

INSTRUCTION MANUAL



CSI Web Server

Revision: 11/18



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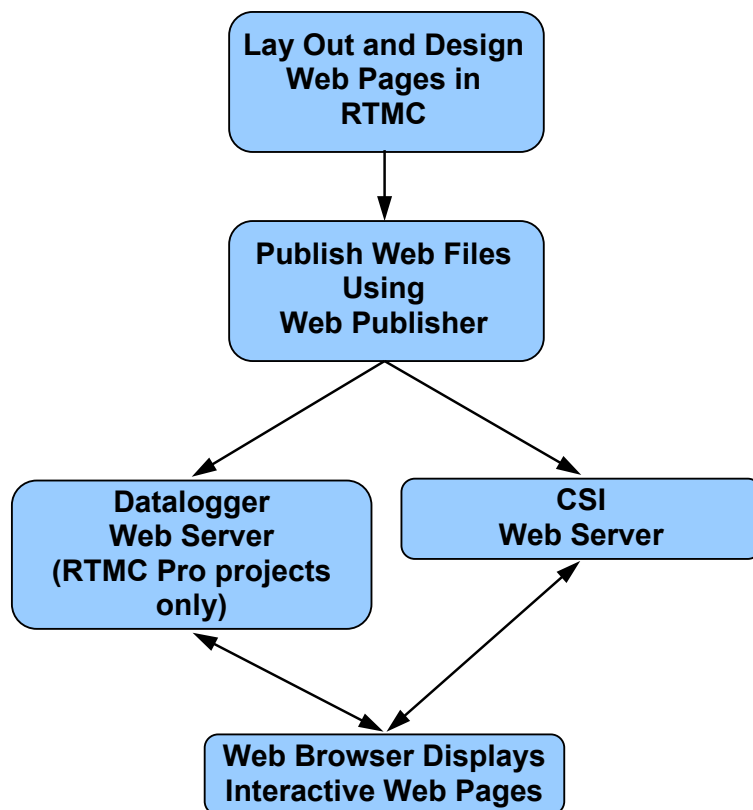
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CSI Web Server

The CSI Web Server software package includes the CSI Web Server, CSI Web Server Administrator, and the Web Publisher. The CSI Web Server runs on a PC and displays projects created using RTMC or RTMC Pro in any web browser that supports HTML5. The Web Server Administrator allows you to configure or check the status of the Web Server, and easily browse to one or more web sites running on the Web Server. The Web Publisher is used to publish your RTMC or RTMC Pro project to the CSI Web Server. Additionally, projects created in RTMC Pro can be published to an HTTP-enabled datalogger.

The diagram below shows the basic steps in creating your web content.



You first use RTMC to create a project containing the display and/or control components that you want to be available from your website. Next, the Web Publisher is used to publish the web files. From RTMC Pro, you can press the

Publish to Web button () to bring up the Web Publisher and publish your project. (The Web Publisher can also be opened from the Windows Start Menu by selecting **Programs | Campbell Scientific | CSI Web Server | Web Publisher.**) From the Web Publisher, you can choose to add a PC Website or a Datalogger Website (RTMC Pro projects only). After filling in the desired settings, press the **Publish Website** button to publish the content.

The CSI Web Server supports the following target browsers at the indicated version or later:

- Chrome 10
- Firefox 4
- Internet Explorer 9
- Opera 11
- Safari 5

NOTE

If firewalls exist between your web server (i.e., a PC running CSI Web Server or a web-enabled datalogger) and the target audience of your website(s), the firewalls will need to be configured to allow incoming traffic on the port being used by the web server. (The port used by the CSI Web Server is configured through the CSI Web Server Administrator. The port used by a web-enabled datalogger is configured through DevConfig. The default port is 80 for both the CSI Web Server and a web-enabled datalogger.) See your network administrator for help in configuring the firewalls.

1. CSI Web Server Administrator

The CSI Web Server Administrator allows you to configure the web server, check the status of the web server, set up user accounts and passwords, and easily browse to sites running on the web server. It can be opened from the Windows Start Menu by selecting **Programs | Campbell Scientific | CSI Web Server | CsiWebAdmin.**)


1.1 Status


The **Status** tab shows the status of the web server and allows you to browse to sites running on the web server.


If the web server is not running, click on the image to start the web server.

When the web server is running, the version of the web server running will be displayed. The protocol, port, and status (e.g., Protocol HTTP, port 80, status Listening) will also be displayed.

A list of sites provided by the web server will be shown. You can click on any site to browse to that site.

The keys icon () next to each site can be used to create or edit the .csipasswd file for that site. See Section 3, *Web Security* (p. 9), for more information about .csipasswd files and how they control users and their website access rights.

The plus icon () next to “Root” creates a new remote folder. You can then use the keys icon next to the new remote folder to create the .csipasswd file for that remote folder before publishing a website to the folder. See Section 2, *Web Publisher* (p. 5), for information on publishing a website to the remote folder.

The trash can icon () next to each website can be used to remove the website.

NOTE

Only sites published to the web server's root directory and immediate subdirectories of the root directory will be shown. Sites cannot be published to deeper subdirectories.

1.2 Configuration

1.2.1 Edit Root Permissions

The **Edit Root Permissions** button is used to create or edit the root .csipasswd file. It performs the same function as the keys icon next to Root on the **Status** tab, but can be used to edit the root permissions even when the CSI Web Server is not running. See Section 3, *Web Security (p. 9)*, for more information on the function of the root .csipasswd file.

1.2.2 HTTP

The **HTTP** tab controls the root directory and HTTP server port that will be used by the CSI Web Server.

HTML Root Directory – The directory that the web server will use to store/serve web pages, scripts, password files, and source description files.

HTTP Server Port – The TCP Port on which the HTTP server will listen for unencrypted connections. You may need to change this port if there is already a web server running on this machine or if your firewall does not allow service on TCP port 80.

1.2.3 HTTPS

The **HTTPS** tab can be used to set up the CSI Web Server for encrypted service. This requires a Private Key File and Certificate File obtained from a third party Certificate Authority.

HTTPS Enabled – Specifies whether the web server will attempt to offer an HTTPS (encrypted) service.

Server Name – Specifies the domain name that the server will report when it redirects requests from an unsecure link to a secure one. This will only happen if the HTTPS protocol is enabled and the private key and certificate have valid content. This value should be the Fully Qualified Domain Name (FQDN) for your web server and, depending upon firewalls, proxies, and port-forwarding configurations, may be different from the host machine name.

HTTPS Server Port – Specifies the TCP port on which the HTTPS server will listen for unencrypted connections. You may need to change this port if there is already a web server running on this machine or if your network or personal firewall do not allow service on TCP port 443.

Private Key File – Specifies the name of the PEM encoded file that contains the HTTPS private key. The TLS/SSL stack used by the web server supports only AES128 or AES256 encryption for the private key file.

Private Key Password – Specifies the password used to decrypt the TLS/SSL private key. It will be ignored if a private key is specified that is not encrypted.

Certificate File – Specifies the name of the PEM-encoded file that contains the x509 HTTPS certificate.

1.2.4 Log Control

The **Log Control** tab allows you to configure how log files are maintained by the CSI Web Server.

Log File Mode – Controls the way that the web server will write its log files. Select **Disabled** to disable log files, **New Log on Time Intervals** to specify that a new log file will be started on the time interval specified by the Baling Interval, or **New Log after Max Size** to specify that a new log file will be started after the current log file exceeds the size specified by the Maximum Log File Size.

Log Files Directory – Specifies the directory in which the web server will write its log files.

Baling Interval – Specifies the maximum time interval that will be recorded in any one log file when the Log File Mode is set to New Log on Time Intervals.

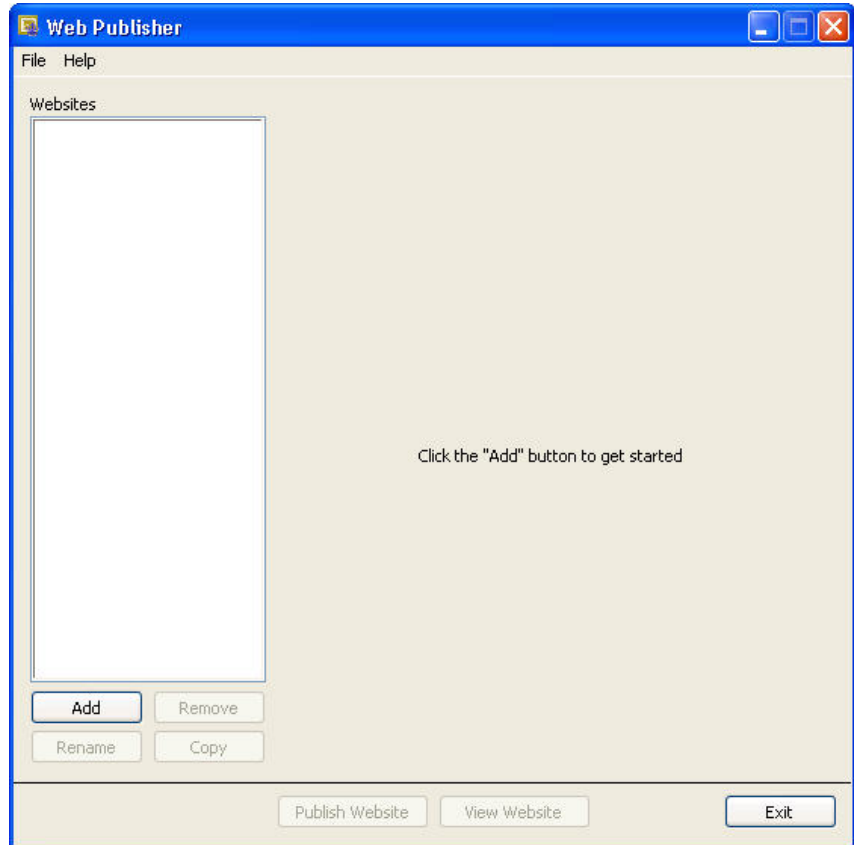
Maximum Log File Size – Specifies the maximum size (in bytes) that will be recorded in any one log file when the Log File Mode is set to New Log after Max Size.

Maximum Log Files Count – Specifies the maximum number of log files that will be kept by the web server before the oldest is overwritten.

Log HTTP Headers – Controls whether the web server will write the headers of HTTP requests and HTTP responses in its log file.

2. Web Publisher

The Web Publisher allows you to publish your RTMC project to the web. In addition, the Web Publisher has display settings that allow you to show other tabs such as data browsing and network status.



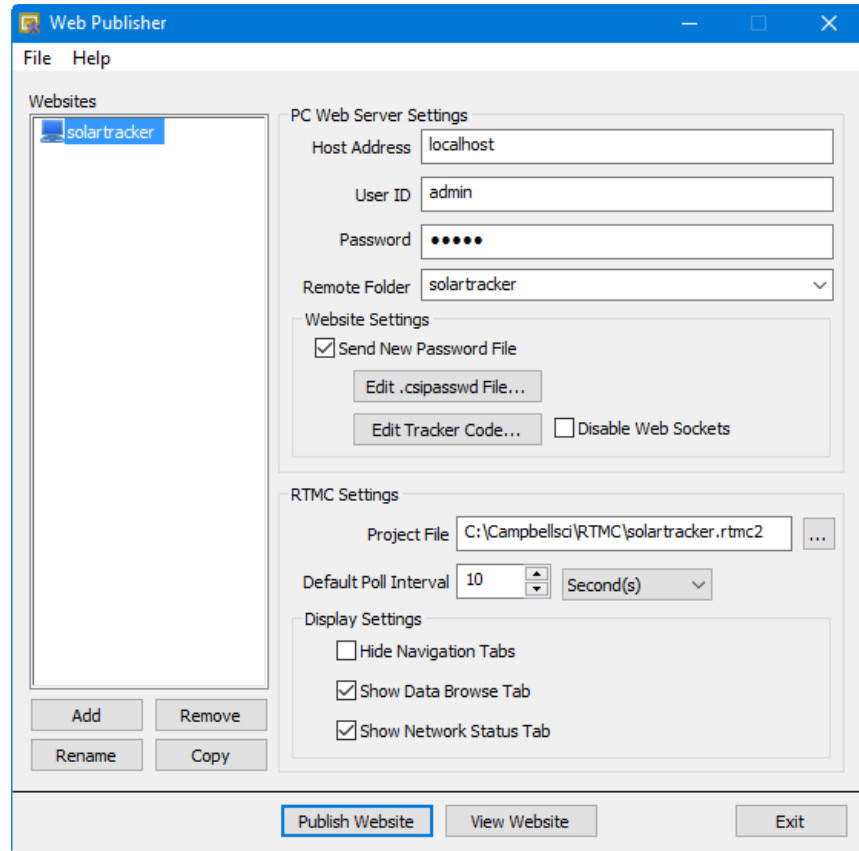
The Web Publisher supports two kinds of websites: PC websites and Datalogger websites.

PC Website – PC websites run on the CSI Web Server. The CSI Web Server supports any number of websites and lets you control user access rights for each website. PC websites support all of the different data sources supported by RTMC (LoggerNet, Data File, Database, HTTP Datalogger, and Virtual Data Sources).

Datalogger Website – Datalogger websites are websites being run on a compatible datalogger like the CR6 Series, CR800, CR1000, and CR3000. Datalogger websites must be designed by RTMC Pro and can only have one data source. The data source must be an HTTP Datalogger Source.

2.1 Creating Websites

To create a website, press the **Add** button and select either **Add PC Website** or **Add Datalogger Website**. Fill in the settings as described below. After filling in the desired settings, press the **Publish Website** button to publish the content.



Web Server Settings

Host Address – Specifies the address where you will be publishing your website. The address can be a domain name or IP address in the form XXX.XXX.XXX.XXX for an IPv4 address or [XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX] for an IPv6 address. If you are using a port other than the default port (80 for http, 443 for https), you need to specify it using a colon followed by the port. For example, campbellsci.com:8080, 192.168.1.1:1234, or [2620:24:8080:8600:85a1:fcf2:2172:11bf]:8080. (CR1000/CR3000/CR800 dataloggers require OS 28 or later to support IPv6 addresses.)

NOTE

For datalogger websites, if the datalogger has only HTTPS enabled with HTTP disabled, it must be specified by adding https:// in front of the IP address or domain name.

For PC websites, if the web server has HTTPS enabled (through the CSI Web Server Administrator), it must be specified by adding https:// in front of the IP address or domain name.

User ID – In order to publish a website, a root-level user must be created. The CSI Web Server Administrator is used to do this for the CSI Web Server. Device Configuration Utility (DevConfig) is used to do this for a datalogger web server. The .csipasswd file that is created controls user accounts and passwords that will be able to publish projects to the web server. In order to publish, a user account needs to be assigned an access level of “all”. This user account with “all” access is called the Root User ID. For more information on security, see Section 3, *Web Security* (p. 9).

Password – The root password is the password associated with the root user ID that has been given “all” access to publish websites to the web server.

Remote Folder – The remote folder controls where a website will be published relative to the web server’s root directory. By default, the CSI Web Server’s root directory is C:\Campbellsci\CsiWebServer. It can be changed from the CSI Web Server Administrator. On the CSI Web Server, you can create as many websites and folders as you want. Each remote folder must be directly below the web server’s root directory (i.e., you cannot publish to *remote_folder\subdirectory*). On a datalogger web server, you are limited on which folders you have available. Currently you can specify /CPU/, /USR/, or /CRD/, if these directories are available. Clicking on the **Remote Folder** drop-down list will show you which folders are currently available.

Website Settings

Send new password file – If a website has been previously created and user rights set up, you may or may not want to overwrite the existing password file for that website.

Edit Password File – Brings up the website .csipasswd file editor. This file is used by the web server to manage user access to the website. On datalogger websites, the .csipasswd file is always placed in the /CPU/ drive automatically.

Hide the password file – (This check box only applies to datalogger websites.) The .csipasswd file can optionally be hidden on datalogger web servers. Hiding the .csipasswd file is a security measure that will help protect access to user names and passwords. Once the .csipasswd file is hidden, it will no longer show up in the file system. Republishing the website with this option disabled will cause the .csipasswd file to show up again.

Edit Tracker Code – Tracker codes can optionally be inserted to track website access. All tracker codes are inserted into a <script> </script> block and are automatically inserted in each page of your website. Google Analytics™ web analytics service and many other tracking services are available for free. The available services range from simple hit counters to enterprise-class web analytic solutions.

Disable Web Sockets – By default, web sockets are used to push data from the web server or datalogger as soon as it becomes available. This is the preferred method. However, some networks do not allow web sockets. Selecting this check box will disable web sockets causing data to be polled by the web browser.

RTMC Settings

Project File – The RTMC project file (*.RTMC2) that will be used to generate the website. PC websites support all of the available data sources. Datalogger websites require an RTMC project that only contains one HTTP datalogger source. When publishing a website, all of the screens, images, and required files are compiled together and automatically copied to the web server.

Note that when publishing to a datalogger website, the HTTP datalogger source in your RTMC project does not need to be specific to the datalogger that the website is published to (e.g., an RTMC project with an HTTP datalogger source at 192.168.4.14 can be published to a datalogger with an IP address of 192.168.9.99). This allows you to create one RTMC project that can be published to multiple datalogger websites.

Default Poll Interval – This setting determines the rate at which data is polled by a web browser on older systems. This setting is somewhat deprecated because of more modern web technologies that have been implemented across many of our products. If you have the latest version of our software, data is now pushed from the web server or datalogger as soon as it becomes available instead of needing to be continually polled.

This functionality is available in:

- CSI Web Server 1.4 or later
- CR1000/CR3000/CR800 Series OS 29 or later
- CR6 Series OS 4 or later

If this functionality is not supported on your system, data will revert to being polled at the **Default Poll Interval**. This means that the browser must ask the web server if it has any new data to be displayed. This setting determines how often new data will be requested. The default poll interval is set to 10 seconds. This setting should be adjusted to provide data at a rate that is suitable for your application. There are many factors that affect how fast data will be able to be polled including the number of users viewing the page, the number of dataloggers being polled, the size of data tables in the dataloggers, the resources available to the web server, the internet browser resources, connection bandwidth, etc.

Display Settings

Hide Navigation Tabs – By default, websites will be displayed with navigation tabs at the top of the web page. These tabs allow users to navigate your website. You can disable these tabs and implement your own navigation system using Hot Spots in RTMC Pro.

Show data browse tab – The show data browse tab option will display a **Browse Data** tab on your website. This tab allows you to view data from all of your data sources.

It also provides a mechanism to do custom data queries. Custom data queries let you download data files or view data directly in the browser. Each table in the **Browse Data** tab will have a **Custom** link next to the table name. Click on the link to open the **Custom Data Query** window and perform a custom data query. (See the DataQuery command in Section 4, *API Commands* (p. 14), for

information on the Date Query Modes available on the Custom Data Query screen.)

Show file browse tab – (This check box only applies to datalogger websites.) The show file browse tab option will display a **Browse Files** tab on a datalogger web server. The file browser allows you to traverse the file system of the datalogger. Each folder is displayed with a link as well as some information about the size of the folder and when the folder was last written to. When clicking on a folder, you will see a list of all the visible files in the directory. Each file is a link, so you can click on the file and view it or download it. The size of the file and last-write time are also displayed. Clicking on the [..] link will take you back to the root directory list of the datalogger file system.

Show datalogger status tab – (This check box only applies to datalogger websites.) The show datalogger status tab option will display a **Datalogger Status** tab on your website that allows you to view the datalogger status. This includes datalogger information, program information, battery information, and card information.

Show network status tab – (This check box only applies to PC websites.) The show network status tab option will display a **Network Status** tab on your website that allows you to see all of your data sources used by the current website. Databases and Data File sources don't currently display any status information. LoggerNet data sources and HTTP Datalogger Sources display a link. When LoggerNet data sources are clicked, all of the stations in the LoggerNet network are displayed with their collection statistics. When an HTTP Datalogger Source is clicked, you see the datalogger status information.

2.2 Managing Websites

To remove a website, select the website in the **Websites** list and press the **Remove** button.

To rename a website, select the website in the **Websites** list and press the **Rename** button.

The settings from the website that is currently selected in the **Websites** list can be copied to a new website by pressing the **Copy** button. This can be useful when multiple websites will have similar settings, such as when you want to publish the same RTMC project to multiple dataloggers.

The website that is currently selected in the **Websites** list can be viewed in a web browser by pressing the **View Website** button.

3. Web Security

Users and their website access rights are controlled through .csipasswd files. Note that .csipasswd files control access to websites as well as direct access to data sources and dataloggers using the API commands described in Section 4, *API Commands* (p. 14).

Each user can be given one of the following access levels:

None – No access is allowed. The account is disabled.

Read Only – Allowed to view data. No values can be changed.

Read/Write – Allowed to view data, make changes to writeable values in a datalogger's Public or Status table or a virtual data source, and set a datalogger's clock.

All – Allowed to view data, make changes to writeable values in a datalogger's Public or Status table or a virtual data source, set a datalogger's clock, use the API FileControl command, and publish websites.

3.1 PC Websites

In order to publish a website to the CSI Web Server, a .csipasswd file must be created. The root directory and each remote folder under the root directory can have its own .csipasswd file. This .csipasswd file controls the user accounts and passwords that will be able to publish projects to that directory and controls user access to websites in that directory. In order to publish, a user account needs to be assigned an access level of "all".

If a remote folder does not have its own .csipasswd file, the root .csipasswd file will be used.

For PC Websites, there is a default .csipasswd file which includes two users:

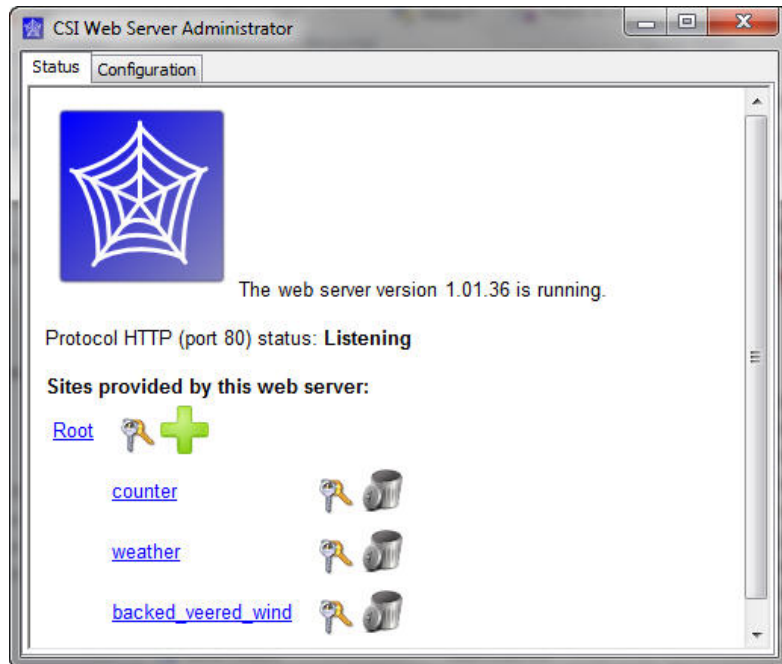
Username: admin
Password: admin
Access Level: All

Username: anonymous
Password:
Access Level: Read Only

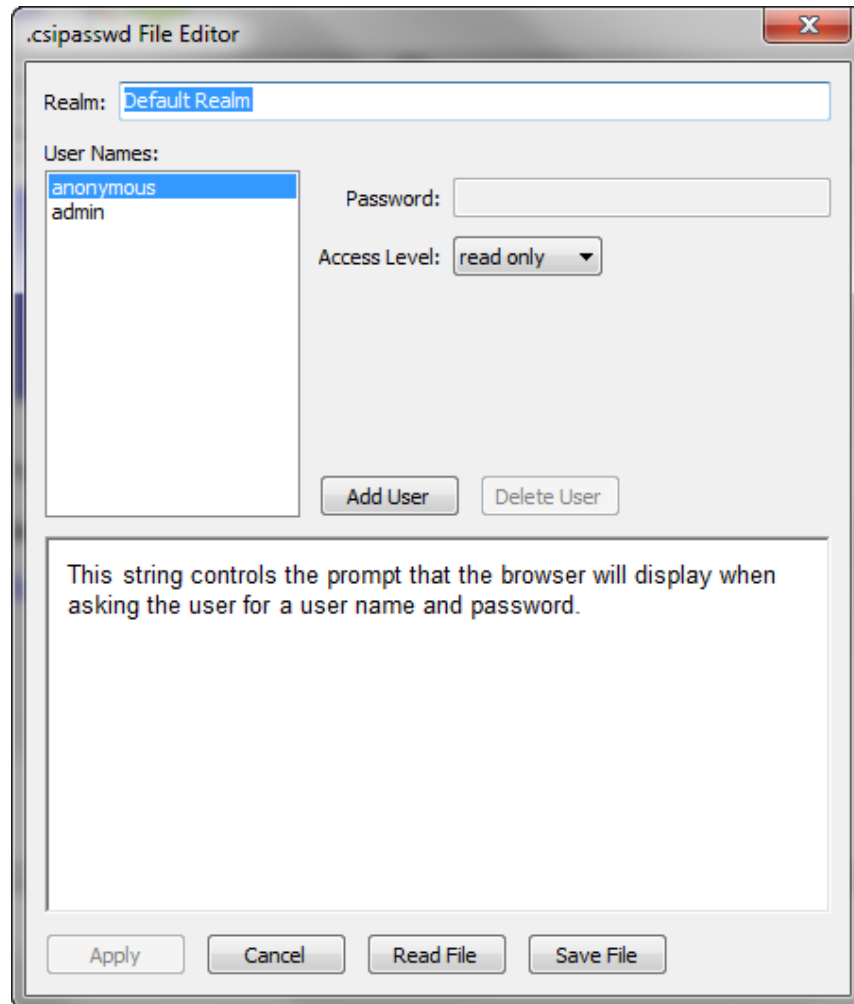
If a root .csipasswd file has not been created, this default .csipasswd file will be used for the root directory and any remote folder that does not include its own .csipasswd file,

The CSI Web Server Administrator is the preferred method of creating and editing .csipasswd files. They can also be created and edited from the Web Publisher. Both methods are described below.

3.1.1 Using the CSI Web Server Administrator



To create the `.csipasswd` file in the root directory, press the keys icon next to “Root”. To create a `.csipasswd` file for a new remote folder press the + icon next to “Root”, enter a name for the site, and press **Add Subdirectory**. Once the new subdirectory appears under “Root”, press the keys icon next to the subdirectory to create the `.csipasswd` file for that subdirectory. The key icons can also be used later to edit the `.csipasswd` files.



The .csipasswd File Editor dialogue box that is opened when the keys icon is pressed has the following fields:

Realm – The name given to this realm. (A realm is a collection of user names and their access levels.) The name will be used in the prompt the browser displays when asking the user for a user name and password.

User Names – Shows the users that are currently defined in this realm. Press **Add User** to add a new user. Select a user name in the list and press **Delete User** to remove that user.

Password – The password for the selected user.

Access Level – Sets the access level for the selected user.

None – No access is allowed. The account is disabled.

Read Only – Allowed to view data. No values can be changed.

Read/Write – Allowed to view data, make changes to writeable values in a datalogger's Public or Status table or a virtual data source, and set a datalogger's clock.

All – Allowed to view data, make changes to writeable values in a datalogger’s Public or Status table or a virtual data source, set a datalogger’s clock, use the API FileControl command, and publish websites.

After defining the desired user names and access levels, press **Apply** to apply the changes. You can also press **Cancel** to discard the changes. Press **Read file** to read a .csipasswd file into the **Website .csipasswd File Editor**. Press **Save File** to save the contents of the **Website .csipasswd File Editor** to a .csipasswd file.

3.1.2 Using the Web Publisher

To create or edit a .csipasswd file from the Web Publisher, select a website from the **Websites** list. You will be creating or editing the .csipasswd file for the subdirectory shown in Remote Folder. If the Remote Folder field is blank, the website is being published to the root directory and you will be editing or creating the root .csipasswd file. Select the **Send new password file** check box and then press the **Edit Password File** button to bring up the **Website .csipasswd File Editor**. Define the user names and access levels you want to be available for this website and press the **OK** button. Press the **Publish Website** button to publish the website and send the new password file.

NOTE

If you are creating a root .csipasswd file from the Web Publisher, you will need to enter the default admin user ID and password described above in the User ID and Password field to publish the website and send the new password file. When the website is published again in the future, you will use an “all” access level user ID and password from the root .csipasswd file to publish to the root directory.

If you are creating a .csipasswd file for a remote folder from the Web Publisher, you will need to enter an “all” access level user ID and password from the root .csipasswd file (or the default admin user ID and password described above if there is no root .csipasswd file) to publish the website and send the new password file. When the website is published again in the future, you will use an “all” access level user ID and password from the remote folder’s .csipasswd file to publish to the remote folder.

3.2 Datalogger Websites

Device Configuration Utility (DevConfig) must be used to create the initial .csipasswd file for a datalogger. The .csipasswd file is created by connecting to the datalogger in DevConfig and then pressing the **Edit .csipasswd File** button on the **Net Services** tab. Define the user names and access levels you want to be available and press the **Apply** button. Pressing the **Apply** button sends the file to the datalogger.

Once a .csipasswd file resides on the datalogger, it can be overwritten from the Web Publisher. Select the datalogger website from the **Websites** list. Select the **Send new password file** check box and then press the **Edit Password File** button to bring up the **Website .csipasswd File Editor**. Define the user names and access levels you want to be available and press the **OK** button. Press the **Publish Website** button to publish the website and send the new password file.

When you press the **OK** button on the **Website .csipasswd File Editor** dialogue box in Web Publisher, this file is stored to your computer. When you press the **Publish Website** button, this file will be sent to the datalogger and will overwrite the current .csipasswd file. Note that when you press the **Edit Password File** button, you are editing the file stored on your computer, not the one stored on the datalogger. This file does not contain any changes made using DevConfig. Therefore, if you have made changes to the .csipasswd file from DevConfig, they will be overwritten when you press the **Publish Website** button.

4. API Commands

The CSI Web Server supports an HTTP API interface for accessing data from data sources defined in the RTMC projects running on the web server. These commands can also be used to access data from CR6 Series, CR800, CR1000, and CR3000 dataloggers directly. The CGI-style request syntax is designed to be flexible and easy to use.

4.1 Command Syntax

Syntax for the commands sent to the web server generally follows the form of:

URL?command=CommandName&uri=DataSource&arguments

The DataSource = *source_name:station_name.table_name.field_name*

For example, Server:CR1000:onemin.TempF

The *station_name* applies only to LoggerNet Server data sources. If the *field_name* is not specified, all of the fields in the table will be output. If the *field_name* refers to an array without a subscript, all of the values associated with that array will be output.

Arguments are appended to the command string using an ampersand (&). Some commands have optional arguments, where omitting the argument results in a default being used. When applicable, optional arguments and their defaults are noted in the descriptions below.

Some commands return a response code indicating the result of the command. These are described below where applicable.

4.2 Data Access Commands

DataQuery

DataQuery allows a web client to poll a data source or datalogger for data. The command returns one or more fields, or one or more records, from a table in the data source or datalogger. DataQuery has the following parts:

URI The URI specifies the data source for the query.

When querying through the CSI Web Server, that data source is specified as *source_name:station_name.table_name.field_name*. (Note the *station_name* applies only to LoggerNet Server data sources.)

For example, the data source for the PTemp field in a CR1000's Public table in a LoggerNet Server data source would be:

Uri=Server:CR1000.Public.PTemp

When querying the datalogger directly, the data source is specified as *table_name.field_name*. For example, the data source for the PTemp field in a datalogger's Public table would be:

Uri=Public.PTemp

Note that *field_name* is optional. If omitted, all values in the table will be returned.

Mode

The Mode specifies the timeframe for the data to be returned. Valid options are:

most-recent – Returns the data from the most recent number of records. The number of records is specified by P1.

since-time – Returns all the data since a certain time. The time is specified by P1.

since-record – Returns all the records since a certain record number. The record number is specified using P1.

date-range – Returns the data in a certain date range. The date range is specified using P1 and P2.

Backfill – Returns all the data that has been stored since a certain time interval (for instance, all the data since 1 hour ago). The interval is specified using P1.

P1/P2

P1 and P2 are used to set the time parameters for Mode:

most-recent – The maximum number of records to return.

since-time – The start time for the data. Format = YYYY-MM-DD T:HH:MM:SS.MS. Time (T) is optional; if only the date is specified, Time is assumed as midnight. When specifying time, MS is optional.

since-record – The starting record number.

date-range – The start time (P1) and end time (P2) for the data. Format = YYYY-MM-DD THH:MM:SS.MS. Time (T) is optional. If only the date is specified, Time is assumed as midnight. When specifying time, MS is optional.

Backfill – The interval, in seconds, for the backfill (e.g., 3600 would be 1 hour).

Format

The Format is the format in which to return the data. Options are HTML, JSON, TOA5, TOB1, XML.

NOTE

If a value of json is specified for the format parameter and the web server has a large data set to send, the web server may choose to break the data into multiple requests by specifying a value of true for the more flag in the JSON output. If this flag is set to true, the user will need to send another request to get the additional data.

ExamplesCSI Web Server

In these examples, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To return the three most recent values from the PTemp variable in the OneMin table of the CR1000 in the LoggerNet server data source:

```
http://192.168.4.14/weather/?command=dataquery&uri=Server:CR1000.o  
nemin.ptemp&format=html&mode=most-recent&p1=3
```

- To return all values since Oct 1, 2011, of the TempF variable in the CR1000_OneMin table of the Database data source:

```
http://192.168.4.14/weather/?command=dataquery&uri=Database:CR1000  
_OneMin.TempF&format=html&mode=since-time&p1=2011-10-01
```

- To return all values between Sept 1, 2011, and Oct 1, 2011, of the TempF variable in the OneMin table of the DataFile data source:

```
http://192.168.4.14/weather/?command=dataquery&uri=DataFile:OneMin.  
TempF&format=html&mode= date-range&p1=2011-09-01&p2=2011-10-  
01
```

- To return all values since Oct 1, 2011, at 10:00 a.m. from the PTemp variable in the OneMin table of the CR1000 in the LoggerNet server data source:

```
http://192.168.4.14/weahter/?command=dataquery&uri=Server:CR1000.o  
nemin.ptemp &format=html&mode=since-time&p1=2011-10-  
01T10:00:00
```

Datalogger

In these examples, you are directly accessing the datalogger at 192.168.12.55.

- To return all records since record 14400 of TempF in the OneMin table of the datalogger at 192.168.12.55:

```
http://192.168.12.55/?command=dataquery&uri=OneMin.TempF&format  
=html&mode=since-record&p1=14400
```


- To return all records since one hour ago:

`http://192.168.12.55/?command=dataquery&uri=OneMin.TempF&format=html&mode=backfill&p1=3600`

BrowseSymbols

The BrowseSymbols command is used to return all the sources in an RTMC project, all the stations in a server data source, all the tables in a datalogger or database, all the fields in a table, or all the elements of an array. It has the following parts:

URI The URI specifies the name of the parent element for which to return the BrowseSymbol information. The format is *source_name:station_name.table_name.field_name*.

Format The Format is the file format for the result of the command. Options are: HTML, JSON, or XML. The following information is returned:

Return	Description
Name	The name of the child element in the datalogger.
URI	The URI of the child element.
Type	The type of the element. 1 = LoggerNet Data Source, 2 = Data File Data Source, 3 = Database Data Source, 9 = HTTP Data Source, 4 = LoggerNet Station, 5 = LoggerNet Statistics Broker, 6 = Table, 7 = Array, 8 = Scalar
Is_enabled	Boolean value which indicates whether the element is enabled for scheduled data collection (relevant only to LoggerNet data sources).
Is_read_only	Boolean value which indicates whether the element is read-only. If not read-only, the element can be changed using SetValueEx.
Can_expand	Boolean value that indicates whether the element has child elements.

Examples

CSI Web Server

In these examples, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To return all data sources in a project:

`http://192.168.4.14/weather/?command=browsesymbols&format=html`

- To return all stations in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Server&format=html`
- To return all tables of the CR1000 station in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Server:CR1000&format=html`
- To return all fields of the Public table of the CR1000 station in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Server:CR1000.Public&format=html`
- To return all elements in the Flag array in the Public table of the CR1000 station in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Server:CR1000.Public.Flag&format=html`
- To return all tables of the Database data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Database&format=html`
- To return all fields of the CR1000_OneMin table of the Database data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=Database:CR1000_OneMin&format=html`
- To return all fields of the OneMin table of the DataFile data source:

`http://192.168.4.14/weather/?command=browsesymbols&uri=DataFile:OneMin&format=html`

Datalogger

In these examples, you are directly accessing the datalogger at 192.168.12.55.

- To return all tables in a datalogger:

`http://192.168.12.55/?command=browsesymbols&format=html`
- To return all fields in the Public table:

`http://192.168.4.14/?command=browsesymbols&uri=Public&format=html`

- To return all the elements in the Flag array, which is part of the Public table:

```
http://192.168.4.14/?command=browsesymbols&uri=Public.flag&format=html
```

4.3 Control Commands

SetValueEx

The SetValueEx command is used to set a value in the datalogger. For the CSI Web Server, a user name and password that has at least read/write rights must be entered (or previously entered in the same session) or the command will fail. Likewise, for direct datalogger access, if a .csipasswd file has been sent to the datalogger, a user name and password must be entered (or previously entered in the same session) or the command will fail. SetValueEx has the following parts:

URI	The URI specifies the value that should be set in the format of <i>source_name:station_name.table_name.field_name</i> .
Value	The new value to which the URI should be set.
Format	The Format is the file format for the result of the command. Options are HTML, JSON, or XML. A result code and description are returned.

Code	Description
0	An unrecognized failure occurred
1	Success
2	The data-source connection failed (LoggerNet data sources only)
3	LoggerNet logon failed (LoggerNet data sources only)
4	Blocked by LoggerNet security (LoggerNet data sources only)
5	Read only
6	Invalid table name
7	Invalid fieldname
8	Invalid fieldname subscript
9	Invalid field data type
10	Datalogger communication failed
11	Datalogger communication disabled (LoggerNet data sources only)

12	Blocked by datalogger security
13	Invalid table definitions (LoggerNet data sources only)
14	Invalid device name (LoggerNet data sources only)
15	Invalid web client authorization

Results codes marked as (LoggerNet data sources only) are applicable only when the API is being used with the CSI web server.

Example

In this example, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To set the Boolean variable called Flag(1) in the Public table of the CR1000 of a LoggerNet server data source to True (-1):

`http://192.168.4.14/weather/?command=setvalueex&uri=Server:CR1000.Public.flag(1)&value=-1&format=html`

ClockCheck

Returns the current time of the CSI Web Server or a station specified by the URI.

URI The URI can be specified as `URI=source_name:station_name` or URI can be omitted.

Examples

CSI Web Server

In these examples, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To check the clock of the CSI Web Server:

`http://192.168.4.14/weather/?command=clockcheck&format=html`

- To check the clock of the CR1000 in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=clockcheck&URI=Server:CR1000_ip&format=html`

Datalogger

In this example, you are directly accessing the datalogger at 192.168.12.55.

- To check the clock of the datalogger:

`http://192.168.12.55/?command=clockcheck&format=html`

ClockSet

Sets the time for the station specified by the URI. For the CSI Web Server, a user name and password that has at least read/write rights must be entered (or previously entered in the same session) or the command will fail. Likewise, for direct datalogger access, if a .csipasswd file has been sent to the datalogger, a user name and password must be entered (or previously entered in the same session) or the command will fail. ClockSet has the following parameters:

URI	The URI can be specified as <code>URI=source_name:station_name</code> . For direct datalogger access, the URI can be omitted.
Time	The time to set the clock to, in the format of YYYY-MM-DD T:HH:MM:SS.MS. MS is optional.
Format	The Format is the file format for the result of the command. Options are HTML, JSON, or XML.

A result code, time, and description are returned for ClockCheck and ClockSet. With ClockSet, the time returned is the time before the clock was set.

Code	Description
1	The clock was checked (successful)
2	The clock was set
3	The LoggerNet session failed (LoggerNet data sources only)
4	Invalid LoggerNet logon (LoggerNet data sources only)
5	Blocked by LoggerNet security (LoggerNet data sources only)
6	Communication with the station failed (LoggerNet data sources only)
7	Communication with the station disabled (LoggerNet data sources only)
8	Blocked by datalogger security
9	Invalid station name (LoggerNet data sources only)

- 10 LoggerNet device is busy (LoggerNet data sources only)
- 11 Specified URI does not reference a LoggerNet station (LoggerNet data sources only)

Results codes marked as (LoggerNet data sources only) are applicable only when the API is being used with a CSI web server.

Examples

CSI Web Server

In this example, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To set the clock of the CR1000 in the LoggerNet server data source to November 1, 2011, 12:26:00:

`http://192.168.4.14/weather/?command=clockset&uri=Server:CR1000&format=html&time=2011-11-01T12:26:00`

Datalogger

In this example, you are directly accessing the datalogger at 192.168.12.55.

- To set the clock of the datalogger to November 1, 2011, 12:26:00:

`http://192.168.12.55/?command=clockcheck&format=html&time=2011-11-01T12:26:00`

4.4 File Management Commands

NewestFile

The NewestFile command will return the most recent file that matches a given expression, as defined by the `expr` argument. This command can be used to display the most recent image stored to the datalogger by a camera. The command will return other files, as well, and the file will be processed based on the settings in the web client (for instance, if the specified file is a CR1 file and the command is entered into a browser, the browser may prompt for the file to be saved or for selection of the program to open the file).

URI The URI can be specified as `URI=source_name:station_name`. For direct datalogger access, the URI can be omitted.

Expr Specifies the path and file pattern for the desired file to be returned. Path determines the drive on the datalogger, i.e., CPU:, USR:, or CRD:. The file pattern can incorporate the use of wildcards. If the path is omitted or invalid, or a file matching the pattern does not exist, an Unrecognized Request response will be returned.

NewestFile requires a minimum access level of Read Only.

Examples

CSI Web Server

In these examples, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To return the newest file with a *.jpg extension from the USR drive of the CR1000 in the LoggerNet server data source:

```
http://192.168.4.14/weather/?command=newestfile&uri=Server:CR1000&
expr=USR:*.jpg
```

- To return the newest *.cr1 file from the CPU drive of the CR1000 in the LoggerNet server data source:

```
http://192.168.4.14/weather/?command=newestfile&uri=Server:CR1000&
expr=CPU:*.cr1
```

Datalogger

In these examples, you are directly accessing the datalogger at 192.168.12.55.

- To retrieve the newest *.jpg file on the datalogger's USR drive:

```
http://192.168.12.55/?command=NewestFile&expr=USR:*.jpg
```

- To retrieve the newest *.cr1 file on the datalogger's CPU drive:

```
http://192.168.12.55/?command=NewestFile&expr=CPU:*.cr1
```

ListFiles

When accessing data through the CSI Web Server, the ListFiles command returns a list of all files stored on the specified station. When accessing a datalogger directly, the ListFiles command returns a list of files stored in the specified directory (/CPU, /USR, /CRD, /USB) of the datalogger. The ListFiles command requires a minimum security level of Read Only.

URI The URI can be specified as `URI=source_name:station_name`. For direct datalogger access, the URI is omitted.

Format The Format is the format in which to return the list of files. Options are HTML, JSON, and XML.

ListFiles returns the following, formatted in a table:

Path The path of the file or directory, relative to the URL.

Is Directory A Boolean value that indicates whether or not the returned object is a directory.

Size An integer that provides the size of a file in bytes, or the number of bytes free in a directory.

Last Write	A string that specifies the date and time a file was last written (returned for files only).
Run Now	A Boolean value that indicates whether or not the file (a datalogger program) is marked by the datalogger file system as currently running.
Run On Power Up	A Boolean value that indicates whether or not the file (a datalogger program) is marked by the datalogger file system as run on power up.
Read Only	A Boolean value that indicates whether or not the file is marked by the datalogger file system as read-only.
Paused	A Boolean value that indicates whether or not the file (a datalogger program) is marked by the datalogger file system as paused.

Examples

CSI Web Server

In this example, you are accessing data through the CSI Web Server at address 192.168.4.14. The RTMC project is published to the remote folder Weather.

- To see all files on the CR1000 in the LoggerNet server data source:

`http://192.168.4.14/weather/?command=ListFiles&uri=Server:CR1000&format=html`

Datalogger

In this example, you are directly accessing the datalogger at 192.168.12.55.

- To return all files on the datalogger's USB drive:

`http://192.168.12.55/USB/?command= ListFiles&format=html`

FileControl

The FileControl command allows you to perform actions on files that are located on one of the datalogger's drives. Note that FileControl can only be used when accessing a datalogger directly and not through the CSI Web Server. The command has the following parts:

File	The name of the file on which to perform the file control operation. This command is optional for Actions 7, 8, 9, 11, and 12.
File2	The name of the second file required for the command. This command is used for options 15, 16, 17, 18, 19, and 20.

Action The following actions are supported:

Code	Description
1	Compile and run the file specified by File and mark it as the program to be run on power up.
2	Mark the file specified by File as the program to be run on power up.
3	Mark the file specified by File as hidden.
4	Delete the file specified by File.
5	Format the device specified by File.
6	Compile and run the file specified by File without deleting existing data tables.
7	Stop the currently running program.
8	Stop the currently running program and delete associated data tables.
9	Install the operating system (*.obj) specified by File. The file must reside on the datalogger's CPU drive (sent to the datalogger using HTTPPut)
10	Compile and run the program specified by File but do not change the program currently marked to run on power up.
11	Pause execution of the currently running program.
12	Resume execution of the currently paused program.
13	Stop the currently running program, delete its associated data tables, run the program specified by File, and mark the same file as the program to be run on power up.
14	Stop the currently running program, delete its associated data tables, and run the program specified by File without affecting the program to be run on power up.
15	Move the file specified by File2 to the name specified by File.
16	Move the file specified by File2 to the name specified by File, stop the currently running program, delete its associated data tables, and

	run the program now specified by File while marking it to run on power up.
17	Move the file specified by File2 to the name specified by File, stop the currently running program, delete its associated data tables, and run the program now specified by File without affecting the program that will run on power up.
18	Copy the file specified by File2 to the name specified by File.
19	Copy the file specified by File2 to the name specified by File, stop the currently running program, delete its associated data tables, and run the program now specified by File while marking it to run on power up.
20	Copy the file specified by File2 to the name specified by File, stop the currently running program, delete its associated data tables, and run the program now specified by File without affecting the program that will run on power up.

Format The Format is the file format for the result of the command. Options are HTML, JSON, or XML.

FileControl returns the following:

Outcome If 0 is returned, the command succeeded. Any non-zero value indicates a failure.

Time The number of seconds that the web client should wait before attempting more communication with the station. A value of 0 means communication can resume immediately.

Description Provides details about the FileControl attempt.

Example

Datalogger

In this example, you are directly accessing the datalogger at 192.168.12.55.

- To set a program named tc-fast.cr1 on the datalogger's CPU drive to run on power up:

```
http://192.168.12.55/?command=filecontrol&file=CPU:tc-fast.cr1&action=2
```


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