YRC1000micro OPTIONS
DeviceNet COMMUNICATION FUNCTION
INSTRUCTIONS
FOR SST-DN4-PCIE MADE BY Molex, Inc.

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

MOTOMAN INSTRUCTIONS

MOTOMAN-INSTRUCTIONS
YRC1000micro INSTRUCTIONS
YRC1000micro OPERATOR’S MANUAL
YRC1000micro MAINTENANCE MANUAL
YRC1000micro ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

Please have the following information available when contacting Yaskawa Customer Support:

- System
- Primary Application
- Software Version (Located on Programming Pendant by selecting: [Main Menu] - [System Info] - [Version])
- Robot Serial Number (Located on robot data plate)
- Robot Sales Order Number (Located on controller data plate)

Part Number: 181258-1CD
Revision: 1
DANGER

- This manual explains the SST-DN4-PCIE board (manufactured by Molex, Inc.) of the YRC1000micro system. Read this manual carefully and be sure to understand its contents before handling the YRC1000micro. Any matter not described in this manual must be regarded as “prohibited” or “improper”.
- General information related to safety are described in “Chapter 1. Safety” of the YRC1000micro INSTRUCTIONS. To ensure correct and safe operation, carefully read “Chapter 1. Safety” of the YRC1000micro INSTRUCTIONS.

CAUTION

- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

NOTICE

- The drawings and photos in this manual 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 manual number will also be revised.
- If your copy of the manual 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.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the YRC1000micro.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, or “NOTICE”.

DANGER
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

WARNING
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

CAUTION
Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

NOTICE
NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

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>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Do not use or keep the board in the following environmental conditions.</td>
</tr>
<tr>
<td>– Where exposed to direct sunshine</td>
</tr>
<tr>
<td>– Where vibration or impact occurs</td>
</tr>
<tr>
<td>– Where high humidity exists</td>
</tr>
<tr>
<td>– Where a strong magnetic field exists</td>
</tr>
<tr>
<td>– Where much dust exists</td>
</tr>
<tr>
<td>– Where a sudden change in the temperature occurs</td>
</tr>
<tr>
<td>– Where corrosive gases occur</td>
</tr>
<tr>
<td>– Where condensation occurs</td>
</tr>
<tr>
<td>• Improper usage of the board may damage the board.</td>
</tr>
</tbody>
</table>
Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

- Press the emergency stop button on the programming pendant or on the external control device, etc.
- Disconnect the safety plug of the safety fence.

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Observe the following precautions when performing a teaching operation within the manipulator's operating range:

- Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
- View the manipulator from the front whenever possible.
- Always follow the predetermined operating procedure.
- Always keep in mind emergency response measures against the manipulator’s unexpected movement toward a person.
- Ensure a safe place to retreat in case of emergency.

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:

- Turning ON the YRC1000micro power
- Moving the manipulator by using the programming pendant
- Running the system in the check mode
- Performing automatic operations

Personal injury may result if a person enters the manipulator's operating range during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop button is located on the right of the programming pendant.

Read and understand the Explanation of the Warning Labels before operating the manipulator.
**DANGER**

- In the case of not using the programming pendant, be sure to supply the emergency stop button on the equipment. Then before operating the manipulator, check to be sure that the servo power is turned OFF by pressing the emergency stop button. Connect the external emergency stop button to the 2-12 pin and 3-13 pin of the Safety connector (Safety).

- Upon shipment of the YRC1000micro, this signal is connected by a jumper cable in the dummy connector. To use the signal, make sure to supply a new connector, and then input it. If the signal is input with the jumper cable connected, it does not function, which may result in personal injury or equipment damage.

---

**WARNING**

- Do not touch the inside of the controller cabinet for at least 5 minutes after turning the power off. Failure to observe this warning may result in electric shock or personal injury because of the residual voltage of the condenser.

- During power ON, do not touch the board. Failure to observe this warning may result in fire or electric shock.

- Perform the following inspection procedures prior to conducting manipulator teaching. If there is any problem, immediately take necessary steps to solve it, such as maintenance and repair.
  - Check for a problem in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.

- Return the programming pendant to a safe place after use. If the programming pendant is left unattended on the manipulator, on a fixture, or on the floor, etc., the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the manipulator starts, the manipulator or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.

- Wiring and installation must be performed by authorized or certified personnel. Failure to observe this caution may result in fire or electric shock.
CAUTION

- Check to be sure that there is no foreign matter (metal piece, etc.) on the board.
  Failure to observe this caution may result in personal injury or equipment damage because of malfunction.
- Check to be sure that there is no problem (damage, bend, etc.) with the components of the board.
  Failure to observe this caution may result in personal injury or equipment damage because of malfunction.
- Connect the cables and connectors properly.
  Failure to observe this caution may result in fire or equipment failure.
- Make sure to properly perform the setting of the switches, etc.
  Failure to observe this caution may result in personal injury or equipment damage because of malfunction.
- Do not touch the solder surface of the board directly with a finger.
  Failure to observe this caution may result in personal injury because of solder projection, etc.

NOTICE

- Do not touch the component-mounting surface of the board directly with a finger.
  Failure to observe this caution may result in the failure of IC, etc. because of static electricity.
- Avoid shock on the board.
  Failure to observe this caution may result in the failure of the board.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the YRC1000micro controller, manipulator cables, the YRC1000micro programming pendant (optional), and the YRC1000micro programming pendant dummy connector (optional).

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>YRC1000micro controller</td>
<td>YRC1000micro</td>
</tr>
<tr>
<td>YRC1000micro programming pendant</td>
<td>Programming pendant (optional)</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
<tr>
<td>YRC1000micro programming pendant dummy connector</td>
<td>Programming pendant dummy connector (optional)</td>
</tr>
</tbody>
</table>
Descriptions of the programming pendant keys, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant</td>
<td></td>
</tr>
<tr>
<td>Character Keys /Symbol Keys</td>
<td>The keys which have characters or symbols printed on them are denoted with [ ].</td>
</tr>
<tr>
<td></td>
<td>e.g. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys /Numeric Keys</td>
<td>[Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.</td>
</tr>
<tr>
<td>Keys pressed simultaneously</td>
<td>When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, e.g. [SHIFT]+[COORD].</td>
</tr>
<tr>
<td>Mode Switch</td>
<td>Mode Switch can select three kinds of modes that are denoted as follows: REMOTE, PLAY or TEACH. (The switch names are denoted as symbols)</td>
</tr>
<tr>
<td>Button</td>
<td>The three buttons on the upper side of the programming pendant are denoted as follows: START, HOLD, or EMERGENCY STOP. (The button names are denoted as symbols)</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with { }. e.g. {JOB}</td>
</tr>
</tbody>
</table>

![Programming Pendant Diagram](image-url)
Description of the Operation Procedure

In the explanation of the operation procedure, the expression “Select • • •” means that the cursor is moved to the object item and [SELECT] is pressed, or that the item is directly selected by touching the screen.

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and ™ are omitted.
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This manual describes the DeviceNet I/O board SST-DN4-PCIE (manufactured by Molex Inc.) to be used in the YRC1000micro.

The application of the SST-DN4-PCIE board allows the general-purpose I/O data exchange between a DeviceNet device and the YRC1000micro.

1.1 System Configuration

1.1.1 SST-DN4-PCIE Board in Slave Mode

The following diagram shows an example of the configuration of a system with an SST-DN4-PCIE board used in slave mode.
1.1.2 SST-DN4-PCIE Board in Master Mode

The following diagram shows an example of the configuration of a system with an SST-DN4-PCIE board used in master mode.

* The SST-DN4-PCIE board does not include a DeviceNet cable or an external terminator.

When the SST-DN4-PCIE board is connected at the end of the network, connect the external terminator to the SST-DN4-PCIE board.

If the terminator is not correctly connected, communications may not be performed.

DeviceNet is a registered trademark of ODVA (Open DeviceNet Vendor Association, Inc.).
2 Hardware Specifications

2.1 Board External View

2.1.1 SST-DN4-PCIE Board

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Card HLTH LED (top)</td>
</tr>
<tr>
<td>B</td>
<td>Card CAN Connector</td>
</tr>
<tr>
<td>C</td>
<td>Card COMM LED (bottom)</td>
</tr>
</tbody>
</table>
2.2 Board Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface to the external device</td>
<td>DeviceNet</td>
</tr>
<tr>
<td>Board mounting position</td>
<td>Option PCI Express slot on the YRC1000micro</td>
</tr>
<tr>
<td>Error indicator</td>
<td>LED display</td>
</tr>
<tr>
<td>Number of transmission I/O points</td>
<td>Maximum number of I/O points for SST-DN4-PCIE:</td>
</tr>
<tr>
<td></td>
<td>Input: 1008 points; Output: 1008 points</td>
</tr>
</tbody>
</table>

**Note on Transmission I/O Points**

1. Input points and output points cannot be configured individually.

2. YRC1000micro has 1024 inputs and 1024 outputs prepared for the I/O board. Of these, 8 inputs and 8 outputs are pre-allocated. In addition, 8 I/O points per channel are required for SST-DN4-PCIE communication status. The remaining number of I/O points are available for transmission.

2.3 Communication Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecting form</td>
<td>Multi-drop, T-branch (1:N communications)</td>
</tr>
<tr>
<td>Transmission speed</td>
<td>500/250/125 kbps</td>
</tr>
<tr>
<td>Transmission media</td>
<td>Dedicated 5-wire cable (2 wires for signals, 2 wires for power supply, 1 drain wire)</td>
</tr>
<tr>
<td></td>
<td>Use a DeviceNet cable such as DCA1-5C10 (manufactured by OMRON).</td>
</tr>
<tr>
<td>Communication distance</td>
<td></td>
</tr>
<tr>
<td>Transmission speed</td>
<td>Network max. distance:</td>
</tr>
<tr>
<td>500 kbps</td>
<td>100 m and less</td>
</tr>
<tr>
<td>250 kbps</td>
<td>250 m and less</td>
</tr>
<tr>
<td>125 kbps</td>
<td>500 m and less</td>
</tr>
<tr>
<td>Branch line length</td>
<td>6 m and less</td>
</tr>
<tr>
<td>39 m and less</td>
<td>78 m and less</td>
</tr>
<tr>
<td>156 m and less</td>
<td></td>
</tr>
<tr>
<td>Total length of branch lines</td>
<td></td>
</tr>
<tr>
<td>39 m and less</td>
<td></td>
</tr>
<tr>
<td>78 m and less</td>
<td></td>
</tr>
<tr>
<td>156 m and less</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage for communication</td>
<td>24 VDC (supplied through the connector for DeviceNet connection)</td>
</tr>
<tr>
<td>Maximum current consumption for communications</td>
<td>0.05 A (1 channel)</td>
</tr>
</tbody>
</table>
2.4 Connector

Table 2-1: DeviceNet (Connector for DeviceNet Connection)

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Signal Name</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (black)</td>
<td>V-</td>
<td>0\textsubscript{24}V power supply line-connecting terminal</td>
</tr>
<tr>
<td>2 (blue)</td>
<td>CAN\textsubscript{L}</td>
<td>DeviceNet signal line-connecting terminal</td>
</tr>
<tr>
<td>3 (bare wire)</td>
<td>Drain</td>
<td>Drain wire-connecting terminal (shielded)</td>
</tr>
<tr>
<td>4 (white)</td>
<td>CAN\textsubscript{H}</td>
<td>DeviceNet signal line-connecting terminal</td>
</tr>
<tr>
<td>5 (red)</td>
<td>V+</td>
<td>+ 24V power supply line-connecting terminal</td>
</tr>
</tbody>
</table>

The color mentioned in ( ) indicates the color of a DeviceNet cable to be connected.
3 Mounting the SST-DN4-PCIE Board

**WARNING**

- Before wiring or installation, make sure to turn the primary power supply off, and put up a warning sign. (e.g. DO NOT TURN THE POWER ON.)

Failure to observe this warning may result in electric shock or personal injury.

- Do not touch the inside of the controller cabinet for at least 5 minutes after turning the power off.

Failure to observe this warning may result in electric shock or personal injury because of the residual voltage of the capacitors.

- During power ON, do not touch the board.

Failure to observe this warning may result in fire or electric shock.

- Wiring and installation must be performed by authorized or certified personnel.

Failure to observe this caution may result in fire or electric shock.

**CAUTION**

- Check to be sure that there is no foreign matter (metal piece, etc.) on the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Check to be sure that there is no problem (damage, bend, etc.) with the components of the board.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Connect the cables and connectors properly.

Failure to observe this caution may result in fire or equipment failure.

- Make sure to properly perform the setting of the switches, etc.

Failure to observe this caution may result in personal injury or equipment damage because of malfunction.

- Do not touch the solder surface of the board directly with a finger.

Failure to observe this caution may result in personal injury because of solder projection, etc.

**NOTICE**

- Do not touch the component-mounting surface of the board directly with a finger.

Failure to observe this caution may result in the failure of IC, etc. because of static electricity.

- Avoid shock on the board.

Failure to observe this caution may result in the failure of the board.
3 Mounting the SST-DN4-PCIE Board

1. Remove the fixing screw (22 screws) of the top board, and remove the top board.

*Fig. 3-1: Removing the Top Board of the YRC1000micro*
2. Mount the SST-DN4-PCIE board, and securely tighten the SST-DN4-PCIE board with screws.

*Fig. 3-2: Mounting the SST-DN4-PCIE board*

3. Connect the DeviceNet cable with the DeviceNet connector on the SST-DN4-PCIE board.

4. Reassemble the top board.

**WARNING**

Do not remove the top board of the YRC1000 micro whenever it is used, except for maintenance. And securely tighten the all fixing screws.

Failure to observe this instruction may cause the ingress of dust, dirt, or water, which may result in electric shock and/or mechanical failure.
4 I/O Signal Allocation

4.1 Setting of Option Board and I/O Module

In order to use the SST-DN4-PCIE board in the YRC1000micro, perform the setting of the option board and I/O module in the following manner.

Set the option board and I/O module in the management mode.

In the operation mode and the editing mode, the settings are for reference only.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

4.1.1 Setting of the SST-DN4-PCIE Board to Slave

1. Turn ON the power supply while pressing {MAIN MENU}.
   - The Maintenance mode starts.

2. Set the security mode to the “Management Mode”.
3. Select {SYSTEM} under the main menu.
   - The sub menu appears.
4. I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

4. Select {SETUP}.
   – The SETUP display appears.

5. Select “OPTION BOARD”.
   – The OPTION BOARD display appears.
6. Select “DN4-PCIE”.

- The DN4-PCIE setup display appears.
- Set the following items:
  - “DN4-PCIE”: whether to use the SST-DN4-PCIE board or not
  - “SLAVE OR MASTER”: the board mode
  - “IO SIZE”: the I/O size (byte)
  - “MAC ID”
  - “BAUD RATE”

- Explanation of Setup Items

  (1) DN4-PCIE
  Sets whether to use the SST-DN4-PCIE board or not. Set “USED”.

  (2) SLAVE OR MASTER
  Sets “slave” or “master”. Set “SLAVE”.

  (3) IO SIZE (byte)
  Sets the I/O size (in bytes) reserved for I/O.
  The maximum setting value of the I/O size is 126 bytes
  \((126 \times 8 = 1008 \text{ points})\).

  (4) MACID
  Sets the MACID. The MACID can be set by numbers from 0 to 63.

  (5) BAUD RATE
  Sets the baud rate. Set the baud rate among 500/250/125 kbps.

  (6) SCAN LIST
  “SCAN LIST” is not used for setting the SST-DN4-PCIE board to slave.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

7. Press [ENTER].
   – The confirmation dialog box appears.

8. Select {YES}.
   – The IO MODULE display appears.
   The message, “Select 'Safety Board FLASH Reset'.” appears, however, do not perform 'Safety Board FLASH Reset' this time, but perform the settings continuously.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

9. Press [ENTER].
   - The rest of the IO MODULE display appears, and “DN4-PCIE (SLAVE)” is displayed.
   - The I/O points is displayed under “DI/DO” according to the I/O size in bytes that is set on the “OPTION BOARD” display.

10. Press [ENTER].
    - The confirmation dialog box appears.

The DI/DO points can be found using the following equation;

```
DI/DO points = (IO size \times 8) + 8
```

“+ 8” : the I/O points for status
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

11. Select {YES}.
   – Select {YES} if the display corresponds to the current mounted status of the I/O modules. The I/O module setting is updated, and the IO MODULE window changes to the EXTERNAL IO SETUP window.

12. The EXTERNAL IO SETUP window appears.

13. Select “AUTO” or “MANUAL” in the ALLOCATION MODE.
   – The selection menu appears after selecting “AUTO” or “MANUAL”.

   ![EXTERNAL IO SETUP Window]

   **NOTE**
   If the allocation mode is changed from “MANUAL” to “AUTO”, the set allocation data is discarded. The data will be allocated by AUTO MODE again. Save the set allocation data to the external devices in advance, if needed.
14. Select the allocation mode to set up.
   – Select "AUTO" to allocate I/O signal allocation automatically. Select "MANUAL" to allocate I/O signal allocation manually.
   – The selected allocation mode is set up.

15. Select “DETAIL” of “EXTERNAL IO ALLOCATION”.
   – When select “AUTO”, the following procedures No.16 to 18 are not necessary. Operate the procedure from No.19.
   – When select “MANUAL”, operate the following procedures No.16 to 18 accordant with the setting manually.
16. Select the external I/O signal number (at the change source) to be changed. (In the setting example, select “#20030”.)

- The select menu appears.

17. Select “MODIFY”, and input the external input signal number (at the change destination) to be changed. (In the setting example, enter “#20190”.)

- The external input signal number is changed.

18. Likewise, select/modify the number of the external input signal.

- Repeat select/modify until it becomes the desired allocation to set up.
19. Press [ENTER].
   - The allocation window of the external output signal appears.

20. Select/modify the number of the external output signal same as the external input signal.
   - Repeat select/modify until it becomes the desired allocation to set up.

21. Press [ENTER].
   - Confirmation dialog appears.

22. Select {YES}.
   - The settings are confirmed, and returns to the SETUP window.
23. Set the security mode to the “SAFETY MODE”.

24. Select {FILE} - {INITIALIZE}.
   - The INITIALIZE window appears.

25. Select “Safety Board FLASH Reset”.
   - The confirmation dialog box appears.

26. Select {YES}.
   - The setting is completed after beep sound.
4. I/O Signal Allocation

4.1 Setting of Option Board and I/O Module

4.1.2 Setting of the SST-DN4-PCIE Board to Master

1. Turn ON the power supply while pressing {MAIN MENU}.
   - The Maintenance mode starts.

2. Set the security mode to the “Management Mode”.
3. Select {SYSTEM} under the main menu.
   - The sub menu appears.
4. I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

4. Select {SETUP}.
   - The SETUP display appears.

5. Select “OPTION BOARD”.
   - The OPTION BOARD display appears.
6. Select “DN4-PCIE”.
   - The DN4-PCIE setup display appears.
   - Set the following items without fail:
     • “DN4-PCIE”: whether to use the DN4-PCIE board or not
     • “SLAVE OR MASTER”: the board mode
     • “IO SIZE”: the I/O size (byte)
     • “MAC ID”
     • “BAUD RATE”
     • As for SCAN LIST, refer to the following step 7 to step 11.

   For the settings other than mentioned above, execute settings as the need arises.

   – Explanation of Setup Items

(1) DN4-PCIE
   Sets whether to use the SST-DN4-PCIE board or not. Set “USED”.

(2) SLAVE OR MASTER
   Sets “slave” or “master”. Set “MASTER”.

(3) IO SIZE (byte)
   Sets the I/O size (in bytes) reserved for I/O. The maximum setting value of the I/O size is 126 bytes (126 × 8 = 1008 points).

(4) MACID
   Sets the MACID. The MACID can be set by numbers from 0 to 63.

(5) BAUD RATE
   Sets the baud rate. Set the baud rate among 500/250/125 kbps.

(6) SCAN LIST
   “SCAN LIST” is used for setting the SST-DN4-PCIE board to master. Refer to the following step 7 to the step 11.

(7) INTERVAL
   Sets the DeviceNet scanning interval. Set to a value from 10 [msec] to 300 [msec] in units of 10 [msec]. The default setting is 30 [msec].
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

(8) TERMINAL OUTPUT FUNCTION
When this board is set as a master, the numbers of non communicating slave terminal can be output to M register. Set ENABLE / DISABLE of this function. Refer to chapter 4.5 “Terminal Output Function (Only in Master Mode)” for the details of this function.

(9) M REGISTER
This item appears when “ENABLE” is selected to the above mentioned ‘(8)TERMINAL OUTPUT FUNCTION’. Set the M register’s leading number as the destination of the terminal output function. Before setting the number, confirm that M register is not used for the different purposes.

(10) TERMINAL OUTPUT SETTING
This item appears when “ENABLE” is selected to the above mentioned ‘(8)TERMINAL OUTPUT FUNCTION’. Set “ENABLE” or “DISABLE”. Refer to chapter 4.6 “Terminal Output Setting (Only in Master Mode)” for the details of this function.

(11) M REGISTER
This item appears when “ENABLE” is selected to the above mentioned ‘(10)TERMINAL OUTPUT SETTING’. Set the M register’s leading number as the destination of the terminal output setting. Before setting the number, confirm that M register is not used for the different purposes.

7. Select “DETAIL”.
- The SCAN LIST setup display appears.

8. Move the cursor to each item on the SCAN LIST display, and select the desired item for setting.
9. Enter a desired value.

- Set each parameter according to the actual status of the mounted slave device.

- Each item in the display indicates as follows:
  - **MAC ID**: Node address of the DeviceNet device
  - **SIZE (IN)**: Number of bytes input from the slave device  
    (1 byte = 8 points)
  - **SIZE (OUT)**: Number of bytes output to the slave device  
    (1 byte = 8 points)
  - **TYPE**: I/O message type of the slave device. The message type “POLL”, “BITSTROBE”, “COS”, and “CYCLIC” are supported. Especially “POLL” is supported by most of the slave devices. For details of “POLL”, “BITSTROBE”, “COS”, and “CYCLIC”, refer to the DeviceNet specifications.

10. Press [ENTER].

- The confirmation dialog box appears.
11. Select {YES}
   
   – The IO MODULE display appears.
   The message, “Select ‘Safety Board FLASH Reset’. ” appears, however, do not perform ‘Safety Board FLASH Reset’ this time, but perform the settings continuously.

12. Press [ENTER].
   
   – The rest of the IO MODULE display appears, and “DN4-PCIE (MASTER)” is displayed.
   
   – The I/O points is displayed under “DI/DO” according to the I/O size in bytes that is set on the “OPTION BOARD” display.

The DI/DO points can be found using the following equation;

DI/DO points = (I/O size × 8) + 8

"+ 8" : the I/O points for status
13. Press [ENTER].
   - The confirmation dialog box appears.

14. Select {YES}.
   - Select {YES} if the display corresponds to the current mounted status of the I/O modules. The I/O module setting is updated, and the IO MODULE window changes to the EXTERNAL IO SETUP window.

15. The EXTERNAL IO SETUP window appears.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

16. Select “AUTO” or “MANUAL” in the ALLOCATION MODE.
   - The selection menu appears after selecting “AUTO” or “MANUAL”.

   ![Selection Menu]

   **NOTE**
   If the allocation mode is changed from “MANUAL” to “AUTO”, the set allocation data is discarded. The data will be allocated by AUTO MODE again. Save the set allocation data to the external devices in advance, if needed.

17. Select the allocation mode to set up.
   - Select “AUTO” to allocate I/O signal allocation automatically.
     Select “MANUAL” to allocate I/O signal allocation manually.
   - The selected allocation mode is set up.
18. Select “DETAIL” of “EXTERNAL IO ALLOCATION”.
   - When select “AUTO”, the following procedures No.19 to 21 are not necessary. Operate the procedure from No.22.
   - When select “MANUAL”, operate the following procedures No.19 to 21 accordant with the setting manually.

19. Select the external I/O signal number (at the change source) to be changed. (In the setting example, select “#20170”.)
   - The select menu appears.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

20. Select “MODIFY”, and input the external input signal number (at the change destination) to be changed. (In the setting example, enter “#20290”.)

– The external input signal number is changed.

![Image of external input signal allocation]

21. Likewise, select/modify the number of the external input signal.

– Repeat select/modify until it becomes the desired allocation to set up.

22. Press [ENTER].

– The allocation window of the external output signal appears.

![Image of external output signal allocation]

23. Select/modify the number of the external output signal same as the external input signal.

– Repeat select/modify until it becomes the desired allocation to set up.
24. Press [ENTER].
   - Confirmation dialog appears.

25. Select {YES}.
   - The settings are confirmed, and returns to the SETUP window.
4 I/O Signal Allocation
4.1 Setting of Option Board and I/O Module

26. Set the security mode to the “SAFETY MODE”.
27. Select {FILE}- {INITIALIZE}.
   – The INITIALIZE window appears.

28. Select “Safety Board FLASH Reset”.
   – The confirmation dialog box appears.

29. Select {YES}.
   – The setting is completed after beep sound.
4.2 Transmission Data

The data to be transferred from the SST-DN4-PCIE board to the inside of the YRC1000micro is not only the I/O data from the external device connected to the DeviceNet, but also the status of the SST-DN4-PCIE board.

Therefore, inside the YRC1000micro, 8 points (1 byte) each for input and output are reserved for the SST-DN4-PCIE board status, beside the area for the digital data. The output area, however, cannot be used.

The transmission data from the SST-DN4-PCIE board are allocated to the external I/O signals of concurrent I/O.

Where an SST-DN4-PCIE board is mounted as an optional I/O board, the concurrent I/O allocation of the board is shown in the following table.

Furthermore, the following table shows the concurrent I/O allocation of the board when the I/O size is set to 16 bytes (input: 128 points, output: 128 points) per one channel.

The I/O area: 20010 to 20017 and 30010 to 30017 is reserved for the standard I/O board of the YRC1000micro.
### 4.2.1 YRC1000micro I/O Allocation example

Note 1) The following example is for the standard setting. When change the allocation of the external output signal or the concurrent ladder program, the allocation changes in accordance with the changes.

Note 2) As for the input data/output data of ASF30 (standard I/O), refer to “YRC1000micro INSTRUCTIONS (RE-CTO-A222)” for more details.

<table>
<thead>
<tr>
<th>ASF30 (standard I/O)</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20010 to 20017</td>
<td>None (allocated on the system)</td>
<td>Input data</td>
<td></td>
</tr>
<tr>
<td>I/O Output</td>
<td>30010 to 30017</td>
<td>None (allocated on the system)</td>
<td>Output data</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SST-DN4-PCIE (DeviceNet)</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O Input</td>
<td>20020 to 20027</td>
<td>00020 to 00027 (IN0009 to IN0016)</td>
<td>Board status 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20030 to 20037</td>
<td>00030 to 00037 (IN0017 to IN0024)</td>
<td>Input data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20040 to 20047</td>
<td>00040 to 00047 (IN0025 to IN0032)</td>
<td>Input data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20050 to 20057</td>
<td>00050 to 00057 (IN0033 to IN0040)</td>
<td>Input data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20060 to 20067</td>
<td>00060 to 00067 (IN0041 to IN0048)</td>
<td>Input data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20070 to 20077</td>
<td>00070 to 00077 (IN0049 to IN0056)</td>
<td>Input data (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20080 to 20087</td>
<td>00080 to 00087 (IN0057 to IN0064)</td>
<td>Input data (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20090 to 20097</td>
<td>00090 to 00097 (IN0065 to IN0072)</td>
<td>Input data (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20100 to 20107</td>
<td>00100 to 00107 (IN0073 to IN0080)</td>
<td>Input data (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20110 to 20117</td>
<td>00110 to 00117 (IN0081 to IN0088)</td>
<td>Input data (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20120 to 20127</td>
<td>00120 to 00127 (IN0089 to IN0096)</td>
<td>Input data (10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20130 to 20137</td>
<td>00130 to 00137 (IN0097 to IN0104)</td>
<td>Input data (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20140 to 20147</td>
<td>00140 to 00147 (IN0105 to IN0112)</td>
<td>Input data (12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20150 to 20157</td>
<td>00150 to 00157 (IN0113 to IN0120)</td>
<td>Input data (13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20160 to 20167</td>
<td>00160 to 00167 (IN0121 to IN0128)</td>
<td>Input data (14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20170 to 20177</td>
<td>00170 to 00177 (IN0129 to IN0136)</td>
<td>Input data (15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20180 to 20187</td>
<td>00180 to 00187 (IN0137 to IN0144)</td>
<td>Input data (16)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I/O Output</th>
<th>External output signal</th>
<th>User output signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>30020 to 30027</td>
<td>10020 to 10027 (OT0009 to OT0016)</td>
<td>System reservation 1)</td>
<td></td>
</tr>
<tr>
<td>30030 to 30037</td>
<td>10030 to 10037 (OT0017 to OT0024)</td>
<td>Output data (1)</td>
<td></td>
</tr>
<tr>
<td>30040 to 30047</td>
<td>10040 to 10047 (OT0025 to OT0032)</td>
<td>Output data (2)</td>
<td></td>
</tr>
<tr>
<td>30050 to 30057</td>
<td>10050 to 10057 (OT0033 to OT0040)</td>
<td>Output data (3)</td>
<td></td>
</tr>
<tr>
<td>30060 to 30067</td>
<td>10060 to 10067 (OT0041 to OT0048)</td>
<td>Output data (4)</td>
<td></td>
</tr>
<tr>
<td>30070 to 30077</td>
<td>10070 to 10077 (OT0049 to OT0056)</td>
<td>Output data (5)</td>
<td></td>
</tr>
<tr>
<td>30080 to 30087</td>
<td>10080 to 10087 (OT0057 to OT0064)</td>
<td>Output data (6)</td>
<td></td>
</tr>
</tbody>
</table>
4 I/O Signal Allocation

4.2 Transmission Data

<table>
<thead>
<tr>
<th>SST-DN4-PCIE (DeviceNet)</th>
<th>I/O Output</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30090 to 30097</td>
<td>10090 to 10097 (OT0065 to OT0072)</td>
</tr>
<tr>
<td></td>
<td>30100 to 30107</td>
<td>10100 to 10107 (OT0073 to OT0080)</td>
</tr>
<tr>
<td></td>
<td>30110 to 30117</td>
<td>10110 to 10117 (OT0081 to OT0088)</td>
</tr>
<tr>
<td></td>
<td>30120 to 30127</td>
<td>10120 to 10127 (OT0089 to OT0096)</td>
</tr>
<tr>
<td></td>
<td>30130 to 30137</td>
<td>10130 to 10137 (OT0097 to OT0104)</td>
</tr>
<tr>
<td></td>
<td>30140 to 30147</td>
<td>10140 to 10147 (OT0105 to OT0112)</td>
</tr>
<tr>
<td></td>
<td>30150 to 30157</td>
<td>10150 to 10157 (OT0113 to OT0120)</td>
</tr>
<tr>
<td></td>
<td>30160 to 30167</td>
<td>10160 to 10167 (OT0121 to OT0128)</td>
</tr>
<tr>
<td></td>
<td>30170 to 30177</td>
<td>10170 to 10177 (OT0129 to OT0136)</td>
</tr>
<tr>
<td></td>
<td>30180 to 30187</td>
<td>10180 to 10187 (OT0137 to OT0144)</td>
</tr>
</tbody>
</table>

1 Board status and system reservation cannot be allocated as IO signal. Also, this data is not able to transmit by DeviceNet. (Unable to communicate with the main PLC.)

[SST-DN4-PCIE Board Status]

The status of the SST-DN4-PCIE board (the first 8 points of the allocation area) is indicated as follows.
The value “xxx” of the allocated input signals in the table indicates the first number of the SST-DN4-PCIE board allocated number. In the table above, where the allocation numbers are 20020 to 20027, “xxx” would be “002”.

<table>
<thead>
<tr>
<th>Signal</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2xxx0 to 2xxx3</td>
<td>Reserved for the manufacturer. The user cannot use these signals.</td>
</tr>
</tbody>
</table>
| 2xxx4 | Not used  
Always set to 0. |
| 2xxx5 | In SLAVE mode  
Not used  
Always set to 0.  
In MASTER mode  
Indicates if communicating with all the slaves or not through DeviceNet.  
Communicating with all slaves: 0,  
Communicating with some slaves: 1 |
| 2xxx6 | Indicates the DeviceNet communication status.  
Normal: 0  
Error: 1 |
| 2xxx7 | Indicates the operation status of the SST-DN4-PCIE board.  
Normal: 0  
Error: 1 |
4.2.2 The Alarm when Communication Error Occurs Using the Board Status

When the SST-DN4-PCIE board detects an error of the DeviceNet communication, by using the CIO ladder program allows to occur the alarm.

The examples of the method are described below.

There are three alarms of the occurrence alarms.

- SST-DN4-PCIE BOARD ERROR
- DeviceNet COMMUNICATION ERROR
- UNSENT SLAVES in DeviceNet

As for the user alarm registration, refer to “Chap. 13.7 I/O Messages and I/O Alarms” in "YRC1000micro OPTIONS INSTRUCTIONS FOR Concurrent I/O (RE-CKI-A469)" for more details.

Register the User Alarm

1. Change the security mode to the Management Mode.
2. Select the (I/O ALARM) from the (IN/OUT) in the main menu.
3. The I/O alarm (user) window appears.

   ![I/O Alarm Window]

4. Move the cursor over the desired No. to register, and press [SELECT].

   - The window changes to the character string entry window.

   ![Character String Entry Window]
5. Enter the I/O alarm name.

6. Press [ENTER].
   - The entered alarm is registered.

7. Register the other alarms.
   - Repeat the same procedures to register the alarm to use.
4 I/O Signal Allocation
4.2 Transmission Data

IO Allocation and the Ladder Program

External input signal

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20025</td>
<td>The unsent slave (slave unit) exists on the DeviceNet network.</td>
</tr>
<tr>
<td>20026</td>
<td>DeviceNet communication error</td>
</tr>
<tr>
<td>20027</td>
<td>SST-DN4-PCIE board operation error</td>
</tr>
</tbody>
</table>

System input signal

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40012</td>
<td>User alarm request</td>
</tr>
<tr>
<td>40220</td>
<td>User alarm code d0</td>
</tr>
<tr>
<td>40221</td>
<td>User alarm code d1</td>
</tr>
<tr>
<td>40222</td>
<td>User alarm code d2</td>
</tr>
<tr>
<td>40223</td>
<td>User alarm code d3</td>
</tr>
<tr>
<td>40224</td>
<td>User alarm code d4</td>
</tr>
<tr>
<td>40225</td>
<td>User alarm code d5</td>
</tr>
</tbody>
</table>

Assistant relay

<table>
<thead>
<tr>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70017</td>
<td>Control power ON completed (Normality ON)</td>
</tr>
</tbody>
</table>
4 I/O Signal Allocation
4.2 Transmission Data

The figure of the ladder
4.3 Management of DeviceNet Slave Allocation (Only in Master Mode)

The use of an external memory device allows a user to save or load the DeviceNet allocation that was set with “SCAN LIST” in the “SST-DN4-PCIE (DeviceNet)” setup display.

The following show operational procedures.

For the overall operation using an external memory device, refer to “Chap. 7. Controlling Peripheral Devices” in “YRC1000micro OPERATOR’S MANUAL(RE-CSO-A058)”.

4.3.1 Saving to External Memory Device

1. Turn ON the YRC1000micro power.
2. Select {EX. MEMORY} under the main menu.
3. Select {SAVE}.
   - The following display appears.
   
   ![Display 1](image1)

4. Select “SYSTEM DATA”.
   - The system data selection display appears.
   
   ![Display 2](image2)
5. Select “SST DEVICENET ALLOC DATA”.
   – The selected system data are marked with “★”.

![Diagram](image)

6. Press [ENTER].
   – The confirmation dialog box appears.

![Confirmation Dialog](image)

7. Select {YES}.
   – Saving the file starts. The transfer display appears.
   – Once the saving is completed, the system data selection display appears.
4.3.2 Loading from External Memory Device

1. Turn ON the YRC1000micro power.
2. Set the security mode to the “Management Mode”.
3. Select {EX. MEMORY} under the main menu.
4. Select {LOAD}.
   - The following display appears.

```
5. Select “SYSTEM DATA”.
   - The system data selection display appears.
```

```
```
6. Select “SST DEVICENET ALLOC DATA”.
   – The selected system data are marked with “★”.

7. Press [ENTER].
   – The confirmation dialog box appears.
4. I/O Signal Allocation
4.3 Management of DeviceNet Slave Allocation (Only in Master Mode)

8. Select {YES}.

– Loading the file starts. The transfer display appears.
– Once the loading is completed, the system data selection display appears.
– Turn OFF the YRC1000micro power and turn ON again.

**NOTE**

The data cannot be loaded if any inconsistency was found between the setting status (node address: MAC ID, station, I/O size) of the SST-DN4-PCIE board and the file data to be loaded from the external memory.

Set the SST-DN4-PCIE board as in the same manner as the setting when the file has been saved, then load the file.

Even if no inconsistency is found, when the different contents of the IO allocation file is loaded, the external IO allocation data requires to be updated. To update the external IO allocation data, perform either operation described below.

• Load “EIOALLC.DAT”, the external IO allocation data which is correctly IO allocated.

• Perform the setting for the external IO allocation in the maintenance mode again.
4.4 Generation of EDS File (Only in Slave Mode)

For setting the communication setting of a DeviceNet, an electronic data sheet (EDS) file is sometimes needed depending on a communication master (or a configuration). In this case, please use the EDS file generated in the following procedure.

Please complete chapter 4.1 “Setting of Option Board and I/O Module” before generating the EDS file. The EDS file cannot be correctly generated before the completion of the setting of the option board and the I/O module.

Please refer to the DeviceNet specification for the details of the configuration and the EDS file. For the use method of the communication master and the generated EDS file, please refer to the operating manual of the communication master.

4.4.1 Generation Procedure of EDS File

1. Turn ON the power supply while pressing {MAIN MENU} simultaneously.
   – The maintenance mode window appears.

2. Select {EX. MEMORY} under the Main Menu.
   – A sub menu appears.

![Maintenance Mode Window](image)

![Sub Menu](image)
3. Select {SAVE}.

   - The following window appears.

4. Select “EDS/GSD FILE SAVE”.

   - The EDS/GSD file save window appears. Among of the DeviceNet boards, a list of the boards, which have been set as slaves, is displayed as the following examples of the screens.

5. Select “DN4-PCIE” to save an EDS file.

   - The selected system data is marked with “★”.
6. Press [ENTER].

   - A confirmation dialog box appears.

7. Select (YES).

   - An EDS file is generated in an effective device (SD card or USB memory).

   - The name of the file generated is as follows.

     **Example**
     SST-DN4-PCIE: Node_Classification_Board_Points.eds

     **Node:** The number of 'ST#' displayed on IO module window.
     **Classification:** Network classification (DevNet)
     **Board:** Board name (DN4-PCIE)
     **Channel:** CH1
     **Points:** Input-and-output Points

     **Example**
     ST16_DevNet_DN4-PCIE_IO16.eds
4.5 Terminal Output Function (Only in Master Mode)

This function enables to output the number of non communicating slave terminals to M register when SST-DN4-PCIE board is used in the DeviceNet master mode.

To utilize this function, set “TERMINAL OUTPUT FUNCTION” enable on the SST-DN4-PCIE setting window, then, to “M register”, set the M register’s leading number as the destination of the terminal output function.

The communication status is output to 4 registers (64 bits) from the designated M register.

The bit equivalent to the non communicating slave terminal (ID) is “1” and that of master, communicating or non allocated terminals are “0”.

Following is an example of setting.

| Leading number of the register (MAC ID 0 to 15 error information: register 850 when setting as well as the window above) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID |

| Leading number of the register +1 (MAC ID 16 to 31 error information: register 851 when setting as well as the window above) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID |

| Leading number of the register +2 (MAC ID 32 to 47 error information: register 852 when setting as well as the window above) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID |

| Leading number of the register +3 (MAC ID 48 to 63 error information: register 853 when setting as well as the window above) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID |
This function enables to specify the number of non communicating slave terminals to M register when TERMINAL OUTPUT FUNCTION is used.
To utilize this function, set “ENABLE” to “TERMINAL OUTPUT FUNCTION” on the SST-DN4-PCIE setting window, then, to “M register” which is directly under “TERMINAL OUTPUT FUNCTION” column, set the M register’s leading number as the destination of the terminal output setting.
Then, set “ENABLE” to “TERMINAL OUTPUT SETTING”, then, to “M register” which is directly under “TERMINAL OUTPUT SETTING” column, set the M register’s leading number as its destination
From the designated M register, the communication status is designated to output to 4 registers (64 bits).
Communication error is output when the bit equivalent to the non communicating slave terminal (ID) is set to “1”, and the error will not be output when the bit is set to “0”.
Following is an example of setting.

![Diagram showing terminal output setting](image)

Leading number of the register
(MAC ID 0 to 15: designation of output terminal: register 854 when setting as well as the window above)

<table>
<thead>
<tr>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
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<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
</tr>
</tbody>
</table>

Leading number of the register +1
(MAC ID 16 to 31: designation of output terminal: register 855 when setting as well as the window above)

<table>
<thead>
<tr>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
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<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
</tr>
</tbody>
</table>

Leading number of the register +2
(MAC ID 32 to 47: designation of output terminal: register 856 when setting as well as the window above)

<table>
<thead>
<tr>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
</tr>
</tbody>
</table>

Leading number of the register +3
(MAC ID 48 to 63: designation of output terminal: register 857 when setting as well as the window above)

<table>
<thead>
<tr>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
</tr>
</tbody>
</table>
4.7 QuickConnect Function (Only in Master Mode)

It is able to use the QuickConnect (hereafter abbreviated as QC) or QuickConnectReconnect (hereafter abbreviated as QCR) function when the SST-DN4-PCIE board is set as the DeviceNet master.

In order to activate the QC function, set the parameter “S2C259” to “0”.

The following is a setting example of the QC or QCR function.

1. QC RECONNECT TIME
   - Specify the reconnect time. Usually, use by the 100msec.

   ![Diagram](image1)

   2. Setup the QC/QCR
      - Set “ ” in “QC” of the slave terminals (ID) using at the allocation screen of the SST-DN4-PCIE board. Also to activate the QCR function, set “ ” in “QCR” while “ ” is set to “QC”.
      - Activating the QC function enables the DeviceNet to communicate fast. Also, activating the QCR function enables to reconnect again after passing the reconnecting time.

   ![Diagram](image2)
To use of the QC function, the slave side also should be corresponding with the QC function. If connect with the slave, which is not corresponding with the QC function, the communication start timing will not be fast. However, the DeviceNet is still able to communicate.

When the QC function is valid, after establishing the communication, keep the communication with at least one station. If stopping the communication with all stations, it will not reconnect again. In that case, turn the YRC1000micro control power supply OFF and ON again.
5 Network Specifications

5.1 Network Configuration

5.1.1 Network Connections

5.1.1.1 Connection Form

The following diagram shows the network connections.

*Fig. 5-1: Network Connections*
5.1.2 Configuration Elements

The network is configured from the following elements.

- **Node**
  A node is either a slave that connects to an external I/O unit, or the master that manages the I/O of the slaves. There are no restrictions on the location of the master or slaves. Any node in the figure above can be the master or a slave.

- **Trunk line and drop lines**
  A cable with a terminator on each end is a trunk line. Any cable branching from the trunk line is a drop line.

- **Connection methods**
  A node is connected using the T-branch method or multi-drop method. A T-Branch Adapter is used to connect a node with the T-branch method. A node is directly connected to the trunk line or a drop line with the multi-drop method. Both T-branch and multi-drop methods can be used together in the same network, as shown in the figure above.

- **Terminator**
  Both ends of the trunk line must connect to a terminator to decrease signal reflection and ensure stable network communication.

- **Communication power supply**
  The communication connector of each node must be provided with a communication power supply through the communication cable for DeviceNet communication. Provide the communication power supply, the internal circuit power supply, and the I/O power supply separately.

**NOTE**

1. The communication cable must be a DeviceNet cable.
2. Both ends of the trunk line must connect to a terminator. The following is the specification for the terminator.

   - Resistance Value: 121Ω
   - Allowable Difference of Resistance Value: ±1%
   - Rating Power: 1/4W
   - Type: Metal Film Resistor

3. Only DeviceNet devices can be connected to the network. Do not connect any other devices, such as a lightning arrester.
5.1.1.3 Branching from the Trunk Line

There are three methods that can be used to branch from the trunk line.

**Fig. 5-2: Branching from the Trunk Line**

- **(1) Single Branching**
- **(2) Branching to Three Drop Lines**
- **(3) Direct Node Connection**

5.1.1.4 Branching from Drop Lines

There are three methods that can be used to branch from drop lines.

**Fig. 5-3: Branching from Drop Lines**

- **(1) Single Branching**
- **(2) Branching to Three Drop Lines**
- **(3) Direct Node Connection**
5.1.2 Precautions for Wiring DeviceNet Cables

5.1.2.1 Maximum Network Length

The maximum network length is either the line length between two nodes located farthest from each other or the line length between the terminators on the ends of the trunk line, whichever is longer.

DeviceNet cables can be either thick cables or thin cables.

The thick cables can be used for relatively long distance communication with less signal attenuation distortion, however, they are rigid and difficult to bend.

The thin cables are pliable and easy to bend, however, they are not applicable for the long distance communication since the amount of signal attenuation distortion is considerably big.

The maximum network length is determined by the type of cable, as shown in the following table.

<table>
<thead>
<tr>
<th>Baud Rate (kbps)</th>
<th>Maximum Network Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thick Cable</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>125</td>
<td>500</td>
</tr>
</tbody>
</table>
5 Network Specifications
5.1 Network Configuration

5.1.2.2 Drop Line Length

The drop line length is the line length between a branch point on the trunk line to the farthest node that is located on the drop line. The maximum drop line length is 6 m. A drop line can be branched out into other drop lines.

The line connecting two nodes located farthest from each other can use both thick and thin cables provided that the length of each cable satisfies the conditions in the following table.

<table>
<thead>
<tr>
<th>Baud Rate (kbps)</th>
<th>Maximum Network Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>$L_{\text{thick}} + L_{\text{thin}} \leq 100$</td>
</tr>
<tr>
<td>250</td>
<td>$L_{\text{thick}} + 2.5 \times L_{\text{thin}} \leq 250$</td>
</tr>
<tr>
<td>125</td>
<td>$L_{\text{thick}} + 5.0 \times L_{\text{thin}} \leq 500$</td>
</tr>
</tbody>
</table>

$L_{\text{thick}}$: thick cable length, $L_{\text{thin}}$: thin cable length
5.1.2.3 Total Drop Line Length

The total drop line length is a total of all drop line lengths. The total drop line length must be within the allowable range and even then, each drop line must be 6 m or less.

The allowable range of total drop line length varies with the baud rate as shown in the following table.

<table>
<thead>
<tr>
<th>Baud Rate (kbps)</th>
<th>Total Drop Line Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>39 max.</td>
</tr>
<tr>
<td>250</td>
<td>78 max.</td>
</tr>
<tr>
<td>125</td>
<td>156 max.</td>
</tr>
</tbody>
</table>

*Fig. 5-4: Configuration example (for 500 kbps transmission speed)*

The above example must satisfy the following conditions.

\[
a \leq 6 \text{ m}, \ b \leq 6 \text{ m}, \ c \leq 6 \text{ m}, \ d \leq 6 \text{ m}, \ d + f \leq 6 \text{ m}, \\
\ d + e + g \leq 6 \text{ m}, \ d + e + h \leq 6 \text{ m}
\]

The total drop line length must satisfy the following condition.

\[
\text{Total drop line length} = a + b + c + d + e + f + g + h \leq 39 \text{ m}
\]
6 Connections for DeviceNet Communication

6.1 Location of Communication Power Supply

6.1.1 Basic Precautions

1. The communication power supply to the network must be 24 VDC.
2. The communication power supply must have a sufficient margin in the capacity.
3. Connect the communication power supply to the trunk line.
4. If many nodes are provided with power from a single power supply, locate the power supply as close as possible to the middle of the trunk line.
5. The allowable current flow in a thick cable is 8 A and that in a thin cable is 3 A.
6. The power supply capacity for a drop line varies with the drop line length. The longer a drop line is, the lower the maximum current capacity of the drop line will be regardless of the thickness of the drop line. Obtain the allowable current (I) of the drop line (i.e., the allowable current consumption of the drop line and devices connected to it) from the following equation.
   \[ I = \frac{4.57}{L} \]
   I: Allowable current (A)
   L: Drop line length (m)
7. If only the communication power supply is turned OFF while the network is operating, errors may occur in the nodes that are communicating at that time.
6.1.2 Location of Power Supply

The following two types of configuration are possible for the location of the power supply.

- **Nodes on Both Sides of the Power Supply**

  ![Diagram of Nodes on Both Sides of the Power Supply]

- **Nodes on One Side of the Power Supply**

  ![Diagram of Nodes on One Side of the Power Supply]

Note: The “Nodes on Both Sides of the Power Supply” method is recommended if a single power supply is connected to many nodes.
6.1.3 How to Decide the Location of the Power Supply

1. To provide a sufficient flow of current to each node, the power supply capacity required for each node and the voltage drop caused by the cable length must be taken into consideration. Calculate the following values:
   - The power supply capacity required for each node
   - The distance from the power supply

2. There are two methods to calculate the power supply capacity for the trunk line.
   (1) Simplified calculation with the estimated values from the graph
   (2) Calculation with the actual values (the voltage drop calculated according to the resistance value and the current consumption of the communication cable.)

   - Each drop line must satisfy the equation between the drop line’s length and the dropline’s power supply capacity described in 6 of chapter 6.1.1 “Basic Precautions”.
   - The values shown in the graph are obtained under unfavorable conditions, such as the configuration which results in the maximum voltage drop. Therefore, the network operates correctly if the result of the simplified calculation based on the graph satisfies the condition for the required power supply capacity.

   ![Diagram of DeviceNet Communication](attachment:image)

   • Even if the result of the simplified calculation based on the graph does not satisfy the condition for the required power supply capacity, the result of the calculation with the actual values may satisfy the condition. The network operates correctly as long as either of the results by simplified calculation based on the graph or by the calculation with the actual values satisfies the condition.

   1. It is recommended to use separate power supplies for communications and for the internal circuit.

   **NOTE**
   2. If the communication power supply is also used as the internal circuit power supply, the simplified calculation based on the graph is not applicable. Calculate the power supply capacity with the actual values.
3. Simplified Calculation with the Estimated Values from the Graph

The voltage of the communication power supply to each node must be 11 VDC or more.
If not, the communications will be unstable.
A current flowing to the communication cable causes a voltage drop.
The longer the communication cable is or the greater the current is, the bigger the voltage drop will be.
The following tables show the maximum allowable current that can supply sufficient voltage to the communication power supply regardless of a voltage drop for a thick cable and a thin cable.

a) For a thick cable

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. current (A)</td>
<td>8.00</td>
<td>8.00</td>
<td>5.42</td>
<td>2.93</td>
<td>2.01</td>
<td>1.53</td>
<td>1.23</td>
<td>1.03</td>
<td>0.89</td>
<td>0.78</td>
<td>0.69</td>
<td>0.63</td>
</tr>
</tbody>
</table>

b) For a thin cable

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. current (A)</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.06</td>
<td>1.57</td>
<td>1.26</td>
<td>1.06</td>
<td>0.91</td>
<td>0.80</td>
<td>0.71</td>
<td>0.64</td>
</tr>
</tbody>
</table>

![Graph for thick cable](image1.png)

![Graph for thin cable](image2.png)
(1) **How to confirm sufficient power supply capacity**

Check the following for each node.

When nodes are located on both sides of the power supply, check for the nodes on each side.

The graph to be referred to differs depending on the cable type (thick or thin cable) of the trunk line.

I) Calculate the total current consumption, “A,” of all the nodes located for each side.

II) From the graph, obtain the maximum current, “B,” that may flow to the cable according to the cable type and the distance from the power supply to the end of trunk line.

III) If \( A \leq B \):

   the total current consumption “A” calculated in step 1 is equal to or less than the allowable maximum current “B” obtained in step 2, and the power supply capacity is sufficient for all the nodes.

IV) When the nodes are located on both sides of the power supply, repeat steps I) to III) for the nodes on the other side.

(2) **Corrective actions**

If \( A > B \),

the total current consumption “A” calculated in step I) is more than the maximum current “B” obtained in step II), so consider the following corrective actions to satisfy the conditions for the required power supply capacity.

- Move the power supply to the middle of the trunk line, so that the nodes are located on both sides of the power supply.
- When the nodes are located on both sides of the power supply, move the power supply to the side where the bigger power supply capacity is required.
- When a thin cable is used, replace it with a thick cable.

If \( A > B \) after having taken these corrective actions, recalculate the power supply capacity taking the actual arrangement of nodes into consideration.

**Example 1: Where the power supply is at the end of the trunk line**

The following diagram shows an example where the thick cable with the total length of 210 m is used and the power supply is connected at the end of the trunk line.

![Diagram showing a network with power supply at the end of the trunk line](image)

Total length of the power supply cable = 210 m
6 Connections for DeviceNet Communication

6.1 Location of Communication Power Supply

Total current consumption of nodes = 0.2 A + 0.1 A + 0.05 A + 0.2 A + 0.15 A 
= 0.7 A

Max. current obtained from the graph = 1.5 A

As A (total current consumption) < B (max. current), sufficient communication power can be supplied to all nodes.

Example 2: Where the power supply is in the middle of the trunk line

The following diagram shows an example where the thick cable with the total length of 240 m is used and the power supply is connected in the middle of the trunk line.

Total length of the power supply cable on the left of the power supply = 120 m
Total length of power supply cable on the right of the power supply = 120 m

Total current consumption of the nodes on the left of the power supply = 0.2 A + 0.3 A + 0.1 A = 0.6 A
Total current consumption of the nodes on the right of the power supply = 0.25 A + 0.15 A + 0.1 A = 0.5 A

The maximum current on the left obtained from the graph = approx. 2.5 A
The maximum current on the right obtained from the graph = approx. 2.5 A

As A (total current consumption on the left) < B (maximum current on the left) and A (total current consumption on the right) < B (maximum current on the right), sufficient power can be supplied to all nodes.

4. Calculation with Actual Values

If the result of the simplified calculation based on the graph still does not satisfy the conditions, check by detailed calculations using the following equation.

(1) Equation

I) When a communication power supply and an internal circuit power supply are separate

Check the distance between the power supply and each node in addition to the current consumption for the communication unit of each node.

If these values satisfy the following equation, sufficient power can be supplied to the node.

However, the current must not exceed the maximum allowable current to the cable, 8 A for a thick cable and 3 A for a thin cable.
6 Connections for DeviceNet Communication
6.1 Location of Communication Power Supply

Equation \[ \sum [(L_n \times R_c + N_t \times 0.005) \times I_n] \leq 4.65 \, \text{V} \]

- \( L_n \): Distance between the power supply and a node (excluding the length of the drop line)
- \( R_c \): Maximum resistance of the cable (0.015 \( \Omega \)/m for a thick cable, 0.069 \( \Omega \)/m for a thin cable)
- \( N_t \): Number of adapters between the power supply and a node
- \( I_n \): Current consumption required for the communication unit of node
- 0.005 \( \Omega \)= Contact resistance value of an adapter

II) When the communication power supply is also used as the internal circuit power supply

Because the allowable voltage range of the communication power supply is different from that of the internal circuit power supply as shown below, avoid using the power supply for both communications and the internal circuit.

- Allowable voltage range for the communication power supply: 11VDC to 25 VDC
- Allowable voltage range for the internal circuit power supply: 24 VDC - 15 % to +10 %

Check the distance between the power supply and each node in addition to the total current consumption for the communication unit and the internal circuit of each node.

If these values satisfy the following equation, sufficient power can be supplied to the node.

However, the current must not exceed the maximum allowable current to the cable, 8 A for a thick cable and 3 A for a thin cable.

Equation \[ \sum [(L_n \times R_c + N_t \times 0.005) \times I_n] \leq 0.65 \, \text{V} \]

- \( L_n \): Distance between the power supply and a node (excluding the length of the drop line)
- \( R_c \): Maximum resistance of the cable (0.015 \( \Omega \)/m for a thick cable, 0.069 \( \Omega \)/m for a thin cable)
- \( N_t \): Number of adapters between the power supply and a node
- \( I_n \): Current consumption required for the communication unit and the internal circuit of a node
- 0.005 \( \Omega \)= Contact resistance value of an adapter

(2) Corrective actions

If the obtained values do not satisfy the equation, consider the following corrective actions.

- Place a node with a large current consumption close to the power supply.
- Move the power supply to the middle of the trunk line so
that the nodes are located on both sides of the power supply.

- When nodes are located on both sides of the power supply, move the power supply to the side where the bigger power supply capacity is required.
- When a thin cable is used, replace it with a thick cable.

### 6.2 Grounding

#### 6.2.1 Grounding Method

1. The DeviceNet cable system must be grounded at only one location in the network in order to avoid a ground loop. Ground the DeviceNet cable system closest to the center of the network. As shown below, connect the drain wire of the communication cable to the FG terminal of the communication power supply and ground the power supply connected to the drain wire to a resistance of 100 Ω or less.

2. If more than one power supply is used, connect the drain wire of the cable only to the power supply closest to the center of the network. Ground the power supply to a resistance of 100 Ω or less. Do not connect the drain wire to the other power supplies other than that. For connecting multiple power supplies to the network, use a power supply tap for each power supply. (Power supplies are not counted as nodes.)

- Grounding resistance must be 100 Ω or less.
- Grounding location must be reserved only for the DeviceNet cable system. The same location cannot be used for grounding of servo drivers or grounding of inverters.
- Ground the drain wire at only one place. Do not ground the drain wire at several locations in the network.

**NOTE**
7 Error Indication

7.1 LED Indicators

On the SST-DN4-PCIE board, the board status display LED: HLTH LED and the DeviceNet status display LED: COMM LED are provided.

In startup after the power is turned ON, HLTH LED and COMM LED light up in green and red alternately for LED test and then in green.

If HLTH LED and COMM LED do not light up in green after a specified time with the power ON, the communication is not being performed correctly.

Even though the SST-DN4-PCIE board is inserted into the PCI Express slot on the YRC1000micro, HLTH LED lights up in orange if the channel has been set to “NOT USED” in the option board setup.

HLTH LED also lights up in orange until the application software is activated after the power to the YRC1000micro is turned ON, even though the option board and the I/O module are normally configured so that the SST-DN4-PCIE board can be used in the YRC1000micro.
7. Error Indication

7.1 LED Indicators

### 7.1.1 HLTH LED

HLTH LED indicates the status of the SST-DN4-PCIE board.

<table>
<thead>
<tr>
<th>HLTH LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLTH unlit</td>
<td>Power loss</td>
<td>Check the connection of the SST-DN4-PCIE board and the YRC1000micro PCI Express slot.</td>
</tr>
<tr>
<td>HLTH lit in green</td>
<td>SST-DN4-PCIE board in normal state</td>
<td>The SST-DN4-PCIE board operates normally.</td>
</tr>
<tr>
<td>HLTH lit in red</td>
<td>Error state</td>
<td>The SST-DN4-PCIE board does not operate correctly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Turn OFF and ON the YRC1000micro main power to start the system again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the connection of the SST-DN4-PCIE board and the YRC1000micro PCI Express slot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace the SST-DN4-PCIE board.</td>
</tr>
<tr>
<td>HLTH lit in orange</td>
<td>Pre-operation state</td>
<td>Although the self-diagnosis at the start-up has finished successfully, the following processes have not been performed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the DeviceNet communication settings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the wiring and connection of the DeviceNet cable and connector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the voltage and connection of the communication power supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the transmission speed of each device.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the terminator value (121 Ω) of the mounted terminator and its mounted status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the operation status of the DeviceNet master device.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check if the number of I/O points for the connected master or slave corresponds to the number of I/O allocated points.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace the SST-DN4-PCIE board.</td>
</tr>
</tbody>
</table>
### 7.1.2 COMM LED

The COMM LED indicates the status of DeviceNet.

<table>
<thead>
<tr>
<th>COMM LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
</table>
| COMM unlit             | In offline status              | The connection failure between the SST-DN4-PCIE board and the YRC1000micro PCI Express slot, communication power supply failure, or DeviceNet line failure occurs.  
• Check the connection of the SST-DN4-PCIE board and the YRC1000micro PCI Express slot.  
• Check the wiring and connection of the DeviceNet cable and connector.  
• Check the voltage and connection of the communication power supply.  
• Check the transmission speed of each device.  
• Check the terminator value (121 Ω) of the mounted terminator and its mounted status.  
• Check the operation status of the DeviceNet master device. |
| COMM blinks in green   | Communication is not established. | In online status, but communication is not established.  
• Check the wiring and connection of the DeviceNet cable and connector.  
• Check the voltage and connection of the communication power supply.  
• Check the transmission speed of each device.  
• Check the terminator value (121 Ω) of the mounted terminator and its mounted status.  
• Check the operation status of the DeviceNet master device.  
• Check if the number of I/O points for the connected master or slave corresponds to the number of I/O allocated points. |
| COMM lit in green      | Communication in normal status | Communication is established in online.                                                                                                                             |
### Error Indication

#### 7.1 LED Indicators

<table>
<thead>
<tr>
<th>COMM LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
</table>
| COMM blinks in red | Time-out error        | A time-out error occurs between the YRC1000micro and the connected device.  
  • Turn OFF and ON the YRC1000micro main power to start the system again.  
  • Check the wiring and connection of the DeviceNet cable and connector.  
  • Check the voltage and connection of the communication power supply.  
  • Check the transmission speed of each device.  
  • Check the terminator value (121 Ω) of the mounted terminator and its mounted status.  
  • Check the operation status of the DeviceNet master device.  
  • Check if the number of I/O points for the connected master or slave corresponds to the number of I/O allocated points.  
  • Extend the scanning interval for the communications cycle of the master device, and recheck communications. |
| COMM lit in red | Communication fatal error | A node address is overlapped, or a Bus-off is detected on the network.  
  • Turn OFF and ON the YRC1000micro main power to start the system again.  
  • Reset the node address so that the node address is not overlapped.  
  • Check the wiring and connection of the DeviceNet cable and connector.  
  • Check the voltage and connection of the communication power supply.  
  • Check the transmission speed of each device.  
  • Check the terminator value (121 Ω) of the mounted terminator and its mounted status.  
  • Check the transmission distance.  
  • Check if there is no noise generating factor.  
  • Replace the SST-DN4-PCIE board. |
YRC1000micro OPTIONS
DeviceNet COMMUNICATION FUNCTION
INSTRUCTIONS
FOR SST-DN4-PCIE MADE BY Molex, Inc.