

**Open Network for High-Speed Control** CompoNet Fast and Intelligent CompoNet\*

# News Topics



**New Products** 

# **NEW**

#### **CompoNet Master Board for PCI Bus and CompactPCI Bus**

The communication speed of 1 ms per 1000 points and the communications

cycle time optimization realized super high speed control by computers.



CompoNet Master Board for PCI Bus 3G8F7-CRM21 CompoNet Master Board for CompactPCI Bus 3G8F8-CRM21 Available in 2 types: one for PCI Bus and the other for CompactPCI Bus

Operable both in Windows OS, and in other OS by accessing to shared memory.

Programmable by C/C++/ or VB.

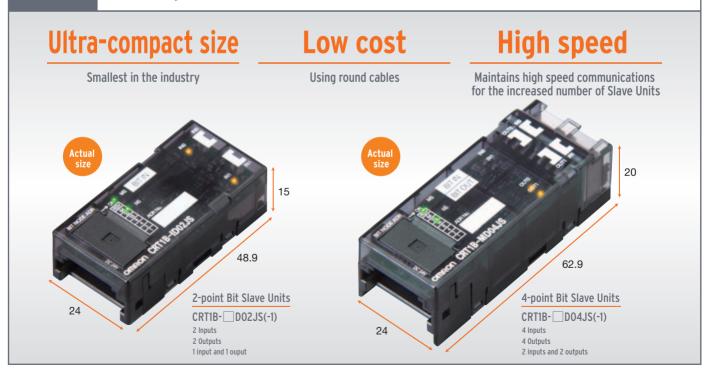
The communication cycle time optimization further speeded up CompoNet.

Combined use with a computer realized the

Combined use with a computer realized the higher speed control than ever.

# NEW

Innovation in wiring! Fast, low-cost, and compact Bit Slave Units CRT1B-series



In August 2009, CompoNet was established as the International Standard IEC/PAS62026-7.

# Manufacturing Site Moving into the Global Open Netwo



Information layer Controller layer



**Device layer** 

Sensor & Actuator layer



# The drastic changes to the environment faced by today's manufacturing industry has led a wide range of issues such as the standardization of system infrastructure and the shift to more advanced functions. In order to solve these issues, it is necessary to share on-site data, such as for product quality and how to respond to changes in the rk Era enviroment, to vertically start up devices utilizing this data and execute preventive maintenance universally and quickly. That is why attention is focusing on utilizing globally standardized "open networks" in the plant management layer, the control layer, and the device layer. I/O Slave Unit DeviceNet Safety

"CompoNet" globally standardized open network in the sensor & actuator layer

## [CompoNet]

CompoNet was established as the International Standard IEC/PAS62026-7 in August 2009.

CompoNet is the latest sensor & actuator layer open network. It was introduced and its specifications given by ODVA \*1 in 2006.

This open network fuses CIP network technology \*2 and high-level communications technology that consolidates the know-how for reducing the amount of wiring developed over many years at actual manufacturing sites. It was established and released as the International Standard IEC/PAS62026-7 in August 2009.

CompoNet attains the industry's fastest class of communications, 1000 signals per ms between connected devices and the controller and provides a high-performance network environment never seen before.

The open network means reduced device costs, improved functions, the quality of procurement on a global level, and standardization turns design know-how into assets.

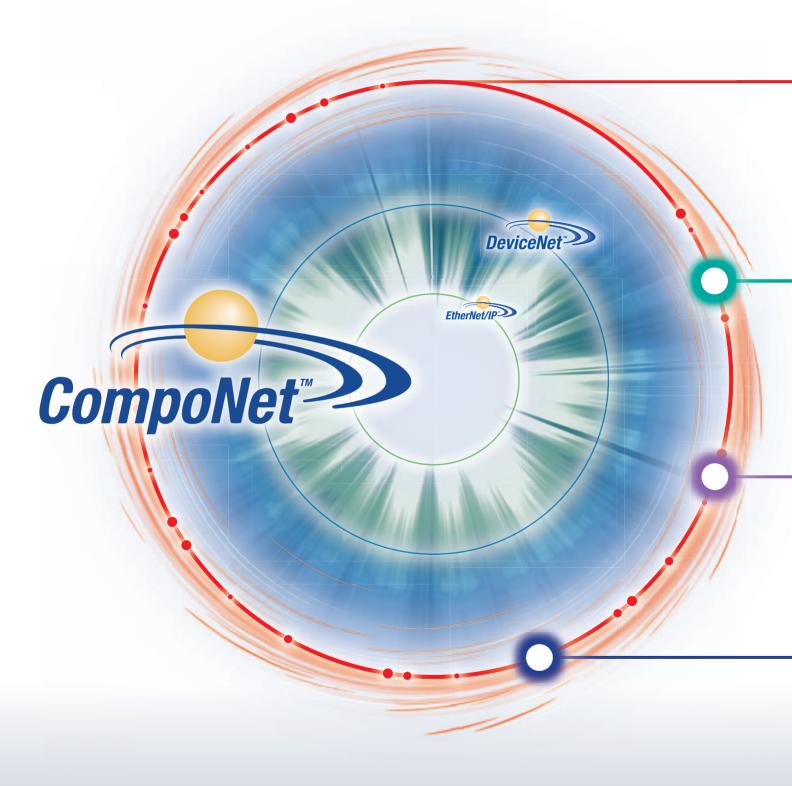
With the rapid expansion of family devices by many control equipment makers in Japan and overseas, CompoNet is establishing a multi-vendor environment that is a truly global open network.

- \*1 The abbreviation for Open DeviceNet Vendor Association, a non-profit organization in the United States. ODVA supports networks based on CIP technology and is run by the main vendors inside and outside Japan. It has active bases in America, Europe, China, South Korea, and Japan.
- \*2 CIP is the abbreviation for Common Industrial Protocol. This is a protocol that enables communications between open networks of equipment from multiple vendors. Control of each piece of equipment, programming, data collection, etc. can be standardized free of any restrictions due to the network type of differences among equipment.

Note: CompoNet, DeviceNet, and EtherNet/IP are registered trademarks of ODVA, ODVA Website:http://www.odva.org/

The conventional fast communication networks exceeding 10 Mbps must use special cables, which place restrictions on wiring. For example, they do not allow the connecting of branches.

In order to be able to use regular cables with their easier wiring, the only choice is a low baud rate network. With conventional field networks, achieving a "high-speed" while maintaining "ease of wiring", "informatization", and "low cost" is difficult. CompoNet achieves these competing conflicting objectives thanks to the latest technology for raising the efficiency of communication lines. CompoNet makes it possible to construct the manufacturing systems of the near future.



# **Fast Communication**

1024 points in 1 ms: fastest class in the industry

# CompoNet

solves the problems of conventional field networks!



# Informatization

Device preventive maintenance

# Simple and Low-Cost

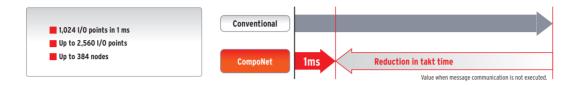
Simple installation and regular cables mean lower cost

## Fast Communication Fast multipoint communication reduces takt times

#### Fastest Communication Speeds in the Industry

Provides the fastest communication speeds in the industry for a sensor-actuator level network.

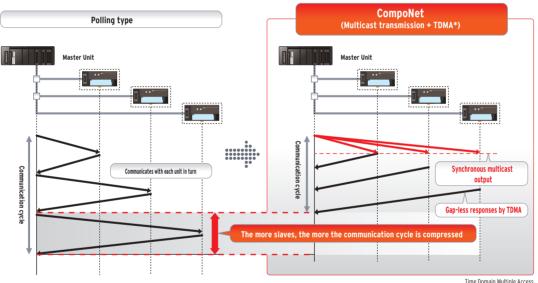
It is possible to send data consisting a large number of control points on multiple nodes. There is no response time delay, even with repeater units.



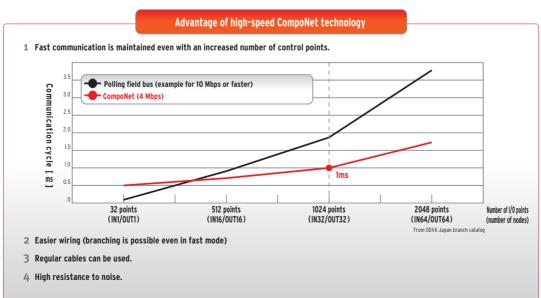
#### Fast Communication Technology even at Low Baud Rate of 4 Mbps

Provides excellent performance in applications with large numbers of control points and also in expansion work.

Efficient multicast transmission enables stable and fast communication even when the number of slaves increases.



Time Domain Multiple Access





# Wiring

#### Superior branching adaptability reduces wiring work

#### Flexible Installation

#### Select the best branching method for your application.

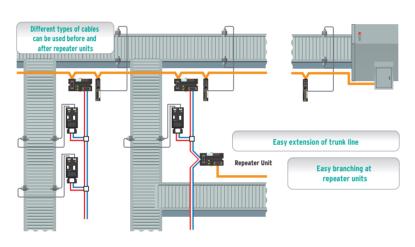
CompoNet provides both fast communication and easy wiring.

Branch wiring is a powerful tool for installing large numbers of slaves in a variety of locations.

You can optimize your cable layout to match the layout of your equipment.

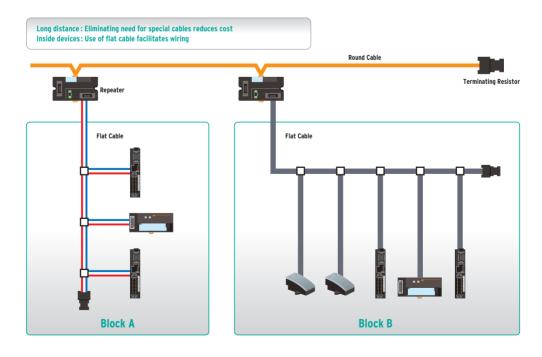
#### Distance can easily be extended.

A maximum distance of 1500 m is possible (when baud rate is 93.75 kbps).





#### Different types of cables can be mixed.

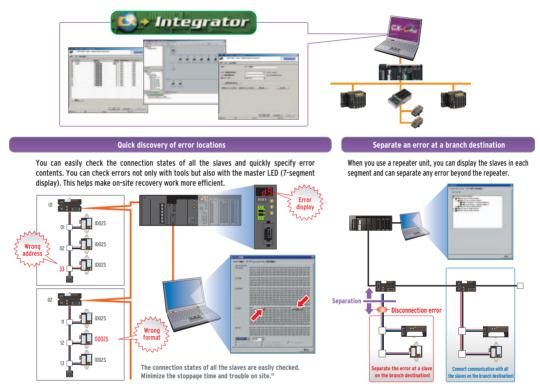


## Informatization Reducing the start-up time and maintenance work with informatization

#### CX-Integrator Makes Start-Up and Recovery Work More Efficient

CX-Integrator software lets you set the PLC network/serial communication system configuration from a computer.

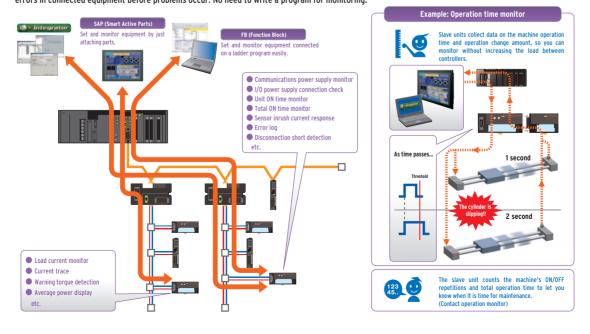
CX-Integrator makes it easy to handle CompoNet assignment, parameter setting, connection state monitoring, comment setting, network diagnosis, etc. from a computer.



#### Informatization of the all Equipment

Smart features are features of the slave main units that collect a variety information used for from start-up to maintenance.

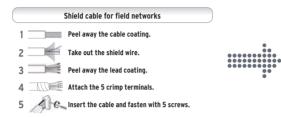
Monitor network power supply voltage with tools and display units. Slaves collect a variety of information helpful for preventive maintenance and detect errors in connected equipment before problems occur. No need to write a program for monitoring.



# Simple and Low-Cost Slashes start-up workload and equipment cost!

#### Flat Cable for Easy One-Touch Installation

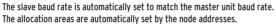
Flat cable shortens installation time. It also prevents connector installation mistakes.





#### Smooth Start-Up with Simple Setup

Just set the master baud rate and the slave node addresses and the system is ready for start-up.



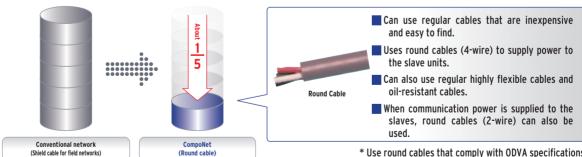


\*1. Using CX-Integrator makes detailed settings and monitoring possible

# Rotary switch used Easy-to-understand decimal switch Reduces setting mistakes.

#### Can Use Regular Round Cables for Fast Communication

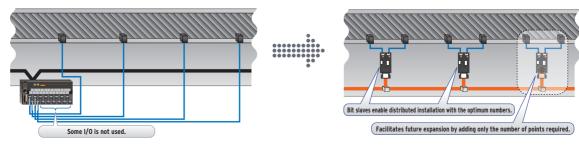
Regular round cables can be used as the communication cables.



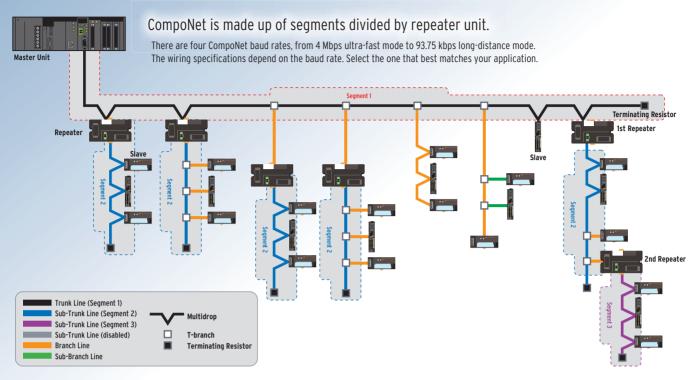
#### \* Use round cables that comply with ODVA specifications.

#### Bit-level distribution for effective I/O installation

Bit slaves enable optimum I/O configuration and wiring becomes more efficient.



# **Network Specifications**



Baud rate	Cable	e type	Trunk line and sub-trunk line length (When 2 repeaters are used.)	Number of slaves per segment (Including number of repeaters)	Branch line length	Total branch line length per segment	Branch location restrictions	Number of slaves per branch line	Sub-branch line length	Total sub-branch line length per segment
4Mbps		cable I, II able I, II	30m (90m)	32	_	_	_	_	_	_
3Mbps	Round cable I, II Flat cable I, II		30m (90m)	32	0.5m	8m	3/meter	1	_	_
	Round	Without branches	100m (300m)	32	_	_	_	_	_	_
1.5Mbps	cable I	With branches	30m (90m)	32	2.5m	25m	3/meter	3	_	_
i.omups	Round cable II Flat cable I, II		30m (90m)	32	2.5m	25m	3/meter	3	0.1m	2m
	Round cable I		500m (1500m)	32	6m	120m	3/meter	1	_	_
93.75kbps	Round cable II Flat cable I, II		200m (600m)	32		20	0 meter free wiring tota	al wire length per segm	ent	

#### Relation between Baud Rate and Communications Cable

The Cable that can be used and the required baud rates are automatically determined by whether a trunk line-branch line formation or an unrestricted wiring formation is used.

	Baud rate					
Cable type	4Mbps 3Mbps		1.5Mbps	93.75kbps		
Round cable I				Trunk line-branch line wiring formation		
Round cable II	Trunk line-branch line wiring formation (See note 1.)	Trunk line-branch line wiring formation	Trunk line-branch line wiring formation	Unrestricted wiring formation		
Flat cable I						
Flat cable II	Trunk line-branch line wiring formation (See note 2.)					

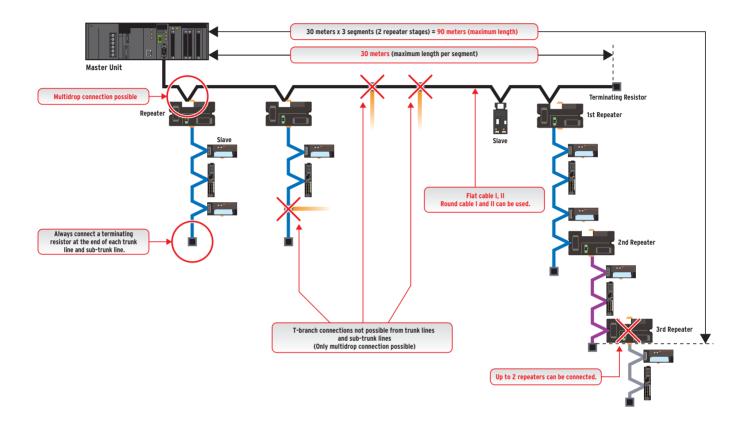
Note: (1) If a baud rate of 4 Mbps is used, branching is not possible from the trunk line. (Only multidrop connections are possible.)

(2) If a baud rate of 4 Mbps is used, branching and multidrop connections are not possible from the trunk line. (There are no Multidrop Connentors for Flat Cable II.)

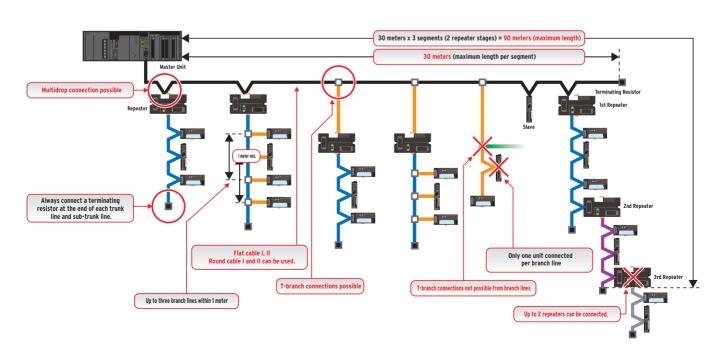
The following table shows the conditions and restrictions for each formation.

	Wiring formation				
Item	Trunk line-branch line formation	Unrestricted wiring formation			
Master Unit location	End of network	Anywhere in network (not necessarily at the end)			
Maximum number of Slave Units connected to any one branch line	1 or 3 depending on the cable type and baud rate	No restrictions			
Terminating Resistor location	On the opposite ends of the trunk line and all sub-trunk lines from the Master Unit and each Repeater Unit	On the most remote ends from the Master Unit and each Repeater Unit			

#### **Example of wiring for 4Mbps** (Application: Ultra-fast communications)

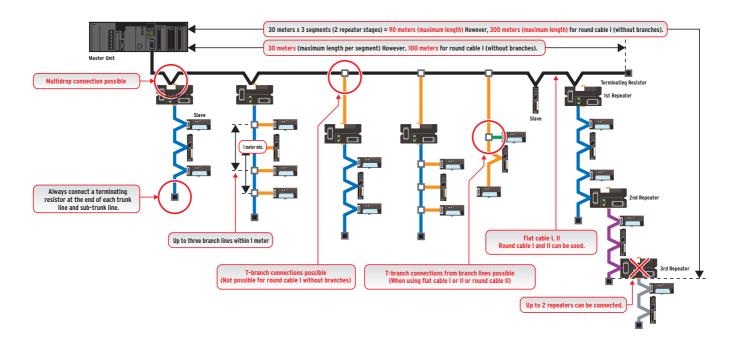


#### **Example of wiring for 3Mbps** (Application: Fast communications with branching)



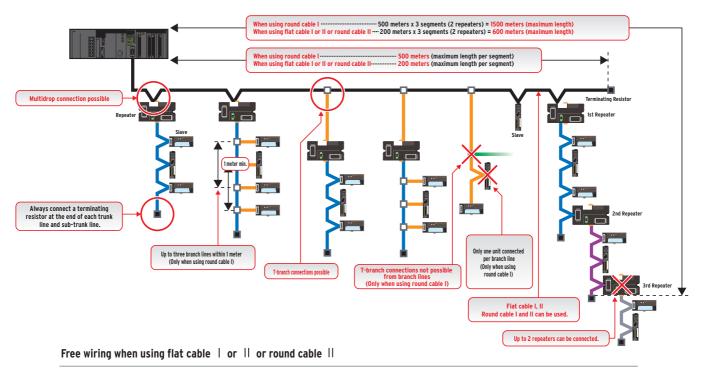
# **Network Specifications**

**Example of wiring for 1.5 Mbps** (Application: Balance of fast communications and branching)

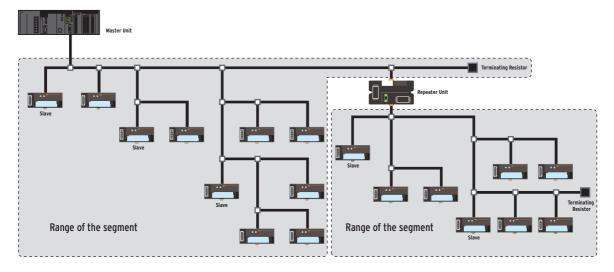


#### Example of wiring for 93.75 kbps (Application: Long-distance wiring and free wiring)

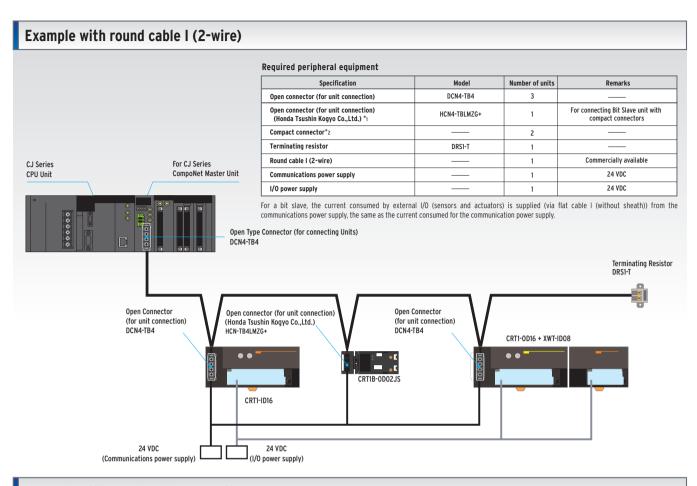
#### Example using round cable I



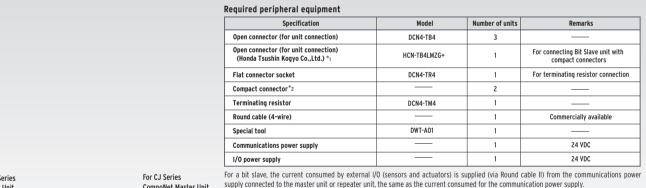
With this wiring formation, there is no distinction between the trunk line and branch lines. There are no wiring restrictions as long as the total cable length does not exceed 200 m. There is also no limit in the number of branches.

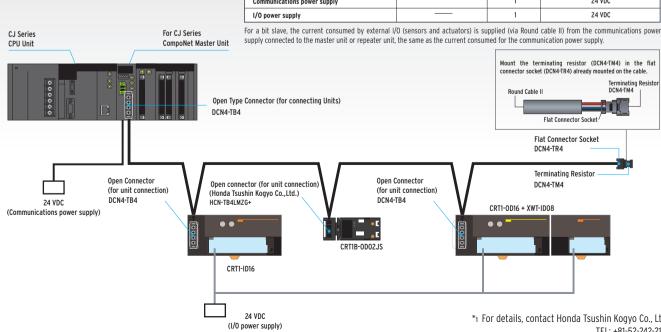


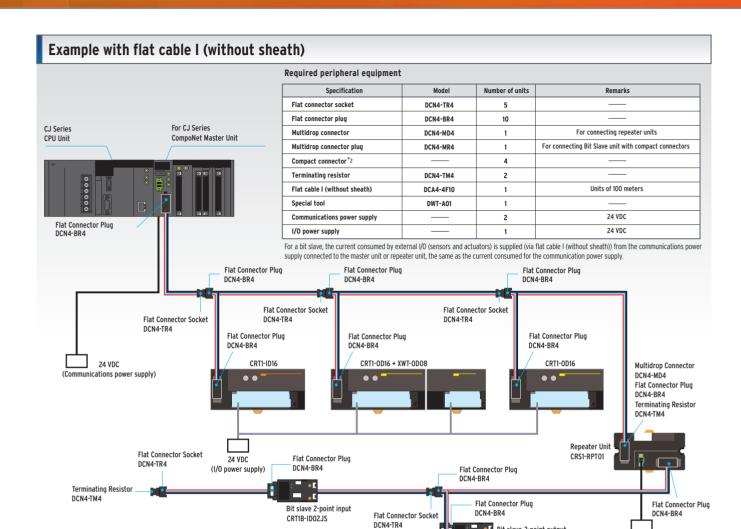
# **Configuration Examples and Peripheral Devices**



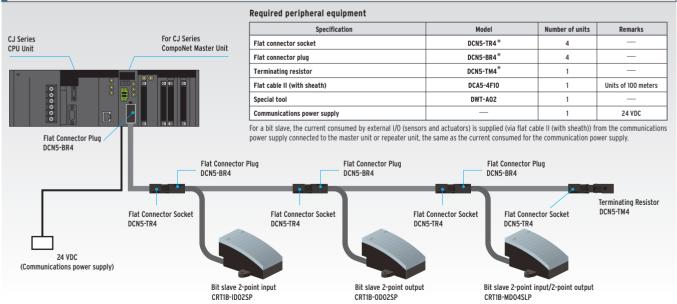
#### Example with round cable II (4-wire)







#### Example with flat cable II (with sheath)



#### \*2 Compact Connectors

The compact connectors use XA-series Connectors from JST Mfg. Co., Ltd.

Special cable connectors must be attached for cables connecting to external devices if a Slave Unit with Compact Connectors is used.

W	Applicable cable range			M. del	Orientes Test
Name	mm²	AWG#	Wire sheath external diameter	Model	Crimping Tool
0	0.08 to 0.33	28 to 22	1.2 to 1.9	SXA-001T-P0.6	YC692 or YC692R
Contacts	0.22 to 0.5	24 to 20	1.5 to 1.9	SXA-01T-P0.6	YRS701 or YRS701R
Housing	Housing —			XAP-03V-1	_

Note (1) Automated Crimp Tools are also available. For details, contact the manufacturer.

(2) For information on the processing procedure, refer to the instruction manualincluded with the tool or contact the manufacturer (JST MR, Co., Ltd.).

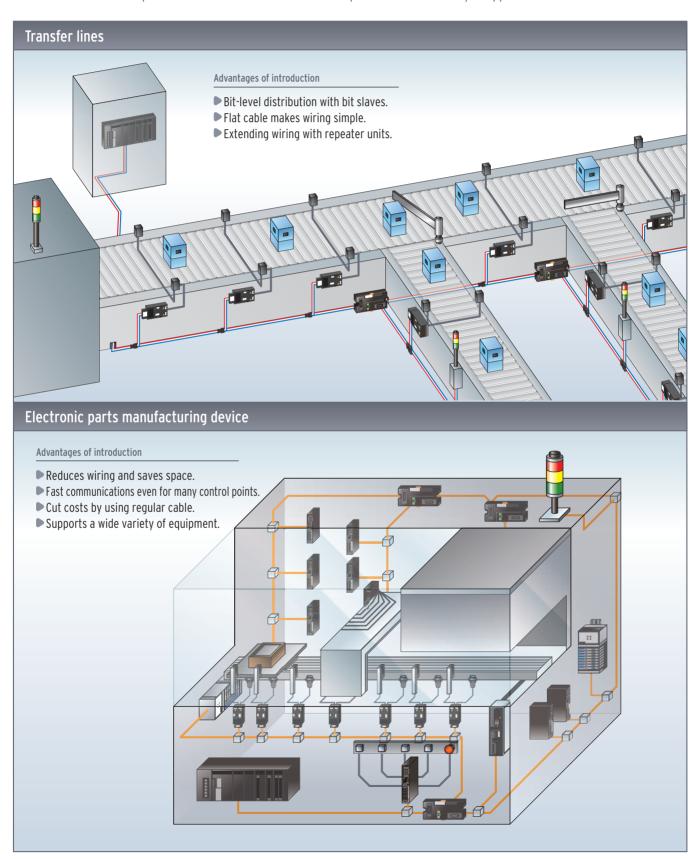
Bit slave 2-point output CRT1B-OD02JS

24 VDC (Communications power supply)

## **Application Examples**

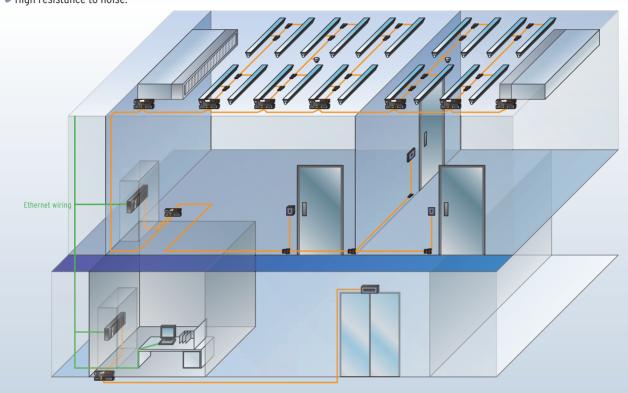
## CompoNet Applications for Every Type of Manufacturing Site

These applications offer high-performance communication and superior installability that aid in reducing takt times and cutting down the work of start-up and maintenance. Customers use CompoNet in a wide variety of applications.



# **Building automation** Advantages of introduction ▶ Wiring up to 1500 meters. Regular cables can be used.

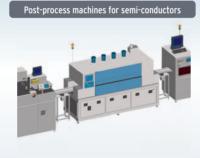
- ▶ Plenty of connection capacity even for distributed installation.
- ▶ High resistance to noise.

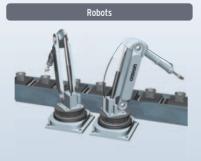


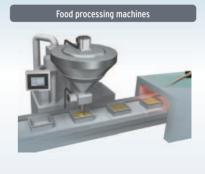
#### CompoNet allows high speed communications and bit-level distribution. It is usable by various applications.













#### **Master Units**



CS Series CS1W-CRM21



#### Digital I/O Slaves

#### Two-tire Screw Terminal Block



CJ Series

CJ1W-CRM21

#### Screw-Type Terminal Block, Relay Output/SSR Output



#### Three-tire Screw Terminal Block



Input Units
CRT1-ID08TA(-1)
CRT1-ID08TAH(-1)
CRT1-ID16TA(-1)
CRT1-ID16TA(-1)
Output Units
CRT1-OD08TAH(-1)
CRT1-OD08TAH(-1)
CRT1-OD16TA(-1)
CRT1-OD16TA(-1)

I/O Unit CRT1-MD16TA(-1) CRT1-MD16TAH(-1)

#### Horizontal Slaves with e-CON Connectors



Input Units
CRT1-ID165(-1)
CRT1-ID165(-1)
CRT1-ID325(-1)
CRT1-ID325H(-1)
Output Units
CRT1-OD165(-1)
CRT1-OD225(-1)
CRT1-OD325(-1)
CRT1-OD325(-1)
CRT1-OD325H(-1)

I/O Unit CRT1-MD16S(-1) CRT1-MD16SH(-1) CRT1-MD32S(-1) CRT1-MD32SH(-1)

#### Vertical Slaves with e-CON Connectors



CRT1-VID08S(-1) CRT1-VOD08S(-1)

#### **Vertical Slaves with MIL Connectors**



CRT1-VID16ML(-1) CRT1-VOD16ML(-1)



CRT1-VID32ML(-1) CRT1-VOD32ML(-1) CRT1-VMD32ML(-1)

#### **Horizontal Slaves with Clamp Terminals**



CRT1-ID08SL(-1) CRT1-OD08SL(-1)



CRT1-ID16SL(-1) CRT1-OD16SL(-1)



CRT1-MD16SL(-1)









### **Product Introductions**

The CompoNet network lets you connect to units and branch and extend cables by just mounting connectors on communications cables and units. The cable connection and branching methods depend on the cable type and branching form.

- Four types of cable can be used on CompoNet networks.
- Round cable I (2-wire), commercially available
- Round cable II (4-wire), commercially available
- Flat cable I (without sheath) DCA4-4F10
- Flat cable II (with sheath) DCA5-4F10
- The terminating resistors, connectors, and special tools depend on the cable type.



- \*1 Open Type Connectors (DCN4-TB4) are notconnectable with Bit Slave Units whose connectors are small. Use connectors made by Honda Tsushin Kogyo instead.
- \*2 Multidrop Connectors (DCN4-MD4) are not connectable with Bit Slave Units with Compact Connectors. Use Multidrop Connector Plugs (DCN4-MR4) instead.

#### Compact Connectors

The compact connectors use XA-series Connectors from JST Mfg. Co., Ltd.
Special cable connectors must be attached for cables connecting to external devices if a Slave Unit with Compact Connectors is used.

Name	Applicable cable range			Model	Crimping Tool
	mm²	AWG#	Wire sheath external diameter	Model	Crimping 1001
Contacts	0.08 to 0.33	28 to 22	1.2 to 1.9	SXA-001T-P0.6	YC692 or YC692R
	0.22 to 0.5	24 to 20	1.5 to 1.9	SXA-01T-P0.6	YRS701 or YRS701R
Housing		_		XAP-03V-1	_

Note (I) Automated Crimp Tools are also available. For details, contact the manufacturer.

(2) For information on the processing procedure, refer to the instruction manualincluded with the tool or contact the manufacturer (JST Mfg. Co., Ltd.).

# Comparison of Specifications with DeviceNet

#### Reference data

This table compares CompoNet and DeviceNet specifications. Select the one that matches your applications and uses.

	CompoNet	DeviceNet Device
Features	Bit-level distribution High speed, multiple nodes, superior branching, low cost	High-capacity I/O data communication for multiple points and multiple channels
Maximum baud rate	4 Mbps (1024 points/1 ms)	500 kbps (1024 points/12.6 ms *)
Communication medium	Round cable I (2-wire)  Round cable II (4-wire)  Special flat cable I (4-wire, without sheath)  Special flat cable II (4-wire, with sheath)	Special thick cable (5-wire) Special thin cable (5-wire) Special flat cable (4-wire)
Maximum communication distance	1500 m (for 93.75 kbps with repeaters and round cable I)	500 m (for 125 kbps with special thick 5-wire cable)
Maximum number of nodes connected	■ Word slave unit: 64 input units/64 output units ■ Bit slave unit: 128 input units/128 output units ■ Repeater unit: 64 units	64 units (including master, slaves and configurator)
Maximum number of I/O points	■ Word slave unit: inputs and 1024 outputs (2048 I/O points total)  ■ Bit slave unit: inputs and 256 outputs (512 I/O points total)	32000 points (When using CS1W-DRM21-V1/CJ1W-DRM21)
Safety support	None	Yes (DeviceNet Safety)

st This chart reflects the theoretical values for the CJ1 series master unit so refer to them as approximated values.

Master

#### YASKAWA ELECTRIC CORPORATION

+81-4-2962-5823 www.e-mechatronics.com



265IF-01(CompoNet Master Communication Module)

- ▶ Features

  1. 265IF-0I can be connected to the abundant slave group as a CompoNet master.

  2. 265IF-0I is attached to the optional slot of the MP2000 series controller.

Coming soon

Inverte

Europe
Hilscher GmbH (Germany)
Tel: +49-(0)-6190-9907-0
Morth America merica, Inc. (USA)
Tel: +1-630-505-5301
Asia-Pacific
Hilscher GmbH (Germany)
Tel: +49-(0)-6190-9907-0
China China Hilscher GmbH (Shanghai Rep. Office) Tel: +86-(0)-21-6355-5161

Hilscher GmbH

Tel: +91-(0)-11-4051-5640 info@hilscher.com Overseas sales areas: Europe, North America, Asia-Pacific, China, Other

CompoNet Slave PCI card

► Features

- 1. Date exchange via Dual Port Memory as host I/F 2. Driver for Windows and other type of RTOS on request 3. Plan for PCI Express card and other PC form factors

Coming soon

YASKAWA ELECTRIC CORPORATION

+81-930-25-2548

www.e-mechatronics.com

Overseas sales areas: Overseas sales dreas: Europe YASKAWA ELECTRIC EUROPE GmbH Tel:+49-6196-569-300 North America YASKAWA ELECTRIC AMERICA,INC. Tel:+1-847-887-7000 IEI:+1-84/-88/-7000 Asia-Pacific Yaskawa Electric Korea Corporation Tei:+82-2-784-7844 Yaskawa Electric (Singapore) Pte.itd. Tei:+65-6282-3003

YASKAWA ELECTRIC (SHANGHAI) CO.,LTD. +86-21-5385-2200



YASKAWA AC Drive V1000 [CIMR-Vxxxxxxxxxxx1

► Features

- Synchronous motor capability more compact, greater energy savings
   Powerful functions for quick installation, easy maintenance
   Compliance with EU's RoHS standard. Shock-proof, moisture-resistant, and other models also available.

Coming soon

SMC CORPORATION

+81-3-5207-8249 www.smcworld.com

Europe, North America Asia-Pacific, China



Fieldbus System Compatible with CompoNet™ [EX120/121/122 Series]

► Features

- To Output type: Compatible with NPN(+COM.)/PNP(-COM.)

  2. Applicable Solenoid Valve Series: SY,SV/VO Series

  3. Low Power Consumption: SY Series also available with a power saving 0.1W circuit.

Solenoid Valves

Controllers and Signal Towers

CKD CORPORATION

Europe TEL:+81-(0)568-74-1303 North America TEL:+81-(0)568-74-1303 Asia-Pacific TEL:+81-(0)568-74-1303 China TEL:+81-(0)568-74-1303

www.ckd.co.jp/english

Overseas sales areas: Europe, North America, Asia-Pacific China, Other



Pilot type 3•5 ports pilot valve

- 1. Very long life: more than 60 million times due to elastic seal with few air leakage.

  2. Enhanced safety function: Manual override button with protective cover and integrated check valve

**Koganei Corporation** 

+81-42-383-7271 www.koganei.co.jp

Overseas sales areas: Europe, North America, Asia-Pacific



CompoNet-compatible Solenoid Valves [JA Series]

- Features
  1. Thin and Compact: Valve width of only 10 mm with effective area of
- 1. Thin and Compact. Valve width of only for 3.5 mm2.
  2. Lower power consumption.
  Standard: 0.5 W Low current type: 0.25 W
  3. Two 3-port valves in one body.

CompoNet-compatible Solenoid Valves [F Series]

- ► Features
  1. Single/double dual-use valves.
  2. Three of valve widths: 10, 15 and 18 mm
  3. Uses dual-use fittings for different tube sizes.

IAI Corporation

www.intelligentactuator.com/

Overseas sales areas: Europe, North America, Asia-Pacific, China





Controller for RCA/RCA2 Series ROBO CYLINDER [ACON-C/CG]

- ► Features

  1. Designed for 24 VDC servomotors.

  2. Multipoint positioning: up to 512 points.

  3. High speed: Up to 800 mm/s.

Controller for RCP2/RCP3 Series ROBO CYLINDER [PCON-C/CG] Features
Designed for 24 VDC pulse motors.
Multipoint positioning: up to 512 points.
High power in lower speed range.

CompoNet Supported Wall-Mount Signal Tower

- ► Features
  1. A 37.5 mm-thin design that significantly enhances integration with equipment as a built-in signal system.
- Clear vertical cut lens enhanced for illumination over a wide
- perspective.

  3. Built-in audible alarm.

PATLITE Corporation





CompoNet Supported Signal Tower

Features

1. Use of ultr

Use of ultra-bright LED enhanced for illumination.
 Two selectable sound patterns with adjustable volume.





## **Development Support**

#### **OMRON Corporation**

open\_integration@omron.co.jp

MPU for CompoNet Slave, MPU for CompoNet Master

#### ▶ Features

Slave: Omron offers the development approach of three types by the function of the slave.

1. Few-Point Slave
1/0 Size:Digital I/O in MAX 32 points ·Application interface:Via I/O port

2. Multi-Points Slave
•1/0 size: Outputs: 0 to 256 points (32 bytes) Inputs: 0 to 256 points (32 bytes)

-Apllication interface:DPRAM

3. Protocol stack

No restriction in MPII and OS

#### Master: Omron offers two kinds of development approaches.

DP-RAM/F MPU
Development is unnecessary of the communication protocol.
The communication protocol including RAS is mounted on MPU.

System Call I/F of ITRON

#### **OMRON Corporation**

www.omron.com/

Overseas sales areas: Asia-Pacific.



On board Connector [XW7D-PB4-S][XW7D-PB4-L]

#### ► Features

- 1.3 type models are ready to correspond with some applications.
  2. Enable to mate DCN4-MD4/DCN4-TB4 with lock lever.

#### HMS INDUSTRIAL NETWORKS Co.,Ltd

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Development too

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Overseas sales areas: Europe, North America, Asia-Pacific, China



Anybus CompactCom Componet [ABCC-CPN]

#### ► Features

- Embedded solutions of CompoNet slave for device vendors.
   Can release the device for CompoNet with short term.
   Common interface with DeviceNet and EtherNet/IP.

Release:February / 2010

#### Hilscher GmbH

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CompoNet Communication Controller InetX 50/netX 100/netX 5001

#### ▶ Features

- CompoNet, DeviceNet, EtherNet/IP and various Fieldbus / Real Time Ethernet on one chip
  2. Control by external CPU via DPM or Application can be implemented on the internal ARM (200MHz)
  3. UART/USB/SPI/I2C/GPI0/LCD controller/ADC/PWM/DMA/CCD (depends on chip type)

#### NSD Co., Ltd.

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#### CompoNet Master Stack Tool Kit (C-MTK)

- A developers' tool kit to implement communication function for CompoNet master modules
   CompoNet master protocol stack firmware example source codes and various kinds of technical items are included
   Software development and its technical survices can be provided, if a industrial device vendor would like to develop CompoNet devices.

#### CompoNet Slave Stack Tool Kit (C-SSC)

#### ► Features

- A developers' tool kit to implement communication function for CompoNet slave modules.
   CompoNet slave protocol stack firmware example source codes and various kinds of technical items are included.
- 3. Software development and its technical survices can be provided, if a industrial device vendor would like to develop CompoNet devices.

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