OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

**DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**Caution** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

**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 "PLC" means Programmable Controller.

The abbreviation “host” means a controller, such as an IBM PC/AT or compatible computer, that controls a PT (Programmable Terminal).

**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.

- **Reference** Indicates supplementary information on related topics that may be of interest to the user.

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

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No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.
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About this Manual

Section 1 Overview
Provides an outline of the RGB and Video Input Unit, including its features and system configuration.

Section 2 Installing the RGB and Video Input Unit
Describes the nomenclature and functions of each part, the procedure for installing the RGB and Video Input Unit on a PT, and the procedure for connecting external devices to the Unit.

Section 3 RGB and Video Input Unit Functions
Describes the functions available when using an RGB and Video Input Unit along with the setting and adjustment procedures required for its operation.

Appendices
Provides hardware specifications, dimensions, and NS-CA001 comparison information.

⚠️ 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.
Related Manuals

The following manuals are used for NS-series PTs. (The boxes at the end of the catalog numbers indicate the revision code.)

- **NS Series -V1 Setup Manual** .....................................................V083-E1-
  Provides information on NS-V1 Series models (i.e., the NS12-V1, NS10-V1, NS8-V1, and NS5-V1).
  Describes how to connect the PT to the host and peripheral devices, methods to set up communications and operation, and procedures for maintenance.
  Refer to the *NS Series Programming Manual* (SBSA-512□) for information on PT functions and specific operating procedures.

- **NS Series Setup Manual** ............................................................V072-E1-
  Provides information on NS Series models (i.e., the NS12, NS10, and NS7).

- **NS Series Programming Manual** ..............................................V073-E1-
  Describes the screen configurations, object functions, and host communications for the PT.

- **NS-Designer Operation Manual** ................................................V074-E1-
  Describes operating procedures for the NS-Designer, which is used to create the screens displayed on the PT and transfer them to the PT. It includes screen creation and transfer procedures.
The following terminology is used in this manual.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>In this manual, indicates a Programmable Terminal in OMRON’s NS Series.</td>
</tr>
<tr>
<td>NS Series</td>
<td>Indicates products in OMRON’s NS Series of Programmable Terminals.</td>
</tr>
<tr>
<td></td>
<td>Unless otherwise specified, the information in this manual applies to the NS Series.</td>
</tr>
<tr>
<td>PLC</td>
<td>Indicates Programmable Controllers in the OMRON’s SYSMAC CS/CJ, C, or CVM1/CV Series of Programmable Controllers.</td>
</tr>
<tr>
<td>CS/CJ Series</td>
<td>Indicates Programmable Controllers in OMRON’s SYSMAC CS/CJ Series of Programmable Controllers: CS1G, CS1H, CS1G-H, CS1H-H, CJ1G, and CJ1M.</td>
</tr>
</tbody>
</table>
Introduction

Thank you for purchasing an RGB and Video Input Unit for the NS-series PT. The RGB and Video Input Unit is an Expansion Unit that is installed on an NS-series Programmable Terminal (PT) to display RGB signals from analog signal output devices, such as personal computers, or pictures from devices such as video cameras and Vision Sensors.

Refer to the NS Series Setup Manual, the NS Series Programming Manual, and the NS-Designer Operation Manual for details on the functions and performance of the PT.

● Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

Personnel in charge of introducing FA systems into production facilities
- Personnel in charge of designing FA systems
- Personnel in charge of installing and connecting FA systems
- Personnel in charge of managing FA systems and facilities

● Notice

This manual provides information for connecting and setting up an RGB and Video Input Unit for the NS-series PT. Be sure to read this manual before attempting to use the Unit and keep this manual close at hand for reference during installation and operation.

● General Precautions

- The user must operate the product according to the performance specifications described in the operation manuals.
- Do not use the PT touch switch input functions for applications where danger to human life or serious property damage is possible, or for emergency switch applications.
- Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.
- Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.
- This manual provides information for connecting and setting up an NS-series PT. Be sure to read this manual before attempting to use the PT and keep this manual close at hand for reference during installation and operation.
Safety Precautions

WARNING

Do not attempt to take the Unit apart and do not touch any internal parts while the power is being supplied. Doing either of these may result in electrical shock.
Precautions for Safe Use

- On unpacking the Unit and peripheral devices, check the external appearance and confirm that there is no damage. Also, shake the Unit gently and be sure there are no abnormal sounds.
- Be sure that metal scraps do not fall into the Unit when preparing the panel for installation.
- The power supply must have reinforced insulation to conform to the EC Low Voltage Directive.
- Be sure to ground the Unit properly to prevent malfunction due to noise.
- Do not touch the surface of the circuit board or the components mounted to it with our bare hands. Discharge static electricity from your body before handling the board.
- Before inserting or removing connectors, make sure that the Unit and the PT are turned OFF.
- After connecting the cables, always secure the cable connectors with screws.
- The cable's tensile load is 30 N max. Do not subject it to loads greater than this.
- Before turning power ON and OFF or pressing the reset switch, check the system to confirm that it is safe to do so.
- The entire system may shut down depending on how the power is turned ON and OFF. Follow the proper procedures for turning power ON and OFF.
- Carefully check the screen data, macros, and host program to make sure they are operating properly before actually using them.
- Do not perform the following while the Memory Card is being accessed.
  - Turning the power OFF on the PT
  - Pressing the reset switch on the PT
  - Removing the Memory Card
    (Always follow the proper procedure for removing the Memory Card.)
- To ensure that the system operates safely, add a procedure to the program at the host that periodically reads operation signals from the PT to see if the PT is operating properly.
- Do not use more than 30 N of force to press touch switches.
- Before pressing touch switches, check the system to confirm that it is safe to do so.
- Do not press a touch switch when the display is not backlit or is blank.
- Touch switch inputs may not be entered if the switches are pressed too quickly in rapid succession. Confirm each input before moving on to the next one.
- Always make sure that screen data is backed up on the NS-Designer before you initialize screen data.
- Never use chemical wipes or volatile solvents, such as benzene or thinner, to clean the Unit.
- Do not disassemble, repair, or modify the Unit.
- The disposal of the Unit and discarded batteries may be regulated by national or local authorities. Dispose of them in accordance with the laws and regulations of the relevant country and local authority.
Precautions for Correct Use

- Do not install the Unit at sites subject to the following conditions. Otherwise the product may malfunction.
  - Severe temperature variations
  - Temperature or humidity outside the ranges stated in the specifications
  - High humidity and condensation
  - Splashing of chemical agents
  - Severe oil splashing
  - Corrosive or flammable gases
  - Strong vibration or shock
  - Direct exposure to wind and rain (outdoor sites)
  - Strong ultra-violet irradiation

- Take adequate measures to ensure shielding if the Unit is used at a site subject to any of the following conditions. Otherwise, the product may malfunction.
  - Static electricity or noise from other equipment
  - Strong electromagnetic fields
  - Nearby power cables
  - Potential exposure to radioactivity
Section 1 Overview

This section provides an outline of the RGB and Video Input Unit, including its functions, features, and connection types.

1-1 RGB and Video Input Unit Features ........................................... 1-2
1-2 System Configuration .................................................................. 1-3
Install the RGB and Video Input Unit (NS-CA002) on the PT Expansion Interface to display external video images or analog RGB pictures on the PT. The Unit is an option for NS-series PTs.

- **Features**
  - Two video input ports (composite NTSC/PAL signal)
  - One analog RGB input port
    - Display resolution: 800 x 600 (mounted to an NS12 PT), 640 x 480 (mounted to an NS10 or NS8 PT)
    - Horizontal frequency: 37.5 kHz (mounted to an NS12 PT), 31.5 kHz (mounted to an NS10 or NS8 PT)
    - Vertical frequency: 60 Hz
  - One port for console output to a Vision Sensor Controller (same function key operations as the F160-KP)
  - Selectable video display size (and positionable displays)
  - Overlapping on video displays (Functional objects and pop-up screens can overlap video displays.)

* The above features apply only to PTs on which the RGB and Video Input Unit (NS-CA002) can be installed. Refer to 1-2 System Configuration for details.
A system configuration using the RGB and Video Input Unit is shown below.

**Note**

The RGB and Video Input Unit (NS-CA002) operates only when installed on the models in the *Applicable* column of the following table. Do not install it on any other PT.

<table>
<thead>
<tr>
<th>Applicable</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS12-TS0□(B) -V1</td>
<td>NS12-TS0□ (B)</td>
</tr>
<tr>
<td>NS10-TV0□ (B) -V1</td>
<td>NS10-TV0□ (B)</td>
</tr>
<tr>
<td>NS8-TV□□ (B) -V1</td>
<td>NS7-SV0□ (B)</td>
</tr>
<tr>
<td></td>
<td>NS5-SQ0□ (B) -V1</td>
</tr>
</tbody>
</table>
## Section 2 Installing the RGB and Video Input Unit

This section describes the procedure for installing the RGB and Video Input Unit on an NS-series PT and the procedure for connecting cables to the Unit.

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>RGB and Video Input Unit Components</td>
<td>2-2</td>
</tr>
<tr>
<td>2-2</td>
<td>Nomenclature and Functions</td>
<td>2-3</td>
</tr>
<tr>
<td>2-3</td>
<td>Installing the RGB and Video Input Unit</td>
<td>2-4</td>
</tr>
<tr>
<td>2-4</td>
<td>Connecting Video Input Connectors</td>
<td>2-9</td>
</tr>
<tr>
<td>2-5</td>
<td>Connecting the RGB Input Connector</td>
<td>2-11</td>
</tr>
<tr>
<td>2-6</td>
<td>Connecting the Console Port Connector</td>
<td>2-12</td>
</tr>
</tbody>
</table>
The following table shows the RGB and Video Input Unit model and product configuration.

<table>
<thead>
<tr>
<th>Model</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGB and Video Input Unit</td>
<td>Components</td>
</tr>
<tr>
<td>NS-CA002</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Contents</td>
</tr>
<tr>
<td>RGB and video board (1)</td>
<td>Allows video input and RGB input.</td>
</tr>
<tr>
<td>Cover (1)</td>
<td>Protects the RGB and video board.</td>
</tr>
<tr>
<td>Cable (1)</td>
<td>Connects the PT’s functional ground terminal and the cover to prevent noise.</td>
</tr>
<tr>
<td>Screws (M3) (9)</td>
<td>These screws are used for the following:</td>
</tr>
<tr>
<td></td>
<td>• Securing the RGB and video board to the back of the PT.</td>
</tr>
<tr>
<td></td>
<td>• Securing the cover to the back of the PT.</td>
</tr>
<tr>
<td></td>
<td>• Attaching the cable to the cover.</td>
</tr>
<tr>
<td>Operation manual</td>
<td>Manual for the NS-CA002.</td>
</tr>
</tbody>
</table>
This section describes the names and functions of RGB and Video Input Unit parts.

- **RGB and Video Board: Front View**

  - **Positions of screws for attaching the board to the PT**
  - **Contrast Adjustor**
    - Used to adjust the contrast of the video input. Both channels are adjusted together and cannot be adjusted individually.
  - **Contrast Adjustor**
  - **Two Video Input Connectors**
    - BNC-type connectors for inputting NTSC/PAL signals.
  - **Analog RGB Input Connector**
    - D-sub 15-pin connector (Mini) used to connect a device, such as a computer, that outputs analog RGB signals and allows displaying pictures on the PT.
  - **Console Port Connector**
    - Connects to the console connector of an OMRON Vision Sensor and allows Vision Sensor settings and other operations to be performed from the PT.

- **RGB and Video Board: Rear View**

  - **Expansion Interface Connector**
    - Connects to the PT's expansion interface connector when mounting the RGB and video board.
This section describes the procedure for installing the RGB and Video Input Unit on the PT.

**Note**
- Do not touch the surface of the circuit board or the components mounted to it with your bare hands.
- After installing the Unit on the PT, always secure it with the screws provided. The applicable mounting torque is 0.6 N-m.
- Before installing or removing the Unit, make sure that the Unit and the PT are turned OFF. Make sure that installing or removing is carried out correctly as described in *Installing or Removing*.
- When the Unit is installed, the depth of the PT increases by 24 mm. Make sure that there is enough space in the control panel before installing the Unit.

When complying with the EC Directive for the NS hardware with an RGB and Video Input Unit mounted, make sure that the NS hardware is mounted on the control panel and each cable is connected with a ferrite core.

**Recommended Control Panel**

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC-SCF16-45</td>
<td>Nitto Electric Works, Ltd.</td>
</tr>
</tbody>
</table>

**Recommended Ferrite Cores**

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZCAT1518-0730</td>
<td>TDK</td>
<td>Video Cable</td>
</tr>
<tr>
<td>ZCAT1518-0730</td>
<td>TDK</td>
<td>Console Cable</td>
</tr>
<tr>
<td>ZCAT2035-0930</td>
<td>TDK</td>
<td>RGB Monitor Cable</td>
</tr>
<tr>
<td>ZCAT1325-0530</td>
<td>TDK</td>
<td>FG Cable</td>
</tr>
<tr>
<td>ZCAT-3035-1330</td>
<td>TDK</td>
<td>AC Power Cable</td>
</tr>
<tr>
<td>ZCAT-2436-1330</td>
<td>TDK</td>
<td>AC Power Cable</td>
</tr>
</tbody>
</table>

**Installing the RGB and Video Input Unit**

1. Install the RGB and video board so that its expansion interface connector is inserted into the expansion interface connector on the back of the PT and the respective screw holes are aligned. Hold the RGB and video board by the corners, keeping it parallel to the back of the PT.
(2) Push firmly on the connector end of the board and make sure that it is inserted sufficiently.

(3) Secure the four corners of the RGB and video board with screws.

(4) Insert screws in the screw holes for attaching the cover and tighten them slightly.
(5) Align the cover screw holes with the screws and mount the cover.

(6) Slide the cover downward and tighten the screws.
● Connecting the Cable
Connect the functional ground terminal of the PT and the cover with the cable to prevent malfunction due to noise.

● Removing the RGB and Video Input Unit
(1) Remove the cover from the back of the PT. Loosen the cover mounting screws and slide the cover upward.

Loosen the screws.  Remove the cover.
(2) Remove the cover and remove the screws securing the four corners of the RGB and video board.

(3) Remove the RGB and video board from the expansion interface connector on the back of the PT in the order shown in the following diagram.

(1) Hold the RGB and video board by the corners and remove it starting from the top.

(2) Pull the entire RGB and video board away from the PT.
2-4 Connecting Video Input Connectors

This section describes the procedure for connecting cameras to the RGB and Video Input Unit mounted on the PT.

**Note** The cable’s tensile load is 30 N maximum. Do not subject it to loads greater than this.

- **Connecting Video Input Connectors**
  1. Insert the BNC socket on the camera’s output cable into a video input connector.
  2. After inserting the BNC socket, twist it clockwise until it locks into place.
2-10 Disconnecting Video Input Connectors

1. Unlock the BNC socket on the camera’s video output cable by pressing it in and twisting it counterclockwise.

2. After unlocking the BNC socket, pull it out.

3. If the camera’s video output cable uses an RCA plug, connect it to the video input connector using a BNC-RCA connector as way shown below.

   * The BNC-RCA connector is not provided with the RGB and Video Input Unit (NS-CA002).
This section describes the procedure for connecting an analog RGB output device, such as a computer, to the RGB and Video Input Unit installed on a PT.

**Note** The cable's tensile load is 30 N maximum. Do not subject it to loads greater than this.

- **Connecting the RGB Input Connector**
  1. Insert the socket of the RGB cable into the RGB input connector on the RGB and Video Input Unit.
  2. Tighten the screws firmly to secure the connector.

- **Disconnecting the RGB Input Connector**
  1. Loosen the screws of the connector.
  2. Carefully remove the RGB cable from the connector on the RGB and Video Input Unit.
This section describes the procedure for connecting the console port connector of an OMRON Vision Sensor (F150-C10V3, F160-C10V2, F180-C10, F400-C10V2, F250-C10, or V530-R150V2) to the RGB and Video Input Unit installed on a PT. This connection requires an OMRON Relay Cable (F150-VKP).

**Connecting the Console Port Connector**

Insert the socket of the Relay Cable (F150-VKP) into the RGB and video board’s console port connector.

The socket locks into place when it is inserted.

**Disconnecting the Console Port Connector**

Remove the Relay Cable by pulling the collar back on the connector as shown below.
Section 3 RGB and Video Input Unit Functions

This section describes the functions available when using the RGB and Video Input Unit along with the setting and adjustment procedures required for its operation.

3-1 Display ................................................................. 3-2
3-2 Video Capture ...................................................... 3-15
3-3 Console Connection ............................................. 3-17
3-4 Settings and Adjustments ....................................... 3-18
A PT screen can display images from devices connected to the RGB and Video Input Unit. The type of devices that can be connected to the Unit range from video cameras, Vision Sensors, and other video equipment to personal computers and other analog RGB output devices.

### 3-1-1 Video Display

Install the NS-CA002 RGB and Video Input Unit on an NS12-V1, NS10-V1, or NS8-V1 PT to display video images from video devices such as video cameras or Vision Sensors on the PT.

<table>
<thead>
<tr>
<th>No. of video input connectors</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input methods</td>
<td>NTSC or PAL</td>
</tr>
<tr>
<td>Max. simultaneous displays</td>
<td>1</td>
</tr>
<tr>
<td>Video display size</td>
<td>Any size up to 640 x 480 dots (W x H)</td>
</tr>
<tr>
<td>On-screen positioning</td>
<td>Selectable (Images must not extend off the screen.)</td>
</tr>
<tr>
<td>Positionable screens</td>
<td>Normal (base) screens only</td>
</tr>
<tr>
<td>Functional object overlap</td>
<td>In the order opened (an object can overlap a video display)</td>
</tr>
</tbody>
</table>

**Reference**

- The RGB and Video Input Unit has two video input connector ports that enable up to two input devices (e.g. video cameras and Vision Sensors) to be connected to the Unit at one time. With only one video display possible per screen, images from a video camera and Vision Sensor cannot be displayed at the same time. One screen cannot display two RGB images either.
- The NTSC/PAL setting is the same for all video input ports. This means that a video camera and Vision Sensor connected to the Unit at the same time cannot be set individually to NTSC or PAL.
- Video displays cannot be performed on the NS5-SQ0□-V1. The user can create a video display with the NS5-SQ0□-V1 selected as the PT model, but do not transfer screen data containing video images to the PT.
• **Procedure for Displaying Video Images**

1. Mount the RGB and video board on an NS-V1 PT.
   Follow the procedure for installing the RGB and Video Input Unit on the back of the PT. Refer to 2-3 *Installing the RGB and Video Input Unit* for details.

2. Connect a video camera, Vision Sensor, or other input device to a video input connector.
   Connect the input device to the video input connector on the RGB and Video Input Unit. Refer to 2-4 *Connecting Video Input Connectors* for details.

3. Create a project.
   Use the NS-Designer to create the RGB and Video Input Unit project.
   - Creating New Projects
     Set the *System Version* field to *System Ver. 5.1 or later* in the New Project Dialog Box.
   - Opening Existing Projects
     A project with screen data that was edited or saved using NS-Designer Ver. 5.0 or earlier must be converted to System Ver. 5.1 or later from the Settings Menu on the NS-Designer.
     Select *Settings – Conversion – Project – To Ver 5.1*.

4. Set system settings from NS-Designer.
   (1) Select *Settings – System Setting* on the NS-Designer.
   (2) Select the Video Tab from the System Setting Dialog Box.
   (3) Set the *Video Board* field to *RGB/Video Input Unit with 2 channels (NS-CA002)*, and click the OK Button.

Refer to **3-1-3 Changing the Video Board Field Setting** for details.
5. Set the video input method.
   (1) Select **Settings – System Setting** on the NS-Designer.
   (2) Select the Video Tab from the System Setting Dialog Box.
   (3) Set the **Video Input Method** and click the **OK** Button.

   **Reference**
   The NTSC/PAL setting is the same for all video input ports. A video camera and Vision Sensor connected to the Unit at the same time cannot be set individually to NTSC or PAL.

6. Create a video display.
   Create a video display object on the screen to display video images.
   (1) Select **Functional Objects – Video Display** or select the ![Icon] on the NS-Designer.
   (2) Place the video display object on the screen. The size and position of the object can be adjusted at this time, or they can be changed later from the Property Setting Dialog Box.
   (3) Select the channel of the video port that will be displayed.
   Select the video input channel where a video camera, Vision Sensor, or other input device is connected. Set the channel in the **Select Input ch** field in the Properties Setting Dialog Box from the Video Display Window.

   **Reference**
   - When the RGB and Video Input Unit (NS-CA002) is selected, pop-up screens and keypads may be displayed on the video display.
   - The video display object and other functional objects are organized in the order they were opened. This may place functional objects on top of the video display object.
   - A video display object can be any size up to 640 x 480 dots (W x H).
   - A video display object cannot be placed with all or part of it off the screen.
   - Video display objects can be placed on normal (base) screens only. They cannot be placed on pop-up screens, sheets, or frames.
   - Only one video display object can be placed on a screen at a time.

7. Transfer the newly created screen data to the PT.
   Save the newly created screen data, and then transfer it to the PT. Refer to **10-1 Transferring Data** in the NS-Designer Operation Manual for details.

   **Reference**
   Video displays cannot be performed on the NS5-SQ0□-V1. The user can create a video display with the NS5-SQ0□-V1 selected as the PT model, but do not transfer screen data containing video images to the PT.
### Property Settings for Video Display Objects

This section describes video display items in the Functional Objects Properties Dialog Box from the Video Display Window.

<table>
<thead>
<tr>
<th>General</th>
<th>Selects the input channel for the video signal displayed by the video display object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>-</td>
</tr>
<tr>
<td>Image Position</td>
<td>Selects the video display frame start point and space line setting for data input from a video camera or Vision Sensor.</td>
</tr>
<tr>
<td>Size/Position</td>
<td>Sets the size of the video display object.</td>
</tr>
</tbody>
</table>

![Video Display Window](image)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Comment</td>
<td>Used to write descriptive comments about the video display object (up to 32 characters long).</td>
</tr>
</tbody>
</table>
| (2) | Select Input ch    | Selects the input channel for the video signal displayed by the video display object.  
                   | 1 ch: Channel 1 video input connector                                   
                   | 2 ch: Channel 2 video input connector                                   |
### 3-1 Display

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
</table>
| (1) | Start Point of Video Display Frame | Sets the start point for image data input from the video camera or Vision Sensor at each channel. The setting range is as follows:  
Dot position: 0 to 66 (depending on size of video display)  
Line position: 0 to 48 (depending on size of video display) |
| (2) | Space line setting          | If the image input from a video camera or Vision Sensor is smaller than the display area, the image can be displayed with the difference filled in with black. This setting sets the size of the black fill area. The range is as follows:  
0 to 479 (Video display height – 1 is the maximum value.) |
<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Size</td>
<td>Sets the height and width of the video display object in dot units. The range is as follows: Height: 1 to 480, Width: 1 to 640</td>
</tr>
<tr>
<td>(2)</td>
<td>Position from the Upper Left of Screen</td>
<td>Sets the position of the video display object based on its horizontal (X axis) and vertical (Y axis) position from the upper left side of the screen. The range is as follows: X coordinate: 0 to 639 (as long as non of the video display is positioned off the screen) Y coordinate: 0 to 479 (as long as non of the video display is positioned off the screen)</td>
</tr>
<tr>
<td>(3)</td>
<td>Aspect Ratio</td>
<td>Used to lock or change the ratio of width to height for the video display object. When this setting is cleared, the height and width of the object can be set individually.</td>
</tr>
</tbody>
</table>
Blank Channel Fill-in Color

The blank channel fill-in color is one that is replaced by an image to display video images on a PT screen. The color is transparent to video images on the screen. When a blank channel fill-in color is selected for functional and other objects (excluding video display objects), the area with the blank channel fill-in color becomes transparent and video images show through the color. The part above the display area shows video images and the part outside the display area is black. If a rectangle is placed on the screen and the blank channel fill-in color selected for the rectangle is the transparent color for example, then video images are displayed in part of the rectangle.

Select **Settings - System Setting** on the NS-Designer, and then set the *Color which fills blank channels* field from the System Setting Dialog Box that is displayed.
3-1-2 RGB Display

Install the NS-CA002 RGB and Video Input Unit on an NS12-V1, NS10-V1, or NS8-V1 PT to display an analog RGB signal from devices such as personal computers on the PT.

<table>
<thead>
<tr>
<th>No. of RGB input connectors</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. simultaneous displays</td>
<td>1</td>
</tr>
</tbody>
</table>
| RGB display size           | Mounted to the NS12 PT: 800 x 600 dots (W x H)  
Mounted to the NS10 or NS8 PT: 640 x 480 dots (W x H) (full-screen display only) |
| On-screen positioning      | Fixed (full-screen display only) |
| Positionable screens       | Normal (base) screens only |
| Functional object overlap  | No (RGB display is full screen) |

**Reference**
- The RGB and Video Input Unit has one analog RGB input connector port that enables only one device, such as a personal computer, to be connected to the Unit at a time.
- The analog RGB signal input must conform to input specifications for the Unit. Otherwise the image may not be displayed or may be distorted on the PT screen.
- The RGB display fills the entire PT screen. The display size of the analog RGB signal input must match the screen size (resolution) of the mounted PT.

**RGB Display Procedure**

1. Mount the RGB and video board on the NS-V1 PT.
   Follow the procedure for installing the RGB and Video Input Unit on the back of the PT. Refer to 2-3 *Installing the RGB and Video Input Unit* for details.

2. Connect a device such as a personal computer to the analog RGB input connector.
   Connect the device to the analog RGB input connector on the RGB and Video Input Unit. Refer to 2-5 *Connecting the RGB Input Connector* for details.

3. Create a project.
   Use the NS-Designer to create the RGB and Video Input Unit project.
   - **Creating New Projects**
     Set the System Version field to *System Ver. 5.1 or later* in the New Project Dialog Box.
3-1 Display

- **Opening Existing Projects**
  A project with screen data that was edited or saved using NS-Designer Ver. 5.0 or earlier must be converted to System Ver. 5.1 or later from the Settings Menu on the NS-Designer.
  Select *Settings – Conversion – Project – To Ver 5.1.*

4. Select the RGB and Video Input Unit.

   (1) Select *Settings – System Setting* on the NS-Designer.
   (2) Select the Video Tab from the System Setting Dialog Box.
   (3) Set the *Video Board* field to *RGB/Video Input Unit with 2 channels (NS-CA002)*, and click the OK Button.

**Reference**

Observe the following precautions when changing the *Video Board* field setting.
- If the *Video Board* field is changed with a video display object already on the screen, the control object on the screen will be converted or will be deleted.
- Check to see if all video display objects and Command Buttons in the project operate correctly with the Video Input Unit you selected when you changed the *Video Board* field setting.
- Refer to 3-1-3 *Changing the Video Board Field Setting* for details.

5. Create an RGB display.

   Create a video display object on the screen to display the RGB image.

   (1) Select *Functional Objects – Video Display* or select the  Icon on the NS-Designer.
   (2) Place the video display object on the screen. The size and position of the object is not important at this time.
   (3) Select the input that will be displayed to RGB.
     Set the *Select Input ch* field to RGB in the Properties Setting Dialog Box from the Video Display Window.
3-1 Display

**Reference**

- Pop-up screens and keypads cannot be seen with an RGB image displayed because the RGB image is a full-screen display at the top layer on the PT.
- Do not create other functional objects with an RGB image displayed. The objects cannot be seen because the RGB image is a full-screen display at the top layer on the PT.
- The size of the video display object displaying an RGB image is fixed at 640 x 480 dots (W x H) when the board is mounted to an NS10 or NS8 PT and at 800 x 600 dots (W x H) when the board is mounted to an NS12 PT.
- A video display object cannot be placed with all or part of it off the screen.
- Video display objects can be placed on normal (base) screens only. They cannot be placed on pop-up screens, sheets, or frames.
- Only one video display object can be placed on a screen at a time.

6. Transfer the newly created screen data to the PT.

   Save the newly created screen data, and then transfer it to the PT. Refer to 10-1 Transferring Data in the NS-Designer Operation Manual for details.

**Reference**

Video displays cannot be performed on the NS5-SQ0□-V1. The user can create a video display with the NS5-SQ0□-V1 selected as the PT model, but do not transfer the screen data to the PT.

**Property Settings for Video Display Objects**

This section describes video display items in the Functional Objects Properties Dialog Box from the RGB Display Window.

<table>
<thead>
<tr>
<th>General</th>
<th>Sets the video display object to display an RGB image.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>-</td>
</tr>
<tr>
<td>Image Position</td>
<td>-</td>
</tr>
<tr>
<td>Size/Position</td>
<td>-</td>
</tr>
</tbody>
</table>
### 3-1 Display

**No.** | **Item** | **Contents**
---|---|---
(1) | Comment | Used to write descriptive comments about the video display object (up to 32 characters long).
(2) | Select Input ch | Selects analog RGB image display for the video display object.
  | | RGB: Analog RGB input

#### 3-1-3 Changing the *Video Board* Field Setting

This field selects the type of Video Input Unit that will be used in the project. It must be set when a project is first created because the functions available with each Unit vary slightly. Changing this setting changes the current project. If you change the setting while a project is being edited and then try to save the project, you will get a dialog box telling you that the project has been changed and asking you where to save it. Specify where to save the project.
When the Video Board Field Setting Changes

The following changes will be made to screen data that is being edited when the Video Board field is changed.

1. Switching from an NS-CA001 Video Input Unit to an NS-CA002 RGB and Video Input Unit

<table>
<thead>
<tr>
<th>Component</th>
<th>Properties</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video display</td>
<td>Comments</td>
<td>No change.</td>
</tr>
<tr>
<td>Display size</td>
<td>800 x 600: Changes to 640 x 480. Position from the upper left side of screen = Sets to (0, 0).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 640 x 480: No change.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 320 x 240: Changes to 320 x 240 with no split screen. Changes the display position to that of the smallest input channel number displayed.</td>
<td></td>
</tr>
<tr>
<td>Split screen designation</td>
<td>Changes to no split screen.</td>
<td></td>
</tr>
<tr>
<td>Select Input ch</td>
<td>Channel 1 or 2: No change. Channel 3 or 4: Changes to channel 1</td>
<td></td>
</tr>
<tr>
<td>Frame</td>
<td>Changes to no frame.</td>
<td></td>
</tr>
<tr>
<td>Start Point of Video Display Frame</td>
<td>The following changes are made depending on the display size after the setting was changed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 640 x 480: dot position = 33, line position = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 320 x 240: dot position = 16, line position = 1</td>
<td></td>
</tr>
<tr>
<td>Space line setting</td>
<td>No change.</td>
<td></td>
</tr>
<tr>
<td>Position from the Upper Left of Screen</td>
<td>The following changes are made depending on the display size before the setting was changed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 800 x 600: X coordinate = 0, Y coordinate = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 640 x 480: No change.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 320 x 240: Changes the display position to that of the smallest input channel number displayed.</td>
<td></td>
</tr>
<tr>
<td>Command Buttons</td>
<td>-</td>
<td>No change.</td>
</tr>
</tbody>
</table>

2. Switching from an NS-CA002 RGB and Video Input Unit to an NS-CA001 Video Input Unit

<table>
<thead>
<tr>
<th>Component</th>
<th>Property</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video display</td>
<td>-</td>
<td>Deletes all video display objects.</td>
</tr>
<tr>
<td>Command Buttons</td>
<td>-</td>
<td>No change.</td>
</tr>
</tbody>
</table>
Reference

If Video Control – Video Capture is selected from the Function field in Command Button properties, you can only select Upper left or No split screen when the Video Board field setting is changed.

When you switch the Video Input Unit to the RGB and Video Input Unit and try to use the Command button to capture an image, the capture Command Button will not function with Lower left selected for example.

Review the Function field settings after you change the Video Board field setting to ensure that all video control Command Buttons function properly.
3-2 Video Capture

Video images displayed on the PT can be captured and saved on a Memory Card in BMP format. These images may be captured using a system memory bit or a Command Button on the PT screen.

- **Video Capture by System Memory Bit**
  $SB24$ is used to capture an image when it turns ON. It turns OFF after the video capture is completed. If an error occurs while an image is being captured, $SB47$ will turn ON.
  A file is created in the log folder (¥LOG) under the Memory Card directory for the captured BMP data, and is named according to the following rules. The normal screen number and file number will be automatically added to the file name when the video capture is executed.

  ![3999_VideoLT_999.bmp](image)

  - **File Number**: The files will be automatically numbered in order from 001 to 999. If all numbers are used, the oldest numbered file will be deleted and the newest file will be saved. (Same procedure as for the Command Button.)
  - **VideoLT**: A fixed character string.
  - **Screen number**: The normal screen number when the video capture was executed will be automatically added (0000 to 3999).

- **Video Capture by Command Button**
  Select **Video Control – Video Capture** from the **Function** field in Command Button properties. Specify the name of the BMP file that will be saved in the **Save File** field.
  A file is created in the log folder (¥LOG) under the Memory Card directory for the captured BMP data, and is named according to the following rules. The file number will be automatically added to the file name when the video capture is executed.

  ![Video999.bmp](image)

  - **File Number**: The files will be automatically numbered in order from 001 to 999. If all numbers are used, the oldest numbered file will be deleted and the newest file will be saved.
  - **Name of saved file**:
• When you change the Video Board field setting from System Settings, the Command Button may not capture video images because the video display settings have changed. Always review the Command Button settings after you change the Video Board field setting.

• Operation will be as follows when the If Memory Card is full property is set to Update and the Memory Card is full when you save a captured video image:
  1. The size of the current file is compared to the size of the oldest file. If the current file is smaller, then the oldest file will be deleted and the current file will be saved.
  2. If the current file is larger than the oldest file, then the second oldest file will be added and the size of the two files will be compared to the current file. If the oldest and second oldest files together are larger than the current file, then the two oldest files will be deleted and the new file will be saved.
  3. If space cannot be secured according to the rules above, the files in the Memory Card will remain unchanged and an error message will be displayed.

• RGB display images cannot be accepted

• When a video image is captured, a file with the same name as the captured image file and an extension of .mng will be created in the log folder (¥LOG) under the Memory Card directory. These files are used to manage numbers for file names. Do not edit or delete these files.
3-3 Console Connection

Connect the console connector of an OMRON Vision Sensor Controller to the RGB and Video Input Unit to perform functions, such as setting the Vision Sensor, using buttons on the PT screen.

● Using Console Connection Functions

Select Video Control – Vision Sensor Console Output from the Function field in Command Button properties. Set the console button functions you want to use in the Signal type field.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Signal type</td>
<td>Selects the type of signal that will be sent to the Vision Sensor.</td>
</tr>
</tbody>
</table>
3-4 Settings and Adjustments

3-4-1 System Settings

Select the Video Tab from the System Setting Dialog Box.

![System Setting Dialog Box]

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Video Board</td>
<td>Selects the type of video board mounted on the PT. Changing this setting changes the current project.</td>
</tr>
<tr>
<td>(2)</td>
<td>Color which fills blank channels</td>
<td>Selects the color that is used to display video images with the NS-CA002 RGB and Video Input Unit installed.</td>
</tr>
<tr>
<td>(3)</td>
<td>Video Input Method</td>
<td>Selects the video signal input method. The setting is the same for all video board inputs.</td>
</tr>
<tr>
<td>(4)</td>
<td>Save in a file</td>
<td>Sets the action to perform if the Memory Card is full when you save a file with an image captured by system memory bit. Update: Deletes the oldest file before saving the current file. Stop: File will not be saved.</td>
</tr>
</tbody>
</table>
3-4-2 Video Configuration

Install the RGB and Video Input Unit on the PT to display video images on the PT from video cameras or Vision Sensors connected to the Unit. Video Configuration can be used to adjust the contrast of images and to output to the Vision Sensor console.

- Opening the Video Configuration Window
The Video Configuration Window is accessed from the System Menu.
(1) Display the Special Screen Tab Page from the System Menu and select Video Configuration from the Special Function field. Then, click the Start Button.

- Exiting Video Configuration
Click the Back Button on the bottom right side of the Video Configuration Window to exit Video Configuration. The window will return to the System Menu.
**Image Quality Adjustments and Console Output Methods**

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Display area</td>
<td>Displays images from a video camera or Vision Sensor connected to the channel 1 or channel 2 video input connector on the RGB and Video Input Unit. Use the Select Input ch field to switch the channel that is displayed. The area turns blue if data is not input to the channel currently being displayed.</td>
</tr>
</tbody>
</table>
| (2) | Image adjustments     | Adjusts the quality of the image from the selected video input connector channel on the RGB and Video Input Unit. The contrast, brightness, shade, and tone of the image can be adjusted by clicking the buttons. The adjustments are as follows:  

  - <<: -10
  - <: -1
  - >: +1
  - >>: +10 |
| (3) | Video Input Method    | Selects the method used to input image signals from the video input connectors on the RGB and Video Input Unit.                                                                                       |
| (4) | Select Input ch       | Selects the input channel on the RGB and Video Input Unit that will be adjusted.  

  - 1 ch: Video input connector channel 1  
  - 2 ch: Video input connector channel 2  
  - RGB: Analog RGB input connector (RGB Configuration is accessed.) |
3-4 Settings and Adjustments

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>Vision Sensor Console Outputs</td>
<td>Click these buttons to send control signals to an OMRON Vision Sensor connected to the console output connector on the RGB and Video Input Unit. Refer to the Vision Sensor manual for details on individual button functions. Function keys (F1 to F9) are available only with Command Buttons.</td>
</tr>
<tr>
<td>(6)</td>
<td>Write</td>
<td>Saves image quality adjustments. Previous settings will remain if the PT is restarted without clicking the <strong>Write</strong> Button.</td>
</tr>
</tbody>
</table>

**Video Configuration by Command Buttons**

Image adjustments (contrast, brightness, shade, and tone) can be performed using Command Buttons.

![Command Button - PH32000](image)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
</table>
| (1) | Contrast | Setting items: -10, -1, +1, +10  
Adjustable in 64 steps. |
| (2) | Brightness | Setting items: -10, -1, +1, +10  
Adjustable in 128 steps. |
| (3) | Shade | Setting items: -10, -1, +1, +10  
Adjustable in 32 steps. |
| (4) | Tone | Setting items: -10, -1, +1, +10  
Adjustable in 256 steps. |
3-4-3 Contrast Adjustor Settings

The contrast must be adjusted if the image on the PT screen is too bright or too dark. It is usually adjusted using the Video Configuration function. If the contrast is not improved this way, then change the contrast adjustor setting on the RGB and video board. Turn the contrast adjustor gradually using a small Phillips screwdriver while checking the image displayed on the PT.

* The image may be distorted if the contrast adjustor is turned too far. When that happens, turn the adjustor in the opposite direction until the distortion is eliminated.
3-4-4 RGB Configuration

Install the RGB and Video Input Unit on the PT and connect a personal computer to the Unit to display analog RGB images from the personal computer on the PT. *RGB Configuration* can be used to adjust the quality of these images.

- **Opening the RGB Configuration Window**
  Switch from *Video Configuration* to access *RGB Configuration*.
  1. Display the Special Screen Tab Page from the System Menu and select *Video Configuration* from the *Special Function* field. Then, click the **Start** Button.
  2. Click the **RGB** Button in the *Select Input ch* field.
  3. RGB Display is selected. Touch anywhere on the screen.

- **Exiting RGB Configuration**
  Click the **Back** Button on the bottom right side of the RGB Configuration Window to exit *RGB Configuration*. The window will return to the System Menu.

- **RGB Image Quality Adjustments**
  RGB images are always displayed full screen. This means the display cannot be checked while you are adjusting image quality. Click the **RGB** Button in the *Select Input ch* field to select RGB display, and touch anywhere on the screen to go back to adjusting the image. Switch back and forth between image adjustment and RGB display this way until the RGB image is adjusted.
### 3-4 Settings and Adjustments

#### Table of Contents

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>RGB display area</td>
<td>Does not display RGB images. Click the RGB Button in the Select Input ch field to switch to full-screen RGB display.</td>
</tr>
</tbody>
</table>
| (2) | Gain adjustments            | Adjusts the gain of the individual R, G, and B signals in image data from the RGB input connector on the RGB and Video Input Unit. The adjustments are as follows: 
  - <<: -10 
  - <: -1 
  - >: +1 
  - >>: +10 |
| (3) | Phase level                 | Finely adjusts the image signal from the RGB input connector on the RGB and Video Input Unit. Overall sharpness of the RGB image may be improved by adjusting this level. |
| (4) | Select Input ch             | Selects the input channel on the RGB and Video Input Unit that will be adjusted.  
  - 1 ch: Video input connector channel 1 (Video Configuration is accessed.)  
  - 2 ch: Video input connector channel 2 (Video Configuration is accessed.)  
  - RGB: Analog RGB input connector |
| (6) | Write                       | Saves image quality adjustments. Previous settings will remain if the PT is restarted without clicking the Write Button. |
RGB Configuration by Command Buttons

RGB image gain can be adjusted using Command Buttons.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
</table>
| (1) | Red  | Setting items: -10, -1, +1, +10  
      |      | Adjustable in 256 steps. |
| (2) | Green| Setting items: -10, -1, +1, +10  
      |      | Adjustable in 256 steps. |
| (3) | Blue | Setting items: -10, -1, +1, +10  
      |      | Adjustable in 256 steps. |
3-4-5 Video Display Control

Video and RGB displays can be turned ON and OFF using system memory bits. When a system memory bit is used for video display control, the RGB display can be turned OFF temporarily by host command. Video display control is allocated to $SB15. $SB15 displays images when it turns ON if there is a video display object on the current screen and there is video or RGB input data available. The video or RGB image display stops when $SB15 turns OFF. You know that $SB15 is ON if there is a video display object present and video starts to play when the screen is switched. You know it is OFF if there is no video display object present and video does not start to play when the screen is switched.
Appendices

Appendix 1  Specifications ......................................................... A-2
Appendix 2  Pin Arrangement .................................................... A-3
Appendix 3  Dimensions .......................................................... A-4
Appendix 4  Comparison to NS-CA001 Video Input Unit .......... A-5
Appendix 1 Specifications

A-1-1 General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>150 x 102 x 22 mm (W x H x D)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.5 kg max.</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>If the Unit is mounted at an angle between 0º and 30º to the horizontal: 0 to 40ºC</td>
</tr>
<tr>
<td></td>
<td>If the Unit is mounted at an angle between 30º and 90º to the horizontal: 0 to 50ºC</td>
</tr>
<tr>
<td>Ambient storage temperature</td>
<td>-20 to 60ºC</td>
</tr>
<tr>
<td>Ambient operating humidity</td>
<td>35% to 85% (with no condensation)</td>
</tr>
<tr>
<td>Rated power supply voltage</td>
<td>Power supplied from the PT's expansion interface connector (5 V ±5%, 3.3 V ±5%)</td>
</tr>
<tr>
<td>Operating atmosphere</td>
<td>No corrosive gases.</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Same as PT.</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Same as PT.</td>
</tr>
</tbody>
</table>

A-1-2 General Specifications

- **External Interface Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video input</td>
<td>2 ports</td>
</tr>
<tr>
<td>Analog RGB input</td>
<td>1 port</td>
</tr>
<tr>
<td>Console output</td>
<td>1 port</td>
</tr>
<tr>
<td>Expansion interface</td>
<td>1 port (for the PT's expansion interface connector)</td>
</tr>
</tbody>
</table>

- **Video Input Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input method</td>
<td>NTSC/PAL</td>
</tr>
<tr>
<td>Signal input connector</td>
<td>BNC connector</td>
</tr>
<tr>
<td>Input signal</td>
<td>Standard NTSC or PAL composite video signal 1.0 Vp-p, 75</td>
</tr>
</tbody>
</table>

- **Analog RGB Input Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display resolution (No. of dots)</td>
<td>640 x 480 (Mounted to the NS10 or NS8) 800 x 600 (Mounted to the NS12)</td>
</tr>
<tr>
<td>Horizontal frequency</td>
<td>31.5 kHz 37.5 kHz</td>
</tr>
<tr>
<td>Vertical frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Signal input connector</td>
<td>D-Sub,15-pin</td>
</tr>
<tr>
<td>Input synchronization signal</td>
<td>Separate, TTL, positive/negative polarity</td>
</tr>
<tr>
<td>Input picture signal</td>
<td>Analog, positive polarity (0.7 Vp-p/75 )</td>
</tr>
</tbody>
</table>

* Be sure to change the resolution and frequency to levels that can be displayed on the PT before connecting the PT to a personal computer or other devices.
Appendix 2 Pin Arrangement

- Analog RGB Input Connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>H SYNCH</td>
<td>Input (personal computer or other external device) -&gt; RGB and Video Input Unit</td>
</tr>
<tr>
<td>14</td>
<td>V SYNCH</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>NC</td>
<td></td>
</tr>
</tbody>
</table>

Connector hood

GND: Ground
Appendix 3 Dimensions
# Appendix 4 Comparison to NS-CA001 Video Input Unit

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video input ports</td>
<td><strong>NS-CA002</strong> 2 ports  \hspace{1cm}  <strong>NS-CA001</strong> 4 ports</td>
</tr>
<tr>
<td>Analog RGB input port</td>
<td><strong>NS-CA002</strong> 1 port  \hspace{1cm}  <strong>NS-CA001</strong> None</td>
</tr>
<tr>
<td>Console output port</td>
<td><strong>NS-CA002</strong> 1 port  \hspace{1cm}  <strong>NS-CA001</strong> 1 port</td>
</tr>
<tr>
<td>Video display size</td>
<td><strong>NS-CA002</strong> Selectable up to 640 x 480 dots  \hspace{1cm}  <strong>NS-CA001</strong> Fixed sizes 800 x 600 dots, 640 x 480 dots, 320 x 240 dots</td>
</tr>
<tr>
<td>Split screen video display</td>
<td><strong>NS-CA002</strong> Not supported  \hspace{1cm}  <strong>NS-CA001</strong> Supported (4 screens max.)</td>
</tr>
<tr>
<td>Video picture overlap</td>
<td><strong>NS-CA002</strong> Supported  \hspace{1cm}  Functional objects, pop-up screens, and other objects can overlap a video display  \hspace{1cm}  <strong>NS-CA001</strong> Not supported  \hspace{1cm}  The video display is always on the top layer.</td>
</tr>
<tr>
<td>RGB display size</td>
<td><strong>NS-CA002</strong> Fixed display 800 x 600 dots, 640 x 480 dots  \hspace{1cm}  <strong>NS-CA001</strong> -</td>
</tr>
<tr>
<td>Simultaneous RGB and video display</td>
<td><strong>NS-CA002</strong> Not supported  \hspace{1cm}  <strong>NS-CA001</strong> -</td>
</tr>
<tr>
<td>RGB picture overlap</td>
<td><strong>NS-CA002</strong> Not supported  \hspace{1cm}  The RGB picture is always on the top layer.  \hspace{1cm}  <strong>NS-CA001</strong> -</td>
</tr>
<tr>
<td>Console button press and hold</td>
<td><strong>NS-CA002</strong> Supported  \hspace{1cm}  The external output signal stays ON as long as the command button is held down.  \hspace{1cm}  <strong>NS-CA001</strong> Not supported  \hspace{1cm}  The external output signal automatically turns OFF even if the command button is held down.</td>
</tr>
<tr>
<td>Video capture</td>
<td><strong>NS-CA002</strong> Supported  \hspace{1cm}  <strong>NS-CA001</strong> Supported</td>
</tr>
<tr>
<td>Display control for RGB and video pictures</td>
<td><strong>NS-CA002</strong> Supported Using $SB15  \hspace{1cm}  <strong>NS-CA001</strong> Not supported</td>
</tr>
<tr>
<td>Frame display</td>
<td><strong>NS-CA002</strong> Not supported  \hspace{1cm}  <strong>NS-CA001</strong> Supported</td>
</tr>
</tbody>
</table>
### Revision History

A manual revision code appears as a suffix to the catalog number on the cover of the manual.

#### Man.No. V086-E1-02

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>01</td>
<td>April 2004</td>
<td>Original production</td>
</tr>
<tr>
<td>01</td>
<td>Jun 2004</td>
<td>Added a note about the EC Directive.</td>
</tr>
</tbody>
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