Configuration of FinsGateway V3.20 via Serial connection for FINS protocol

Whitepaper

The information in this article refers to:
- Complimentary Software CD – FinsGateway 3.20.
- CitectSCADA V5.x and higher.

Summary:

This article describes the configuration of a serial connection using FinsGateway V3.20. Communication is achieved using a standard RS232 port to a CJ1M CPU22.
1. General information

Citect performs communication via the FINS-Functions (FINS API) of FinsGateway. Therefore FinsGateway must be installed and configured before successful communications is possible.

![Communication principle diagram](image1)

Fig. 1: Communication principle

The FinsGateway software supports many protocols (Serial, Ethernet, SYSMAC Link, Controller Link) for communication with the OMRON PLC. Therefore it is possible to use one Citect driver for different kinds of communication since the FinsGateway makes it transparent.

![FinsGateway Layer Model diagram](image2)

Fig. 2: FinsGateway Layer Model

The following FINS Citect drivers are supported:

<table>
<thead>
<tr>
<th>FINS Citect Drivers</th>
<th>Supported PLCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINS</td>
<td>C/CV-Series PLCs</td>
</tr>
<tr>
<td>FINS3</td>
<td>CS1/CJ1-Series PLCs</td>
</tr>
</tbody>
</table>

Information:
The latest Citect drivers can be downloaded from [www.citect.com](http://www.citect.com).
2. Configuration example

**Required Software / Hardware**

**Software**
- Complimentary Software CD – FinsGateway 3.20
- CitectSCADA V5.x or higher (CitectSCADA V6.0 recommended)
- FINS CitectSCADA driver driver version 1.03.01.054 or higher
- CX-Programmer V3.20

**Hardware**
- Standard PC with RS232 Port
- OMRON PLC (in this case a CJ1M CPU22)
- Serial RS-232 programming cable (part no. CS1W-CN226)

**PC Running FinsGateway**

![Diagram of PC connected to PLC via RS-232 cable](image)

**Information:**
By default, the Peripheral port on the PLC has the following settings:
- 9600 Baud, 7 Data bits, 2 Stop bits, Even parity, Mode: Host Link.
If you are unsure of your Peripheral port configuration, you can use Auto-online in CX-Programmer to automatically detect these settings.
3. Installation of FinsGateway Software V3.20

1. Once you have logged into the PC with administrator rights, put the Complimentary Software CD in the CD drive. A html page should automatically start. You can then choose to install FinsGateway Software. Alternatively you can run Setup.exe from the “Omron Fins Gateway\FGW3EE_DISKS\” directory on the CD.

2. It is recommended that you exit all other Windows programs before continuing with the installation; to continue click Next >.

3. Enter your name and company in the user registration window; to continue click OK.

4. Confirm your details; to continue click Yes.
5. Choose the directory in which you want to install the software. The default directory is C:\Program Files\OMRON\FinsServerNT\; to continue the installation click Next >.

![Choose Destination Location](image1)

Fig. 7: FinsGateway install destination

6. Select the appropriate components you want to install. For serial communication you must select FinsGateway+SerialUnit Embedded, likewise for Ethernet communication you must select FinsGateway+ETN_UNIT Embedded; to continue the installation click Next >.

![Select FinsGateway Products](image2)

Fig. 8: FinsGateway components to be installed.
7. Continue to click **Next >** until the installation process is finished. Once it has completed, you must restart the computer.

![Setup Complete](image)

**Fig. 9: Restart computer.**

8. The next step is to install the FinsGateway update. The update version used in this instance is V3.20. Once the update is complete you must again restart your computer.

9. The installation of FinsGateway software is now complete!!
4. Configuration of FinsGateway software

1. Run the FinsGateway Service Manager from the FinsGateway folder:

```
[Image of FinsGateway folder]
```

This will load the Service Manager (yellow icon) in your system tray:

```
[Image of Service Manager icon]
```

2. Right click on this icon, and select “Setting”.

This will load the FinsGateway Service Manager:

```
[Image of FinsGateway Service Manager]
```

3. Expand the Driver section in the Menu Structure. Select the SerialUnit and click properties. This will open the following window for Serial Unit Properties:

```
[Image of Serial Unit Properties]
```

In this example we are using COM1 for serial communications.
4. Now click on the “Communications Unit” tab. This will allow us to view the COM1 Serial Unit Properties:

![COM1 Serial Unit Properties](image)

In this example, the Peripheral port on the PLC has communication settings: 19200 Baud, 7 Data bits, 2 Stop bits, Even Parity, 0 Retries, and 5 seconds Timeout.

Information:
If you are unsure of your serial configuration, you can click “Explore” to automatically detect the communication settings.

5. Next, select the “Nodes” tab to configure the serial unit Node address:

![COM1 Serial Unit Properties](image)
Enter a unique Node number. This is important for the FinsGateway software to identify the Serial connection to the PLC, and soon becomes important later in CitectSCADA FINS communication settings.

Select the Type of PLC you are communicating with (CJ1-CPU22).

Choose the Protocol the FinsGateway will use to communicate with the Omron PLC. In this case SYSWAY-CV is used (Consult your PLC manual for details about which Peer protocol you should use).

Click **OK** to continue.

6. The Serial Unit has now been configured:

Click **OK** to continue.
7. The next step is to start the SerialUnit Service. To do this, expand the “Services” section and click on “SerialUnit”. Now over to the right hand side, click “Start”:

8. It is now important to confirm that your communications configuration is correct, and that the FinsGateway is able to communicate with the PLC. To test this go to the Menu, “Network” and select “FINS Communication Test”:
9. This will display the following window:

From this utility it is possible to test the communications path to the PLC. Enter the Peer Address (net.node.unit). In this particular case, COM1 Serial connections always uses Network number 0. The Node is the number that was configured earlier, which is 240. And the Unit number is 0 for the CPU. That will make the Peer Address 0.240.0.

10. Click on Send to test the communication path:

If the communication test was completed successfully, it will display at the bottom “Send complete normally”, otherwise an error message would appear.

Click close to exit the FINS Network Tester.

11. The FinsGateway Service Manager can now be closed. The FinsGateway Serial Unit configuration is now complete!!!
5. CitectSCADA FINS-Driver Configuration

**Step 1: CitectSCADA Communication Configuration**

1. In Citect Explorer create a NEW (empty) test project.

2. Then go to Citect Project Editor under the Communication menu and follow the steps as follows:
   1. Create a new I/O Servers e.g. “IOServer”:
   ![I/O Server Configuration](image)
   
   2. Create a new Board “BOARD1”, with Board Type “FINS”, and Address “0”:
   ![Boards Configuration](image)
   
   3. Create a new Port “PORT1_BOARD1”, with Port Number “1”, and Board Name “BOARD1”:
   ![Ports Configuration](image)
4. Create a new I/O Device e.g. “OMRON_PLC” with the following details:

Notice that the I/O Device address is 0/240/0. (net/node/unit)
Where net is the FINS Network Address (0 for COM1 port)
Node is the FINS Node address (240 in this case)
Unit is the FINS CPU unit address (CPU is usually unit 0)

The protocol used is FINS3. The FINS protocol should be used with
C/CV-Series PLCs and the FINS3 protocol should be used with the
CS1/CJ1-Series PLCs. If in doubt compare the Data types
available for your PLC, and the data types supported with each
protocol.

5. The communications configuration is now complete!!

Step 2: CitectSCADA FINS Variable declaration

1. Open the Variable Tags Form. You will find this in the Citect Project
Editor under Tags | Variable Tags.

2. Create a Variable Tag with the following settings:

Information:
For more information about the different data types and the Citect
variable addressing format, look for the Help Topics “OMRON PLC
Serial - Data Types” or “Variable Tag Dialog Properties”.

CitectSCADA / FinsGateway Serial Communication – Whitepaper V1.0 (13/16)
Step 3: Pack and Compile Project

1. From the Citect Project Editor, pack and compile your project.

2. Now run the computer setup wizard to configure the role of the PC. In this case it will need to run as an I/O Server.

3. Use TagDebug from the Kernel to verify your communications with the PLC.

4. The configuration of CitectSCADA is now complete!!
6. Troubleshooting

1. Question:
   I start up my project but I am getting a Hardware Error “I/O Device Off-line, cannot talk”. On further investigation in the Kernel under I/O devices, I can see Generic Error 12, Driver Error 23 (0x17). What is wrong?

   Solution:
   The most common reason why this error occurs is a configuration error. Another reason may be that the PLC is powered down, or there is a communication failure, or broken link.

   Check the following:
   - Confirm that the PLC is powered up.
   - Check the physical cable link.
   - Check the FinsGateway Serial Unit configuration.
   - Use the “FINS Communication Test” utility to test communications between FinsGateway and the PLC.
   - Check that the Address specified in the I/O Device form matches the configuration of FinsGateway (net.node.unit).

2. Question:
   I have successful communications, but when I try to write to a specific address, I get Generic Error 25, Driver Error 32 (0x20). What am I doing wrong?

   Solution:
   The description for the error given in the help states “Wait_mutex_failed” and “driver failed in standby process of exclusive control of shared memory”.

   The driver is trying to write to an address that the PLC has exclusive access over. The solution is to write to a different address space, and map the value using PLC code. This error will usually occur when the PLC is in RUN mode. It will not happen if the PLC is in MONITOR mode.
7. Information

Omron Electronics PTY LTD
71 Epping Rd
North Ryde NSW 2113
Australia
Tel  +61 2 9878 6377
Fax +61 2 9878 6981
Web:  http://www.omron.com.au

Citect PTY LTD
3 Fitzsimons Lane
Gordon NSW 2072
Australia
Tel  +61 2 9496 7300
Fax +61 2 9496 7399
E-Mail:  support-australia@citect.com
Web:  http://www.citect.com