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DeviceNet Communications Module for NT31/NT631

The NT31/NT631 operator interfaces can now communiate with a PLC over DeviceNet using the NT-DRT21 module. Touch screens can be located at convenient locations along the remote I/O bus up to 500m from the host PLC.

Omron DeviceNet implementation simplfies the setup of the DeviceNet module. Assign a DeviceNet network node number to the NT screen, and the Omron DeviceNet master auto-enrollment feature takes care of establishing communications on the DeviceNet network.

Why connect an HMI on DeviceNet?

Convenience - By using DeviceNet, there is no need to run an additional serial cable to establish HMI communications. The existing DeviceNet wiring used for I/O can be connected to the NT-DRT21 to establish the HMI to PLC communication.

Multi-vendor applications - The NT-DRT21 is compatible with third party DeviceNet masters so the NT31/631 units can be placed on any system, allowing a facility to standardize on the Omron NT31/631 platform. Furthermore, the NT unit can be transferred to a different vendor s DeviceNet master without making any changes to the screen program.
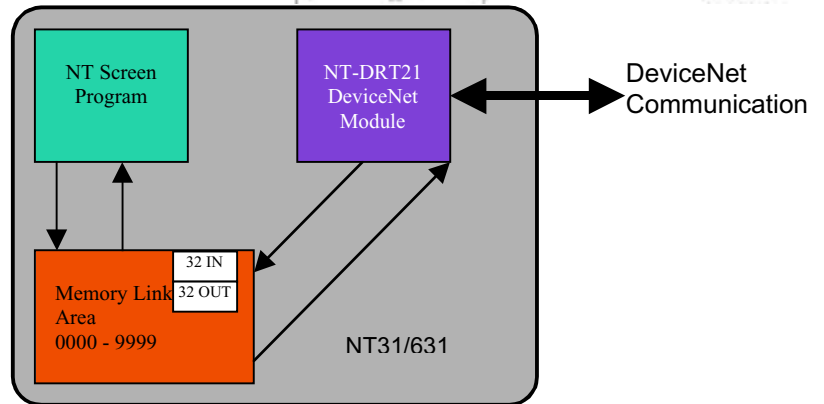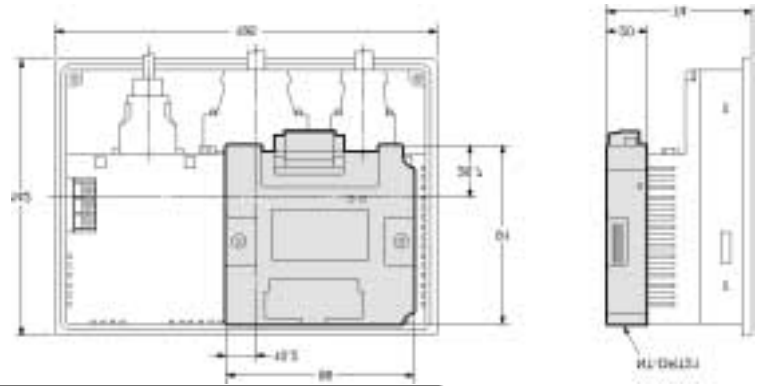
DeviceNet
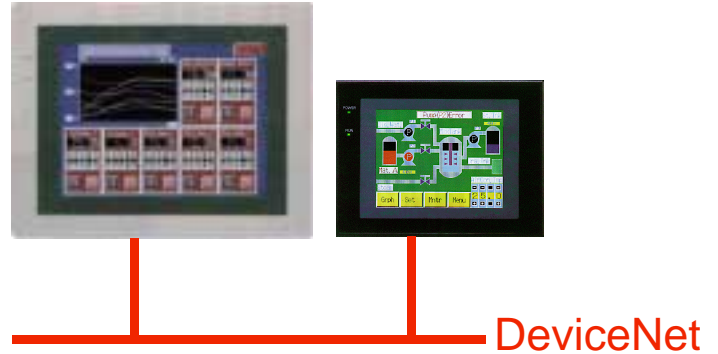
- **Program using NT-Series Support Tool (NTST) v3.3 or later.**

- **NT-DRT21 module mounts on the back of the NT31 and NT631.**

- **Program the touch screen to reference its own internal memory area, words 0 through 9999.**

- **Reserve up to 32 input and 32 output words as Remote I/O for continuous update from the DeviceNet master.**

- **120 additional words of NT memory are accessible using explicit commands from the PLC.**

- **Locate the touch screen up to 500 meters from the PLC on the DeviceNet network.**

- **Baud rate up to 500kbps.**

OVERVIEW

The NT-DRT21 module mounts to the expansion interface connector on the back of the NT31 and NT631, as illustrated in the image to the right. The NT is then connected to the DeviceNet network using the standard 5 wire network and drop connectors.

The NT31 and NT631 are shipped with operating systems that support a serial connection to Omron PLCs. A special operating system supporting DeviceNet must be loaded using the NTST System Installer utility. The NT-DRT21 can then communicate with the 10000 Memory Link addresses in the NT unit.

Using NTST, create a screen project configured for Memory Link mode. As shown in the image to the right, all screen objects and tables within the touch screen that would typically have referenced PLC memory areas now reference the Memory Link area, as shown below.

The system menus that appear within the NT31/631 unit when the DeviceNet operating system is loaded allow the NT unit to be configured for DeviceNet network communications. The following information can be set from the system menus:

- Communication Speed (125, 250, or 500kbps) Baud Rate
- Node Number (0 to 63)
- Strobe ON Time (30 to 100ms)
- Output area leading address (word 0 to 9999)
- Output area size (5 to 32 words)
- Input area leading address (word 0 to 9999)
- Input area size (2 to 32 words)

The 32 input and 32 output words set within the system menu are continuously scanned by the DeviceNet master on the PLC. Use these areas for points that need to be updated or read often when programming in NTST. Use explicit messaging for inputs or outputs that only need to be updated or read infrequently. Explicit messages can access up to 120 words from any address from word 0 to 9999 and can be launched as needed from the PLC program.

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Network Configuration

The number of NT units that can be placed on a DeviceNet network is determined by the availability of Remote I/O capacity. The amount of total Remote I/O available on a network depends on the DeviceNet master unit running the network and whether a DeviceNet Configurator has been used to more efficiently manage the memory allocation in the PLC master. The DeviceNet I/O modules on the network use up Remote I/O capacity, too. These factors must be taken into account when determining how to place HMI on the DeviceNet network.

Explicit messaging is active by default and requires a significant allotment of memory in the DeviceNet master. The configurator can deactivate explicit messaging and free up this reserved memory, increasing available capacity of Remote I/O, and allowing more NT units to be connected to the network. Remember that explicit messaging can access 120 additional words in the NT memory area. Deactivating the explicit messaging eliminates this option.

Word Capacity by DeviceNet Master:

DeviceNet Master	DeviceNet Master Fixed Allocation Capacity (without Configurator) [words]		DeviceNet Master Free Allocation Capacity with Explicit Messaging Disabled (with Configurator) [words]	
CS1-DRM21	500 Input	500 Output	1000 Input	1000 Output
CVM1/CV-Series	64 Input	64 Output	200 Input	200 Output
CS1/C200Ha	50 Input	50 Output	150 Input	150 Output
C200HS	32 Input	32 Output	40 Input	40 Output

Example Calculations:

- If the maximum number of words (32 IN/32 OUT) is allocated in the NT unit memory, two NT units can be placed on a CVM1 master network without using a configurator.

- If the maximum number of words (32 IN/32 OUT) is allocated in the NT unit memory, six NT units can be placed on a CVM1 master network by using a configurator. Explicit messages are disabled.

- If only 16 input and 16 output words (16 IN/16 OUT) of NT unit memory are reserved, four NT units can be placed on a CVM1 master network without using a configurator.

- The new CS1-DRM21 DeviceNet master can handle 15 NT units, fully allocating 32 IN/32 OUT per NT unit without using a configurator.

Please refer to the Operation Manuals for the DeviceNet catalog and the CV, C200H, and CS1 DeviceNet Master manuals for DeviceNet network performance and design issues.

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ORDERING INFORMATION

Use the following part numbers to order the hardware and related materials to create a touch screen/DeviceNet solution.

Ordering Information

Part Number	Description
NT-DRT21	**DeviceNet Interface Module for NT31 and NT631 touch screens (special drivers included for NT31/631 units. Purchase operation manual V066-E1-1 separately)**
NT31-ST121n-EV2	5.7 Monochrome STN LCD Touch Screen
NT31C-ST141n-EV2	5.7 Color STN LCD Touch Screen
NT631C-ST141n-EV2	11.3 Color STN LCD Touch Screen
NT631C-ST151n-EV2	10.4 Color **TFT** LCD Touch Screen
NT631-ST211n-EV2	10.4 Electroluminescent Touch Screen
NT-ZJCAT1-EV4	NT-Series Support Tool (NTST) v4.1
NTST-SMP	12 month Software Maintenance Program for NTST
C200HS-CN220-EU	PC to NT unit — screen data and operating system download cable.
V066-E1-1	**NT-DRT21 Operation Manual**
V062-E1-1	NT31 Set-up Manual
V063-E1-1	NT631 Set-up Manual
V064-E1-1	NT31/NT631 Reference Manual
W267-E1-4	CVM1 & C200HW DeviceNet Master Operation Manual
W380-E1-1	CS1 DeviceNet Master Operation Manual

n = B for touch screen products with a black front bezel.

NOTE:

The NT31/631 DeviceNet drivers only support EV1 level features. EV2 level features such as recipe, background math calculations, input object bit interlock, and word wrap for text labels are not supported for NT31/631 units configured for DeviceNet.

The Programming Console feature and Device Monitor function are not available when using DeviceNet communications.

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