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

MOTOMAN INSTRUCTIONS
MOTOMAN-□□□ INSTRUCTIONS
DX100 INSTRUCTIONS
DX100 OPERATOR’S MANUAL
DX100 MAINTENANCE MANUAL

The DX100 operator’s manuals above correspond to specific usage. Be sure to use the appropriate manual.
MANDATORY

- This manual explains the Adpci1535(1559) board of the DX100 system and general operations. Read this manual carefully and be sure to understand its contents before handling the DX100.
- General items related to safety are listed in Chapter 1: Safety of the DX100 Instructions. To ensure correct and safe operation, carefully read the DX100 Instruction before reading this manual.

CAUTION

- Some drawings in this manual 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 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.
- 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 manual carefully before installation, operation, maintenance, or inspection of the DX100.

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

⚠️ 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.

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

🚫 PROHIBITED
Do not use or keep the board in the following environmental conditions. Improper usage of the board may damage the board.
- Where exposed to direct sunshine
- Where vibration or impact occurs
- Where high humidity exists
- Where a strong magnetic field exists
- Where much dust exists
- Where a sudden change in the temperature occurs
- Where corrosive gases occur
- Where condensation occurs
WARNING

• Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the DX100 and programming pendant are pressed. 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.

Fig. : 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.

Fig. : Release of Emergency Stop

• Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator
  – 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 persons are present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the DX100 power
  – 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 are problems. The emergency stop buttons are located on the right of the front door of the DX100 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product. The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX100 controller</td>
<td>DX100</td>
</tr>
<tr>
<td>DX100 programming pendant</td>
<td>Programming pendant</td>
</tr>
</tbody>
</table>
Descriptions of the programming pendant, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant Character Keys</td>
<td>The keys which have characters printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
<tr>
<td>Symbol Keys</td>
<td>The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture. ex. page key</td>
</tr>
<tr>
<td>Axis Keys Number Keys</td>
<td>&quot;Axis Keys&quot; and &quot;Number Keys&quot; 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, ex. [SHIFT]+[COORD]</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with { }. ex. {JOB}</td>
</tr>
</tbody>
</table>

**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 the SELECT key 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 bland names for each company or corporation. The indications of (R) and ™ are omitted.
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1.1.2 Adpci1535 Board in Master Mode

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2.2 Board Specifications

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3 Setting Functions

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3.2 Setting Switches

4 Mounting the Adpci1535 Board

4.1 Opening the Front Door of the DX100

4.2 Confirming Switch Settings on the Adpci1535 Board

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This manual gives the instructions for using the Adpci1535(1559) board (manufactured by Advanet Inc.) for DeviceNet in the DX100. The application of this board allows the transmission of NX100's general-purpose I/O data with other devices connected to DeviceNet.

The Adpci1559 board, with the simplified functions of the Adpci1535 board, is the product of the same series as the Adpci1535 board. Although its shape differs from that of the Adpci1535 board, the Adpci1559 board has the DeviceNet function exactly equivalent of the Adpci1535 board, which allows users to use either board without any problem. The boards Adpci1535 and Adpci1559 are both indicated as "Adpci1535" on the screen of the programming pendant. When using the Adpci1559 board, read this manual replacing the board name "Adpci1535" with "Adpci1559", except for the section in which the external view of the 1559 board is explained.

NOTE

The version of DX100 system software which can be used by the Adpci1535 board is after DS1.30.00A(**)-00.

NOTE

When the Adpci1535 board is connected at the end of the network, connect the external terminator to the Adpci1535 board. If the terminator is not correctly connected, communications may not be performed. The Adpci1535 board does not include a DeviceNet cable and the external terminator.

DeviceNet is a registered trademark of ODVA (Open DeviceNet Vendor Association, Inc.).
1.1 System Configuration

1.1.1 Adpci1535 Board in Slave Mode

The following diagram shows an example of the system configuration when the Adpci1535 board is used in the slave mode.

![Diagram of Adpci1535 Board in Slave Mode]

1.1.2 Adpci1535 Board in Master Mode

The following diagram shows an example of the system configuration when the Adpci1535 board is used in the master mode.

![Diagram of Adpci1535 Board in Master Mode]
2 Hardware Specifications

2.1 Board External View

2.1.1 Adpci1535 Board

Diagram showing the external view of the Adpci1535 Board, with labels for Jumper pin, Dip switch, Module status LED, Network status LED, and DeviceNet connector.
2.1.2 Adpci1559 Board

- **Advant Inc Adpci1559**
- **Jumper pin**
- **Dip switch**
- **DeviceNet connector**
- **Module status LED**
- **Network status LED**
### 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>PCI slot in the DX100</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</td>
</tr>
<tr>
<td></td>
<td>Input: 2000 points</td>
</tr>
<tr>
<td></td>
<td>Output: 2000 points</td>
</tr>
</tbody>
</table>

**Note on Transmission I/O Points**

- Input points and output points cannot be configured individually.
- DX100 has 2048 inputs and 2048 outputs prepared for the I/O board. Of these, 40 inputs and 40 outputs are pre-allocated. In addition, 8 I/O points per channel are required for Adpci1535 communication status. The remaining number of I/O points 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>Select among 500/250/125 Kbps</td>
</tr>
<tr>
<td>Transmission media</td>
<td>Dedicated 5-wire (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>Transmission speed</td>
</tr>
<tr>
<td></td>
<td>500 Kbps</td>
</tr>
<tr>
<td></td>
<td>250 Kbps</td>
</tr>
<tr>
<td></td>
<td>125 Kbps</td>
</tr>
<tr>
<td>Power supply voltage for communication</td>
<td>24 VDC (supplied through the connector for connecting DeviceNet)</td>
</tr>
<tr>
<td>Maximum current consumption for communications</td>
<td>0.07 A</td>
</tr>
</tbody>
</table>

### 2.4 Connector

DeviceNet (Connector for DeviceNet)

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Signal Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (black)</td>
<td>V-</td>
<td>0V power supply line connecting terminal</td>
</tr>
<tr>
<td>2 (blue)</td>
<td>CAN_L</td>
<td>DeviceNet signal line connecting terminal</td>
</tr>
<tr>
<td>3 (bare wire)</td>
<td>Drain</td>
<td>Drain wire connecting terminal (shield)</td>
</tr>
<tr>
<td>4 (white)</td>
<td>CAN_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 in the parentheses after the terminal number indicates the color of the DeviceNet cable to be connected.
3 Setting Functions

3.1 Function Setting Switches

This section explains the jumper pins and dip switches that set the functions of this board, and their roles. Perform the proper settings following the instructions below. For more details of setting, refer to chapter 3.2 “Setting Switches”.

(A) Jumper Pin:
The jumper pins are set as follows by default, and no modification is necessary.

JP1: Short
JP2: Open
JP3: Short

(B) Dip Switch:
DSW1: sets the ID and type of the DeviceNet board.

DSW1-1 to DSW1-2
Unused switches; set these switches to OFF in the normal setting.

DSW1-3 to DSW1-8
Switches to set the board ID for board identification.
Set the first board ID to "0".
(DSW1-3 to DSW1-8: OFF.)
Set the second board ID to "1".
(DSW1-3 to DSW1-7: OFF; DSW1-8: ON.)

DSW1-9 to DSW1-0
Switches to set the board type set in the DeviceNet board.
(DSW1-9: OFF; DSW1-0: ON.)
### 3.2 Setting Switches

<table>
<thead>
<tr>
<th>Switches</th>
<th>Setting Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1 to JP3</td>
<td>JP1: Short</td>
</tr>
<tr>
<td>Only for manufacturer use</td>
<td>JP2: Open</td>
</tr>
<tr>
<td></td>
<td>JP3: Short</td>
</tr>
<tr>
<td>DSW1</td>
<td>[Diagram of DSW1 settings]</td>
</tr>
</tbody>
</table>

**Board ID and board type settings**

- **DSW1-1 to DSW1-2**: unused.
  - DSW1-1: OFF
  - DSW1-2: OFF

- **DSW1-3 to DSW1-8**: for board ID setting.
  - The first board
    - DSW1-3: OFF
    - DSW1-4: OFF
    - DSW1-5: OFF
    - DSW1-6: OFF
    - DSW1-7: OFF
    - DSW1-8: OFF
  - The second board
    - (In this case, please mount the second board so that both the board IDs and the PCI option slot numbers are arranged in ascending order.)
    - DSW1-3: OFF
    - DSW1-4: OFF
    - DSW1-5: OFF
    - DSW1-6: OFF
    - DSW1-7: OFF
    - DSW1-8: ON

- **DSW1-9 to DSW1-0**: for board type setting.
  - DSW1-9: OFF
  - DSW1-0: ON
4 Mounting the Adpci1535 Board

**WARNING**

- Before wiring, be sure to turn OFF the power supply and put up a warning sign, such as “DO NOT TURN ON THE POWER”. Failure to observe this warning may result in an electric shock or an injury.
- Do not touch the inside of the DX100 for 5 minutes after the power is turned OFF. The remaining charged voltage in the capacitor may cause an electric shock or an injury.
- Be sure to close the door and install the protection cover while the power is turned ON. Failure to observe this warning may result in a fire or an electric shock.

**CAUTION**

- The wiring and mounting must be performed by authorized and qualified personnel. Failure to observe this caution may result in a fire or an electric shock.
- Make sure that there is no foreign matter such as metal chips on the board. In case of malfunction, etc. it may result in an injury or damage the board.
- Make sure that there is no damage or deflection of parts on the board. In case of malfunction, etc. it may result in an injury or damage the board.
- Correctly connect each cable and connector. Failure to observe this caution may result in a fire or damage the board.
- Set the switches, etc. correctly. Malfunction, caused by an incorrect setting, may result in an injury or damage the board.
- Never touch the mounting surfaces of the board parts directly with fingers. The generated static electricity may damage the IC.
- Never touch the soldered surfaces of the board directly with fingers. Protrusions on the soldered surface may result in an injury.
- No shock to the board. The shock may damage the board.
Mount the Adpci1535 board in the following manner.

1. Turn the two door locks on the front face of the DX100 clockwise for 90° with a coin or a flat tip screwdriver.

2. With the door locks turned clockwise for 90°, turn the main switch handle to the “OFF” position, and slowly open the door.

4.2 Confirming Switch Settings on the Adpci1535 Board

1. Be sure that the settings of switches on the board are correct.
2. For the switch settings, refer to chapter 3.2 “Setting Switches”.

NOTE
When mounting the Adpci1535 board, note the followings.
When there is a board: No restriction of the order to installation of a PCI slot.
When there are two boards: Be sure to attach as follows.
The 1st board(board ID=0) → PCI Option Slot 1
The 2nd board(board ID=1) → PCI Option Slot 2
4.3 Mounting the Adpci1535 Board on the DX100

1. Remove the riser board from the CPU rack.
2. Mount the Adpci1535 board to the riser board, then securely tighten the Adpci1535 board with the board fixing screws.
3. Mount the riser board in the CPU rack.

4.4 Connecting the Cable

4.5 Closing the Front Door of the DX100

1. Close the door gently.

2. Turn the two door locks on the front face of the DX100 counterclockwise for 90° with a coin or a flat tip screwdriver.
5 Allocating I/O Signals

5.1 Setting the Option Board and I/O Module

In order to use the Adpci1535 board on the DX100, the system configuration should be set in the following manner.

NOTE
Add or modify the I/O module status in the Management Mode.
In the Operation Mode and Editing Mode, the settings on the screen are only for reference.
The boards Adpci1535 and Adpci1559 are both indicated as "Adpci1535" on the screen of the programming pendant.

5.1.1 Slave Mode

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

2. Set the Security Mode to the “MANAGEMENT MODE”.
3. Select {SYSTEM} under the main menu.
   – A sub menu appears.
4. Select {SETUP}.
   - The SETUP window appears.

5. Select {OPTION BOARD}.
   - The OPTION BOARD window appears.
   Installation of the current state of the option board is appeared as the following examples.

6. Select "Adpci1535".
   - The Adpci1535 setting window appears.
7. Move the cursor to each item on the Adpci1535 setting window, and select the desired item for setting.

8. Enter the desired value.
   
   – Set the items "Adpci1535", "SLAVE OR MASTER", "IO SIZE", "MAC ID", "BAUD RATE" on the window.
   
   – Each item in the display indicates as follows.

   ① Adpci1535
      Select "USE" or "NOT USE" about the Adpci1535 board.
      Select "USE".

   ② SLAVE OR MASTER
      Select "SLAVE" or "MASTER".
      Select "SLAVE".

   ③ IO SIZE (Unit: byte)
      Specify the size of the I/O which is to be ensured in the I/O area. The size can be set up to 250 bytes.
      (250*8 = 2000 points)

   ④ MAC ID
      Specify the MAC ID by setting a value from 0 to 63.

   ⑤ BAUD RATE
      Select the desired communication speed from 500 kbps, 250kbps, or 125 kbps.

   ⑥ SCAN LIST
      Unused in the slave mode.
5 Allocating I/O Signals
5.1 Setting the Option Board and I/O Module

9. Press [ENTER].
   – A confirmation dialog box appears.

10. Select "YES".
    – The I/O MODULE window appears.
11. Press [ENTER].
   - The rest of the IO MODULE window appears, displaying "Adpci1535(SLAVE)". "DI" or "DO" shows the I/O points according to the I/O size (in bytes) set in the step 8.

   ![IO MODULE Window]

   The DI or DO points can be calculated as follows:
   \[ \text{DI/DO points} = (\text{I/O size} \times 8) + 8 \]
   "+8": I/O points for status.

12. Press [ENTER].
   - A confirmation dialog box appears.
13. Select "YES".

   – The SETUP window appears.

5.1.2 Master Mode

1. Turn ON the power supply while pressing [MAIN MENU] simultaneously.

   – The maintenance mode window appears.

2. Set the Security Mode to the “MANAGEMENT MODE”.
3. Select {SYSTEM} under the main menu.
   – A sub menu appears.

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

5. Select {OPTION BOARD}.
   – Installation of the current state of the option board is appeared as the following examples.
6. Select "Adpci1535".
   - The Adpci1535 setting window appears.

   ![Adpci1535 Setting Window](image)

7. Move the cursor to each item on the Adpci1535 setting window, and select the desired item for setting.

8. Enter a desired value
   - Set the items "Adpci1535", "SLAVE OR MASTER", "IO SIZE", "MAC ID", "BAUD RATE" on the window.

   ![Adpci1535 Setting Window](image)

   - Each item in the display indicates as follows.

   ①Adpci1535
   Select "USE" or "NOT USE" about the Adpci1535 board. Select "USE".

   ②SLAVE OR MASTER
   Select "SLAVE" or "MASTER". Select "MASTER".

   ③IO SIZE (Unit: byte)
   Specify the size of the I/O which is to be ensured in the I/O area. The size can be set up to 250 bytes. (250*8 = 2000 points)

   ④MAC ID
   Specify the MAC ID by setting a value from 0 to 63.
5 Allocating I/O Signals
5.1 Setting the Option Board and I/O Module

BAUD RATE
Select the desired communication speed from 500 kbps, 250kbps, or 125 kbps.

SCAN LIST
Set the slave allocation for the settings in the master mode. (See the following steps for details.)

9. Select "DETAIL".
   – The allocation setting window appears.

10. Point the cursor to each item and press [SELECT].
11. Enter the desired value.
   – Perform the parameter setting suitable for the conditions of connected slave devices.

   – Each item in the display indicates as follows.
MAC ID: Node address of the DeviceNet equipment.
IN: Input byte number from the slave device (1 byte = 8 points).
OUT: Output byte number to the slave device (1 byte = 8 points).
TYPE: I/O message type of the slave device. The Adpci1535 board supports POLL. (Refer to a DeviceNet specifications for details on POLL.)
### INTERVAL

The time interval for the DeviceNet scan. The value is displayed on the line of the master device. Set the value in the range of 10 to 300 msec (the value can be modifiable by 10 msec). The default setting is 30 msec.

12. Press [ENTER].

   – A confirmation dialog box appears.

13. Select "YES".

   – The IO MODULE window appears.
14. Press [ENTER].
   - The rest of the IO MODULE window appears, displaying
     "Adpci1535(MASTER)". "DI" or "DO" shows the I/O points according to the I/O size (in bytes)
     set in the step 8.

   The DI or DO points can be calculated as follows:

   DI/DO points = (I/O size*8) +8
   
   
   "+8": I/O points for status.

15. Press [ENTER].
   - A confirmation dialog box appears.
16. Select "YES".
   – The SETUP window appears.
5 Allocating I/O Signals

5.2 Transmission Data

The data to be transferred from the Adpci1535 board to the inside of the DX100 includes the I/O data from the external devices connected to the DeviceNet and the status of the Adpci1535 board.

Therefore, inside the DX100, 8 points (1 byte) each for input and output are reserved for the status of the Adpci1535 board besides the area for the digital data. However, the output area cannot be used.

The transmission data from the Adpci1535 board are allocated to the external I/O signals of concurrent I/O.

Where only an Adpci1535 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).

The I/O area: 20010 to 20057 and 30010 to 30057 is reserved for the general I/O unit of the DX100.

<table>
<thead>
<tr>
<th>Board</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adpci1535</td>
<td>20060 to 20067 board status</td>
<td>30060 to 30067 cannot be used</td>
</tr>
<tr>
<td></td>
<td>20070 to 20077 input data (1)</td>
<td>30070 to 30077 output data (1)</td>
</tr>
<tr>
<td></td>
<td>20080 to 20087 input data (2)</td>
<td>30080 to 30087 output data (2)</td>
</tr>
<tr>
<td></td>
<td>20090 to 20097 input data (3)</td>
<td>30090 to 30097 output data (3)</td>
</tr>
<tr>
<td></td>
<td>20100 to 20107 input data (4)</td>
<td>30100 to 30107 output data (4)</td>
</tr>
<tr>
<td></td>
<td>20110 to 20117 input data (5)</td>
<td>30110 to 30117 output data (5)</td>
</tr>
<tr>
<td></td>
<td>20120 to 20127 input data (6)</td>
<td>30120 to 30127 output data (6)</td>
</tr>
<tr>
<td></td>
<td>20130 to 20137 input data (7)</td>
<td>30130 to 30137 output data (7)</td>
</tr>
<tr>
<td></td>
<td>20140 to 20147 input data (8)</td>
<td>30140 to 30147 output data (8)</td>
</tr>
<tr>
<td></td>
<td>20150 to 20157 input data (9)</td>
<td>30150 to 30157 output data (9)</td>
</tr>
<tr>
<td></td>
<td>20160 to 20167 input data (10)</td>
<td>30160 to 30167 output data (10)</td>
</tr>
<tr>
<td></td>
<td>20170 to 20177 input data (11)</td>
<td>30170 to 30177 output data (11)</td>
</tr>
<tr>
<td></td>
<td>20180 to 20187 input data (12)</td>
<td>30180 to 30187 output data (12)</td>
</tr>
<tr>
<td></td>
<td>20190 to 20197 input data (13)</td>
<td>30190 to 30197 output data (13)</td>
</tr>
<tr>
<td></td>
<td>20200 to 20207 input data (14)</td>
<td>30200 to 30207 output data (14)</td>
</tr>
<tr>
<td></td>
<td>20210 to 20217 input data (15)</td>
<td>30210 to 30217 output data (15)</td>
</tr>
<tr>
<td></td>
<td>20220 to 20227 input data (16)</td>
<td>30220 to 30227 output data (16)</td>
</tr>
</tbody>
</table>
*1 [Adpci1535 Board Status]

The status of the Adpci1535 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 numbers of the Adpci1535 board allocation number. In the table on the previous page, where the allocation numbers were 20060 to 20067, “xxx” would be 006.

<table>
<thead>
<tr>
<th>Signal</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2xxx0 to 2xxx3</td>
<td>Reserved for manufacturer (unusable)</td>
</tr>
<tr>
<td>2xxx4</td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td>Always set to 0.</td>
</tr>
<tr>
<td>2xxx5</td>
<td>(In SLAVE mode)</td>
</tr>
<tr>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td>Always set to 0.</td>
</tr>
<tr>
<td></td>
<td>(In MASTER mode)</td>
</tr>
<tr>
<td></td>
<td>Indicates if communicating with all the slaves or not through DeviceNet.</td>
</tr>
<tr>
<td></td>
<td>Communicating with all slaves: 0;</td>
</tr>
<tr>
<td></td>
<td>Communicating with some slaves: 1.</td>
</tr>
<tr>
<td>2xxx6</td>
<td>Indicates the DeviceNet communication status.</td>
</tr>
<tr>
<td></td>
<td>Normal: 0; Error: 1.</td>
</tr>
<tr>
<td>2xxx7</td>
<td>Indicates the operation status of the Adpci1535 board.</td>
</tr>
<tr>
<td></td>
<td>Normal: 0; Error: 1.</td>
</tr>
</tbody>
</table>
5.3 Management of DeviceNet Slave Allocation (Only in the Master Mode)

The DeviceNet slave allocation settings made for the setting entry "SCAN LIST" in the Adpci1535 setting window can be saved and loaded with an external memory device as shown in the following procedure.

For the details on general operations of the external memory devices, refer to "7 External Memory Devices" in "DX100 OPERATOR'S MANUAL".

5.3.1 Saving the Data

1. Turn ON the power to the DX100.
2. Select {EX. MEMORY} under the Main Menu.
3. Select (SAVE).
   – The following window appears.
4. Select "SYSTEM DATA".
   – The system data selection window appears.
5. Select “ADVANET DNET ALLOC DATA”.
   – The selected system data is marked with “★”.

6. Press [ENTER].
   – A confirmation dialog box appears.
7. Select “YES”.
   - The external memory device starts saving the file.
   - To cancel the saving, select “STOP”.
     When the saving is completed or cancelled, the file selection window appears.

5.3.2 Loading the Data

1. Turn ON the power to the DX100.
2. Set the Security Mode to the “MANAGEMENT MODE”.
3. Select {EX. MEMORY} under the Main Menu.
4. Select {LOAD}.
   - The following window appears.
5 Allocating I/O Signals
5.3 Management of DeviceNet Slave Allocation (Only in the Master Mode)

5. Select {SYSTEM DATA}.
   - The system data selection window appears.

6. Select “ADVANET DNET ALLOC DATA”.
   - The selected system data is marked with “★”.

7. Press [ENTER].
   - A confirmation dialog box appears.
8. Select “YES”.
   - The external memory device starts loading the file.
     When the file is successfully loaded, the load window reappears.

9. Turn ON the power supply again.

   If the settings (node address (MAC ID), station number, I/O size) of the Adpci1535 board in the DX100 are not consistent with the file to be loaded, the load operation fails. Before loading the file, prepare the board so that the board is set the same as the one that saved the file.
5.4 Generation of EDS File

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

Please complete chapter 5.1 “Setting the 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 configurator 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.

5.4.1 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.
3. Select "{SAVE}".
   - The following window appears.

4. Select "EDS FILE SAVE".
   - The EDS 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.

   - 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 (CompactFlash or USB memory).
The name of the file generated is as follows.

*Node_Classification_Board_Points.eds*

Node: The number of 'ST#' displayed on IO module window.
Classification: Network classification (DevNet)
Board: Board name (Adpci1535)
Points: Input-and-output Points

<Example>

ST16_DevNet_Adpci1535_IO16.eds
ST16_DevNet_Adpci1535_IO26.eds
6 Network Specifications

6.1 Network Configuration

6.1.1 Network Components

(1) The following diagram shows the network topology.

Fig. 6-1: Network Topology

![Network Topology Diagram]

- T (with terminator)
- T: Trunk line
- Drop line
- T: T-branch adapter

(2) A network consists of the following components.

(a) Node
A node is either a slave which connects to an external I/O unit, or the master which manages each I/O slave. The master and slaves can be positioned at any location of the node in the above diagram without restriction.

(b) 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.

(c) Connection Methods
A node is connected in the T-branch method or multi-drop method. A T-Branch Adapter is used to connect a node in the T-branch method. A node is directly connected to the trunk line or a drop line in the multi-drop method.

Both T-branch and multi-drop methods can be used together in the same network, as shown in the diagram above.

(d) Terminator
Each end of the trunk line must connect with a terminator to decrease signal reflection and ensure the stable network communications.

(e) Communications Power Supply
The communications connector of each node must be provided with a communications power supply through the communications cable to enable the DeviceNet communications.

Provide the communications power supply, the internal circuit power supply, and the I/O power supply separately.
6 Network Specifications

6.1 Network Configuration

- Make sure to use the DeviceNet cable for the communications cable.
- Each end of the trunk line must be connected to a terminator specified as follows.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance Value</td>
<td>121 Ω</td>
</tr>
<tr>
<td>Allowable Difference of Resistance Value</td>
<td>± 1%</td>
</tr>
<tr>
<td>Rating Power</td>
<td>1/4 W</td>
</tr>
<tr>
<td>Type</td>
<td>Metal film resistor</td>
</tr>
</tbody>
</table>

- Only the DeviceNet devices can be connected to the network. Do not connect any other devices, such as a lightning arrester.

(3) Branching from the Trunk Line

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

Fig. 6-2: Branching from the Trunk Line

(4) Branching from Drop Lines

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

Fig. 6-3: Branching from the Drop Lines
6.1.2 Precautions for Network Configuration

(1) Maximum Network

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.

The DeviceNet cables can be either thick cables or thin cables. The thick cables are used for relatively long distance communications 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 communications since the amount of signal attenuation distortion is considerably big.

The maximum network length is determined by the cable type, 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>

The line connecting two nodes located farthest from each other can use both thick and thin cables together. Compared to the case of only a thick cable, the maximum network length is short. In this case, the length of each cable needs to fulfill 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>LTHICK + LTHIN ≤ 100</td>
</tr>
<tr>
<td>250</td>
<td>LTHICK + 2.5 × LTHIN ≤ 250</td>
</tr>
<tr>
<td>125</td>
<td>LTHICK + 5.0 × LTHIN ≤ 500</td>
</tr>
</tbody>
</table>

LTHICK: thick cable length; LTHIN: thin cable length
(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.

(3) Total Drop Line Length

The total drop line length is a total of all drop line lengths. The total drop line may exceed the limitation even if the length of each drop line is within 6 meters. Make sure that the total drop line length does not exceed the value listed in the following table.

The following examples is for a baud rate of 500 kbps.

<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. 6-4: Configuration example (for 500 kbps transmission speed)

In this case, the following conditions must be fulfilled:

\[
\begin{align*}
\text{a} & \leq 6 \text{ m}, \quad \text{b} \leq 6 \text{ m}, \quad \text{c} \leq 6 \text{ m}, \quad \text{d} \leq 6 \text{ m}, \quad \text{d+f} \leq 6 \text{ m}, \\
\text{d+e+g} & \leq 6 \text{ m}, \quad \text{d+e+h} \leq 6 \text{ m}
\end{align*}
\]

The total drop line length must fulfill the following condition:

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

7.1 Location of Communications Power Supply

7.1.1 Basic Precautions

(1) The communications power supply to the network must be 24 VDC.

(2) The communications power supply must have a sufficient margin in the capacity.

(3) The communications power supply is to be connected to the trunk line.

(4) If many nodes are provided with power from a single power supply, locate the power supply close to the middle of the trunk line as much as possible.

(5) The allowable currents for a thick cable and a thin cable are respectively 8 A and 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 the communications power supply is individually turned OFF during the network operations, errors may occur in the active nodes.

7.1.2 Location of Power Supply

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

(1) Nodes on Both Sides of the Power Supply
(2) 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.

7.1.3 How to Determine the Location of the Power Supply

(1) To provide a sufficient 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.

(a) Simplified calculation with the estimated values from the graph.

(b) Calculation with the actual values (the voltage drop calculated according to the resistance value and the current consumption of the communications cable.)

Each drop line must satisfy the equation between its length and power supply capacity described in (6) in chapter 7.1.1 “Basic Precautions”.

• The values shown in the graph are obtained under unfavorable conditions, such as the configuration shown in the following figure 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.

• 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.
7 Connections for the DeviceNet Communications
7.1 Location of Communications Power Supply

- It is recommended to use separate power supplies for communications and for the internal circuit.
- If the communications 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 communications power supply to each node must be 11 VDC or more. If the voltage drops below 11 VDC, the communications become unstable.

When a current flows in the communications cable, the voltage drops. The longer the communications 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 communications 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>

NOTE
• It is recommended to use separate power supplies for communications and for the internal circuit.
• If the communications 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.
How to confirm sufficient power supply capacity

Perform the following procedure to check each node.

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

Note that the graph to be referred to is different depending on the cable type (thick or thin cable) of the trunk line.

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

(2) 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.

(3) If $A \leq B$:

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

(4) When the nodes are located on both sides of the power supply, repeat the steps (1) to (3) for the nodes on the other side.

Corrective actions

If $A > B$:

The total current consumption “A” calculated in the step 1 is more than the maximum current “B” obtained in the step 2, 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 the result is "A > B" after having taken these corrective actions, recalculate the power supply capacity taking the actual arrangement of nodes into consideration.
Example 1: When the power supply is located 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](image1)

Total length of the power supply cable = 210 m

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

The result is "A (total current consumption) < B (max. current)" and sufficient communications 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.

![Diagram](image2)

Total length of the power supply cable on the left of the power supply = Total length of the 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

With the results "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.

Equation

(1) When the communications power and the internal circuit power are separately supplied

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

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 communications unit of a node
- 0.005 \( \Omega \)= Contact resistance value of an adapter

(2) When the communications power and the internal circuit power are shared from one power supply

Since the allowable voltage ranges of the communications power and the internal circuit power are different as follows, avoid using the shared power supply for them

- Allowable voltage range for the communications 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 communications 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
7 Connections for the DeviceNet Communications

7.1 Location of Communications Power Supply

In: Current consumption required for the communications unit and the internal circuit of a node

\[ 0.005 \, \Omega = \text{Contact resistance value of an adapter} \]

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.
7.2 Grounding

7.2.1 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.

![Diagram showing grounding method]

(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.

To connect multiple power supplies to the network, use a power supply tap for each power supply. (Note that the 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 the servo drivers or inverters.
- Make sure to ground the drain wire at only one place. Never ground the drain wire at several locations in the network.
8 Error Indication

8.1 LED Indicators

The Adpci1535 board is equipped with a board status display LED and a DeviceNet status display LED. They are indicated with “MS” (module status) and “NS” (network status) respectively. When the power is turned ON, the MS and NS LEDs alternately light up in green and red for LED test then light in green if the board is properly started. If the MS and NS LEDs do not light up in green after a while, the communication is not being performed correctly.

8.1.1 MS LED

The MS LED indicates the status of the Adpci1535 board.

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS unlit</td>
<td>Power loss</td>
<td>Check the connection of the Adpci1535 board and the PCI slot of the DX100.</td>
</tr>
<tr>
<td>MS lit in green</td>
<td>Module in normal state</td>
<td>The Module operates normally.</td>
</tr>
</tbody>
</table>
8.1.2 NS LED

The NS LED indicates the communication status of DeviceNet.

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS unlit</td>
<td>In offline status</td>
<td>Indicates a connection error between the Adpci1535 board and the PCI slot of the DX100; a communication power supply failure; and a line failure of DeviceNet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the connection between the Adpci1535 board and the PCI slot of the DX100.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the wirings and connections of the DeviceNet cable and connectors.</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>NS blinks in green</td>
<td>Communication is not established.</td>
<td>The board is in online status, however, the communication is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check the wirings and connections of the DeviceNet cable and connectors.</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>
</tbody>
</table>
## Error Indication

### DX100

#### 8.1 LED Indicators

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
<th>Indications and Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS lit in green</td>
<td>Communication in normal status</td>
<td>The board is in online status, and the communication is established.</td>
</tr>
</tbody>
</table>
| NS blinks in red     | Time-out error                | Indicates a time-out error between the DX100 and the connected device.  
|                      |                               | • Power OFF and ON the DX100 to restart the system.  
|                      |                               | • Check the wirings and connections of the DeviceNet cable and connectors.  
|                      |                               | • Check the voltage and connection of the communication power supply.  
|                      |                               | • Check the transmission speed of each device.  
|                      |                               | • Check the terminator value (121 \( \Omega \)) 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.  
|                      |                               | • Increase the time interval for the DeviceNet scan, and recheck the communications.                                                                         |
| NS lit in red        | Communication fatal error     | Indicates a duplicated node address, or a bus-off on the network.  
|                      |                               | • Power OFF and ON the DX100 to restart the system.  
|                      |                               | • Change the node address to resolve the duplicated node address.  
|                      |                               | • Check the wirings and connections of the DeviceNet cable and connectors.  
|                      |                               | • Check the voltage and connection of the communication power supply.  
|                      |                               | • Check the transmission speed of each device.  
|                      |                               | • Check the terminator value (121 \( \Omega \)) of the mounted terminator and its mounted status.  
|                      |                               | • Check the transmission distance.  
|                      |                               | • Check if there is no factor generating a noise, etc.  
|                      |                               | • Replace the Adpci1535 board.  |
DX100 OPTIONS
Adpci1535(1559)BOARD
INSTRUCTIONS
FOR DeviceNet

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