MEDIA**TECHNOLOGY**SYSTEMS INC.

MANUAL

STAGE8.8
CobraNet™ Interface

766 LAKEFIELD ROAD, WESTLAKE VILLAGE, CALIFORNIA 91361 U.S.A. www.mediatechnologysystems.com
Part # MAN-0308-MCA-RevB

FCC Compliance Notice & Interference Statement.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING CONDITIONS. THIS DEVICE MAY CAUSE HARMFUL INTERFERENCE. THIS DEVICE IS DESIGNED TO ACCCEPT AND OPERATE WITH ANY INTERFERENCE RECEIVED. THIS INCLUDES INTERFERENCE THAT MIGHT CAUSE UNDESIRED OPERATION.

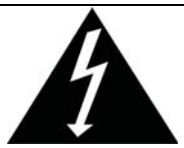
CAUTION: ANY CHANGES OR MODIFICATIONS MADE WITHOUT THE EXPRESS APPROVAL AND PERMISSION OF MANUFACTURER, VOID RESPONSIBILITY OF MANUFACTURER FOR COMPLAINCE.

THIS EQUIPMENT HAS BEEN TESTED BY A COMPETANT BODY AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS-B DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FEDERAL COMMUNICATIONS COMMISSION RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL RF ENERGY IN A RESIDENTIAL INSTALLATION.

THIS EQUIPMENT, IF NOT PROPERLY INSTALLED IN ACCORDANCE WITH THIS MANUAL, LOCAL, STATE AND NATIONAL RECOMMENDED PRACTICES, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. SUCH INTEFERENCE AND CAN BE DETERMINED BY SWITCHING THE DEVICE ON AND OFF. THERE IS NO GUARANTEE THAT THE DEVICE WILL NOT CAUSE INTERFERENCE. TO RADIO AND TELEVISION RECEPTION. USER IS ENCOURAGED TO TRY TO CORRECT ANY INTERFERENCE BY ONE OR MORE OF THE FOLLOWING MEASURES:

- *-RE-ORIENT OR RELOCATE THE RECEIVING ANTENNA*
- *-INCREASE THE DISTANCE OF ANY EQUIPMENT AND THE DEVICE.*
- *-CONNECT THE DEVICE TO A DIFFERENT A/C POWER CIRCUIT OUTPUT TO THE RECEIVER*
- *-CONSULT QUALIFIED TECHNICIAN OR A RADIO.TV SPECIALIST FOR ASSISTANCE.*

Explanation of Symbols



TO PREVENT ELECTRIC SHOCK DO NOT REMOVE COVER.
NO USER SERVICABLE PARTS INSIDE. REFER TO QUALIFIED
AND CERTIFIED SERVICE PERSONNEL.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

The exclamation mark in a triangle is intended to alert the use to the user to the presence of important operating and maintenance/service instructions in this manual.

The lightning flash in a triangle is intended to alert the user to the presence of un-insulated “dangerous” voltages within a product’s chassis that may be sufficient to create a risk of electric shock to humans.

Table of Contents

1 Welcome

1.1 Important Safety Instructions

- Important Safety Instructions:
- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Only use attachments/accessories specified by the manufacturer.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

1.2 Declaration of Conformity:

EMC: This equipment has been designed to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

Industry Canada Class A emission compliance statement: This Class B digital apparatus complies with Canadian ICES-003. Avis de conformite' a' la re'glementation d'Industrie Canada. Cet appareil nume'rique de classe A est conforme a' la norme.

1.3 How to use this manual.

This manual provides you with valuable information for safely and correctly installing, setting up and operating your amplifier. It is not possible to cover all aspects of installation and application of complex product. However, we have attempted to supply all critical and essential information, plus advice and explanations where relevant. There is a great body of work re amplification and sounds systems best practices, available from many sources on line. MTSI will, from time to time add “White Papers” and Application Notes to our website. As well as additional information on amplifier use and other valuable information.

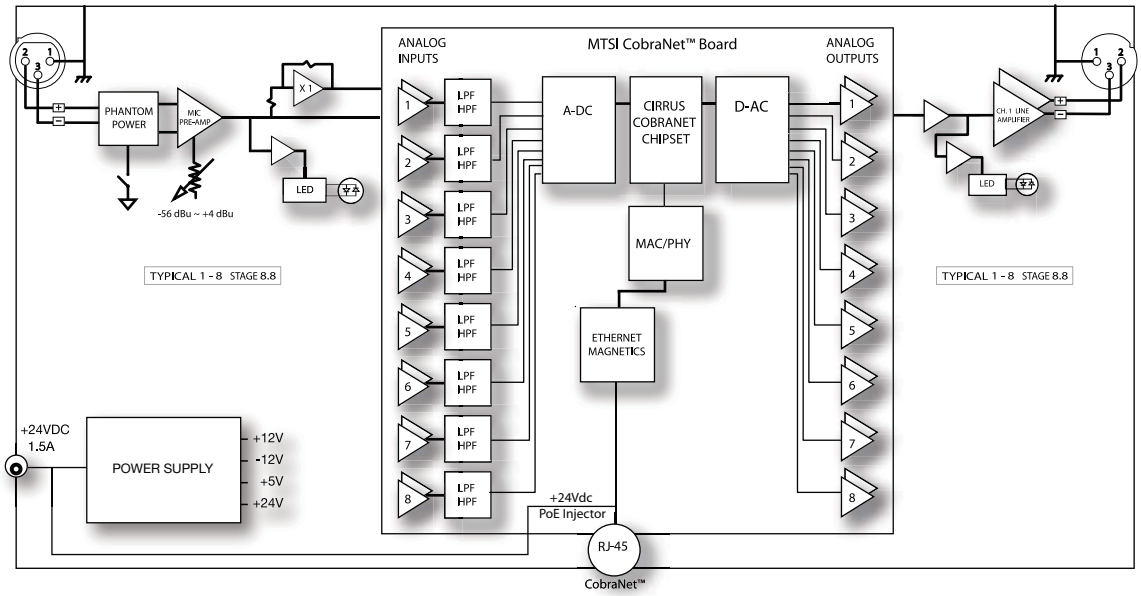
It is particularly important that you read this manual and especially the Warnings and Cautions.

2 Specifications

Intermodulation Distortion:	<1%
Total Harmonic Distortion:	<1% THD
Small Signal Frequency Response:	20-20kHz ±3dB
Hum & Noise: Typically	>70dB below rated output
Input Sensitivity:	-56dBu @ max gain for +4dBu output
Voltage Gain:	-60dB to 0dB
Input Impedance:	6K Ohms
Output Impedance:	150 Ohms, 600 Ohm min load.
Max Input voltage level:	+22dBu
Max Output Voltage Level:	+22dBu
Input Level Control: Rotary gain control	60dB gain range.
Phantom Power:	+24VDC, switch selectable per channel
Input: Signal Present - Peak Indicators	Bicolor LED, Green, signal present, RED, 6dB before clip
Output: Signal Present - Peak Indicators	Bicolor LED, Green, signal present, RED, 6dB before clip
Input / Output connections:	EUR 3.5mm type
Power Indicator:	RED Led power ON
Power Requirements:	24VDC @ 1.5A max
Wall Wart DC Power supply:	100 - 240VAC 50/60Hz output 24VDC @ 1.5Amps

3 Functional Description

3.1 Signal Path



3.2 Analog Section

Each analog input circuit employs a fully balanced true differential topology designed to maximize CMRR across all possible input connection methods, where the input and output connectivity has been designed to meet AES48 standards for immunity to hum, buzz and SCIN.

Each input stage has a 10kohm input impedance and can accommodate signals of up to +24dBu peak, where the input channel gain is adjustable from 0dB to +60dB, ie –from 56dBu (nominal)/+36dbu (peak) to +4dBu (nominal)+24dbu (peak) via a front panel mounted rotary potentiometer. Each input channel has an individual front panel mounted switch that form phantom power (+24volts DC).

Both input and output channels have front panel mounted signal (-20dB threshold) and peak (-3dB threshold) LED's.

Each output channel is 600ohm impedance and drives signals of up to +24dBu peak.

3.3 Digital section

The STAGE8.8 is a CobraNet™ interface with 8 analog Mic/line input channels and 8 line level output channels.

The CobraNet™ port uses the Cirrus Logic CS181xxx/CS496xxx chipset (similar to the commonly used CM2 card). This allows for up to 8 audio input channels from the network and up to 16 audio output channels to the network, 8 local analog mic/line input channels to the network and 8 local analog line level output channels from the network.

See Figure 3-1 for details of the internal block diagram for the Digital Section I/O.

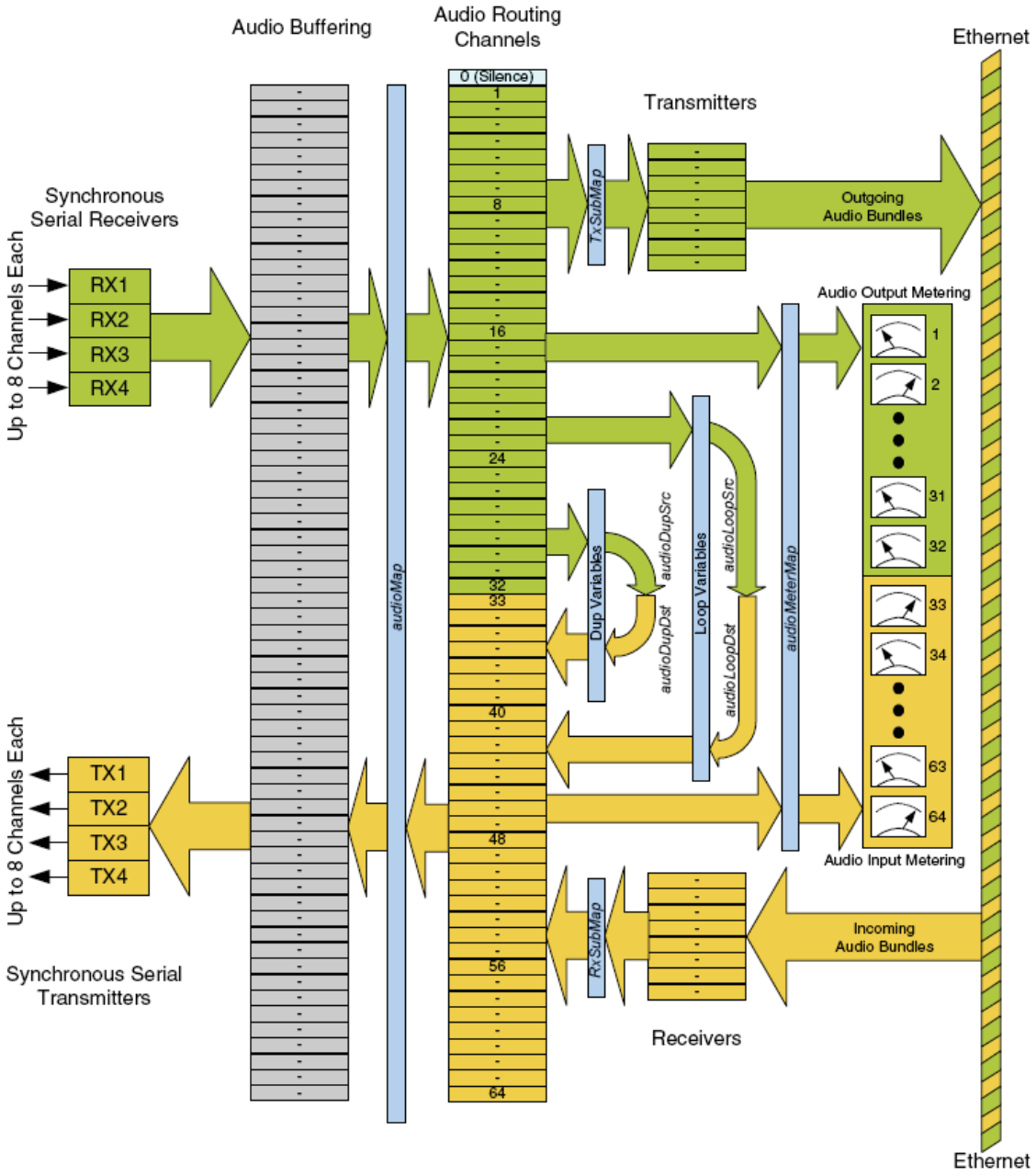


Figure 3-1: Block diagram showing the Cobranet routing of the STAGE8.8

In addition to audio transport, the CobraNet™ port provides control and monitoring capability via SNMP. MTS provides an OEM version of Stardraw control with embedded MTS SNMP drivers for custom GUI rendering. This is downloadable from the MTS

website. The SNMP controls include all the standard CobraNet™ OID's and the Cirrus DSP extensions.

See Cirrus Logic's UM23 users manual for full details of the chipset and PM25 programmers manual for full details of the SNMP controls…

http://www.CobraNet™.info/en/products

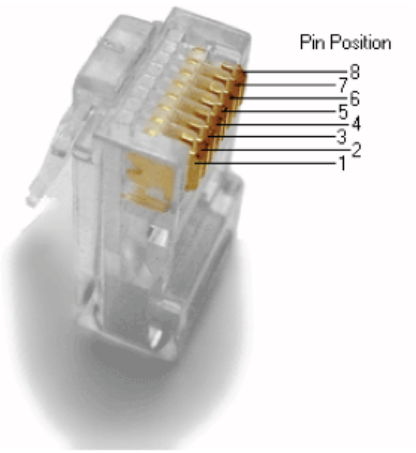
The 8 analog inputs are mapped to the CobraNet™ transmitter channels 1 to 8 and then repeated on channels 9 to 16. This will allow two unicast bundles to transmit the audio to two different locations. The CobraNet™ receiver channels 33 to 40 are mapped to the analog output channels 1 to 8.

3.4 Network connections

The MTS STAGE8.8 uses the standard TIA/EIA-568-B wiring scheme (T568B)… see below:

Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color
1	3	2	tip	white/green stripe	white/orange stripe
2	3	2	ring	green solid	orange solid
3	2	3	tip	white/orange stripe	white/green stripe
4	1	1	ring	blue solid	blue solid
5	1	1	tip	white/blue stripe	white/blue stripe
6	2	3	ring	orange solid	green solid
7	4	4	tip	white/brown stripe	white/brown stripe
8	4	4	ring	brown solid	brown solid

Pins on plug face (socket is reversed)



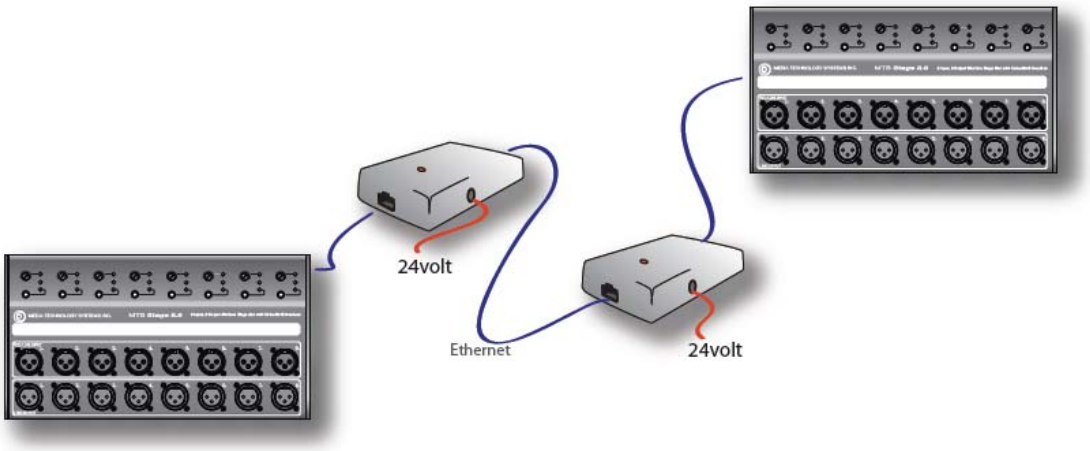
3.5 Power Supply

The STAGE8.8 interface products use an internationally approved "world voltage", external power supply unit, model number:

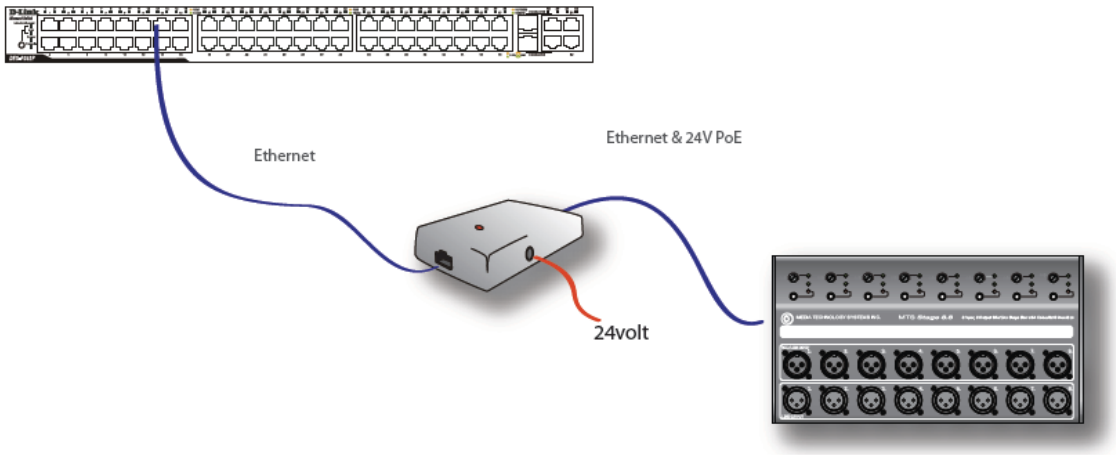
This supply takes 100-240VAC 50/60Hz and provides 24VDC at 1.5 Amps to the internal supply board. Regulation and supply rails are generated internally by a Switch Mode Power Supply (SMPS) board that derives plus 12 and minus 12 Volt, 5 Volt and 24Volt rails for the various circuit elements, such as the MTSI CobraNet™ board, that for the STAGE8.8.

3.6 Connections

For standalone crossover connection between two STAGE8.8's (ie no Ethernet switch), use the two Data in connections to separate the DC supplies. For a typical stage box, the two injectors would be at the control room/mixing console and just the long cable with Data and power to the stage. See below…



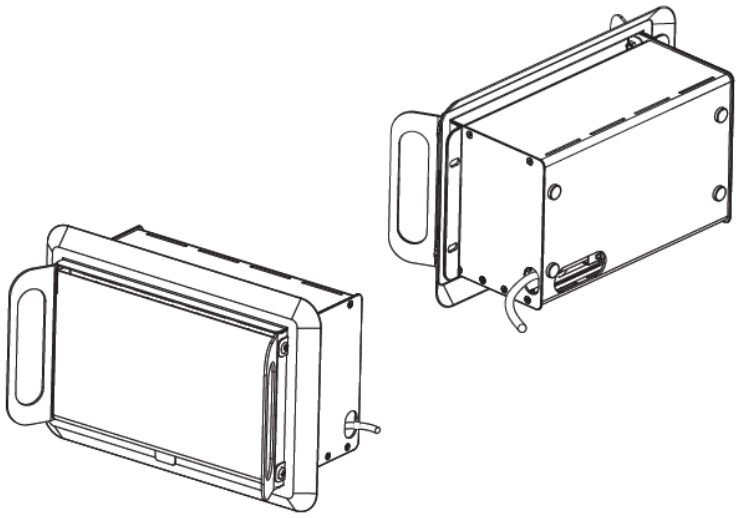
The Cobranet network port also carries the 24 volt power on the unused 4 wires of the 100BaseTx connection. The STAGE8.8 ships with a 24volt PSU and PoE injector (note the Stage8.8 is a custom PoE and not IEEE802.3af). The injector connects as follows…



3.7 Wall/Floor mount kit

The shallow depth (3.5") of the STAGE8.8 allows installation in a standard drywall construction. This option would provide 8 inputs and 8 outputs (off one UTP cable) at various wall and floor positions in an Auditorium, Banquet Hall or Conference Room.

The STAGE8.8 ships with a wall/floor mount accessory (see below) that attaches to the main STAGE8.8 chassis and provides a decorative cover.



4 Simple Configuration (No DSP)

The STAGE8.8 ships with the 8 analog inputs linked to CobraNet® Transmitter sub channels 1-8 and CobraNet® Receiver sub channels 33-40 are linked to the 8 analog outputs. This allows the STAGE8.8 to be used 'out of the box' by merely setting up Transmitter and Receiver ('Bundle') network addresses.

However, the STAGE8.8 has the capability of transmitting 16 CobraNet® channels and receiving 16 CobraNet® channels, so a more sophisticated routing can be configured using the free utility Cobranet Discovery (CNDISCO) from Cirrus Logic.

4.1 CNDISCO - Setup

To use CNDISCO, the host PC or laptop must be set to the default IP subnet in order to talk to the STAGE8.8. Figure 4-1 below shows the method of setting up a Windows computer. NOTE: The default IP address of the STAGE8.8 IS 192.168.192.50.

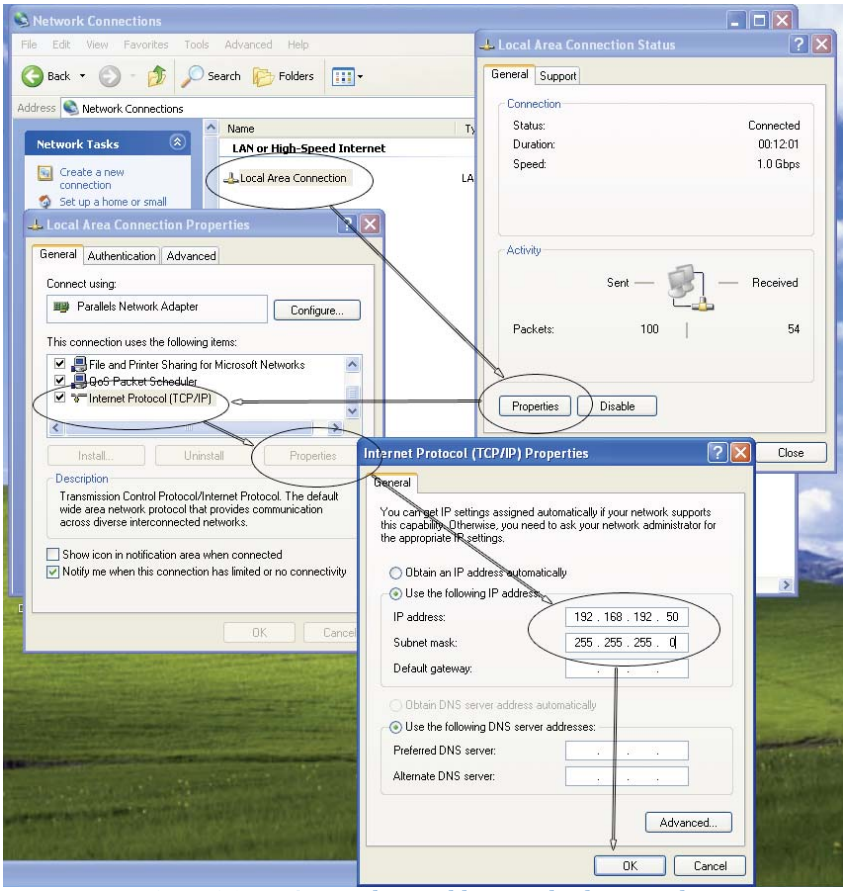


Figure 4-1: Setting up the IP address and subnet mask.

- Go to Control Panel and then open "Network connections".
- Click on the General tab and open "Properties".
- Select "Internet Protocol (TCP/IP)" and click on properties.

- Finally, change the selection from “Obtain an IP address automatically” to “Use the following IP address” and set to your desired IP domain, eg:-
  - IP address: 192.168.192.50
  - Subnet mask: 255.255.255.0
- After finishing using the CNDISCO application, return to the Control Panel and reset the selection back to “Obtain an IP address automatically”.

If an intelligent or managed switch/router is in use, then the switch address will need to be set to the same subnet, usually 192.168.1.1 or 192.168.1.254 are the most common default addresses.

4.2 Advanced settings

In order to use CNDISCO effectively, it will be necessary to enable the configuration and advanced features. This will also allows you to put any version of firmware on any hardware-compatible CobraNet™ module. CNDISCO needs to have the particular firmware version of a device in its firmware directory in order to properly identify the device for compatible firmware upgrades. Should the situation arise where you know the device is a specific model but CNDISCO says there are no compatible firmware upgrades, using the advanced feature, you'll be able to update the firmware anyway.

How to enable the advanced feature:

Open cndisco.ini (WinXP) or the config file (WinVista/Win7) the in Notepad

Its usually in a directory like this: C:\Program Files\Peak Audio\CobraNet™ Discovery.

Find the Configuration section. It usually looks something like this:

[Configuration]
Adapter Index=[10] [10] Broadcom NetXtreme 57xx Gigabit Controller
Firmware Location=C:\Program Files\Peak Audio\CobraNet™ Discovery\firmware

Start a new line after one of the lines in that section and type in Advanced Feature=1.
Add CC_Enable=1 under Advanced Feature=1

It should look something like this when you're done:

[Configuration]
Adapter Index=[10] [10] Broadcom NetXtreme 57xx Gigabit Controller
Firmware Location=C:\Program Files\Peak Audio\CobraNet™ Discovery\firmware
Advanced Feature=1
CC_Enable=1

For WinVista/Win7, the line is slightly different, ie, change…

<add key "Advanced Feature" value="0" />

to...

<add key "Advanced Feature" value="1" />

Save the changed .ini/config file and exit Notepad. The advanced features are now enabled.

Now when you update the firmware you'll see a check box in the "Select Firmware Version" dialog box marked "Show All Firmware Versions". Check the box and you'll be able to choose from all the firmware versions stored in the firmware directory.

4.3 Configuration

The CNDISCO manual (found in the C:\Program Files\Cirrus Logic\CobraNet™ Discovery folder) will explain in detail most of the configuration processes, so these have not been repeated here. However, there are some useful features of the CobraNet™ protocol that are not covered explicitly, ie…

One of the key features of the STAGE8.8 product is the ability to set up to 4 CobraNet™ audio transmitters and 8 CobraNet™ receivers. In addition, MTS has provided the ability to set each bundle subchannel configuration.

The settings are:-

- Transmitter setup: This section covers the CobraNet™ transmitters (see Figure 4-2). The CS496112 chipset allows for up to 4 transmitters, each of up to 8 channels, subject to an overall channel count of 2 analog input channels and 8 network audio streaming channels. The settings are:-
    - Bundle number: This sets the bundle address of each transmitter. The bundle numbers are 0 (off, ie no transmission), 1-255 are multicast, 256-65279 are unicast and 65280-65535 are private.
    - Unicast mode: If the transmitter bundle address is normally unicast (>255), but more than one receiver is available for that bundle address, then the bundle can be transmitted either multicast or multi-unicast.
    - Max Unicast: Depending on unicast mode, the maximum number of multi-unicast bundles can be set between 1 and 4.
    - Transmitter1…Transmiter4: This lists the four transmitters associated with the bundle address and allows the user to set the audio subchannels associated with that bundle. The subchannel mapping allows the user to decide which of the 8 audio channels are mapped to each bundle and in which order they are transmitted.
    - Subformat Resolution: This sets the word length of the transmitted audio to 16, 20, or 24 bit. Note: if the word depth is set to 24bit, then only 7 audio channels can fit in one bundle.
    - UnicastMode: This value can be used to override or modify the normal unicast vs. multicast implications of the assigned bundle number. The normal default value is ‘Never Multicast’. The available options are:
        - Always Multicast – All bundles are sent multicast regardless of Bundle number.

- Multicast over 1 – If more than one receiver is set to receive this bundle, it will be multicast, else it will be Unicast
- Multicast over 2 – If more than two receivers are set to receive this bundle, then it will be multicast, else it will be unicast or multi-unicast
- Multicast over 3 – If more than three receivers are set to receive this bundle, then it will be multicast, else it will be unicast or multi-unicast
- Multicast over 4 – If more than four receivers are set to receive this bundle, then it will be multicast, else it will be unicast or multi-unicast
- Never Multicast – Only a single bundle will be sent unicast

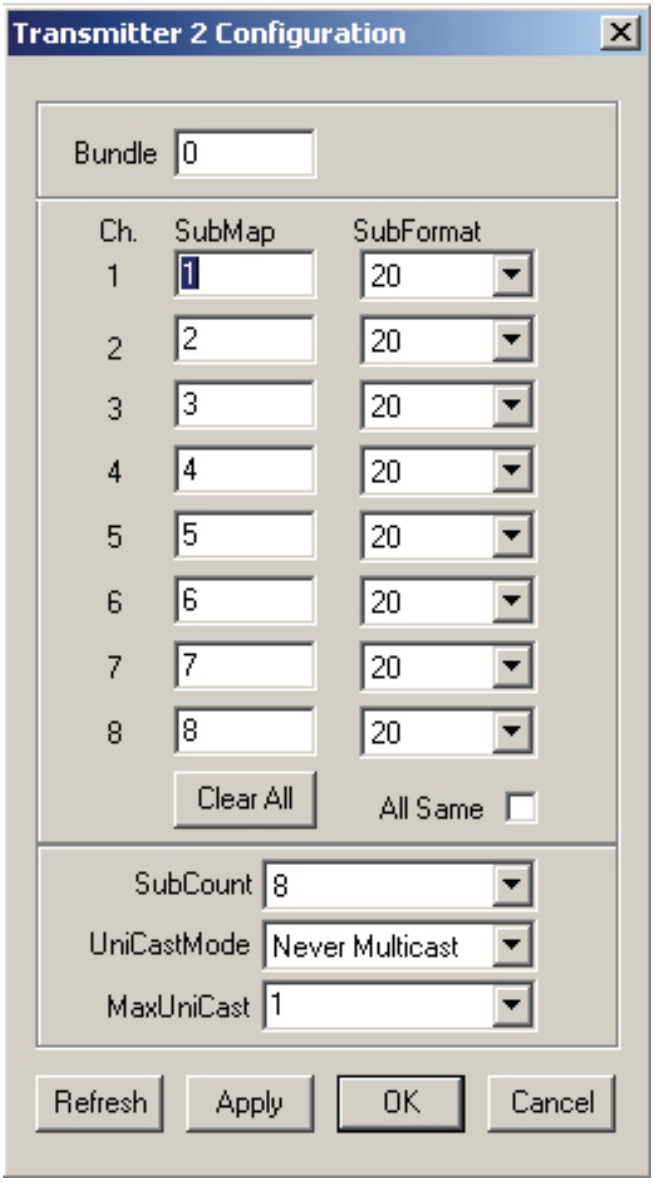


Figure 4-2: CobraNet™ Transmitter settings page

- Receiver setup: This section covers the CobraNet™ receivers (see Figure 4-3). The CS496112 chipset allows for up to 8 receivers, each of up to 8 channels, subject to an overall channel count of 2 analog output channels and 8 network audio streaming channels.. The settings are:-

- Bundle number: Same process and limitations as described in the transmitter section
- Receiver active: This LED only lights if there is a valid transmitter sending audio on that bundle address and channel.
- RX1…RX8: Same process and limitations as described in the transmitter section

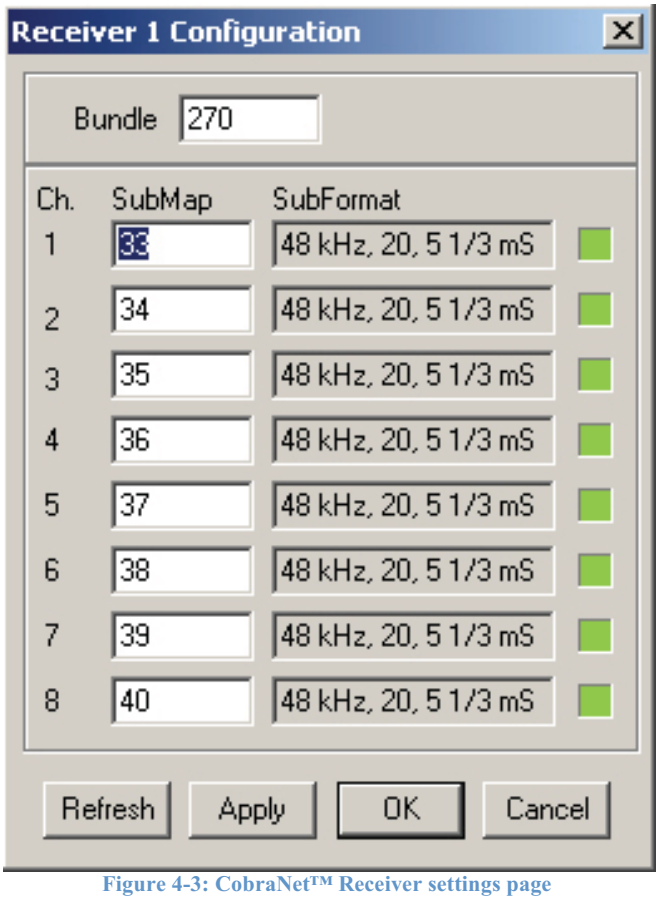


Figure 4-3: CobraNet™ Receiver settings page

- Main Interface settings: This section covers the more advanced variables not usually associated with bundle management and which apply to the CobraNet™ device globally (see Figure 4-4). These are explained in detail in the CNDISCO manual, but 2 are of particular importance to the ION series interfaces, ie…
  - Persistance: The STAGE8.8 is a very simple interface product and does not have a preset memory, so "persistence" is used to store the last settings in case of power down. Please note…
    - All CobraNet™ settings need up to 1 minute to establish persistence, as they are stored in the CobraNet™ flash. If the ION power is cycled before the settings are stored to flash, then the settings will be lost.
    - If the persistence tick box is off, then no settings will be saved.
  - Mode Rate Control: The options are 1.33mS, 2.66mS or 5.33mS latency. Note: there are significant trade-offs if changes are made to the 5.33mS default settings (see PM25), particularly in terms of the number of switch hops that can be used. If the STAGE8.8 interface is being used with a

simple local network with a single Ethernet switch, then 1.33mS can be safely used. If more than 1 switch, then use 2.67mS. If more than 3 switches, then use 5.33mS.

- The “Location” is a useful way of uniquely naming the STAGE8.8 interface. Up to 60 characters, eg “Ballroom 3: Stage left, Mics 7/8”. For more detailed naming information in a large project, both the “Location” and “Contact” fields can be used.

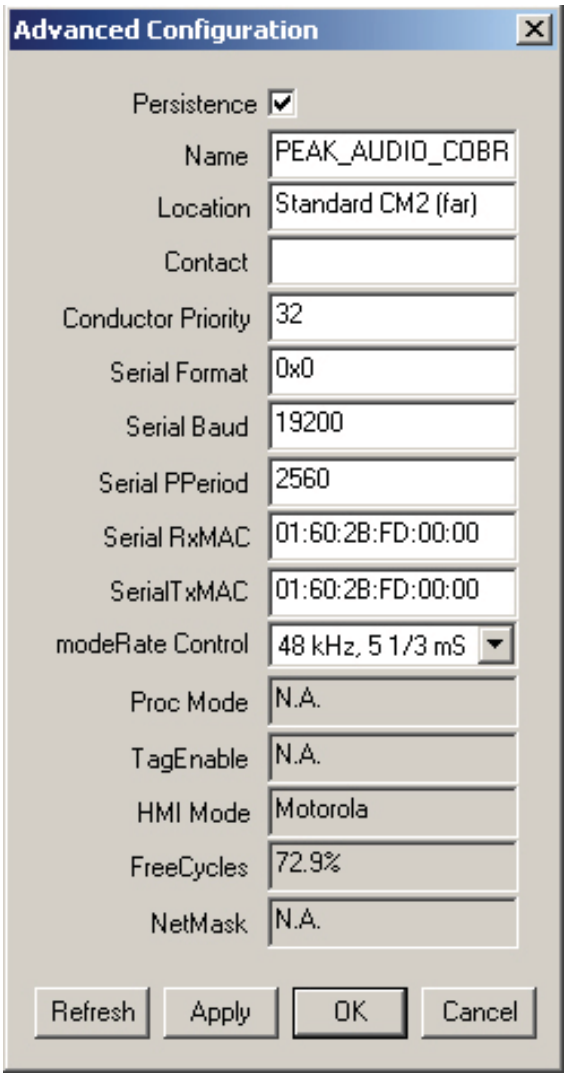


Figure 4-4: Global Interface settings

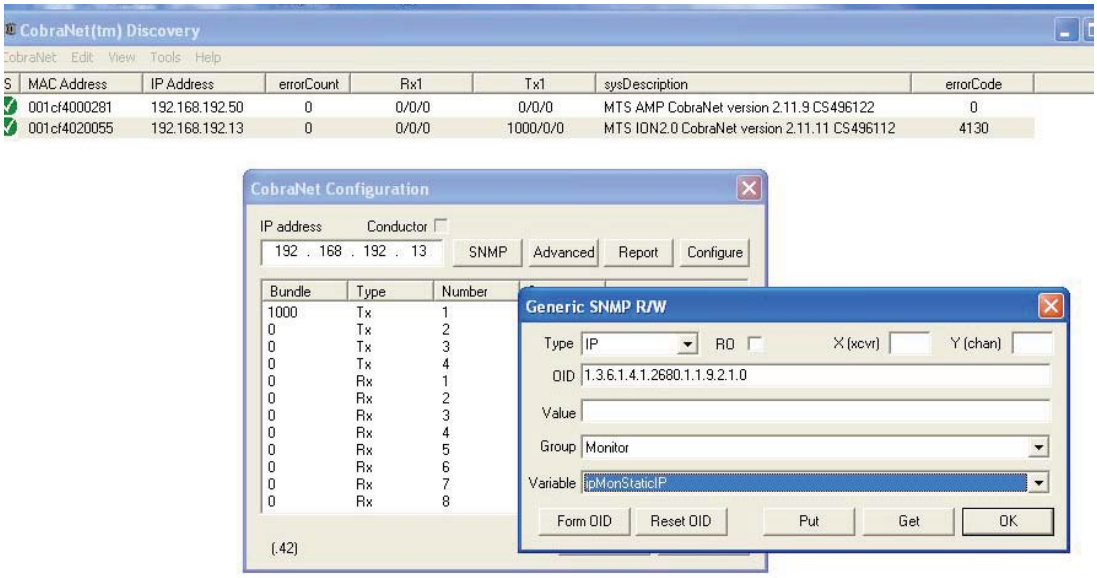
4.4 Presets

The STAGE 8.8 is a simple device and does not contain a host processor and no access to multiple preset functionality. However, the Cobranet flash can be used to save Cobranet interface settings via “persistence” (see previous section and Figure 4-4). If the persistence option is enabled, then the last set of values/settings can be stored into the Cobranet flash and will be restored on power up. Note that these settings can take up to

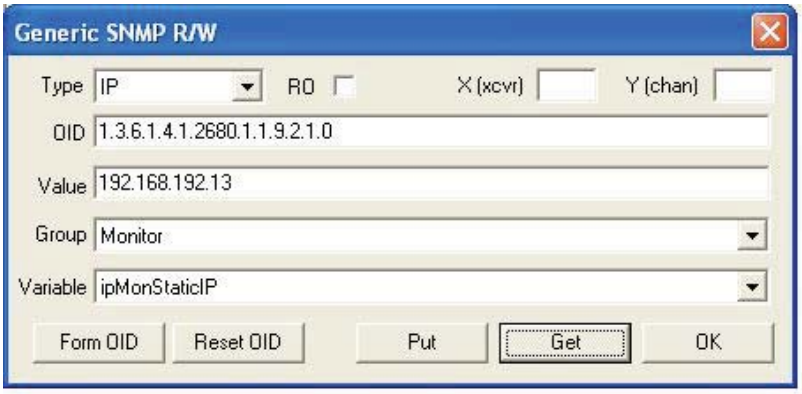
1 minute to save, as they are stored in between other processes. Also note that DSP settings are not stored-only Cobranet interface settings.

4.5 Setting a static IP address

First set persistence on (see Section 5). Then double click on the device in the main CNDISCO window to open the configuration menu (see below). In the configuration menu select the “SNMP” button. An SNMP window will open and select the “Monitor” Group and the “ipMonStaticIP” variable.



In the value section, type the desired IP address in AAA.BBB.CCC.DDD format and then press “PUT”. Confirm the setting by pressing “GET” See below for an example.



5 Firmware

The Cobranet firmware is updated using the free utility (Cobranet Discovery) from Cirrus Logic – see Figure 5-1 below.

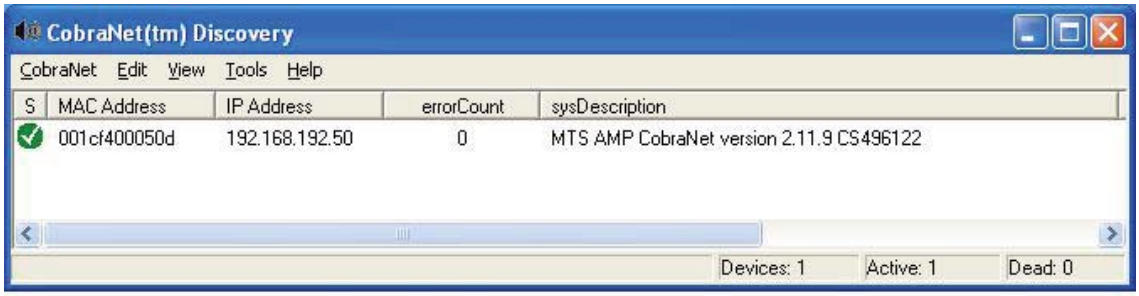


Figure 5-1: Cobranet Discovery showing 2.11.9 firmware

After loading the CNDISCO application, Advanced features will need to be enabled. Enabling advanced features in CNDISCO allows you to put any version of firmware on any hardware-compatible Cobranet module you wish. CNDISCO needs to have the particular firmware version of a device in its firmware directory in order to properly identify the device for compatible firmware upgrades. Should the situation arise where you know the device is a specific model but CNDISCO says there are no compatible firmware upgrades, using the advanced feature, you'll be able to update the firmware anyway.

How to enable the advanced feature: Firstly, open cndisco.ini in Notepad. Its usually in a directory like this: C:\Program Files\Peak Audio\CobraNet Discovery. Then find the Configuration section. It usually looks something like this:

[Configuration]
Adapter Index=[10] [10] Broadcom NetXtreme 57xx Gigabit Controller
Firmware Location=C:\Program Files\Peak Audio\CobraNet Discovery\firmware

Start a new line after one of the lines in that section and type in Advanced Feature=1. It should look something like this when you're done:

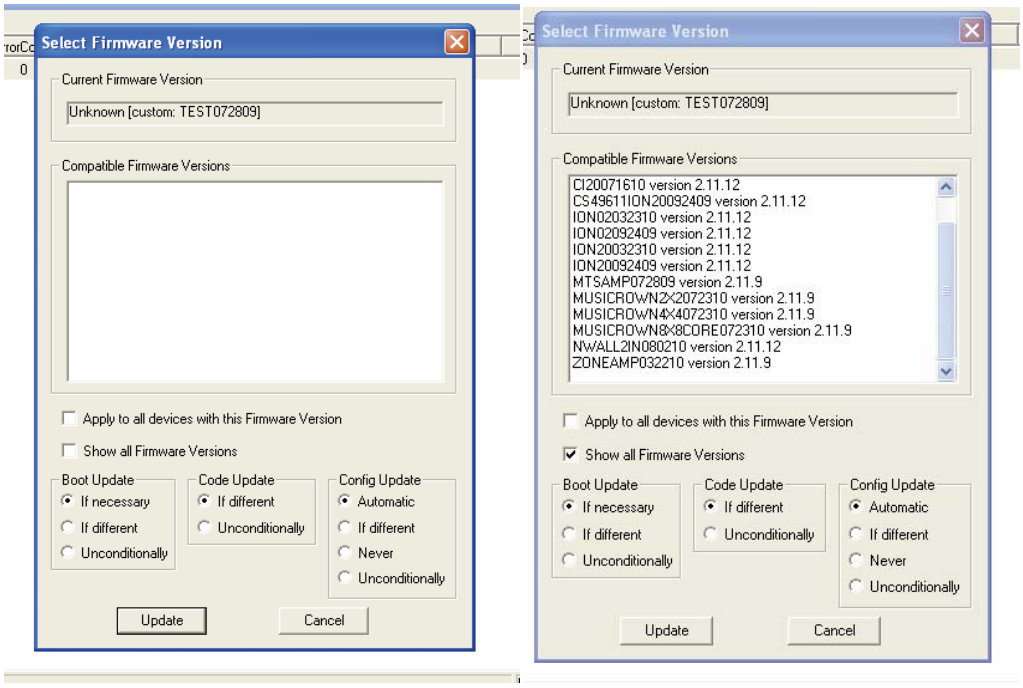
[Configuration]
Adapter Index=[10] [10] Broadcom NetXtreme 57xx Gigabit Controller
Firmware Location=C:\Program Files\Peak Audio\CobraNet Discovery\firmware
Advanced Feature=1

Save the file and exit Notepad. The advanced feature is now enabled.

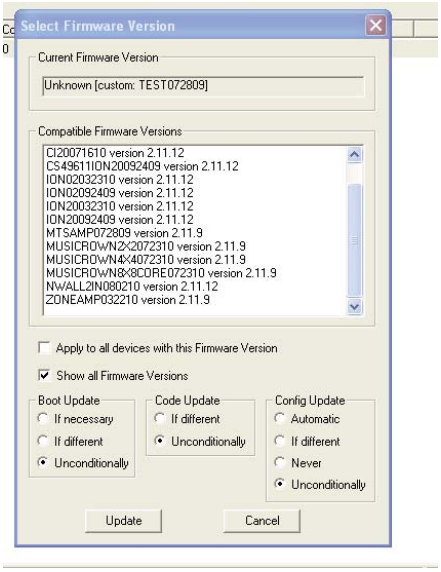
Now save the MTS cobranet binary file “MTS_2_11_xx.bin” to the Firmware folder and use CNDISCO to upload the firmware. Please ensure that you ONLY use the MTS binary, otherwise it will be lacking the amplifier specific controls needed for the correct operation of the product..

First Click on Cobranet and then choose Upload firmare…

Now when you update the firmware you'll see a check box in the "Select Firmware Version" dialog box marked "Show All Firmware Versions". Check the box and you'll be able to choose from all the firmware versions stored in the firmware directory.



Then choose all “Unconditionally” and select the “MTS_2_11_xx.bin”… binary and hit Update. You will get a warning, so accept and then see the updating dialog box below. Once completed, power cycle the product.


Select Firmware Version
Current Firmware Version
Unknown [custom: TEST072809]
Compatible Firmware Versions
CI20071610 version 2.11.12
CS49611ION20092409 version 2.11.12
ION02032310 version 2.11.12
ION02092409 version 2.11.12
ION20032310 version 2.11.12
ION20092409 version 2.11.12
MTSAMP072809 version 2.11.9
MUSICROWN2X2072310 version 2.11.9
MUSICROWN4X4072310 version 2.11.9
MUSICROWN8X8CORE072310 version 2.11.9
NWALL2IN080210 version 2.11.12
ZONEAMP032210 version 2.11.9
Apply to all devices with this Firmware Version
Show all Firmware Versions
Boot Update
If necessary
If different
Unconditionally
Code Update
If different
Unconditionally
Config Update
Automatic
If different
Never
Unconditionally
Update
Cancel


192.168.192.61 - Upload Firmware
Uploading the runtime code
Cancel

6 INDEX