**Notice:**

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to the product.

**DANGER!** Indicates information that, if not heeded, is likely to result in loss of life or serious injury.

**WARNING** Indicates information that, if not heeded, could possibly result in loss of life or serious injury.

**Caution** Indicates information that, if not heeded, could result in relative serious or minor injury, damage to the product, or faulty operation.

**OMRON Product References**

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “Ch,” which appears in some displays and on some OMRON products, often means “word” and is abbreviated “Wd” in documentation in this sense.

The abbreviation “PC” means Programmable Controller and is not used as an abbreviation for anything else.

**Visual Aids**

The following headings appear in the left column of the manual to help you locate different types of information.

**Note** Indicates information of particular interest for efficient and convenient operation of the product.

**1, 2, 3...** 1. Indicates lists of one sort or another, such as procedures, checklists, etc.
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## Revision History

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<th>Revision History</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>129</td>
</tr>
</tbody>
</table>
About this Manual:

This manual describes the installation and operation of the NT-series Host Interface Unit Direct Connection and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the NT-series Host Interface Unit Direct Connection.

**WARNING**  Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

**Section 1** describes the role and operation of the Host Interface Unit, and its relationship to the PT features and the new Direct Connection function.

**Section 2** describes how to connect the Host Interface to the PT and the PT to the PC.

**Section 3** describes the basic operation of the new Direct Connection function. Please read this section carefully before using your PT. The Direct Connection function is extremely useful when a PT is used.

**Section 4** describes the actual operation of the PT using Direct Connection. Only the allocated bits and words are described related to the settings with the Support Tool.

**Section 5** describes how to convert existing screen data for use with Direct Connection and how to convert a PC program written for Direct Connection OFF for use with Direct Connection OMRON.

**Section 6** describes the procedures to follow if the PT does not operate correctly.
SECTION 1
Host Interface Unit

This section describes the role and operation of the Host Interface Unit, and its relationship to the PT features and the new Direct Connection function.

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1-2 Programmable Terminal .................................................. 3
  1-2-1 Role and Operation .................................................. 3
  1-2-2 Displays ................................................................. 5
1-3 Host Interface Unit ....................................................... 5
  1-3-1 Operation ............................................................... 5
  1-3-2 Direct Connection Function ........................................ 6
1-4 System Configuration .................................................... 8
1-5 Before Operating ........................................................ 9
1-1 Getting Starting

To ensure that the Host Interface Unit works correctly, carefully observe the following when positioning and handling it.

Location

Do not install the Host Interface Unit in a location subject to the following conditions:

- Dust, chemicals, or steam
- Severe temperature fluctuations
- High humidity and condensation
- Direct sunlight
- Strong electrical or magnetic fields
- Poor ventilation
- Severe vibration

Handling

Do not:

- Subject the Unit to strong shocks or vibrations
- Position the Unit's PCB downward
- Touch the Unit's PCB
- Put heavy objects on the unit
- Supply a voltage different from the specified voltage
System Configuration

The equipment and parts required to configure the system to use the Direct Connection function are shown below.

<table>
<thead>
<tr>
<th>Programmable Terminal</th>
<th>Screen-data Memory Board/ Screen Memory</th>
<th>Host I/F Unit</th>
<th>System ROM</th>
<th>Support tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT20M</td>
<td>Monochrome LCD: NT20M-DT121-V2 Touch-panel Model</td>
<td>Screen Memory SRAM: 32 KB; RAM22-15</td>
<td>Host Interface Unit NT600M-LK201</td>
<td>NT20M-SMR31-E</td>
</tr>
<tr>
<td></td>
<td>Backlight replaceable: NT20M-DT131 Touch-panel Model</td>
<td>SRAM: 128 KB; RAM13-10 EPROM: 64 KB; ROM-KD-B EPROM: 128 KB; ROM-13-12B EEPROM: 32 KB; EER22-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EL display: NT600M-DT211 Touch-panel Model</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1-2  Programmable Terminal

The OMRON Programmable Terminal (PT) displays the status and other information about the FA-applied factory. The PT is briefly described below.

1-2-1  Role and Operation

The Programmable Terminal (PT) is a FA factory terminal device which communicates with Programmable Controllers (PCs) and displays the operating status of machines and other equipment, work instructions, and operations of the PT.
Production Line Status Monitoring

The PT displays real-time information about the system and equipment operating status and manufactured quantity.

<table>
<thead>
<tr>
<th>Production Control</th>
<th>Date: 27 Jan 93</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time: 14:15:32</td>
</tr>
<tr>
<td>Product</td>
<td>NT20M</td>
</tr>
<tr>
<td>Today's target</td>
<td>560 units</td>
</tr>
<tr>
<td>Current production</td>
<td>305 units</td>
</tr>
<tr>
<td>% achieved</td>
<td>54.4 %</td>
</tr>
<tr>
<td>Defects</td>
<td>2 units</td>
</tr>
<tr>
<td>Repairs</td>
<td>7 units</td>
</tr>
</tbody>
</table>

Messages

The PT warns of system or equipment errors with a display and buzzer, and prompts the appropriate remedial action.

Panel Switch Functions (Operation from the PT)

Setting touch switches on the PT allows workers to use the PT as an operating panel. Production targets and other numeric data input to the PT can be transmitted to the PC.
1-2-2 Displays

The PT can display the following items to provide the operations mentioned previously. Each of these items is called a “display element.”

Text
Characters which remain unchanged can be written directly as text.

Character String Memory Tables
Character strings stored in the character-string memory table are displayed. The display can be changed by changing the data stored in the character-string memory table.

Numeral Memory Tables
Numbers stored in the numeral memory table are displayed. The display can be changed by changing the data stored in the numeral memory table. The Direct Connection compatible Host Interface Unit also allows the display of hexadecimal values.

Lamps
Lamps are square or round frames which indicate the operating status. They are controlled by the PC. They can be lit (highlighted) or flashed (intermittent normal and highlighted display).

Touch Switches
Touch switches can be set anywhere on the screen. Touching the screen at a touch switch location can switch the display (stand-alone function or display-switch function) or notify the PC (notification function). The touch switches can be lit or flashed by the PC in the same way as the lamps.

Bar Graphs
The bar graph displays a comparison with a value stored in the memory table. A percentage value can be displayed simultaneously.

1-3 Host Interface Unit

The Host Interface Unit provides communication between the PT and PC. This section describes the operation of the Host Interface Unit and the newly added Direct Connection function.

Refer to Section 3 Direct Connection Operation and Section 4 PT Operation for details on the Direct Connection function.

1-3-1 Operation

Many communication units are available to provide communication between the PT and PC for different system configurations. The Host Interface Unit is just one of the communication units which can be mounted on the PT. It can be connected to the Host Link Unit or CPU of a C-series or CV/CVM-series PC.

The Host Interface Unit operates as an intermediary between the PT and PC. It reads information to be displayed on the PT from the PC memory area and writes it to the PT memory table, and writes information to the PC memory area with the PT touch switches.
The Host Interface Unit reads instructions to switch screens from the PC memory area and controls the PT. It reads the status of the PT and writes it to the PC memory area.

1-3-2 Direct Connection Function

The new Direct Connection function has been added to the Host Interface Unit to enable the reading and writing of PC bit and word data.

The Direct Connection function is described below.

- The PT is able to directly refer to PC bit and word data so that a PT can be connected to a PC without changing the PC program currently running the production line.
- The bits and words referring to operating status and work instruction information and those storing input data can be freely allocated to almost any part of the PC memory. Bits and words in the PC can be referenced from any memory table.
- The area to control and notify the PT status, including display screens, backlighting on a flash control, alarms and buzzers, can be freely allocated to any part of the PC memory.

Setting

The Direct Connection function is set using the NT-series Support Tool, which is the name of the software used to create and maintain the display data for the PT displays, memory table data, and mark data. Refer to the manual listed below for information on the Support Tool and how it is used, as well as for the system configuration:

NT20M/NT2000M/NT600M Support Tool Operation Manual (V004)

In this case, communication is with the PC’s DM area. Data in all other areas is PC program data which must be sent to the DM area in order to be transmitted. In addition, the number of numeral and character-string memory tables which can be communicated with the PC is limited.

1-3-2 Direct Connection Function

The new Direct Connection function has been added to the Host Interface Unit to enable the reading and writing of PC bit and word data.

The Direct Connection function is described below.

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NT20M/NT2000M/NT600M Support Tool Operation Manual (V004)

In this case, communication is with the PC’s DM area. Data in all other areas is PC program data which must be sent to the DM area in order to be transmitted. In addition, the number of numeral and character-string memory tables which can be communicated with the PC is limited.

This manual describes communications using the Host Interface Unit and Direct Connection. Refer to NT-series Host Interface Units Operation Manual (V003) for information on communication without using the Direct Connection function.
reduces the load on the PC and increases the efficiency of program development.

Refer to Section 3 Direct Connection Operation and Section 4 PT Operation for details on the Direct Connection function.

Direct Connection Examples

Examples are presented below of PT and PC operation when the Direct Connection function is set.

Example 1
The status of a PC bit can be directly displayed as a PT lamp without using a PC program.

Example 2
The displayed word can be freely selected for each memory table. The display as a heraldically value makes it easy to monitor word contents.
1-4 System Configuration

This section shows the basic configuration of a system using a Host Interface Unit. Refer to the individual equipment manuals for information on the equipment used in the system.

System Equipment and Software

OMRON PC
General reference to a C-series or CV/CVM1-series PC. A CV/H-series or CV-series PC can be connected directly to the PT. A Host Link Unit is required to connect a C-series PC.

Programmable Terminals
NT20M, NT2000M, and NT600M.

Computer
IBM PC/AT or compatible.

Support Tool
NT20M/NT2000M/NT600M Support Tool Version 4.0.

Connections
Use an RS-232C cable to connect the PT to the PC. An RS-422 or optical-fiber cable can be used with a Link Adapter.

Refer to the following chapters for details about connecting the PT to the PC.

RS-232C Cable
Section 2 Installation and Settings

RS-422 Cable
Appendix D RS-422 Connections

Optical Fiber Cable
Appendix E Optical Fiber Cable Connections
1-5 Before Operating

Follow the procedure indicated below before operating a PT with Host Interface Unit installed.

**PC**
- Check and change the PC settings.
  - Refer to the appropriate PC Manual
- Create the PC program.
  - Refer to the appropriate PC Manual
- Trial operation

**PT**
- Check the PT power supply and ground cable connections.
  - Refer to the appropriate PT Manual
- Install the Host Interface Unit.
  - Refer to page 13.
- Check and set the PT and Host Interface Unit.
  - Refer to page 14.
- Connection to the PC.
  - Refer to page 15.
- Check settings and communications.
  - Refer to page 35.

**Support Tool**
- Create screens with the Support Tool
  - Refer to the NT-series Support Tool Operation Manual.
Reference Manuals

The NT20M/NT2000M Series and NT600M Series are covered in the six manuals described below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NT20M/NT2000M Operation Manual</td>
<td>This manual provides specifications, functions, and operating instructions for the NT20M and NT2000M Programmable Terminals.</td>
<td>V001</td>
</tr>
<tr>
<td>NT600M Operation Manual</td>
<td>This manual provides specifications, functions, and operating instructions for NT600M Programmable Terminals.</td>
<td>V002</td>
</tr>
<tr>
<td>NT-series Host Interface Unit</td>
<td>This manual covers the commands, controls, and communications specifications for operating the NT20M and the NT600M. Refer to this manual when programming host computer communications.</td>
<td>V003</td>
</tr>
<tr>
<td>Operation Manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NT20M/NT600M Support Tool Operation</td>
<td>This manual covers methods for creating screens, including screen data preparation, switches, lights, and alarms.</td>
<td>V004</td>
</tr>
<tr>
<td>Manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NT-series Host Interface Unit</td>
<td>This manual covers the Direct Connection feature which has been added to the Host Interface Unit.</td>
<td>V015</td>
</tr>
<tr>
<td>Direct Connection Operation Manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NT-series RS-232C/RS-422 Interface</td>
<td>This manual covers the commands, controls, and communications specifications for operating the NT20M and the NT600M with the RS-232C/RS-422 Interface Unit. Refer to this manual when programming host computer communications.</td>
<td>V016</td>
</tr>
<tr>
<td>Unit Operation Manual</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This section describes how to connect the Host Interface to the PT and the PT to the PC.

2-1 Components and Settings ................................................................. 12
  2-1-1 Description and Function of Components ......................................... 12
  2-1-2 DIP Switch Settings ................................................................. 12
2-2 Installing the Host Interface ............................................................ 13
  2-2-1 Installation .............................................................................. 13
  2-2-2 Setting the PT Switches ............................................................ 14
2-3 Connection to an OMRON PC ............................................................ 15
  2-3-1 Compatible PCs ....................................................................... 15
  2-3-2 Connecting the PT .................................................................... 16
  2-3-3 PC Switch Settings ................................................................. 17
2-1 Components and Settings

The parts of the Host Interface and how to set the operating environment are described below.

2-1-1 Description and Function of Components

The names and functions of the Host Interface parts are shown in the diagram below.

NT600M-LK201 Host Interface

2-1-2 DIP Switch Settings

Set the operating environment with the Host Interface DIP switches (SW4) before installing the PT.

Set the Host Interface DIP switches in the positions shown below.

SW4-3 to 4-6 and 4-0

Not used
Initializes the memory table allocating the words.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>PT</td>
<td>Initial values set by the Support Tool.</td>
</tr>
<tr>
<td>OFF</td>
<td>PC</td>
<td>The contents of the words allocated in the PC memory are used as the memory table initial values.</td>
</tr>
</tbody>
</table>

Sets the PT Status Control Area and PT Status Notify Area in the General Memory.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Add</td>
<td>Add PT Status Control Area and PT Status Notify Area to the general memory.</td>
</tr>
<tr>
<td>OFF</td>
<td>Don’t add</td>
<td>Do not add PT Status Control Area and PT Status Notify Area to the general memory.</td>
</tr>
</tbody>
</table>

Sets the PT Baud Rate

Set the Baud Rate to the same value as the PC Host Link function baud rate setting.

Set the Baud Rate to the maximum value that both the PT and PC can handle.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Baud Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW4-7: ON, SW4-8, 9: OFF</td>
<td>4,800 bps</td>
</tr>
<tr>
<td>SW4-7: ON, SW4-8: OFF</td>
<td>9,600 bps</td>
</tr>
<tr>
<td>SW4-7, 8: ON, SW4-9: OFF</td>
<td>19,200 bps</td>
</tr>
</tbody>
</table>

**Note**

1. Turn off the power supply before setting the operating environment with the DIP switches.
2. Be sure to correctly set the communication conditions. Communication is not possible if conditions are not set as shown above.
3. Use the cables recommended by OMRON to connect the units. Incorrect communication may result if non-recommended cable types are used.

### 2-2 Installing the Host Interface

How to install the Host Interface in the PT.

#### 2-2-1 Installation

Turn the cut-out in the Host Interface to the left and push the Unit in until a “click” is heard.

In difficult-to-connect situations move the Unit when connecting the Host Interface.

**Installation in the NT20M**
Installation in the NT600M

How to Remove the Unit
Hold the unit by the indentations at each side, press inwards and pull out the unit.

Removal from the NT600M

Note Turn off the PT power supply when installing or removing the unit.

2-2-2 Setting the PT Switches

If Host Interface is installed the communication specifications must be set with DIP switches (SW1) on the PT. These settings are not required if the Direct Connection function is selected. Turn ON DIP-switch SW1-8 when Direct Connection is not selected.
The PT unit DIP switch (SW1) settings are described below. Refer to the appropriate PT Operation Manual for more details.

**Note** Turn off the power supply before setting the DIP switches.

### 2-3 Connection to an OMRON PC

Connect the PT fitted with the Host Interface to the OMRON PC with an RS-232C.

#### 2-3-1 Compatible PCs

Some models and series of OMRON PCs have the Host Link function built-in. Check the model and series of the PC against the type of Host Link Unit before making the connections.

The compatible PCs are listed in the table below.

<table>
<thead>
<tr>
<th>PC-series</th>
<th>Units with built-in Host Link function</th>
<th>Connectable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-series</td>
<td>--- C20H/C28H/C40H/C60H C__H</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C120-LK201-V1</td>
<td>C120, C200H, C500, C1000H</td>
</tr>
<tr>
<td></td>
<td>C200H-LK201</td>
<td>C200H</td>
</tr>
<tr>
<td></td>
<td>C500-LK201-V1</td>
<td>C500, C1000H</td>
</tr>
<tr>
<td>CV-series</td>
<td>CV500-LK201</td>
<td>CV500</td>
</tr>
<tr>
<td></td>
<td>CV500-CPU01</td>
<td>CV1000</td>
</tr>
<tr>
<td>CVM1-series</td>
<td>CV500-LK201 CVM1-CPU01 CVM1-CPU11</td>
<td>CVM1</td>
</tr>
</tbody>
</table>
2-3-2 Connecting the PT

OMRON provides two types of connector cables. Refer to the diagrams below to select the appropriate cable for the unit connectors. Connect the PT to the PC.

**Note**  Turn off the PT and PC power supplies before inserting or removing connectors.

**Connecting to a PC with 25-pin Connector**
Use the following connector cable with a 25-pin connector at each end to connect the PT to a PC with a 25-pin connector:

* XZ7-10048 (25-pin to 25-pin) Connector Cable

**Connecting to a PC with 9-pin Connector**
Use the following connector cable with a 25-pin connector at one end and a 9-pin connector the other end to connect the PT to a PC with a 9-pin connector:

* XZ7-10049 (9-pin to 25-pin) Connector Cable
### Connecting the PT to a CV or CVM1 Series Host Link Unit

Two types of connector are found on CV500-LK201 Host Link Units. Both of these connector types can be connected with an RS-232C connector cable. Select the connector cable which matches the connector type.

<table>
<thead>
<tr>
<th>Communications Port 1</th>
<th>RS-232C</th>
</tr>
</thead>
<tbody>
<tr>
<td>XZ7-10048 Cable</td>
<td>Connect a 25-pin RS-232C connector to Communications port 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communications Port 2</th>
<th>RS-232C/RS-422</th>
</tr>
</thead>
<tbody>
<tr>
<td>XZ7-10049 Cable</td>
<td>Connect a 9-pin RS-232C/RS-422 connector to Communications port 2. Set the communications path selector to the RS-232C side (upper side) before using this port.</td>
</tr>
</tbody>
</table>

I/O port selector switch
Always set to RS-232C.

#### If a Cable Longer than 2 m is Required

If a cable longer than 2 m is required, a longer cable can be fabricated; however the overall length should not exceed 15 m. Refer to Appendix C RS-232C Connections for more details.

#### Connection with RS-422 or Optical-fiber Cable

In addition to RS-232C the following two other connection methods are available to connect the PT to PC. Refer to the appropriate appendices for more information on these connection methods.

**RS-422**
Use RS-422 connections if the PT is more than 15 m from the PC. Communication is possible up to 500 m through a multicore shielded cable. However, connection is limited 1-to-1 connection between units. Refer to Appendix D RS-422 Connections for more details.

**Optical-fiber**
Optical-fiber cable connections are used in situations where unstable communication occurs because of noise problems. Communication is possible up to 500 m. However, connection is limited 1-to-1 connection between units. Refer to Appendix E Optical Fiber Cable Connections for more details.

#### 2-3-3 PC Switch Settings

When the PT and PC are connected together, set the conditions at the PC Host Link Unit and the CPU as shown in the table below.

The method of setting the conditions with the switches on each unit is described...
on the following pages. Refer to the manual on each unit for more detailed information on making these settings.

<table>
<thead>
<tr>
<th>Item</th>
<th>Switch setting position</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O port</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Baud rate</td>
<td>Set to the same baud rate as the PT</td>
</tr>
<tr>
<td>Transfer code</td>
<td>ASCII, 7 data bits, 2 stop bits</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>1-to-1/1-to-N</td>
<td>1-to-N</td>
</tr>
<tr>
<td>Instruction level</td>
<td>Level 1</td>
</tr>
<tr>
<td>Unit#</td>
<td>00</td>
</tr>
</tbody>
</table>

**Note**  
The 1-to-N setting enables BCC (Block Check Character). The 1-to-N connection cannot be used to connect a Host Link Unit to a PT.

**Connection to a Host Link Unit**

Two types of Host Link Unit are available: a Rack-mounting type and a CPU-mounted type. The switch settings differ according to the type of Host Link Unit. Set the switches accordingly to the unit type.

**C200H: Rack-mounting Type**

**C200H-LK201**

**Setting the Front Switches**

Set each switch with a flathead screwdriver until the displayed settings agree with the settings described on the previous page.

- **SW1/SW2**: Set the Unit# Set both switches SW1 and SW2 to 0.
- **SW3**: Baud rate setting  
  4: 4,800 baud  
  5: 9,600 baud  
  6: 19,200 baud
- **SW4**: Sets the instruction level, parity, and transfer code. Set to 2.
Setting the Rear Switches

C500(F), C1000(F)  
Rack-mounting Types

C500-LK201-V1

Setting the Rear Switches

DIP Switch: 1-to-1/1-to-N setting

CTS selector switch  
External

0 V (ON)

CTS setting selector switch  
Always set to the 0 V (ON) position.

C500(F), C1000(F)  
Rack-mounting Types

C500-LK201-V1

Setting the Rear Switches

I/O port selector switch  
Always set to RS-232C.

DIP switch SW1: Unit # setting

Synchronization setting selector switch  
Set to Internal.

DIP switch SW2: Baud rate, 1-to-1/1-to-N,  
instruction level setting

CTS setting selector switch  
Always set to the 0 V (ON) position.
Setting the Rear Switches

I/O port selector switch
Always set to RS-232C.

DIP switch SW1: Unit # setting
Parity, transfer code setting.
- Unit # setting.

Synchronization setting selector switch
Set to Internal.

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Instruction level setting
- Set to enable levels 1, 2, 3
- 1-to-1/1-to-N setting
- Set to 1-to-N.

CTS setting selector switch
Always set to the O V (ON) position.

5 V supply
ON
OFF

I/O port
RS-422
RS-232C

Synchronization
Internal
External

Termination resistance
OFF
ON

CTS
0 V
External

Parity, transfer code setting.
Unit # setting.

Baud rate
19,200 bps
9,600 bps
4,800 bps
Setting the Rear Switches

DIP switch SW1: Unit #, parity, transfer code setting

Parity is fixed at Even Parity, Transfer Code is fixed at ASCII, 7 data bits, 2 stop bits

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

DIP switch SW3: Synchronization and CTS setting

Setting the Front Switches

Set the operating conditions with the PC System Setting functions when a CV Series Host Link Unit is connected to a PC. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU.
Set the DIP switches to enable the system settings to be made.

Connection to a CPU

Set the operating conditions with the PC System Setting functions when connecting to a Mini H-type (C□□H) or CV/CVM1 Series CPU. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU. Refer to the Mini H-type PCs: C20H, C28H, C40H, C60H Installation Guide for more details of the system settings.

Mini H-type PCs (C□□H)  
C20H/C28H/C40H/C60H  
No switch settings required when connecting to a Mini H-type PC.

CV/CVM1-series  
CV500-CPU01  
CV1000-CPU01  
CVM1-CPU01  
CVM1-CPU11
**Front Switch Settings**
When connecting to a CV/CVM1 Series CPU, select the RS-232C input port.
SECTION 3
Direct Connection Operation

This section describes the basic operation of the new Direct Connection function. Please read this section carefully before using your PT. The Direct Connection function is extremely useful when a PT is used.

3-1 The Direct Connection Function .................................................. 26
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3-3 PT Status Control and Notification .............................................. 28
   3-3-1 PT Status Control Area ....................................................... 28
   3-3-2 PT Status Notify Area .......................................................... 31
3-4 PT Internal Processing Flow ..................................................... 33
3-5 Checking the Host Interface Settings ......................................... 35
3-1 The Direct Connection Function

Direct Connection is a new function added to the Host Interface Unit. Its features are described below.

Direct Connection

When a Host Interface Unit is mounted to a PT, the bits and words of the PC memory area can be freely allocated as reference elements required for the display and to store input data. The PT is then able to directly read and write these allocated bits and words to change the display and to control and notify the PT status. This function is called Direct Connection. The bits and words allocated for use by the Direct Connection function are referred to as “allocated” bits and words.

Types and Features of Allocated Data

Using Direct Connection the following items can be allocated to bits and words of the PC memory:

- Display elements: numerals, character strings, lamps, touch switches
- PT status: alarm and buzzer outputs, backlighting lit or flashing, screen selection, currently displayed screen number, operating status, etc.

These allocated bits and words can be used by the PC to control the PT. The items the PC can control are categorized into two groups, as follows:

- Control and notification of display elements
- Control and notification of PT status

The relationship between the allocated memory and the control operation is shown in the table below.

<table>
<thead>
<tr>
<th>Element, area</th>
<th>Allocated memory</th>
<th>Function</th>
<th>Control or Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp</td>
<td>Bit</td>
<td>Control of display elements</td>
<td>Lights (flashes) when the allocated bit is turned ON (1) and goes out when the bit is turned OFF (0).</td>
</tr>
<tr>
<td>Touch switch</td>
<td>Bit</td>
<td>Control of display elements</td>
<td>Lights (flashes) when the allocated bit is turned ON (1) and goes out when the bit is turned OFF (0).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display element notification</td>
<td>The allocated bit remains ON (1) while the touch switch is pressed.</td>
</tr>
<tr>
<td>Numeral table</td>
<td>Word</td>
<td>Display element control and notification</td>
<td>The contents of the allocated word and numeral table are continuously read and written to ensure that their contents are always identical.</td>
</tr>
<tr>
<td>Character-string memory table</td>
<td>Word</td>
<td>Display element control and notification</td>
<td>The contents of the allocated word and character-string memory table are continuously read and written to ensure that their contents are always identical.</td>
</tr>
<tr>
<td>PT Status Control Area</td>
<td>Word</td>
<td>PT status control</td>
<td>The allocated word is read to control the next PT status, including screen selection, copying a memory table, buzzer, backlighting.</td>
</tr>
<tr>
<td>PT status notification</td>
<td>Word</td>
<td>PT status notification</td>
<td>Notifies the allocated word of a change in PT status, including change of selected screen, numeral input to the memory table, operating status.</td>
</tr>
</tbody>
</table>

Note To use the Direct Connection function, words must be allocated for the PT Status Control Area and PT Status Notify Area.
Data Allocated in the PC

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Area name</th>
<th>Allocate bit</th>
<th>Allocate word</th>
<th>Numeral</th>
<th>Character string</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C-series PC</td>
<td>CV-series PC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR area</td>
<td>CIO Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>TC or</td>
<td>Timer /Counter</td>
<td>Timer Area</td>
<td>NG</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td>TIM</td>
<td>Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC or</td>
<td>Counter Area</td>
<td>Counter Area</td>
<td>NG</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td>CNT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Words allocated as memory tables are limited in length as follows:
- Numeral table entries: 2 words max.
- Character-string memory tables: 20 consecutive words max.

If the PT Status Control Area and PT Status Notify Area are allocated to general memory, up to 10 consecutive words can be allocated. If the general memory is not used, 4 words are used for the PT Status Control Area and 3 words for the PT Status Notify Area.

**Note**

1. Do not exceed the memory area when allocating words.
2. When a bit is allocated, all other bits in the word containing the allocated bit are set OFF (0).

### 3-2 Display Element Control and Notification

The control and notification of display elements using allocated bits and words is described below.

**Controlling Display Elements**

The PT and PC operate as described below to display element control.

1, 2, 3...

1. The PT asks the PC the status of the bits and words allocated to the elements displayed on the screen.
2. The PC responds with bit and word data.
3. The PT changes the display in response to the bit and channel data received.
3-3 PT Status Control and Notification

The PT Status Control Area and PT Status Notify Area are described below. Refer to 4-1 Using the PT for details.

3-3-1 PT Status Control Area

The PT Status Control Area is set by choosing Direct or Direct Specify Information under the Expansion Function from the Screen List on the Support Tool. Any data written to this specified area is read by the PT. The PT Status Control Area is configured as ten consecutive words, as shown in the diagram below.

Notification of Display Elements

When the contents of a currently displayed numeral or character-string memory table is changed or a touch switch is pressed, the information is written to the bits and words in the PC memory.

Example:

When the contents of the currently displayed numeral or character-string memory table is changed or a touch switch is pressed, the information is written to the bits and words in the PC memory.

Example:

Notification of Display Elements
First word (Word n): Set with the Support Tool when the screen is created.

### Screen Switch Settings
Specify the screen# to switch the screen displayed on the PT.

### Copy Memory Table Settings
Specify to copy the contents of a memory table internally in the PT.
Set the copy type to match the type of memory table to be copied, as follows:
- **0**: Character-string memory table
- **1**: Numeral table

### Pt Status Control Bits
Set the bits ON or OFF according to the following table to control the backlighting and buzzer.

<table>
<thead>
<tr>
<th>Bit no.</th>
<th>Controlled item</th>
<th>1 (ON)</th>
<th>0 (OFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Screen display (see note)</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>14</td>
<td>Alarm output</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>13</td>
<td>Continuous buzzer</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>12</td>
<td>Intermittent buzzer</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>11</td>
<td>Initialize display history</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>10</td>
<td>Backlight color</td>
<td>Red</td>
<td>White</td>
</tr>
<tr>
<td>8</td>
<td>Backlight mode</td>
<td>Continuous light</td>
<td>Flash</td>
</tr>
</tbody>
</table>

**Note**
Backlighting turns on if the Screen Display bit is set ON and turns off if the Screen Display bit is set OFF.

### Control General Memory
The following bits and words can be allocated to the control general memory:
- lamp and touch switch control bits
- numeral table

Using this memory has the following effects.
The control general memory is read frequently at the same time as the PT Status Control Area. Allocating bits and words to the control general memory achieves faster screen refresh than allocating the bits and words to other areas of the memory.

Up to 96 bits (6 words) can be allocated. The operation is identical to when the bits and words are allocated elsewhere in memory. Refer to 4-7 Turning Lamps...
Using the PT Status Control Area

When control data is written to the PT Status Control Area, the PT responds as shown in the diagram below.

Without Control General Memory

Turn OFF the Host Interface Unit DIP Switch (SW4-2) if the control general memory is not used. The PT Status Control Area is configured as only four words, n to (n+3). The function of these words is the same as when the control general memory is used.

DIP Switch Setting

SW4-2 sets the PT Status Control Area and PT Status Notify Area in the general memory.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>yes</td>
<td>Add the general memory value to the PT Status Control Area and PT Status Notify Area.</td>
</tr>
<tr>
<td>OFF</td>
<td>no</td>
<td>Do not add the general memory value to the PT Status Control Area and PT Status Notify Area.</td>
</tr>
</tbody>
</table>
**3-3-2 PT Status Notify Area**

The PT Status Notify Area is set by choosing Direct or Direct Specify Information under the Expansion Function from the Screen List on the Support Tool.

Any changes in PT status are written to the PC PT Status Notify Area. The PT Status Notify Area is configured as ten consecutive words, as shown in the diagram below.

First word (Word n): Set with the Support Tool when the screen is created.

<table>
<thead>
<tr>
<th>Word</th>
<th>Screen# (4-digit BCD)</th>
<th>Copy source memory table# (3-digit BCD)</th>
<th>Copy destination memory table# (3-digit BCD)</th>
<th>Copy type</th>
<th>PT status control bit</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n + 1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n + 2</td>
<td>Copy type</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n + 3</td>
<td>PT status</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Currently Displayed Screen**

The screen number of the screen displayed on the PT is written to this word. Simultaneously, the PT Status Screen Switch Strobe Flag is set ON (1). After the PC is notified, this flag reverts to OFF (0). Checking the status of this flag provides a simple method of checking if the PT display has switched.

**Content Upgrade Memory Table**

The number of the numeral table is written to this word when the numeral table contents change due to PT switch operation. The input value appears in the word allocated for the appropriate numeral table. As the number of the numeral table is written, the PT Status Number Setting Strobe Flag is simultaneously set ON (1). After the PC is notified, this flag reverts to OFF (0). Checking the status of this flag provides a simple method of checking if a number has been input from the PT.

**PT Status**

The bits shown in the following table are turned ON or OFF in response to the PT operating status and battery level.

<table>
<thead>
<tr>
<th>Bit</th>
<th>Notified item</th>
<th>1 (ON)</th>
<th>0 (OFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>PT operating status</td>
<td>Run</td>
<td>Stop</td>
</tr>
<tr>
<td>13</td>
<td>Battery</td>
<td>Low</td>
<td>Normal</td>
</tr>
</tbody>
</table>
The touch switch notify bits can be allocated to the control general memory. Using this memory has the following effects.

The notify general memory is written to the PC simultaneously with the PT Status Notify area, which has a high notification priority. Allocating bits to the notify general memory achieves faster touch switch notification than allocating the bits to other areas of the memory.

Up to 112 bits (7 words) can be allocated. The operation is identical to when the bits are allocated elsewhere in memory. Refer to 4-11 Determining Touch Switch Status.

### Using the PT Status Notify Area

The PT Status Notify area is notified as follows when the PT status changes.

Without Notify General Memory

Turn OFF the Host Interface Unit DIP Switch (SW4-2) if the notify general memory is not used. The PT Status Notify Area is configured as only three words, n to (n+2). The function of these words is the same as when the notify general memory is used.

### DIP Switch Setting

The DIP switches are under the switch cover on the front of the I/F Unit.
SW4-2 sets the PT Status Control Area and PT Status Notify Area in the general memory.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>yes</td>
<td>Add the general memory to the PT Status Control Area and PT Status Notify Area.</td>
</tr>
<tr>
<td>OFF</td>
<td>no</td>
<td>Do not add the general memory to the PT Status Control Area and PT Status Notify Area.</td>
</tr>
</tbody>
</table>

First word (Word n): Set with the Support Tool when the screen is created.

<table>
<thead>
<tr>
<th>Word</th>
<th>15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>Screen# (4-digit BCD)</td>
</tr>
<tr>
<td>n + 1</td>
<td>Numeral table entry number (3-digit BCD)</td>
</tr>
<tr>
<td>n + 2</td>
<td>PT status</td>
</tr>
</tbody>
</table>

PT Status Control Area when General Memory Not Used

3-4 PT Internal Processing Flow

The processing carried out inside a PT mounted to a Host Interface Unit is described below. Processing is divided into two types: periodic processing, event processing. Refer to the appropriate PT Operation Manual for more details.

Periodic Processing

To allow high-speed control by the PC, the PT Status Control area is executed three times per loop.

If the control general memory is specified for PT processing, the control general memory is read simultaneously with the PT Status area. The control bits and
words allocated in the control general memory for lamps and touch switches are processed more rapidly than those allocated to other areas of memory.

<table>
<thead>
<tr>
<th>PT processing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT power ON</td>
<td></td>
</tr>
<tr>
<td>Initialize</td>
<td></td>
</tr>
<tr>
<td>Restart operation</td>
<td>Hardware and communication status checked.</td>
</tr>
<tr>
<td>Write initial values to memory tables (PT &amp; PC)</td>
<td>The initial values stored in the PT are written as the memory table initial values to the allocated words in the PC.</td>
</tr>
<tr>
<td>Read PT Status Control area (PT &amp; PC)</td>
<td>The PC reads and executes the contents of the PT Status Control area to control the PT.</td>
</tr>
<tr>
<td>Read bits (PT &amp; PC)</td>
<td>The PC reads the bits allocated for lamps and touch switches and lights or turns them off as appropriate.</td>
</tr>
<tr>
<td>Read PT Status Control area (PT &amp; PC)</td>
<td></td>
</tr>
<tr>
<td>Read numeral table (PT &amp; PC)</td>
<td>The PC reads the words allocated as the numeral tables and changes the display.</td>
</tr>
<tr>
<td>Read PT Status Control area (PT &amp; PC)</td>
<td></td>
</tr>
<tr>
<td>Read character-string memory table (PT &amp; PC)</td>
<td>The PC reads the words allocated as the character-string memory tables and changes the display.</td>
</tr>
</tbody>
</table>

Note Only data for the currently displayed screens is read from the PC. Even if a memory table allocated to the PC memory is changed, the PT data contents remain unchanged until the memory table is used for a display screen.

Event processing When the PT status changes during PT operation, data is written to the appropriate area of the PC memory. These writing processes occur only when the PT status changes. If more than one change occurs simultaneously data is written to the PC according to the highest order of preference.

During PT processing, the control general memory and PT Status area are read simultaneously. The lamp and touch switch control bits and the numeral table
allocated to the control general memory are processed faster than those allocated to other areas of the memory.

<table>
<thead>
<tr>
<th>PT processing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write to PT Status Notify Area (PT ↔ PC)</td>
<td>The PT Status Notify Area is written to notify the PC of a change in the PT operating status.</td>
</tr>
<tr>
<td>Write bits (PT ↔ PC)</td>
<td>The bit data is written to notify the PC that a touch switch was pressed.</td>
</tr>
<tr>
<td>Write Numeral table entry (PT ↔ PC)</td>
<td>The allocated word data is written to notify the PC that values in a numeral table were changed.</td>
</tr>
<tr>
<td>Write character-string memory table (PT ↔ PC)</td>
<td>The allocated word data is written to notify the PC that the contents of a character-string memory table were changed.</td>
</tr>
</tbody>
</table>

**Note** Only bit, numeral and character-string memory table data for the currently displayed screens is written to the PC. Changes are not written to the PC if the contents of an undisplayed memory table are changed.

### 3-5 Checking the Host Interface Settings

Use the PT Status Area check function to check the Host Interface Unit settings. Follow the procedure below to check the settings.

1. Display the PT System Menu.
2. Select the Maintain Mode item. The Maintain Mode menu is displayed.
3. Select the PT Setting item. The PT Settings are displayed.
4. Display the Host Link I/F Settings screen.

![Host Link I/F Settings](image)

The PT Status Control Area, PT Status Notify Area, and Programmable controller settings are not displayed in the initialized status (i.e., before data transfer).

5. Check that the PT settings are the same as the Host Interface Unit DIP switch (SW4) settings.

The menu selection differs according to the model and type of PT. Refer to the appropriate *PT Operation Manual* for details of menu operation.
SECTION 4
PT Operation

This section describes the actual operation of the PT using Direct Connection. Only the allocated bits and words are described related to the settings with the Support Tool. Refer to the Support Tool and PT Operation Manuals for details of other settings.

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4-1 Using the PT

How to create screen data, Direct Connection, and connecting the Support Tool are described below before the use of the PT is explained.

4-1-1 Before Using the PT

This section describes PC program creation and Support Tool screen data creation only as it relates to using the PT. For details of other procedures, refer to 1-4 System Configuration.

Preparing to Operate the PT

The relationship between PT, PC and Support Tool operations is shown below.

Note

The PT reads and writes data to allocated bits and words in the PC even if the PC is not set to Run mode.

Control of the PT and reading the status with the Peripheral Tool monitoring functions are also enabled.

Creating Screen Data

The PT switches the display between multiple screens. All screen data for a single PT corresponds to a single file.

Equipment

The following equipment and settings are used in the examples in this section:

General memory:

PT:
NT600M-DT211 (EL display, touch panel version NT600M)

PC:
OMRON C200H

The memory area used depends on the PC type. Refer to Appendix B PC Memory Map for details.

Support Tool
NT20M/NT2000M/NT600M Support Tool Version 4.0

Direction Connection
OMRON

Set with the Tool Setting screen on the Support Tool. Refer to 4-1-3 Setting Direct Connection for details.
4-1-2 Creating Screen Data

Screen data is created with the Support Tool. The basic procedure to create these screens is outlined below along with the relevant page number. The example describes the procedure for creating a new file using Support Tool version NT20M, NT2000M, or NT600M.

Tool Settings
- NTM model setting (PT model)
- Memory capacity setting (screen memory)
- Direct Connection (OFF, OMRON)

Create Screen
- Create new file: select New File
- Edit existing file: select file to edit
Create New File

Enter filename on completion.

Setting Direct Connection Information

Press the function key \texttt{Next Page} followed by function key \texttt{Direct} to set the following data.

- PT Status Control Area (word allocation)
- PT Status Notify Area (word allocation)
- Numeral table (word allocation)
- Character-string memory table (word allocation)
- Reuse existing file: select Read

**Screen Selection Display**

Select Screen

Creating Screen

The following screen will be displayed. Set the following data from this screen.

- Numeral display (numeral table selection)
- Character-string display (character-string memory table selection)
- Lamp (bit allocation)
- Touch switch (bit allocation for control and notification)
- Bar graph (numeral table selection)
- Set numbers (numeral table selection)
Complete Create Screen

**Screen Selection Display**

Complete Create File  Specify the filename for the newly created screen.

Set Start-up Screen Number  Press the function key F8: Start-up Screen. The following screen is displayed when the PT is booted up.

Transfer  Press the function key F6: Transfer. Transfer the created screen data to the PT.

Transferring Data to the PT  To transfer the screen data to the PT, connect the PT and Support Tool together and set the PT in Transfer Mode.

When reusing existing file data with a different Direct Connection setting, change the settings as described in Section 5 Converting Data.

4-1-3 Setting Direct Connection  

Set Direct Connection with the Support Tool before selecting a file. It is set from the Main Menu of the Tool Setting screen.

To select Direct Connection, set the Direct Connection item to either OMRON or ON (depending on the Support Tool version).
Connecting to the Support Tool

The following equipment and software is required to create screens with the Support Tool:

Computer: PC/AT compatible computer.

Software:
- NT20M/NT2000M/NT600M Support Tool Version 4.0
- NT20M-ZA3PC-V4: 3.5-inch floppy disk
- NT20M-ZA5PC-V4: 5-inch floppy disk
- NT610G/NT610C Support Tool Version 1.0
- NT610G-ZASPC; 3.5-inch and 5-inch floppy disks packaged together

Connecting cable: CV500-CN228, 2 m cable

Refer to the NT-series Support Tool Operation Manual for details on the Support Tool software and connecting cables.

Connections

Connect the computer RS-232C connector to the PT connector with the connecting cable as shown in the diagrams below.

NT20M
4-2 Switching Displayed Screens

Description

Write the screen number to the Screen Switch setting in the PT Status Control Area to switch the screen displayed on the PT.

Allocated start address: Word n (set with the Support Tool)

Screen#: 0000 (Screen clear — no display)
0001 to 0250 (NT20M)
0001 to 0250 (NT600M)

Restrictions

Allocated Words

The PT Status Control Area can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer /Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Counter Area</td>
<td>Counter Area</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Procedure

1. Use the Support Tool to allocate the PT Status Control Area to the PC memory.
2. Create a PC program to write the number of the displayed screen to the Screen Switch setting word in the PT Status Control Area as a 4-digit BCD (binary coded decimal) value.

**Important Points**

The displayed screen switches when the contents of the allocated word are changed. To re-specify the number of the currently specified screen, first write the value 0000 to clear the screen before writing the appropriate screen number. As shown in the example, it is also possible to use the function to notify which screen is currently displayed.

**Reference**

When the displayed screen is switched due to PT Status Control Area operation, the screen number is written to the Currently Displayed Screen word in PT Status Notify Area. Refer to 4-8 Determining the Screen Displayed on the PT for details.

Continuous or superimposed screens can be displayed by specifying the parent screen. If a child screen is specified, only the child screen is displayed.

Refer to the appropriate PT Operation Manual and NT-series Support Tool Operation Manual for information about displaying continuous and superimposed screens.

One way to switch screens is to set the screen number to a touch switch with the Support Tool. Refer to the Stand-alone functions (screen switch function) in the appropriate PT Operation Manual and NT-series Support Tool Operation Manual for details.

**Application Example**

This example operates the PC switch (bit) to change the PT display screen.

**Allocation**

Allocate the memory as follows using the Support Tool:

- PT Status Control Area: 0100
- PT Status Notify Area: 0110

**Screens**

Create screens numbers 2 and 3 with the Support Tool and transfer them to the PT.

**PC Program**

Create a PC ladder program, as follows:

```
@MOV(21) 110 #0002 100
@MOV(21) #0003 100
@MOV(21) 11212 110 100
```

**Operation**

PT operation when the program is run is described below.

1. Screen number 2 is displayed on the PT when bit 00002 turns ON.
2. Screen number 3 is displayed on the PT when bit 00003 turns ON.
3. When the Screen Switch Strobe Flag turns ON the number of the currently displayed screen is read and written to the Currently Displayed Screen word.
in PT Status Notify Area. In this case, the same screen need not be written twice.

When a program is created as in (3) above, the screen can also be switched from the PT using the Stand-alone functions (screen switch function) and it is not necessary to input the same screen number twice. The step in (3) is not necessary if the Stand-alone functions are not used.

Refer to 4-8 Determining the Screen Displayed on the PT for more information on the Screen Switch Strobe Flag and notification of the currently displayed screen.

4-3 Changing Displayed Numerals or Character Strings

Description

The PT display can be changed by editing the contents of the numeral or character-string memory table used for the display.

The method described below for changing the display involves copying the contents of one memory table to another. Writing the source and destination memory table numbers to the Copy Memory Table Setting words of the PT Status Control Area allocated to the PC copies the contents of one memory table to another in the PT, which changes the display.

This is a convenient method to display predetermined numbers of character strings to suit the operating status. The changes are processed extremely rapidly as the PT Status Control Area is used.

Allocated start address: Word n (set with the Support Tool)

Copy Type

0: Copy character-string memory table
1: Copy numeral table

Character-string Memory Table Numbers
000 to 127 (NT20M)
000 to 255 (NT600M)

Numeral Table Numbers
000 to 127 (NT20M)
000 to 511 (NT600M)

Restrictions

Allocated Words
The PT Status Control Area can be allocated to the areas listed in the following table.
The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

### Procedure

1. Use the Support Tool to allocate the PT Status Control Area to the PC memory.
2. Specify the memory table to be displayed with the Screen Create functions of the Support Tool.
   - Specify a numeral table for a numeral display.
   - Specify a character-string memory table for a text display.
3. Use the Table Edit functions to write the contents of the copy source memory table.
4. Create a PC program to write the data described in (2) and (3) above to the Copy Memory Table setting words in the PT Status Control Area.

### Important Points

In some cases the PT will read the specified area while the instructions are being written to the PT Status Control Area.

Therefore when using this method, be sure to write the copy destination memory table number word \( n+2 \) before writing the copy source memory table number \( n+1 \). The data may be written to an incorrect memory table if the copy source memory table number is specified first.

The PT reads only the words allocated to the memory tables displayed on the screen. If words are allocated to the copy source memory table, they are used during initialization only.

The display may be incorrect when a numeral table is copied if the display method or number of stored addresses differ.

The copy is not executed if the Copy Type is set to a value other than 0 or 1.

The memory table is copied only when the contents change. To make repeated copies between the same source to destination memory table, set the Copy Type to a value other than 0 or 1 then reset it to the correct value.

### Reference

Prepare a number of copy source memory tables in advance and use them to switch the display to suit the operating status.

### Application Example

This example switches the displayed screen by copying the character-string memory table.

#### Allocation

Allocate the memory as follows using the Support Tool:
- PT Status Control Area: 0100

#### Screens

Use the Support Tool to create a screen which displays character-string memory table entry #4 and transfer it to the PT.
Set the initial values of the character-string memory table as shown below. It is not necessary to allocate addresses.

<table>
<thead>
<tr>
<th>#</th>
<th>Contents</th>
<th>Qty characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Normal</td>
<td>6 chars</td>
</tr>
<tr>
<td>10</td>
<td>Error</td>
<td>6 chars</td>
</tr>
<tr>
<td>11</td>
<td>Normal</td>
<td>6 chars</td>
</tr>
</tbody>
</table>

**PC Program**

Create a PC ladder program, as follows:

1. The Error Flag (bit 09000) turns ON and the PT displays the message “Error” when an error occurs.
2. The Error Flag (bit 09000) turns OFF and the PT display reverts to “Normal” when the error is cleared.

**Note** Specify the copy destination memory table before the copy source memory table.

**4-4 Editing Displayed Numerals or Character Strings**

**Description**

The PT display can be changed by editing the contents of the numeral or character-string memory table used for the display. The method described below for changing the display involves editing the contents of the PC memory allocated to the memory table.
This is a convenient method to display changes in memory contents when monitoring the PC memory.

### Restrictions

**Allocated Words**

The number of words which can be allocated is shown in the table below.

<table>
<thead>
<tr>
<th>Memory table</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeral</td>
<td>1 or 2 words</td>
</tr>
<tr>
<td>Character-string</td>
<td>NT20M: 1 to 16 words (2 to 32 characters)</td>
</tr>
<tr>
<td></td>
<td>NT600M: 1 to 20 words (2 to 40 characters)</td>
</tr>
</tbody>
</table>

The memory table can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Numeral</th>
<th>Character-string</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Counter Area</td>
<td>Auxiliary Area</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK (1 or 2 words for numeral tables)</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK (1 or 2 words for numeral tables)</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

**Contents and Display of Allocated Words**

**Numerals**

Numbers are stored in the allocated words as shown below.

Stored as a single word

```
<table>
<thead>
<tr>
<th>Digit 4</th>
<th>Digit 3</th>
<th>Digit 2</th>
<th>Digit 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>12</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>
```

Example: 1234

```
<table>
<thead>
<tr>
<th>15 to 12</th>
<th>11 to 8</th>
<th>7 to 4</th>
<th>3 to 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
```
Stored as a double words

<table>
<thead>
<tr>
<th>Word</th>
<th>Start</th>
<th>Start + 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15 to 12</td>
<td>11 to 8</td>
</tr>
<tr>
<td>Start</td>
<td>Digit 4</td>
<td>Digit 3</td>
</tr>
<tr>
<td>Start + 1</td>
<td>Digit 8</td>
<td>Digit 7</td>
</tr>
</tbody>
</table>

Example: 12345678

<table>
<thead>
<tr>
<th>Word</th>
<th>Start</th>
<th>Start + 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15 to 12</td>
<td>11 to 8</td>
</tr>
<tr>
<td>Start</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Start + 1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Numbers can be handled in three different ways. The most-significant digit is processed differently according to the type of numeral display, as follows:

- **Hexadecimal display**: display of all digits identical to the contents of the allocated words;
- **Decimal, no sign**: an “F” as the most-significant digit is displayed as “0,” any other value as the most-significant digit and all other digits are displayed identical to the contents of the allocated words;
- **Decimal, with sign**: an “F” as the most-significant digit is displayed as a minus sign (−), any other value as the most-significant digit and all other digits are displayed identical to the contents of the allocated words;

**Display Example**

**Data contains numbers 0 to 9 only**

- **Decimal, no sign**: 123456
- **Decimal, with sign**: -123456
- **Hexadecimal**: F0123456

**Data includes letters A to F**

- **Decimal, no sign**: 123B56
- **Decimal, with sign**: -123B56
- **Hexadecimal**: F0123B56

If hexadecimal data (A to F) is transmitted when a decimal display is selected, the letters are displayed unchanged.

**Note**

1. If the number of display digits is less than the number of digits to display (4 digits for a single word, 8 digits for two words) the contents of the allocated word are not displayed and all digits are displayed as asterisks (*).
2. If the display is selected as a decimal display with sign, an “F” as the most-significant digit represents the minus sign. Consequently, the number of digits in a negative number is reduced by one.

The actual display is also affected by the zero-suppression and decimal-point display settings. Refer to the *NT-series Support Tool Operation Manual* for details.

**Character Strings**

Character strings are stored in sequential words from the start address as Special English 8-bit code (normal characters). Two normal characters or one wide character is allocated to each word of memory. A maximum of 20 words (40 characters) can be allocated in the NT600M, or 16 words (32 characters) in the NT20M.
Character codes 00 to 1FH are displayed as a normal space character. 00H is converted to 20H.

Procedure

1. Use the Support Tool to allocate the numeral and character-string memory table to the PC memory.
2. Create a PC program to write the display numerals and character strings to the allocated words.

Important Points

To use a single numeral table to display multiple screens, standardize the display method. Incorrect display may result if the display method is changed.

If the number of characters written is less than the number of characters in the allocated words, fill the remaining character spaces with normal characters (character code: 20H). The display may be incorrect if other unwanted character codes remain.

Reference

The display switches very rapidly if the numeral table is allocated to the general memory words of the PT Status Control Area. However, it is not possible to allocate a character-string memory table to the general memory.

Application

This example directly displays the contents of the words allocated as the numeral table in the PC memory.

Allocation

Allocate the memory as follows using the Support Tool:
- numeral table entry #1: 0000 (number words: 2)
- numeral table entry #2: 0002 (number words: 1)

Screens

Use the Support Tool to create a screen which displays numeral table numbers 1 and 2 and transfer it to the PT.
Create a PC ladder program, as follows:

1. The contents of word 0000 are incremented by 1 each second. The displayed value in the numeral table entry entry number1 is increased by 1 each second.
2. When the counter in (1) causes an increase in the most-significant digits, the contents of word 0001 are incremented by 1. The displayed value in the PT numeral table entry number1 most significant digits is increased by 1.
3. When bit 00001 turns ON the contents of 0002 are incremented by 1. The displayed value in the PT numeral table entry number 2 is increased by 1.

4-5 Upgrading Bar Graphs

Description

The bar graph can be upgraded by editing the contents of the memory table used for the bar graph.

<table>
<thead>
<tr>
<th>PT</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeral table entry #1</td>
<td>Allocated word (numeral table entry #1)</td>
</tr>
<tr>
<td>12345678</td>
<td>12345678</td>
</tr>
</tbody>
</table>

Allocate the words using the Support Tool.

Restrictions

Allocated Words

The number of words which can be allocated is shown in the table below.

<table>
<thead>
<tr>
<th>Memory table</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeral</td>
<td>1 or 2 words</td>
</tr>
</tbody>
</table>

The memory table can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer /Counter Area</td>
<td>Timer Area</td>
<td>1 word only</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Timer /Counter Area</td>
<td>Counter Area</td>
<td>1 word only</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK (1 or 2 words for numeral tables)</td>
</tr>
</tbody>
</table>
The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Refer to 4-4 Editing Displayed Numerals and Character Strings for information on saving numbers to allocated words.

**Note**
1. A bar graph cannot be used to display hexadecimal values.
2. If a decimal, no sign display is selected and an “F” written to the most-significant digit in the word allocated to the bar graph (which represents a minus sign), the bar graph displays zero and the percent display indicates ‘‘***’’.

### 4-6 Controlling the PT Status

**Description**

Write the control data to the PT Status Control bits in the PT Status Control Area allocated in PC memory to control the backlighting and buzzer.

![PT Status Control Area Diagram]

**Allocated start address:** Word n (set with the Support Tool)

| Word n + 3 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | Bit |
|------------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|
| PT status control bit | 0 | 0 | PT status control bits |

**PT Status Control bits:**

<table>
<thead>
<tr>
<th>Word n + 3</th>
<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>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Turn bits 7 to 0 OFF.

<table>
<thead>
<tr>
<th>Bit</th>
<th>Controlled item</th>
<th>1 (ON)</th>
<th>0 (OFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Screen display</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>14</td>
<td>Alarm output</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>13</td>
<td>Continuous buzzer</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>12</td>
<td>Intermittent buzzer</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>11</td>
<td>Initialize display history</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>10</td>
<td>Backlight color</td>
<td>Red</td>
<td>White</td>
</tr>
<tr>
<td>8</td>
<td>Backlight mode</td>
<td>Continuous light</td>
<td>Flash</td>
</tr>
</tbody>
</table>

**Note**

- Bit 10 (Backlight color) is valid for the NT20M.
- Bit 8 (Backlight mode) is valid for the NT20M.
- Bit 15 (Screen display) when used for a LCD (liquid-crystal display) backlighting turns on if the Screen Display bit is set to ON and turns off if the Screen Display bit is set to OFF. For EL operation, screen display operation is controlled.

**Screen Display (Bit 15)**

The Screen Display bit is used to display and clear the screen to prevent “burn in” on the CRT.

Set Bit 15 to 0 (OFF) to clear the screen. To restore the screen display, set Bit 15 to 1 (ON), or press the System key or touch switch. On the LCD display version PT, the bit acts to turn the backlight on and off.
Another method of restoring the screen is to display a screen using the Screen Switch setting bit.

**Alarm Output (Bit 14)**

The Alarm Output bit turns on and off the ALM OUTPUT terminals at the rear of the PT.

Alarm Output control with Bit 14 is enabled only when the alarm output is turned on with the PT memory switches.

Refer to the appropriate *PT Operation Manual* and the *NT-series Support Tool Operation Manual* for more details.

**Continuous (Bit 13) and Intermittent (Bit 12) Buzzers**

The continuous buzzer sounds continually without interruption.

The intermittent sounds for 0.5 s at 0.5 s intervals.

If both Bit 13 and Bit 12 are turned ON simultaneously, Bit 13 takes priority and the continuous buzzer is selected.

Buzzer control with these bits is enabled only when the buzzer is turned on with the PT memory switches.

Refer to the appropriate *PT Operation Manual* and the *NT-series Support Tool Operation Manual* for more details.

**Initialize Display History (Bit 11)**

The Initialize Display History initializes the display history stored in the PT.

The display history is initialized when Bit 11 is set from 0 (OFF) to 1 (ON). Bit 11 reverts to 0 (OFF) after the display history is initialized.

**Backlight Color (Bit 10) and Mode (Bit 8)**

The NT20M allows backlighting to be controlled as follows using combinations of Bit 10 and Bit 8.

<table>
<thead>
<tr>
<th>Bit</th>
<th>Backlight status when Bit 15 set 1 (ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

When backlighting is turned OFF (Bit 15 is set to 0 (OFF)), the backlight color (red or white) and backlight mode (continuous or flashing) are invalid.

In addition to the PT Status Control Area, the PT status can be controlled by setting the screen attributes with the Support Tool, as follows:

- Alarm: Alarm output ON/OFF
- Buzzer attribute: Continuous, Intermittent, Off
- Backcolor: White backlighting, Red backlighting
- Backlighting: Backlighting On/Off

In addition, the display (or backlighting) is turned off if the PT is unused for a certain time if the PT memory switches are set to enable the burn-in prevention feature (EL display version) or the backlight control feature (LCD display version).

Refer to the appropriate *PT Operation Manual* and the *NT-series Support Tool Operation Manual* for more details.

**Note**

The PT Status Control bits remain unchanged if the PT status is changed with the screen attributes or memory switches, so that the status of the PT Status Control bits do not match the actual PT status.

Example: The continuous buzzer may sound if the status of Continuous Buzzer bit 13 is 0 (OFF).

**Restrictions**

**Allocated Words**

The PT Status Control Area can be allocated to the areas listed in the following table.
### Procedure

1. Use the Support Tool to allocate the PT Status Control Area to the PC memory.
2. Create a PC program to write the control status to the PT Status Control bits in the PT Status Control Area.

#### Note
1. The PT Status Control Area is not read immediately after the PT is booted up. The PT Status Control Area is read and control executed when the control status is changed.
2. The control of PT status is executed when the status of a bit is changed. To revert to the control status before the change, set all bits from Bit 8 to Bit 15 back to the status it had before the change.

### Application

This example controls the PT status to use the PT as a warning lamp.

### Allocation

Allocate the memory as follows using the Support Tool:

- **PT Status Control Area**: 0100

### Screens

Not required.

### PC Program

Create a PC ladder program, as follows:

```
<table>
<thead>
<tr>
<th>09002</th>
<th>09003</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Ladder Diagram" /></td>
<td></td>
</tr>
</tbody>
</table>
```

### Operation

PT operation when the program is run is described below.

1. PT Status Control bits are set as shown below when bit 09002 turns OFF. This command block not executed when bit 09003 is OFF.
   - Screen display (Bit 15): 1 (ON)
   - Continuous buzzer (Bit 13): 1 (ON)
   The PT continuous buzzer sounds.
2. PT Status Control bits are set as shown below when bit 09003 turns OFF.
   • Screen display (Bit 15): 1 (ON)
   • Intermittent buzzer (Bit 12): 1 (ON)
   The PT intermittent buzzer sounds.

3. PT Status Control bits are set as shown below when both bits 09002 and
   09003 turn ON.
   • Continuous buzzer (Bit 13): 0 (OFF)
   • Intermittent buzzer (Bit 12): 0 (OFF)
   The PT buzzer stops.

4-7 Turning Lamps and Touch Switches On and Off

Description
The lamps and touch switches are lit (flashed) and extinguished by setting bits
allocated in the PC memory as the lamp and touch switch control bits ON (1) or
OFF (0).

Allocate the control bits with the Support Tool. The control bits control the status
of lamps and touch switches as follows:
0 (OFF): Not lit
1 (ON): Lit or flashing

The lamp and touch switch display attributes are set with the Support Tool to de-
termine if the lamp or touch switch lights continuously or flashes. Refer to the

Restrictions
Allocated Bits
The lamp and touch-switch control bits can be allocated to the areas listed in the
following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Counter Area</td>
<td></td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to
Appendix B PC Memory Map for more details.
Procedure

1. Use the Support Tool to allocate the lamp and touch switch Control Bits to the PC memory. Use the display attributes to set if each lamp and touch switch flashes or lights continuously.

2. Create a PC program to set the Control Bits on or off to light (flash) or extinguish each lamp and touch switch.

Reference

The lamp and touch switch displays are processed more rapidly if the PT Status Control Area is allocated to the general memory. Refer to 3-3 PT Status Control and Notification for more details. These bits are used in the same way as the allocated control bits.

Notify bits can be allocated to lamps and touch switches in addition to the control bits. The notify bits inform the PC whether a touch switch has been pressed. Refer to 4-11 Determining Touch Switch Status.

A touch switch is “lit” by highlighting the displayed touch switch.

Application Example

This example controls the bits to move a robot arm and turning the lamps on and off.

Allocation

Allocate the memory as follows using the Support Tool:

Lamp #0: 00200 (output bit to raise robot arm)
Lamp #1: 002001 (output bit to lower robot arm)
Lamp #2: 00202 (output bit to rotate robot arm counterclockwise)
Lamp #3: 00203 (output bit to rotate robot arm clockwise)
Lamp #4: 00204 (output bit to clamp rotate robot arm)
Lamp #5: 00205 (output bit to unclamp rotate robot arm)

Screens

Create a screen as shown below to display Lamps #0 to #5 with the Support Tool and transfer it to the PT. Set the display attribute to “Light”.

PC Program

No PC ladder program is required to control the PT. Only a program to control the robot arm movement is required.

Operation

When the ladder program is executed to control the robot arm, the PT lamps turn on and off in synchronization with the arm movement.

For example, Lamp#0 lights when the robot arm ascends and goes out when it stops ascending.

4-8 Determining the Screen Displayed on the PT

Description

The screen displayed on the PT can be determined by reading the Currently Displayed Screen from the the PT Status Notify Area allocated in the PC memory. When the screen is switched, the PT Status Notify Area is notified as follows:
Switch notification: PT Status Display Switch Flag
New Screen number: Currently Displayed Screen

<table>
<thead>
<tr>
<th>PT</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Displayed Screen</td>
<td>Content upgrade memory table</td>
</tr>
<tr>
<td>Screen number</td>
<td>Currently Displayed Screen</td>
</tr>
<tr>
<td>Screen Switch Strobe Flag</td>
<td>PT status</td>
</tr>
</tbody>
</table>

Allocated start address: Word n (set with the Support Tool)

<table>
<thead>
<tr>
<th>Word n</th>
<th>Bit</th>
<th>Word n+2</th>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Screen# (4-digit BCD)</td>
<td>Currently Displayed Screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT status</td>
<td>PT status</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Screen#: 0000 to 0250 (NT20M)
0000 to 1000 (NT600M)

Screen Switch Strobe Flag

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

Restrictions
Allocated Words

The PT Status Notify Area can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Timer/Counter Area</td>
<td>Counter Area</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Procedure

1. Use the Support Tool to allocate the PT Status Notify Area to the PC memory.
2. Create a PC program to read the Currently Displayed Screen from PT Status Notify Area.
   The screen# is handled as a 4-digit BCD (binary coded decimal) value.

Reference

The Currently Displayed Screen is upgraded when the screen is switched with
the stand-alone function. Refer to the Stand-alone functions (screen switch function) in the PT User’s Manuals for details.
The PT Status Display Switch bit turns ON (1) in the PT Status Control Area when the screen display switches. It reverts to OFF (0) when the PC is notified of the screen switch. The current screen# can be read by reading the Currently Displayed Screen when the PT Status Display Switch bit turns ON (1).

The number of the parent screen is notified if continuous screens or superimposed screens are displayed.

Application Example

This example reads the screen# each time the PT screen display switches.

Allocation

Allocate the memory as follows using the Support Tool:

PT Status Control Area: 0100

Screens

Create several screens which can be switched with the Support Tool and transfer them to the PT.

PC Program

Create a PC ladder program, as follows:

```
@MOV (21)
DM0100
DM0101

@MOV (21)
11212
110
DM0100
```

Word storing the previously displayed screen number.

Word to notify the currently display screen number.

Word storing the currently displayed screen number.

Operation

PT operation when the program is run is described below.

1. When the PT screen display switches and the Screen Switch Strobe Flag (Bit: 11212) turns ON, the contents of 0100 are transferred to 0101. The number of the previously displayed screen is stored in word 0101.

2. The new screen number notified by the PT is read and transferred to 0100. The number of the currently displayed screen is stored in word 0101.

4-9 Determining a Number Input to the PT

Description

The PT can be used as a numeric keypad to write numbers to a numeral table. When a number is written to a numeral table with this so-called “number setting function” an area allocated in PC memory is notified as follows:

Upgrade notify: PT Status Number Setting Strobe Flag
Upgraded table entry number: Upgraded memory table
Upgrade details: numeral table allocated word

```plaintext
<table>
<thead>
<tr>
<th>Numeral table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>12345678</td>
</tr>
</tbody>
</table>

PT Status Notify Area

Currently Displayed Screen

Content upgrade memory table

PT status

Table # Number Setting Strobe Flag

Allocated word (numeral table entry #1)

Start

1, 2, 3...

Start + 1
```

Start + 1
Allocated start address: Word n (set with the Support Tool)

<table>
<thead>
<tr>
<th>Word</th>
<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>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>n + 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>n + 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PT status</td>
<td>0</td>
<td>0</td>
<td>PT status</td>
<td></td>
</tr>
</tbody>
</table>

Numerical table# (3-digit BCD)
Content upgrade memory table

Screen#: 000 to 127 (NT20M)
000 to 511 (NT600M)

Number Setting Strobe Flag

<table>
<thead>
<tr>
<th>Word</th>
<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>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>n + 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 0 0</td>
</tr>
</tbody>
</table>

Restrictions

Allocated Words

The PT Status Notify Area can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Timer/Counter Area</td>
<td>Counter Area</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Contents and Display of Allocated Words

Numbers are stored in the allocated words as shown below.

Stored as a single word

<table>
<thead>
<tr>
<th>15</th>
<th>12</th>
<th>11</th>
<th>8</th>
<th>7</th>
<th>4</th>
<th>3</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit 4</td>
<td>Digit 3</td>
<td>Digit 2</td>
<td>Digit 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example: 1234

<table>
<thead>
<tr>
<th>15</th>
<th>12</th>
<th>11</th>
<th>8</th>
<th>7</th>
<th>4</th>
<th>3</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stored as a double words

<table>
<thead>
<tr>
<th>Word</th>
<th>15</th>
<th>12</th>
<th>11</th>
<th>8</th>
<th>7</th>
<th>4</th>
<th>3</th>
<th>0</th>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>Start + 1</td>
<td>Digit 4</td>
<td>Digit 3</td>
<td>Digit 2</td>
<td>Digit 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digit 8</td>
<td>Digit 7</td>
<td>Digit 6</td>
<td>Digit 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example: 12345678

<table>
<thead>
<tr>
<th>Word</th>
<th>15</th>
<th>12</th>
<th>11</th>
<th>8</th>
<th>7</th>
<th>4</th>
<th>3</th>
<th>0</th>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 8 8 8</td>
</tr>
<tr>
<td>Start + 1</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The order in which the numbers are stored in the allocated words depends on the original specification of the Host Interface Unit NT20M-SMR01 or NT600M-SMR01-V. Refer to 5-4 Modifying Programs for Conversion.

Numbers can be handled in the following three different ways:

Hexadecimal: Cannot be input with the number setting function.

Decimal, no sign: Stored as entered.

Decimal, with sign: For a negative number, an “F” is stored as the most-significant digit, all other digits stored as entered. A positive number is stored as entered.

Examples:

```
123456  →  Word
     Start: 3 4 5 6
     Start + 1: 0 0 1 2

-123456 →  Start: 3 4 5 6
     Start + 1: F 0 1 2
```

**Note**

1. If a negative value is written when the value is handled as a decimal display with sign, an “F” as the most-significant digit represents the minus sign. Consequently, the number of digits in a negative number is one less than for a positive number.

2. All numbers are stored as integers. If a decimal point is input, the position of the decimal point is determined by the display method setting. The input number cannot therefore be determined from the contents of the memory word.

**Procedure**

1. Use the Support Tool to allocate the PT Status Notify Area to the PC memory.

2. Use the Support Tool to create a number setting screen and allocate a numeral table to the PC memory area.

3. Create a PC program to read the PT content upgrade memory table when the PT Status Number Setting Strobe Flag in the PT Status Notify Area turns ON (1). The contents of the PT content upgrade memory table are handled as 3-digit BCD (binary coded decimal) values.

4. Read the words allocated to the numeral table allocated at step (3).

**Important Points**

The Number Setting Strobe Flag turns OFF (0) when the PC has been notified. Therefore, always read the PT content upgrade memory table when this flag turns ON (1).

Numbers input to the PT are stored in the words allocated to the numeral table as BCD (binary coded decimal) values. The most-significant digit is treated differently for positive and negative values. Consider these restrictions when creating the PC program to read the contents of the allocated words.

**Application Example**

This example reads the contents of the numeral table input from the PT

**Allocation**

Allocate the memory as follows using the Support Tool:

PT Status Control Area: 0110

Numeral table entry number 3: 0003 (words: 1)
Determining PT Operating Status Section 4-10

Numeral table entry number 4: 0004 (words: 1)

Screens
Create a number setting screen with the Support Tool to input values into memory tables numbers 3 and 4 and transfer it to the PT. Numbers should be input as 4 digits.

PC Program
Create a PC ladder program, as follows:

Operation
PT operation when the number setting screen is displayed and the program is run as described below.
When the Number Setting Strobe Flag (Bit: 11211) turns ON (1) the contents of word 111 are transferred to 0105. The number of the numeral table with upgraded contents is stored in word 0105.
The value input to the numeral table is stored in the word allocated to the numeral table. Numeral table entry number 3 is allocated to word 0003 and numeral table entry number 4 is allocated to word 0004.

4-10 Determining PT Operating Status

Description
The PT operating status and the battery level can be determined by reading the PT Status word in the PT Status Notify Area allocated to the PC memory.

Allocated start address: Word n (set with the Support Tool)

PT Status Notify Bits:

<table>
<thead>
<tr>
<th>Word n + 2</th>
<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>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word n + 2</th>
<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>
<th>Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### PT Operating Status (Bit 15)
This bit is ON (1) when the PT is in Run mode. It is OFF when the PT is not in Run mode and while the System Menu is displayed. Reading and writing the allocated bits and words is disabled when this bit is OFF (0).

### Battery (Bit 13)
This bit turns ON (1) when the PT internal memory back-up battery is low.

### Screen Switch Strobe Flag (Bit 12)
This bit turns ON (1) when the PT screen display switches due to an instruction from the PC or due to the stand-alone functions. It reverts to OFF (0) when the PC is notified of the screen switch. Refer to 4-8 Determining the Screen Displayed on the PT for more details.

### Number Setting Strobe Flag
This bit turns ON (1) when a value is written to a numeral table by the PT number setting function. It reverts to OFF (0) when the PC is notified of the number input. Refer to 4-9 Determining a Number Input to the PT for more details.

### Restrictions
#### Allocated Words
The PT Status Notify Area can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Counter Area</td>
<td>Counter Area</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

### Procedure
1. Use the Support Tool to allocate the PT Status Notify Area to the PC memory.
2. Write a PC program to read the PT Status word from the PT Status Notify Area and check the status of the bits described above.

### Important Points
All screen data and other data in the PT is lost when the PT battery becomes flat. Replace the battery with a new one as soon as possible after a low battery voltage is detected. Refer to the appropriate PT Operation Manual for details of the battery replacement procedure.

### Application Example
This example reads the PT operation status then sounds the buzzer and outputs an alarm if the battery voltage is low.

#### Allocation
Allocate the memory as follows using the Support Tool:
PT Status Control Area: 0100
PT Status Notify Area: 0110

Not required.

Create a PC ladder program, as follows:

```
@ORW(35)
103
#6000
103
```

PT status control word
Sets the alarm output and continuous buzzer to 1
PT status control word

Operation

PT operation when the program is run is described below.

If the low-battery notify bit (11213) is ON the following bits in the PT Status Control Area are controlled:

- Alarm output (bit 14): 1 (ON)
- Continuous buzzer (bit 13): ON

The PT continuous buzzer sounds and the alarm output turns ON.
Refer to 4-6 Controlling the PT Status.

4-11 Determining Touch Switch Status

Description

A touch switch status (pressed or not) can be determined by checking the ON/OFF status of the notify bit allocated in the PC to the touch switch.

```
PT

Touch switch 1

PC
```

Allocate the notify bits with the Support Tool.
The status of the bit reflects the touch switch status, as follows:

- 0 (OFF): not pressed
- 1 (ON): pressed

Restrictions

Allocated Bits

The PT Status Notify Area can be allocated to the areas listed in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocation OK?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
</tr>
<tr>
<td>TC or CNT</td>
<td>Counter Area</td>
<td></td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
</tr>
</tbody>
</table>
The range of each memory area differs according to the PC type. Refer to Appendix B PC Memory Map for more details.

Procedure

1. Use the Support Tool to allocate the touch switch notify bits to the PC memory.
2. Write a PC program to read and check the allocated notify bits.

Important Points

All unallocated bits are 0 (OFF) in the word to which the touch switch notify bits are allocated. Do not use this word for any other purpose other than allocation of touch switches.

Be sure to allocate each touch switch on a single screen to different bits.

Reference

Allocating the bits to the PT Status Notify Area general memory achieves faster touch switch notification than allocating the bits to other areas of the memory. Refer to 3-3 PT Status Control and Notification for details. These bits are used in the same way as notify bits allocated to other parts of memory.

The screen attributes are ignored when Direct Connection is used. The attributes are permanently set as a Touch Switch.

In addition to the notification function, the following two other functions can be allocated to touch switches with the Support Tool. When one of these functions is specified, the allocated bits are not notified of the touch switch status.

a. Screen switch function (stand-alone or screen switch function
b. Use as a keypad for number input (number setting function)

Refer to the appropriate PT Operation Manuals for details about these functions.

Application

This example uses the touch switches as normal switches for use as a PT operating panel.

Allocation

Allocate the touch switches as follows using the Support Tool:

Touch switch number 10: control bit 05000 (Run lamp)
notify bit: 06000

Touch switch number 11: control bit 05001 (Stop lamp)
notify bit: 06001

Set the touch switch function to Notify Bit.

Screens

Create a screen which displays touch switches numbers 10 and 11 as shown below and transfer it to the PT. Set the display attribute to “Light”.

```
Touch switch #10

Line 1
RUN
STOP

Touch switch #11
```
Create the following ladder program.

**Operation**

PT operation when the created screen is displayed and the program is run is described below.

Refer to 4-7 Turning Lamps and Touch Switches On and Off for the method of lighting and turning off touch switches.
SECTION 5
Data Conversion

This section describes how to convert existing screen data for use with Direct Connection and how to convert a PC program written for Direct Connection OFF for use with Direct Connection OMRON.

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-1</td>
<td>Summary of Data Conversion</td>
<td>68</td>
</tr>
<tr>
<td>5-1-1</td>
<td>Direct Connection Formats</td>
<td>68</td>
</tr>
<tr>
<td>5-1-2</td>
<td>Data Conversion Procedure</td>
<td>68</td>
</tr>
<tr>
<td>5-2</td>
<td>Data Conversion</td>
<td>68</td>
</tr>
<tr>
<td>5-3</td>
<td>Changing the Allocated Bits and Words for Data Conversion</td>
<td>69</td>
</tr>
<tr>
<td>5-4</td>
<td>Modifying Programs for Conversion</td>
<td>72</td>
</tr>
<tr>
<td>5-4-1</td>
<td>Comparing Conventional and Direct Connection Formats</td>
<td>72</td>
</tr>
<tr>
<td>5-4-2</td>
<td>Program Modifications and Setting Areas</td>
<td>74</td>
</tr>
</tbody>
</table>
5-1 Summary of Data Conversion

The new Host Interface Units can handle Direct Connection and conventional Host Interface Unit specification screen data. This section describes the types of Direct Connection format and the procedure to convert existing screen data for use with Direct Connection.

5-1-1 Direct Connection Formats

Direct Connection format is set from the Tool Setting screen on the Support Tool. It can be set in two ways, as follows:

OFF: Direct Connection not used. Conventional Host Interface Unit specification is used. Use this setting to give compatibility between the Host Interface Unit specification and the screen data and PC programs.

OMRON or ON: Enables Direct Connection for the OMRON C Series and CV/CVM Series PCs.

Note

"OMRON" is displayed by the NT20M/NT2000M/NT600M Support Tool Version 4.0 and "ON" is displayed by the NT610G/NT610C Support Tool Version 1.0.

Refer to 2-3 Connection to an OMRON PC for information on compatible PCs. The "conventional" Host Interface Unit specification refers to a Host Interface Unit using one of the following System ROMs:

- NT20M: NT20M-SMR01
- NT600M: NT600M-SMR01-V

5-1-2 Data Conversion Procedure

The data conversion procedure is shown below:

1. Convert Data
   Read the existing file or screen data and convert to the Direct Connection format set with the Support Tool.

2. Convert Allocated Bits and Words
   Convert the allocated bits and words to match the Direct Connection format.

3. Modify Programs (Direct Connection OFF to ON or OMRON)
   When converting data from Direct Connection OFF to either ON or OMRON, the conventional Host Interface Unit programs can be modified for re-use.

5-2 Data Conversion

The method for converting data between different Direct Connection formats is described below.

Convertible Data

The following data can be converted:

- OFF
- OMRON
- ON

: Conversion OK

or

It is not possible to convert data to the Direct Connection OFF format.

How to Covert Data

Data of different Direct Connection formats is converted using the Support Tool.
All data in the file is converted.
1. Set the Direct Connection format of the data after conversion using “Direct Connection” on the Tool Setting screen of the Support Tool.

2. Select the file to be converted from the File Directory.

   **Note** The contents of the selected file are overwritten. If the contents of the file are needed, use the Copy function to copy the file before converting it.

3. The following prompt is displayed:

   ![Help Message]

   ---- Help Message ----
   Direct connection setting changed
   OK to convert? 

   - = Confirm
   ~ = Abort

4. Press the RETURN KEY to run the data conversion.

---

**Data Communication between the PT and Support Tool**

**PT to Support Tool** (receiving data)

Regardless of the Support Tool settings, data is read from the PT and a file is created in the Direct Connection format set at the PT.

**Support Tool to PT** (sending data)

Date transmission is not possible if the PT contains data of a different Direct Connection format from the transmitted file. In this case, either transmit data with the same format as the data in the PT or initialize all data in the PT.

---

### 5-3 Changing the Allocated Bits and Words for Data Conversion

After data is converted from one Direct Connection format to another, the allocated bits and words are changed as follows:

**Items Changed**

When data is converted from Direct Connection OFF to Direct Connection OMRON or ON format, all allocated bits and words revert to an “unallocated” status. Reset the items listed below to match the system and PLC program.

**PT Status Control Area**

Allocated words:

Set the start addresses for the words allocated in the PT Status Control Area.

**PT Status Notify Area**

Allocated words:

Set the start addresses for the words allocated in the PT Status Notify Area.

**Character Strings**

Allocated words:

Set the number of words allocated to the character-string memory table (NT20M: 1 to 16 words or NT600M: 1 to 20 words), the start address, initialize/not initialize.

Other character-display-related settings remain unchanged after the conversion.

**Numerals**

Allocated words:
Set the number of words allocated to the numeral table (1 or 2 words), the start address, initialize/not initialize.
Display method:
Set if the numbers are displayed as a decimal or hexadecimal value.
Other number-related settings remain unchanged after the conversion.

**Lamps**
Allocated control bits:
Set the bit addresses to control the lighting (flashing) of the lamps.
Other settings remain unchanged after the conversion.

**Touch Switches**
Allocated control bits:
Set the bit addresses to control the lighting (flashing) of the touch switches.
Display attributes:
Set if the touch switch lights continuously or flashes when the control bit turns ON (1).
Notify function:
Set the operation when the touch switch is pressed. If screens are switched using the Stand-alone functions (screen switch function), the setting remains unchanged after conversion.
If the number setting function is used to input numbers from a displayed keypad, the keypad settings must be repeated after data conversion. Set the touch key numbers again.
Allocated notify bits:
Set the bit addresses to notify the PC when each touch switch is pressed.
Other settings remain unchanged after the conversion.
In addition to the items listed above, the words for the numeral table used for bar graph and number settings must be re-allocated.

**Allocatable Bits and Words**
The following bits and words of the PC memory area can be allocated for OMRON PC Direct Connection.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Area name</th>
<th>C-series PC</th>
<th>CV-series PC</th>
<th>Allocate bit</th>
<th>Allocate word</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>DM Area</td>
<td>DM Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>I/S</td>
<td>IR Area</td>
<td>CIO Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>TC or TIM</td>
<td>Timer/Counter Area</td>
<td>Timer Area</td>
<td>NG</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td></td>
<td>TC or CNT</td>
<td>Counter Area</td>
<td>NG</td>
<td>1 word only</td>
<td>NG</td>
</tr>
<tr>
<td>HR</td>
<td>Holding Area</td>
<td>---</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>AR</td>
<td>AR Area</td>
<td>Auxiliary Area</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>LR</td>
<td>Link Area</td>
<td>---</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
</tbody>
</table>

The range of each memory area differs according to the PC type. Refer to *Appendix B PC Memory Map* for more details.

**Setting Programs for Reuse**
The method described below allows a Direct Connection OFF format PC program to be reused with only minor modifications.
The method involves setting up the DM area as shown in the diagram below to match the Direct Connection OFF format bit and word allocation as closely as
possible. The setting to initialize the memory table or not should remain unchanged.

Start address (Word n): Set to DM0000, DM0256, DM1024, or DM2048.

<table>
<thead>
<tr>
<th>Word</th>
<th>PT Status Control Area (4 words) (see note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>Lamp/touch switch control bits (allocate lamps and touch switch numbers to bits with the same number).</td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
<tr>
<td>n + 3</td>
<td></td>
</tr>
<tr>
<td>n + 4</td>
<td></td>
</tr>
<tr>
<td>n + 5</td>
<td></td>
</tr>
<tr>
<td>n + 6</td>
<td></td>
</tr>
<tr>
<td>n + 7</td>
<td></td>
</tr>
<tr>
<td>n + 8</td>
<td>PT Status Notify Area (3 words) (see note 1)</td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
<tr>
<td>n + 10</td>
<td></td>
</tr>
<tr>
<td>n + 11</td>
<td></td>
</tr>
<tr>
<td>n + 12</td>
<td></td>
</tr>
<tr>
<td>n + 13</td>
<td></td>
</tr>
<tr>
<td>n + 14</td>
<td></td>
</tr>
<tr>
<td>n + 15</td>
<td></td>
</tr>
<tr>
<td>n + 16</td>
<td>Numeral table entry number 1 (2 words)</td>
</tr>
<tr>
<td>n + 17</td>
<td></td>
</tr>
<tr>
<td>n + 18</td>
<td>Numeral memory table entry number 2 (2 words)</td>
</tr>
<tr>
<td>n + 19</td>
<td></td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
<tr>
<td>n + 272</td>
<td>Character-string memory table entry number 1 (20 words) (see note 2)</td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
<tr>
<td>n + 291</td>
<td></td>
</tr>
<tr>
<td>n + 292</td>
<td></td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
<tr>
<td>n + 311</td>
<td></td>
</tr>
<tr>
<td>to</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

1. Set the DIP switches such that the general memory is not used.

2. The diagram refers to the NT600M. For the NT20M, reserve 16 words for each character-string memory table.

The “conventional” Host Interface Unit specification refers to a Host Interface Unit using one of the following System ROMs:

- NT20M: NT20M-SMR01
- NT600M: NT600M-SMR01-V
5-4 Modifying Programs for Conversion

This section describes the method to modify a program created for a conve-
tional Host Interface Unit (Direct Connection OFF) to use it for Direct Conne-
cction.

It is important to understand the differences between the conventional format
and Direct Connection format before modifying a program.
The modifications to the program described here are the minimum modifications
required. To use the Direct Connection format to most effectively control the PT
the programs should be entirely rewritten.

5-4-1 Comparing Conventional and Direct Connection Formats

The differences between the conventional format and Direct Connection format
are described below.

Example 1

The memory tables and the bits and words to control and notify the lamp and
touch switch status can be allocated almost anywhere in the PC memory. The
number of words allocated to a memory table can also be freely allocated (see
Modification and Settings 1, page 74).

Example 2

No limit on the number of memory tables in the PC memory as memory tables,
lamps and touch switches can be independently read or written to the PC
memory (see Modification and Settings 2, page 74).
Example 3

All control and notification uses bits instead of lamp and touch switch numbers, so that lamps and touch switches can all be handled by a single process and it is not necessary to change the processing to suit the number (see Modification and Settings 3, page 74).

Example 4

The memory table initial values when the PT is booted up can be selected between the values set with the Support Tool and the values in the PC (see Modification and Settings 4, page 75).

Example 5

The PT control and notification functions have been simplified to use a fixed memory area for each function, thereby eliminating the need for instruction codes and simplifying data preparation and analysis (see Modification and Settings 5, page 75).

Example 6

Hexadecimal display of number data is possible. The handling of number data has changed such that negative numbers can be expressed as number data. In conventional format, instruction codes were used to differentiate between posi-
tive and negative values and this could not be determined from the number data alone (see Modification and Settings 6, page 76).

5-4-2 Program Modifications and Setting Areas

If existing programs are re-used, refer to 5-4-1 Comparing Conventional and Direct Connection Formats for information on program modification and setting memory areas.

This section described how to modify programs. Refer to the following manuals for more information on programs.

- Conventional format programs:
  NT-series Host Interface Units Operation Manual
- Direct Connection format programs:
  Refer to Section 3 Direct Connection Operation and 4 PT Operation.

Modification and Settings-1
Allocate the bits and words in the same way as for the conventional format.

Modification and Settings-2
The number of memory tables allocated to the PC memory should match the Host Interface Unit CIP switch settings in the conventional format.

Modification and Settings-3
Allocate the same control and notify bits to lamps and touch switches 0 to 63 (or 0 to 111) as were allocated in the conventional format. For lamps and touch switches numbered 64 (or 112) and above, modify the program to allow bit control and notification. Allocate bits for easy handling by the program.
Example: Allocation of lamp #64 to turn the lamp on when bit 000001 turns ON and to turn it off when bit 000002 turns ON.

Conventional format

```plaintext
MOV(21) #7100 DM0000
MOV(21) #0064 DM0001
```

Direct Connection

```plaintext
MOV(21) #7000 DM0000
MOV(21) #0064 DM0001
```

Allocate bit 100000 as the control bit for lamp #64. Set the bit as a holding bit that is set by bit 000001 and reset by 000002. The lamp turns on and off according to the ON and OFF status of bit 100000.

When bit 000001 turns ON an instruction lights lamp #64. The lamp turns off when bit 000002 turns ON.

**Modification and Settings-4** Set with the DIP switches or Support Tool whether or not the PC memory is initialized with the values set by the Support Tool. This setting must match the Host Interface Unit DIP switch settings in the conventional format. Refer to 2-1 *Components and Settings* for information on the DIP switch settings.

**Modification and Settings-5** Modify parts of the program using instruction codes to conduct the same processing with no instruction codes.
Example: To read numbers input with the PT number setting function to numeral table entry number 4.

In this example, the PT Status Notify Area is allocated to the DM Area and the status of the Number Setting Strobe Flags is checked using HR bits and work bits. When writing a program for Direct Connection use, initially allocating the PT Status Notify Area to work bits allows the Number Setting Strobe Flag bits to be used directly as the input bits.

**Modification and Settings-6** Modify the program such that number representation matches the number representation of the Direct Connection format. Refer to 4-4 Editing Displayed Numerals and Character Strings.
Example: Writing the value –1234567 to numeral table entry number 2 when bit 00001 turns ON.

Conventional format

<table>
<thead>
<tr>
<th>00001</th>
<th>@MOV(21)</th>
<th>#4002</th>
<th>DM0000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@MOV(21)</td>
<td>#0123</td>
<td>DM0001</td>
</tr>
<tr>
<td></td>
<td>@MOV(21)</td>
<td>#4567</td>
<td>DM0002</td>
</tr>
</tbody>
</table>

Direct Connection

<table>
<thead>
<tr>
<th>00001</th>
<th>@MOV(21)</th>
<th>#4567</th>
<th>DM0020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@MOV(21)</td>
<td>#0123</td>
<td>DM0021</td>
</tr>
</tbody>
</table>

If numeral table is allocated to memory, a negative number cannot be directly written to it in the conventional format. Instruction code 4 (negative number input) is used to write –1234567 as the most- and least-significant 4 digits to numeral table entry number 2.

In the Direct Connection format, negative numbers can also be directly input to words allocated to a numeral table. In this program, the value –1234567 least- and most significant 4 digits are written to the words 0020 and 0021 allocated numeral table entry number 2.

**Note** The order of the words storing the most-significant 4 digits and least-significant 4 digits is opposite in the conventional format to the Direct Connection format.
SECTION 6
Troubleshooting

This section describes the procedures to follow if the PT does not operate correctly.

6-1 Errors Occurring when the Power is Turned ON .................................................. 80
6-2 Errors Occurring During Operation ................................................................. 80
6-3 Communication Errors ................................................................. 80
6-1 Errors Occurring when the Power is Turned ON

Refer to the table below for the causes and remedies for errors occurring when the PT power is turned on.

<table>
<thead>
<tr>
<th>General source of error</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Host Interface Unit</td>
<td>Host Interface Unit not installed. The System ROM is not compatible with the Host Interface Unit.</td>
<td>Install the Host Interface Unit. Determine the System ROM compatible with the Host Interface Unit and mount the correct type of ROM.</td>
</tr>
<tr>
<td>Memory not formatted</td>
<td>Screen data memory board not installed. EEPROM or EPROM not mounted correctly on the screen data memory board. The screen memory board DIP switch settings do not match the specifications of the memory chip.</td>
<td>Correctly install the screen data memory board. Correctly mount the memory chip on the screen memory board. Correctly set the screen memory board DIP switches.</td>
</tr>
<tr>
<td>Screen data corrupted</td>
<td>The screen data is not compatible with the System ROM. The power supply was turned off during transmission of the screen data.</td>
<td>Create the correct screen data with the Support Tool. Transfer the screen data once more with the Support Tool.</td>
</tr>
<tr>
<td>Mark data corrupted</td>
<td>The power supply was turned off during transmission of the screen data. Transmission of the screen data was interrupted.</td>
<td>Transfer the screen data once more with the Support Tool.</td>
</tr>
<tr>
<td>Host error</td>
<td>If the PT DIP switches are set to enable Host RUN input: The PC power supply is not turned on. The Host RUN input signal voltage is low.</td>
<td>Turn on the PC power supply. Apply the voltage to the Host RUN input.</td>
</tr>
<tr>
<td>No Direct information set</td>
<td>The PT Status Control Area and PT Status Notify Area are not allocated to memory.</td>
<td>Allocate the PT Status Control Area and PT Status Notify Area to memory with the Support Tool.</td>
</tr>
</tbody>
</table>

6-2 Errors Occurring During Operation

Refer to the table below for the causes and remedies for errors occurring during PT operation.

<table>
<thead>
<tr>
<th>General source of error</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host error</td>
<td>If the PT DIP switches are set to enable Host RUN input: The PC power supply is not turned on. The Host RUN input signal voltage is low.</td>
<td>Check the PC power supply and operating status.</td>
</tr>
<tr>
<td>Setting error</td>
<td>Bits or words allocated with the Support Tool in the PC memory not found.</td>
<td>Check the memory in the PC used and correct the bit and word allocation.</td>
</tr>
</tbody>
</table>

6-3 Communication Errors

The remedies for communication errors occurring during operation are described below.

**Communication Error Message**

A message is displayed on the PT and a buzzer sounds when a communication error occurs. Error messages are displayed if automatic reset after communication error is disabled with the DIP switches.

**Procedure**

When the buzzer sounds, press the BUZZER or RETURN key to revert the screen display to the operation display.
Error Display

Communication errors are displayed as follows:

Error on Receive

![Receive Error]

Error on Transmit

![Transmit Error]

<table>
<thead>
<tr>
<th>General source of error</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity error</td>
<td>Communication parameters set incorrectly.</td>
<td>Make sure the PT parity bit, frame length, baud rate, stop bits, and flow control settings match the PC settings. Use a noise-resistant cable if communication occurs in an environment with high levels of noise.</td>
</tr>
<tr>
<td>Overrun error</td>
<td>Noise caused data corruption during communica-</td>
<td></td>
</tr>
<tr>
<td>Framing error</td>
<td>tion.</td>
<td></td>
</tr>
<tr>
<td>Buffer overflow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timeout</td>
<td>Cable connector is disconnected.</td>
<td>Reconnect the cable. Make sure the PC is able to communicate with the PT.</td>
</tr>
<tr>
<td></td>
<td>PC is halted.</td>
<td></td>
</tr>
<tr>
<td>NAK error (End code simulta-</td>
<td>An error existed in the communication data from</td>
<td>Possible PT defect. Check PT operation. Use a noise-resistant cable if communication occurs in an environment with high levels of noise. Refer to the SYMCC C-series Rack PCs SYMCC WAY - Host Link Units System Manual. Check the End code.</td>
</tr>
<tr>
<td>neously displayed)</td>
<td>the PT. Noise caused data corruption during</td>
<td></td>
</tr>
<tr>
<td></td>
<td>communication.</td>
<td></td>
</tr>
<tr>
<td>Unit # error</td>
<td>The PC unit # was changed. The PC is transmit-</td>
<td>Set the PC unit # to 0. Check PC operation. Use a noise-resistant cable if communication occurs in an environment with high levels of noise.</td>
</tr>
<tr>
<td></td>
<td>ting incorrect data. Noise caused data corrup-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tion during communication.</td>
<td></td>
</tr>
<tr>
<td>FCS error</td>
<td>The PC is transmitting incorrect data.</td>
<td>Check PC operation. Use a noise-resistant cable if communication occurs in an environment with high levels of noise.</td>
</tr>
<tr>
<td></td>
<td>Noise caused data corruption during communi-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cation.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix A
Communication Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication standard</td>
<td>EIA RS-232C</td>
</tr>
<tr>
<td>Communication settings</td>
<td>Start-stop synchronization</td>
</tr>
<tr>
<td></td>
<td>Baud rate: 4800, 9600, 19200 bps</td>
</tr>
<tr>
<td></td>
<td>Data bits: 7</td>
</tr>
<tr>
<td></td>
<td>Stop bits: 2</td>
</tr>
<tr>
<td></td>
<td>Parity: even</td>
</tr>
<tr>
<td>Connectors</td>
<td>25-pin D-sub connector (female),</td>
</tr>
<tr>
<td></td>
<td>Optical Fiber Cable compatible</td>
</tr>
<tr>
<td>No. of units</td>
<td>1-to-1</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>Max. 15 m (up to 500 m using optical-fiber cable)</td>
</tr>
<tr>
<td>Protocol</td>
<td>C Series SYSWAY (1: N)</td>
</tr>
</tbody>
</table>
# Appendix B
## PC Memory Map

### OMRON C Series Memory Map

<table>
<thead>
<tr>
<th>Ladder type</th>
<th>PC</th>
<th>IR Area</th>
<th>HR Area</th>
<th>AR Area</th>
<th>Link Relay Area</th>
<th>Timer/Counter Area</th>
<th>DM Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C20H</td>
<td>0000 to 0255</td>
<td>0000 to 0099</td>
<td>0000 to 0027</td>
<td>0000 to 0063</td>
<td>0000 to 0511</td>
<td>0000 to 1999</td>
<td></td>
</tr>
<tr>
<td>C28H</td>
<td>0000 to 0063</td>
<td>0000 to 0031</td>
<td>---</td>
<td>---</td>
<td>0000 to 0127</td>
<td>0000 to 0051</td>
<td></td>
</tr>
<tr>
<td>C40H</td>
<td>0000 to 0255</td>
<td>0000 to 0099</td>
<td>0000 to 0027</td>
<td>0000 to 0063</td>
<td>0000 to 0511</td>
<td>0000 to 1999</td>
<td></td>
</tr>
<tr>
<td>C500</td>
<td>0000 to 0063</td>
<td>0000 to 0031</td>
<td>---</td>
<td>0000 to 0031</td>
<td>0000 to 0127</td>
<td>0000 to 0511</td>
<td></td>
</tr>
<tr>
<td>C120</td>
<td>0000 to 0063</td>
<td>0000 to 0031</td>
<td>---</td>
<td>0000 to 0031</td>
<td>0000 to 0127</td>
<td>0000 to 0511</td>
<td></td>
</tr>
<tr>
<td>C60H</td>
<td>0000 to 0063</td>
<td>0000 to 0031</td>
<td>---</td>
<td>0000 to 0031</td>
<td>0000 to 0127</td>
<td>0000 to 0511</td>
<td></td>
</tr>
<tr>
<td>C200H</td>
<td>0000 to 0255</td>
<td>0000 to 0099</td>
<td>0000 to 0027</td>
<td>0000 to 0063</td>
<td>0000 to 0511</td>
<td>0000 to 4095</td>
<td></td>
</tr>
<tr>
<td>C1000H</td>
<td>0000 to 0255</td>
<td>0000 to 0099</td>
<td>0000 to 0027</td>
<td>0000 to 0063</td>
<td>0000 to 0511</td>
<td>0000 to 4095</td>
<td></td>
</tr>
<tr>
<td>C2000(H)</td>
<td>0000 to 0255</td>
<td>0000 to 0099</td>
<td>0000 to 0027</td>
<td>0000 to 0063</td>
<td>0000 to 0511</td>
<td>0000 to 4095</td>
<td></td>
</tr>
</tbody>
</table>

### OMRON CV/CVM1 Series Memory Map

<table>
<thead>
<tr>
<th>PC</th>
<th>CIo Area</th>
<th>HR Area</th>
<th>AR Area</th>
<th>Link Area</th>
<th>Timer Area</th>
<th>Counter Area</th>
<th>DM Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV500</td>
<td>0000 to 2555</td>
<td>---</td>
<td>0000 to 0099</td>
<td>0000 to 0127</td>
<td>0000 to 0511</td>
<td>0000 to 8191</td>
<td></td>
</tr>
<tr>
<td>CVM1-CPU01-E</td>
<td>0000 to 2555</td>
<td>---</td>
<td>0000 to 0099</td>
<td>0000 to 0127</td>
<td>0000 to 0511</td>
<td>0000 to 9999</td>
<td>(see note)</td>
</tr>
<tr>
<td>CV1000</td>
<td>0000 to 2555</td>
<td>---</td>
<td>0000 to 0099</td>
<td>0000 to 1023</td>
<td>0000 to 1023</td>
<td>0000 to 9999</td>
<td>(see note)</td>
</tr>
<tr>
<td>CVM1-CPU11-E</td>
<td>0000 to 2555</td>
<td>---</td>
<td>0000 to 0099</td>
<td>0000 to 1023</td>
<td>0000 to 1023</td>
<td>0000 to 9999</td>
<td>(see note)</td>
</tr>
</tbody>
</table>

**Note**  Range applicable to PT operation.
Appendix C
RS-232C Connections

Prepare a connector cable to connect a PT to an OMRON PC separated by more than 2 m when the supplied connector cable cannot be used.
Connect the wires to the connectors in accordance with the connector specification for each unit.

Parts Required
Two connectors, two connector covers and one cable are required to make up a connecting cable. One connector and connector cover is supplied with each PT and PC unit. The cable is not supplied. Purchase the appropriate length of OMRON-recommended cable.
The connector type supplied with each unit and the recommended cable type are shown in the table below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>XM2A-2501</td>
<td>25-pin, manufactured by OMRON, Supplied with NT600M-LK201 I/F Unit, Supplied with the following Host Link Units: C500-LK203, CV500-LK201, C200H-LK201</td>
</tr>
<tr>
<td></td>
<td>DB-25P</td>
<td>25-pin, manufactured by JAE, Supplied with the following Host Link Units: C500-LK201-V1, C120-LK201-V1</td>
</tr>
<tr>
<td></td>
<td>XM2A-0901</td>
<td>9-pin, manufactured by OMRON, Supplied with CV-series CPU Units, Supplied with the following Host Link Unit: CV500-LK201</td>
</tr>
<tr>
<td>Connector cover</td>
<td>XM2S-2511</td>
<td>25-pin, manufactured by OMRON, Supplied with NT600M-LK201 I/F Unit, Supplied with the following Host Link Units: C500-LK203, CV500-LK201, C200H-LK201</td>
</tr>
<tr>
<td></td>
<td>DB-C2-J9</td>
<td>25-pin, manufactured by JAE, Supplied with the following Host Link Units: C500-LK201-V1, C120-LK201-V1</td>
</tr>
<tr>
<td></td>
<td>XM2S-0901</td>
<td>9-pin, manufactured by OMRON, Supplied with CV-series CPU Units, Supplied with the following Host Link Unit: CV500-LK201</td>
</tr>
<tr>
<td>Cable</td>
<td>AWG28 * 5P IFVV-SB</td>
<td>Multicore cable, manufactured by Fujikura Densen.</td>
</tr>
<tr>
<td></td>
<td>CO-MA-VV-SB 5P * 28AWG</td>
<td>Multicore cable, manufactured by Hitachi Densen.</td>
</tr>
</tbody>
</table>

Note
1. The necessary connector and connector cover to connect an OMRON C__H to a PT are not supplied and must be purchased separately.
2. The connector on a C__H CPU is a 9-pin connector. Purchase the following connector and connector cover to make a connection to a C__H:
   3. Connector: XM2A-0901 (9-pin, manufactured by OMRON)
   4. Connector cover: XM2S-0911 (9-pin, manufactured by OMRON)

OMRON Unit Connector Specifications and Wiring
The combination of pin numbers to be connected when wiring a cable differs according to the unit connector specification. First check the connector specifications of the unit then connect the wires to the pins as described in the following pages for the relevant connecting cable.

Host Interface Unit 25-pin Connector Specifications
Electrical characteristics: Complies with EIA RS-232C
Appendix C

RS-232C Connections

Signal direction: Signal input and output is relative to the PC.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Send data</td>
<td>SD (TXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Receive data</td>
<td>RD (RXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Request to send</td>
<td>RS (RTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Clear to send</td>
<td>CS (CTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Signal ground</td>
<td>SG (GND)</td>
<td>---</td>
</tr>
<tr>
<td>14</td>
<td>Optical connector +5V (see note 1)</td>
<td>+ 5V</td>
<td>---</td>
</tr>
</tbody>
</table>

**Note**
1. C500-LK203 and C200H-LK201 only.
2. Ground the PC unit FG terminal to Class 3 ground. Refer to the appropriate *PC Installation Guide* for details.

**Connecting a PT to a C Series Host Link Unit**

**C Series Host Link Unit 25-pin Connector Specifications**

- Applicable Host Link Unit: C200H-LK201
- C500-LK201-V1
- C500-LK203
- C120-LK201-V1

Electrical characteristics: Complies with EIA RS-232C

Signal direction: Signal input and output is relative to the PC.
## RS-232C Connections

### Connector pin # | Signal name | Abbreviation | Signal direction
--- | --- | --- | ---
1 | Frame ground | FG | ---
2 | Send data | SD (TXD) | Yes
3 | Receive data | RD (RXD) | Yes
4 | Request send | RS (RTS) | Yes
5 | Clear to send | CS (CTS) | Yes
7 | Signal ground | SG (GND) | ---
14 | Optical connector +5V (see note 2) | +5V | ---
15 | Send signal element timing 2 (see note 1) | ST2 | Yes
17 | Receive signal element timing (see note 1) | RT | Yes
20 | Data terminal ready | ER (DTR) | Yes
24 | Send signal element timing 1 (see note 1) | ST1 | Yes

**Note**
1. No element timing signals on C200H-LK201.
2. C500-LK203 and C200H-LK201 only.

### Wiring Connections

Short PC (Host Link Unit) Pin 4 (RS) and Pin 5 (CS) together on the connector. However, it is not necessary to short RS to CS together if the CTS selector switch on the rear of the PC is set to the 0 V position*.

Connect the cable shielding wire to the connector cover and Pin 1 at the Host Link Unit end of the cable only.

### Connecting a PT to a C Series CPU

#### C Series CPU Unit 9-pin Connector Specifications

- **Applicable CPU:** C20H/C28H/C40H/C60H
- **Electrical characteristics:** Complies with EIA RS-232C
- **Signal direction:** Signal input and output is relative to the PC.

---

* The asterisk (*) indicates a note or exception.
### Connector pin # | Signal name | Abbreviation | Signal direction | Input | Output
---|---|---|---|---|---
1 | Frame ground | FG | --- | ---
2 | Send data | SD (TXD) | Yes |
3 | Receive data | RD (RXD) | Yes |
4 | Request to send | RS (RTS) | Yes |
5 | Clear to send | CS (CTS) | Yes |
7 | Signal ground | SG (GND) | --- | ---

### Wiring Connections
Connect the cable shielding wire to the connector cover and Pin 1 at both the PT and CPU ends of the cable.

### Connecting a PT to a CV-Series Host Link Unit

#### CV-Series Host Link Unit 25-pin Connector Specifications
Applicable Host Link Unit: CV500-LK201
Electrical characteristics: Complies with EIA RS-232C
Signal direction: Signal input and output is relative to the PC.
Communication port #1: 25-pin connector
### RS-232C Connections

#### Appendix C

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector cover</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Send data</td>
<td>SD (TXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Receive data</td>
<td>RD (RXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Request to send</td>
<td>RS (RTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Clear to send</td>
<td>CS (CTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Signal ground</td>
<td>SG (GND)</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>Carrier detected</td>
<td>CD (DCD)</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>Optical connector +5V</td>
<td>+ 5V</td>
<td>Yes</td>
</tr>
<tr>
<td>20</td>
<td>Data terminal ready</td>
<td>ER (DTR)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Communication port #2: 9-pin connector

![Diagram of 9-pin connector](image)

### Wiring Connections

A CV-Series Host Link Unit has two types of connector, which must each be wired differently.

Connect the cable shielding wire to the connector cover and Pin 1 at the Host Link Unit end of the cable only.

Short Pin 4 (RS) and Pin 5 (CS) together on the connector. However, it is not necessary to short RS to CS together if the CTS selector switch on the rear of the PC is set to the 0 V position*.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector cover</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Send data</td>
<td>SD (TXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Receive data</td>
<td>RD (RXD)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Request send</td>
<td>RS (RTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Clear to send</td>
<td>CS (CTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Carrier detected</td>
<td>CD (DCD)</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Signal ground</td>
<td>SG (GND)</td>
<td>---</td>
</tr>
</tbody>
</table>

*This is the condition when the CTS selector switch is set to the 0 V position.
RS-232C Connections

Appendix C

Communication port #1: 25-pin connector

<table>
<thead>
<tr>
<th>PT (Host Interface Unit)</th>
<th>PC (Host Link Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin number</td>
<td>Abbreviation</td>
</tr>
<tr>
<td>FG</td>
<td>1</td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
</tr>
<tr>
<td>RD</td>
<td>3</td>
</tr>
<tr>
<td>RS</td>
<td>4</td>
</tr>
<tr>
<td>CS</td>
<td>5</td>
</tr>
<tr>
<td>SG</td>
<td>6</td>
</tr>
<tr>
<td>Shielding wire</td>
<td></td>
</tr>
<tr>
<td>Shielding wire</td>
<td></td>
</tr>
</tbody>
</table>

Communication port #2: 9-pin connector

<table>
<thead>
<tr>
<th>PT (Host Interface Unit)</th>
<th>PC (Host Link Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin number</td>
<td>Abbreviation</td>
</tr>
<tr>
<td>FG</td>
<td>1</td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
</tr>
<tr>
<td>RD</td>
<td>3</td>
</tr>
<tr>
<td>RS</td>
<td>4</td>
</tr>
<tr>
<td>CS</td>
<td>5</td>
</tr>
<tr>
<td>SG</td>
<td>6</td>
</tr>
<tr>
<td>Shielding wire</td>
<td></td>
</tr>
<tr>
<td>Shielding wire</td>
<td></td>
</tr>
</tbody>
</table>

Connecting a PT to a C-Series CPU

CV-Series CPU 9-pin Connector Specifications

Applicable CPU: CV500-CPU01
CV1000-CPU01
CVM1-CPU01
CVM1-CPU11

Electrical characteristics: Complies with EIA RS-232C

Signal direction: Signal input and output is relative to the PC.
### Connector pin # | Signal name | Abbreviation | Signal direction | Input | Output
---|---|---|---|---|---
Connector cover | Frame ground | FG | --- | --- | ---
2 | Send data | SD (TXD) | Yes | --- | ---
3 | Receive data | RD (RXD) | Yes | --- | ---
4 | Request to send | RS (RTS) | Yes | --- | ---
5 | Clear to send | CS (CTS) | Yes | --- | ---
9 | Signal ground | SG (GND) | --- | --- | ---

#### Wiring Connections
Connect the cable shielding wire to the connector cover and Pin 1 at the CPU end of the cable only.

#### Making the Cable
The procedure to make up a cable is described below. This procedure also applies to fabrication of an RS-422 cable.

**Cable Preparation**
The preparation of the cable differs according to whether or not the shielding wire is to be connected to the FG.

**Cable with Shielding Wire Connected to FG**
1. Cut the cable to the required length.
2. Remove the external vinyl insulation from the cable with a razor blade. Take care not to damage the shielding underneath.
3. Cut back the shielding wire with scissors.
4. Use wire strippers to strip the insulation from each core wire.
5. Fold back the insulation.
6. Wrap aluminum foil tape around the folded-back shielding wire.

Cable with Shielding Wire Not Connected to FG

1. Cut the cable to the required length.
2. Remove the external vinyl insulation from the cable with a razor blade. Take care not to damage the shielding underneath.
3. Cut back the shielding wire with scissors.
4. Use wire strippers to strip the insulation from each core wire.
5. Wrap vinyl tape over the cut-off end of the shielding wire.

Soldering

1. Slide heat-shrink tube over each wire.
2. Pre-solder each wire and connector terminal.
3. Solder each wire to the connector terminal.

4. Push the heat-shrink tube over the soldered joint and heat the tube to shrink it in place.

**Connector Cover Assembly**

Assemble the connector covers as shown in the diagram below.
Appendix D
RS-422 Connections

A PT with a Host Interface Unit installed and an OMRON PC are connected with an RS-422 cable. RS-422 cables can connect a PT to a PC between 15 m and 500 m apart.

RS-422 connection permits a 1-to-N connection between the host computer and PC (that is, multiple PCs can be connected to a single computer). However PT-to-PC connection is on a 1-to-1 basis only.

Compatible PCs

Some models and series of OMRON PCs have the Host Link function built-in. Check the model and series of the PC against the type of Host Link Unit before making the connections. The compatible PCs are listed in the table below.

<table>
<thead>
<tr>
<th>PC series</th>
<th>Units with built-in Host Link function</th>
<th>Connectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Link Unit</td>
<td>CPU Unit</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>C-series</td>
<td>C20H/C28H/C40H/C60H</td>
<td>C120, C200H, C500, C1000H</td>
</tr>
<tr>
<td>C120-LK201-V1</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>C120-LK202-V1</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>C200H-LK201</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>C200H-LK202</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>C500-LK201-V1</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>C500-LK203</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>CV-series</td>
<td>CV500-LK201</td>
<td>CV500, CV1000</td>
</tr>
<tr>
<td>CV500-LK201</td>
<td>CV500-CPU01</td>
<td></td>
</tr>
<tr>
<td>CV500-CPU01</td>
<td>CV500</td>
<td></td>
</tr>
<tr>
<td>CV500-CPU01</td>
<td>CV1000</td>
<td></td>
</tr>
<tr>
<td>CV500-LK201-V1</td>
<td>CV1000</td>
<td></td>
</tr>
<tr>
<td>CV500-LK203</td>
<td>CV1000</td>
<td></td>
</tr>
<tr>
<td>CVM1-series</td>
<td>CV500-LK201</td>
<td>CVM1</td>
</tr>
<tr>
<td>CV500-LK201</td>
<td>CVM1-CPU01</td>
<td></td>
</tr>
<tr>
<td>CVM1-CPU01</td>
<td>CVM1</td>
<td></td>
</tr>
</tbody>
</table>

Parts Required to Prepare an RS-422 Cable

OMRON does not provide RS-422 cables. Prepare a connecting cable if required by the operating environment (long distance between the PC and PT, for example).

Two connectors, two connector covers and one cable are required to make up a connecting cable. One connector and connector cover is supplied with each PT and PC unit. The cable is not supplied. Purchase the appropriate length of the OMRON-recommended cable.

The connector type supplied with each unit and the recommended cable type are shown in the list below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>XM2A-0901</td>
<td>9-pin, manufactured by OMRON&lt;br&gt;Supplied with CV Series CPUs.&lt;br&gt;Supplied with the following Host Link Units:&lt;br&gt;C200H-LK202, C500-LK203, CV500-LK201</td>
</tr>
<tr>
<td></td>
<td>DE-9P</td>
<td>9-pin, manufactured by JAE&lt;br&gt;Supplied with the following Host Link Units:&lt;br&gt;C200H-LK202, C500-LK201-V1</td>
</tr>
<tr>
<td>Connector cover</td>
<td>XM2S-0901</td>
<td>9-pin, manufactured by OMRON&lt;br&gt;Supplied with CV Series CPUs.&lt;br&gt;Supplied with the following Host Link Units:&lt;br&gt;C200H-LK202, C500-LK203, CV500-LK201</td>
</tr>
<tr>
<td></td>
<td>DE-CI-J6</td>
<td>9-pin, manufactured by JAE&lt;br&gt;Supplied with the following Host Link Units:&lt;br&gt;C200H-LK202, C500-LK201-V1</td>
</tr>
<tr>
<td>Cable</td>
<td>H-9293A (CO-HC-ESV-3P 7/0.2)</td>
<td>RS-422 cable manufactured by Hirakawa Cables.</td>
</tr>
</tbody>
</table>

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Connecting the Cables

RS-422 communication allows connection between a PT and PC via a Link Adaptor using RS-232C and RS-422 cables.

The method of connection differs depending on whether the unit has an RS-232C connector or RS-422 connector.

**Note**
1. Ground the PC unit FG terminal to Class 3 ground. Refer to the appropriate *PC Installation Guide* for details.
2. Turn off both the PT and PC power supplies before connecting or disconnecting connectors.

**Connecting Units with an RS-232C Connector**

The diagram below shows the connection of a PC and PT using an RS-422 cable and two Link Adaptors. The connection from the PT and PC to the Link Adaptor is by means of an RS-232C cable.

**Connecting Units with an RS-422 Connector**

Some types of PC unit have an RS-422 connector. An RS-422 cable can be connected directly to this connector.

**About the Cables**

**RS-232C Cable**

Versions of RS-232C cable are available with the following connector combinations:

- XZ7-10048 (25-pin to 25-pin)
- XZ7-10049 (25-pin to 9-pin)

If a cable more than 2 m long is required, refer to *Appendix 3C RS-232C Connections* for details on how to make one.

**RS-422 Cable**

OMRON does not provide RS-422 cables. Refer to this *Appendix* if an RS-422 cable is required.
**Link Adaptors**

The Link Adaptor is a converter to connect different types of communication cables together. Set the switches as shown below when a Link Adaptor is used. Refer to the *SYSMAC C-series Rack PCs SYSMAC WAY - Host Link Units System Manual (W143)* for details.

**CTS setting**
Always leave this switch set to 0 V.

**Termination resistance setting**
Set ON if an RS-422 cable is connected to the PC.

---

**Connecting Units with an RS-232C Connector**

The PT to PC connection method below uses two Link Adaptors.

**Wiring an RS-232C Cable**

**Connector Specifications for a B500-AL004 (-P) Link Adaptor**

Connector: RS-232C
Electrical characteristics: Complies with EIA RS-232C
Signal direction: Signal input and output is relative to the PT.

---

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Send data</td>
<td>SD (TXD)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Receive data</td>
<td>RD (RXD)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Request send</td>
<td>RS (RTS)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Clear to send</td>
<td>CS (CTS)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>DR</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7</td>
<td>Signal ground</td>
<td>SG (GND)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>CD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Data terminal ready</td>
<td>ER (DTR)</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Wiring Connections

The wiring of the RS-232C cables to connect the PT to the Link Adaptor and the PC to the Link Adaptor is described below. However, the PC connector specification depends on the type of PC. Refer to Appendix C RS-232C Connections for details about the PC connector specifications.

<table>
<thead>
<tr>
<th>PT (Host Interface Unit)</th>
<th>Abbreviation</th>
<th>Pin number</th>
<th>Link Adaptor</th>
<th>Pin number</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG</td>
<td>1</td>
<td></td>
<td>1</td>
<td>FG</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
<td></td>
<td>2</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>RD</td>
<td>3</td>
<td></td>
<td>3</td>
<td>RD</td>
<td></td>
</tr>
<tr>
<td>RS</td>
<td>4</td>
<td></td>
<td>4</td>
<td>RS</td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>5</td>
<td></td>
<td>5</td>
<td>CS</td>
<td></td>
</tr>
<tr>
<td>SG</td>
<td>7</td>
<td></td>
<td>7</td>
<td>SG</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>20</td>
<td>ER</td>
<td></td>
</tr>
</tbody>
</table>

Shielding wire
RS-232C cable

Wiring an RS-422 Cable

Connector Specifications for a B500-AL004 (-P) Link Adaptor
Connector: RS-422
Electrical characteristics: Complies with EIA RS-422
Signal direction: Signal input and output is relative to the PT or PC.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive data B</td>
<td>RDB</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Signal ground</td>
<td>SG</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>Send data B</td>
<td>SDB</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Receive data A</td>
<td>RDA</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Frame ground</td>
<td>FG (GND)</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>Send data A</td>
<td>SDA</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Wiring Connections

The connection of two Link Adaptors with an RS-422 cable is shown below.

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Abbreviation</th>
<th>Pin number</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RDB</td>
<td>1</td>
<td>RDB</td>
</tr>
<tr>
<td>3</td>
<td>SG</td>
<td>3</td>
<td>SG</td>
</tr>
<tr>
<td>5</td>
<td>SDB</td>
<td>5</td>
<td>SDB</td>
</tr>
<tr>
<td>6</td>
<td>RDA</td>
<td>6</td>
<td>RDA</td>
</tr>
<tr>
<td>7</td>
<td>FG</td>
<td>7</td>
<td>FG</td>
</tr>
<tr>
<td>9</td>
<td>SDA</td>
<td>9</td>
<td>SDA</td>
</tr>
</tbody>
</table>

Connecting Units with an RS-422 Connector

The connector specifications and wiring connections for a unit with an RS-422 connector is described below. Refer to this Appendix for details about the PC connector specifications.

Connecting to a C Series Host Link Unit

C Series Host Link Unit 25-pin Connector Specifications

Applicable Host Link Unit: C200H-LK202
C500-LK201-V1
C120-LK202-V1

Electrical characteristics: Complies with EIA RS-422
Signal direction: Signal input and output is relative to the Host Link Unit.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive data B</td>
<td>RDB</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Signal ground</td>
<td>SG</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>Send data B</td>
<td>SDB</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Receive data A</td>
<td>RDA</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Frame ground</td>
<td>FG (GND)</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>Send data A</td>
<td>SDA</td>
<td>Yes</td>
</tr>
</tbody>
</table>
RS-422 Connections

Appendix D

Wiring Connections

<table>
<thead>
<tr>
<th>Link Adaptor</th>
<th>PC (Host Link Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-422 interface</td>
<td>RS-422 interface</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Pin number</td>
</tr>
<tr>
<td>RDB</td>
<td>1</td>
</tr>
<tr>
<td>SG</td>
<td>3</td>
</tr>
<tr>
<td>SDB</td>
<td>5</td>
</tr>
<tr>
<td>RDA</td>
<td>6</td>
</tr>
<tr>
<td>FG</td>
<td>7</td>
</tr>
<tr>
<td>SDA</td>
<td>9</td>
</tr>
</tbody>
</table>

Connecting to a C Series Host Link Unit (Insulated)

C Series Host Link Unit 25-pin Connector Specifications

Applicable Host Link Unit:  C500-LK201-V1
                          C120-LK202-V1

Electrical characteristics: Complies with EIA RS-422
Signal direction: Signal input and output is relative to the Host Link Unit.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector cover</td>
<td>Frame ground</td>
<td>FG</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Receive data B</td>
<td>RDB</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Send data B</td>
<td>SDB</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Receive data A</td>
<td>RDA</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Frame ground</td>
<td>FG</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>Send data A</td>
<td>SDA</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Wiring Connections

Connect the cable shielding wire to the connector cover and Pin 7 at the Host Link Unit end of the cable only.
Connecting to a CV Series Host Link Unit

CV Series Host Link Unit Connector Specifications
Applicable Host Link Unit: CV500-LK201 (communication port #2)
Electrical characteristics: Complies with EIA RS-422
Signal direction: Signal input and output is relative to the Host Link Unit.

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector cover</td>
<td>Frame ground</td>
<td>FG</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Send data A</td>
<td>SDA (SD −)</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Send data B</td>
<td>SDB (SD +)</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Receive data A</td>
<td>RDA (RD −)</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Receive data B</td>
<td>RDB (RD +)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Wiring Connections

Connecting to a CV Series CPU

CV Series CPU Connector Specifications
Applicable CPU: CV500-CPU-1
CV1000-CPU01
CVM1-CPU01
CVM1-CPU11

Electrical characteristics: Complies with EIA RS-422
Signal direction: Signal input and output is relative to the PC.
Appendix D

### Connector pin #

<table>
<thead>
<tr>
<th>Connector pin #</th>
<th>Signal name</th>
<th>Abbreviation</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector cover</td>
<td>Frame ground</td>
<td>FG</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Send data A</td>
<td>SDA (SD –)</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Send data B</td>
<td>SDB (SD +)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Request send</td>
<td>RS</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Clear to send</td>
<td>CS</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Receive data A</td>
<td>RDA (RD –)</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Receive data B</td>
<td>RDB (RD +)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Wiring Connections

Short Pin 4 (RS) and Pin 5 (CS) together on the connector at the PC end of the cable.

### RS-422 Connections

#### Link Adaptor

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RDB</td>
</tr>
<tr>
<td>2</td>
<td>SDB</td>
</tr>
<tr>
<td>3</td>
<td>SG</td>
</tr>
<tr>
<td>4</td>
<td>RS</td>
</tr>
<tr>
<td>5</td>
<td>CS</td>
</tr>
<tr>
<td>6</td>
<td>RDA</td>
</tr>
<tr>
<td>7</td>
<td>FG</td>
</tr>
<tr>
<td>8</td>
<td>RDB</td>
</tr>
</tbody>
</table>

#### RS-422 Interface

**PC (Host Link Unit)**

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SDA</td>
</tr>
<tr>
<td>2</td>
<td>SDB</td>
</tr>
<tr>
<td>4</td>
<td>RS</td>
</tr>
<tr>
<td>5</td>
<td>CS</td>
</tr>
<tr>
<td>6</td>
<td>RDA</td>
</tr>
</tbody>
</table>

### PC Switch Settings

When the PT and PC are connected together, set the conditions at the PC Host Link Unit and the CPU as shown in the table below.

The method of setting the conditions with the switches on each unit is described on the following pages. Refer to the manual on each unit for more detailed information on making these settings.

<table>
<thead>
<tr>
<th>Item</th>
<th>Switch setting position</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O port</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Baud rate</td>
<td>Set to the same baud rate as the PT</td>
</tr>
<tr>
<td>Transfer code</td>
<td>ASCII, 7 data bits, 2 stop bits</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>1-to-1/1-to-N</td>
<td>1-to-N</td>
</tr>
<tr>
<td>Instruction level</td>
<td>Level 1</td>
</tr>
<tr>
<td>Unit#</td>
<td>00</td>
</tr>
</tbody>
</table>

**Note**  The 1-to-N setting enables BCC (Block Check Character). The 1-to-N connection between Host Link Units and PTs is not possible.

### Connection to a Host Link Unit

Two types of Host Link Unit are available: a Rack-mounting Unit and a CPU-mounted Unit. The switch settings differ according to the type of Host Link Unit. Set the switches according to the unit type.

#### C200H: Rack-mounting Unit

- C200H-LK201
- C200H-LK202
Setting the Front Switches

Set each switch with a flathead screwdriver until the displayed settings agree with the settings described on the previous page.

<table>
<thead>
<tr>
<th>LK201</th>
<th>RUN</th>
<th>RCV</th>
<th>XMT</th>
<th>ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SW1/SW2: Set the Unit#
Set both switches SW1 and SW2 to 0.

SW4: Sets the instruction level, parity, and transfer code.
Set to 2.

SW3: Baud rate setting
4: 4,800 baud
5: 9,600 baud
6: 19,200 baud

Setting the Rear Switches

C200H-LK201

DIP Switch: 1-to-1/1-to-N setting

CTS selector switch
External
Set ON

CTS setting selector switch
Always set to the 0 V (ON) position.
Appendix D

C200H-LK202
For types with an RS-422 connector.

Termination resistance ON/OFF switch.
Set ON.

**Note:** The termination resistance must also be turned ON at the Link Adaptor.

1-to-1 (ON)
1-to-N (OFF)

1-to-1/1-to-N selector switch.
Set to 1-to-N (OFF).

---

C500(F), C1000(F) Rack-mounting Units
C500-LK201-V1
C500-LK203

Setting the Rear Switches
C500-LK201-V1

---

I/O port selector switch
When connecting to the RS-232C connector, set to RS-232C.
When connecting to the RS-422 connector, set to RS-422.

DIP switch SW1: Unit # setting

0
1

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
19,200 bps - - 0 0 1 0
9,600 bps - - 0 1 0 0
4,800 bps - - 0 1 1 0

Instruction level setting
Set to enable levels 1, 2, 3

1-to-1/1-to-N setting
Set to 1-to-N.

CTS setting selector switch
Always set to the 0 V (ON) position.

Termination resistance ON/OFF switch.
Set ON when using an RS-422 cable.

**Note:** The termination resistance must also be turned ON at the Link Adaptor.
Setting the Rear Switches

C500-LK203

5 V supply
- ON
- OFF

I/O port
- RS-422
- RS-232C

Synchronization
- Internal
- External

Termination resistance
- OFF
- ON

CTS
- 0 V
- External

DIP switch SW1: Unit #, parity, transfer code setting

Parity, transfer code setting:
0 0 0 0 0 - - - - - - - - - - - Set to 0.

Baud rate:
19,200 bps: 0 0 1 0
9,600 bps: 0 1 0
4,800 bps: 0 1 1

Instruction level setting:
1 - - - - - Set to enable levels 1, 2, 3
1 - - 0 - - - - - 1-to-1/1-to-N setting

Note: The termination resistance must also be turned ON at the Link Adaptor.

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Instruction level setting:
0 - - - - - - - - - - - - Set to 0.
1 - - - - - Set to enable levels 1, 2, 3

1-to-1/1-to-N setting:
0 - - - - - - - - - - - 1-to-1/1-to-N setting
1 - - - - - - - - - - - Set to 1-to-N.

CTS setting selector switch
Always set to the 0 V (ON) position.

Termination resistance ON/OFF switch.
Set ON when using an RS-422 cable.

Note: The termination resistance must also be turned ON at the Link Adaptor.
CPU-mounted Units  
C120-LK201-V1  
C120-LK202-V1

Setting the Rear Switches

DIP switch SW1: Unit #, parity, transfer code setting

Parity is fixed at Even Parity, Transfer Code is fixed at ASCII, 7 data bits, 2 stop bits

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
19,200 bps: 0 1 0 1 0 0 0 0
9,600 bps: 1 0 1 0 0 0 0 0
4,800 bps: 0 1 1 0 0 0 0 0

Instruction level setting
Set to enable levels 1, 2, 3
1-to-1/1-to-N setting
Set to 1-to-N.

DIP switch SW3: Synchronization and CTS setting

Synchronization setting selector switch
Set to Internal.

CTS setting selector switch
Always set to the 0 V (ON) position.

DIP SW3 on C120-LK202-V1 Termination resistance

Termination resistance setting
Set ON when using an RS-422 cable.

Note: The termination resistance must also be turned ON at the Link Adaptor.
**CV Series Rack-Mounting Units**

**CV500-LK201**

**Setting the Front Switches**

Set the operating conditions with the PC System Setting functions when a CV Series Host Link Unit is connected to a PC. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU.

Set the DIP switches to enable the system settings to be made. Refer to the *CV Support Software Operation Manuals* for more details of the system settings.

**Communication port 1:** RS-232C

**Communication port 2:** RS-232C/RS-422

**Note:** The termination resistance must also be turned ON at the Link Adaptor.

---

**SW3/SW4: Unit# setting**

Set both switches SW3 and SW4 to 0.

**I/O port selector switch**

- When connecting to the RS-232C connector, set to RS-232C.
- When connecting to the RS-422 connector, set to RS-422.

**DIP switch settings**

**SW2/SW3:** CTS setting

Always set both SW2 (Communication port 1) and SW3 (Communication port 2) to the 0 V (ON) position.

**SW1:** Select PC System Settings

Set SW1 to the OFF position.

**Termination resistance ON/OFF switch.**

Set ON when using an RS-422 cable.
**Connection to a CPU**

Set the operating conditions with the PC System Setting functions when connecting to a Mini H-type (C20H/G01/G01H) or CV/CVM1 Series CPU. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU. Refer to the *Mini H-type PCs: C20H, C28H, C40H, C60H Installation Guide* for more details of the system settings.

**Mini H-type PCs:** C20H/C28H/C40H/C60H

No switch settings required when connecting to a Mini H-type PC (C20H/G01/G01H).

The connector is an RS-232C-dedicated port. It cannot be set to RS-422.

**CV-/CVM1-series:**
- CV500-CPU01
- CV1000-CPU01
- CVM1-CPU01
- CVM1-CPU11

**Front Switch Settings**

- **Communication method switch:**
  - RS-232C
  - RS-422

- **I/O port selector switch**
  - When connecting to the RS-232C connector, set to RS-232C. When connecting to the RS-422 connector, set to RS-422.

- **Termination resistance ON/OFF switch.**
  - Set ON when using an RS-422 cable.

**Note:** The termination resistance must also be turned ON at the Link Adaptor.

Set SW-6 to the OFF position.
Appendix E
Optical Fiber Cable Connections

A PT with a Host Interface Unit installed and an OMRON PC are connected with a optical-fiber cable. The optical-fiber connection method is used in environments with a high level of noise and when the PT and PC are more than 15 m apart. Connection up to 500 m is possible but system configuration is restricted to 1-to-1 connections. Optical-fiber cable connections can be made by the following two methods: Optical Interface or Link Adaptor.

Applicable PCs

Some models and series of OMRON PCs have the Host Link function built-in. Check the model and series of the PC against the type of Host Link Unit before making the connections. The compatible PCs are listed in the table below.

<table>
<thead>
<tr>
<th>PC series</th>
<th>Units with built-in Host Link function</th>
<th>Connectable to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Host Link Unit</td>
<td>CPU</td>
</tr>
<tr>
<td></td>
<td>C20H/C22H/C40H/C60H</td>
<td>C_H</td>
</tr>
<tr>
<td>C-series</td>
<td>C120-LK101-(P)V1</td>
<td>C120, C200H,</td>
</tr>
<tr>
<td></td>
<td>C120-LK201-V1</td>
<td>C500, C1000H</td>
</tr>
<tr>
<td></td>
<td>C120-LK202-V1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C200H-LK101-P</td>
<td>C200H</td>
</tr>
<tr>
<td></td>
<td>C200H-LK201</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C200H-LK202</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C500-LK101-(P)V1</td>
<td>C500, C1000H</td>
</tr>
<tr>
<td></td>
<td>C500-LK103(-P)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C500-LK201-V1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C500-LK203</td>
<td></td>
</tr>
<tr>
<td>CV-series</td>
<td>CV500-LK201</td>
<td>CV500</td>
</tr>
<tr>
<td>CV1000-CPU1</td>
<td>CV500-CPU01</td>
<td>CV100</td>
</tr>
<tr>
<td>CVM1-series</td>
<td>CV500-LK201</td>
<td>CVM1</td>
</tr>
<tr>
<td></td>
<td>CV1000-CPU01</td>
<td></td>
</tr>
</tbody>
</table>

Connection with the Optical Interface

The Optical Interface is used to make an optical-fiber connection between two units with RS-232C connectors. The connection is made with optical modules and an optical-fiber cable, as shown in the diagram below. The optical module is a converter to convert between RS-232C and optical communication.

Connection can be made to the following PCs: C120-LK201-V1, C200H-LK201, C500-LK201-V1, C500-LK203, CV500-LK201.
Making the Connection

![Diagram showing connection between NT600M Host Interface Unit and Host Link Unit/CPU](image)

**Note** 1. Ground the PC unit FG terminal to Class 3 ground. Refer to the appropriate *PC Installation Guide* for details.

2. Turn off both the PT and PC power supplies before connecting or disconnecting connectors.

**Parts Required in an Optical Interface**

The parts used in each optical interface for each type of connection are shown in the table below. Order the appropriate parts for the type of connection required.

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Module</td>
<td>Z3RN-A-5</td>
<td>RS-232C-to-optical 25-pin converter, manufactured by OMRON</td>
</tr>
<tr>
<td>Optical fiber cable</td>
<td>Z3F2-4D_ M</td>
<td>PCF type, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When ordering, specify the cable length in the blank in the model number ( ). The following cable lengths are available: 1, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 250, 300, 350, 400, 450, and 500.</td>
</tr>
<tr>
<td>AC adaptor</td>
<td>Z3GP-01</td>
<td>100 VAC, manufactured by OMRON</td>
</tr>
</tbody>
</table>

**Optical-fiber Cables**

A plastic-clad optical-fiber cable (PCF) is used which allows communication up to 500 m.

**Optical Modules**

A 5 V power supply is required to use the Optical Modules. This power supply can be taken from the Host Interface Unit installed on the PT or from some types of unit installed in a PC. Other types of unit do not allow 5 V power supply, and the AC Adaptor is required for use with these units.

If the power can be supplied from the unit, set the Optical Module power switch to the P position. The types of unit requiring and not requiring an AC Adaptor are shown in the table below.

<table>
<thead>
<tr>
<th>AC Adaptor not required</th>
<th>AC Adaptor required</th>
</tr>
</thead>
<tbody>
<tr>
<td>C200H-LK201</td>
<td>C120-LK201-V1</td>
</tr>
<tr>
<td>C500-LK203</td>
<td>C500-LK201-V1</td>
</tr>
<tr>
<td>CV500-LK201</td>
<td></td>
</tr>
</tbody>
</table>

**Connection with Link Adaptors**

A PT and PC can be connected with an optical-fiber cable and Link Adaptors.

Two methods are connection are used:

- connection to a unit with an RS-232C or RS-422 connector
- connection to a unit with an optical-fiber connector

**Note** 1. Ground the PC unit FG terminal to Class 3 ground. Refer to the appropriate *PC Installation Guide* for details.
2. Turn off both the PT and PC power supplies before connecting or disconnecting connectors.

**Connection to a Unit with an RS-232C or RS-422 connector**

The PT and PC are connected via Link Adaptors as shown in the diagram below. The connection from the PT to the Link Adaptor is by means of an RS-232C cable and the connection from the Link Adaptor to the PC is by means of an RS-232C or RS-422 cable.

Connection can be made to the following PCs:
- C20H/C28H/C40H/C60H
- C120-LK201-V1
- C200H-LK201
- C200H-LK202
- C500-LK201-V1
- C500-LK203
- CV500-LK201
- CV500-CPU01
- CV1000-CPU01
- CVM1-CPU01
- CVM1-CPU11

**Connection to a Unit with an Optical-fiber Connector**

Some models of Host Link Unit for C Series PCs have a connection for optic-fiber connection. An optic-fiber cable can be directly connected to this type of unit as shown in the diagram below.

Connection can be made to the following PCs:
- C120-LK101-(P)V1
- C200H-LK101-P
- C500-LK101-(P)V1
- C500-LK103(-P)

**Note** The cap must always be fitted over an optical-fiber connector when it is not used to prevent errors due to external light.
Parts Required for Connection with a Link Adaptor

The parts used for connection with a Link Adaptor are shown in the table below. Order the appropriate parts for the type of connection required.

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>With RS-232C connector</td>
<td>XZ7-10048</td>
<td>2 m 25-pin-to-25-pin type, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>XZ7-10049</td>
<td>2 m 25-pin-to-9-pin type, manufactured by OMRON</td>
</tr>
<tr>
<td>Optical-fiber cable</td>
<td></td>
<td>3 types of optical-fiber cable can be used:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>APF (plastic optical-fiber cable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PCF (plastic-clad optical-fiber cable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H-PCF (hard plastic-clad quartz optical-fiber cable)</td>
</tr>
<tr>
<td>Link Adaptor</td>
<td>B500-AL004(-P)</td>
<td>100/200 VAC, manufactured by OMRON</td>
</tr>
</tbody>
</table>

About the Cables

RS-232C Cable

RS-232C cables with the following connectors can be used:
- XZ7-10048 (25-pin to 25-pin) Connector Cable
- XZ7-10049 (9-pin to 25-pin) Connector Cable

If a cable longer than 2 m is required, refer to Appendix C RS-232C Connections for information on making up cable.

RS-422 Cable

OMRON does not provide RS-422 cables. Prepare a connecting cable as described in Appendix D RS-422 Connections if required.

Optical-fiber Cable

The length of optical-fiber cable differs according to the type of cable and Link Amplifier, as shown in the following table:

<table>
<thead>
<tr>
<th>Optical-fiber cable</th>
<th>B500-AL004-P</th>
<th>B500-AL004</th>
</tr>
</thead>
<tbody>
<tr>
<td>APF</td>
<td>20 m</td>
<td>no connection possible</td>
</tr>
<tr>
<td>H-PCF</td>
<td>100 m</td>
<td>200 m</td>
</tr>
<tr>
<td>PCF</td>
<td>200 m</td>
<td>800 m</td>
</tr>
</tbody>
</table>

Refer SYMAMC C-series Rack PCs SYMAMC WAY - Host Link Unit System Manual (W143) and the Link Adaptor Instruction Manual for information on optical-fiber cable specifications and handling procedures.

Link Adaptors

The Link Adaptor is a converter to connect different types of communication cables together. Set the switches as shown below when a Link Adaptor is used.

Refer to Appendix D RS-422 Connections for the wiring connections if an RS-232C or RS-422 cable is connected to a Link Adaptor.

The B500-AL004 (-P) Link Adaptor is used.
PC Switch Settings

When the PT and PC are connected together, set the conditions at the PC Host Link Unit and the CPU as shown in the table below.

The method of setting the conditions with the switches on each unit is described on the following pages. Refer to the manual on each unit for more detailed information on making these settings.

<table>
<thead>
<tr>
<th>Item</th>
<th>Switch setting position</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O port</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Baud rate</td>
<td>Set to the same baud rate as the PT</td>
</tr>
<tr>
<td>Transfer code</td>
<td>ASCII, 7 data bits, 2 stop bits</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>1-to-1/1-to-N</td>
<td>1-to-N (see note)</td>
</tr>
<tr>
<td>Instruction level</td>
<td>Level 1</td>
</tr>
<tr>
<td>Unit#</td>
<td>00</td>
</tr>
</tbody>
</table>

Note  The 1-to-N setting enables BCC (Block Check Character). The 1-to-N connection cannot be used to connect a Host Link Unit to a PT.

Connection to a Host Link Unit

Two types of Host Link Unit are available: a Rack-mounting type and a CPU-mounted type. The switch settings differ according to the type of Host Link Unit. Set the switches according to the unit type.

C200H: Rack-mounting Type

C200H-LK201
C200H-LK202
C200H-LK101-P

Setting the Front Switches

Set each switch with a flathead screwdriver until the displayed settings agree with the settings described on the previous page.
Setting the Rear Switches

C200H-LK201

CTS selector switch

Always set to the 0 V (ON) position.

DIP Switch: 1-to-1/1-to-N setting

5 V supply setting
Set ON (5 V supply ON) when connecting through Optical Modules.
Set OFF when connecting through the Link Adaptor.

1-to-1/1-to-N setting
Set SW3 ON (1-to-N).

C200H-LK-202
For types with an RS-422 connector.

Termination resistance ON/OFF switch.
Set ON.

Note: The termination resistance must also be turned ON at the Link Adaptor

1-to-1 (ON)
1-to-N (OFF)

1-to-1/1-to-N selector switch.
Set to 1-to-N (OFF).
C200H-LK-101-P
For types with an optical-fiber connector.

1-to-1 (ON)
1-to-N (OFF)

1-to-1/1-to-N selector switch.
Set to 1-to-N (OFF).
C500(F), C1000(F), Rack-mounting Types

C500-LK201-V1
C500-LK101-(P)V1
C500-LK203
C500-LK103(-P)

Setting the Rear Switches
C500-LK201-V1

- **I/O port selector switch**
  - When connecting to the RS-232C connector, set to RS-232C.
  - When connecting to the RS-422 connector, set to RS-422.

- **Synchronization setting selector switch**
  - Set to Internal.

- **DIP switch SW1: Unit # setting**
  - Set to 0.
  - Instruction level setting: Set to enable levels 1, 2, 3
  - 1-to-1/1-to-N setting: Set to 1-to-N.

- **DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting**
  - Baud rate: 19,200 bps, 9,600 bps, 4,800 bps
  - Instruction level setting: Set to enable levels 1, 2, 3
  - 1-to-1/1-to-N setting: Set to 1-to-N.

- **CTS setting selector switch**
  - Always set to the 0 V (ON) position.

- **Termination resistance ON/OFF switch**
  - Set ON when using an RS-422 cable.

**Note:** The termination resistance must also be turned ON at the Link Adaptor
DIP switch SW1: Unit # setting

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
- 19,200 bps
- 9,600 bps
- 4,800 bps

Instruction level setting
- Set to enable levels 1, 2, 3
- 1-to-1/1-to-N setting
- Set to 1-to-N.

Set ON (5 V supply ON) when connecting through Optical Modules. Set OFF when connecting through the Link Adaptor.

I/O port selector switch
- When connecting to the RS-232C connector, set to RS-232C.
- When connecting to the RS-422 connector, set to RS-422.

DIP switch SW1: Unit #, parity, transfer code setting

Parity, transfer code setting
- Set ON (5 V supply ON) when connecting through Optical Modules.
- Set OFF when connecting through the Link Adaptor.

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
- 19,200 bps
- 9,600 bps
- 4,800 bps

Instruction level setting
- Set to enable levels 1, 2, 3
- 1-to-1/1-to-N setting
- Set to 1-to-N.

CTS setting selector switch
- Always set to the 0 V (ON) position.

Termination resistance ON/OFF switch.
- Set ON when using an RS-422 cable.

Note: The termination resistance must also be turned ON at the Link Adaptor.
DIP switch SW1: Unit # setting

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
19,200 bps - - - - - 0 0 1 0 1 1 - - - - Instruction level setting
9,600 bps - - - - - 1 0 1 0 Set to enable levels 1, 2, 3
4,800 bps - - - - - 0 1 1 0 0 - - - - 1-to-1/1-to-N setting
Parity, transfer code setting.
Unit # setting.
Set to 0.
CPU-mounted Type
C120-LK201-V1
C120-LK202-V1
C120-LK101-(P)V1

Setting the Rear Switches
C120-LK201-V1, C120-LK202-V1

DIP switch SW1: Unit #, parity, transfer code setting

Parity is fixed at Even Parity, Transfer Code is fixed at ASCII, 7 data bits, 2 stop bits

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

Baud rate
19,200 bps 0 0 1 0
9,600 bps 1 0 1 0
4,800 bps 0 1 1 0

Instruction level setting
Set to enable levels 1, 2, 3
Set to 1-to-1/1-to-N setting
Set to 1-to-N.

DIP switch SW3: Synchronization and CTS setting

Synchronization setting selector switch
Set to Internal.

CTS setting selector switch
Always set to the 0 V (ON) position.

DIP SW3 on C120-LK202-V1 Termination resistance

Termination resistance setting
Set ON when using an RS-422 cable.

Note: The termination resistance must also be turned ON at the Link Adaptor.
Parity is fixed at Even Parity, Transfer Code is fixed at ASCII, 7 data bits, 2 stop bits

DIP switch SW2: Baud rate, 1-to-1/1-to-N, instruction level setting

- **Baud rate**
  - 19,200 bps: 0 0 1 0
  - 9,600 bps: 1 0 1 0
  - 4,800 bps: 0 1 1 0

- **Instruction level setting**
  - Set to enable levels 1, 2, 3

- **1-to-1/1-to-N setting**
  - Set to 1-to-N.

DIP switch SW1: Unit #, parity, transfer code setting

- **Unit # setting**
  - Set to 0.
CV Series Backplane Mounted Type
CV500-LK201

Setting the Front Switches
Set the operating conditions with the PC System Setting functions when a CV Series Host Link Unit is connected to a PC. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU.

Set the DIP switches to enable the system settings to be made.

SW3/SW4: Unit# setting
Set both switches SW3 and SW4 to 0.

I/O port selector switch
- When connecting to the RS-232C connector, set to RS-232C.
- When connecting to the RS-422 connector, set to RS-422.

DIP switch settings

SW2/SW3: CTS setting
Always set both SW2 (Communication port 1) and SW3 (Communication port 2) to the 0 V (ON) position.

SW1: Select PC System Settings
Set SW1 to the OFF position.

Communication method switch:
- RS-232C
- RS-422

5 V supply setting
Set ON (5 V supply ON) when connecting through Optical Modules.
Set to the upmost position (5 V supply ON) when an Optical Module is connected to Communication Port 1.

Termination resistance ON/OFF switch.
Set ON when using an RS-422 cable.

Note: The termination resistance must also be turned ON at the Link Adaptor.
Connection to a CPU

Set the operating conditions with the PC System Setting functions when connecting to a Mini H-type (C20H) or CV/CVM1 Series CPU. The PC System Settings can be made from the Peripheral Tool (FIT, etc.) or PC system setting information created with a Peripheral Tool can be transferred to the CPU. Refer to the *Mini H-type PCs: C20H, C28H, C40H, C60H Installation Guide* for more details of the system settings.

Mini H-type PCs: C20H/C28H/C40H/C60H

No switch settings required when connecting to a Mini H-type PC (C20H).

The connector is an RS-232C-dedicated port. It cannot be set to RS-422.

CV-/CVM1-series: CV500-CPU01
CV1000-CPU01
CVM1-CPU01
CVM1-CPU11

Front Switch Settings
Appendix F
Product Information

Host Interface Unit

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Interface Unit</td>
<td>NT600M-LK201</td>
</tr>
</tbody>
</table>

PT

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Programmable Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifications</td>
<td>NT20M-DT131</td>
<td>Touch-panel version (replaceable backlight model)</td>
</tr>
<tr>
<td></td>
<td>NT20M-DT121-V2</td>
<td>Touch-panel version (monochrome LCD model)</td>
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<tr>
<td></td>
<td>NT600M-DT122</td>
<td>Touch-panel version (monochrome LCD model)</td>
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<tr>
<td></td>
<td>NT600M-DT211</td>
<td>Touch-panel version (EL display model)</td>
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</tbody>
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Host Link Unit

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
<th>Applicable PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C120-LK101-(P)V1</td>
<td>CPU-mounted type with optical-fiber cable connector</td>
<td>C-series C120, C200H, C500, C1000H</td>
</tr>
<tr>
<td>C120-LK201-V1</td>
<td>CPU-mounted type with RS-232C connector</td>
<td>C-series C200H</td>
</tr>
<tr>
<td>C2120-LK202-V1</td>
<td>CPU-mounted type with RS-422 connector</td>
<td>C-series C200H</td>
</tr>
<tr>
<td>C200H-LK101-P</td>
<td>Rack-mounting Unit with optical-fiber cable connector for C200H</td>
<td>C-series C200H</td>
</tr>
<tr>
<td>C200H-LK201</td>
<td>Rack-mounting Unit with RS-232C connector for C200H</td>
<td>C-series C200H</td>
</tr>
<tr>
<td>C200H-LK202</td>
<td>Rack-mounting Unit with RS-422 connector for C200H</td>
<td>C-series C200H</td>
</tr>
<tr>
<td>C500-LK101-(P)V1</td>
<td>Rack-mounting Unit with optical-fiber cable connector for C500</td>
<td>C-series C500, C1000H</td>
</tr>
<tr>
<td>C500-LK202</td>
<td>Rack-mounting Unit with RS-422 connector for C500</td>
<td>C-series C500, C1000H</td>
</tr>
<tr>
<td>C500-LK201-V1</td>
<td>Rack-mounting Unit with selectable RS-232C/RS-422 connector for C500</td>
<td>CV-/CVM1-series CV500, CV1000, CVM1</td>
</tr>
<tr>
<td>C500-LK203</td>
<td>Ranch-mounting Unit with selectable RS-232C/RS-422 connector for C500</td>
<td>CV-/CVM1-series CV500, CV1000, CVM1</td>
</tr>
</tbody>
</table>

CPU

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
<th>Applicable PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C20H/C28H/C40H/C60H</td>
<td>9-pin type for RS-232C connector</td>
<td>C-series C20H, C28H, C40H, C60H</td>
</tr>
<tr>
<td>CV500-CPU01</td>
<td>9-pin type for selectable RS-232C/RS-422 connector</td>
<td>CV-/CVM1-series CV500, CV1000, CVM1</td>
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</tbody>
</table>
## Related Parts and Equipment for PT

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>System ROM</td>
<td>NT20M-SMR31</td>
<td>NT20M, NT600M</td>
</tr>
<tr>
<td></td>
<td>NT600M-SMR31</td>
<td></td>
</tr>
<tr>
<td>Screen memory board</td>
<td>NT600M-MP251</td>
<td></td>
</tr>
<tr>
<td>IC socket type</td>
<td>NT600M-MR641</td>
<td>NT600M</td>
</tr>
<tr>
<td>S-RAM 64KB</td>
<td>NT600M-MR151</td>
<td></td>
</tr>
<tr>
<td>S-RAM 128KB</td>
<td>NT600M-MR251</td>
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<tr>
<td>S-RAM 256KB</td>
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<td></td>
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<tr>
<td>Screen memory</td>
<td>RAM22-15</td>
<td>NT20M</td>
</tr>
<tr>
<td>S-RAM 64KB</td>
<td>ROM13-10</td>
<td></td>
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<tr>
<td>EPROM 64KB</td>
<td>ROM13-12B</td>
<td></td>
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<tr>
<td>EPROM 128KB</td>
<td>EER22-20</td>
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<tr>
<td>EPROM 256KB</td>
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<tr>
<td>EPROM 32KB</td>
<td>ROM-KD-B</td>
<td>for NT600M IC socket type</td>
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<tr>
<td></td>
<td>ROM13-12B</td>
<td></td>
</tr>
<tr>
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<td>ROM23-15B</td>
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<tr>
<td></td>
<td>EER22-20</td>
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<tr>
<td>Support Tool</td>
<td>NT20M-ZA5AT-EV4</td>
<td>3.5-inch (2DD) and 5.25-inch (2HD) disks</td>
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## Parts and Equipment for Connections

### Connector Cables

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
<th>Applicable Host Link Unit/CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>XZ7-10048</td>
<td>XZ7-10048 (25-pin to 25-pin) connector cable</td>
<td>C120-LK201-V1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C200H-LK201</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C500-LK201-V1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CV500-LK201</td>
</tr>
<tr>
<td>XZ7-10049</td>
<td>XZ7-10049 (9-pin to 25-pin) connector cable</td>
<td>C20H/C28H/C40H/C60H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CV500-LK201</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CV500-CPU01</td>
</tr>
<tr>
<td></td>
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<td>CV1000-CPU01</td>
</tr>
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<td>CVM1-CPU01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVM1-CPU11</td>
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### Cable

<table>
<thead>
<tr>
<th>Interface</th>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-232C</td>
<td>AWG28 * 5P</td>
<td>Multicore shielded cable, manufactured by Fujikura Densen</td>
</tr>
<tr>
<td></td>
<td>IFVV-SB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CO-MA-VV-SB</td>
<td>Multicore shielded cable, manufactured by Hitachi Densen</td>
</tr>
<tr>
<td></td>
<td>5P * 28AWG</td>
<td></td>
</tr>
<tr>
<td>RS-422</td>
<td>H-9293A</td>
<td>Multicore shielded cable, manufactured by Hirakawa Densen</td>
</tr>
<tr>
<td></td>
<td>(CO-HC-ESV-3P * 7/0.2)</td>
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### Connectors

#### RS-232C

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>XM2A-2501</td>
<td>25-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>XM2A-0901</td>
<td>9-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>DB-25P</td>
<td>25-pin, manufactured by JAE</td>
</tr>
<tr>
<td>Connector cover</td>
<td>XM2S-2511</td>
<td>25-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>XM2S-0901</td>
<td>9-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>DB-C2-J9</td>
<td>25-pin, manufactured by JAE</td>
</tr>
</tbody>
</table>
### RS-422

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>XM2A-0901</td>
<td>9-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>DE-9P</td>
<td>9-pin, manufactured by JAE</td>
</tr>
<tr>
<td>Connector cover</td>
<td>XM2S-0901</td>
<td>9-pin, manufactured by OMRON</td>
</tr>
<tr>
<td></td>
<td>DE-C1-J6</td>
<td>9-pin, manufactured by JAE</td>
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### Optical Interface

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Module</td>
<td>Z3RN-A-5</td>
<td>RS-232C-to-optical 25-pin converter, manufactured by OMRON</td>
</tr>
<tr>
<td>Optical fiber cable</td>
<td>Z3F2-4D_M</td>
<td>PCF type, manufactured by OMRON, specify the cable length in the blank in the model number (-). The following cable lengths are available: 1, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 250, 300, 350, 400, 450, and 500.</td>
</tr>
<tr>
<td>AC adaptor</td>
<td>Z3GP-01</td>
<td>100 VAC, manufactured by OMRON</td>
</tr>
</tbody>
</table>

### Link Adaptor

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Adaptor</td>
<td>B500-AL004(-P)</td>
<td>100/200 VAC, manufactured by OMRON</td>
</tr>
</tbody>
</table>

### Optical Fiber Cable

Refer to the appropriate optical-fiber cable manuals for information on the specifications and handling procedures for the optical-fiber cables used for connection through a Link Adaptor.
Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.

Cat. No. V015-E1-1

The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

<table>
<thead>
<tr>
<th>Revision code</th>
<th>Date</th>
<th>Revised content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>September 1993</td>
<td>Original production</td>
</tr>
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</table>