

# **CobraNet™ INTERFACE CARD MY16-CII**

**OWNER'S MANUAL  
BEDIENUNGSANLEITUNG  
MODE D'EMPLOI  
MANUAL DE INSTRUCCIONES  
取扱説明書**

**EN****DE****FR****ES****JA**

## 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 coaxial 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

The above statements apply **ONLY** to those products distributed by Yamaha Corporation of America or its subsidiaries.

\* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

(class B)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## CANADA

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

• This applies only to products distributed by Yamaha Canada Music Ltd.

(class B)

• Ceci ne s'applique qu'aux produits distribués par Yamaha Canada Musique Ltée.

# 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.

Yamaha cannot be held responsible for damage caused by improper use or modifications to the device, or data that is lost or destroyed.

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- The illustrations in this document are for instructional purposes, and may appear somewhat 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**

## 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

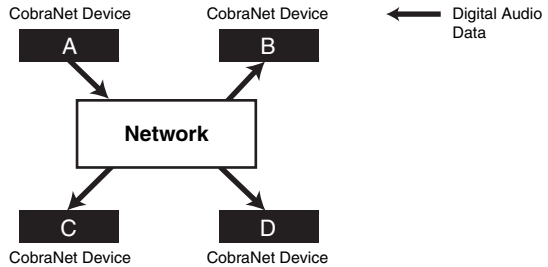
Two types of bundle can be used with CobraNet: “multicast” bundles and “unicast” bundles. Multicast bundles can be transmitted from a single device to all devices on the network, while unicast bundles are transferred from a single transmitting device to a single receiving device or a limited number of 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.

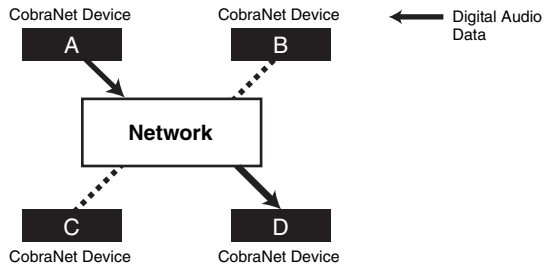
### Multicast Bundles

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

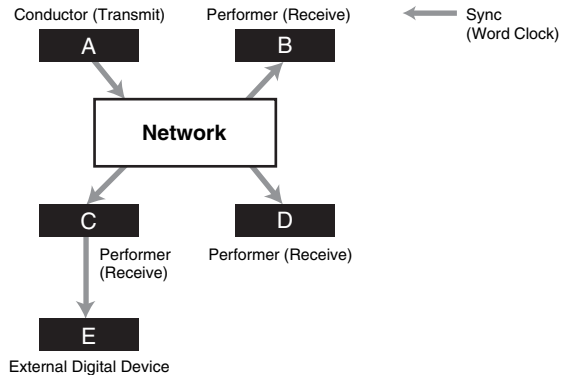
On any CobraNet network one device generates a timing signal that all other devices receive and are synchronized to. The device that generates the synchronization signal is known as the “conductor,” while all other devices are “performers.”

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 C on the CobraNet network sends the synchronization signal to external device E.



## ■ CobraNet Cables and Network Switch

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.

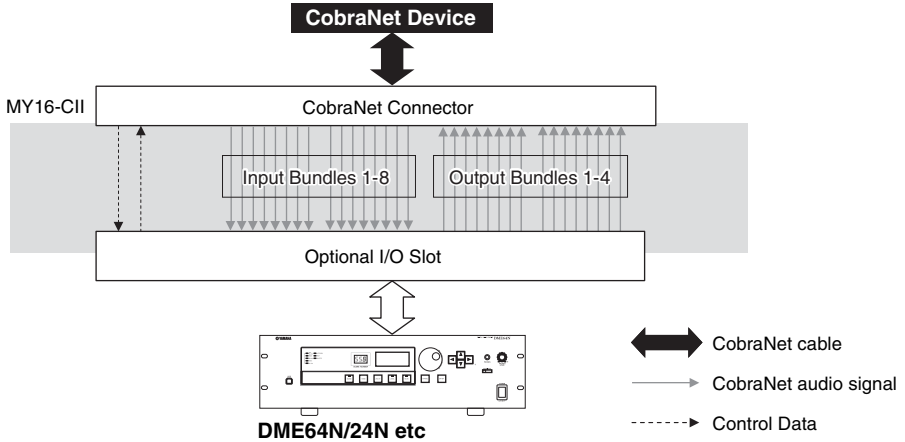
Always use network switch in a CobraNet network. When using metal cable for connections, be sure to use Category 5 straight cables.



# 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,<br>48kHz | 20bit,<br>48kHz | 24bit,<br>48kHz | 16bit,<br>96kHz | 20bit,<br>96kHz | 24bit,<br>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.

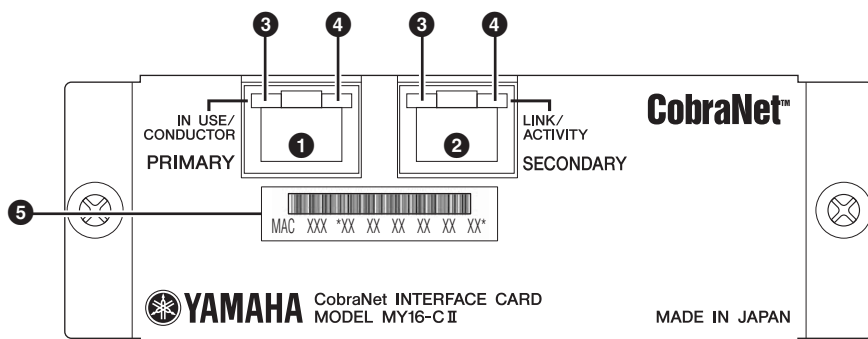
Depending on the configuration, the maximum number of channels that can be handle may be less than 8.

## 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, network switch 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, network switch, 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

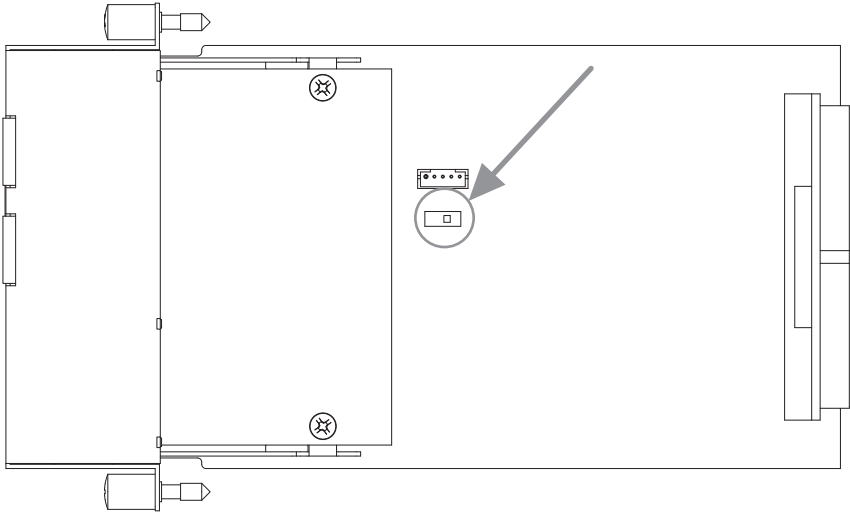
These are green indicators to the right of the [PRIMARY] and [SECONDARY] connectors. The indicator for each connector will light or flash slowly when a network cable is properly connected, and will flash rapidly while data is being properly transferred via the corresponding connector.

### ❺ MAC Address

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

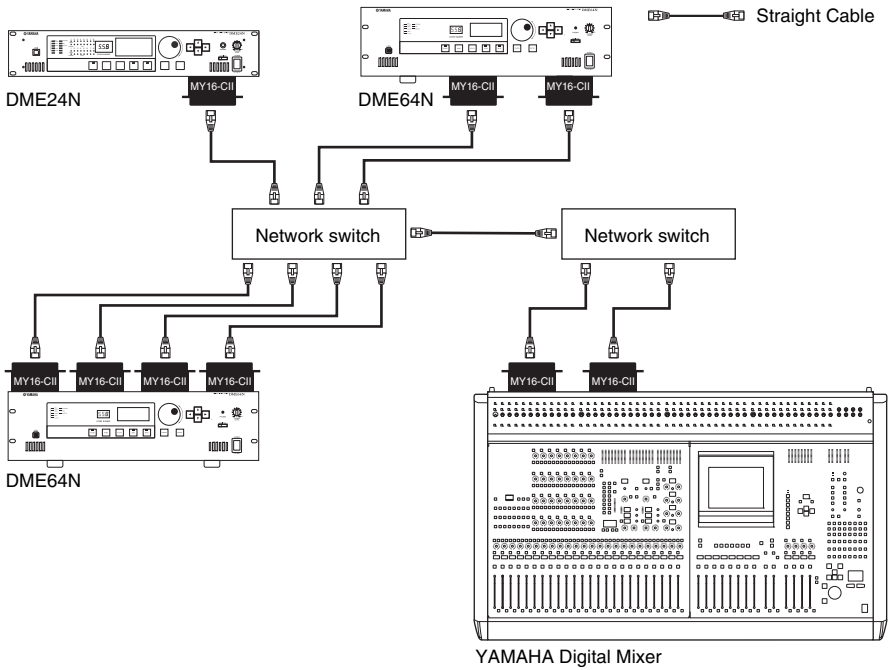
## ■ Slide Switch

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.

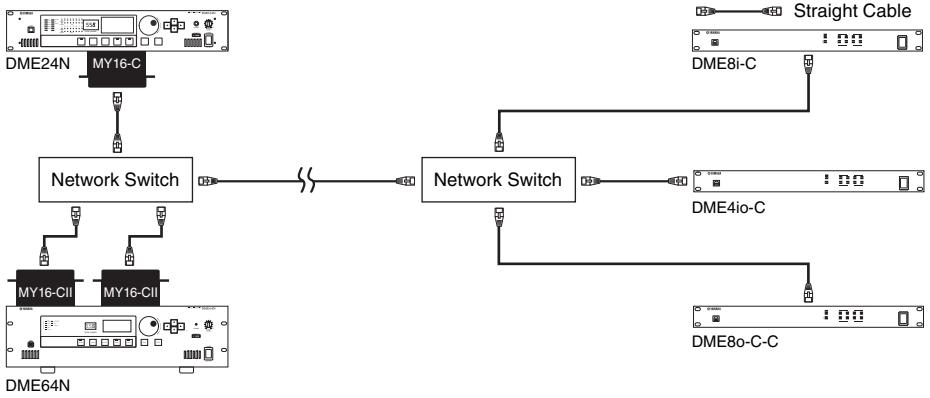


# Connection Examples

## ■ Connecting via Network switch



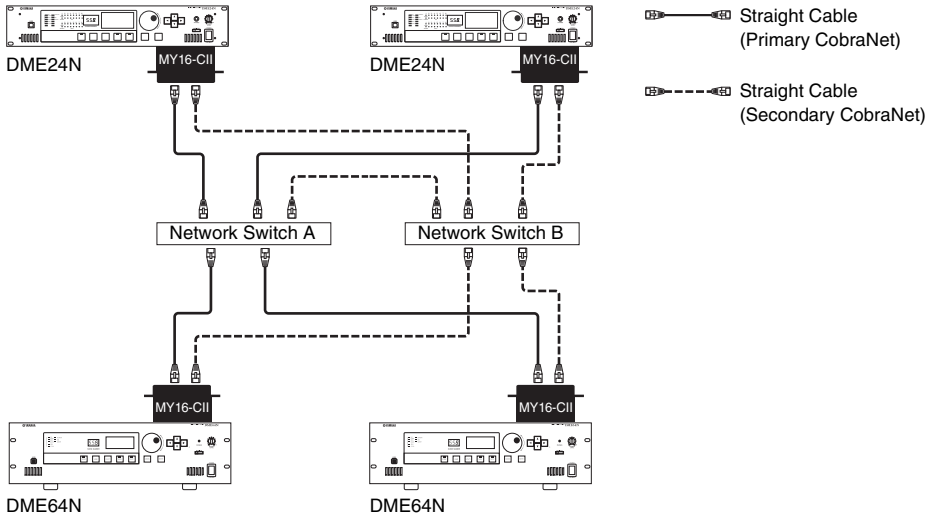
## ■ Connecting to Other CobraNet Devices



## ■ 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.



# Specifications

## ■ GENERAL SPECIFICATION

| Parameter                                | Conditions  | Min.                    | Typ. | Max.                    | Unit |
|--|---|-------------------------|------|-------------------------|------|
| Sampling Frequency<br>Frequency Accuracy | selected as a conductor, and selected as a master clock                   | 47.9982<br>-37ppm (48k) | 48   | 48.0018<br>+37ppm (48k) | kHz  |
|  |   | 95.9964<br>-37ppm (96k) | 96   | 96.0036<br>+37ppm (96k) | kHz  |
| Frequency Range                          | selected as a conductor, and not selected as a master clock               | 47.9976<br>-50ppm (48k) |      | 48.0024<br>+50ppm (48k) | kHz  |
|  |   | 95.9952<br>-50ppm (96k) |      | 96.0048<br>+50ppm (96k) | kHz  |
| Frequency Range                          | selected as a performer   | 47.9976<br>-50ppm (48k) |      | 48.0024<br>+50ppm (48k) | kHz  |
|  |   | 95.9952<br>-50ppm (96k) |      | 96.0048<br>+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)<br>-20–60 (Storage Temperature Range) |                         |      |                         |      |
| Accessories                              | Owner's Manual  |                         |      |                         |      |

\* 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 |
|                    |          | 2.67ms  | 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

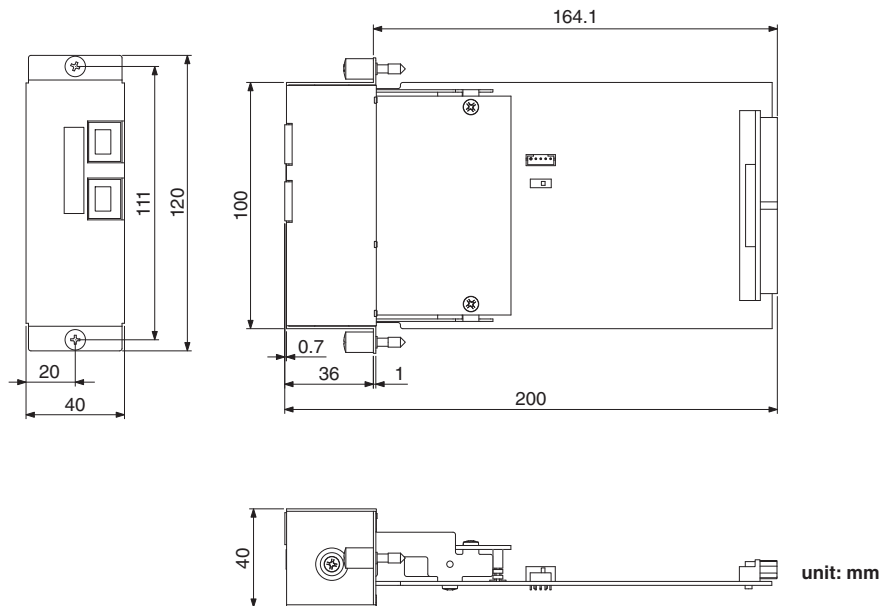
**Straight Cables**

| 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



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Yamaha Pro Audio global web site:  
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Yamaha Manual Library  
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