HMS ETHERNET/IP ADAPTER
SUPPLEMENT FOR EXAMPLE CONFIGURATIONS WITH
CONTROLLOGIX/COMPACTLOGIX PLC FOR
DX200, DX100 AND NX100 CONTROLLERS

Upon receipt of the product and prior to initial operation, read this supplement thoroughly, and retain for future reference.

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Revision: 0
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Mandatory

- This supplement is intended to explain mainly the HMS EtherNet/IP Adapter configuration. Be sure to read and understand this supplement thoroughly before installing and operating the manipulator.

- General items related to safety are listed in the Chapter 1: Safety of the controller manual. To ensure correct and safe operation, carefully read the controller manual before reading this supplement.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-1999). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association
900 Victors Way
P.O. Box 3724
Ann Arbor, Michigan 48106
TEL: (734) 994-6088
FAX: (734) 994-3338
www.roboticsonline.com

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!

We recommend approved Yaskawa training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
CAUTION

- Some drawings in this supplement are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.

- The drawings and photos in this supplement are representative examples and differences may exist between them and the delivered product.

- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the supplement revision number will also be revised.

- If your copy of the supplement is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product’s warranty.
Notes for Safe Operation

Read this supplement carefully for use of the HMS EtherNet/IP Adapter.

In this supplement, the Notes for Safe Operation are classified as “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.

![DANGER] Indicates an imminent hazardous situation which, if not avoided, could result in death or serious injury to personnel.

![WARNING] Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

![CAUTION] Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

![MANDATORY] Always be sure to follow explicitly the items listed under this heading.

![PROHIBITED] Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations.

At any rate, be sure to follow these important items.

**NOTE**

To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maintenance and inspection must be performed by specified personnel.</td>
</tr>
<tr>
<td>Failure to observe this caution may result in electric shock or injury.</td>
</tr>
<tr>
<td>• For disassembly or repair, contact your Yaskawa representative.</td>
</tr>
<tr>
<td>• Do not remove the motor, and do not release the brake.</td>
</tr>
<tr>
<td>Failure to observe these safety precautions may result in death or serious injury from unexpected turning of the manipulator’s arm.</td>
</tr>
</tbody>
</table>
WARNING

• Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the controller and the programming pendant. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

*Figure 1: Emergency Stop Button*

• Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

*Figure 2: Release of Emergency Stop*

• Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  – Be sure to use a lockout device to the safeguarding when going inside. Also, display the sign that the operation is being performed inside the safeguarding and make sure no one closes the safeguarding.
  – View the manipulator from the front whenever possible.
  – Always follow the predetermined operating procedure.
  – Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  – Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

• Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the power for the controller.
  – Moving the manipulator with the programming pendant.
  – Running the system in the check mode.
  – Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem.

The emergency stop buttons are located on the right of front door of the controller and the programming pendant.
Definition of Terms Used Often in This Supplement

The MOTOMAN is a YASKAWA industrial robot product.

The MOTOMAN usually consists of a manipulator, a controller, a programming pendant, and supply cables.

In this supplement, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Supplement Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX200, DX100, NX100 controller</td>
<td>Controller</td>
</tr>
<tr>
<td>Programming Pendant</td>
<td>Programming Pendant</td>
</tr>
</tbody>
</table>

Explanation of Warning Labels

Always follow the warnings on the labels.

Also, an identification label with important information is placed on the body of the manipulator. Prior to operating the manipulator, confirm the contents.
Customer Support Information

If you need assistance with any aspect of your HMS EtherNet/IP Adapter, please contact Yaskawa Motoman Customer Support at our 24-hour telephone number:

(937) 847-3200

For routine technical inquiries, you can also contact Yaskawa Motoman Customer Support at the following e-mail address:

techsupport@motoman.com

When using e-mail to contact Yaskawa Motoman Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.

Please use e-mail for routine inquiries only. If an urgent or emergency need for service, replacement parts, or information, contact Yaskawa Motoman Customer Support at the telephone number shown above.

Please have the following information ready before calling:

<table>
<thead>
<tr>
<th>System</th>
<th>HMS EtherNet/IP Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>DX200, DX100 or NX100</td>
</tr>
<tr>
<td>Robots</td>
<td></td>
</tr>
<tr>
<td>Software Version</td>
<td>Access this information on the Programming Pendant’s LCD display screen by selecting (MAIN MENU) - (SYSTEM INFO) - (VERSION)</td>
</tr>
<tr>
<td>Robot Serial Number</td>
<td>Located on the robot data plate</td>
</tr>
<tr>
<td>Robot Sales Order Number</td>
<td>Located on the controller data plate</td>
</tr>
</tbody>
</table>
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1 Introduction

This supplement will describe the steps to setup the HMS Anybus PCI EtherNet/IP board as an “adapter” (slave) on an EtherNet/IP network, when installed in a NX100, DX100, or DX200 controller.

These steps will show all the settings required to establish and test communication with a CompactLogix or ControlLogix PLC and associated settings in the RSLogix5000.

1.1 Requirements for Example

1.1.1 Hardware

- ControlLogix or CompactLogix PLC
- BOARD,PC,ETHERNET/IP ADAPTER
  - (SLAVE),WITH MODBUS/TCP SERVER/SLAVE,PCI,AB3606
    MFG Information: HMS / Anybus-S EtherNet/IP Adapter
  - Yaskawa Part Number: 157874-5

This PCI card is separate and distinct from the Ethernet PCI card from Woodhead/SST/Molex, which is obsolete by the manufacture and is no longer available for sale by Yaskawa America Inc.

Yaskawa referenced the Ethernet PCI card from Woodhead/SST/Molex by the following part numbers:

- 151164-1
- 151164-2

1.1.2 Software

- PLC Configuration Software: RSLogix5000 v19 or later - customer supplied
- Anybus IPConfig and EDS File (see website below for downloads)
  http://www.anybus.com/support/support.asp?PID=73&ProductType=Anybus-S

1.1.3 Responsibility

- Controls Engineer
2 EtherNet/IP Board Configuration

2.1 Verify AB3606 Card Settings

1. Boot into MAINTENANCE mode by holding [Main Menu] during power up on the Programming Pendant.

2. Touch [System] > [Security] and upgrade to MANAGEMENT security level.
   - The password is all 9's.

3. Touch [System] > [Setup] > "OPTION BOARD".

4. Select the Anybus board from the list and press the [ENTER] key.
   - The Anybus is identified by the slot number it is connected to.
   - For this example, the Anybus board is AB3606.
5. Set the first option to “USED.”
   • The first option should be set to “USED” from the factory.

6. Set the IO Size to match the desired byte size to exchange with the PLC.
   • When shipped from the factory the byte size is normally 20.
   • Various quantity levels can be set for the IO SIZE depending on the controller model (DX200/DX100/NX100).

   - When setting the byte size adjust the number to match the amount of information that will be exchanged between the controller and the PLC.
   - The byte size you enter will be required when setting up the PLC Configuration. See chapter 3 “PLC Setup (using RSLogix 5000)”, step 6 on page 3-2
7. Press [Enter] multiple times confirming and accepting all modifications prompts until the IO MODULE screen appears.

8. Always confirm that the Anybus board appears in the list.
   - For this example, the board is AB3606.
   - DI/DO count should equal: ([Number of Bytes] x 8) + 8
     • In this example, the Number of Bytes is 20, so the number of bits for both fields is 168.

9. Press [Enter] multiple times until you receive a prompt and select [YES].

10. It is now OK to turn OFF the controller and boot it up normally.
2.2 Setting the IP address of the card

1. Ensure your computer is connected to the PCI card using a standard Ethernet cable.
   • A network hub and separate EtherNet cables may be required.

2. Open the Anybus IPconfig tool on your computer.
   • This will quickly scan your network for any/all Anybus boards.

   **NOTE** Make sure to boot up the robot controller before opening the Anybus IPconfig tool on your computer.

3. Find the card you wish to configure and double-click the entry.

   **NOTE** You can also select the card you want to configure by highlighting and pressing the [Settings] button on the bottom of the Anybus IPconfig screen.

4. Observe the following Configure screen appears and set the DHCP to Off.
2-5

HMS EtherNet/IP Adapter
Example Configurations

2 EtherNet/IP Board Configuration
2.2 Setting the IP address of the card

5. Set the desired IP address and Subnet mask for your card.
6. Press the [Set] button to save and return to the Anybus IPconfig screen.
7. Please note the firmware version listed in the “Version” column of the Anybus IPconfig screen.

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8. Obtain the correct EDS file from the Anybus website. See “Software” on page 1

- If the firmware version is a very old version, Yaskawa has access to the following older version numbers. Contact the Customer Service for assistance by referring to “Customer Support Information” on page viii.
  - 1.32 EDS_ABS_EIP_V_1_9.eds
  - 1.34 and < 2.x EDS_ABS_EIP_V_1_11.eds
  - 2.x EDS_ABS_EIP_V_2_01.eds

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**NOTE**

Not all PLC’s require the EDS file. For example, the EDS file is not required to commission a ControlLogix or CompactLogix in the method stated in this supplement.
3 PLC Setup (using RSLogix 5000)

**WARNING**

- The PLC Setup chapter should be completed by the Controls Engineer.

*Failure to observe this warning may result in death or serious injury from unexpected actions by the robot.*

1. Open a RSLogix5000 project file.
2. Configure the PLC rack to use an Ethernet communication module in one of the slots.
3. Add a robot to the Ethernet network through the project explorer on the left hand side:

![Project Explorer Screenshot](image1)

4. Select the [ETHERNET-MODULE] from the module list.

![Module List Screenshot](image2)
3. PLC Setup (using RSLogix 5000)

5. Setup the device parameters:
   a) Enter a Name (such as “NX100robot”)  
   b) Select the “Comm Format” (data structure) to be: Data - SINT

   **NOTE**
   Data - SINT is an 8-bit data type, which matches the robot’s byte size (1 byte = 8 bits).

   c) Specify the IP address. Refer to section 2.2 “Setting the IP address of the card”, step 5 on page 2-5.
      • In this example the IP address is 192.168.1.100

6. Set the Connection Parameters.
   • Refer to section 2.1 “Verify AB3606 Card Settings”, step 6 on page 2-2 for the IO size used.
      – In this example the size of the IO are 20 bytes.

   • The Assembly Instance values (Input, Output and Configuration) are specified by the manufacture.
   a) Enter the Input Values
      • Assembly Instance: 100
      • Size: 20

   b) Enter the Output Values
      • Assembly Instance: 150
      • Size: 20

   c) Enter the Configuration Values
      • Assembly Instance: 1
      • Size: 0

7. Download the project to the PLC and go online.
8. Place processor in Run mode.

**NOTE** If the processor is left in programming or test mode the processor will not communicate.

9. Verify successful communication by checking for a steady green I/O light on both the PLC hardware CPU and in the software itself.

**NOTE** Another way to confirm successful communication is if there are no "yellow triangles" in the I/O Configuration.
4 Testing

1. In the RSLogix 5000 software, open the controller tags from the left side of the tree.

2. While online, turn on robot output 33 using the pendant.
   - OT#33 is the right output to use in the case of no other expansion cards and the Anybus board is the first card in the PCI slot. If other hardware is present adjust the output number appropriately.

3. Verify that the PLC NX100robot.I.Data[0].0 is on.
   - "NX100robot" is the name assigned in chapter 3 "PLC Setup (using RSLogix 5000)", step 5. Other name choices will affect the data structure naming.

4. Turn on the PLC output NX100robot.O.Data[0].0, while online.

5. Verify robot input 33 is on, using the pendant and being online.
5 Additional Information

Additional information is available at the following web site:

http://www.anybus.com/support/support.asp?PID=73&ProductType=Anybus-S
HMS ETHERNET/IP ADAPTER
SUPPLEMENT FOR EXAMPLE CONFIGURATIONS WITH CONTROLLOGIX/COMPACTLOGIX PLC FOR DX200, DX100 AND NX100 CONTROLLERS

HEAD OFFICE
2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004, Japan
Phone  +81-93-645-7703    Fax  +81-93-645-7802

YASKAWA America Inc. (Motoman Robotics Division)
100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone  +1-937-847-6200    Fax  +1-937-847-6277

YASKAWA Europe GmbH (Robotics Division)
Yaskawastrasse 1, 85391 Allershausen, Germany
Phone  +49-8166-90-100    Fax  +49-8166-90-103

YASKAWA Nordic AB
Bredbandet 1 vän. 3 varvsholmen 392 30 Kalmar, Sweden
Phone  +46-480-417-800    Fax  +46-480-417-999

YASKAWA Electric (China) Co., Ltd.
22/F One Corporate Avenue No.222, Hubin Road, Huangpu District, Shanghai 200021, China
Phone  +86-21-5385-2200    Fax  +86-21-5385-3299

YASKAWA SHOUGANG ROBOT Co. Ltd.
No7 Yongchang North Road, Beijing E&T Development Area, China 100176
Phone  +86-10-6788-2858    Fax  +86-10-6788-2878

YASKAWA India Private Ltd. (Robotics Division)
#426, Udyog Vihar, Phase- IV, Gurgaon, Haryana, India
Phone  +91-124-475-8500    Fax  +91-124-475-8542

YASKAWA Electric Korea Co., Ltd
9F, Kyobo Securities Bldg., 26-4, Yeouido-dong, Yeongdeungpo-gu, Seoul 150-737, Korea
Phone  +82-2-784-7844    Fax  +82-2-784-8495

YASKAWA Electric Taiwan Corporation
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone  +886-2-8913-1333    Fax  +886-2-8913-1513

YASKAWA Electric (Singapore) PTE Ltd.
151 Lorong Chuan, #04-02A, New Tech Park, Singapore 556741
Phone  +65-6282-3003    Fax  +65-6289-3003

YASKAWA Electric (Thailand) Co., Ltd.
252/125-126 27th Floor, Tower B Muang Thai-Phatra Complex Building, Rachadrphisek Road, Huaykwang, Bangkok 10320, Thailand
Phone  +66-2693-2200    Fax  +66-2693-4200

PT. YASKAWA Electric Indonesia
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma, Jakarta 13610, Indonesia
Phone  +62-21-2982-6470    Fax  +62-21-2982-6741

Specifications are subject to change without notice
for ongoing product modifications and improvements.