

IEEE 488

APPLICATION BULLETIN

CUSTOMIZING THE F4 TEMPERATURE CHAMBER WEBPAGE IN ICS'S 8099 ETHERNET INTERFACE

INTRODUCTION

ICS's 8099 Ethernet to Modbus RTU Interface includes a WebServer with HTML pages that allow a user to configure its network settings with a standard web browser such as Firefox, Internet Explorer, Netscape etc. While this capability simplifies configuring the 8099 it does not to let a user use the 8099 to control anything.

To overcome this problem, ICS has generated several prototype webpages that let a user use the 8099 to control a Modbus device. This Application Note describes a webpage that is targeted to a Temperature-Humidity Chamber controlled by a Watlow F4 Controller. The webpage can be easily modified for various Temperature Chamber configurations or adapted to other products that use the F4. The Watlow F4 can also be replaced with another controller by customizing the 8099's firmware.

The purpose of this Application Note is to describe the prototype F4 Temperature Chamber webpage and to show how it can be modified for various Chamber or product configurations.

PROTOTYPE TEMPERATURE CHAMBER PAGE

The prototype 8099 Temperature Chamber webpage is shown in Figure 1. It displays current Temperature, Relative Humidity and Auxiliary Temperature readings and lets the user enter setpoint values for both Temperature and Humidity. The user can also select degrees C or degrees F for the Temperature values. Decimal point settings are not changed but are read and used to correct the readback displays. The user can also set eight output control registers that may be used to turn Chamber functions off and on. Table 1 lists the F4 registers used in the Temperature Chamber Page and the associated HTML variables. The Function descriptions relate to Figure 1

The Temperature Chamber webpage uses generic substitution variables, like *%input1%*, to display the process values from the Watlow controller. CGI variables, like *input1sp*, are set to a value which is in turn written to the associated F4 register. Radio button controls are displayed checked or blank. The Radio Button CGI variable, like *dout1*, is set to a value of On or Off. The substitution variables *%dout1on%* or *%dout1off%* are returned as checked or blank.

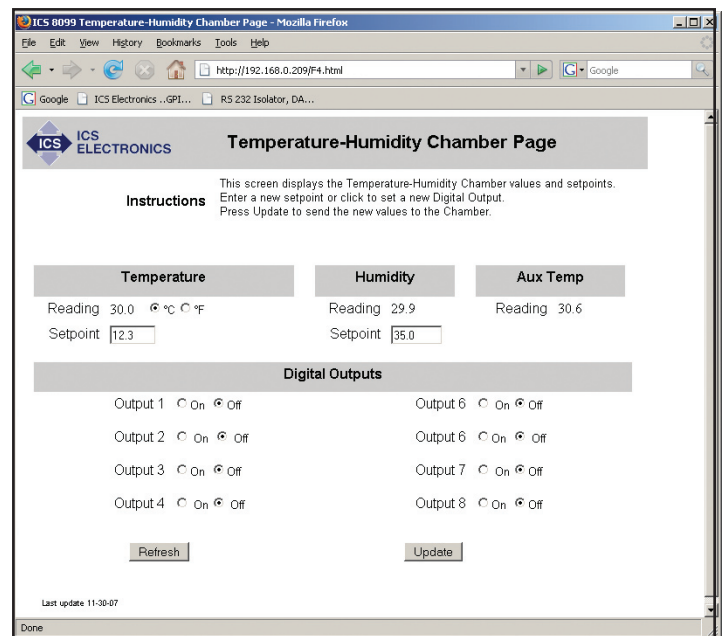


Figure 1 Prototype 8099 Temperature Chamber Webpage

The form has two buttons, Refresh and Submit. Refresh causes all substitution variables to be read and served back to the client. Submit causes the Webserver to write any changed CGI values out to the Watlow Controller and then to read the substitution variables to refresh the page.

The 8099's Webserver does not do any error checking so the user must check his own values before clicking the Submit button. If the Webserver encounters any problems, it displays a general error page, 500.html, that lists the possible errors. They are:

1. 8099 is busy with a client application. (Network links have preference over the Web server links)
2. F4 response error or communication failure.
3. Parameter out of range.
4. Command not supported by the F4.

The user will have to make the necessary corrections and re-Submit the Temperature Chamber webpage when the 8099 is available.

TABLE 1 Webpage Variables and F4 Register List

HTML Variable	F4 Register	Function (On the prototype F4 page)
%input1%	100	Current Temperature Rdg
%input1sp%	300	Temperature Setpoint Rdg
input1sp	300	Temperature Setpoint CGI
	606	Temperature decimal point
%input2%	104	Relative Humidity Rdg
%input2sp%	319	Relative Humidity Setpoint Rdg
input2sp	319	Relative Humidity Setpoint CGI
	616	RH decimal point
%input3%	108	Current Aux Temperature Rdg
	626	Aux Temperature decimal point
%degCon%	901	Degree C button Rdg
%degCoff%	901	Degree F button Rdg
degC	901	Degree C CGI
%dout1on%	2000	Control #1 On Rdg
%dout1off%	2000	Control #1 Off Rdg
dout1	2000	Control #1 CGI
%dout2on%	2010	Control #2 On Rdg
%dout2off%	2010	Control #2 Off Rdg
dout2	2010	Control #2 CGI
%dout3on%	2020	Control #3 On Rdg
%dout3off%	2020	Control #3 Off Rdg
dout3	2020	Control #3 CGI
%dout4on%	2030	Control #4 On Rdg
%dout4off%	2030	Control #4 Off Rdg
dout4	2030	Control #4 CGI
%dout5on%	2040	Control #5 On Rdg
%dout5off%	2040	Control #5 Off Rdg
dout5	2040	Control #5 CGI
%dout6on%	2050	Control #6 On Rdg
%dout6off%	2050	Control #6 Off Rdg
dout6	2050	Control #6 CGI
%dout7on%	2060	Control #7 On Rdg
%dout7off%	2060	Control #7 Off Rdg
dout7	2060	Control #7 CGI
%dout8on%	2070	Control #8 On Rdg
%dout8off%	2070	Control #8 Off Rdg
dout8	2070	Control #8 CGI

GENERAL PAGE CHANGES

Application Note AB80-5 deals with making general appearance changes to the standard html pages such as replacing ICS's logo, changing the displayed page titles, page colors and text changes. Note that the names of the error and index pages cannot be changed. The OEM can remove the serial settings from the config.html page if these are to be hidden from the end user. The network settings are required by the LXI Specification.

F4 PAGE CHANGES

The OEM may want to create a control page that is unique to each model or product. Several products or models can be grouped on one page if they have similar functions and use similar controls. In either case, save the prototype F4.html page with a new name.

```

<tr>
  <td height="44">&nbsp;</td>
  <td valign="top"><div align="center">
    <inputname="reset" type="button" onclick="MM_goToURL('parent','F4.html');return document.MM_returnValue" value="Refresh" />
    &nbsp;</div></td>
  <td>&nbsp;</td>
  <input type="hidden" name="chain" value="F4.html" />
  <td valign="top"><div align="center"><input type="submit" name="Submit" value="Update" /></div></td>
</tr>

```

Figure 2 Submit and Update Button html code

Changing the F4.html page name requires two changes to the html code that deals with the Refresh and Submit buttons. See Figure 2 above. Replace F4 in the Refresh button code with the name of the new page. Also replace the *chain* value F4.html with the new page name.

Change the page title and appearance to match any changes made to the index page. Add the product name or model number and any directions for using the page.

Any process variable or setpoint that is not being used can be deleted. The Webserver ignores any deleted variables. The remaining controls can be relabeled and relocated as desired. The html variable names must match those in Table 1 to control the corresponding F4 register.

It is possible to create multiple control pages, one for each product. However, the OEM user has to be aware of the 8099's space limitation for html pages and not exceed its 63 kbyte limit when uploading pages and graphics. That is why grouping multiple similar products on one page is a better idea since it saves space. The 8099 html pages and graphic in the download currently use 36 kbytes¹. Another strategy is to create a page per product and then only install the page for the product being shipped.

MODIFYING THE TEMPERATURE CHAMBER PAGE

The prototype 8099 Temperature Chamber Webpage is titled F4.html. F4.html is a standard html page that can be modified by Dreamweaver or by any html editing software. The prototype F4 and the 500 error pages can be downloaded from the Application Note page on ICS's website. The download includes a modified index page with a link to the F4 page, the remaining 8099 pages and the VXI11_html utility.

The 8099 is shipped with a standard set of html pages that do not include the link to the F4 page. The user should upload all of the pages in the download to the 8099 and try out the prototype F4.html page before making any changes. Follow the directions in AB80-5 for using the VXI11_html utility and uploading pages to the 8099.

INDEX PAGE CHANGES

Figure 3 shows the 8099's modified index page with a button that links to the prototype F4 page. The button should be relabeled to call out the OEM's control page. The button can also be repositioned to another location. The OEM can add multiple buttons if there are multiple control pages. Figure 4 shows the html code for the button.

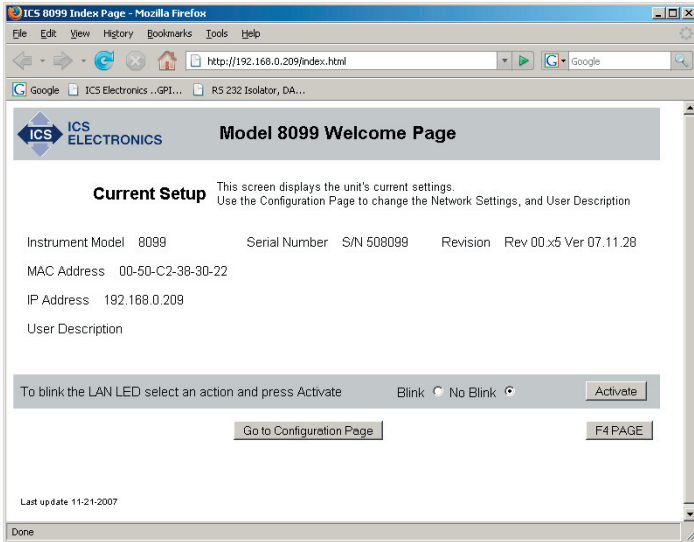


Figure 3 8013 Index Page

```
<td >
<input name="Submit" type="submit" onclick="MM_
goToURL('parent','F4.html');return document.MM_returnValue"
value="F4 PAGE" />
</td>
```

Figure 4 F4 Link Button html Code

Replace the 'F4.html' in 'goToURL()' with the name for the new F4 control page. This must be the same name used in the uploading process to the 8099. Replace the 'F4 PAGE' in 'value="F4 PAGE"' with a descriptive name for the new control page. i.e. 'Model XYZ Chamber Control Page' This is the label that appears when the button is displayed in the browser.

To add additional buttons simply copy the code and place it where desired on your webpage. Modify the new button code as described above for the existing F4 button. In Dreamweaver, it is easier to draw a layout cell where you want to place the button and use the Insert menu to select Form>Button. Relabel the button as described above. Highlight the button and use the Behaviors Panel + button to add a 'Go To URL' behavior to the button. When the Go To URL Panel opens, browse to select the appropriate chamber or product control page.

500 ERROR PAGE CHANGES

Figure 5 shows the 500.html Error Page. This page may not be renamed and must be included in the html upload with the product control page. However the appearance of the 500.html page can be changed to match the other pages.

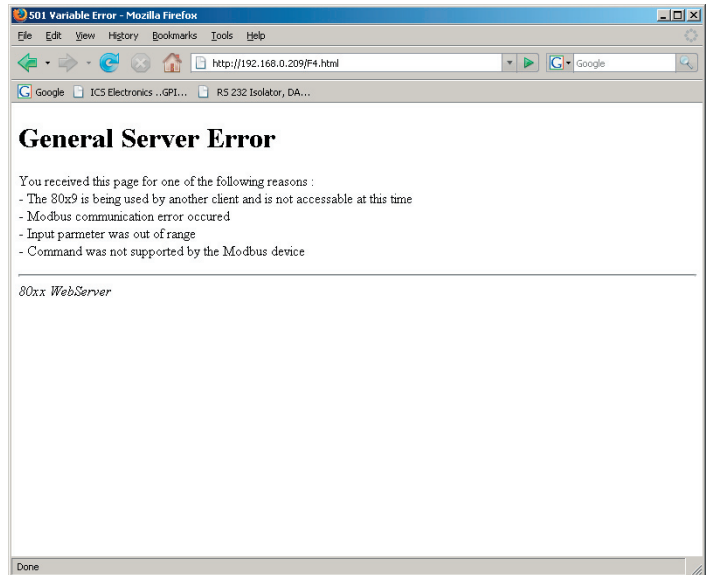


Figure 5 500.html Error Page

UPLOAD PAGES WITH ICS'S VXI11_html UTILITY

Use ICS's VXI11_html utility to upload the modified files to the 8099 as described in Application Bulletin AB80-5. Copy the modified files into the directory with the VXI11_html utility. Be sure to include the 404.html, 501.html and index.html pages. When you run the VXI11_html utility it prefills the file list with these files which are needed by the 8099 webservice. Enter the remaining file names by placing a file name in the Add File text box and pressing the Add File button. The file name is then added to the FileList box. This step is repeated until all .html, .gif and .jpg files are listed in the FileList box. Include the 8099 config.html, confirm.html and reboot.html pages unless they have been deleted or renamed. Press the Save to Flash button to upload the files to the 8099.

When the upload is complete, press Reboot to restart the 8099 and you are ready to test the uploaded HTML pages in the 8099 Interface with different web browsers². Repeat the editing, uploading and testing cycle until you are satisfied with the results.

SUMMARY

This application note has described how an OEM can modify the 8099's prototype F4 Temperature Chamber control page to control Temperature Humidity Chambers, Temperature Chambers or other temperature controlling products that incorporate a Watlow F4 Controller. The OEM can create a page per product or group several products on one page.

This Application Note has also shown how to modify the index page to link to the new control page and how to add buttons to the index page to link to the new control page(s).

Notes:

1. Measure file size with Windows Explorer on a PC. MAC OSX shows minimum 4 kbyte file sizes which is misleading.
2. The current version of Firefox (2.0.0.11) does not always generate the correct cgi instructions when you press Activate or Update. Test your html pages with IE and other browsers.