

Applications Guide



Contents

General Information	2
Important Notices.....	2
Introduction.....	2
Accessories	3
Trend Log Graphs.....	4
Viewing from the Object Page	4
Viewing from a Graphics Page	8
Creating Custom Tables.....	12
Navigating Graphics Pages Via Drop-Down Boxes	16
Introduction.....	16
Creating the Drop-Down Box	18
Navigation Notes	18
Index.....	19

General Information

Important Notices

The KMC logo and KMC Controls are registered trademarks of KMC Controls, Inc. Other products and name brands mentioned may be trademarks of their respective companies or organizations.

All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the written permission of KMC Controls, Inc.

The material in this document is for information purposes only. **The contents and the product it describes are subject to change without notice.** KMC Controls, Inc. makes no representations or warranties with respect to this document. In no event shall KMC Controls, Inc. be liable for any damages, direct or incidental, arising out of or related to the use of this document.

Introduction

This document gives information on accessories, configuration, and various applications.

For **mounting, connection, configuration, operation, and troubleshooting information**, see the **BAC-A1616BAC Building Controller Installation and Operation Guide**.

For **specifications and other information**, see the **BAC-A1616BAC Building Controller Data Sheet**.

The latest support files are always available on <https://partners.kmccontrols.com/>, the Partner site of the KMC Controls public web site (www.kmccontrols.com).

See also the Help system in TotalControl Design Studio.

Specifications, design, and operation are subject to change without notice.

Accessories

Enclosures

- HCO-1035** Steel control panel enclosure, 20 W x 24 H x 6" D
- HCO-1036** Steel control panel enclosure, 24 W x 36 H x 6" D



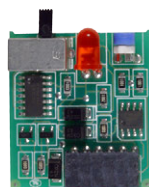
Replacement Parts

- HPO-0054** Replacement fuse bulb
- HPO-0063** Replacement two-pin jumper



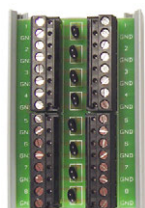
Output Override Boards

- HPO-6701** Triac output override board
- HPO-6702** 0–10 VDC analog, with adjustable override pot., output override board
- HPO-6703** NO relay output override board
- HPO-6704** 4–20 mA current loop output override board
- HPO-6705** NC relay output override board
- HPO-6802** Raised cover, with labels, for output override boards



Repeater and Surge Suppression

- HPO-0071** Eight-input transient suppressor board
- HPO-0070** Twelve-output transient suppressor board
- KMD-5567** EIA-485 network surge suppressor module
- KMD-5575** EIA-485 network repeater/isolator



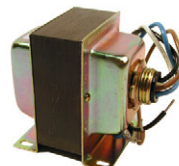
Expansion and Interfaces

- CAN-A168EIO** I/O expansion module
- KMD-5569** Modem (for dial-up point-to-point, approved for BAC-A1616BC use)
- KMD-5672** EIA-232 to female DB-9 PC connector cable (for Serial 2 debug port)



Transformers

- XEE-6111-040** Transformer, 120-to-24 VAC, 40 VA, single-hub
- XEE-6112-040** Transformer, 120-to-24 VAC, 40 VA, dual-hub
- XEE-6111-100** Transformer, 120-to-24 VAC, 96 VA, single-hub
- XEE-6112-100** Transformer, 120-to-24 VAC, 96 VA, dual-hub



Trend Log Graphs

Viewing from the Object Page

Starting with firmware version R2.0.0.5, a graphical view of a trend log buffer was added to the Trend Log object web page. Two icons allow selection of (new) graph or (existing) tabular views. Click the desired view.

The Graph page visualizes the current contents of the trend buffer and allows the user to zoom, scroll, and see sampled points, values, and dates. See the screen captures on the following pages.

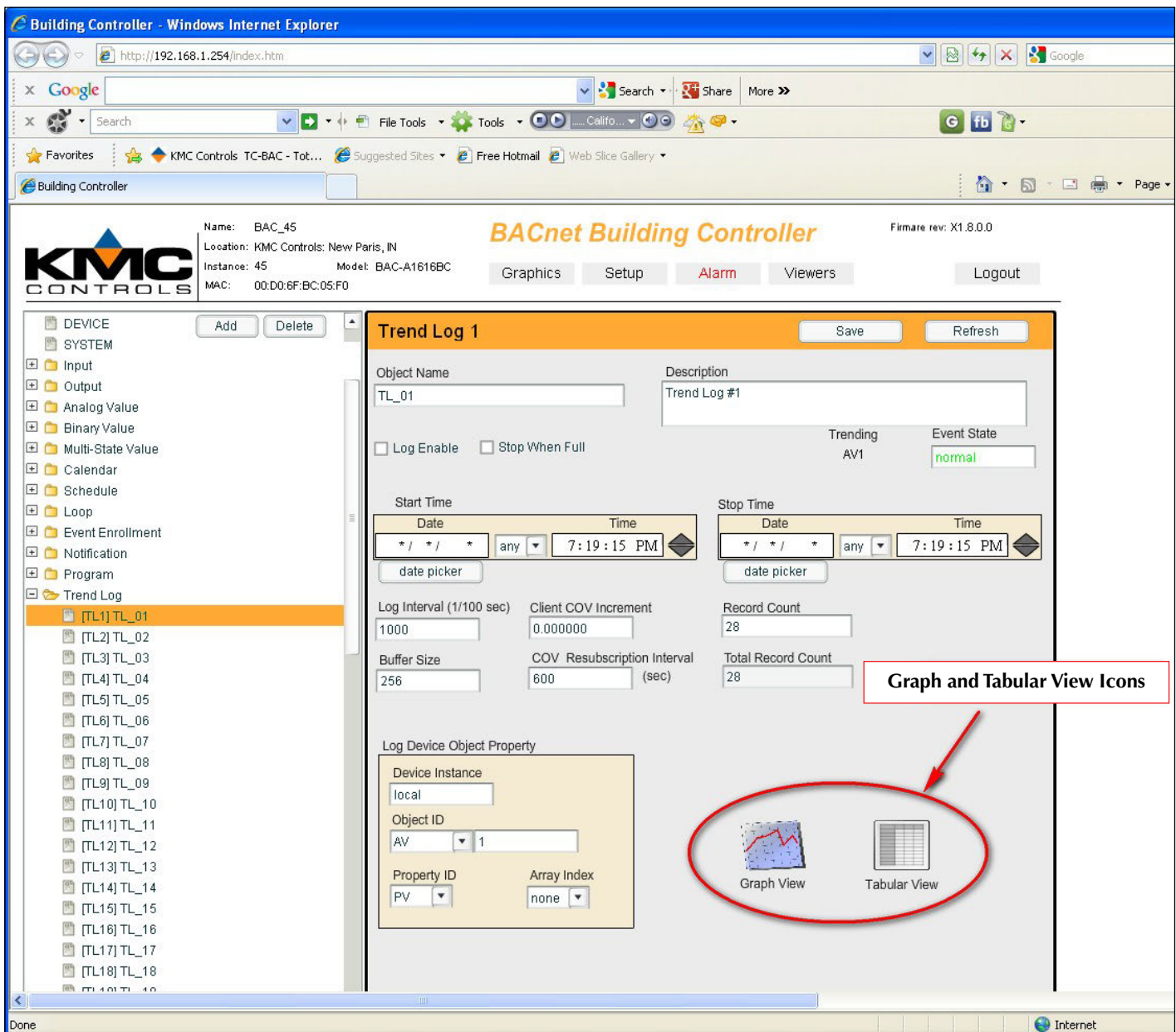


Illustration 1

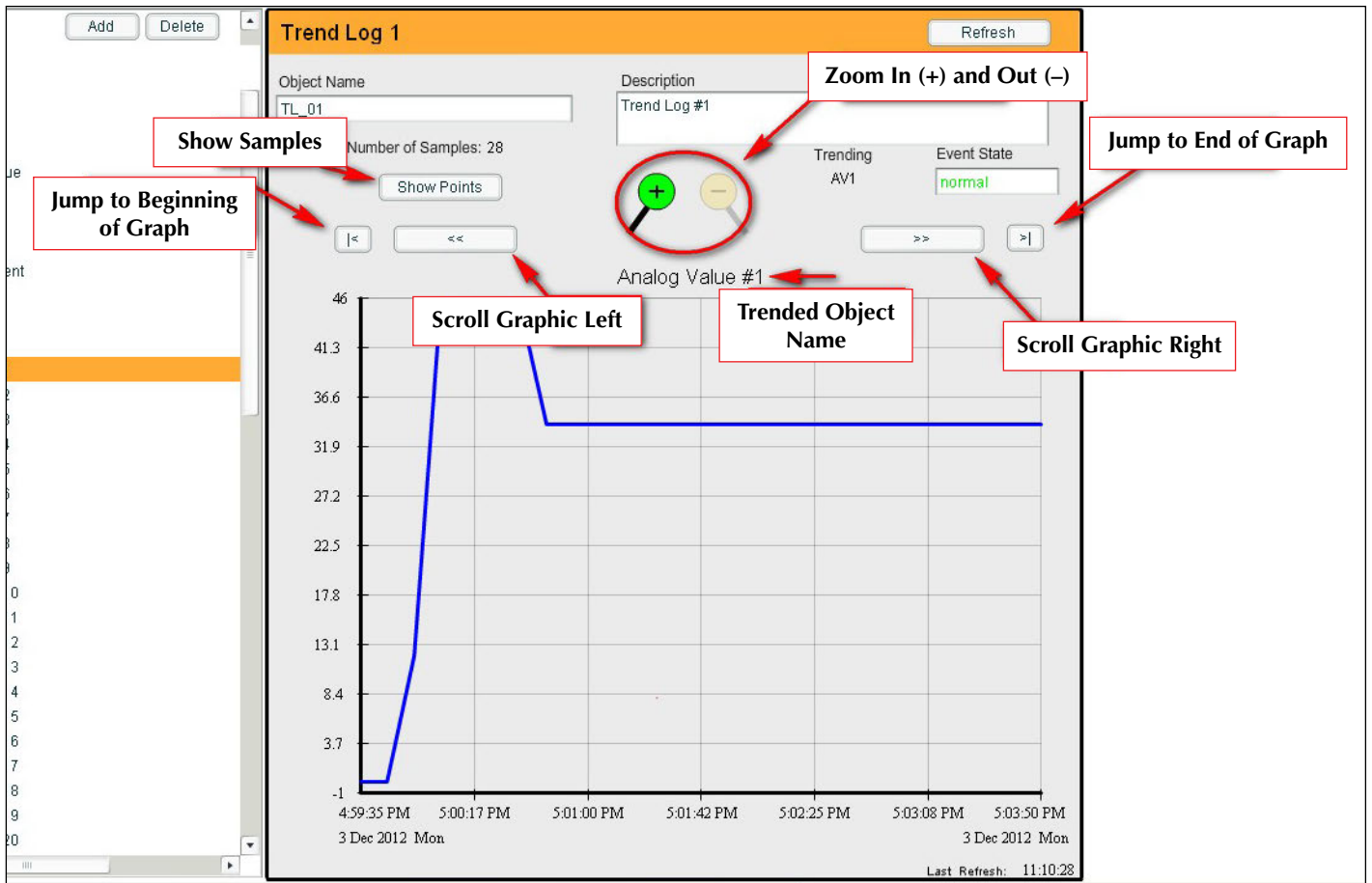


Illustration 2

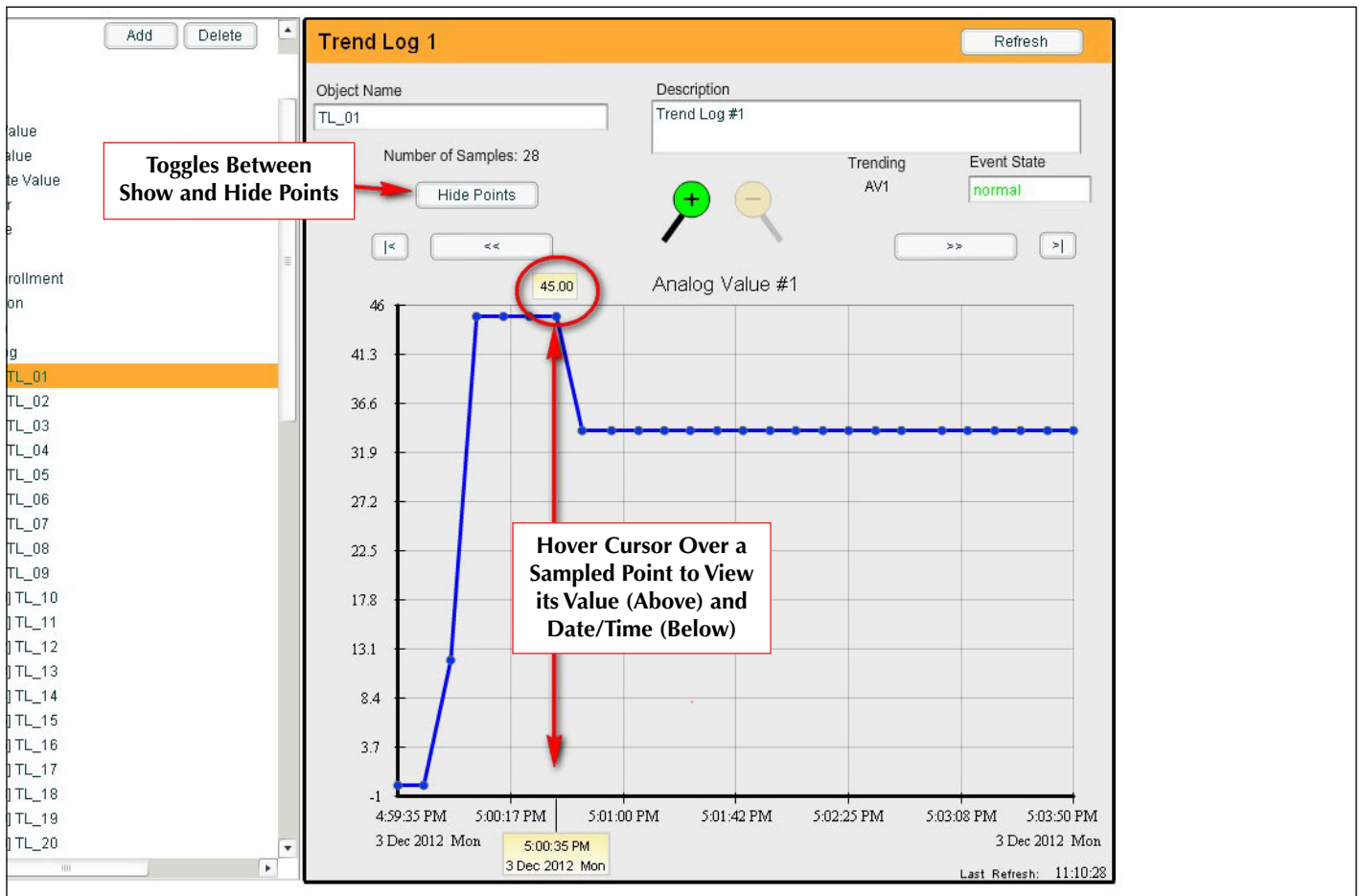


Illustration 3

On the Graph page, click *Show Points* to display each sampled point. Hovering the mouse pointer over a sampled point will display a tool tip showing the actual value above the point and the sampled date/time on the time line below.

To zoom **in**:

- Click on the + magnifier icon to zoom in slowly (two samples at a time).
- Click and hold the left mouse button and drag a box from left to right to select the desire zoom area. (But do not let the zoom box touch the right-hand edge of the graph.)

NOTE: The zoom function only magnifies the time base axis (X), not the value axis (Y).

Use the << or >> buttons to scroll left or right and the |< and >| buttons to jump to the beginning or end of the graph.

To zoom **out**:

- Click on the – magnifier icon to zoom in slowly (two samples at a time).
- Click and hold the left mouse button and drag a box from the right to the left (opposite of zoom in) and the graph will zoom completely out (zoom all).



Illustration 4

Binary objects have “Active” and “Inactive” text fields associated with the two levels. This text is displayed on the value axis when a binary object is trended.

Similar to the binary objects, the MSV (Multi-State Value) objects have a “State” text field to represent

the various (up to 16) states of the object. The state text corresponding to each level is displayed on the value axis when an MSV object is trended.

For more information, see the Trend Logs section of the [BAC-A1616BAC Building Controller Installation and Operation Guide](#).

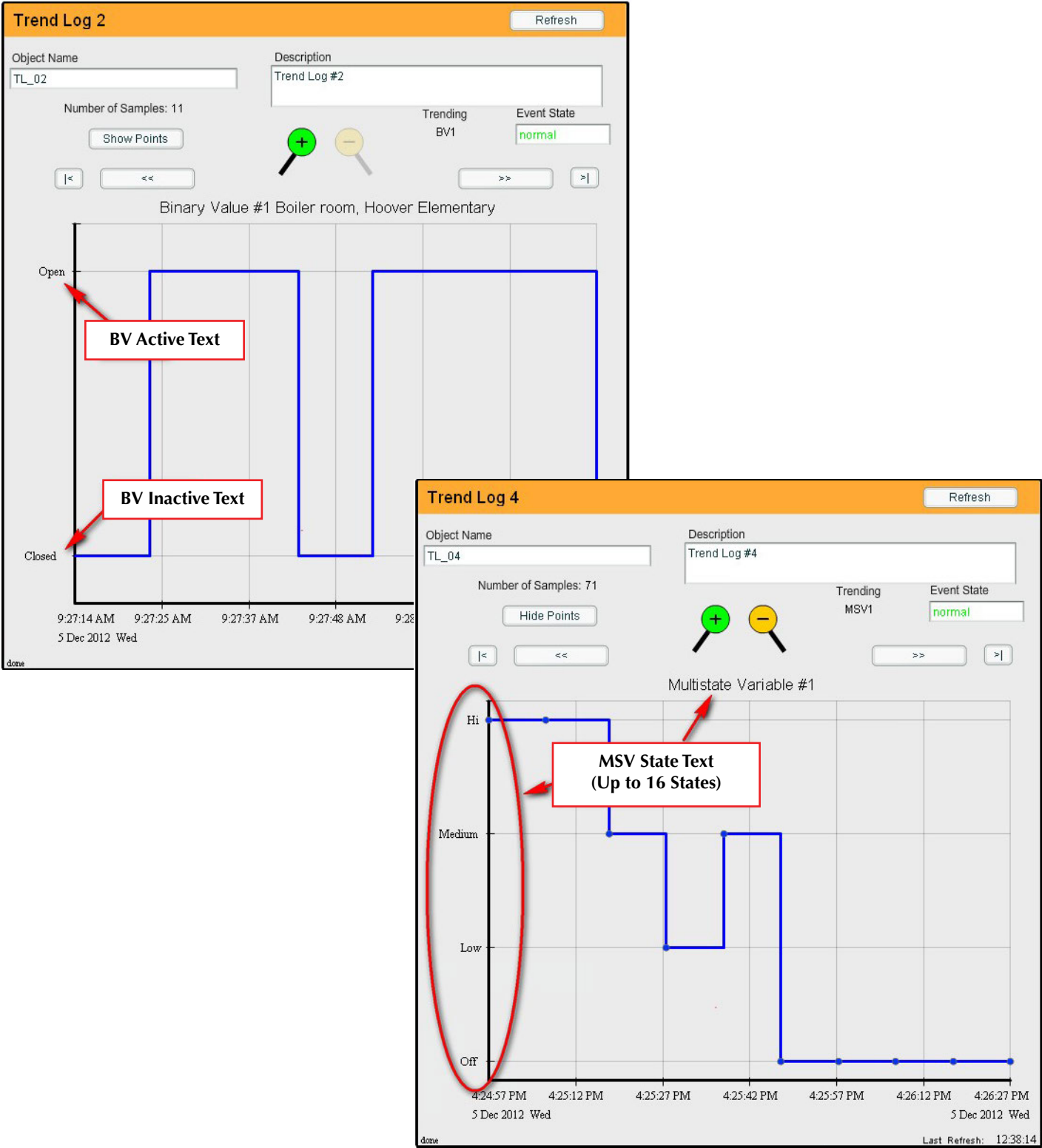


Illustration 5

Viewing from a Graphics Page

Starting with firmware version R2.0.0.11, trend log graphs can be viewed from a graphics page by simply clicking a navigation button. The graph opens in a pop-up window and may be resized if desired.

Illustration 6 shows a graphics page with two buttons linked to Trend objects. The Room Temp Graph navigation button is linked to Trend Log 2. Behind the graph (clip art) icon is an invisible navigation button linked to Trend Log 1.

Clicking either navigation button pops up new windows corresponding to their respective links. Clicking the Room Temp Graph (Trend Log 2) is shown in Illustration 7. Clicking the (invisible button) graph icon (Trend Log 1) is shown in Illustration 8.

Multiple windows can be open at the same time. (See Illustrations 9.) Both graphs can be displayed together, resized, and moved for comparison. (See Illustration 10.)

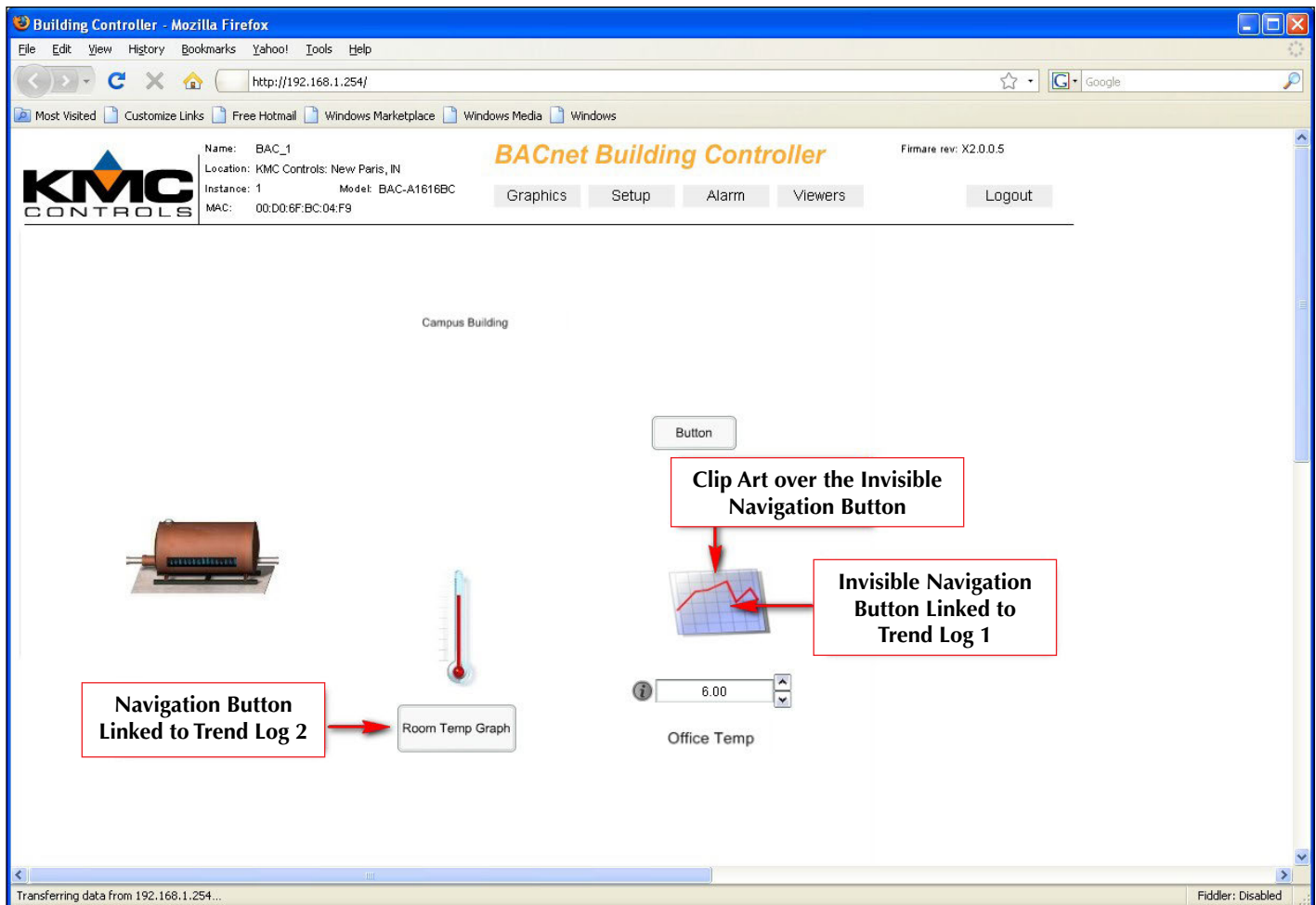


Illustration 6

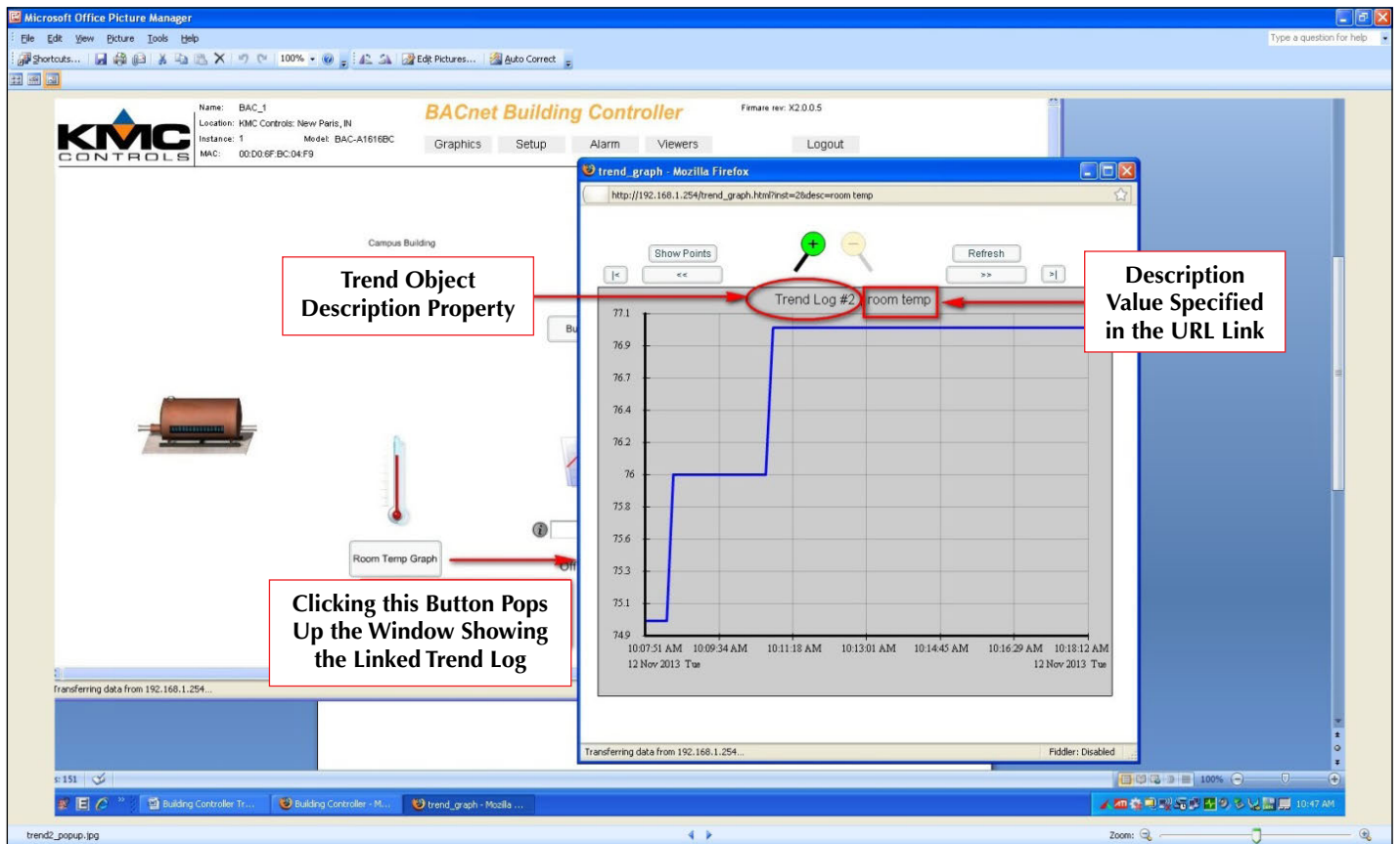


Illustration 7

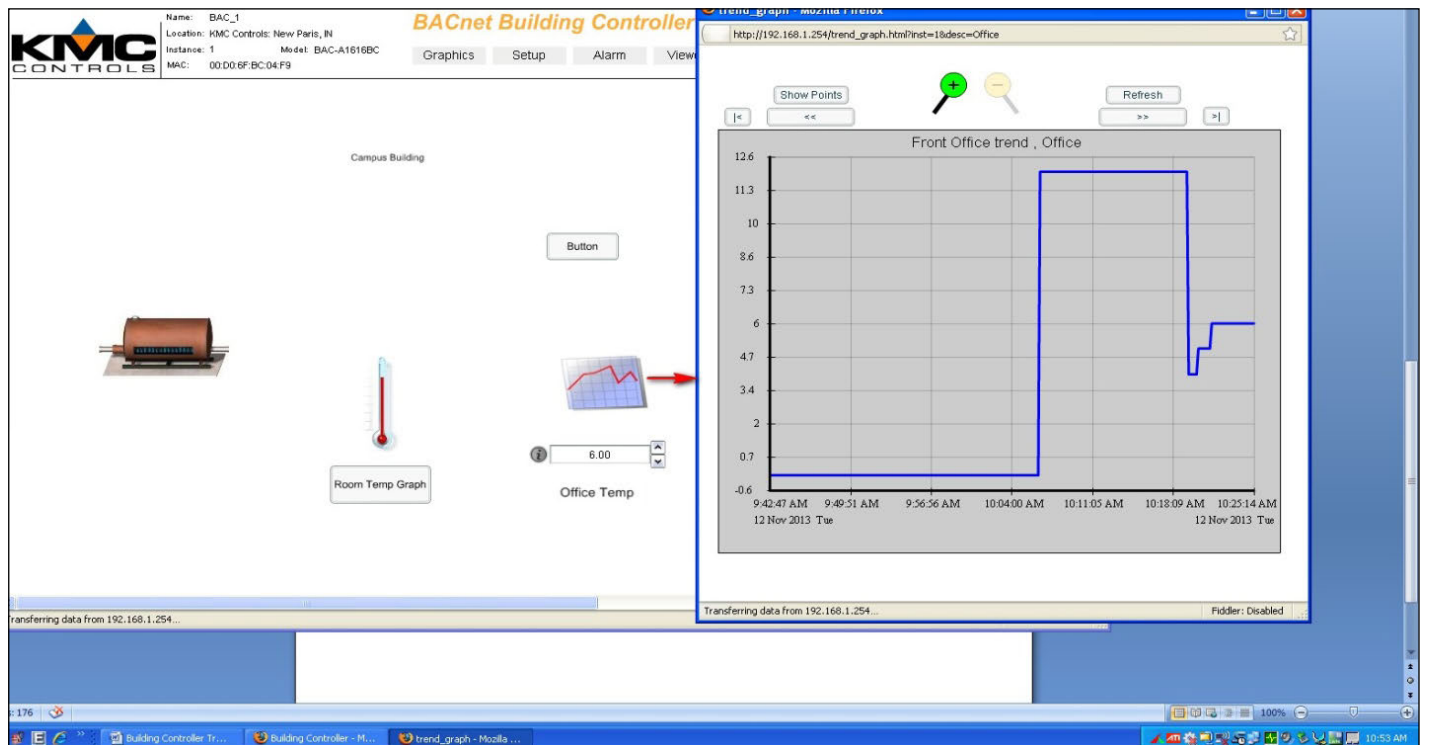


Illustration 8

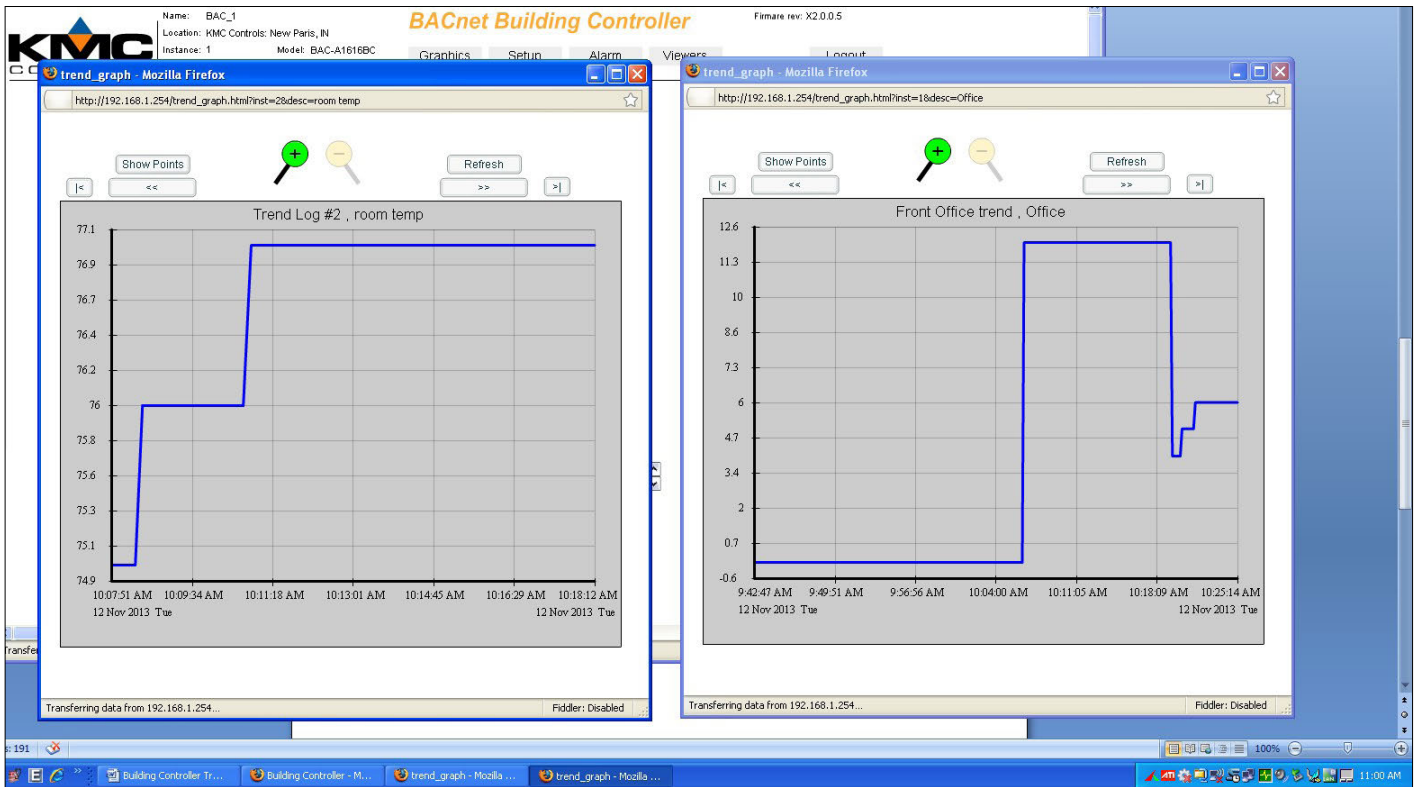


Illustration 9

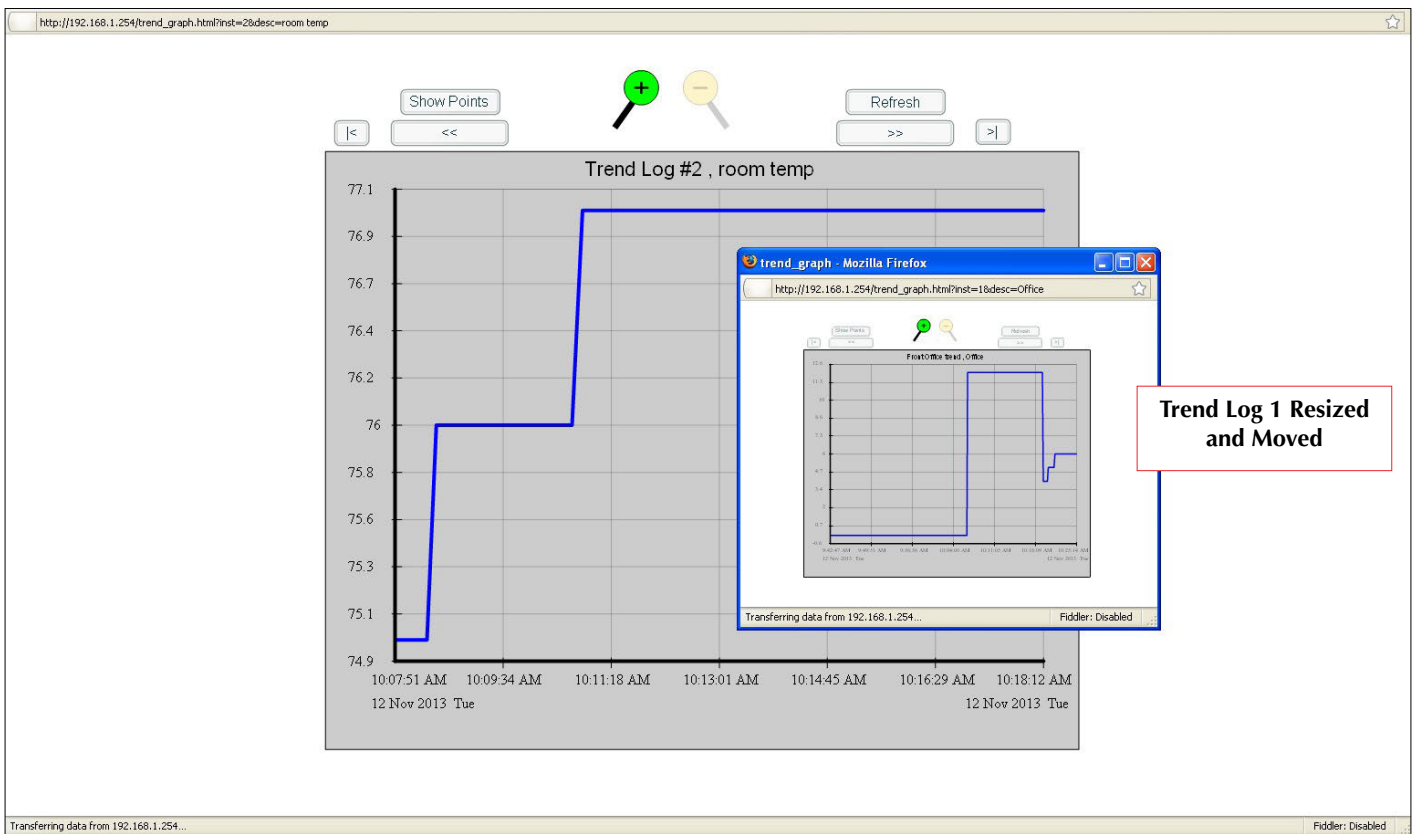


Illustration 10

Illustration 11 shows the TotalControl graphics page setup for the navigation button that links to Trend Log 2.

1. In the Hyperlink section of the Properties tab, in the Destination drop-down box, select *UserURL*.
2. In the URL field, enter "trend_graph.html?inst=" followed by the instance number of the desired trend object.

NOTE: Optionally, enter a description for the pop-up graph that will be displayed just

above the graph. After the device instance number, enter "&desc=" and then the desired description.

The sample link shown below is:

"trend_graph.html?inst=2&desc=Room Temp"

For accessing the Building Controller remotely, prefix the IP address to the URL value, such as:

"http://192.168.1.254/trend_graph.html?inst=2&desc=Room Temp"

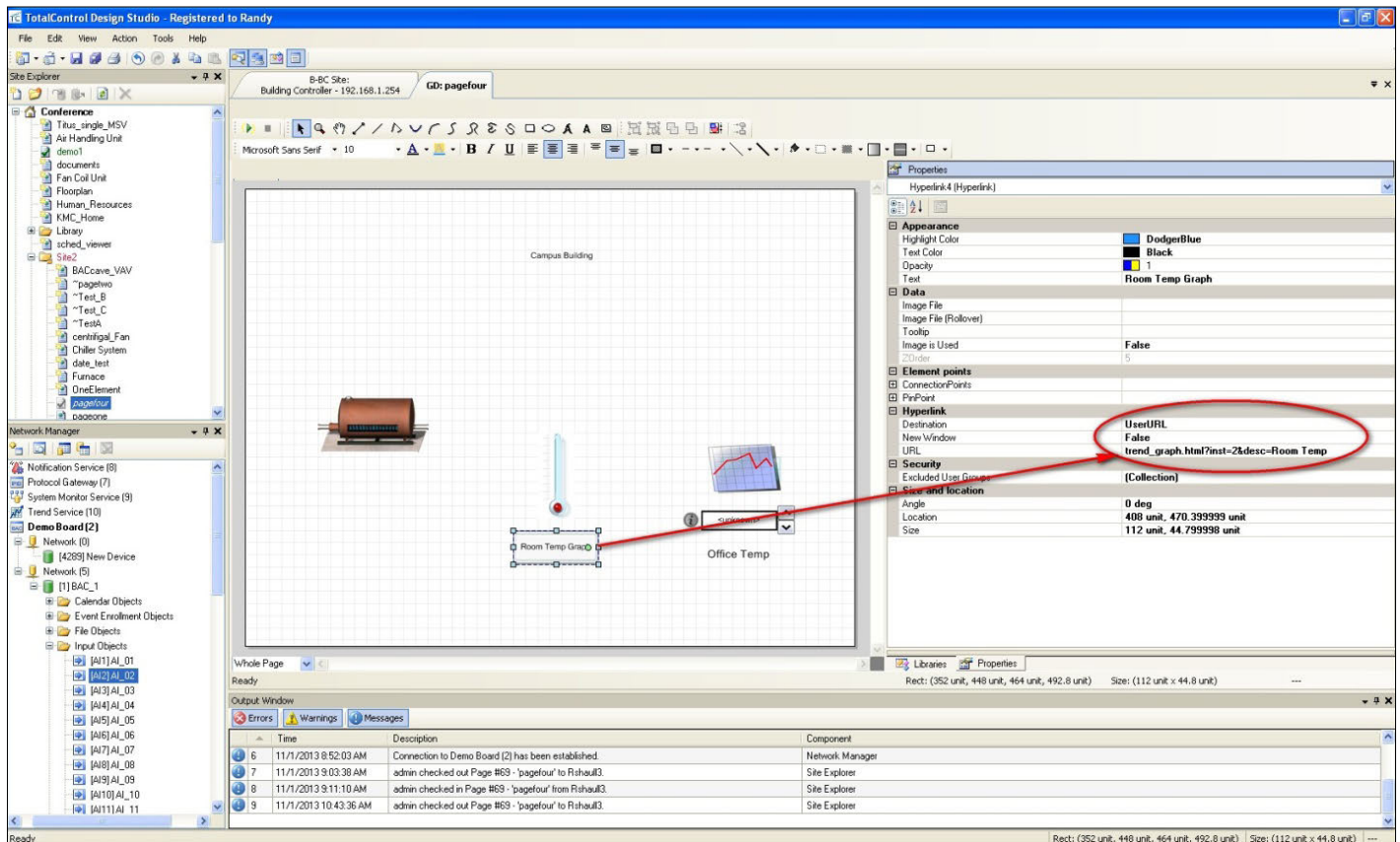


Illustration 11

Creating Custom Tables

Starting with firmware R2.0.0.5, an easy way to create custom tables was added—by calculating the input table’s Y value from the new Input Source Values table.

NOTE: Default input types and tables already cover a great number of sensors. See *Input*

Device Configuration (Firmware R2.0.0.11 and Later Factory Defaults) on page 15.

Sample Input Table 10 below is for a 0–10 VDC temperature transmitter displaying a 55–90° temperature range.

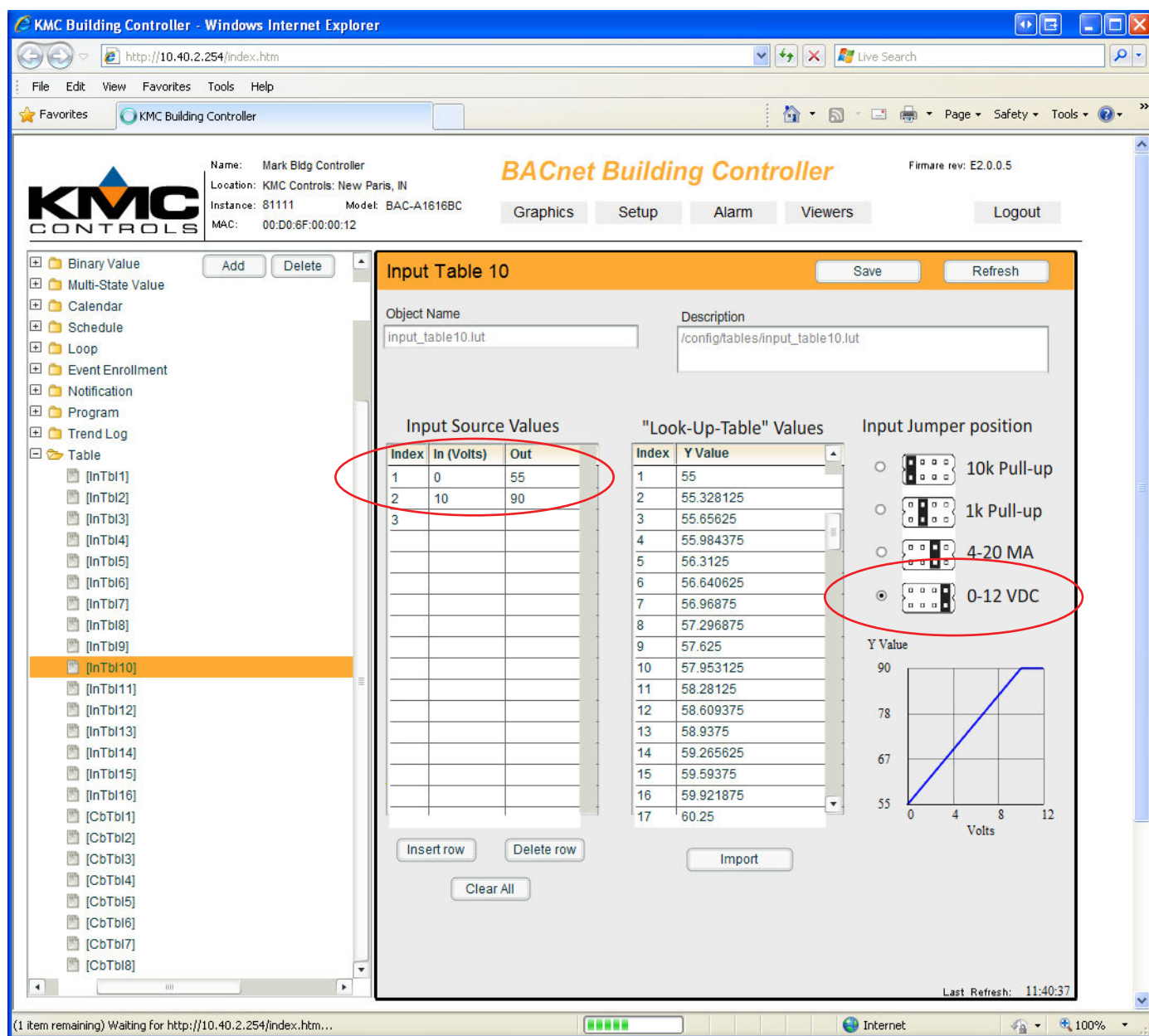


Illustration 12 — Custom Table for 0–10 VDC Temperature Transmitter

NOTE: Adding as many input/output values that are known or are feasible to add will increase accuracy for non-linear devices.

STE-6014 Temp. Sensor w/ Setpoint

Analog Input 9

Object Name

STE-6020 Pot Setpoint

Description

STE-6020 Pot Setpoint

Device Type

no-device

Event State

normal

Status Flags

In Alarm

Fault

Overridden

Out of Service

☐ Out of Service

Present Value

70.10

Units

degrees-F

Filter Weight

0

COV Increment

1.000000

multiplier

1.000000

offset

0.000000

Lookup Table

13

Input Table 13

Object Name
Description

Input Source Values

Index	In (ohms)	Out
1	0	68
2	10000	74

"Look-Up-Table" Values

Index	Y Value
1	68
2	68.0472440944882
3	68.0952380952381
4	68.144
5	68.1935483870968
6	68.2439024390244
7	68.2950819672131
8	68.3471074380165
9	68.4
10	68.453781512605
11	68.5084745762712
12	68.5641025641026
13	68.6206896551724
14	68.6782608695652
15	68.7368421052632
16	68.7964601769911
17	68.8571428571429

Input Jumper position

☒ 10k Pull-up
☐ volts ☒ ohms

☐ 1k Pull-up

☐ 4-20 MA


☐ 0-12 VDC

Y Value

Ohms

Last Refresh: 12:52:29

Illustration 13 — Custom Table and Configuration for Reduced (10K Pot) Setpoint Range

[illegible]

Sample Input Table 12 has been configured for a 4–20 mA CO₂ transmitter (for 0–2000 ppm).



Illustration 14

Input Table 12

Object Name: input_table12.lut

Description: /config/tables/input_table12.lut

Input Source Values

Index	In (MA)	Out
1	4	0
2	20	2000
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

"Look-Up-Table" Values

Index	Y Value
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0

Input Jumper position

- ☐ 10k Pull-up
- ☐ 1k Pull-up
- ☒ 4-20 MA
- ☐ 0-12 VDC

Y Value

Ma

Buttons: Insert row, Delete row, Clear All, Import

Last Refresh: 10:53:44

BAC-A1616BAC Applications Guide, AN0813A Rev. B

Sample Input Table 14 has been configured for a 1K RTD (Resistance Temperature Detector) using the (room temperature range only) values from the manufacturer’s chart.



1K RTD

NOTE: Default input types and tables already cover a great number of sensors. **Tables for RTDs and thermistors are also available as CSV downloads from the KMC Partners web site (partners.kmccontrols.com).** For more information, especially for how to import CSV files using the *Import* button, see the Tables section of the **BAC-A1616BAC Building Controller Installation and Operation Guide**. See also the Connecting Inputs section of that document for more information about jumper settings, voltages, and other information about different kinds of inputs.

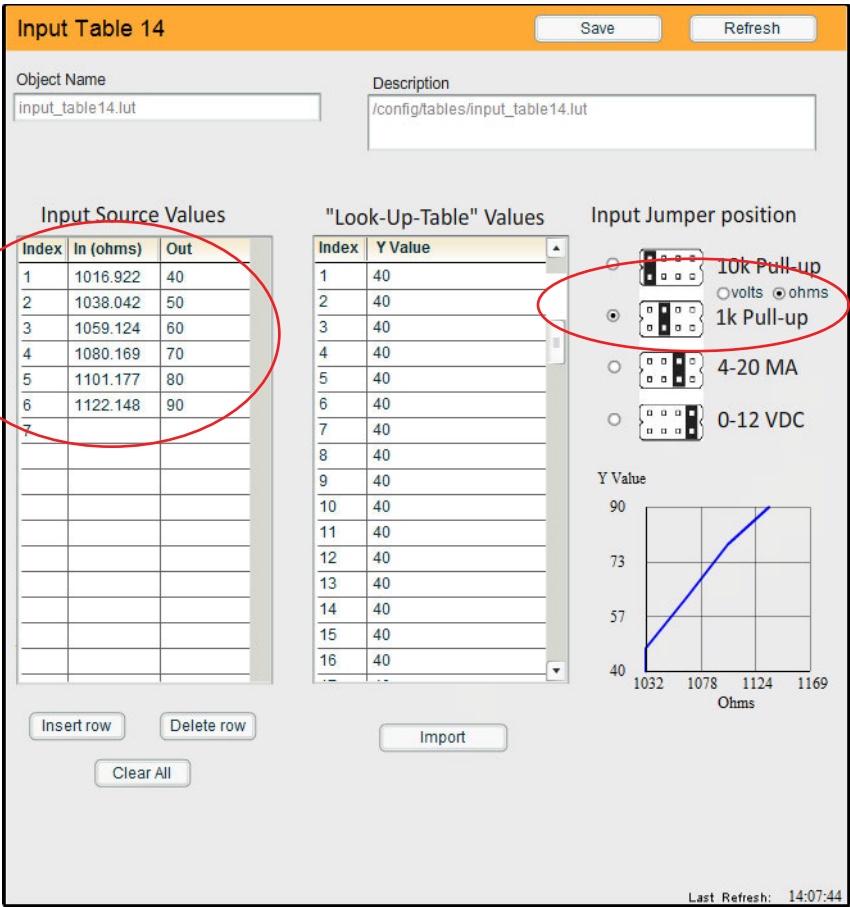


Illustration 17 — Custom Table for 1K RTD

Input Device Configuration (Firmware R2.0.0.11 and Later Factory Defaults)				
Device Type	Temp. Scale	Multiplier	Offset	Input Table
Type II Thermistor (10K ohms)	C	1	0	2
	F	1.8	32	
Type III Thermistor (10K ohms)	C	1	0	3
	F	1.8	32	
STE-6012/6016 Temperature (0-12 VDC)	C	1	0	4
	F	1.8	32	
STE-6012/6016 Setpoint (0-12 VDC)	C	1	0	5
	F	1.8	32	
STE-6014/6017/6018/6019/6020 Rotary Setpoint (10K ohms)	C	1	0	6
	F	1.8	32	
Precon 78 RTD (1K ohms Platinum 378)	C	1	0	7
	F	1.8	32	
Precon 85 RTD (1K ohms Platinum 385)	C	1	0	8
	F	1.8	32	
Precon 91 RTD (1K ohms Platinum 391)	C	1	0	9
	F	1.8	32	

Illustration 18 — Default Input Device Configuration

Navigating Graphics Pages Via Drop-Down Boxes

Introduction

Starting with firmware R2.0.0.5, graphics pages can be navigated with a drop-down box. Prior firmware versions allowed navigation of linked pages only through the “Navigation” button element. The drop-down box method allows navigation via user interaction, Control Basic programs, and/or a BAC-net write operation from another controller.

Navigation is still also available through the *Graphics* button tree list of available pages.

NOTE: This feature is available on BAC-A1616BAC web pages, but it is not available in TotalControl web server pages even though TotalControl Design Studio is used to construct the pages for the BAC-A1616BAC.

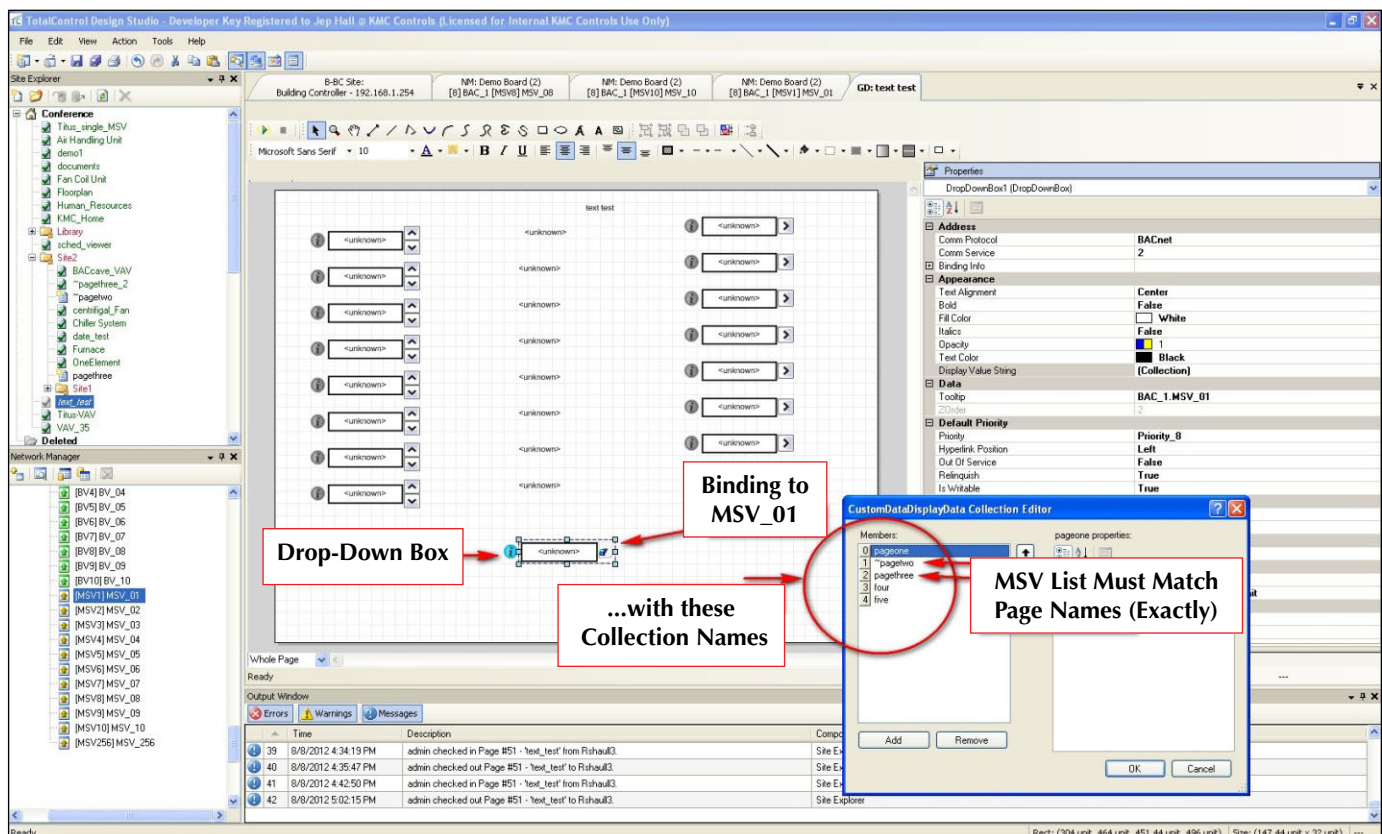


Illustration 19 — Custom Table for 0–10 VDC Temperature Transmitter

A drop-down list element is bound to an MSV (Multi-State Value) object in the BAC-A1616BAC. The collection list within the drop-down element is set to the name of the desired page(s). When the MSV index matches the index corresponding to the page in the collection list, the graphics engine navigates to that selected page. To navigate via the drop-down (MSV) channel, set up a graphics page with the proper binding and collection list. See [Creating the Drop-Down Box on page 18](#).

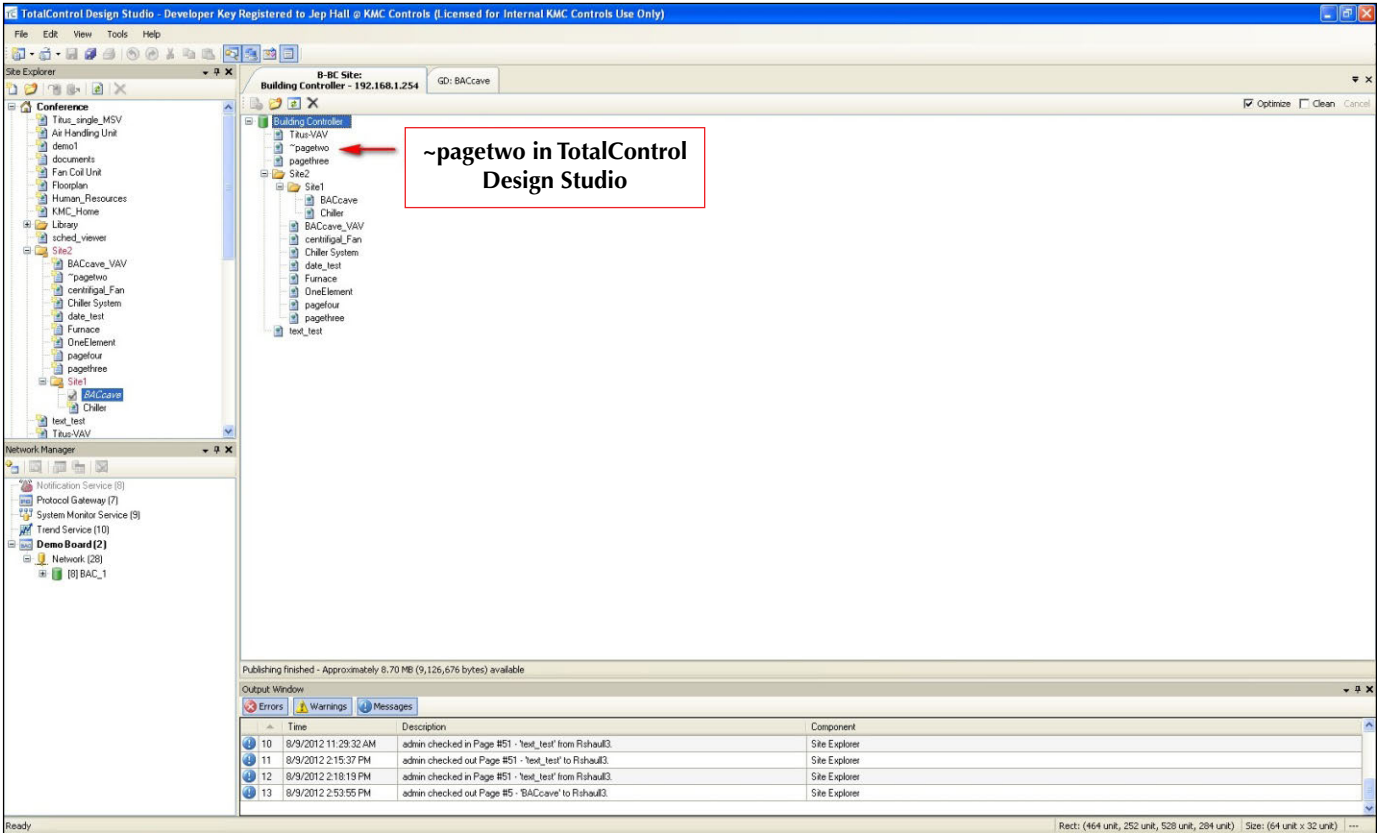
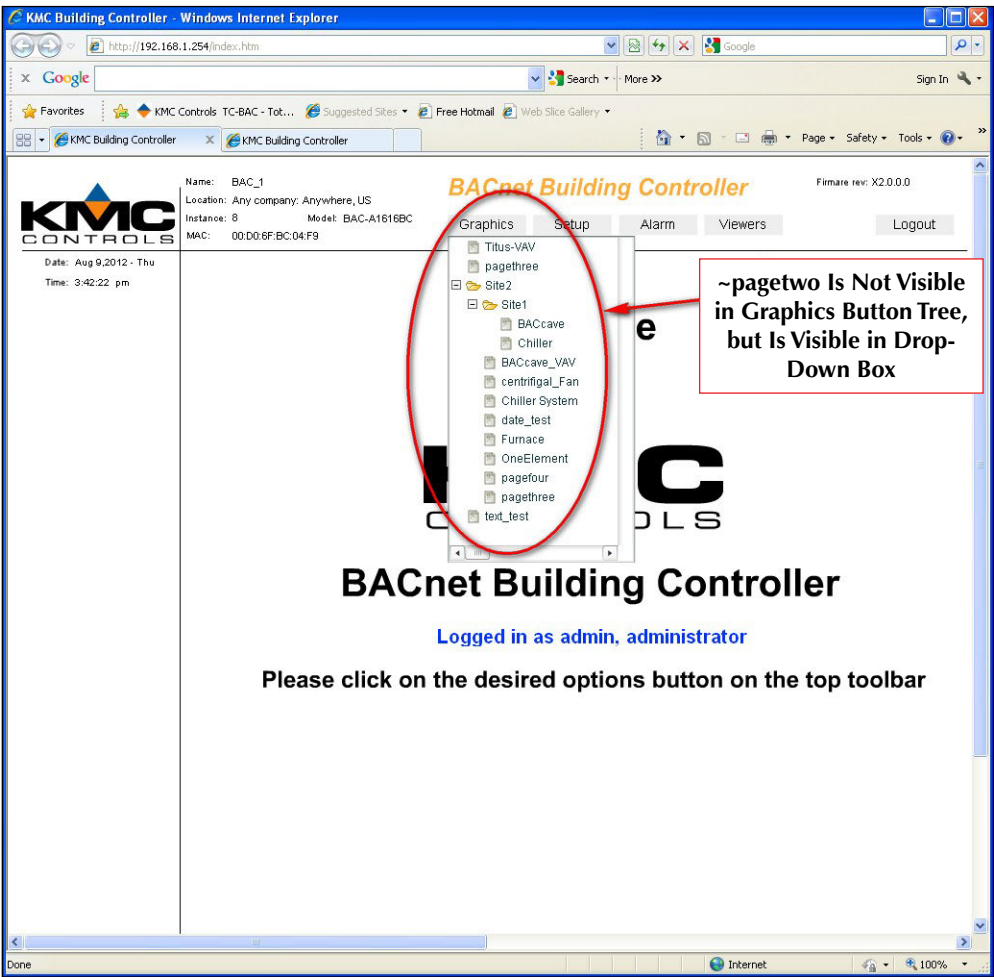


Illustration 20 — Custom Table for 0–10 VDC Temperature Transmitter

Creating the Drop-Down Box

To create a drop-down navigation box in Total Control:

1. Configure an unused MSV object with the desired page file names for each state. (Right-click in the State Text box and select *Add String* and/or *Edit String*.) The order must be the desired order in the drop-down box. (The order can be changed by right-clicking and selecting *Move Up* or *Move Down*.)
2. Add the drop-down box (from the Graphics Library) on the first page and drag the MSV object icon in the Network Manager onto the box.
3. Copy the box to other pages as desired.

For more information, see the Help files in Total Control.

Navigation Notes

Page Naming Convention

For the navigation to work, the collection list **name** must **match** the desired navigation page name **exactly**. If the names are not an exact match, the page jump will not occur.

Every page on the site also must have a **unique name** (even if they are in different folders). The navigation box finds the page in whatever folder it is. (The illustrations in this section, for example, incorrectly have a duplicate “pagethree” in different folders.)

“Invisible” Pages

If the designer wants the user to **not** see the jump page in the *Graphics* button tree list, a tilde (~) can be placed in the front of the page’s file name (~pagetwo in the example shown):

- The page now named with the ~ will no longer show up in the *Graphics* button tree list at the top of the web page. The ~ before the page name hides the name in the *Graphics* button tree.
- The page named with the ~, however, can still be accessed via the drop-down list as long as the ~ is before the name in both the MSV state list and the page file name.

Unexpected Navigation

If any navigation page with the drop-down button is selected from the *Graphics* button tree list at the top of the screen, the drop-down box on that page will **automatically reload** the page that corresponds to the present value of the MSV (probably whatever was last selected from the drop-down box unless relinquished or overwritten by Control Basic). Depending on the MSV present value, the end result might be the desired page or an unexpected page. If drop-down boxes are used for navigation, they should be used as exclusively as possible for best results.

Index

Symbols

0-5 VDC: [14](#)
0-10 VDC: [12](#)
4-20 mA: [14](#)

A

Accessories: [3](#)

C

Configuration, input: [15](#)
Custom tables: [12](#)

D

Device configuration: [15](#)
Drop-down box: [16](#)

E

Enclosure: [3](#)
Expansion: [3](#)

G

Graphics page: [8](#), [16](#)
Graph, trend: [4](#)

I

Important notices: [2](#)
Input device configuration: [15](#)
Interfaces: [3](#)

M

MSV (Multi-State Value): [17](#)

N

Navigation: [8](#), [16](#)

O

Object page: [4](#)
Offset: [15](#)
Output override boards: [3](#)

P

Parts, replacement: [3](#)

R

Reference documents: [2](#)
Repeater: [3](#)
Replacement parts: [3](#)
RTD table: [15](#)

S

Setpoint range: [13](#)
STE-6014/6017/6018/6019 temperature sensors: [13](#)
Support files: [2](#)
Surge suppression: [3](#)

T

Tables
 Custom: [12](#)
 Default input: [15](#)
Transformers: [3](#)
Trend log: [4](#)

W

Web site: [2](#)

KMC Controls

19476 Industrial Drive
New Paris, IN 46553
574.831.5250; Fax 574.831.5252
www.kmcccontrols.com
info@kmcccontrols.com