YAMAHA

CobraNet™ INTERFACE CARD
MY16-CII
OWNER'S MANUAL
BEDIENUNGSANLEITUNG
MODE D'EMPLOLI
MANUAL DE INSTRUCCIONES
取扱説明書

FCC INFORMATION (U.S.A.)

1. **IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!**
   This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. **IMPORTANT:** When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. **NOTE:** This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA90620

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PRECAUTIONS

PLEASE READ CAREFULLY BEFORE PROCEEDING
* Please keep this manual in a safe place for future reference.

⚠ *WARNING*

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

• Before installing the MY16-CII in an audio device please check to make sure that the device is compatible with the MY16-CII and check possible restrictions regarding the maximum number of Yamaha and third-party expansion cards that can be simultaneously installed. Refer to the operation manual supplied with the audio device, and/or the Yamaha Pro Audio web site at: http://www.yamahaproaudio.com/

• Do not install the MY16-CII card in any Yamaha products not specified by Yamaha for use with the MY16-CII to avoid possible electrical shock, fire, or equipment damage.

• Do not attempt to disassemble or modify the card. Do not apply excessive force to card connectors or other card components. Mishandling of the card may lead to shock, fire hazard, or equipment failure.

• Be sure to disconnect the power cable of the main unit before installing this card (in order to eliminate shock hazard).

• Turn off all peripheral devices connected to the host device before installation, and unplug all related cables.

⚠ *CAUTION*

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the device or other property. These precautions include, but are not limited to, the following:

• Do not touch the metallic leads (pins) of the circuit board when handling the card. The pins are sharp and may cause hand cuts.

• Wear a pair of heavy gloves during installation to avoid scratching or cutting your hands on sharp edges.

• Avoid touching exposed connectors and metal parts to minimize the possibility of bad connections.

• Drain all static electricity from your clothing and body before handling the card. Static electricity can damage the card. Touch an exposed metal part of the host device or other grounded object beforehand.

• Do not drop the card or subject it to physical shock as this can result in breakage and/or malfunction.

• Do not drop screws or other small parts inside the card. If power is applied while screws or similar metal objects are loose inside the unit the card may malfunction or be damaged. If you cannot retrieve dropped objects yourself, refer the problem to qualified Yamaha service personnel.

Table of contents

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  different from the actual equipment.
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• Ethernet is a trademark of Xerox Corporation.
• All other trademarks are the property of their respective holders and are hereby acknowledged.

Greetings

Thank you for choosing the Yamaha MY16-CII CobraNet™ INTERFACE CARD.
The MY16-CII is a CobraNet™* expansion card for use with compatible Yamaha professional
audio equipment. Complying to CobraNet™ standards, the MY16-CII allows transmission and
reception of up to 32 channels (16 in/16 out) of uncompressed digital audio data.

* CobraNet™: An audio networking system developed by Cirrus Logic, Inc. that allows real-time
transmission and reception of multiple channels of uncompressed digital audio signals via a Fast
Ethernet (100 megabits/sec.) network. A single network cable can handle a maximum of 64
channels (128 channels bidirectional) of audio data.

In order to take full advantage of the advanced features and performance provided by the
MY16-CII card we urge you to read this manual thoroughly, and keep it in a safe place for further
reference.

Before installing the MY16-CII in an audio device please check to make sure that the device is
compatible with the MY16-CII and check possible restrictions regarding the maximum number of
Yamaha and third-party expansion cards that can be simultaneously installed.

The Yamaha Pro Audio web site is at: **http://www.yamahaproaudio.com/**

Package Contents

• MY16-CII card
• This manual
• CD-ROM (CobraNet Manager)

The CobraNet Manager software license agreement can be found at the end of this document (on page 15). Please be sure to read the software license agreement before installing the software. Opening the CD-ROM package constitutes full agreement with the license agreement.

About CobraNet™

■ CobraNet is …

An audio networking system developed by Cirrus Logic, Inc. that allows real-time transmission and reception of uncompressed digital audio signals via a Fast Ethernet network cable. The network can simultaneously handle up to 64 input and output channels, for a total of 128 channels (64 channels if repeater hubs are used). The maximum number of channels than can be handled in practical situations may be lower due to performance limitations imposed by the equipment used and the condition of the audio signal.

Currently, the CobraNet network will handle 16, 20, or 24-bit audio at sampling rates of 48 or 96 kHz. The CobraNet network is capable of transmitting control data at the same time as the audio signals. The types of control data transmitted are determined by the equipment used.

The CobraNet network imposes a 5.33-millisecond (2.67 milliseconds or 1.33 milliseconds with some settings) latency on transferred audio signals. Latency and bit depth can be set via the CobraNet Manager application.

Refer to the CobraNet home page for more details: **http://www.cobranet.info/**

■ Bundles

Audio is transmitted over the CobraNet network in units known as "bundles." These bundles are processed at the receiving end to reconstitute the original audio signals. In the case of the MY16-CII a bundle can contain up to eight channels. Each bundle is identified by a number from 1 to 65,279, and audio transmission via the network becomes possible when the same bundle number is specified at both the transmitting and receiving devices. Bundles can be transmitted and received over the entire network as long as sufficient network resources are available. The actual number of bundles that can be handled will depend on the capabilities of the equipment used. The MY16-CII can use up to 4 output bundles and up to 8 input bundles. Bundle numbers can be assigned via the CobraNet Manager application.
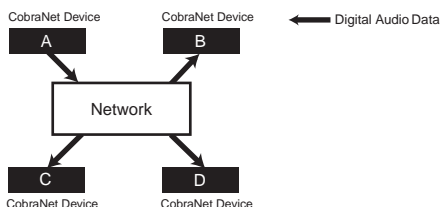
■ Multicast Bundles and Unicast Bundles

Two types of bundle can be used with CobraNet: "multicast" bundles and ''unicast'' bundles. Multicast bundles can be transmitted from a single device to all devices on the network, while unicast bundles are transferred from a single transmitting device to a single receiving device or a limited number of receiving devices.
Unicast bundles are only sent to devices which have been set to the same bundle number as the transmitting device. Multicast bundles are sent to all devices on the network regardless of their settings, but only bundles with the specified bundle number(s) are processed. For this reason multicast bundles make heavy use of network resources and it is recommended that the maximum number of bundles be limited to 4 (32 channels). Unicast bundles should be employed when it is necessary to handle 5 or more bundles at a time. It is also possible to set multiple devices to receive the same unicast bundle number, and depending on the transmitting device up to 4 receiving devices may be able to simultaneously receive the same bundle. This situation is known as "multi-unicast." The MY16-CII is capable of handling multi-unicast bundles.
Different number ranges are used for multicast and unicast bundles: multicast bundles are numbered 1 through 255, while unicast bundles are numbered 256 through 65,279.
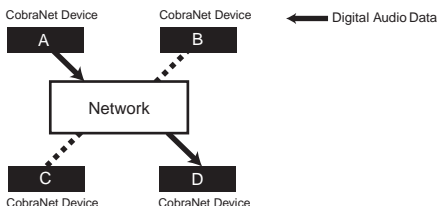
Multicast Bundles

Multicast bundles transmitted from device A are sent to all devices on the network (B through D in the example).

Unicast Bundles

Unicast bundles are received only by devices set to receive the same bundle numbers as the transmit bundle number of the transmitting device A (device D in this example).

■ Conductor and Performers

On any CobraNet network one device generates a timing signal that all other devices receive and are synchronized to. The device that generates the synchronization signal is known as the "conductor," while all other devices are "performers."

The conductor for the network is automatically assigned and need not be specified by the operator. When an MY16-CII is assigned to be the conductor for the network, the LED indicator to the left of the connector that is connected to the network will flash orange. If the conductor fails for some reason, conductor status is automatically switched to another device on the network.

Since the conductor transmits the synchronization signal to the performers via the network cable, no separate word clock cables are required and the total number of cables used by the system is kept to a minimum. Digital audio devices that are not connected to the network, however, will need to receive a word clock signal from a device on the network in order to achieve synchronization.

NOTE Digital signals and control data are transmitted and received by all conductor and performer devices on the CobraNet network.

Conductors transmit the synchronization signal that is received and used by performers. Clock synchronization is necessary to transfer digital audio data to and from devices outside the CobraNet network. In this example device B on the CobraNet network sends the synchronization signal to external device E.
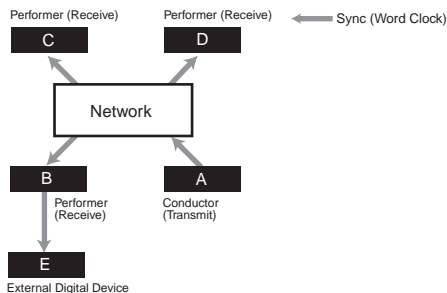

■ CobraNet Cables and Hubs

Category-5 metal cables can be used for runs of up to 100 meters, while multimode optical fiber cables can be used for runs of up to 2 kilometers.

"Cross" and "straight" Ethernet cables are available. "Cross" cables should be used for direct connection between two devices. Hubs and ''straight'' cables are required to connect 3 or more devices.

The MY16-CII System

The MY16-CII handles 16 channels of audio input and output that are assigned to bundles that will be transmitted and received to and from the appropriate network devices.
The MY16-CII can use up to 4 output bundles and up to 8 input bundles.
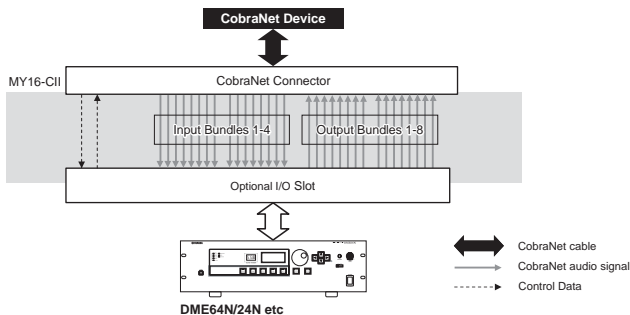
The maximum number of channels that can be assigned to each bundle is as follows.

Maximum channels per bundle

Latency	16bit, 48kHz	20bit, 48kHz	24bit, 48kHz	16bit, 96kHz	20bit, 96kHz	24bit, 96kHz
5.33ms	8	8	7	4*	4*	3**
2.66ms	8	8	8	4*	4*	4*
1.33ms	8	8	8	4*	4*	4*

*Since 96-kHz audio is handled as two 48-kHz signals combined, the maximum number of channels is halved.
**The audio signal output from the 4th channel will include some aliasing noise, and proper operation cannot be guaranteed. Please do not use this channel.

⚠ NOTE The number of channels per bundled can be changes as shown below.
Depending on the configuration, the maximum number of channels that can be handle may be less than 8.

Number of bundles per channel and usable channels

Channels per Bundle	Input / Output Bundle				Input Bundle			
	Bundle 1	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 7	Bundle 8
8	1-8	9-16	-	-	-	-	-	-
4	1-4	5-8	9-12	13-16	-	-	-	-
2	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16
1	1	2	3	4	5	6	7	8

Controls & Functions

■ **Panel Connectors and Indicators**
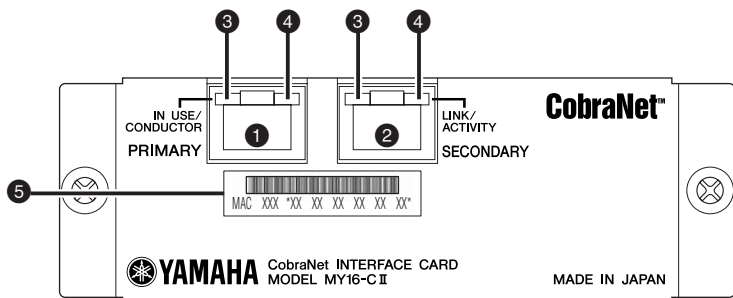
❶ **[PRIMARY] and** ❷ **[SECONDARY] Connectors**
These are 100Base-TX Ethernet connectors. The MY16-CII provides two Ethernet connectors to allow construction of redundancy networks employing dual (primary and secondary) circuits. The [PRIMARY] connector is for connection to the main circuit, while the [SECONDARY] connector is for connection to the backup circuit.
If a failure occurs on the PRIMARY circuit (e.g. a cable failure, accidental disconnection, switching hub failure, etc.) the SECONDARY circuit will automatically take over. Basic redundancy network setup is described on page 13.
Use STP (Shielded Twisted Pair) cables to protect against electromagnetic interference.

❸ **[IN USE/CONDUCTOR] Indicators**
These are the LED indicators to the left of the [PRIMARY] and [SECONDARY] connectors. These indicators will light when power has been properly applied to the MY16-CII card. These indicators will flash when the MY16-CII is operating as the network conductor. If an error occurs on the connected network, both the [PRIMARY] and [SECONDARY] connector [IN USE/CONDUCTOR] indicators will flash orange.
If both the [PRIMARY] and [SECONDARY] connector [IN USE/CONDUCTOR] indicators flash orange, try disconnecting the corresponding Ethernet connectors. The indicator will go out if a cable, hub, or other device connected to the network has failed. If the indicator continues flashing orange even after the cable is disconnected, there may be a fault in the MY16-CII card itself. In this case please refer the problem to qualified Yamaha service personnel.

❹ **[LINK/ACTIVITY] Indicators**
These are green indicators to the right of the [PRIMARY] and [SECONDARY] connectors. The indicator for each connector will light or flash slowly when a network cable is properly connected, and will flash rapidly while data is being properly transferred via the corresponding connector.

❺ **MAC Address**
The MAC (Media Access Control) address allows the CobraNet Manager to differentiate between individual MY16-CII unuts.

■ Slide Switch
The slide switch on the MY16-CII circuit board is set to MODE5. Please do not change this setting, otherwise the unit will not operate properly.
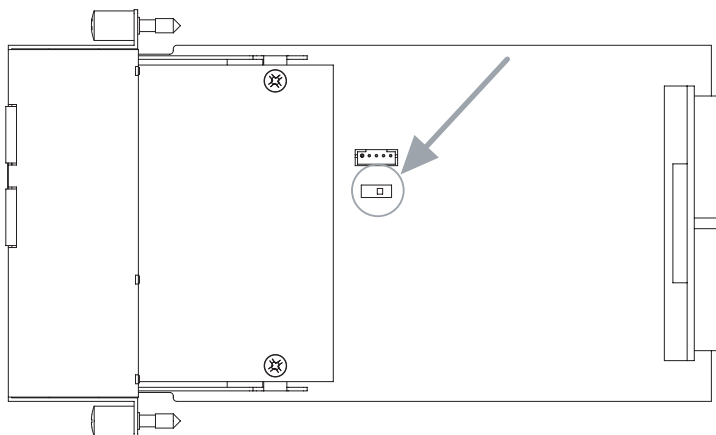
Connection Examples

Connecting Two Devices

Cross Cable

MY16-CII

MY16-CII

DME64N

YAMAHA Digital mixier

Connecting via Hub

Cross Cable

DME24N

DME64N

MY16-CII

MY16-CII

MY16-CII

Switching Hub

Switching Hub

MY16-CII MY16-CII MY16-CII MY16-CII

MY16-CII MY16-CII

DME64N

YAMAHA Digital Mixer
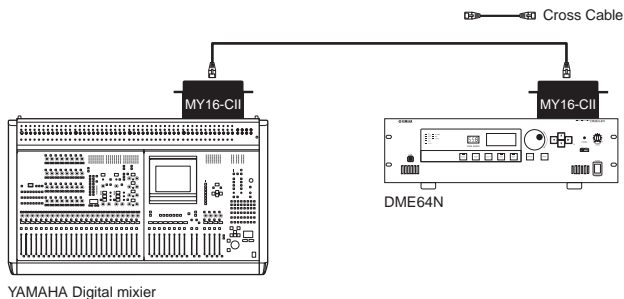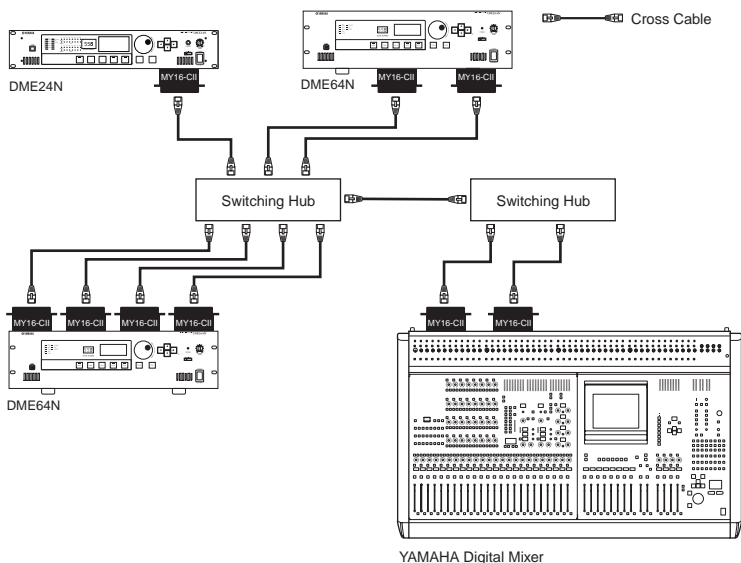
Connecting to Other CobraNet Devices

Straight Cable

DME24N
MY16-C
DME8i-C

Switching Hub ⟶⟶ Switching Hub
DME4io-C

MY16-CII MY16-CII

DME64N

DME8o-C
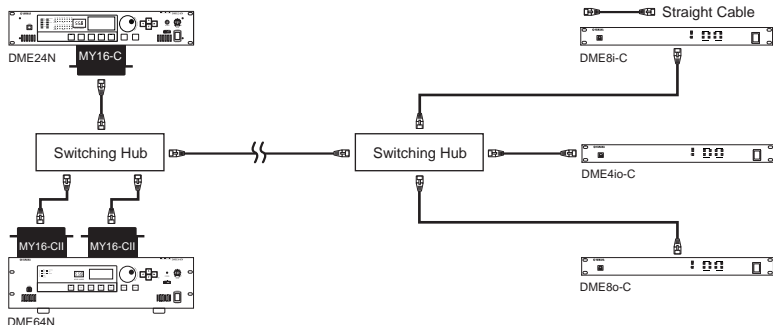
CobraNet Redundancy Network

NOTE Redundancy Networks

Redundancy networks employ dual (primary and secondary) circuits. Communication usually occurs over the primary circuit, but if a failure occurs on the primary circuit – cable failure, accidental disconnection, switch failure, etc. – the secondary circuit will automatically take over. Redundancy networks offer significantly higher reliability compared to single-circuit systems.

DME24N MY16-CII
DME24N MY16-CII

Straight Cable
(Primary CobraNet)

Straight Cable
(Secondary CobraNet)

Switching Hub A Switching Hub B

MY16-CII MY16-CII

DME64N DME64N
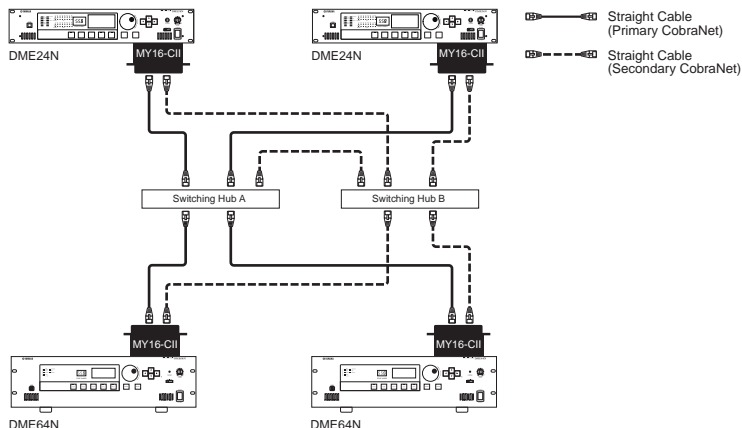
CobraNet Manager Installation

The CobraNet Manager (D&R CobraNet Manager Lite for Yamaha) is a software application that displays parameters and information related CobraNet devices connected to a CobraNet network, and allows the various parameters to be edited as needed. CobraNet Manager is required to set up the MY16-CII.

NOTE To install and use the CobraNet Manager it would be necessary to have 'administrator' rights on the computer.

■ Contents of CD-ROM

CobraNet Manager Lite for Yamaha
CobraNet Manager Lite for Yamaha Owner's Manual (For MY16-CII setup)
D&R CobraNet Manager Lite for Yamaha User Manual (English only)

NOTE Refer to the ''CobraNet Manager Lite for Yamaha'' owner's manual for MY16-CII setup procedures.

■ System Requirements

OS	Windows XP Professional/Home Edition
CPU	1GHz or higher; Intel® Pentium®/ Celeron® family processor
Memory	512 MB or more
Hard disk space	50MB or more
Display	1024 x 768 pixels, 256 colors or higher recommended

For some computers and systems, performance parameters exceeding those stipulated in the System Requirements list above may be required.

■ Installing the Application

1. Double click the ''CobraNetManager_'' folder on the CD-ROM. ''Setup.exe'' and the related files will be displayed.

2. Double click the ''Setup.exe'' file and the CobraNet Manager setup window will appear.

3. Follow the on-screen instructions to complete the setup procedure.

For instructions on using the CobraNet Manager to set up the MY16-CII, refer to the ''CobraNet Manager Lite for Yamaha'' owner's manual that is provided in pdf format the CD-ROM ''Manual'' folder. More detailed information about the CobraNet manager can be found in the D&R CobraNet Manager Lite for Yamaha User Manual.

NOTE In order to view the CobraNet Manager Owner's Manual, Adobe Acrobat Reader must be installed to your computer. If you do not have Adobe Acrobat Reader, you can download it http://www.adobe.com/

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Specifications

GENERAL SPECIFICATION

Parameter	Conditions	Min.	Typ.	Max.	Unit
Sampling Frequency					
Frequency Accuracy	selected as a conductor, and selected as a master clock	47.9982 -37ppm (48k)	48	48.0018 +37ppm (48k)	kHz
		95.9964 -37ppm (96k)	96	96.0036 +37ppm (96k)	kHz
Frequency Range	selected as a conductor,and not selected as a master clock	47.9976 -50ppm (48k)		48.0024 +50ppm (48k)	kHz
		95.9952 -50ppm (96k)		96.0048 +50ppm (96k)	kHz
Frequency Range	selected as a performer	47.9976 -50ppm (48k)		48.0024 +50ppm (48k)	kHz
		95.9952 -50ppm (96k)		96.0048 +50ppm (96k)	kHz
Jitter*	Fs: 48kHz			5	ns
	Fs: 96kHz			10	ns
Power Requirements	DC digital 5V		375		mA
	DC digital 3.3V		140		mA
Dimensions (mm)	120 x 40 x 200 (W x H x D)				
Net Weight (kg)	0.6				
Temperature Range (˚C)	10–35 (Operating Temperature Range) -20–60 (Storage Temperature Range)				
Accessories	Owner's Manual, CD-ROM				

* Jitter is measured with DME64N (MASTER CLOCK : MY16-CII)

DIGITAL INPUT/OUTPUT CHARACTERISTICS

Terminal	Format	Latency	Data length	Audio [Fs=48kHz (96kHz*)]
PRIMARY, SECONDARY	CobraNet	5.33ms	24bit	14(6)ch Input/14(6)ch Output
			20/16bit	16(8)ch Input/16(8)ch Output
		2.66ms	24/20/16bit	
		1.33ms		

* Double Channel format and Single format are supported at 96kHz.

European models
Purchaser/User Information specified in EN55103-1 and EN55103-2.
Conforms to Environments: E1, E2, E3 and E4

Europäische Modelle
Käufer/Benutzerinformationen nach EN55103-1 und EN55103-2.
Entspricht den Umgebungen: E1, E2, E3 und E4

Pour les modèles distribués en Europe
Les informations d'achat/utilisation sont décrites dans les documents EN55103-1 et EN55103-2.
Conformité aux normes environnementales : E1, E2, E3 et E4

Modelos europeos
Información comprador/usuario especificada en EN55103-1 y EN55103-2.
Conforme para entornos: E1, E2, E3 y E4

CobraNet Ports (100Base-TX Ethernet, RJ-45)

Pin	Connection
1	TxD+
2	TxD–
3	RxD+
4	Unused
5	Unused
6	RxD–
7	Unused
8	Unused

Straight/Cross Cable Wiring Details

Straight Cables

Pins
1 —— 1
2 —— 2
3 —— 3
4 —— 4
5 —— 5
6 —— 6
7 —— 7
8 —— 8

Cross Cables

Pins
1 —— 3
2 —— 6
3 —— 1
4 —— 4
5 —— 5
6 —— 2
7 —— 7
8 —— 8

Dimensions

unit: mm
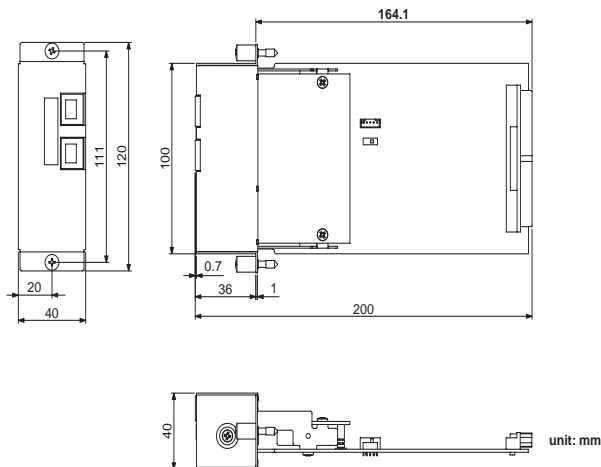
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