

| Subject: PROFIdrive | Doc: AN.AFD.31 | | | | | | |
|--|----------------|--|--|--|--|--|--|
| Title: Using the Yaskawa ProfiNet Option SI-EP3 or SI-EP3/V with Siemens Step 7 Software | | | | | | | |

Application Note

Using the Yaskawa ProfiNet Option SI-EP3 or SI-EP3/V with Siemens Step 7 Software

USE OF TECHNICAL INFORMATION!

Technical content and illustrations are provided as technical advice to augment the information in manual, not supercede it. The information described in this document is subject to change without notice. Yaskawa assumes no responsibility for errors or omissions or damages resulting from the use of the information contained in any technical document. All warnings, cautions and product instruction for product use must be followed. Qualified personnel should carry out installation, operation and maintenance.

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Introduction

This document describes how to add a Yaskawa AC Drive with an SI-EP3 Option to a PROFINET network using the Siemens Step 7 software version 5.4.

Intended Audience

This document is intended for those involved in designing, installing and/or commissioning a PROFINET system including Yaskawa AC Drives. It is assumed that the reader is familiar with Yaskawa AC Drives, PROFINET and Siemens Step 7 programming. Familiarity with the SI-EP3 Option and with the A1000 and V1000 installation guides and technical manuals is highly recommended.

References

Siemens documentation may be downloaded from 49948856 45531107

Following manuals may be downloaded from SIEPYEACOM07 SIEPYEACOM06 SIEPC71061641 SIEPC71060618 http://support.automation.siemens.com SIMATIC PROFINET with STEP 7 SIMATIC Programming with STEP 7 V5.4

www.yaskawa.com

1000-Series Option SI-EP3 PROFINET Technical Manual V1000-Series Option SI-EP3/V PROFINET Technical Manual Yaskawa 1000 Series AC Drive Technical Manual Yaskawa V1000 AC Drive Technical Manual

PROFINET information may be downloaded from

http://www.profibus.com/technology/profinet/

Create Step 7 Project

Create Project

- Open the Step 7 software
- Select New from the File menu
- Enter the project Name
- Select **OK**

| | SIMATIC Manager | | |
|-------------|------------------------------------|--------|------|
| | File PLC View Options | Window | Help |
| Salaat Filo | <u>N</u> ew | Ctrl+N | |
| Select File | 'New Project' Wizard | ~ | |
| New | Open | Ctrl+0 | |
| | S7 Memory Card | + | |
| | Memory Card <u>File</u> | • | |
| | Delete | | |
| | Reorganize | | |
| | Manage | | |
| | Archive | | |
| | Retrieve | | |
| | Page Setup | | |
| | <u>1</u> Accessible Nodes MPI | | |
| | Exit | Alt+F4 | |
| | | | |
| | | | |
| | | | |
| | Creates a new project or a new lib | rary. | |
| | | | |

Figure 1 -- Create Project

| | SIMATIC Manager File PLC View Options Window (D 22 19 10 10 10 10 10 10 10 10 10 10 10 10 10 | New Project User projects Libraries Multiprojects Name Storage path | | |
|--------------------|---|---|---------------|--|
| Enter project Name | | Add to current multiproject | | |
| | | Name: | <u>T</u> ype: | |
| Select OK | | PROFInet | Project 💌 | |
| Sect OK | | Storage location (path): [C:\Program Files\Siemens\Step7\s7proj | E Library | |
| | Press F1 to get Help. | OK Ca | ncel Help | |

Figure 2 -- Project Name

Add Station

- Select Station from the Insert menu
- Select the Station Type (SIMANTEC 300 Station for this example)
- Double Click on Hardware



Figure 3 -- Select Station



Figure 4 -- Open Hardware Configuration

Add GSD File

- Select Install GSD File from the Options menu
- Select the GSD file to install
- Select Install
- Select Close



Figure 5 -- Install GSD File



Figure 6 -- Select SI-EP3 GSD File

Add CPU

- Select Insert Object from the Object menu
- Select Station Type, Rack and Rail
- Select CPU from catalog
- Drag CPU to highlighted slot in the system rack



Configure CPU

- Enter CPU IP Address and Subnet Mask
- Add network
- Enter network name
- Select OK









Figure 12 -- PROFINET Network Added

Add Drive w/ SI-EP3 Option to PROFINET Network

- Select SI-EP3 from catalog
- Drag SI-EP3 to network
- Select Object properties from the Edit menu
- Enter the SI-EP3 name and device number
- Enter SI-EP3 IP Address
- Select the network connection
- Select OK
- Select the cyclic I/O
- Drag the I/O to the designated slot
- Right click on memory and select Object Properties
- Select Parameter tab
- Select Control and Status Word Selection
- Select either PROFIdrive or Yaskawa
- Select OK



Figure 13 -- Add SI-EP3 Drive to Network



Figure 14 -- Configure SI-EP3 Option



Figure 15 -- Add Name and Device Number



Figure 16 -- Add IP Address and Network Connection



Figure 17 -- Add Cyclic I/O



Figure 18 -- Cyclic I/O Properties

| | | Properties - Std Tgm 1 + 5 PZD - (R-/S1) | | × | 1 |
|----------------|-----------------------|--|------------|------|------------------|
| | HW Config - [SIMA | General Addresses Parameters | | | × |
| | <u>Station</u> Edit I | | Value | | |
| | 🗋 🗁 🔓 🗳 🗳 | 🖃 🔄 Parameters | | | |
| | | 🗄 🔄 Input Parameter 1 | | | |
| | 📼 (0) UR | Parameter number | 0 | | |
| Select Profile | | 🔄 🤤 Input Parameter 2 | | | mt mi |
| Select I Ionie | 2 00 0012 | Parameter number | 0 | | |
| | | 🗇 🦳 Input Parameter 3 | | | _ |
| | PN-IO | ☐ Parameter number | 0 | | |
| | X2 P1 Pm 1 | 🖃 🦳 Input Parameter 4 | | | |
| | 3 | ☐ Parameter number | 0 | | |
| | 4 | E Input Parameter 5 | | | |
| | 5 | | 0 | | |
| | | Control and Status Word Selection | | | Control 300/400 |
| | | □ ⊆ Control and Status word sele | Yaskawa 💌 | | 0011101 0007 400 |
| | | Dutput Parameter 1 | Yaskawa | | [|
| | (1) NW-Ci | L ⊒ Parameter number | PRUFIDIIVe | 1 | |
| | | | | | |
| | Slot Module | Carter de la contraction de la | U | | |
| | U NW-Lon | | 0 | | |
| | XI Interrace | | 0 | | |
| Select OK | /// FUN// | | 0 | | |
| | 2377 FUT2 | | • | | |
| | T g Stargin t | | 0 | | |
| | | | - | 1 | |
| | Press E1 to bet Help. | | | | |
| | | OK | C | | |
| | | UK | Can | Heip | |
| | | | | | |

Figure 19 -- Control and Status Word Configuration

Assign Device Name

All PROFINET devices must have an assigned name. Assigning a name to a device requires that the device be connected to and can be seen by the network. Although it is not necessary to assign device names at this point, the process is shown here.



Figure 20 – Assign Device Name



Figure 21 -- Assign Name Dialog

Save, Compile and Download

- Save and compile the configuration
- Download the configuration to the PLC



Figure 22 -- Save and Compile



Figure 23 -- Download to PLC

Drive Control Programming

Variable table

- Create Variable Table
- Name the Variable Table
- Populate the Variable table with Drive I/O
- Set Mode to Online
- Enter Drive Variables
- Press F9 to Send Modified Values



Figure 24 -- Create Variable Table



Figure 25 -- Name the Variable Table

| | SIMATIC Manager - IPROFine | 🔛 Va | ır - NWCo | nveyor_10 |) | | | | _ 🗆 🗡 | | | _ [[]] | x |
|----------------------|----------------------------|----------|----------------|------------|--------------------------------|-------------|-------------|------------|---------------|----|------|--------|------|
| | File Edit Insert PLC | Tabl | e <u>E</u> dit | Insert | P <u>L</u> C V <u>a</u> riable | View | Options | Window | <u>H</u> elp | | | _ 8 | × |
| | D 🚅 🎛 🛲 🗶 🗈 🐔 | -12 | 0 🖻 | | <u>x</u> 🖻 🖻 | n Ca | X 💁 | ₽ № | <u>©</u> ≱ &r | | ? | | |
| | 🖃 🎒 PROFInet | E N | WConvey | /or_I0 P | ROFInet\SIMATI | C 300(1)\(| CPU 315-2 I | PN/DP\S7 P | <u>- 0 ×</u> | | | | -1 |
| | E SIMATIC 300(1) | | Addre | ss Symbo | Display format | Status v | alue | Mo | dify value | | | | - 11 |
| | E- CPU 315-2 PN/DP | 1 | PIW 25 | 56 | BIN | | | | | | | | - 11 |
| | Sources | 2 | PIW 25 | 58 | HEX | | | | | | | | - 11 |
| Enter Inputs | Blocks | 3 | PIW 26 | 50 | HEX | | | | | | | | - 11 |
| | ─── →{ | 4 | PIW 26 | 52 | HEX | | | | | | | | - 11 |
| PIW [Input Address] | | 5 | PIW 26 | 64 | HEX | | | | | | | | - 11 |
| | | 6 | PIW 26 | 56 | HEX | | | | | | | | - 11 |
| | | <u> </u> | PIVV 28 | 00 | ILX. | | | | | | | | - 11 |
| | | | POW 1 | 256 | HEX | | | | | | | | - 11 |
| | | 10 | POW 2 | 258 | HEX | | | | | | | | - 11 |
| | | 11 | PQW 2 | 260 | HEX | | | | | | | | - 1 |
| Enter Outputs | | 12 | PQW 2 | 262 | HEX | | | | | | | | |
| DOW [Output Address] | | 13 | PQW 2 | 264 | HEX | | | | | | | | |
| rQw [Output Address] | | 14 | PQW 2 | 266 | HEX | | | | | | | | - 11 |
| | | 15 | PQW 2 | 268 | HEX | | | | | | | | - 11 |
| | | 16 | | | | | | | | | | | |
| | Press F1 to get Help. | Press | F1 for help |) . | | | | Γ | 9 // | .0 | | | 11. |
| | | | | Fig | gure 26 | Popul | ate Va | riable | Table | | | | |

| | SIMATIC Manager | a Var | - [NWConveyor_] | 0 PROFI | net\SIMATIC 300(1)\CPU 315-2 | PN/DP\S7 F | Program(1)] | |
|-----------------|---|----------|----------------------|---------------|------------------------------------|------------|------------------------|-------|
| Select Variable | File Eart Inse | 26 1 | | | Variable view Options | window | | 스 트립즈 |
| | 🗅 🗲 🎛 🛲 | -[22] | |) X 🖻 | <u>T</u> rigger | Ctrl+R | Ø 66° ≤27 66° ≤27 //cr | ₩? |
| | 🖃 🖓 PROFInet | | Address | II Display | <u>M</u> onitor | Ctrl+F7 | life walke | _ |
| | E SIMATIC 2 | 1 | DIM 256 | DISPIDY | Modify | Ctrl+F9 | ity value | |
| Select Monitor | 🖃 🛛 🔛 CPU 31 | - | PWV 200 | | Update Monitor Values | F7 | | |
| Sciect Monitor | 🖻 📴 S7 | 2 | PIW 230 | | Activate Modify Values | F9 | | |
| | - 🗈 | 3 | PWV 200 | | | | | |
| | ••••••••••••••••••••••••••••••••••••••• | 4 | PIW 202 | | Modify Address to <u>1</u> | Ctrl+1 | | |
| | | 0 | PIW 204 | | Modify Address to <u>0</u> | CtrI+0 | | |
| | | 7 | PIW 200 | | Enable Peripheral Outputs | Shift+F9 | | |
| | | · | PIW 200 | псл | | | | |
| | | 0 | DOM OFC | DIN | Display Force Values | Alt+F2 | | |
| | | 9 | PUW 250 | DIN | Forge | | | |
| | | 10 | PUW 258 | HEX | Stop Forcing | | | |
| | | 11 | PQW 260 | HEX | Modify Value as Comment | E3 | | |
| | | 12 | PUW 262 | HEX | mouny gauge to comment | | | |
| | | 13 | PQW 264 | HEX | | | | |
| | | 14 | PQW 266 | HEX | | | | |
| | | 15 | PQW 268 | HEX | | | | |
| | | 16 | | | | | | |
| | | | | | | | | |
| | Press F1 to get Help. | Starts/S | Stops the monitoring | g of the vari | iables depending on the trigger co | • | Offline Abs < 5.2 | 1. 1. |

Figure 27 -- Set Table to Online

PROFIdrive

| | A File File File File File File File File | | | | | | | | | |
|---|---|-----------|--------------------|-------------------|-------------|---------------------------------------|------------------|--|--------------------|--|
| | | | | | | | 2 <u>0</u> 66 47 | | | |
| Read | PROFInet | 1 | Address PIW 256 | Symbol Dis BIN | play format | Status value 2#0000_0011_0011_0111 | Modify value | | PZD1 (STW) | |
| Status Word [*] | ⊡- डा S7 | 2 | PW 258 PW 260 | HE) HE) | x X | W#16#1770 W#16#0000 | | | PZD2 (HIW) PZD3 | |
| Telefence Trequency | | 4 | PIW 262 PIW 264 | HE) HE) | K K | W#16#0000 W#16#0000 | | | PZD4 PZD5 | |
| I | | 6 | PIW 266 PIW 268 | HE) HE) | ĸ | W#16#0000 W#16#0000 | | | PZD6 PZD7 | |
| Write Control Word ¹ | | 8 | DOWN OF D | ues | | 34 | W#16#007F | | PZD1 (STW) | |
| Frequency Reference | | 10 | POW 258 | HE | • • | | W#16#1770 | | PZD2 (HSW) PZD3 | |
| D DO A MULT | | 12 | PQW 260 | HE | Λ K | M M | | | PZD4 PZD5 | |
| Press F9 to Write | | 13 14 | PQW 264 PQW 266 | HE) HE) | K K | pa pa | | | PZD6 PZD7 | |
| To the Drive | | 15 16 | PQW 268 | HE | ĸ | <u>≱€</u> | | | | |
| | Press F1 to get Help. | PROFI | net\SIMATIC | 300(1)\\S | 7 Program(1 |) | N RUN | | | |
| Figure 28 Enter PROFIdrive Control Values | | | | | | | | | | |

¹ Control and Status words for the PROFIdrive profile selected in the Cyclic I/O Configuration. Note that the Control and Status words for PROFIdrive profile are not the same as for the Yaskawa profile. PROFIdrive: Control RUN 007Fh

Yaskawa

| Read Status Word ² | SIMATIC Manager - [PROFine] File Edit Insert PLC Eile Edit Insert PLC Eile Edit Insert PLC Eile Edit Insert N Eile Edit Insert N Eile Edit Insert N Eile Edit Insert N Eile Edit Insert Edit | | ar - [NWC [able E | conveyor_ dit Inser | IO @PROFIne t PLC Vari | Image: Status value Image: Status value | PN/DP\S7 Pro) idow <u>H</u> elp ? ©? 66 ⁻ ⊭ Modify value | - 0 × - 8 × * | |
|---|--|-----------|----------------------|------------------------|---------------------------|--|--|------------------------|-----------------------------|
| Pafaranaa Eraguanay | ⊡ 🔄 S7 Program(1) | 2 | PIW 25 | | | 2#1100_0000_0010_0001 W#16#12DC | | | PZDI (ZSW) PZD2 (NIST A) |
| Reference Frequency | Sources | 3 | PIW 26 | D | HEX | W#16#0000 | | | PZD3 |
| | | 4 | PIW 26 | 2 | HEX | W#16#0000 | | | PZD4 |
| | | 5 | PIW 26 | 4 | HEX | W#16#0000 | | | PZD5 |
| Write | | 6 | PIW 26 | 6 | HEX | W#16#0000 | | | PZD6 |
| $C_{\text{restrict}} = 1 W_{\text{rest}}^2$ | | 7 | PIW 26 | 8 | HEX | W#16#0000 | | | PZD7 |
| Control word | | 8 | | | | | | | |
| Frequency reference | | 9 | PQW 2 | 56 | HEX | par 🔶 | W#16#0001 | | PZD1 (STW) |
| -1 | | 10 | PQW 2 | 58 | NEA | | W#16#1770 | | PZD2 (NSOLL_A) |
| | | 11 | PQW 2 | 60 | HEX | 24 | | | PZD3 |
| | | 12 | PQW 2 | 62 | HEX | M | | | PZD4 |
| Press EQ to Write | | 13 | PQW 2 | 64 | HEX | M | | | PZD5 |
| riess r 9 to write | | 14 | PQW 2 | 66 | HEX | M | | | PZD6 |
| Modified Values | | 15 | PQW 2 | 68 | HEX | × | | | PZD7 |
| To the Drive | | 16 | | | | | | | |
| | » Press F1 to get Help. | PROFI | Inet\SIMA | TIC 300(1) | \\\$7 Program(| 1) | | IN //. | |

Figure 29 -- Enter Yaskawa Control Values

² Control and Status words for the Yaskawa profile selected in the Cyclic I/O Configuration Yaskawa: Control RUN 0001h

Ladder Logic (LAD)

Control the Drive From the PLC Program with PROFIdrive Profile Selected



Figure 30 – Basic Drive Control Program

Change the Acceleration Rate When the PROFIdrive Profile is Selected

- Enter the acceleration parameter address in F7-33 with the value desired.
 Parameter C1-01 (0200h)
- Power cycle the drive to store and make the parameter value active.



Figure 31 – Control Acc Rate

| | |
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