YAMAHA

AMP CONTROL UNIT
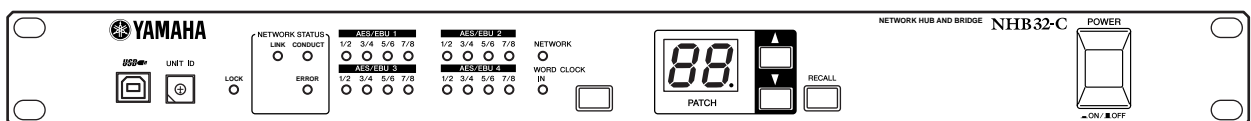
ACU 16-C

NETWORK HUB and BRIDGE

NHB 32-C

Owner's Manual
Mode d'emploi
Bedienungsanleitung
Manual de instrucciones

M

ACU16-C/NHB32-C
Owner's Manual Addendum

Please make the following changes and additions to the ACU16-C/NHB32-C owner's manual. Some of these are due to the ACU16-C/NHB32-C system software upgrade, while others are corrections and supplementary explanations.

Changes due to the software upgrade

❏ Support for CobraNet "Low Latency" (system software v1.10)

In conjunction with the upgrade to system software V1.10, the latency setting that had been fixed at 5.33 ms can now be selected from three choices (5.33 ms/2.67 ms/1.33 ms). This allows even lower-latency distribution of audio signals. In addition, you can now make connections at the desired latency to digital mixers such as the PM5D or digital mixing engines such as the DME64N/24N via the Yamaha "MY16-C" card.

Changing the latency can be done in conjunction with NetworkAmp Manager V1.1.0E. For the procedure, refer to the NetworkAmp Manager owner's manual (PDF format).

The latency and audio bit depth settings will determine the limits on the number of channels that can be distributed in one bundle, and the number of bundles that can be distributed.

- **NHB32-C**

Latency	20-bit		24-bit	
	Channels per bundle	Maximum number of bundles (total of input and output)	Channels per bundle	Maximum number of bundles (total of input and output)
5.33ms	8	8	7	8
2.67ms	8	8	8	8
1.33ms	8	4	8	4

- **ACU16-C**

Latency	Maximum number of bundles (input only)
5.33ms	4
2.67ms	4
1.33ms	4

If two or more different latencies exist in a CobraNet network, it may become impossible for the various devices to communicate correctly. You must make sure that all CobraNet devices in a single network have the same latency setting.

Additions and corrections

❏ Cable Length & Switching Hubs

The maximum length of a cable used in a 100Base-T Ethernet network is 100 m (a maximum of 2 km for a multimode optical fiber cable), but depending on the type of cable used and on the performance of the switching hub, there are cases in which this length cannot be guaranteed. Three or four switching hubs can be connected, but this also will depend on the performance of the switching hub.

❏ "System Requirements (NetworkAmp Manager)" (page 10)

The following items have been added to the operating requirements for NetworkAmp Manager.
- If your computer has HyperThreading Technology, you must disable it when connecting via USB.
- This software cannot be used on a computer that has multiple CPUs (e.g., Intel's Xeon processor or AMD's Opteron processor).
- This software cannot be used on a computer that has a dual core CPU (e.g., Intel's Pentium-D processor or AMD's Athlon64 x2 processor).
- This software cannot be used on a computer running Windows XP x64 Edition.

❏ **"Installing Acrobat Reader" (page 12)**

Incorrect—To view the *Network Amp Manager Owner's Manual,* you'll need to install the Adobe Acrobat Reader software, which is included on the CD-ROM. If you already have this software installed, skip this section.

Correct—To view the *NetworkAmp Manager Owner's Manual* (PDF format), Adobe Reader software (free of charge) must be installed. If you don't have Adobe Reader, please download it from the Adobe Corporation's website. http://www.adobe.com

❏ **"PRIMARY & SECONDARY CobraNet ports" (page 22)**

Incorrect—Primary and secondary can be used to build redundancy into systems. Under normal conditions, the ACU16-C uses the PRIMARY port. However, if communication via that port fails, it will automatically switch to the SECONDARY port and operation will continue uninterrupted.

Correct—Primary and secondary can be used to build redundancy into systems. Under normal conditions, the ACU16-C uses the PRIMARY port. However, if system problems such as port malfunction or broken cable occur in the PRIMARY port, it will automatically switch to the SECONDARY port. The audio signal will be momentarily interrupted, but the duration of the interruption will depend on the performance and settings of the hub, and on the structure of the system.

❏ **"Introduction" (page 25)**

Incorrect—Up to eight NHB32-Cs can be used on a single CobraNet network, providing bridging between 512 CobraNet audio channels and 512 AES/EBU format inputs and outputs.

Correct—Up to eight NHB32-Cs can be used on a single CobraNet network, providing bridging a maximum (total inputs and outputs) of 256 channels of CobraNet audio and AES/EBU audio.

❏ **"CobraNet Primary & Secondary" (page 35)**

Incorrect—In the first example, if a primary connection fails, the system automatically switches to secondary and operation continues uninterrupted. However, if the switching hub fails, the entire system stops working. In the second example, individual switching hubs are used for primary and secondary, so even if switching hub A fails, operation continues on secondary via switching hub B.

Correct—In the first example, if a primary connection fails, the system automatically switches to secondary. However if the switching hub fails, the entire system stops working. In the second example, individual switching hubs are used for primary and secondary, so even if switching hub A fails, operation continues on secondary via switching hub B.
Be aware that with either connection, the time required in order to switch between primary and secondary will depend on the performance and settings of the hub.

❏ **"CobraNet Primary & Secondary, Ex. 2" (page 35)**

In consideration of a case in which the primary connection fails, connect switching hub A and switching hub B.

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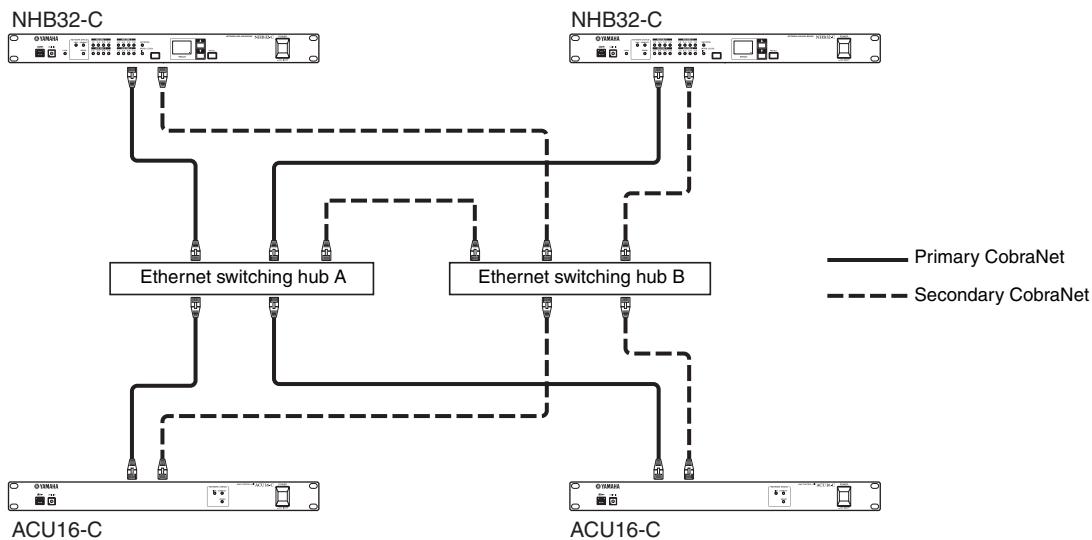
ACU 16-C / NHB 32-C

Notes on rack-mounting the unit

E

If you install the ACU16-C/NHB32-C along with another ACU16-C/NHB32-C or other device in a rack that is not well ventilated, the temperature inside the rack may rise due to the heat generated from the devices and the devices may be unable to perform properly. When you rack-mount the unit, be sure to keep a gap of 1U (4.5cm) above and below the unit for better ventilation. Also, install the ventilation panels in these gaps or remove the partition panels.

If the temperature inside the rack is expected to be 40°C or higher (in this case, the room temperature is generally about 30°C or higher), install the fan kit on the top shelf of the rack, and install the ventilation panels between devices or remove the partition panels. The fan kit must generate a maximum wind of 1.6m^3/min or higher and a maximum static pressure of 5mmH$_2$O or higher.

Anmerkungen zum Rackeinbau des Geräts

D

Wenn Sie den ACU16-C/NHB32-C gemeinsam mit einem anderen ACU16-C/NHB32-C oder einem Gerät mit mangelhafter Lüftung in ein Rack einbauen, könnte die Temperatur im Innern des Racks rapide ansteigen und Ausfälle der vorhandenen Geräte verursachen. Lassen Sie über und unter Geräten in einem Rack jeweils 1HE (4,5cm) frei, um eine ausreichende Luftzirkulation zu gewährleisten. In diesen Öffnungen müssen Lüftungsblenden angebracht werden. Außerdem sind eventuell vorhandene Trennplatten zu entfernen.

Wenn die Temperatur im Innern des Racks die 40°C-Marke zu übersteigen droht (was der Fall ist, wenn die Raumtemperatur mindestens 30°C beträgt), müssen Sie ganz oben im Rack eine Lüftereinheit und zwischen den Geräten Lüftungsblenden einbauen. Trennplatten zwischen diesen Partien müssen entfernt werden. Die Lüftereinheit muss einen Luftstrom von mindestens 1,6m^3/min und einen statischen Druck von 5mmH$_2$O oder mehr erzeugen.

Remarques concernant l'installation de l'unité dans un rack

F

Si vous installez l'ACU16-C/NHB32-C dans le même rack qu'un deuxième ACU16-C/NHB32-C ou tout autre dispositif avec une ventilation autonome plutôt limitée, la température au sein du rack pourrait très vite monter à des valeurs qui empêchent les unités de fonctionner correctement. De ce fait, pour le montage en rack, il convient de laisser un espace d'1U (4,5cm) au-dessus et en dessous de tels dispositifs pour assurer une bonne circulation d'air frais. De plus, il faut couvrir les ouvertures ainsi laissées avec des panneaux de ventilation. Retirez toute cloison éventuellement présente entre deux unités.

Si la température au sein du rack risque de monter au-delà de 40°C (auquel cas la température ambiante s'élève à 30°C ou plus), installez un kit de ventilation en haut du rack et des panneaux de ventilation entre les unités. Retirez en outre les cloisons qui les séparent. Le kit de ventilation doit générer un flux d'air supérieur à 1,6m^3/min et une pression statique de 5mmH$_2$O ou plus.

Notas acerca de la instalación en rack de la unidad

S

Si instala el ACU16-C/NHB32-C junto con otro ACU16-C/NHB32-C u otro dispositivo en un armario rack que no esté correctamente ventilado, la temperatura en el interior del armario puede elevarse debido al calor generado por los propios dispositivos y afectar al correcto funcionamiento de los mismos. Cuando instale la unidad en rack, asegúrese de dejar una separación de 1U (4.5cm) por encima y por debajo de la unidad con el fin de conseguir una correcta ventilación. Además, instale los paneles de ventilación en estas separaciones o elimine los paneles de partición.

Si se calcula que la temperatura en el interior del rack sea de 40°C o más (en este caso, cuando la temperatura de la habitación es de 30°C o superior), instale el kit de ventilación en la parte superior del armario rack e instale los paneles de ventilación entre los dispositivos o elimine los paneles de división. El kit de ventilación debe generar un caudal mínimo de 1.6m^3/min o superior con una presión estática mínima de 5 mm H$_2$O o superior.
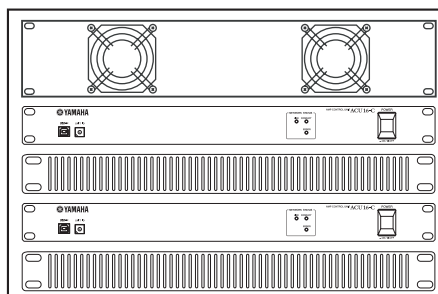
fan kit/Lüftereinheit/
Kit de ventilation/Kit de ventilación

ACU16-C/NHB32-C

ventilation panel/Lüftungsblenden/
Panneau de ventilation/Panel de ventilación

ACU16-C/NHB32-C

ventilation panel/Lüftungsblenden/
Panneau de ventilation/Panel de ventilación

Important Note for PC-N Series Power Amplifier Users

When you are using the ACU16-C connected to a PC9500N or PC4800N power amplifier, the NetworkAmp Manager's meter may not display the correct value, depending on your power amplifier. Please check your power amplifier for the following items to find out whether the problem has been fixed on your amplifier:

Locate the product serial number label on the packing container or on the rear panel of the power amplifier.

- If the first two alphabetical letters in the serial number are IL, IM, IN, IO, IP, IX, IY, IZ, or JH, the problem may not have been fixed on the amplifier. Otherwise, you can assume that the problem has been fixed on your amplifier.

- On units that have a serial number that begins with any of the letter combinations described above, if there is a green round sticker adjacent to the serial number label, the problem has been fixed on the unit.

If the problem has not been fixed on your power amplifier, contact your Yamaha dealer.

E

Wichtiger Hinweis für den Einsatz von Endstufen der PC-N-Serie

Wenn Sie den ACU16-C an eine Endstufe des Typs PC9500N oder PC4800N anschließen, zeigen die Meter von NetworkAmp Manager eventuell nicht den richtigen Wert an. Wenn das bei Ihnen der Fall ist, können Sie folgendermaßen ermitteln, ob das Problem der Endstufe behoben werden muss:

Bringen Sie die Seriennummer Ihrer Endstufe in Erfahrung. Diese finden Sie auf dem Lieferkarton und dem rückseitigen Typenschild.

- Wenn die ersten beiden Buchstaben der Seriennummer „IL", „IM", „IN", „IO", „IP", „IX", „IY", „IZ" oder „JH" lauten, bedarf die Endstufe eventuell noch einer Aktualisierung. Andernfalls können Sie davon ausgehen, dass das Problem bereits behoben wurde.

- Auf Geräten, deren Seriennummer mit den oben erwähnten Buchstaben beginnt und bei denen das Problem bereits behoben wurde, befindet sich neben dem Typenschild ein runder grüner Aufkleber.

Fehlt dieser Aufkleber auf Ihrer Endstufe, so wenden Sie sich bitte an Ihren Yamaha-Händler.

D

Remarque importante à l'attention des utilisateurs d'un amplificateur de puissance de la série PC-N

Quand l'ACU16-C est branché à un amplificateur de puissance PC9500N ou PC4800N, il se peut (selon l'ampli de puissance) que l'affichage de niveau de NetworkAmp Manager n'indique pas la valeur correcte. Contrôlez alors le numéro de série de votre amplificateur comme suit pour vérifier si ce problème doit être corrigé ou non:

Vérifiez le numéro de série de l'amplificateur sur l'emballage ou le panneau arrière de l'appareil.

- Si les deux premières lettres du numéro de série correspondent à "IL", "IM", "IN", "IO", "IP", "IX", "IY", "IZ" ou "JH", le problème n'a peut-être pas été corrigé sur l'amplificateur. Si les lettres initiales du numéro de série diffèrent des caractères ci-dessus, vous pouvez partir du principe que le problème a été corrigé sur votre amplificateur.

- Certains amplificateurs dont le numéro de série commence par une paire de lettres mentionnée ci-dessus pourraient comporter une vignette ronde et verte collée à côté de l'étiquette du numéro de série. La présence de cette vignette signifie que le problème a été corrigé sur l'appareil en question.

Si le problème n'a pas été corrigé sur votre amplificateur de puissance, contactez votre revendeur Yamaha.

F

Nota importante para los usuarios de los amplificadores de la serie PC-N

Si utiliza el ACU16-C conectado a un amplificador PC9500N o PC4800N, el indicador NetworkAmp del Manager puede que no visualice el valor correcto, dependiendo de su amplificador. Compruebe los siguientes elementos en su amplificador para saber si el problema se ha solucionado:

Localice la etiqueta del número de serie del producto en el embalaje o en el panel posterior del amplificador.

- Si las dos primeras letras del número de serie son "IL", "IM", "IN", "IO", "IP", "IX", "IY", "IZ" o "JH", es posible que el problema no se haya solucionado en el amplificador. De lo contrario, puede asumir que el problema se ha solucionado en el amplificador.

- En las unidades con números de serie que empiecen por cualquier serie de letras mencionada, si observa un punto verde al lado de la etiqueta del número de serie, el problema se ha solucionado en la unidad.

Si el problema persiste en el amplificador, contacte con su distribuidor Yamaha.

S

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF
ELECTRIC SHOCK, DO NOT REMOVE
COVER (OR BACK). NO USER-SERVICEABLE
PARTS INSIDE. REFER SERVICING TO
QUALIFIED SERVICE PERSONNEL.

The above warning is located on the top of the unit.

Explanation of Graphical Symbols
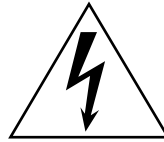
The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and mainte-nance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY INSTRUCTIONS

1 Read these instructions.

2 Keep these instructions.

3 Heed all warnings.

4 Follow all instructions.

5 Do not use this apparatus near water.

6 Clean only with dry cloth.

7 Do not block any ventilation openings. Install in accordance with the manufacturer's instruc-tions.

8 Do not install near any heat sources such as radiators, heat registers, stoves, or other appa-ratus (including amplifiers) that produce heat.

9 Do not defeat the safety purpose of the polar-ized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the pro-vided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11 Only use attachments/accessories specified by the manufacturer.

12 Use only with the cart, stand, tripod, bracket, or table spec-ified by the manufacturer, or sold with the apparatus. When a cart is used, use cau-tion when moving the cart/ apparatus combination to avoid injury from tip-over.

13 Unplug this apparatus during lightning storms or when unused for long periods of time.

14 Refer all servicing to qualified service person-nel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or mois-ture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK,
DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

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Precautions

Warnings

Installation

- Connect this unit's power cord only to an AC outlet of the type stated in this *Owner's Manual* or as marked on the unit. Failure to do so is a fire and electrical shock hazard.
- Do not allow water to enter this unit or allow the unit to become wet. Fire or electrical shock may result.
- Do not place heavy objects, including this unit, on top of the power cord. A damaged power cord is a fire and electrical shock hazard. In particular, be careful not to place heavy objects on a power cord covered by a carpet.
- Do not place a container with liquid or small metal objects on top of this unit. Liquid or metal objects inside this unit are a fire and electrical shock hazard.

Operation

- Do not scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard.
- Do not remove the unit's cover. You could receive an electrical shock. If you think internal inspection, maintenance, or repair is necessary, contact your dealer.
- Do not modify the unit. Doing so is a fire and electrical shock hazard.
- If lightning begins to occur, turn off the power switch of the unit as soon as possible, and unplug the power cable plug from the electrical outlet.
- If there is a possibility of lightning, do not touch the power cable plug if it is still connected. Doing so may be an electrical shock hazard.
- Use only the included power cord with this unit. Using other types may be a fire and electrical shock hazard.

In case an abnormality occurs during operation

- If the power cord is damaged (i.e., cut or a bare wire is exposed), ask your dealer for a replacement. Using the unit with a damaged power cord is a fire and electrical shock hazard.
- If you notice any abnormality, such as smoke, odor, or noise, or if a foreign object or liquid gets inside the unit, turn it off immediately. Disconnect the power cord. Consult your dealer for repair. Using the unit in this condition is a fire and electrical shock hazard.
- Should this unit be dropped or the cabinet be damaged, turn the power switch off, remove the power plug from the AC outlet, and contact your dealer. If you continue using the unit without heeding this instruction, fire or electrical shock may result.

Cautions

Installation

- Keep this unit away from the following locations:
  — Locations exposed to oil splashes or steam, such as near cooking stoves, humidifiers, etc.
  — Unstable surfaces, such as a wobbly table or slope.
  — Locations exposed to excessive heat, such as inside a car with all the windows closed, or places that receive direct sunlight.
  — Locations subject to excessive humidity or dust accumulation.
- Hold the power cord plug when disconnecting it from an AC outlet. Never pull the cord. A damaged power cord is a potential fire and electrical shock hazard.
- Do not touch the power plug with wet hands. Doing so is a potential electrical shock hazard.
- This unit has ventilation holes to prevent the internal temperature from rising too high. Do not block them. Blocked ventilation holes are a fire hazard. In particular, do not operate the unit while it's on its side, is upside down, or while it's covered with a cloth or dust sheet.
- When installing the unit in a rack, you must use the rack-mounting screw holes at the rear in addition to those on the front panel.
- When rack-mounting or stacking several units, always leave at least 1U (i.e., about 4.5 cm) of free space above and below the unit for normal ventilation. If the airflow is restricted, the unit may overheat, which could cause a fire.
- To relocate the unit, turn the power switch off, remove the power plug from the AC outlet, and remove all connecting cables. Damaged cables may cause fire or electrical shock.
- This unit is equipped with a dedicated ground connection to prevent electrical shock. Before connecting the power plug to an AC outlet, be sure to ground the unit. If the power cord has a three-pin plug, it will provide sufficient grounding so long as the AC outlet is grounded correctly.

Operation

- If you know you will not use this unit for a long period of time, such as when going on vacation, remove the power plug from the AC outlet. Leaving it connected is a potential fire hazard.

Maintenance

- To prevent electrical shock when cleaning the unit, remove the power plug from the AC outlet.

Important Information

Operating Notes

- The performance of components with moving contacts, such switches, rotary controls, faders, and connectors, deteriorates over time. The rate of deterioration depends on the operating environment and is unavoidable. Consult your dealer about replacing defective components.

- Using a mobile telephone near this unit may induce noise. If noise occurs, use the telephone away from the unit.

- The digital circuits of this unit may induce a slight noise into nearby radios and TVs. If noise occurs, relocate the affected equipment.

- When connecting D-sub cables, be sure to tighten the screws on both sides of the connector securely. To disconnect the cable, loosen the screws completely, then remove the cable by holding the connector part. Do not remove the plug by pulling the cable while the screws are still attached. Otherwise, the connector may be damaged, leading to malfunction.

- When you change the wordclock settings on any device in your digital audio system, some devices may output noise, so turn down your power amps beforehand, otherwise your speakers may be damaged.

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- This disc is a CD-ROM. Do not attempt to play the disc on an audio CD player. Doing so may result in irreparable damage to your audio CD player.

- Copying of the commercially available music sequence data and/or digital audio files is strictly prohibited except for your personal use.

- The screen displays as illustrated in this owner's manual are for instructional purposes, and may appear somewhat different from the screens which appear on your computer.

- Future upgrades of application and system software and any changes in specifications and functions will be announced separately.

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Yamaha Web Site

Further information about this unit, related products, and other Yamaha professional audio equipment is available on the Yamaha Professional Audio Web site at: <http://www.yamaha.co.jp/product/proaudio/homeenglish/>.

Package Contents

ACU16-C

- ACU16-C Amp Control Unit
- CD-ROM (NetworkAmp Manager, PDF manual, MIDI drivers)
- Power cord and retaining clamp
- USB cable (for connection to PC running NetworkAmp Manager)
- 3-way Euro-block connectors x16
- This manual

NHB32-C

- NHB32-C Network Hub and Bridge
- CD-ROM (NetworkAmp Manager, PDF manual, MIDI drivers)
- Power cord and retaining clamp
- USB cable (for connection to PC running NetworkAmp Manager)
- This manual

About this Owner's Manual

This *Owner's Manual* consists of three main sections:
- NetworkAmp Manager Installation
- ACU16-C Amp Control Unit
- NHB32-C Network Hub and Bridge

All the information you need in order to install NetworkAmp Manager, and to operate the ACU16-C and NHB32-C is contained in this manual. Although the ACU16-C and NHB32-C can be used standalone, first they need to be configured using NetworkAmp Manager. The PDF format *Network Amp Manager Owner's Manual*, which contains a glossary of NetworkAmp Manager, ACU16-C, and NHB32-C related terms, is on the supplied CD-ROM.

A wealth of information about CobraNet, with sections especially for designers and installers, is available on the Peak Audio Web site at <http://www.peakaudio.com>. If you are designing a CobraNet network, we strongly recommend that you visit this Web site and study the information available in order to fully understand the CobraNet technology. Peak Audio also provide a list of Ethernet devices that have been tested with CobraNet, including switching hubs and media converters.

Contents

1 NetworkAmp Manager Installation

Introduction

This chapter explains how to install NetworkAmp Manager and the necessary drivers. For information on how to use NetworkAmp Manager, refer to the *Network Amp Manager Owner's Manual,* which is included on the CD-ROM in PDF format and can be opened directly from NetworkAmp Manager's Help menu.

CD-ROM Contents

Folder	Software	Description
Acroread\English	Acrobat Reader[1, 2]	Adobe Acrobat Reader software for viewing the PDF format manuals.
NetworkAmp Manager	NetworkAmp Manager[1]	NetworkAmp Manager program and PDF format manual.
Mididrv_	Yamaha CBX Driver	Yamaha serial driver. Necessary if you are connecting to a serial port on your PC.
USBdrv_	Yamaha USB MIDI Driver (Windows 98, Me)	Yamaha USB driver. Necessary if you are connecting to a USB port on your PC.
USBdrv2k_	Yamaha USB MIDI Driver (Windows 2000, XP)	

1. For details on using this software, refer to the PDF manual after installation.
2. This software is not supported by Yamaha.

System Requirements

The system requirements of your operating system may be different to those listed here.

NetworkAmp Manager

Computer	PC with a 450 MHz or faster Intel Pentium or Celeron family processor
OS	Windows 98, 98SE, Me, 2000, XP Home Edition, XP Professional
Memory	64 MB or more (128 MB or more recommended)
Hard Disk	100 MB or more of free space
Display	1024 x 768 pixels, 32,000 colors or higher

Yamaha USB MIDI Driver

Computer	PC with a 166 MHz or faster Intel Pentium or Celeron family processor and USB port
OS	Windows 98, 98SE, Me, 2000, XP Home Edition, XP Professional
Memory	32 MB or more
Hard Disk	2 MB or more of free space

Yamaha CBX Driver

OS	Windows 95, 98, 98SE, Me, NT4.0, 2000, XP Home Edition, XP Professional

System requirements for software not listed here can be found on the CD-ROM.

ACU16-C/NHB32-C Hookup

The following illustration shows the hookup methods that can be used to connect the ACU16-C/NHB32-C to your computer: USB or serial.

1. USB

NHB32-C

ACU16-C

USB port

USB cable

USB port

2. Serial

NHB32-C

ACU16-C

TO COMPUTER port

Serial cable
(9-pin D-sub)

Serial port
(RS-232C)

Windows PC running
NetworkAmp Manager
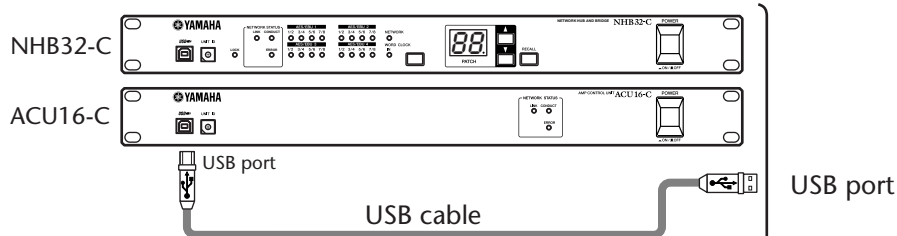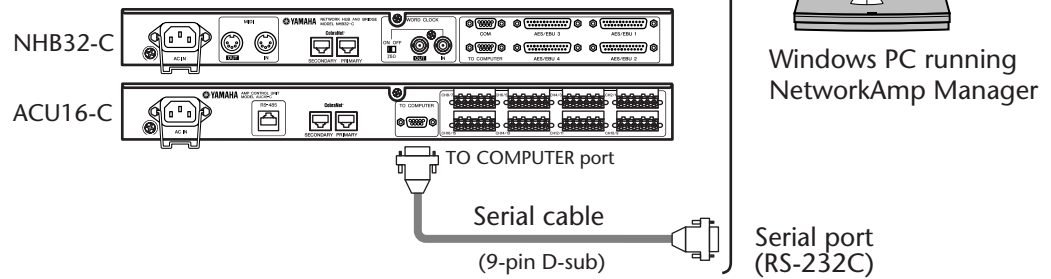
Note: Before you connect to serial ports, turn off the ACU16-C/NHB32-C and your computer.

Installing Acrobat Reader

To view the *Network Amp Manager Owner's Manual,* you'll need to install the Adobe Acrobat Reader software, which is included on the CD-ROM. If you already have this software installed, skip this section.

1 Start your computer and Windows, and insert the included CD-ROM into your computer's CD-ROM drive.

2 On the CD-ROM, double-click the "Acroread_" folder.

This folder contains Acrobat software in several languages.

3 Double-click the folder of the language you want to install.

4 Double-click "ar****.exe."** ("******" indicates the version number and selected language.)

5 Follow the on-screen instructions to install the software.

For instructions on using Acrobat Reader, choose Reader Help from Acrobat Reader's Help menu.

Installing the USB MIDI Driver

If you are connecting the ACU16-C/NHB32-C to a USB port on your computer, you'll need to install the Yamaha USB driver. If you already have this software installed, skip this section.
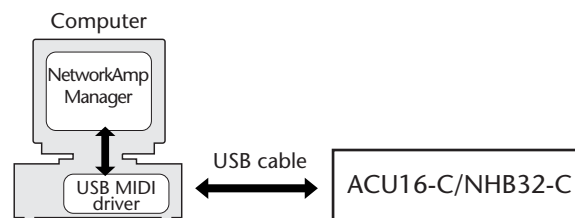
The procedure for installing the Yamaha USB driver depends on the version of Windows that you are using.

Windows 98 & 98SE

1   **Start your computer and Windows, and insert the included CD-ROM into your computer's CD-ROM drive.**

2   **Turn off the ACU16-C/NHB32-C and use a USB cable to connect the USB port on the ACU16-C/NHB32-C to a USB port on your computer.**

3   **Turn on the ACU16-C/NHB32-C.**

The Add New Hardware Wizard appears. If it doesn't appear, try disconnecting and reconnecting the USB cable. Alternatively, open the Add New Hardware control panel.

4   **Click Next.**

The following window appears.

5   **Select "Search for the best driver for your device (Recommended)," and then click Next.**

The following window appears.

6   **Select "Specify a location," and specify "D:\USBdrv_" (replacing "D" with the drive letter of your CD-ROM drive), and then click Next.**

When the driver is located, "YAMAHA USB MIDI Driver" is displayed, as shown below.
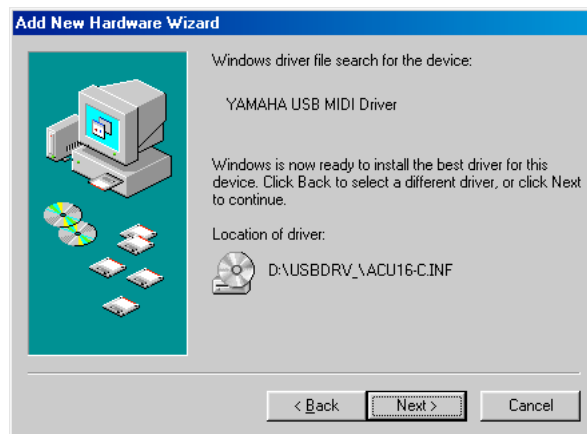
7   **Click Next.**

> *Note: You may be prompted to insert your Windows CD-ROM. Do not insert it! Click OK, and in the "Copy files from" section of the subsequent dialog box, enter "D:\USBdrv_" (replacing "D" with the drive letter of your CD-ROM drive), and then click OK.*

The driver is installed, and the following window appears when the installation is complete.
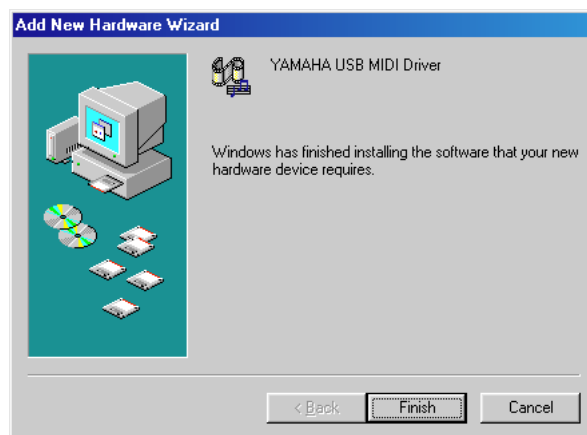
8   **Click Finish, and then restart your computer.**

Windows Me

1   Start your computer and Windows, and insert the included CD-ROM into your computer's CD-ROM drive.

2   Turn off the ACU16-C/NHB32-C and use a USB cable to connect the USB port on the ACU16-C/NHB32-C to a USB port on your computer.

3   Turn on the ACU16-C/NHB32-C.

The Add New Hardware Wizard appears. If it doesn't appear, try disconnecting and reconnecting the USB cable. Alternatively, open the Add New Hardware control panel.

4   Select "Automatic search for a better driver (Recommended)," and then click Next.

Windows Me should be able to locate the driver automatically, in which case you can proceed to Step 5. If the driver cannot be located, select "Specify the location of the driver (Advanced)," click Next, specify your CD-ROM drive (e.g., D:\USBdrv_), and then continue as prompted.

The following window appears when the installation is complete.

5   Click Finish, and then restart your computer.

Windows 2000

1   **Start your computer and Windows, log on as the Administrator, and then insert the included CD-ROM into your computer's CD-ROM drive.**

2   **Go to My Computer–>Control Panel–>System–>Hardware–>Driver Signing–>File Signature Verification, select "Ignore—Install all files, regardless of file signature," and then click OK.**

3   **Turn off the ACU16-C/NHB32-C and use a USB cable to connect the USB port on the ACU16-C/NHB32-C to a USB port on your computer.**

4   **Turn on the ACU16-C/NHB32-C.**

    The Found New Hardware Wizard appears.

5   **Click Next.**

6   **Select "Search for a suitable driver for my device (Recommended)," and then click Next.**

7   **In the subsequent window, select "CD-ROM drives" only, and then click Next.**

    Note: You may be prompted to insert your Windows CD-ROM. Do not insert it! Click OK, and in the "Copy files from" section of the subsequent dialog box, enter "D:\USBdrv2k_" (replacing "D" with the drive letter of your CD-ROM drive), and then click OK.

    The driver is installed, and the message "Completing the Found New Hardware Wizard" appears.

8   **Click Finish, and then restart your computer.**

Windows XP

1   **Start your computer and Windows, and insert the included CD-ROM into your computer's CD-ROM drive.**

2   **Click the Start button, and then click Control Panel.**

If the Control Panel window appears as shown below, click "Switch to Classic View" on the left side of the window in order to see all the control panels.

3   **Go to System Hardware–>Driver signatures–>Driver signature options, select "Ignore—Install software without asking for confirmation," and then click OK.**

4   **Click OK to close the System Properties window, and then click the Close button to close the Control Panel window.**

5   **Turn off the ACU16-C/NHB32-C and use a USB cable to connect the USB port on the ACU16-C/NHB32-C to a USB port on your computer.**

6   **Turn on the ACU16-C/NHB32-C.**

The Found New Hardware Wizard appears.

7   **Select "Install software automatically (recommended) (I)," and then click Next.**
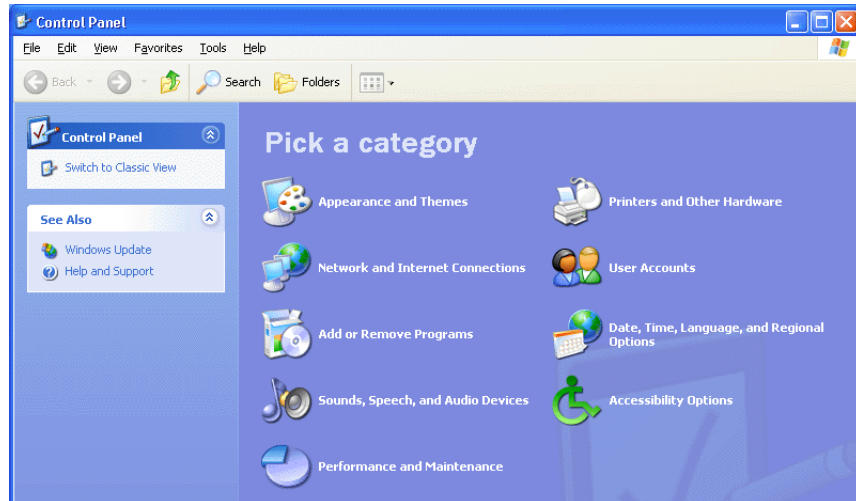
The driver is installed, and the message "Completing the Found New Hardware Wizard" appears.

8   **Click Finish, and then restart your computer.**

Installing the Yamaha CBX Driver

If you are connecting the ACU16-C/NHB32-C to a serial port on your computer, you'll need to install the Yamaha CBX driver. If you already have this software installed, skip this section.
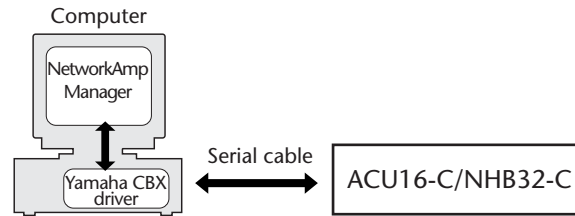
1   Double-click the "Mididrv_" folder on the CD-ROM.

2   Double-click "Setup.exe."

3   Follow the on-screen instructions to install the software.

When prompted to "Select the number of MIDI output ports," choose "Use single MIDI output port."

When the message "Do you want to configure Windows to use the YAMAHA CBX A Driver as the default MIDI output device?" appears, click No.

When the message "Set the HOST SELECT switch on a tone module to PC-2. Connect the TO HOST terminal on a tone module to the computer's COM port." appears, you can ignore it because the ACU16-C/NHB32-C does not have a HOST SELECT switch or port.

Installing NetworkAmp Manager

1   Locate the "NetworkAmp Manager" folder on the CD-ROM.

2   Copy the "NetworkAmp Manager" folder to your hard disk.

To uninstall NetworkAmp Manager, simply delete or drag the "NetworkAmp Manager" folder to the Recycle Bin.

Starting NetworkAmp Manager

To start NetworkAmp Manager, simply double-click the NetworkAmp Manager icon.

When you start NetworkAmp Manager, the Open Project dialog box appears. To create a new project, click Cancel and, on the subsequent dialog boxes, enter a name and select a location for the new project and its folder.

For information on how to use NetworkAmp Manager, refer to the PDF *Network Amp Manager Owner's Manual*, which can be opened directly from NetworkAmp Manager's Help menu.

Installation Troubleshooting

Cannot install the Yamaha USB MIDI Driver

- Is the USB cable connected correctly (page 11)?
- Try disconnecting the USB cable, and then reconnecting it.
- Is USB enabled? When the ACU16-C/NHB32-C is connected to your computer for the first time, if the Add New Hardware Wizard doesn't appear, it may be because your computer's USB controller is disabled. To check this, open the System control panel, click the Device Manager tab, and check for any crosses (x) or exclamation marks (!) next to the "Universal Serial Bus controllers" and "USB Root Hub" items. If these items do have these marks next to them, your USB controller is disabled. For information on enabling your USB controller, refer to your computer's documentation.

- If for some reason installation of the Yamaha USB Driver fails, the ACU16-C/NHB32-C may be registered as an unknown device and you may not be able to reinstall the driver until the unknown device is deleted. In this case, open the System control panel, click the Device Manager tab, and select the "View devices by connection" option. If an item called "Other devices" appears in the list, click it. If there's an item called "Unknown device," select it and then click the Remove button. Disconnect the USB cable, then reconnect it, and now try installing the driver again.

How to remove & reinstall the Yamaha USB MIDI Driver

- **Windows 98, Me:** Presuming that the Yamaha USB MIDI Driver was installed successfully, and that the ACU16-C/NHB32-C has been recognized correctly, the driver can be removed from your computer as follows. Open the System control panel, click the Device Manager tab, select the "YAMAHA USB MIDI Driver," and then click the Remove button. After deleting the following files, disconnect the USB cable, reconnect it, and then reinstall the driver again.

  Windows\Inf\Other\ACU16-C.inf (or NHB32-C.inf)
  Windows\System\Xgusb.drv
  Windows\System\Ymidusb.sys

Improving performance

- If your computer seems unresponsive, make sure it satisfies the system requirements (page 10).

- Quit any other applications that you are not using.

Cannot suspend or resume your computer

- Suspend will not work if there are any MIDI applications open.

- **Windows 2000:** Depending on the USB controller, etc., on some systems, suspend and resume may not work properly. If the ACU16-C/NHB32-C stops responding, try disconnecting and reconnecting the USB cable.

2 ACU16-C Amp Control Unit

Introduction

The Yamaha ACU16-C Amp Control Unit is a CobraNet interface offering 24-bit D/A conversion of up to 16 CobraNet audio channels, which are output via Euro-block connectors for connection to up to eight 2-channel power amplifiers. Up to 16 ACU16-Cs can be used on a single CobraNet network, providing D/A conversion of up to 256 CobraNet audio channels. Primary and secondary CobraNet ports are provided for integration in systems with built-in redundancy.

In addition, the ACU16-C works as an interface for Yamaha's NetworkAmp Manager software, which runs on standard Windows PCs and offers control and monitoring of up to 512 Yamaha PCxxxxN series power amplifiers (32 amps per ACU16-C), up to eight NHB32-Cs, and up to 16 ACU16-Cs. A PC can be connected directly to the ACU16-C by using either USB or RS-232C. Multiple units can be managed from a single PC connected to any ACU16-C or NHB32-C on the CobraNet network.

As of this writing, the Yamaha PC9500N and PC4800N power amplifiers can be networked with the ACU16-C. Please check the Yamaha Professional Audio Web site at the following URL for news and information on networkable power amplifiers to be released in the future, and for information on other Yamaha professional audio products: <http://www.yamaha.co.jp/product/proaudio/homeenglish/>.

Features

- Sixteen 24-bit, 128-times oversampling D/A converters
- 110 dB typical dynamic range
- Select four CobraNet bundles (32 audio channels) in the range 0–16,383[1]
- Individually patch up to 16 CobraNet audio channels to the analog outputs[1]
- Primary and secondary CobraNet ports
- 16 Euro-block analog outputs
- Works as interface for the NetworkAmp Manager software
- RS-485 port for connection of up to 32 Yamaha PCxxxxN series power amplifiers
- USB and RS-232C serial ports for PC connection
- Connect up to 16 ACU16-Cs on a single CobraNet network
- PC/NetworkAmp Manager control via any ACU16-C or NHB32-C on the network
- CobraNet LINK, CONDUCT, and ERROR indicators

---

1. Set in NetworkAmp Manager.

Front Panel
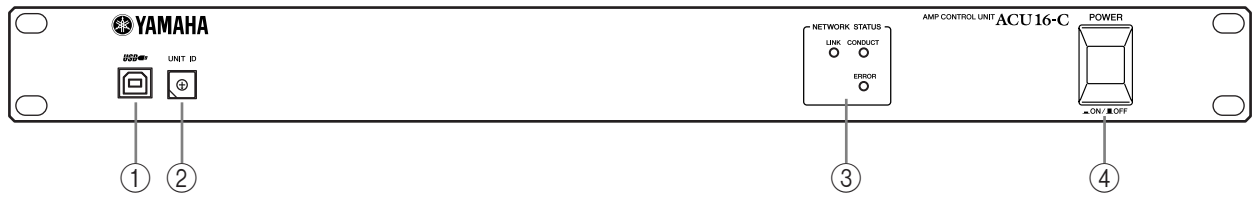
① **USB port**

This USB port is used to connect the ACU16-C to a USB port on a PC running NetworkAmp Manager. The rear panel TO COMPUTER port offers an alternative method of connection. The PC port to be used for communication with the ACU16-C is set in NetworkAmp Manager.

② **UNIT ID switch**

This switch is used to set the unit ID of the ACU16-C. Each ACU16-C on the network must be assigned an exclusive ID from 0 to 15. The following table shows how the switch markings correspond to unit IDs 0 through 15. The switch can be set by using either a small flat-bladed screwdriver or a Phillips screwdriver.

Unit ID	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Switch Setting	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Note: The ACU16-C must be turned off before setting the unit ID. Make sure that each ACU16-C is assigned an exclusive ID. Assigning the same unit ID to two or more ACU16-Cs will produce unpredictable results.
Note: Use a screwdriver that's appropriate for the size of the slot in the switch. Using a screwdriver with too big a handle, or a screwdriver with too small a tip, may damage the switch.

③ **NETWORK STATUS indicators**

LINK: This indicator lights when the ACU16-C has a valid connection to a CobraNet network. If a link cannot be established, the CONDUCT and ERROR indicators light instead.

CONDUCT: This indicator lights when the ACU16-C is the CobraNet Conductor (i.e., wordclock master and arbitrator for the entire network).

ERROR: This indicator lights when a CobraNet link cannot be established, and flashes when a CobraNet interface error occurs.

Note: If a system error occurs, the LINK, CONDUCT, and ERROR indicators flash simultaneously. This type of error can be caused by an incorrect device setting or a faulty ACU16-C. See "System Errors" on page 37 for more information.

④ **POWER ON/OFF switch**

This push switch is used to turn on the ACU16-C. To prevent loud clicks and thumps in your speakers, turn on your audio equipment in the following order (reverse this order when turning off)—sound sources, A/D converters, mixers, network equipment, NHB32-C/ACU16-C, D/A converters, power amplifiers.

Rear Panel
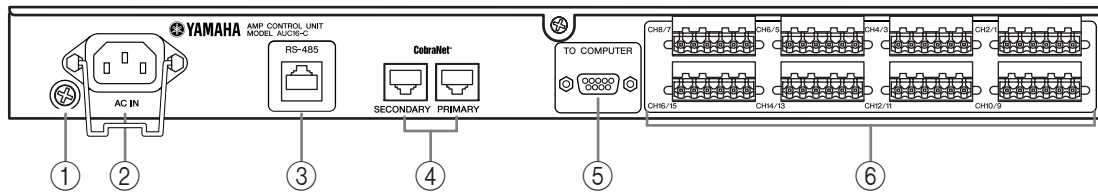
① **Grounding screw**
For electrical safety reasons, it's important that the ACU16-C is grounded properly. The supplied power cord has a three-pin plug, and if the ground terminal of the AC outlet is grounded, then the unit will be grounded sufficiently through the power cord. If the AC outlet does not provide a suitable ground, this screw must be connected to a good ground point. Grounding is also an effective way to eliminate hum, interference, and other noise.

② **AC IN connector**
This connector is used to connect the ACU16-C to an AC outlet via the supplied power cord. Connect the socket-end of the supplied power cord to the AC IN. Connect the plug-end to a suitable AC wall outlet, one that conforms to the power supply requirements stated on the ACU16-C's rear panel. Use the supplied retaining clamp to secure the power cord, preventing inadvertent disconnection.

> *Warning: Turn off all equipment connected to the ACU16-C before making any connections.*

③ **RS-485 port**
This RJ-45 port is used to connect the ACU16-C to a network of up to 32 Yamaha PCxxxxN series power amplifiers for control and monitoring. Networkable Yamaha power amplifiers are connected together in a daisy-chain fashion using standard CAT3 or CAT5 Ethernet cables, maximum length end-to-end, 1 kilometer. UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair) cable can be used.

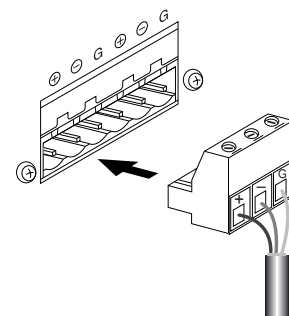④ **PRIMARY & SECONDARY CobraNet ports**
These RJ-45 ports are used to connect the ACU16-C to the primary and secondary CobraNet networks. Primary and secondary can be used to build redundancy into systems. Under normal conditions, the ACU16-C uses the PRIMARY port. However, if communication via that port fails, it will automatically switch to the SECONDARY port and operation will continue uninterrupted. Straight 100Base-TX CAT5 Ethernet cables should be used to connect the ACU16-C to a CobraNet network. Use STP (Shielded Twisted Pair) cables to protect against electromagnetic interference. If necessary, two CobraNet devices can be connected together using a crossover 100Base-TX Ethernet cable. Straight and crossover cables are not interchangeable.

⑤ **TO COMPUTER port**
This 9-pin male D-sub port is used to connect the ACU16-C to a COM port on a PC running NetworkAmp Manager. It's an RS-232C serial interface, supporting cable runs of up to 15 meters. The front panel USB port offers an alternative method of connection. The PC port to be used for communication with the ACU16-C is set in NetworkAmp Manager.

⑥ **Euro-block connectors**
These Euro-block connectors output 16 balanced analog audio signals for connection to power amplifier inputs. CobraNet audio channels are assigned to these outputs in NetworkAmp Manager. There are eight 6-way Euro-block connectors, each with hot (+), cold (−), and ground terminals for two audio channels. The supplied Euro-block plugs should be wired as shown. Tighten the screws to secure the wires. Be careful to clamp the actual conductor, not its insulation.
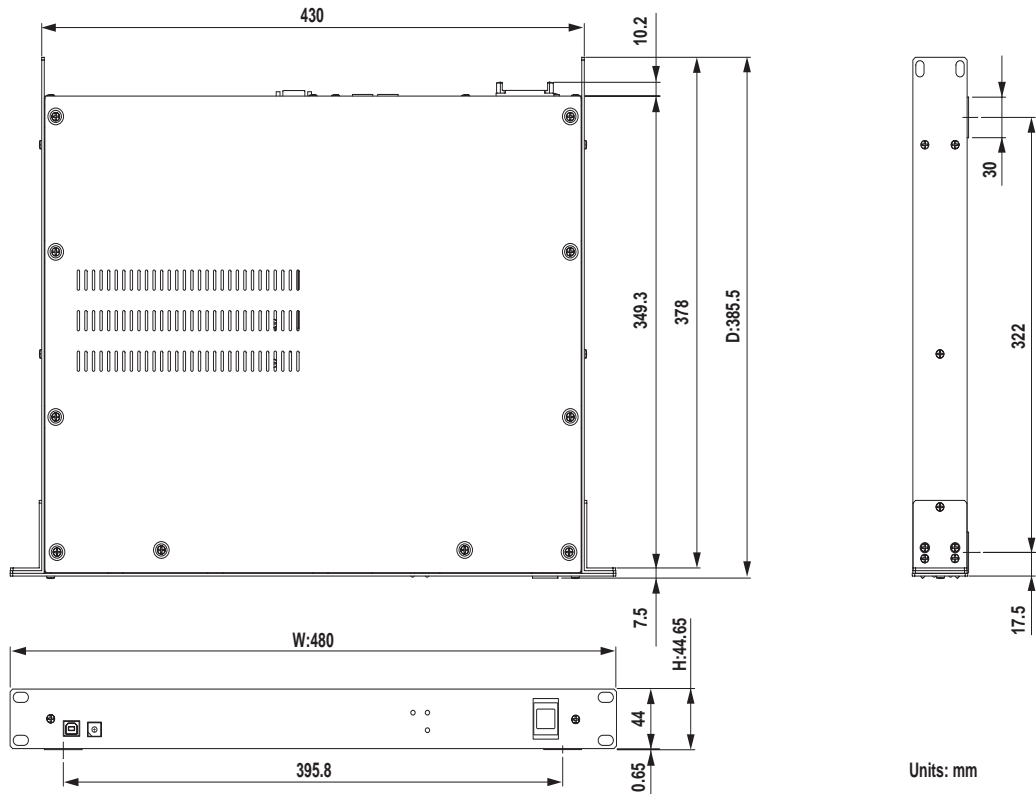
Specifications

D/A converters		24-bit, 128-times oversampling
Dynamic range[1]		110 dB typical
Frequency response		20 Hz–20 kHz +0.5, –1.5 dB (nominal output level @ 1 kHz)
Crosstalk		–80 dB (@ 1 kHz, between adjacent channels)
Signal delay		0.625 ms (CobraNet to analog output)
Total harmonic distortion (20 Hz–20 kHz)	+4 dB output	Less than 0.05%
	Full scale output	Less than 0.01%
Hum & noise[1]		–92 dB
CobraNet	PRIMARY/SECONDARY connectors	RJ-45 x2 (16 in), transformer isolated, IEEE 802.3
	Network status indicators	LINK, CONDUCT, ERROR LEDs
Analog out	Channels	CH1–16 balanced outputs
	Connector	Euro-block connectors 6-way x8
	Source impedance	150 Ω
	For use with nominal	10k Ω lines
	Output level	Nominal: +4 dB (1.23 V), Max. before clip: +18 dB (6.16 V)
Computer ports	TO COMPUTER	9-pin male D-sub (RS-232C)
	USB	USB 1.1
Amp control	RS-485	RJ-45 x1
Unit ID		0–F (0–15)
Power Requirements	U.S./Canada	110–120 V, 50/60 Hz, 40 W
	Other	220–240 V, 50/60 Hz, 40 W
Dimensions	(W x H x D)	480 x 44.65 x 385.5 mm (18 7/8" x 1 3/4" x 15 5/32"), 1U
Net weight		4.8 kg (10.6 lbs)
Operating free-air temperature range		0–40°C (32–104°F)
Storage temperature range		–20 to 60°C (–4 to 140°F)
Supplied Accessories		CD-ROM (NetworkAmp Manager, PDF manual, MIDI drivers) Power cord and retaining clamp USB cable 3-way Euro-block connectors x16 This manual

1. Measured using a 6 dB/octave filter @ 12.7 kHz; equivalent to a 20 kHz filter with an infinite dB/octave attenuation.

ENGLISH

Dimensions

Units: mm

Specifications and descriptions in this owner's manual are for information purposes only. Yamaha Corporation reserves the right to change or modify products or specifications at any time without prior notice. Since specifications, equipment, or options may not be the same in every locale, please check with your Yamaha dealer.

For European Model

Purchaser/User Information specified in EN55103-1 and EN55103-2.
Inrush Current: 45 A
Conformed Environment: E1, E2, E3 and E4

3 NHB32-C Network Hub & Bridge

Introduction

The Yamaha NHB32-C Network Hub & Bridge is a CobraNet bridge offering flexible patching of up to 64 CobraNet audio channels (32 in/32 out) to 64 AES/EBU format inputs and outputs (32 in/32 out). Up to 99 patch setups can be created, stored, and recalled in NetworkAmp Manager. Patches can be recalled directly from the NHB32-C's front panel while NetworkAmp Manager is offline. Up to eight NHB32-Cs can be used on a single CobraNet network, providing bridging between 256 CobraNet audio channels and 256 AES/EBU format inputs and outputs when using unicast distribution. Primary and secondary CobraNet ports are provided for integration in systems with built-in redundancy.

In addition, the NHB32-C works as an interface for Yamaha's NetworkAmp Manager software, which runs on standard Windows PCs and offers control and monitoring of up to 512 Yamaha PCxxxxN series power amplifiers, up to eight NHB32-Cs, and up to 16 ACU16-Cs. A PC can be connected directly to the NHB32-C by using either USB or RS-232C. Multiple units can be managed from a single PC connected to any ACU16-C or NHB32-C on the CobraNet network.

By utilizing CobraNet's Serial Bridge feature, MIDI data (Program Change and Control Change), or AD824 data (head amp control) can be transmitted between any two NHB32-Cs up to 100 meters when using 100Base-TX cabling, and up to 2 kilometers when using fiber. Note that the Serial Bridge cannot carry MIDI, AD824, and Amp Control data simultaneously. Only one can be selected in NetworkAmp Manager. The wordclock source for the NHB32-C can be a pair of AES/EBU inputs, the BNC WORD CLOCK IN, or the CobraNet network.

Features

- 100 recallable patch memories
- 2-digit, 7-segment LED patch number display
- Select eight CobraNet bundles (64 audio channels) in the range 0–16,383[1]
- Individually patch up to 32 AES/EBU ins and outs to 64 CobraNet audio channels[1]
- Select 20-bit (8 channels/bundle) or 24-bit (7 channels/bundle)[1]
- Primary and secondary CobraNet ports
- Four 25-pin female D-sub connectors for AES/EBU I/O
- AD824, MIDI, or Amp Control over CobraNet's Serial Bridge
- Selectable wordclock source—AES/EBU, BNC WORD CLOCK IN, or CobraNet network[2]
- Wordclock LOCK indicator
- Works as interface for the NetworkAmp Manager software
- USB and RS-232C serial ports for PC connection
- Connect up to 8 NHB32-Cs on a single CobraNet network
- PC/NetworkAmp Manager control via any ACU16-C or NHB32-C on the network
- CobraNet LINK, CONDUCT, and ERROR indicators

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1. Set in NetworkAmp Manager.
2. Can be set from the NHB32-C front panel or in NetworkAmp Manager.

Front Panel
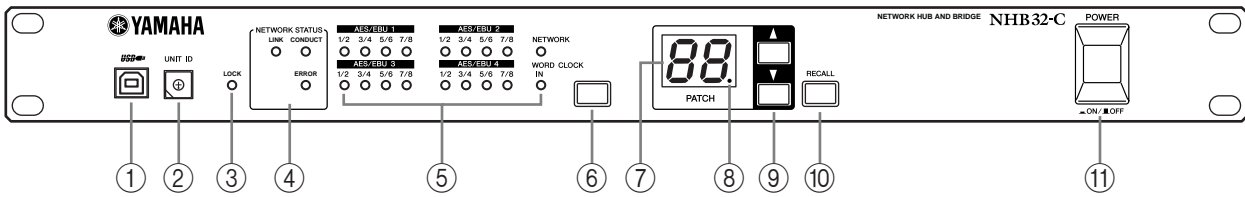
① **USB port**

This USB port is used to connect the NHB32-C to a USB port on a PC running Net-workAmp Manager. The rear panel TO COMPUTER port offers an alternative method of connection. The PC port to be used for communication with the NHB32-C is set in Net-workAmp Manager.

② **UNIT ID switch**

This switch is used to set the unit ID of the NHB32-C. Each NHB32-C on the network must be assigned an exclusive ID from 0 to 7. The following table shows how the switch markings correspond to unit IDs 0 through 7. The switch can be set by using either a small flat-bladed screwdriver or a Phillips screwdriver.

Unit ID	0	1	2	3	4	5	6	7
Switch Setting	0/8	1/9	2/A	3/B	4/C	5/D	6/E	7/F

Note: The NHB32-C must be turned off before setting the unit ID. Make sure that each NHB32-C is assigned an exclusive ID. Assigning the same unit ID to two or more NHB32-Cs will produce unpredictable results.
Note: Use a screwdriver that's appropriate for the size of the slot in the switch. Using a screwdriver with too big a handle, or a screwdriver with too small a tip, may damage the switch.

③ **LOCK indicator**

This indicator lights up when the NHB32-C is locked to the selected wordclock source. It flashes when the NHB32-C is unlocked.

④ **NETWORK STATUS indicators**

These indicators show the status of the CobraNet network.

LINK: This indicator lights when the NHB32-C has a valid connection to the CobraNet network. If a link cannot be established, the CONDUCT and ERROR indicators light instead.

CONDUCT: This indicator lights when the NHB32-C is the CobraNet Conductor (i.e., wordclock master and arbitrator for the entire network).

ERROR: This indicator lights when a CobraNet link cannot be established, and flashes when a CobraNet interface error occurs.

Note: If a system error occurs, the LINK, CONDUCT, and ERROR indicators flash simultaneously. This type of error can be caused by an incorrect device setting or a faulty NHB32-C. See "System Errors" on page 37 for more information.

⑤ **Wordclock source indicators**

These indicators show the currently selected wordclock source.

AES/EBU: Wordclock sourced from a pair of AES/EBU inputs.

NETWORK: Wordclock sourced from the CobraNet network.

WORD CLOCK IN: Wordclock sourced from the NHB32-C's BNC WORD CLOCK IN connector.

⑥ **Wordclock source button**

This button is used to set the wordclock source, which can be a pair of AES/EBU inputs, the CobraNet network, or the NHB32-C's BNC WORD CLOCK IN connector. To set the word-clock source, use the button to select a source and while the corresponding wordclock indicator is flashing, press the button again. The wordclock source will change and the corresponding indicator will stop flashing and light up continuously.

> *Note: When you change the wordclock settings of your system, some devices may output noise, so turn down your power amps beforehand, otherwise your speakers may be damaged.*

⑦ **PATCH number display**

This 2-digit, 7-segment LED displays the number of the currently selected patch.

⑧ **Patch edit indicator**

This indicator lights up when the current patch has been edited since it was last recalled or stored. When the patch is recalled or stored, this indicator goes off. Patches can be edited only in NetworkAmp Manager.

⑨ **Patch selector buttons**

These buttons are used to select patches 0 through 99. Use the Up button to increment the patch number. Use the Down button to decrement the patch number.

⑩ **RECALL button**

This button is used to recall the patch selected by the patch selector buttons. Patches are created and stored in NetworkAmp Manager.

To recall a patch on the NHB32-C, use the patch selector buttons to select a patch from 0 through 99. The PATCH number flashes. When you've selected the patch that you want to recall, press the [RECALL] button. The patch is recalled and the PATCH number stops flashing.

Patch #0 is a special read-only patch containing initial AES/EBU to CobraNet channel assignments. Each AES/EBU input and output is assigned to the correspondingly numbered CobraNet input and output. For example, AES/EBU input #1 is assigned to CobraNet output #1, AES/EBU input #2 is assigned to CobraNet output #2, and so on.

⑪ **POWER ON/OFF switch**

This push switch is used to turn on the NHB32-C. To prevent loud clicks and thumps in your speakers, turn on your audio equipment in the following order (reverse this order when turning off)—sound sources, A/D converters, mixers, network equipment, NHB32-C/ACU16-C, D/A converters, power amplifiers.

Rear Panel
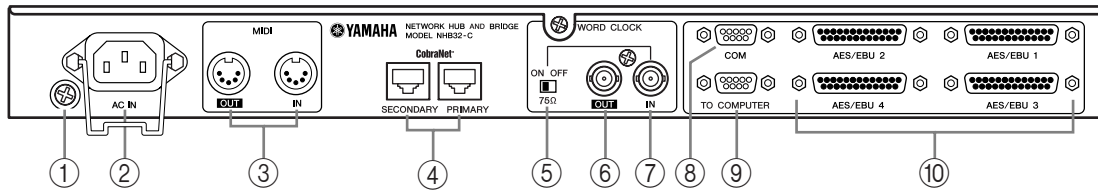
① **Grounding screw**

For electrical safety reasons, it's important that the NHB32-C is grounded properly. The supplied power cord has a three-pin plug, and if the ground terminal of the AC outlet is grounded, then the unit will be grounded sufficiently through the power cord. If the AC outlet does not provide a suitable ground, this screw must be connected to a good ground point. Grounding is also an effective way to eliminate hum, interference, and other noise.

② **AC IN connector**

This connector is used to connect the NHB32-C to an AC outlet via the supplied power cord. Connect the socket-end of the supplied power cord to the AC IN. Connect the plug-end to a suitable AC wall outlet, one that conforms to the power supply requirements stated on the NHB32-C's rear panel. Use the supplied retaining clamp to secure the power cord, preventing inadvertent disconnection.

> *Warning: Turn off all equipment connected to the NHB32-C before making any power connections.*

③ **MIDI OUT/IN ports**

These standard MIDI IN and OUT ports are used to connect MIDI devices for MIDI data transmission via CobraNet's Serial Bridge. Program Change and Control Change messages can be transmitted over the Serial Bridge, however, it's not suitable for time-sensitive performance data such as MIDI Note On/Off.

④ **PRIMARY & SECONDARY CobraNet ports**

These RJ-45 ports are used to connect the NHB32-C to the primary and secondary CobraNet networks. Straight 100Base-TX CAT5 Ethernet cables should be used to connect the NHB32-C to a CobraNet network. Use STP (Shielded Twisted Pair) cables to protect against electromagnetic interference. If necessary, two CobraNet devices can be connected together using a crossover 100Base-TX Ethernet cable. Straight and crossover cables are not interchangeable.

⑤ **WORD CLOCK 75Ω ON/OFF termination switch**

This switch applies 75Ω termination to the WORD CLOCK IN. Normally this switch should be set to ON when a wordclock source is connected to the WORD CLOCK IN. The OFF setting is for use with wordclock source devices with special specifications.

⑥ **WORD CLOCK OUT BNC**

This BNC connector outputs a wordclock signal.

⑦ **WORD CLOCK IN BNC**

This BNC connector is for connecting an external wordclock signal. The wordclock source is selected by using the wordclock source button on the front panel.

⑧ **COM port**

This 9-pin male D-sub port is used to connect a Yamaha AD824 A/D converter. Control signals from a supporting device, such as the Yamaha DME32 Digital Mixing Engine or Yamaha DM2000 Digital Production Console, can be transmitted via CobraNet's Serial Bridge. The COM port is an RS-422 serial interface, supporting cable runs of up to 1 kilometer.

⑨ **TO COMPUTER port**

This 9-pin male D-sub port is used to connect the NHB32-C to a COM port on a PC running NetworkAmp Manager. It's an RS-232C serial interface, supporting cable runs of up to 15 meters. The front panel USB port offers an alternative method of connection. The PC port to be used for communication with the NHB32-C is set in NetworkAmp Manager.

⑩ **AES/EBU 1–4 I/O connectors**

These four 25-pin female D-sub connectors are used to input and output up to 64 channels of AES/EBU format digital audio. Each connector handles eight ins and eight outs. AES/EBU inputs and outputs are assigned to CobraNet audio channels in NetworkAmp Manager.

Cable Length & Switching Hubs

The maximum cable length for 100Ba-se-T Ethernet networks is 100 meters (2 kilometers with fiber optic cables). However, depending on the type of cable, switching hub, ACU16-C/NHB32-C's workload, etc., reliable operation with this length of cable cannot be guaranteed. In addition, although about three or four switching hubs can be connected to a network, the actual number will depend on the efficiency of each switching hub.

Specifications

Patch	**Memories**	100 (#0 is read-only)
	Indicator	7-segment LED x2
CobraNet	**PRIMARY/SECONDARY connectors**	RJ-45 x2 (32 in/32 out), transformer isolated, IEEE 802.3
	Network status indicators	LINK, CONDUCT, ERROR LEDs
Digital I/O	**AES/EBU 1–4**	25-pin female D-sub x4
	Sampling rate	48 kHz
	Signal delay	0.0417 ms (CobraNet to AES/EBU)
Wordclock	**Selectable sources**	AES/EBU, CobraNet, BNC WORD CLOCK IN
	Termination	75Ω ON/OFF switch
	Indicators	LOCK, AES/EBU 1-4 (1/2, 3/4, 5/6, 7/8), NETWORK, WORD CLOCK IN LEDs
Computer ports	**TO COMPUTER**	9-pin male D-sub (RS-232C)
	USB	USB 1.1
AD824 control port	**COM**	9-pin male D-sub (RS-422)
MIDI	**IN, OUT**	5-pin DIN (Program Change/Control Change only)
Unit ID		0–7
Power Requirements	**U.S./Canada**	110–120 V, 50/60 Hz, 40 W
	Other	220–240 V, 50/60 Hz, 40 W
Dimensions	**(W x H x D)**	480 x 44.65 x 386 mm (18 7/8" x 1 3/4" x 15 3/16"), 1U
Net weight		5 kg (11 lbs)
Operating free-air temperature range		0–40°C (32–104°F)
Storage temperature range		–20 to 60°C (–4 to 140°F)
Supplied Accessories		CD-ROM (NetworkAmp Manager, PDF manual, MIDI drivers) Power cord and retaining clamp USB cable This manual

Dimensions
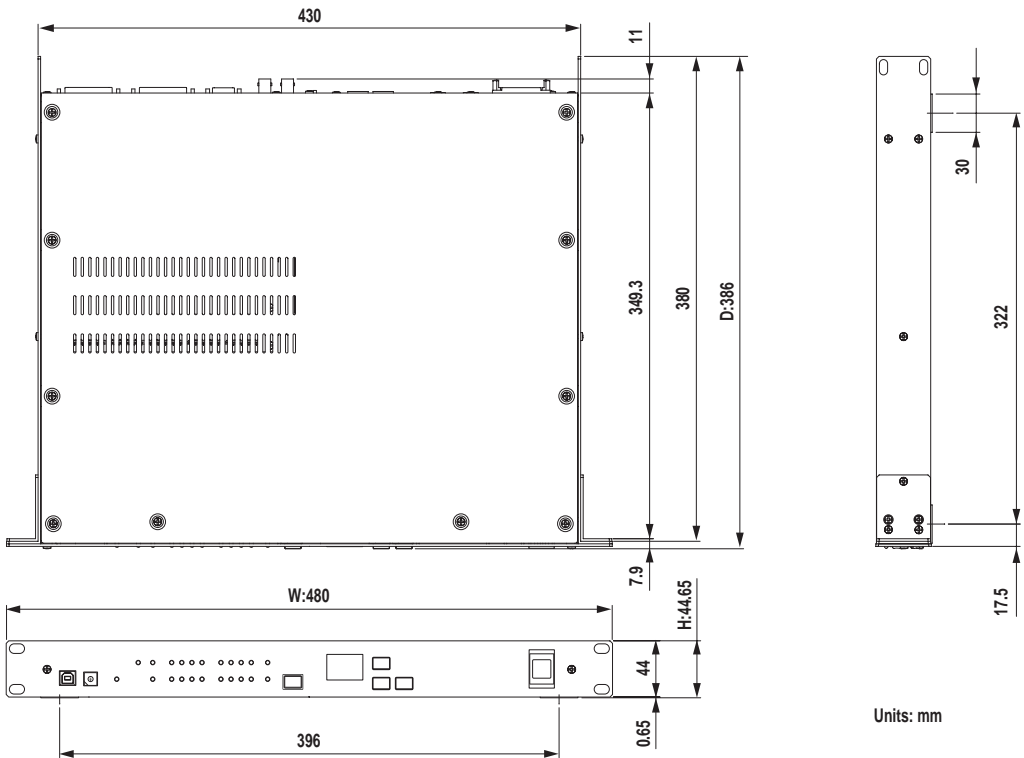
430

11

349.3

380

D:386

30

322

W:480

7.9

H:44.65

44

17.5

0.65

396

Units: mm

Specifications and descriptions in this owner's manual are for information purposes only. Yamaha Corporation reserves the right to change or modify products or specifications at any time without prior notice. Since specifications, equipment, or options may not be the same in every locale, please check with your Yamaha dealer.

For European Model

Purchaser/User Information specified in EN55103-1 and EN55103-2.
Inrush Current: 45 A
Conformed Environment: E1, E2, E3 and E4

ENGLISH

4 System Examples

ACU16-C Power Amp Control System

This example shows how up to 32 Yamaha PCxxxxN series power amplifiers can be connected to a single ACU16-C for remote control and monitoring via NetworkAmp Manager.
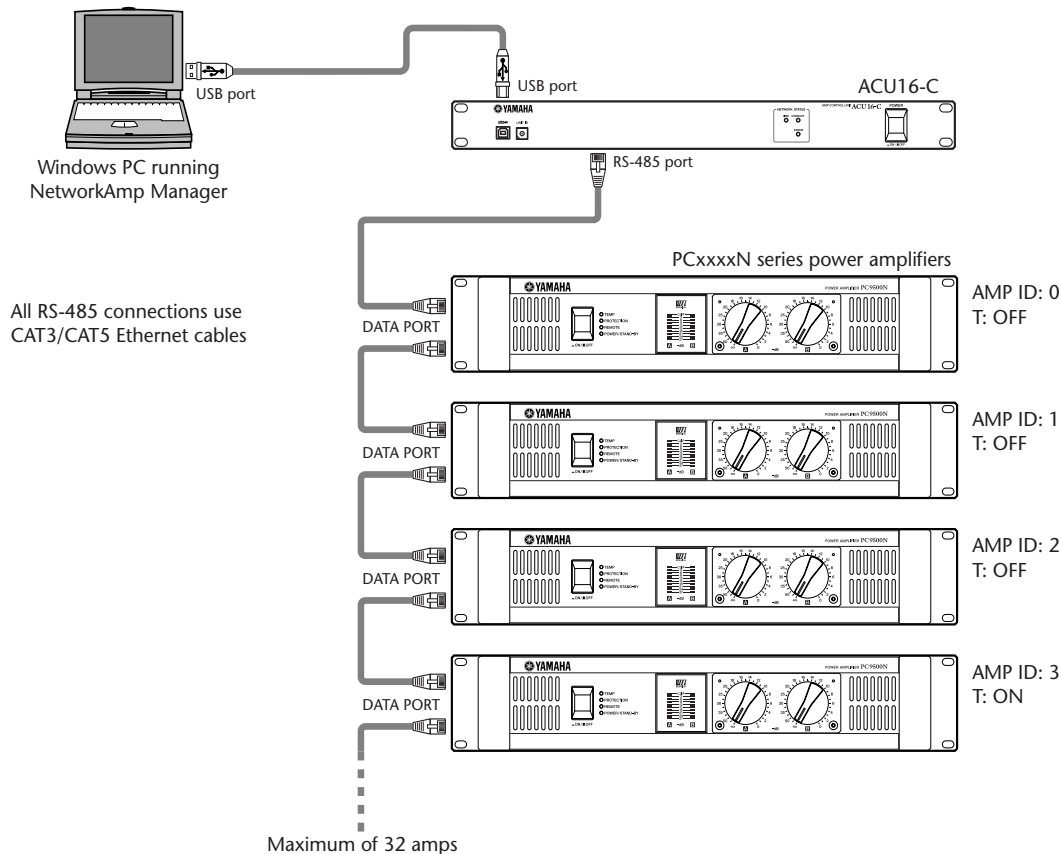
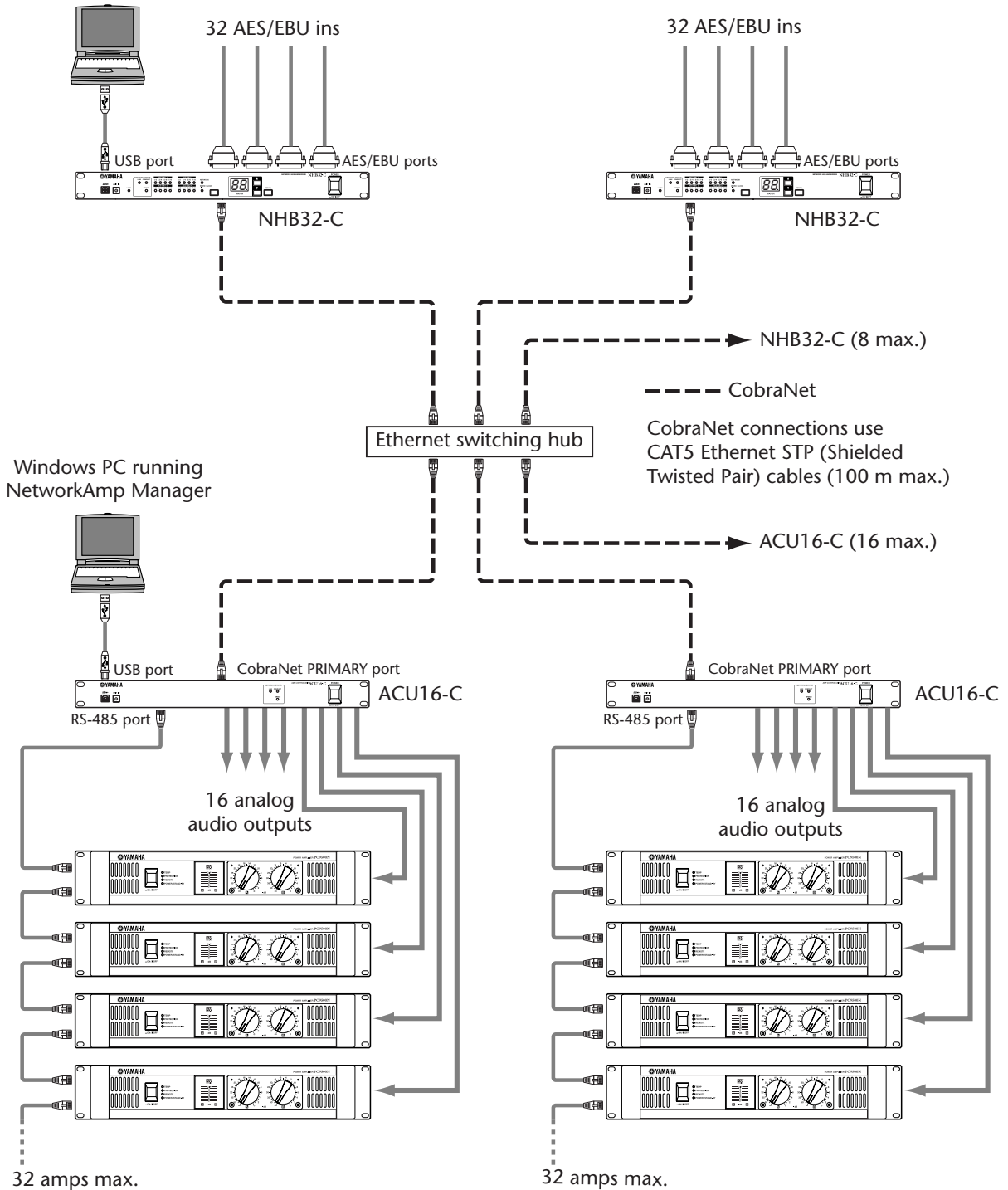### PCxxxxN Series Amp ID Setting

Up to 32 PCxxxxN series power amplifiers, each with an exclusive ID from 0 to 31, can be connected to a single ACU16-C. The ID is set using the power amplifier's rear panel AMP ID DIP switch, which consists of six individual switches, five for setting the ID, one for turning on and off termination (marked "T"). The five switches are individually numbered. IDs are set using a combination of switches to achieve the required ID. For example, to set ID #7, you'd set switches 4, 2, and 1 to the ON position (i.e., 4+2+1=7). To set ID #25, you'd set switches 16, 8, and 1 to the ON position (i.e., 16+8+1=25). To set ID #0, all switches should be set to OFF. On the last power amplifier in the RS-485 daisy-chain, the "T" switch should be set to ON to enable termination.
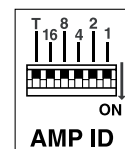
## ACU16-C/NHB32-C CobraNet Audio Distribution System

This example shows how multiple AES/EBU channels can be distributed over long distances (up to 200 meters with 100Base-TX Ethernet cabling) to multiple power amplifiers. The NHB32-Cs handle AES/EBU to CobraNet conversion, while the ACU16-Cs handle Cobra-Net to analog conversion. Power amplifier control and monitoring can be performed on either PC.

Windows PC running
NetworkAmp Manager

32 AES/EBU ins

32 AES/EBU ins

USB port — AES/EBU ports

AES/EBU ports

NHB32-C

NHB32-C

NHB32-C (8 max.)

CobraNet

Ethernet switching hub

CobraNet connections use
CAT5 Ethernet STP (Shielded
Twisted Pair) cables (100 m max.)

Windows PC running
NetworkAmp Manager

ACU16-C (16 max.)

USB port   CobraNet PRIMARY port

CobraNet PRIMARY port

ACU16-C

ACU16-C

RS-485 port

RS-485 port

16 analog
audio outputs

16 analog
audio outputs

32 amps max.

32 amps max.

MIDI Over CobraNet

This example shows how MIDI mode, which is set in NetworkAmp Manager, can transmit MIDI Program Change and Control Change messages from one NHB32-C to another over CobraNet's Serial Bridge feature. In this example, MIDI data from a Yamaha DME32 Digital Mixing Engine is fed through to a Yamaha DM2000 Digital Production Console. While MIDI mode is active, neither Amp Control data nor AD824 data can be transmitted.
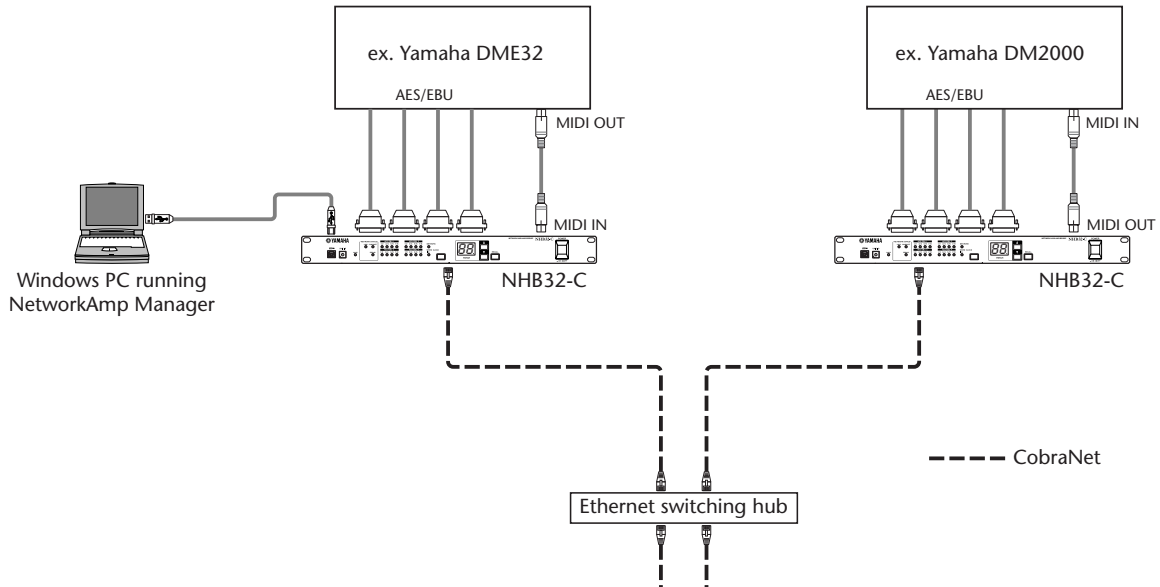
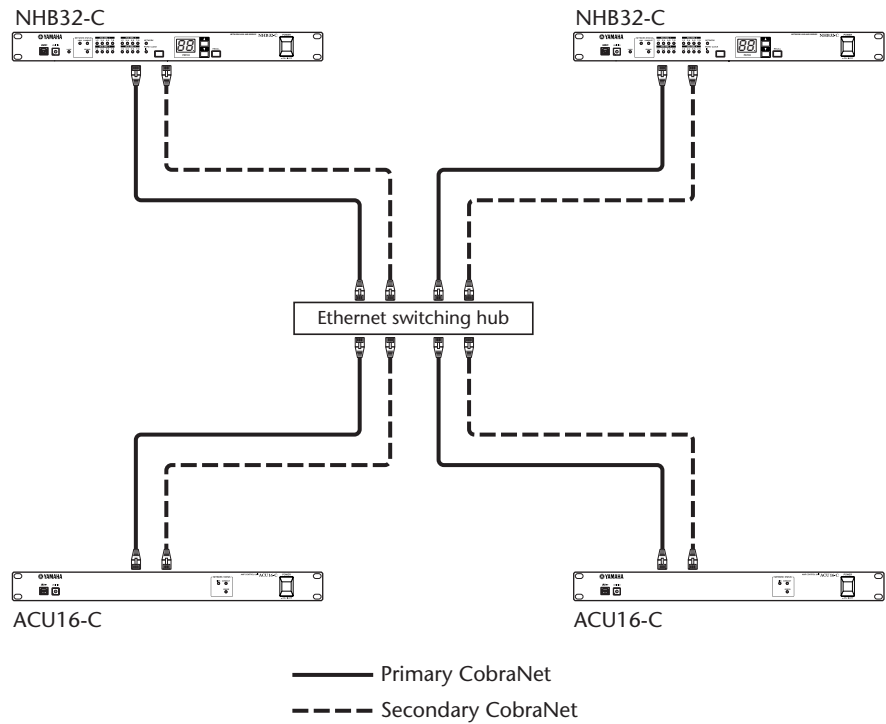## AD824 Control Over CobraNet

This example shows how COM mode, which is set in NetworkAmp Manager, can send AD824 control information from one NHB32-C to another over CobraNet's Serial Bridge feature. In this example, head amp control information is transmitted from a Yamaha DME32 Digital Mixing Engine, or Yamaha DM2000 Digital Production Console to a remote AD824 AD Converter. While COM mode is active, neither Amp Control data nor MIDI data can be transmitted.
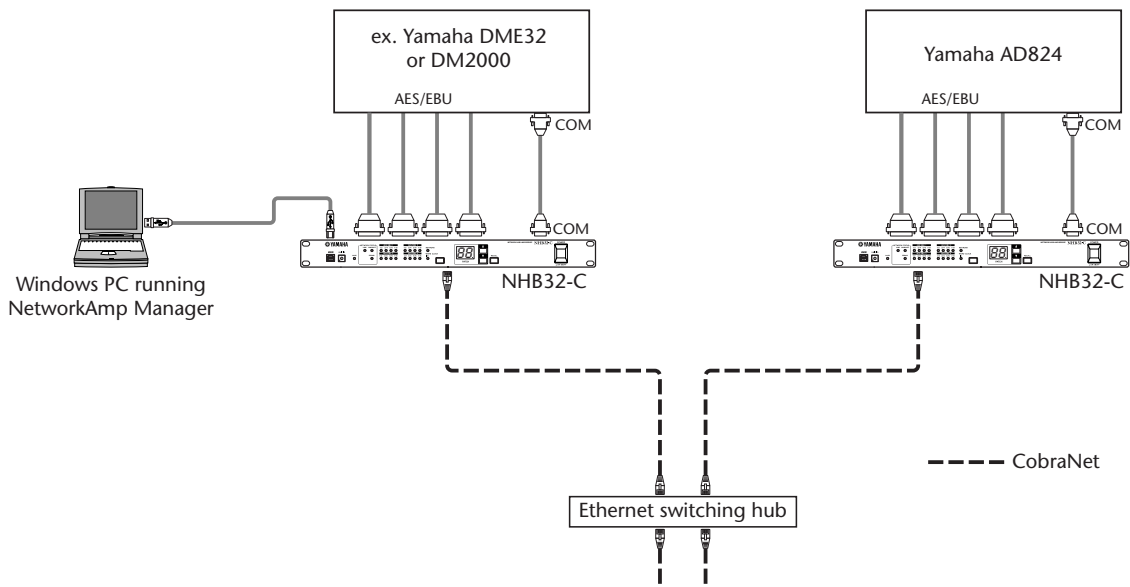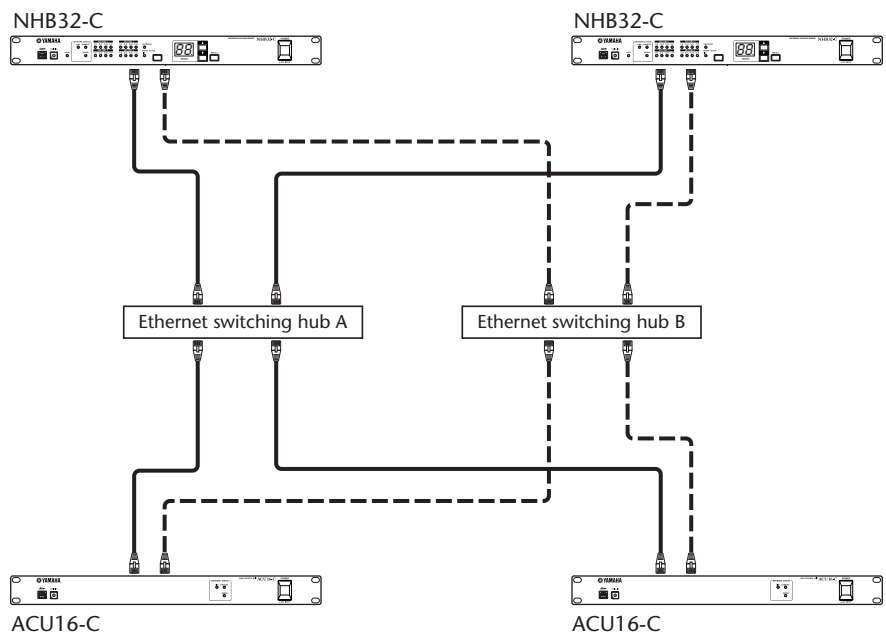
CobraNet Primary & Secondary

These two examples show how the CobraNet PRIMARY and SECONDARY ports can be used to build redundancy into systems. In the first example, if a primary connection fails, the system automatically switches to secondary and operation continues uninterrupted. However, if the switching hub fails, the entire system stops working. In the second example, individual switching hubs are used for primary and secondary, so even if switching hub A fails, operation continues on secondary via switching hub B.

Ex. 1

NHB32-C   NHB32-C

Ethernet switching hub

ACU16-C   ACU16-C

——————— Primary CobraNet

- - - - - Secondary CobraNet

Ex. 2

NHB32-C   NHB32-C

Ethernet switching hub A   Ethernet switching hub B

ACU16-C   ACU16-C

Troubleshooting

Unit	Symptom	Advice
ACU16-C NHB32-C	Cannot power up?	Make sure that the power cord is connected to a suitable AC wall outlet. Also make sure that the other end of the power cord is connected to the unit's AC IN correctly. Use the supplied retaining clamp to ensure that the power cord cannot be disconnected inadvertently. Make sure that the POWER switch is set to the ON position. If you still cannot turn on the unit, contact your Yamaha dealer.
	Cannot establish a connection with NetworkAmp Manager?	Make sure the unit is powered up and that NetworkAmp Manager is running properly on your PC.
		Have you installed the necessary Yamaha USB or CBX driver? See "NetworkAmp Manager Installation" on page 10.
		In NetworkAmp Manager, choose General Setup from the Option menu and make sure that the correct MIDI driver is selected. If you are using a USB connection, this should be "YAMAHA USB." If you are using an RS-232C serial connection, it should be "YAMAHA CBX Driver."
		If you have used NetworkAmp Manager with a USB connection, while the USB cable is still connected, even if you select the "Yamaha CBX Driver," a serial connection will not work unless the USB cable is disconnected.
		Check the USB or RS-232C serial cable connections as appropriate. If you are connecting to an NHB32-C, be sure to connect to the TO COMPUTER port, not the COM port.
		If you are using a USB connection, make sure that your PC's USB port is working correctly. In Windows, open the System control panel and click the Device manager tab. See your Windows documentation for further information.
		If you are using an RS-232C serial connection, make sure that your PC's serial port is working correctly. In Windows, open the System control panel and click the Device manager tab. See your Windows documentation for further information.
		Make sure that all ACU16-Cs and NHB32-Cs are assigned exclusive unit IDs. It's okay to use the same unit IDs for ACU16-Cs and NHB32-Cs.
	Connected the unit to a CobraNet network and the CONDUCT and ERROR indicators light instead of the LINK indicator?	Make sure that all devices on the network are powered up.
		Make sure that the Ethernet cables are connected to the unit properly (i.e., check they're not pushed in only half way).
		Try swapping the Ethernet cable with a known good cable.
		Try connecting the unit to another port on the hub.
		Try disconnecting other devices from the network one-by-one to determine if another device or Ethernet cable is at fault. CAT3 Ethernet cable will almost certainly cause problems, as will incorrectly wired cables, damaged cables, cables deformed by tight cable ties, and tightly bent cables. When making cables yourself, be sure to maintain the natural twist of the conductors as close to the connector as possible. More than 25 mm of untwisted cable can affect performance.
	The LINK indicator is lit, but digital audio cannot be transmitted or received?	Make sure that your CobraNet devices are set to transmit and receive the correct bundles. Also check your audio connections, audio sources, and audio I/O to bundle assignments.
	The CONDUCT indicator never lights up?	This is normal. The CONDUCT indicator lights up only when the unit is working as CobraNet conductor. This selection is made automatically and you don't normally need to do anything.
	The ERROR and CONDUCT indicators light simultaneously?	A CobraNet link cannot be established. Make sure that the switching hubs and other devices are properly connected and turned on.
	The LINK, CONDUCT, and ERROR indicators flash simultaneously?	A system error has occurred. There maybe an incorrect setting on another device or the unit maybe faulty. See "System Errors" on page 37 for more information.
	The ERROR indicator flashes?	An error has occurred with the unit's built-in CobraNet interface. Check the cable connections and settings of all devices on the network. If you cannot resolve the problem and the ERROR indicator keeps flashing, the unit maybe faulty, in which case you should contact your Yamaha dealer.
	Audio sounds distorted?	Continuously distorted sound is most likely due to overloaded audio inputs and levels being too high. Intermittent audio clicks and pops may be network related. Check your Ethernet cables and other CobraNet devices. Also check your word-clock settings.

Unit	Symptom	Advice
ACU16-C	NetworkAmp Manager cannot control and monitor all power amps?	Make sure that all power amps are powered up.
		Make sure that each power amp is assigned an exclusive amp ID.
		Check the RS-485 cable connection between each power amp. If a cable is not connected properly, or a cable is faulty, power amps further down the line will not be detected.
	Speaker output sounds out of phase?	Check your Euro-block connector wiring at the ACU16-C and power amps.
NHB32-C	The LOCK indicator flashes continuously?	This means that the NHB32-C cannot lock to the currently selected wordclock source. Check and correct the source, or select another.
	The PATCH number flashes continuously?	This indicates that a patch other than the one recalled or stored last is selected. Recall the patch, or select the patch that was last recalled or stored in order to stop it flashing.
NetworkAmp Manager	Cannot display the PDF format help document?	Have you installed Acrobat Reader? See the *ACU16-C/NHB32-C Owner's Manual* for details.

System Errors

When a system error occurs, the LINK, CONDUCT, and ERROR indicators flash simultaneously in a repeating patttern. You can determine the type of error by counting the number of flashes. There's a two second pause between each series of flashes, as shown in the following illustration.
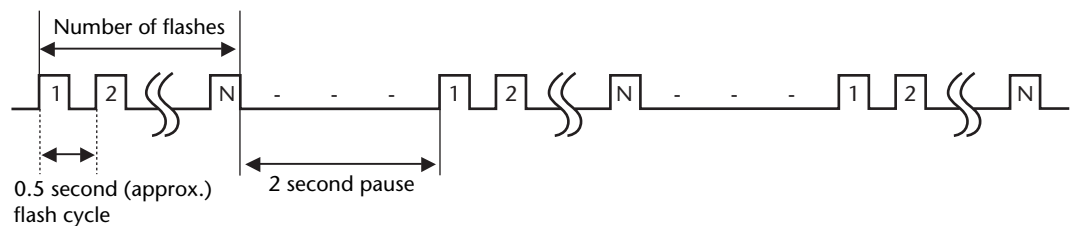

Number of Flashes	Symptom & Advice
2	Two or more units are set to the same ID. Make sure that all units are assigned an exclusive ID.
3	Some NHB32-Cs are in COM mode, some are in MIDI mode. On NetworkAmp Manager's COM/MIDI dialog box, cancel COM/MIDI mode, and then set as required.
4	Three or more NHB32-Cs are in either COM or MIDI mode. On NetworkAmp Manager's COM/MIDI dialog box, cancel COM/MIDI mode, and then set the required mode for two NHB32-Cs.
6	One or more ACU16-C/NHB32-C units have experienced an internal memory read error. Check the error messages in NetworkAmp Manager to determine which units are affected. The units maybe faulty, in which case you should contact your Yamaha dealer.
7	One or more ACU16-C/NHB32-C units have experienced an internal memory write error. Check the error messages in NetworkAmp Manager to determine which units are affected. The units maybe faulty, in which case you should contact your Yamaha dealer.

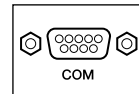# Appendix

Connector Wiring Details

ACU16-C/NHB32-C TO COMPUTER Port (RS-232C)

Pin	Connection
1	Unused
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	Unused

TO COMPUTER
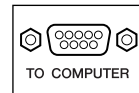
NHB32-C COM Port (RS-422)

Pin	Connection
1	Unused
2	Rx–
3	Tx–
4	Tx+
5	GND
6	Rx+
7	RTS
8	CTS
9	Unused

COM

NHB32-C AES/EBU Ports

AES/EBU
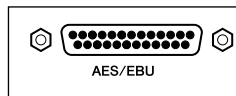
Pin	Connection	Pin	Connection
1	CH1/2 IN +	14	CH1/2 IN –
2	CH3/4 IN +	15	CH3/4 IN –
3	CH5/6 IN +	16	CH5/6 IN –
4	CH7/8 IN +	17	CH7/8 IN –
5	CH1/2 OUT +	18	CH1/2 OUT –
6	CH3/4 OUT +	19	CH3/4 OUT –
7	CH5/6 OUT +	20	CH5/6 OUT –
8	CH7/8 OUT +	21	CH7/8 OUT –
9	Unused	22	GND
10	GND	23	GND
11	Unused	24	GND
12	GND	25	GND
13	GND		

ACU16-C RS-485 Port (RJ-45)

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

RS-485
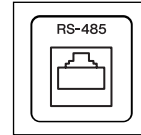
Cable Wiring Details

Although only pins 4, 5, 7, and 8 are used, all pins should be terminated properly, so connect all eight pins even though only four are actually used.

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

ACU16-C/NHB32-C 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

CobraNet

SECONDARY   PRIMARY
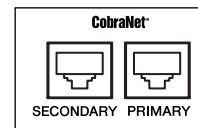
Straight/Crossed Cable Wiring Details

The pin wiring for crossed cables is shown in parenthesis. Although pins 4, 5, 7, and 8 are unused, they must be terminated properly, so connect all eight pins even though only four are actually used.

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

YAMAHA