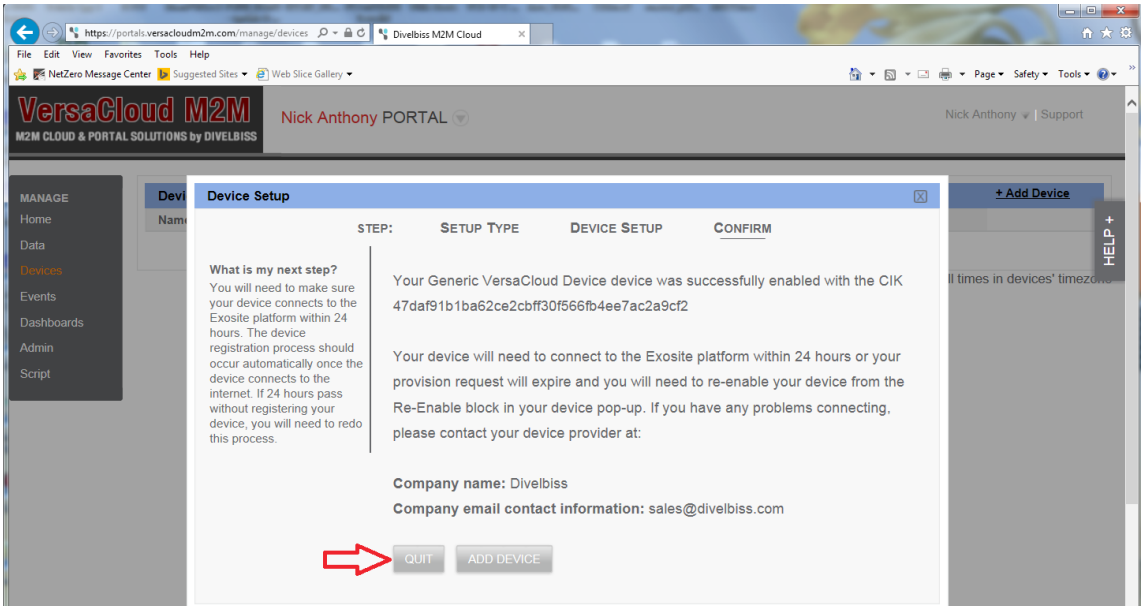

Figure 7 - Add Device dialog - Confirmation

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This dialog (Refer to Figure 7) summarizes that you are adding a device and lists some information. Click the **Quit** button to complete the wizard and finish adding the device. The wizard will close and the device that was added will be listed. Refer to Figure 8.

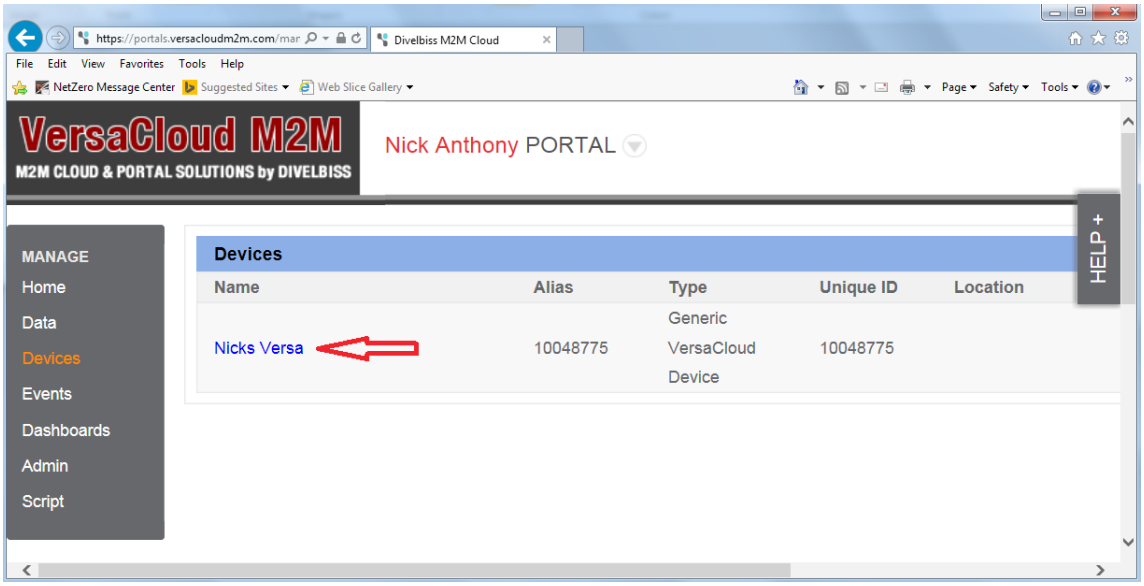

Figure 8 - Device Successfully Added

There is a 24 hour window beginning when a device is added to the VersaCloud M2M portal for the actual device to make a connection to the portal (using the VCloud_Activate function in the device's EZ LADDER ladder diagram program) and activate the device. See the ladder diagram description in this application note.

Failure to activate the device in this 24 hour window will require the device to be re-enabled in your VersaCloud M2M portal before the device can be activated and communicate to the portal.

3. With the device added to the portal, data points must be added and configured. These points are the data that will transmitted between the device and your VersaCloud M2M portal. Click the **Data** selection located on the dash board page side menu (Refer to Figure 9). The Data page will open. Refer to Figure 10.

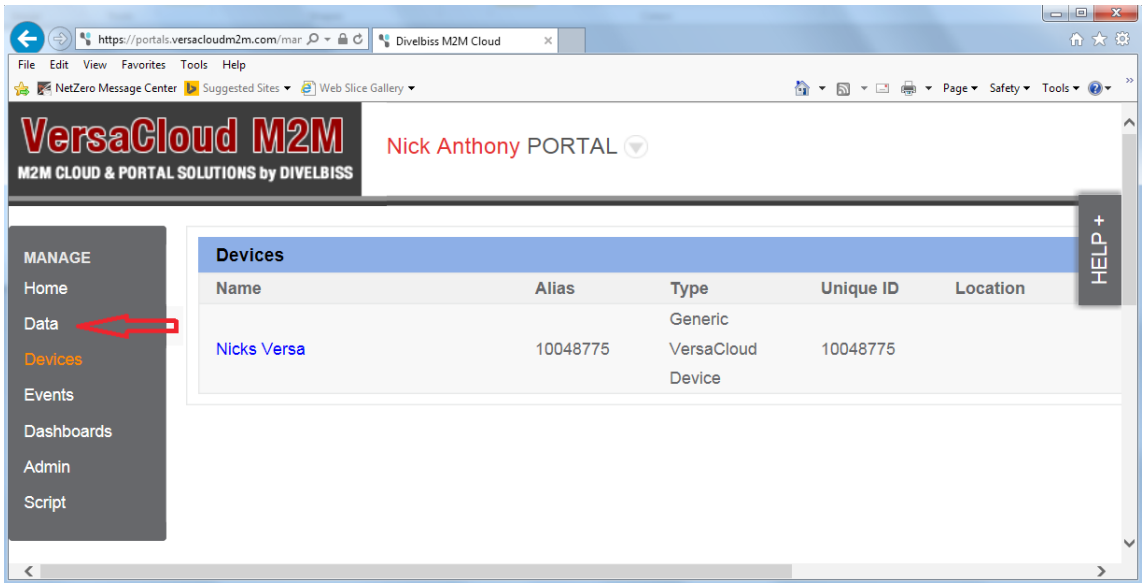

Figure 9 - Select Data Link

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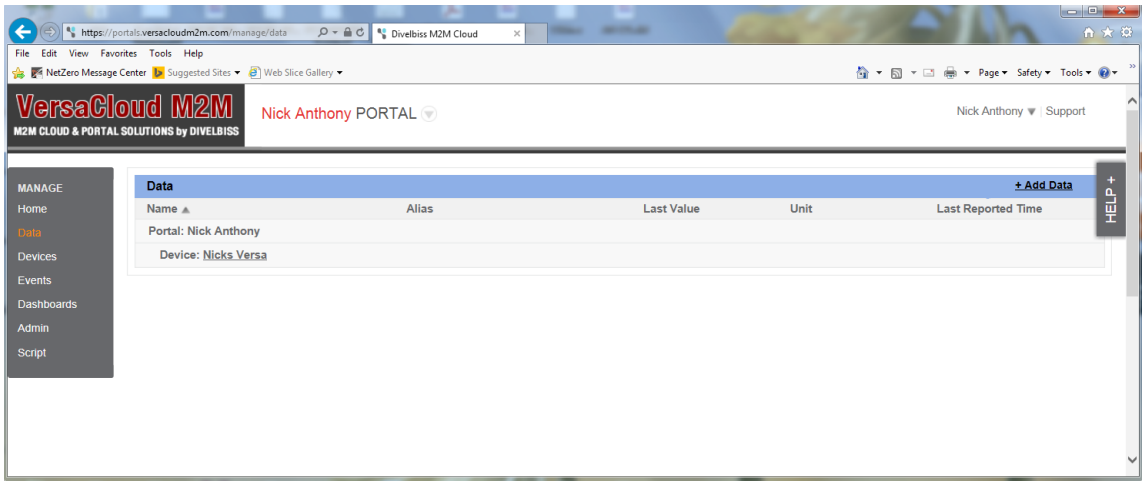

Figure 10 - Data Page

Refer to Figure 11. Click the **Add Data** link. This Data Setup dialog will open. Refer to Figure 12.

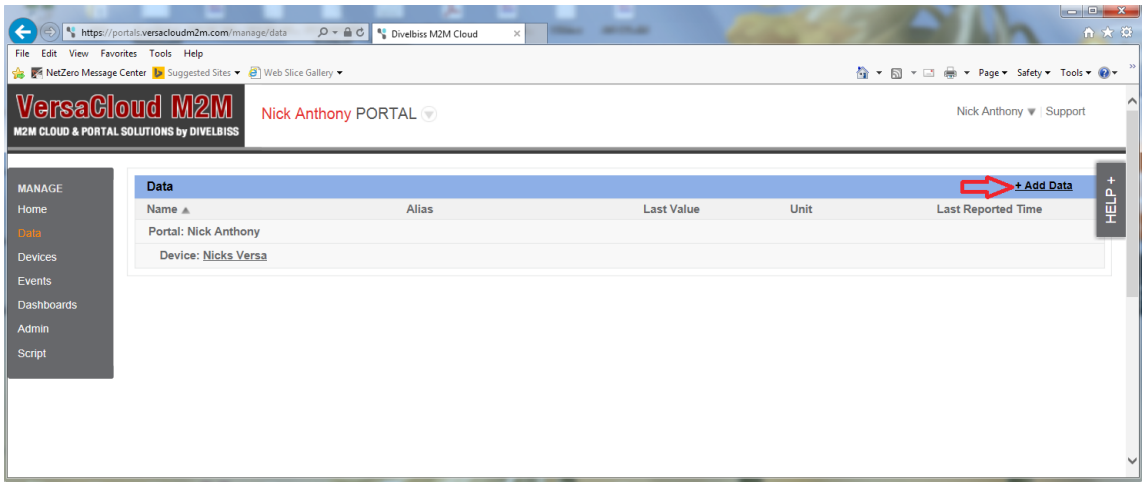

Figure 11 - Data Page - Add Data

Refer to Figure 12. In this dialog, select the device the data to transmitted to and received from. Select the option ***From a Device*** and from the drop-down menu next to the selection, choose the device to communicate to/from (origin). With the device selected, click the **Continue** button. The next wizard dialog will open (Configuration).

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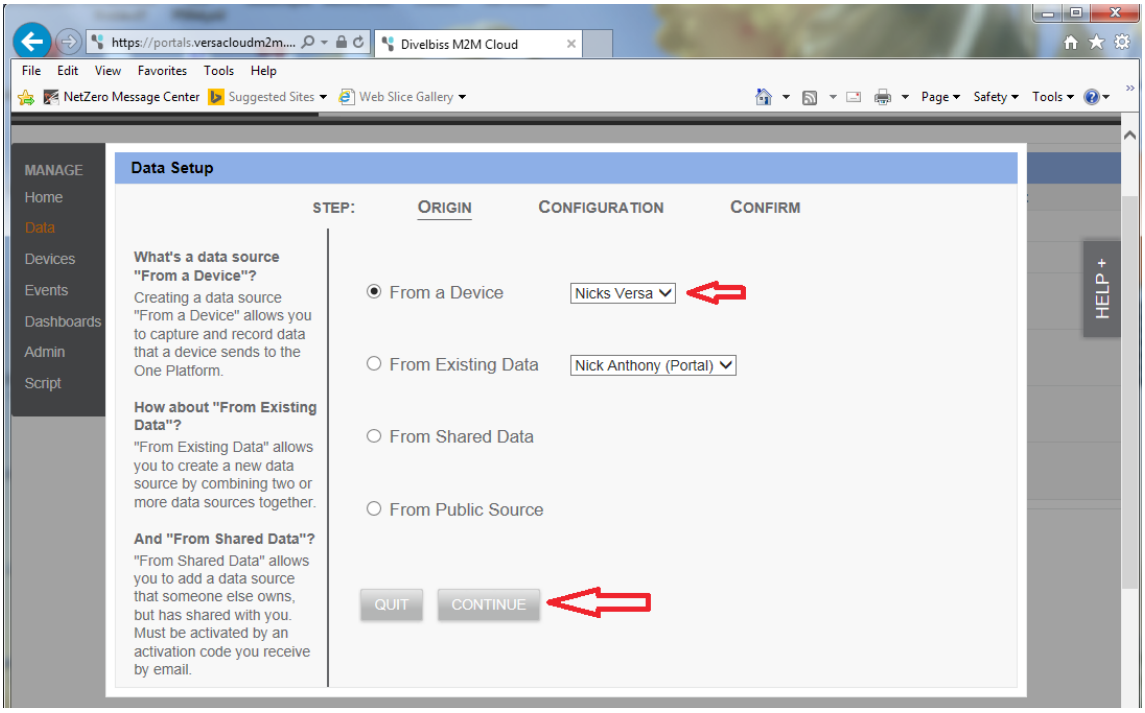

Figure 12 - Data Setup - Origin

Refer to Figure 13. From this wizard dialog (Configuration), Enter the ***Data Source Name*** in the field. This name can be anything, although as shown it should be descriptive of the data source (in this case a DIN0 for digital input 0).

Using the ***Data Source Format*** drop-down menu, select the type of data for the data point. The choices are integer and float (known in EZ LADDER as REAL). This selection must match the type of variable that is being received or transmitted to/from the device (type of variable in the ladder diagram).

Enter the ***Alias*** in the appropriate field. The entered Alias must match exactly the name of the variable in the ladder diagram on the device (as entered in the Vcloud function block of the ladder diagram). With the information completed, click the **Submit** button.

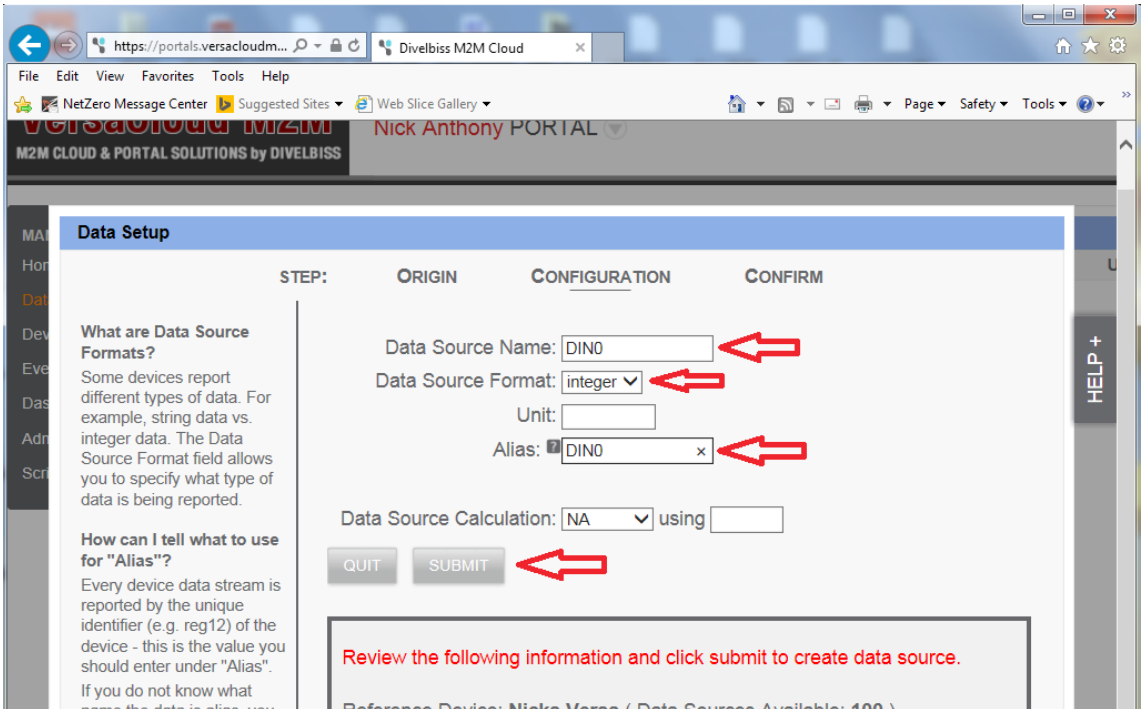

Figure 13 - Data Setup - Configuration

The Data Setup Confirmation dialog will be shown. Refer to Figure 14. This dialog confirms that the data point was added. Click the **Quit** button. The steps to add a data point must be repeated for each data point (variable) that will be transmitted / received between the device and your VersaCloud M2M portal. Add all the required data points. Refer to Figure 15.

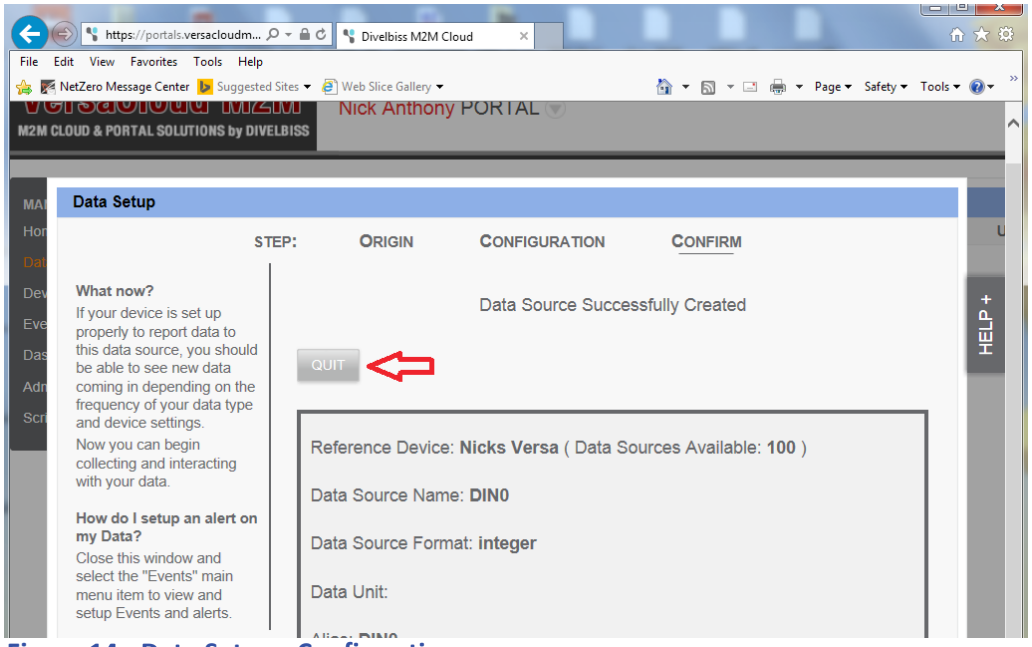

Figure 14 - Data Setup - Confirmation

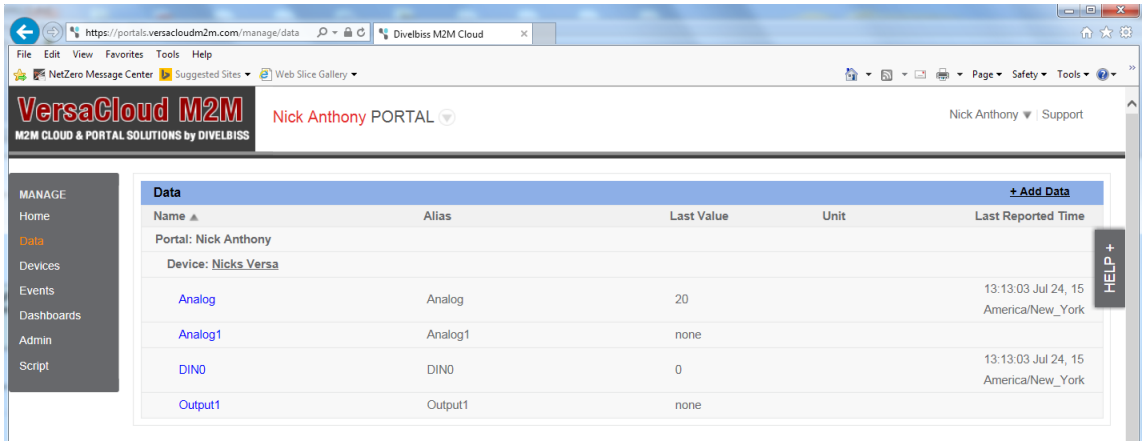

Figure 15 - All Data Points Added

4. Click the **Home** selection located on the dash board page side menu to return to the HOME page.

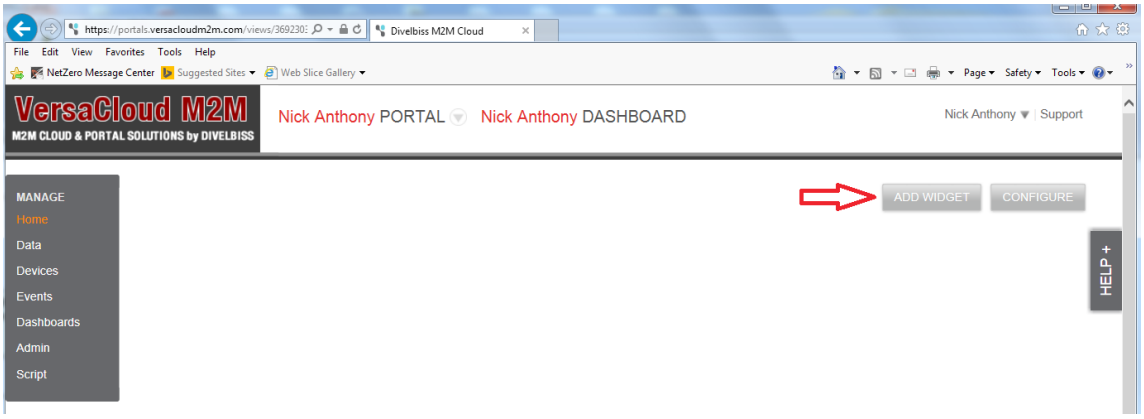

Figure 16 - Home - Add a Widget

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With the data points added, the widgets must be added to the portal dash board page so the data points may be displayed and manipulated.

To add a widget, click the ***Add Widget*** button. Refer to Figure 16. The ***Add Widget*** (Type) dialog will open. Refer to Figure 17. In this dialog, select the type of widget to add (Widget Type). For this application note, select the *On/Off Switch*. Enter the title for the widget (Block Title). The title can be anything, but should be descriptive for the widget and data point it will represent. Click the **Continue** button. The Add Widget - Config dialog will open.

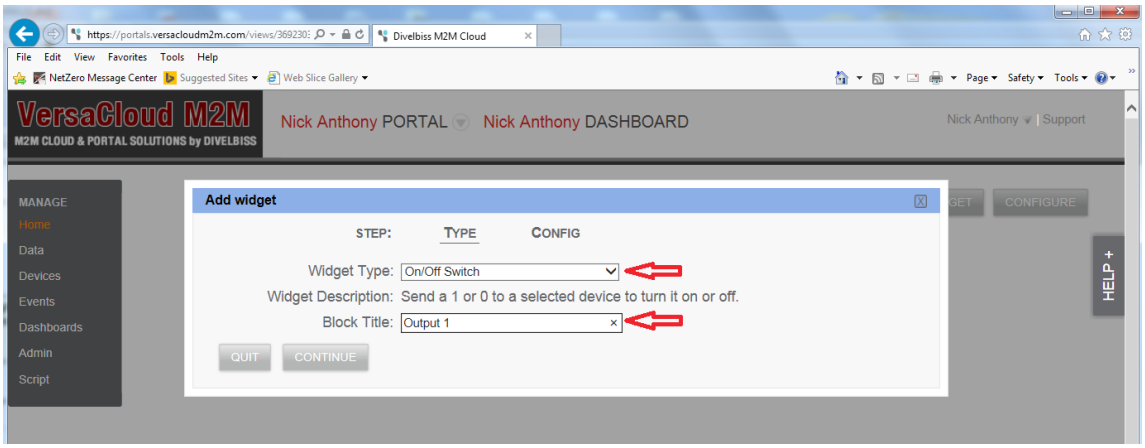

Figure 17 - Add Widget - Type

Refer to Figure 18. In the Add Widget - Config dialog, select the ***Widget Size*** from the drop-down menu. For this example, select the *1 x 1 size*.

Select the ***Data Source*** that to be assigned (associated with) to this widget from the drop-down menu. For this example, select to *Output1* (for the Output1 variable data point previously added).

Enter the ***Refresh Rate*** in seconds. For this example, enter 10 (seconds). This is the rate at which data is updated between the device and your VersaCloud M2M portal (this widget). A 10 second refresh rate is approximately the fastest refresh rate that can be sustained based on communications requirements.

With the entries complete, Click the **Submit** button. A Submitted successfully dialog will open to confirm the widget addition.. Click **Quit** to exit the dialog. The widget to control one output on the device has been added.

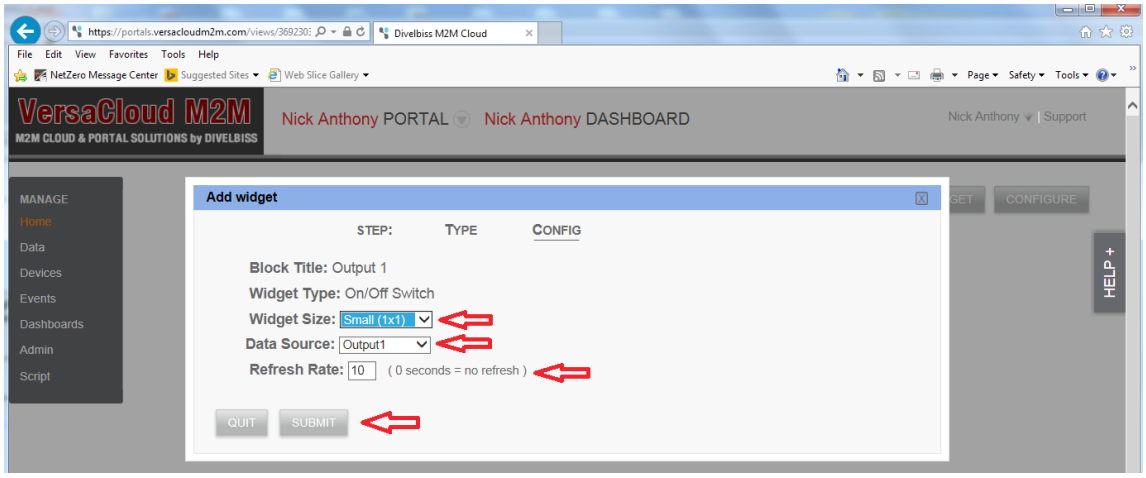

Figure 18 - Add Widget - Config

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5. With a widget added for Output1, one must be added to monitor / read a input value. As before, from the HOME page, click the ***Add Widget*** button. Refer to Figure 19. In this dialog, select the type of widget to add (Widget Type). For this application note, select the *Custom Widget*. Enter the title for the widget (Block Title). The title can be anything, but should be descriptive for the widget and data point it will represent. Click the **Continue** button. The Add Widget - Config dialog will open.

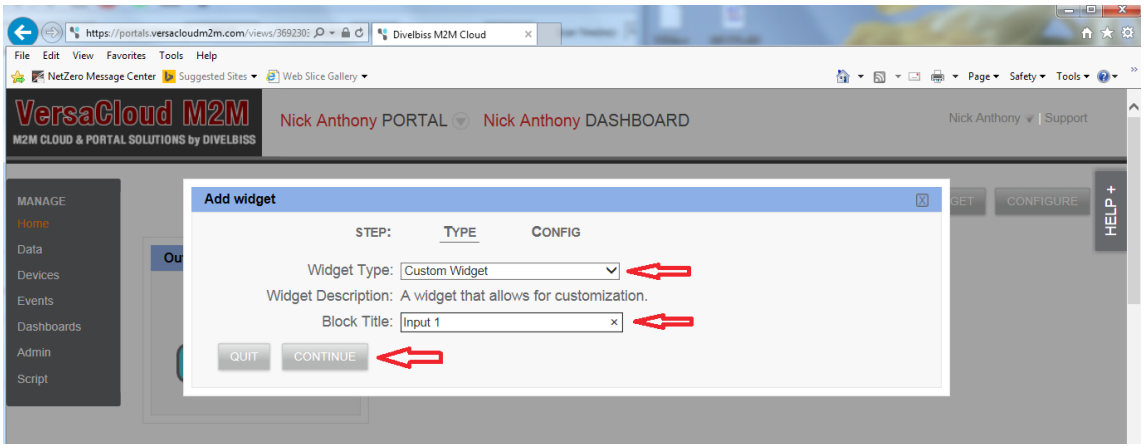

Figure 19 - Add Widget - Type

Refer to Figure 20 (next page).

Set the ***Width*** to *1* and the ***Height*** to *1*. This sets the widget size on the dash board page.

Select *DIN0* in the ***Data Source*** pane by checking the *DIN0* check box. This selects the data point as the source for the widget's data that will be displayed.

Using the ***Script Template*** drop-down menu, select *Status* from the choices. This selects the widget template and thus the widget script for the template.

Enter the ***Refresh Rate*** in seconds. For this example, enter 10 (seconds). This is the rate at which data is updated between the device and your VersaCloud M2M portal (this widget). A 10 second refresh rate is approximately the fastest refresh rate that can be sustained based on communications requirements.

With the entries complete, Click the **Submit** button. A Submitted successfully dialog will open to confirm the widget addition.. Click **Quit** to exit the dialog. The widget to control one output on the device has been added.

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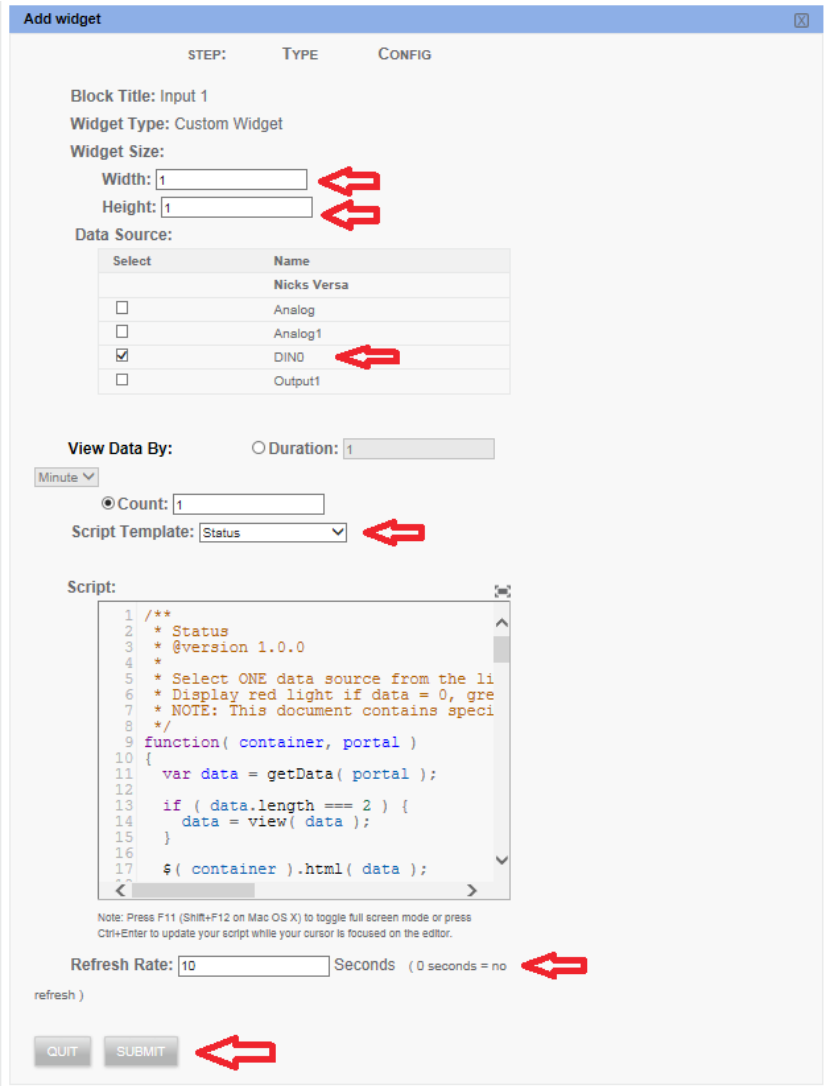

Figure 20 - Add Widget - Config

6. With a widget added to monitor an input value, one must be added to monitor / read an analog input source. As before, from the HOME page, click the ***Add Widget*** button. Refer to Figure 21. In this dialog, select the type of widget to add (Widget Type). For this application note, select the *Gauge*. Enter the title for the widget (Block Title). The title can be anything, but should be descriptive for the widget and data point it will represent. Click the **Continue** button. The Add Widget - Config dialog will open.

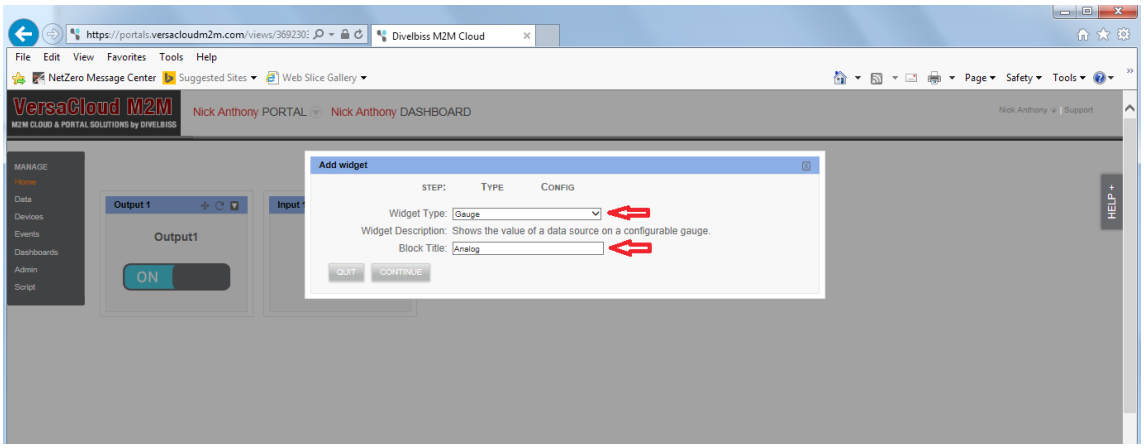

Figure 21 - Add Widget - Type

Refer to Figure 22. Select *Analog* from the ***Data Source*** drop-down menu. This selects the data point as the source for the widget's data that will be displayed.

Enter the ***Refresh Rate*** in seconds. For this example, enter 10 (seconds). This is the rate at which data is updated between the device and your VersaCloud M2M portal (this widget). A 10 second refresh rate is approximately the fastest refresh rate that can be sustained based on communications requirements.

With the entries complete, Click the **Submit** button. A Submitted successfully dialog will open to confirm the widget addition.. Click **Quit** to exit the dialog. The widget to control one output on the device has been added.

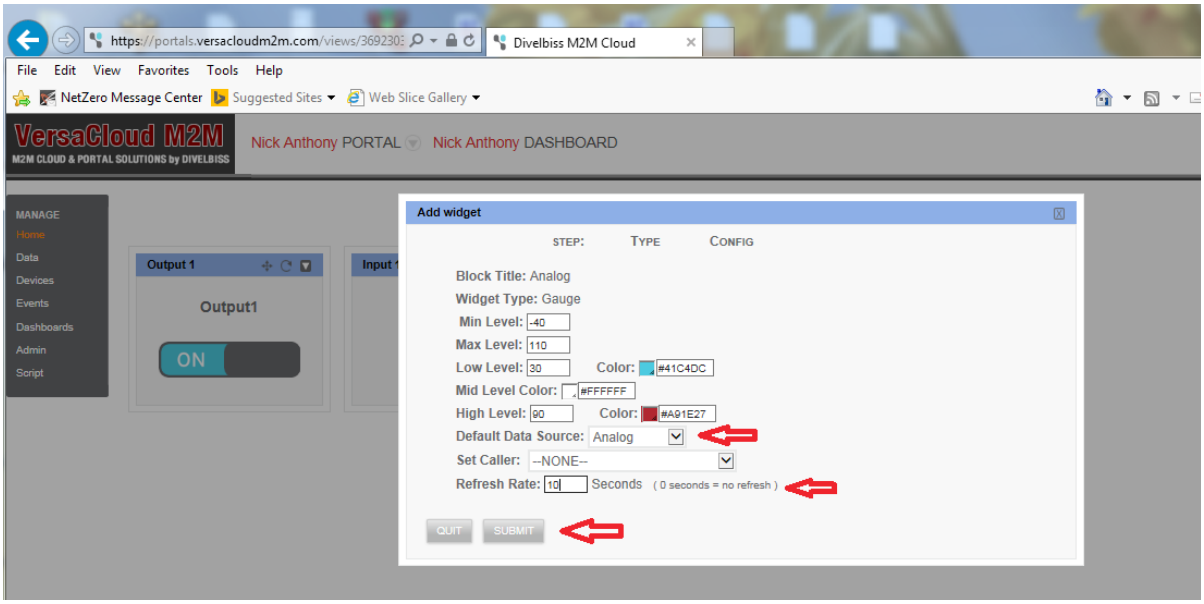

Figure 22 - Add Widget - Config

7. With a widget added to an analog value, one must be added to send an integer value to the device from the dash board page. As before, from the HOME page, click the ***Add Widget*** button. Refer to Figure 23. In this dialog, select the type of widget to add (Widget Type). For this application note, select the *Custom Widget*. Enter the title for the widget (Block Title). The title can be anything, but should be descriptive for the widget and data point it will represent. Click the **Continue** button. The Add Widget - Config dialog will open.

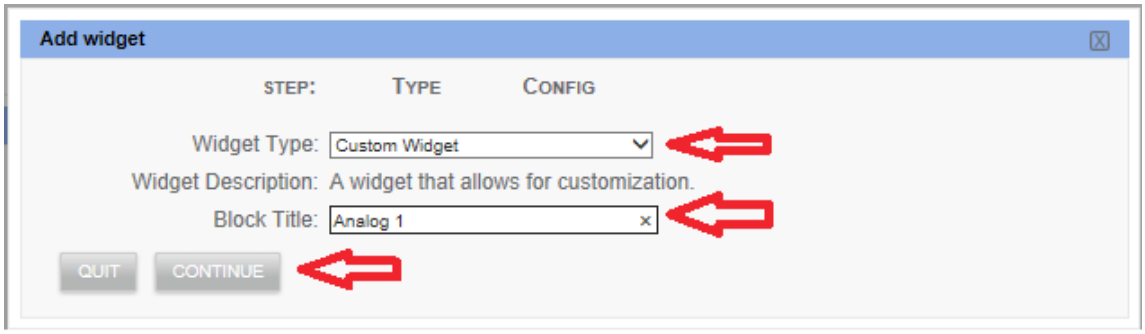

Figure 23 - Add Widget - Type

Refer to Figure 24 (next page).Set the ***Width*** to *1* and the ***Height*** to *1*. This sets the widget size on the dash board page.

Select *Analog1* in the ***Data Source*** pane by checking the *Analog1* check box. This selects the data point as the source for the widget's data that will be displayed.

Using the ***Script Template*** drop-down menu, select *Form* from the choices. This selects the widget template and thus the widget script for the template.

Enter the ***Refresh Rate*** in seconds. For this example, enter 10 (seconds). This is the rate at which data is updated between the device and your VersaCloud M2M portal (this widget). A 10 second refresh rate is approximately the fastest refresh rate that can be sustained based on communications requirements.

With the entries complete, Click the **Submit** button. A Submitted successfully dialog will open to confirm the widget addition.. Click **Quit** to exit the dialog. The widget to control one output on the device has been added.

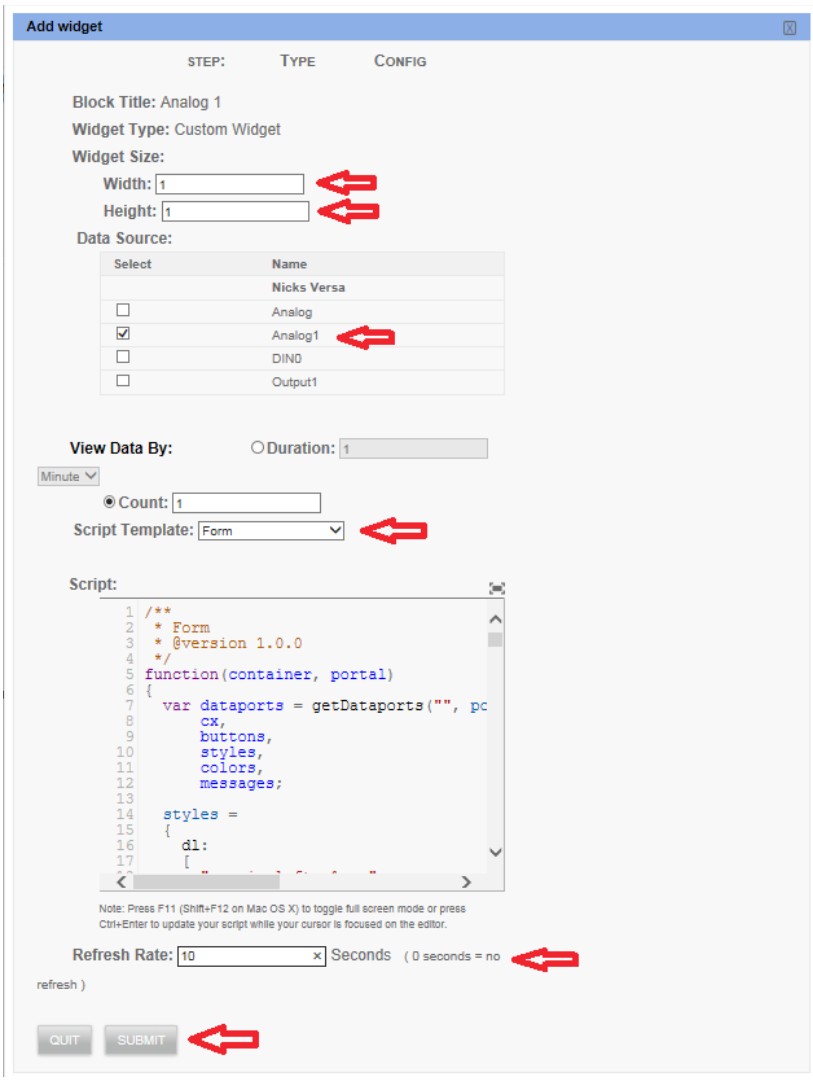

Figure 24 - Add Widget - Config

8. Click the **Home** selection located on the dash board page side menu to return to the HOME page. Refer to Figure 25. With all the widgets in the application note added to the dash board page, it should be similar to Figure 25. The widgets may be positioned and spaced as required.

Run the device or controller with the appropriate application note ladder diagram (as described earlier in the application note. Verify the controller is attached to the internet via Ethernet (this application note is designed to used Ethernet for the internet connection; other methods may be used but will require additional configuration on the device or controller). Activate the device (only required once) as previously described in the ladder diagram section of the application note.

The variables in the ladder diagram may be manipulated by double-clicking and changing the values. Controls in the VersaCloud M2M portal dash board page may be manipulated. Changing data on the portal or in the ladder diagram should cause an update to occur on the other (after a delay for communications). Verify the data can be manipulated and the results viewed on the portal dash board and in the ladder diagram.

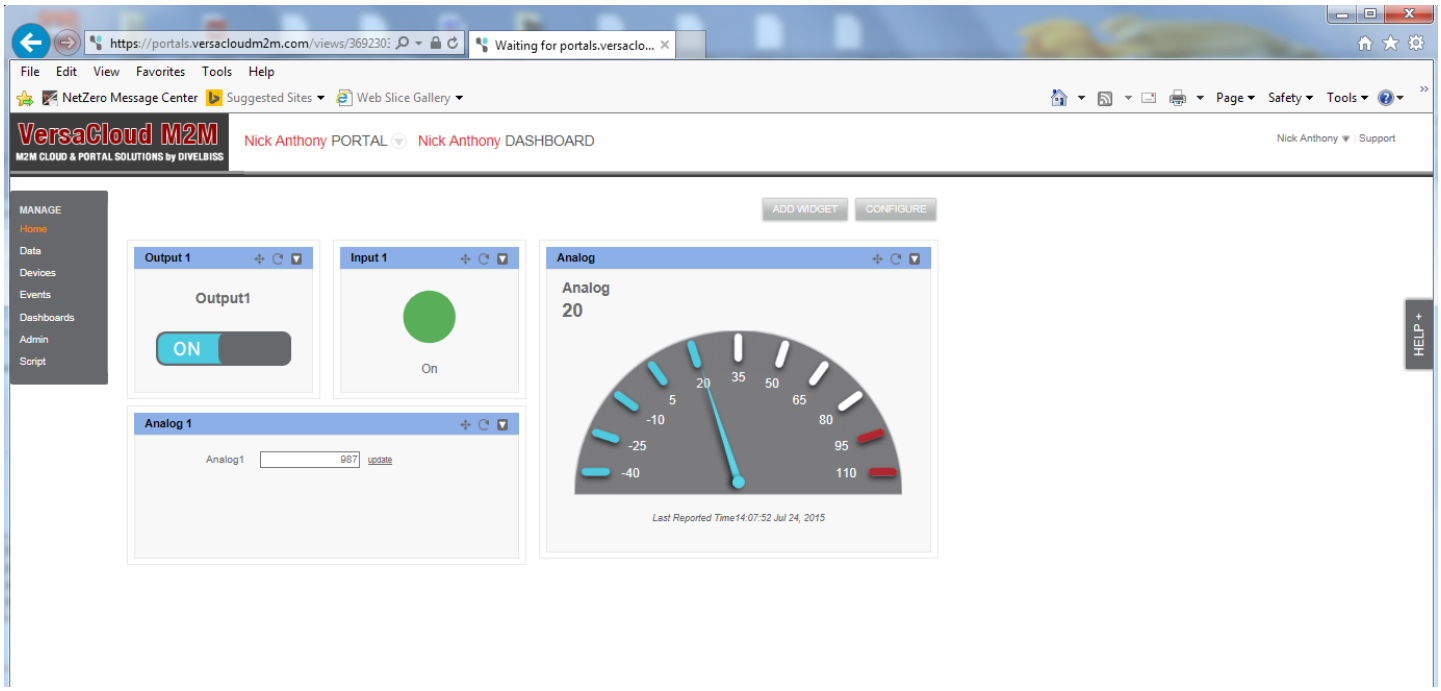

Figure 25 - Completed Application Note Portal Dash Board