Remote CPU & System Diagnostics Made Easy

How the integrated Web server function in Siemens CPUs makes it simple to diagnose and troubleshoot your programmable controllers from virtually anywhere.

Most plant engineers have experienced the problem, probably more times than they care to admit. Some kind of glitch has shut down production and nobody on site has the expertise to troubleshoot the problem. It may be 3 a.m., or maybe you're having a much-needed weekend break with family or friends, but it's up to you to head in to the plant and try to remedy the situation.

Imagine instead if you could merely find a computer with an Internet connection, log in to the affected controller and be able to access all the same diagnostic data as if you had a cable directly attached to it. With the ability to remotely access diagnostics and the status of key, pre-configured variables in the controller's program, you can quickly get to the root of the problem, then get back to sleep or play, as the case may be.

Customers that have some of the latest Siemens controllers know that this scenario is no fantasy. Various Siemens controller models feature an integrated Web server function that engineers can implement with a single click. One more click gives you access to the status of pre-configured tables of variables within your program, allowing effective troubleshooting via any Internet or intranet connection. OEMs can use the same function to remotely troubleshoot any of their equipment that is controlled by a Siemens controller with the integrated Web server. In either instance, the feature can dramatically reduce downtime—and save money.

Simple and cost-effective
The integrated Web server function is available on Siemens controllers including the S7-400, S7-300, and ET 200 controller families. Gaining the same Web server functionality with other vendors' controllers requires a separate communications card, which adds additional expense and takes up valuable rack space. On designated Siemens controllers, the feature comes standard, at no additional cost.

Using the integrated CPU Web server function requires absolutely no programming expertise. Turning the feature on is literally as simple as clicking a box in the CPU hardware configuration setup screen. One more click and you'll be able to load designated variable address tables (VAT) into the CPU, enabling you to view them remotely.

Once the function is enabled, you can connect to the Web server by entering the IP address of the CPU in the address bar of your Web browser. Bookmark the address and you'll have easy access to the site at any time.

A bevy of detailed data
Once you log in, you'll be greeted with a welcome page that identifies the CPU model. Click enter and you'll see a page with LEDs that reflect the current status of the device, the CPU station and module names, as well as the module type.

An Identification page contains characteristic data for the CPU, including its plant designation, location identifier and serial number along with hardware and firmware data. Another page gives you access to all the data stored in the CPU's diagnostic buffer, the same information you're accustomed to seeing while connected directly to the CPU using Siemens STEP 7 software. The diagnostic buffer can contain up to 500 entries, with the most recent always displayed first.

The diagnostics page displays an Events window, listing each diagnostic event with a date and time. Just below is a Details window that enables you to garner detailed information about any event you select from the Events window.

A Messages page displays the content of the CPU's message buffer. The message system relays system diagnostic information relating to the configuration of the connected hardware. You can filter messages to display entries only for those parameters in which you are most interested. Messages can also be sorted by message number, date, time of day, state and other parameters. As with the Diagnostics page, an information window enables you to display details about any message you select.

Users can also check on the health of the integrated PROFINET connection on their CPUs, gathering details on criteria including the name and MAC address of the connection, its IP parameters and physical properties such as port number and link status. Additional windows provide information on data packages sent and received, providing details on collisions and packages sent or received without errors—enabling you to determine the health of the transmission and reception lines.

You'll also be able to check on the status of variables in your program, such as bit, floating point and the like. Simply enter the variable's address into the Web server tag status screen, then select the desired display format from a drop-down list.

Checking on VAT status
Perhaps the most useful feature of the integrated Web server function is the ability to access the status of variables within the CPU program's pre-configured tables. Customers can remotely access up to 50 VAT tables per CPU, and can define up to 200 variables within each table. These are the same VAT tables that Siemens has supported for years with its STEP 7 software, and that you probably already have configured for many of your controllers.

Clicking a single check box during the setup process enables you to download select VAT tables for use with the Web server. With the VAT tables enabled, you'll be able to quickly troubleshoot many problems even if you don't happen to be on site.

Perhaps you're alerted that a certain process in the plant has stopped functioning. That information alone doesn't help you much in troubleshooting. But the ability to see VAT tables enables you to view the sequence the process is supposed to follow and pinpoint the step where it is failing. You can even garner enough detail to determine, for example, the exact input, light curtain button or switch that may be affected. If the problem turns out to be something as simple as a foreign object interfering with the light table, you can quickly troubleshoot the issue and get things running again – potentially saving a time-consuming and costly trip to the plant.

The same function can be a boon to OEMs, allowing them to quickly troubleshoot problems with their plant machinery. OEMs generally know about the most common problem areas for their machines and have configured VAT tables accordingly. Using the integrated Web server function, they may be able to remotely troubleshoot and remedy a problem that previously would have required a time-consuming visit from a service rep.

Conclusion

Indeed, the ability to remotely tap diagnostic information via a Web browser can provide benefits in numerous scenarios that are common to most any plant environment.

Consider the case of a new employee, who may need time to become familiar with the kinds of automation issues that routinely crop up in the plant. Rather than having an expensive, experienced employee on site to back him up, the integrated Web server function enables the new employee to tap into the expertise of a more seasoned engineer as needed – from wherever that engineer may be.

Many plants also operate with two or three shifts. Typically, one of those shifts is considered the "A" team, while the others may be less experienced. The integrated Web server function makes it easy for A team members to back up their counterparts without spending time trekking to the plant.

And of course every plant has to cover for periods when their most seasoned engineers are not on the job due to vacation, sickness, travel, training or the like. Here again, the Web server function makes it simple to tap their expertise when required.

By designing your automation system with Web-based management in mind, you can ensure that engineers have access to detailed diagnostics at any time, wherever they may be. Setting up this remote diagnostic system requires no programming expertise, meaning you'll be able to get up and running in virtually no time. The result will be reduced downtime in your production facility – and you know how much that's worth.

Additional Resources

Check out more information about the integrated Web server function in Siemens CPUs:

Click here to view an online demo of the built-in Web Server

Have more questions? [Click here](#)