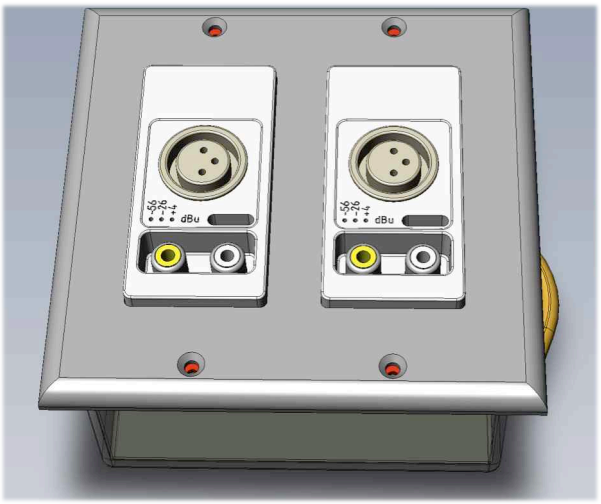
MEDIA**TECHNOLOGY**SYSTEMS INC.



MANUAL

AMX0.2CN
8x2… 24x10 Automixer
&
CobraNet™ Interface

5818 CALVIN AVENUE, TARZANA, CALIFORNIA 91356 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.

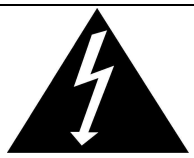
CAUTION: ANY CHANGES OR MODIFICATIONS MADE WITHOUT THE EXPRESS APPROVAL AND PERMISSION OF MANUFACTURER, VOID RESPONSIBILITY OF MANUFACTURER FOR COMPLAINCE.

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

The electrical specifications for the AMX0.2CN is given below. The XLR output has 3 settings, optimized for ProAudio, MI (Prosumer) Microphones and Consumer equipment respectively.

The RCA connectors are fixed at -8dBu (nominal).

Nominal Input Sensitivity/Max Input Level	
XL Output : Min Attenuation	+4dBu/+22dBu
XL Output :Med Attenuation	-2dBu/+18dBu
XL Output :Max Attenuation	-8dBu/+12dBu
RCA Connectors	-8dBu+12dBu
Output Impedance: XL/RCA	600Ω/10,000Ω

3 Installation

3.1 USA and other "Type A, B" (NEMA 1-15/5-15) regions

3.1.1 USA Decora® FacePlates

The most common decorative wall finish in the US is the Decora® format. The AMX0.2CN is available in sizes to suit the Decora® '2-gang' face plates widely available in various finishes (Brass, Aluminium, Plastic, etc) and colors (White, Black, Almond, Gold, Silver, etc) – see Figure 3-1

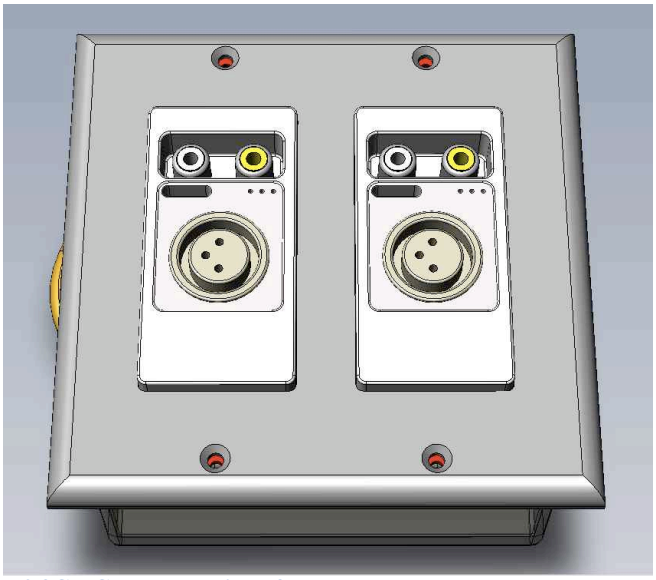


Figure 3-1: AMX0.2CN CobraNet™ interface tooled to match the common Decora® faceplate

NOTE: Media Technology Systems does not supply the faceplate (as this is to customer aesthetic requirements), but the AMX0.2CN is supplied with the white plastic insert (center) that fits the Decora® faceplate.

3.1.2 USA Mounting Enclosures

The AMX0.2CN interface and Decora® faceplate combination will need to be installed into a rear enclosure, usually an 'off the shelf' 2-gang J-Box or 2-gang back box. The AMX0.2CN interface will need a metal rear enclosure of minimum of 42mm deep that is well grounded (see 3.3.3 for grounding recommendations) – see Figure 3-2 for an example of a wetwall installation. RACO™, Hubble™, Leviton™, Graybar™, Grady™, Home Depot™ and many others all have equivalent product available.

For drywall installations use a similar metal enclosure with the side support, such as the 681 model from RACO™ - see Figure 3-3. Again, many vendors have equivalent product available.

NOTE: For full FCC/CE compliance, the AMX0.2CN should be mounted inside a grounded metal backbox (see Figure 3-2 below) with metal conduit connecting the STP cable to the IT room. In addition it is recommended to use a clamp on ferrite bead EMI suppressor for best noise immunity (see.

Figure 3-2: Example of metal backbox suitable for the AMX0.2CN

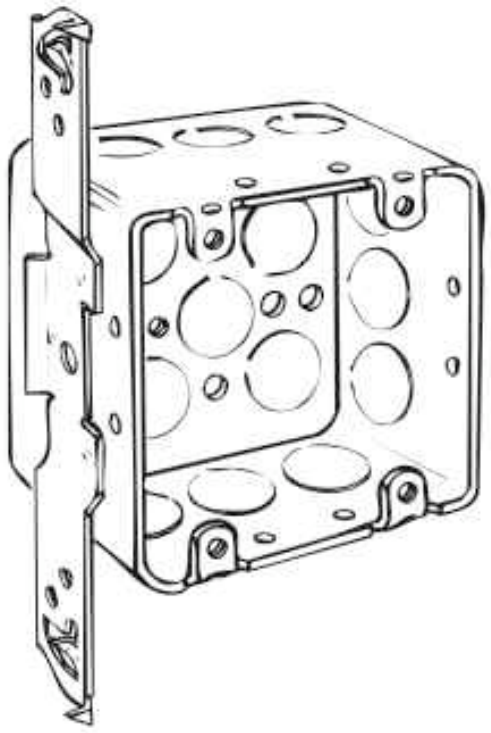


Figure 3-3: RACO™ 681 drywall back box.

3.1.3 USA labelling

There is a recessed slot at the bottom of the AMX0.2CN interface, suitable for a 1” wide x ⅜” high label see Figure 3-4. The recess allows for labels of up to 5/32” deep, which are sufficient even for “Traffolyte” style engraved labels (typically ⅛” deep) containing an aggressive, permanent adhesive.

Figure 3-4: Graphic showing AMX0.2CN label recess (bottom of fascia plate) with label screw holes.

The recess can also handle most other label types from recognized suppliers such as Brady, Sharpmark and others.

In addition, the recess also has a pair of mounting holes, ½" apart. These can be used for permanently attaching labels with screws, but it DOES require the dismantling of the ION interface, This approach is not recommended, as most aggressive adhesives are sufficiently strong to require a special solvent or tool to remove them.

3.2 Unpacking

It is recommended that the carton and packing material is retained so the AMX0.2CN may be shipped for service should this be required. Any damage caused by improper packaging will not be covered under warranty. Should you chose to dispose of the carton and packaging, make sure to dispose of these parts according to local, state and national requirements and good ecological practice.

3.3 Installing the Interface

3.3.1 Analog Input/Output Wire and Connectors:

Microphone and other input sources as well as output to amplifiers, powered speakers and other such devices, should be connected using high quality connectors and cables to assure reliable and quiet operation. It is false economy to use cheap cables. Normal use will degrade these cables quickly and create noise when handling, poor electrical connections and sound quality and the likelihood of non-operation at a critical time. Particular attention should be paid to cable type and quality for hand-held microphone applications.

3.3.2 AMX0.2CN Output Connections

The AMX0.2CN is should be connected as follows…

- XLR Connector: The XLR output has a low impedance (600ohm) drive and can be connected to most Pro-Audio, MI, Prosumer or Consumer equipment. The sensitivity switch will set the nominal output to +4dBu (ProAudio), -2dBu (MI/Prosumer), or -8dBu (Consumer) levels.

- RCA Connectors: These are paired/mono outputs with a fixed gain (-8dBu nominal) and 10k ohm output impedance. The RCA outputs provide a simple and fast connection for Consumer equipment such as MP3 players and Laptops over short distances.

NOTE: The AMX0.2CN internal regulator is a compact size (to suit the wall mount application). This places a strict limit on the impedance of the load it can drive. The AMX0.2CN can happily drive a 10kohm load at +24dBu and a 600ohm load at +22dBu, but loads of less than 300ohm will pull the device out of regulation. Similarly, driving the interface into a clip condition will cause over-current and pull the device out of regulation. In both situations, the likely effect is to reset the interface.

3.3.3 Ground pin

The AMX0.2CN has a rear PCB mounted ground pin – see Figure 3-5 below. Ideally, STP cable should be used, where the shield is connected to a good ground at the PoE switch, but it is accepted that UTP will be used in most situations. The rear PCB ground pin has been provided as a means of connecting the interface to a good ground when used with UTP cable.

The ground pin should be connected to the metal rear enclosure of the AMX0.2CN and in turn, the metal rear enclosure should be connected to either technical ground (preferable), common safety ground (next best), or building ground (worst case).

Please note: ALL grounds should comply with local safety codes and usually have a common connection at the building entrance.

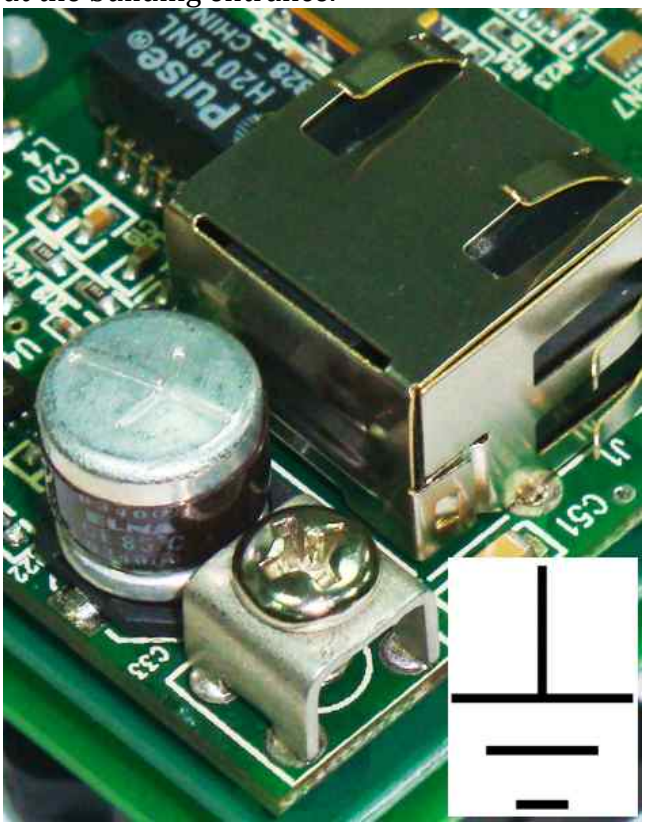


Figure 3-5: Ground Pin on rear PCB of AMX0.2CN

Warning: The AMX0.2CN is designed with consideration of real world conditions where it is possible that external devices, such as mixers, power amplifiers and other A/C powered devices can, through cabling defects and anomalies, connect potentially damaging voltages to the installed system. Should such voltages be inadvertently connected to the AMX0.2CN device, we have provided a fuse in the grounding circuit that will 'open' to protect the rest of the installed system from extensive damage. The only indication of this having occurred may be increased noise from the AMX0.2CN. There are no user serviceable parts inside these products so they must be returned to qualified service personnel or the factory for repair. Please review the warranty information in this manual for how to proceed should this happen.

NOTE: Failure under these conditions is not covered under warranty. Always check your system grounding. Never "lift" A/C grounds on any device in a system in an attempt to cure hum or buzz, so doing can expose users to dangerous and lethal voltages.

3.3.4 AMX0.2CN gain switch and indicator

The XLR connector has a gain switch with 3 positions-see Figure 3-6. There is also an adjacent LED indicator to show the gain setting.

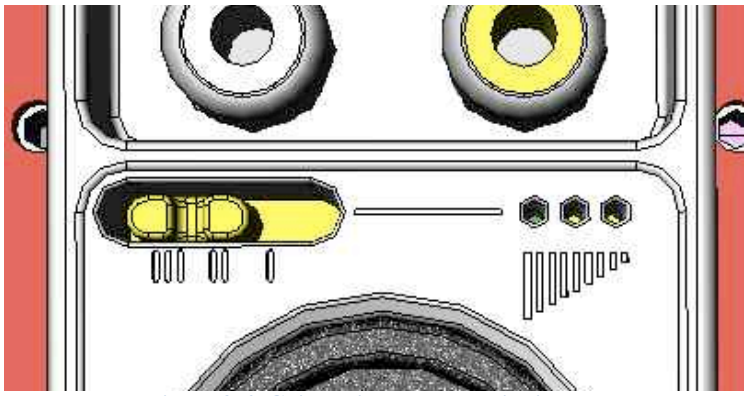


Figure 3-6: Gain switch and LED indicator

The switch sets the output sensitivity, so that the output of the AMX0.2CN can match the full scale/clip point of the connected device. The switch should be set to the left for more sensitive equipment (ie, needs less signal level to drive full output) and to the right for less sensitive equipment (ie, needs more level to drive full output). The LED and switch represents the sensitivity of the connected equipment, so that the peak output of the of the AMX0.2CN increases from left to right, where the left position is for connected devices with a maximum capability of -8dBu (nominal, +12dbu peak), the middle position is for connected devices with a maximum capability of -2dBu (nominal, +18dbu peak) and the right position is for connected devices with a maximum capability of +4dBu (nominal, +22dBu peak).

3.3.5 Mounting Position

The AMX0.2CN can be mounted either way up, ie label at the top or label at the bottom. However, it is recommended that the AMX0.2CN be mounted label at the bottom, as it makes the gain position and LED's easier to see, when the XLR is connected.

In the situation where the AMX0.2CN is mounted with the back can installed for protection (see Figure 3-7), then label at the bottom position is mandatory.

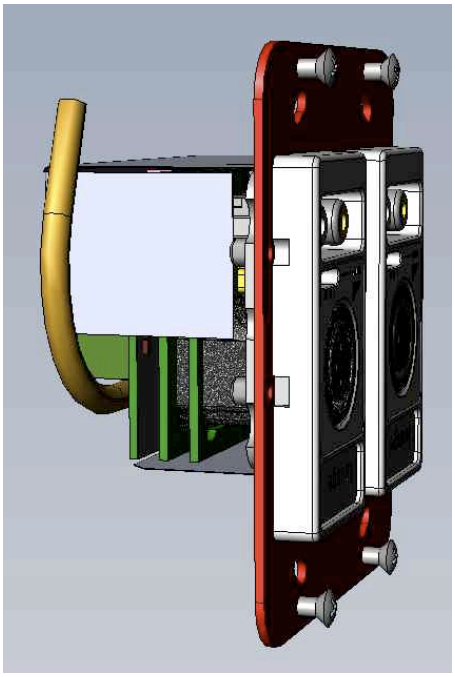
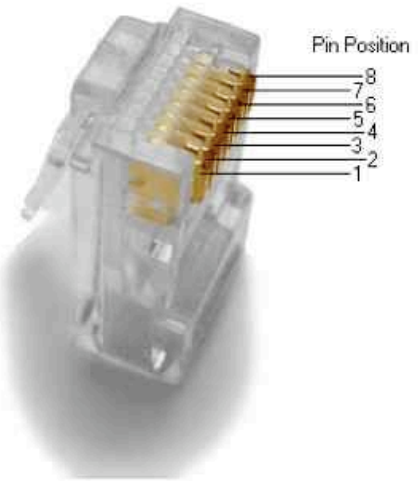


Figure 3-7: Side view showing back can in position

3.3.6 Network connections

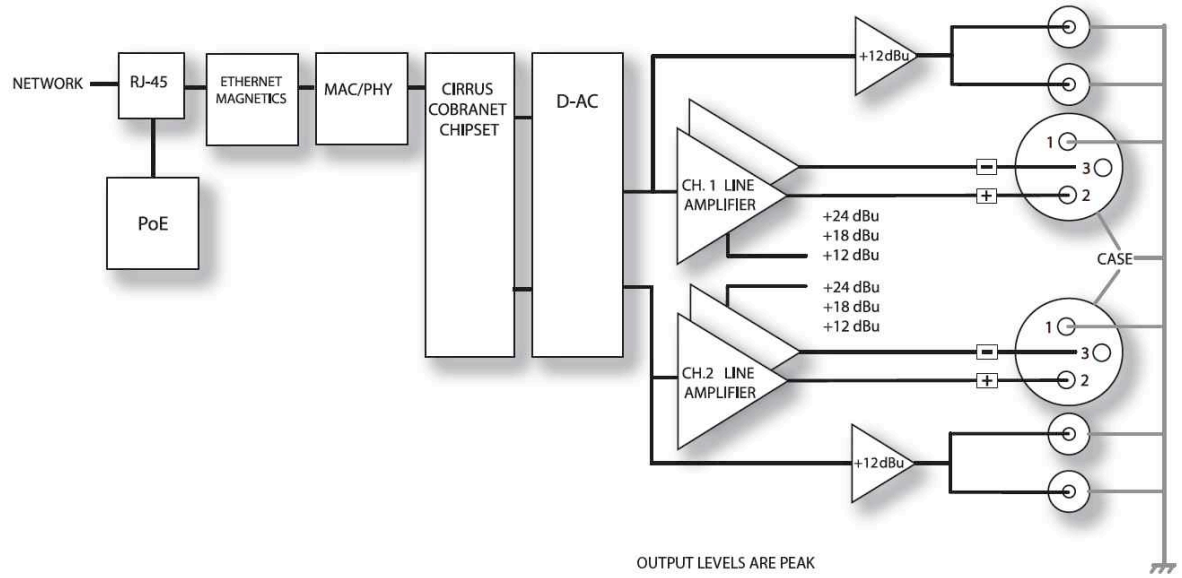
The MTS AMX0.2CN uses the standard TIA/EIA-568-B wiring scheme (T568A)... see below:

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



4 Functional Description

4.1 Signal Path AMX0.2CN



4.2 Digital section

The AMX0.2CN is a CobraNet™ interface with 2 analog Line level output channels. The digital audio streams are sourced from the CobraNet™ interface/CS496112 chipset and converted into analog audio. The CobraNet™ interface provides 8 simultaneous bundle receivers with up to 8 simultaneous audio streams (see Cirrus Logic UM23 and PM25 for full details of the CobraNet™ chipset and protocol).

Each Bundle receiver can handle 8 audio streams of 20bit word depth. Eight Bundle transmitters would therefore imply a potential of 64 audio streams. However the chipset is limited to a maximum of 8 simultaneous incoming audio streams. Thus the 8 streams can be sourced one from each of 8 Bundle receivers, or all 8 streams sourced from one Bundle receiver, or any combination in between.

For example, the 2 analog outputs could be sourced from 2 different network locations, ie 2 Bundle receivers, each of 1 audio channel. Or an 8 channel bundle of BGM audio could be sourced from the network and the desired BGM channel within the 8 from the Bundle receiver could be locally routed to the analog output.

The AMX0.2CN is powered by IEEE802.3af Power over Ethernet (PoE).

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. 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

See Figure 4-1 for details of the internal block diagram for the Digital Section I/O.

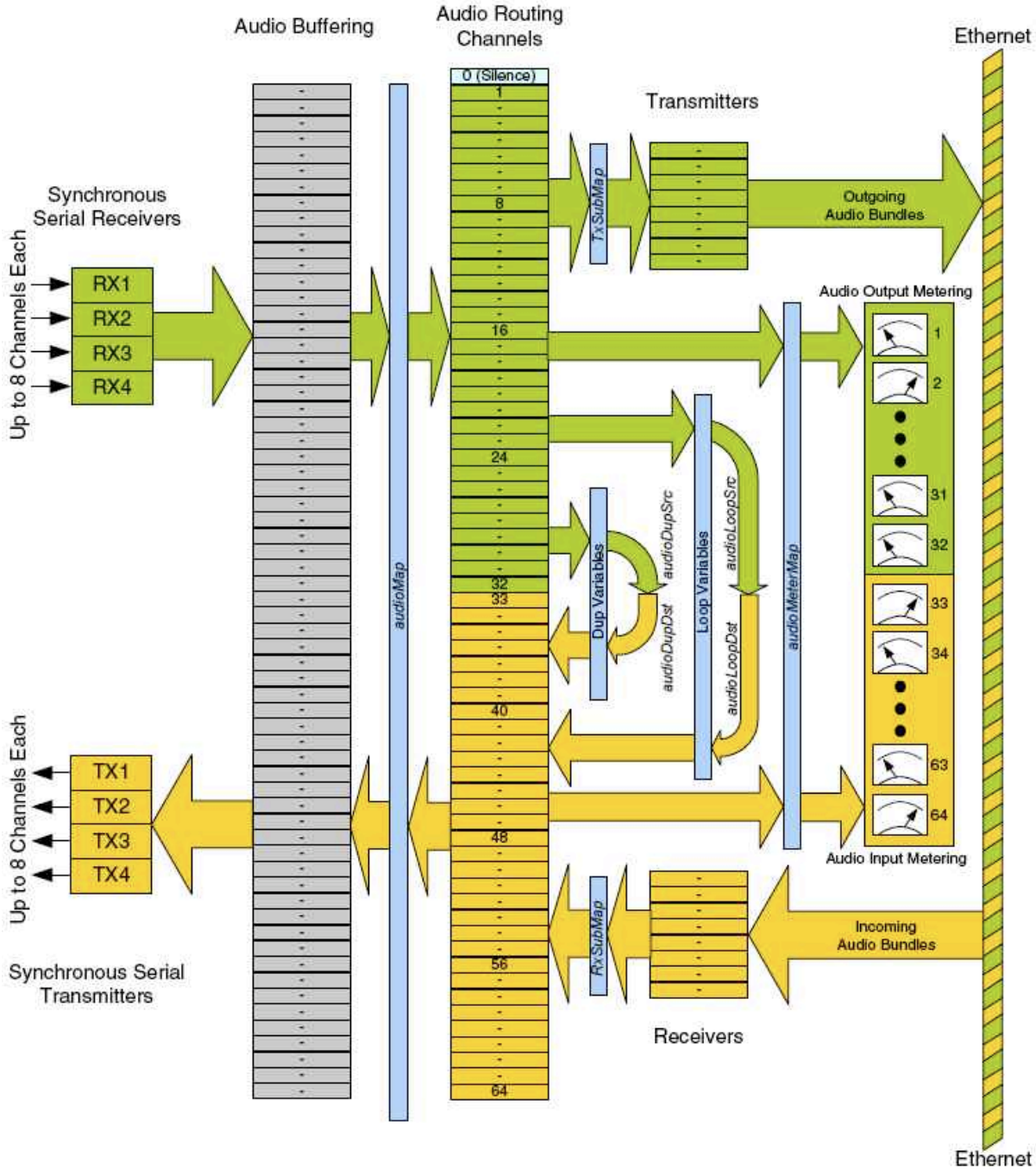


Figure 4-1: Block diagram showing the Cobranet routing of the AMX0.2CN

4.3 Digital Signal processing.

The AMX0.2CN uses the CS496112 chipset, which allows for >100MIPS of digital signal processing (DSP).

4.3.1 Automatic Microphone Mixer

4.3.1.1 Overview

Before proceeding to the DSP schematic, it will be necessary to understand how the Automatic Microphone mixer device works. The input section of the AMX0.2CN is shown below (Figure 4-2) and has inputs 1-8 as audio in, outputs 1-8 as gated audio out, inputs 9-12 as link signals in and output 9 as link signal out.

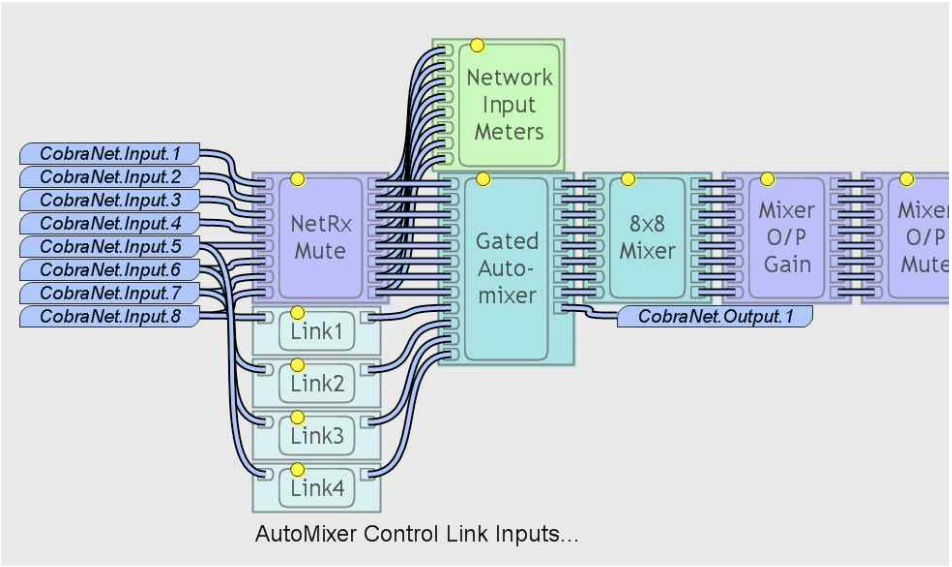


Figure 4-2: AMX0.2CN input section showing Automatic Microphone Mixer device

The automatic mixer device does not actually perform any mixing. The automatic mixer is a set of parallel gates to be connected between microphone input signals and a manual mixer. This system of gates automatically selects the appropriate channels that should be allowed to pass to the mixer.

Selection is based on signal level at the input, overall audio level for the system, priority level assignment and configured maximum open mic constraints. The automix device features the capability to receive link status inputs from other automix devices, combine this information from the multiple sources and local status and produce operational parameters and a Master link output which can be fed back to the other automix devices allowing them to all operate together based on common a common understanding of the system state.

The Automatic mixer features gating and priority logic and facilities for linking with other automatic mixer devices. The master link output conveys Number of Open Mics (NOM), priority and background level information for the system. The master link output is generated based on the link input signals received from other mixers and state

of local gates.

4.3.1.2 Link Signals Overview

The Automix device, when configured as a link master, features the capability to receive link status inputs from other Automix devices, combine this information from the multiple sources and with local status and produce operational parameters and a Master link output which can be fed back to the other Automix devices allowing them to all operate together based on a common understanding of the system state.

If only one Automix device is used in the system, no link signals are required. For systems with numerous Automix devices, only one device in the system performs this service.

The link signal carries NOM, priority and background level information. The link signals can be routed over CobraNet with 16, 20 or 24-bit resolution, as follows

- Priority – Priority is 0 if no channel is open.
- NOM – Count of open microphones.
- Background – Average peak level measured prior to gating among all inputs.

The values of the link output are calculated as follows:

- Priority – the highest priority seen on all valid input links.
- NOM – sum of all valid incoming NOM values
- Background – Sum of average of background values received on valid links scaled by Internal background control and detected peak level of external background input scaled by External background control.

4.3.2 AutoMixer Input and Output Signals

4.3.2.1 Audio Input

Wire microphone & line signals to the inputs. Inputs should have uniform gain. Ideally, unused channels should have their inputs should be muted prior to reaching the Automix device to avoid unnecessarily triggering the gates.

4.3.2.2 Link Input

When this AMX0.2CN ***IS*** serving as a link master for the system, connect the slave Link outputs from each of the other AMX0.2CN devices in the system to these inputs.

4.3.2.3 Master link Input

When this AMX0.2CN is ***NOT*** serving as a link master for the system, connect the Master link output from the AMX0.2CN Link master device in the system to the first of these inputs.

4.3.2.4 Gated Audio

One output per audio input channel. This is a gated version of the audio input channel. These outputs are connected to the mixer, which produces the signal(s) sent to the sound reinforcement system.

4.3.2.5 Link Output

When this AMX0.2CN is ***NOT*** serving as a link master for the system, this output communicates gate priority and background level information to the AMX0.2CN link master device. This output must be connected to a link input on the Link master device for the system.

4.3.2.6 Master link Output

When this AMX0.2CN ***IS*** serving as a link master for the system, this signal must be fanned out to the mater link input of all AMX0.2CN devices in the system.

4.3.3 AutoMixer Controls

A summary of the Automixer control panel is shown below (Figure 4-3).

Figure 4-3: AutoMixer Controls

The controls are…

4.3.3.1 Bypass

Type: Toggle

Default: Disabled

When enabled, audio for the channel is routed directly from the input to output. The gate is
deactivated. The *Open* indicator does not light and channel does not contribute to NOM count or
background level summing.

When disabled, the channel opens and closes in response to input level as constrained by…

- *Priority*,
- *Maximum open mics*
- *Last mic open* logic.

When open, Open indicator lights and channel is counted as an open mic for NOM computations.

Note: Because bypassed channels are not counted in NOM or background level computation, bypass mode is not intended to be used on channels connected to microphones. Bypass mode is intended to be used for auxiliary inputs.

Note: A channel can be disabled by muting the signal before it reaches the automixer.

4.3.3.2 Priority

Type: Integer
Range: 1 to 20
Default: 1

Defines priority for the channel. Gate will not open if a channel with a higher assigned priority is already open. Gate will close immediately if a channel with higher priority opens. Multiple channels with same assigned priority may be open simultaneously.

Note: to disable priority operation, set all channels in the system to the same priority.

4.3.3.3 Gate Threshold

Type: dB
Range: -100 to +23 dB
Default: -10 dB

Level threshold for opening and closing the gate. Threshold is relative to the background level as per Background gain on the link master device. When input level exceeds Threshold *plus* the background level, the gate opens immediately. When input level drops below this threshold, the gate waits for *Hold time* to expire before closing. If level goes above the effective threshold before *Hold time* expires, the gate remains open and *Hold time* is reset.

Note: If *Last mic on* is enabled, the gate may remain open. See *Last mic on* documentation for details.

4.3.3.4 Gate Hold time

Type: Time
Range: 10 ms to 10 s
Default: 1 s

Wait time in open state for closing the gate when input level passes below *Threshold*. *Open* indicator remains lit and channel is counted as an open mic during hold time.

4.3.3.5 Gate Depth

Type: dB
Range: 0 to -100 dB
Default: -20 dB

Attenuation for channel when gate is in closed state (*Open* indicator extinguished). Milder (towards 0 dB) settings produce a more natural response but may adversely affect gain-before-feedback performance of the system.

4.3.3.6 Maximum open mics

Type: Integer
Range: 0 to 255
Default: 255

Maximum open mics allowed at any time in the system. No additional gates will open if current NOM equals or exceeds this setting. Mics are opened on a first-come-first-served basis. The same setting should be used for all automix devices in a system. Using higher settings on some devices will cause open mics to be spread unevenly across the system.

Note 1: To disable *Maximum open mics* behavior, set the control to its maximum value (255).

Note 2: If multiple channels are above threshold when NOM drops to a level where a new mic may open, the lowest numbered channel is given preference.

NOM is read and assessed when *Threshold* is first exceeded. If *NOM*>=*Maximum open mics*, the gate does not open.

4.3.3.7 Input Open Indicator

Type: LED

Lights when signal level exceeds Threshold + background or due to Last mic on logic and channel is not constrained by Priority or Maximum open mics. Never lights in

Bypass mode.

Note: The Input open indicator is available as a 'look at me' trigger for camera presets during video conferencing. The indicator can be accessed using MTS Control (see "MTS Cobranet Interface Programming Manual").

4.3.3.8 Last mic on

Type: Toggle
Default: Disabled

When enabled the last microphone with gate open will remain open when the *Hold time* expires. The *Open indicator* will remain lit and NOM indicator will show 1 and priority will show 0. The last mic will immediately close when any other gate in the system opens. This feature can produce a more natural responding system based on the idea that in many conferencing scenarios, the last to speak is most likely the next to speak.

NOM is read and assessed when *Hold time* expires. If NOM=1, the gate remains open.

4.3.3.9 Link Master Controls

These controls are only active on the device configured as the Link master. A device is configured as Link master by the presence of one or more Link inputs.

4.3.3.10 Link Master NOM attenuation step

Type: dB
Range: 0 to -6 dB
Default: -3 dB

Controls the amount of gain reduction per doubling of the number of open mics. With only one open mic, no gain reduction is introduced. When a second mic opens, the number of mics has doubled and gain of both open channels is reduced by the amount specified by this control. A third open mic will reduce gain by log2(3) (approximately 1.5 times) this setting. A fourth open mic represents a second doubling of open mics reducing gain by two times the setting.

4.3.3.11 NOM response time

Type: Time
Range: 100 ms to 10 s
Default: 1 s

Time constant for moving from one NOM compensation gain setting to the next in response to change in the number of open mics in the system.

4.3.3.12 Background gain

Type: dB

Range: -100 to +23 dB
Default: 0 dB

Scaling factor for internal background level measurement. Higher settings produce more aggressive lifting of gate thresholds in the presence of background noise. *Background* must also be tuned based on mixer size. Higher overall setting are required on mixers with fewer active input channels. See *Background threshold compensation* below for a more detailed description of background level computation and threshold compensation.

4.3.3.13 NOM

Type: Integer
Range: 0 to 255

Count of number of channels with lit *Open indicator* in the system.

NOM is normally in the range 0 to *Maximum open mics* though may exceed *Maximum open mics* briefly if multiple channels on linked mixers receive an above-threshold input simultaneously.

4.3.3.14 NOM gain reduction

Type: dB
Range: 0 to -48 dB

Current gain reduction applied to all channels as per NOM reading and *NOM attenuation step* and *NOM response time* settings

4.3.3.15 Priority

Type: Integer
Range: 0 to 20

Highest priority channel currently in Open state. 0 if no channel is open or one channel is open due to *Last mic on* logic.

4.3.3.16 Background threshold compensation

Type: dB
Range: +35 to -35 dB

Measured level of background noise with application of Background gain setting. Internal background level is the sum of all pre-gate signals received by all microphone inputs.

Inputs in bypass mode do NOT participate in the background level summing. Inputs to this mix are prescaled by -24 dB to prevent overflow for the largest possible mixer.

The device uses this calculation to adjust effective gate threshold levels. Background threshold compensation level is added to the Threshold setting to produce the effective threshold used to determine the signal level required to open the gates. For example, if Threshold is set to -10 dB and Background threshold compensation reads -10 dB, the effective threshold is -4 dB (adding two equal signals produces a resultant 6 dB higher).

4.3.4 AMX0.2CN DSP Operation

The AMX0.2CN DSP input section is shown in Figure 4-4, below.

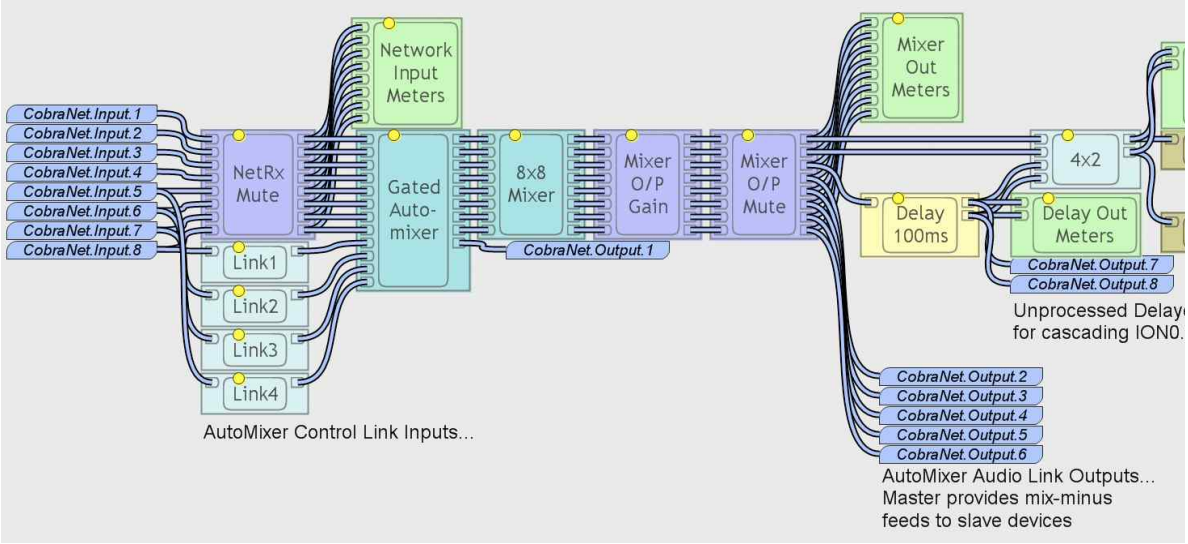


Figure 4-4: AMX0.2CN DSP-Input Section

There are 8 Cobranet input channels available to the AMX0.2CN. Cobranet inputs 1-4 are dedicated audio and are connected to the Gated Automixer audio inputs. Cobranet inputs 5-8 can either be audio or Automixer control signals.

The default settings are shown in Figure 4-5 below.

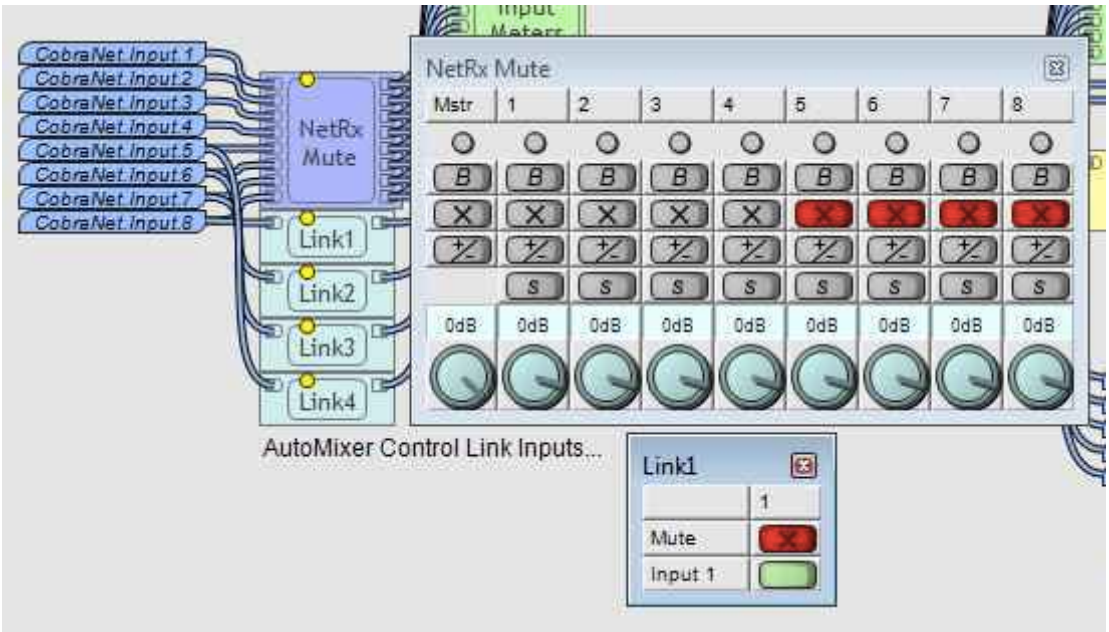


Figure 4-5: Default Automixer link settings

To avoid control signals accidently passing through to the audio outputs, the AMX0.2CN ships with both audio and control disabled to the gated automixer inputs 5-12. The setup process is as follows…

4.3.4.1 'Standalone' operation

One AMX0.2CN in 'standalone' offers 8 Cobranet inputs – ideally, this could be used with 4 x ION2.0 to complete a small meeting room, see Figure 4-6 below.

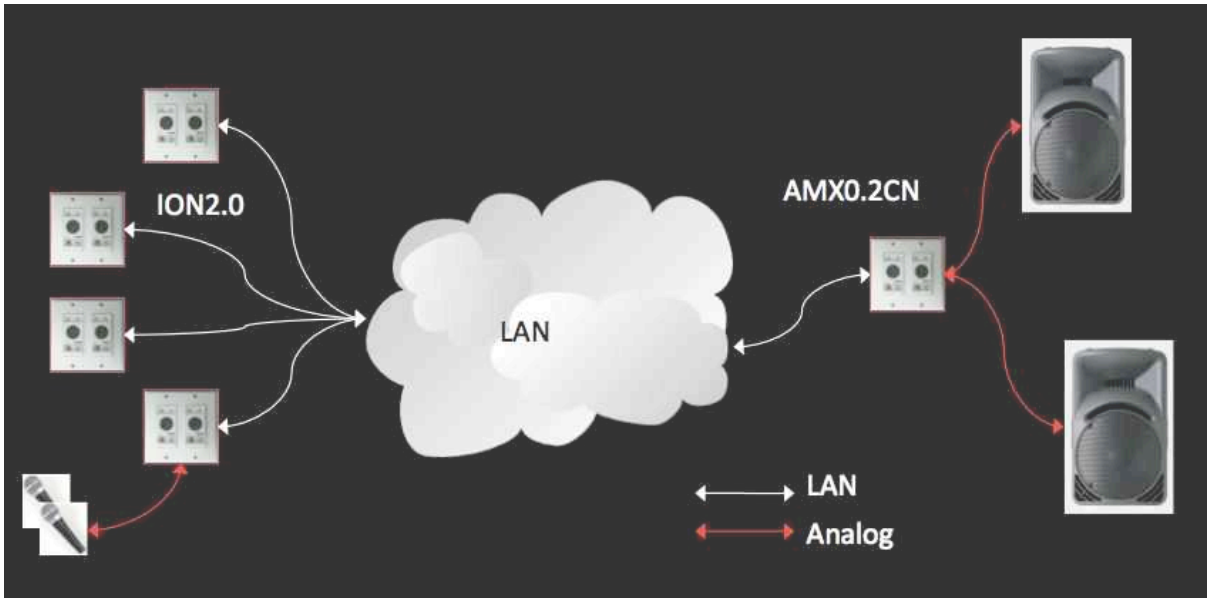


Figure 4-6: Application with four ION2.0 and one AMX0.2CN

To configure for standalone operation, do the following in your MTS Control executable (see MTS Cobranet Interface Programming Manual for details on how to create an executable)…

- Leave all input Link switches ("Link1", "Link2"…"Link4" in MUTE (default). This will stop any automixer link signals entering the audio path. ALERT… accidental application of automixer control signals to the audio path may damage loudspeakers.
- Open "NetRx Mute" and set the outputs to 0dB. This will route Cobranet inputs 5-8 to the automixer gate inputs.
- Set automixer "Link Master" button ON.

4.3.4.2 Master-Slave Operation

Two to five AMX0.2CN can be linked to create a matrix size of up to 24x10 – see Figure 4-7 below of an example of a 12x4 matrix.

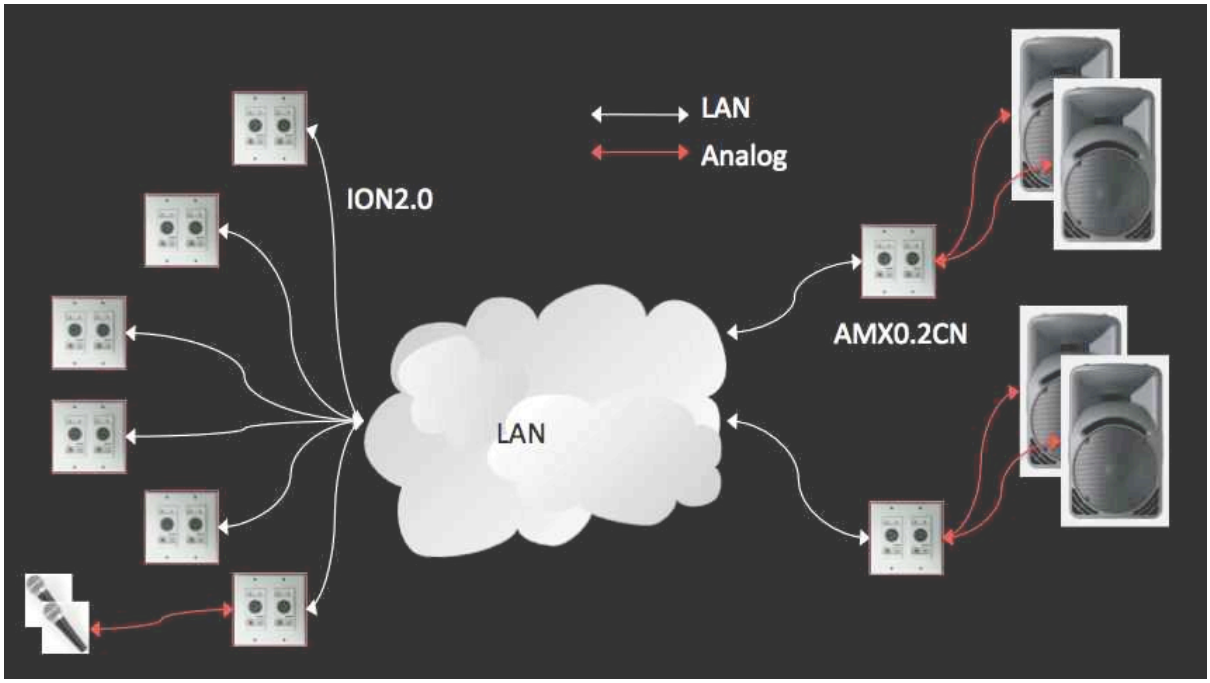


Figure 4-7: Application with six ION2.0 and two AMX0.2CN in linked mode

The linking process is complex, as the AMX02CN is a simple 8x2 audio device and requires the configuration of multiple master-slave links and 'mix-minus' audio routing. The configuration process will require the following, depending on how many AMX02CN devices are connected…

In all configurations…

- There shall be only one Master AMX0.2CN
- The Master (or standalone) AMX0.2CN has automixer "Link Master" button ON. All slaves have "Link Master" button OFF
- The Master unit will take in all link control signals from the slave units, combine with the Master unit status and send out a single Master link control signal to all Slaves.
- Slaves must connect the incoming Master control link feed to the first Automixer link input ONLY (ie slaves only use one link input and that should be input 9 to the automixer and should be connected to receiver subchannel 40-ie, Cobranet channel 8).
- All Slave units will have Cobranet channel 8 in NetRx muted and Link1 switch unmuted. Slave unit Link 2-3-4 switches will all be muted to avoid accidently sending audio to the AutoMixer link inputs.
- For ALL Slave units, output 4 of the 8x8 Matrix Mixer provides the Cobranet Channel 2 audio signal feed to the Master. This will be a sum of the first six inputs, as inputs 7/8 are used for linking, where channel 7 will be connected to the audio input, as it is the sum mix from the second AMX0.2CN and channel 8 is linked to the Automixer channel 9 (the first control link input).
- For all Slaves, Receiver 4 (this assumes that receivers 1, 2 & 3 are connected to ION2.0 for audio inputs) will be configured to receive the unicast signal from the Master AMX0.2CN device and set the subchannel mapping so that receiver Channel 1 is mapped to subchannel 40 (ie, Cobranet input channel 8-the linker

input) and receiver Channel 2 is mapped to subchannel 39 (ie, Cobranet input channel 7-the audio mix input).

- Audio link inputs from other Master or Slave units should be in bypass at the Automixer, as they have already been included in the NOM calculations.

To configure for master-slave linked operation, do the following in your MTS Control executable (see MTS Cobranet Interface Programming Manual for details on how to create an executable)…

NOTE: Figure 4-4 above shows that the Link signal is always Channel 1 of the bundle and the audio mix can be Channels 2-5. This will require the receiver subchannel mapping of the AMX0.2CN to be configured to ensure that audio and link signals are route to the correct input.

- Two AMX0.2CN devices: Master will receive a 2 channel unicast bundle from the slave containing the slave Control link signal and the Slave Mic sum. The Master unit will send a 2 channel unicast bundle containing the Master link signal and Master Mic Sum to the Slave unit

  Two input channels of each unit will be used for linking, so the matrix size will be 12x4.

  For both Master and Slave units, the Automixer Link output is connected to Cobranet output channel 1. In addition, output 4 of the 8x8 Matrix Mixer provides Cobranet Channel 2 audio signal. Normally this will be a sum of the first six inputs, as inputs 7/8 are used for linking.

  Transmitter 1 will be configured to send a 2 channel unicast bundle, where sub channel 1 is the link signal and subchannel 2 is the audio mix signal

  Receiver 4 (this assumes that receivers 1, 2 & 3 are connected to ION2.0's for audio inputs) will be configured to receive the unicast signal from the other AMX0.2CN device and set the subchannel mapping so that receiver Channel 1 is mapped to subchannel 40 (ie, Cobranet input channel 8-the linker input) and receiver Channel 2 is mapped to subchannel 39 (ie, Cobranet input channel 7-the audio mix input).

- Three AMX0.2CN devices: Master will receive a 2 channel unicast bundle from each slave containing the Slave Control link signal and the Slave Mic sum. The Master unit will send a 2 channel unicast bundle to each slave containing Master link signal and Mic Mix-Minus audio.

  Two input channels of each slave unit will be used for linking, plus four input channels of the master so the matrix size will be 16x6

  The Cobranet channel 1 is sent to subchannel 1 of all transmitters to ensure that the Master link signal is available to all Slave devices

The 8x8 Mixer in the Master AMX0.2CN is used to create the audio mix-minus feeds to each slave, where…

The 8x8 Matrix Mixer output 4 is sent to slave 1 and will contain a mix of channels 1-4 (ie the audio feeds into the master AMX0.2CN) plus Channel 6 the audio feed from slave 2. The Cobranet channel 2 is sent to subchannel 2 of transmitter 1 (the transmitter for slave 1)

The 8x8 Matrix Mixer output 5 is sent to slave 2 and will contain a mix of channels 1-4 (ie the audio feeds into the master AMX0.2CN) plus Channel 5 the audio feed from slave 1. The Cobranet channel 3 is sent to subchannel 2 of transmitter 2 (the transmitter for slave 2)

For the Master…

Receiver 3 (this assumes that receivers 1, 2 are connected to ION2.0 for audio inputs) will be configured to receive the unicast signal from Slave 1. Set the subchannel mapping so that receiver 3/Channel 1 is mapped to subchannel 39 (ie, Cobranet input channel 7-to be configured as a linker input) and receiver 3/Channel 2 is mapped to subchannel 37 (ie, Cobranet input channel 5-to be configured as an audio mix input).

Receiver 4 will be configured to receive the unicast signal from Slave 2. Set the subchannel mapping so that receiver 4/Channel 1 is mapped to subchannel 40 (ie, Cobranet input channel 8-to be configured as a linker input) and receiver 4/Channel 2 is mapped to subchannel 38 (ie, Cobranet input channel 6-to be configured as an audio mix input).

- Four AMX0.2CN devices: Master will receive a 2 channel unicast bundle from each slave containing the Slave Control link signal and the Slave Mic sum. The Master unit will send a 2 channel unicast bundle to each slave containing Master link signal and Mic Mix-Minus audio.

  Two input channels of each slave unit will be used for linking, plus six input channels of the master so the matrix size will be 20x8

  The Cobranet channel 1 is sent to subchannel 1 of all three transmitters to ensure that the Master link signal is available and all Slave devices

  The 8x8 Mixer in the Master AMX0.2CN is used to create the audio mix-minus feeds to each slave, where…

  The 8x8 Matrix Mixer output 4 is sent to slave 1 and will contain a mix of channels 1-2 (ie the audio feeds into the master AMX0.2CN) plus Channel 4 and Channel 5 the audio feeds from slave 2 and slave 3. The Cobranet channel 2 is sent to subchannel 2 of transmitter 1 (the transmitter for slave 1)

The 8x8 Matrix Mixer output 5 is sent to slave 2 and will contain a mix of channels 1-2 (ie the audio feeds into the master AMX0.2CN) plus Channel 3 and Channel 5 the audio feeds from slave 1 and slave 3. The Cobranet channel 3 is sent to subchannel 2 of transmitter 2 (the transmitter for slave 2)

The 8x8 Matrix Mixer output 6 is sent to slave 3 and will contain a mix of channels 1-2 (ie the audio feeds into the master AMX0.2CN) plus Channel 3 and Channel 4 the audio feeds from slave 1 and slave 2. The Cobranet channel 4 is sent to subchannel 2 of transmitter 3 (the transmitter for slave 3)

For the Master…

Receiver 2 (this assumes that receiver 1 is connected to ION2.0 for audio inputs) will be configured to receive the unicast signal from Slave 1. Set the subchannel mapping so that receiver 2/Channel 1 is mapped to subchannel 38 (ie, Cobranet input channel 6-to be configured as a linker input) and receiver 2/Channel 2 is mapped to subchannel 35 (ie, Cobranet input channel 3-to be configured as an audio mix input).

Receiver 3 will be configured to receive the unicast signal from Slave 2. Set the subchannel mapping so that receiver 3/Channel 1 is mapped to subchannel 39 (ie, Cobranet input channel 7-to be configured as a linker input) and receiver 3/Channel 2 is mapped to subchannel 36 (ie, Cobranet input channel 4-to be configured as an audio mix input).

Receiver 4 will be configured to receive the unicast signal from Slave 3. Set the subchannel mapping so that receiver 4/Channel 1 is mapped to subchannel 40 (ie, Cobranet input channel 8-to be configured as a linker input) and receiver 4/Channel 2 is mapped to subchannel 37 (ie, Cobranet input channel 5-to be configured as an audio mix input).

- Five AMX0.2CN devices: Four AMX0.2CN devices: Master will receive a 2 channel unicast bundle from each slave containing the Slave Control link signal and the Slave Mic sum. The Master unit will send a 2 channel unicast bundle to each slave containing Master link signal and Mic Mix-Minus audio.

  Two input channels of each slave unit will be used for linking, plus all eight input channels of the master so the matrix size will be 24x10

  The Cobranet channel 1 is sent to subchannel 1 of all four transmitters to ensure that the Master link signal is available at all Slave devices

  The 8x8 Mixer in the Master AMX0.2CN is used to create the audio mix-minus feeds to each slave, where…

  The 8x8 Matrix Mixer output 4 is sent to slave 1 and will contain a mix of Channels 2, 3 & 4- the audio feeds from slave 2, slave 3 and slave 4. The

Cobranet channel 2 is sent to subchannel 2 of transmitter 1 (the transmitter for slave 1)

The 8x8 Matrix Mixer output 5 is sent to slave 2 and will contain a mix of Channels 1, 3 & 4- the audio feeds from slave 1, slave 3 and slave 4. The Cobranet channel 3 is sent to subchannel 2 of transmitter 2 (the transmitter for slave 2)

The 8x8 Matrix Mixer output 6 is sent to slave 3 and will contain a mix of Channels 1, 2 & 4- the audio feeds from slave 1, slave 2 and slave 4. The Cobranet channel 4 is sent to subchannel 2 of transmitter 3 (the transmitter for slave 3)

The 8x8 Matrix Mixer output 7 is sent to slave 4 and will contain a mix of Channels 1, 2 & 3- the audio feeds from slave 1, slave 2 and slave 3. The Cobranet channel 5 is sent to subchannel 2 of transmitter 4 (the transmitter for slave 4)

For the Master…

Receiver 1 will be configured to receive the unicast signal from Slave 1. Set the subchannel mapping so that receiver 1/Channel 1 is mapped to subchannel 37 (ie, Cobranet input channel 5-to be configured as a linker input) and receiver 1/Channel 2 is mapped to subchannel 33 (ie, Cobranet input channel 1-to be configured as an audio mix input).

Receiver 2 will be configured to receive the unicast signal from Slave 2. Set the subchannel mapping so that receiver 2/Channel 1 is mapped to subchannel 38 (ie, Cobranet input channel 6-to be configured as a linker input) and receiver 2/Channel 2 is mapped to subchannel 34 (ie, Cobranet input channel 2-to be configured as an audio mix input).

Receiver 3 will be configured to receive the unicast signal from Slave 3. Set the subchannel mapping so that receiver 3/Channel 1 is mapped to subchannel 39 (ie, Cobranet input channel 7-to be configured as a linker input) and receiver 3/Channel 2 is mapped to subchannel 35 (ie, Cobranet input channel 3-to be configured as an audio mix input).

Receiver 4 will be configured to receive the unicast signal from Slave 4. Set the subchannel mapping so that receiver 4/Channel 1 is mapped to subchannel 40 (ie, Cobranet input channel 8-to be configured as a linker input) and receiver 4/Channel 2 is mapped to subchannel 36 (ie, Cobranet input channel 4-to be configured as an audio mix input)

4.3.4.3 Output Section

The DSP output section is reasonably conventional. There are High Pass and Low Pass filters (24dB/Oct Linkwitz-Riley), 8 bands of parametric filters and a 'look ahead'

compressor with peak detector on each of the two analog output channels (see Figure 4-8 below).

In addition, there is an optional 100mS delay that has a separate feed from the matrix mixer and can be used either as an unprocessed feed to other AMX0.2CN's or ION0.2's (for sequential 100mS-200mS-300mS, etc delays), or locally as a mono-sum delayed signal. The 4:2 router determines if the conventional or delayed feed is sent to either analog output.

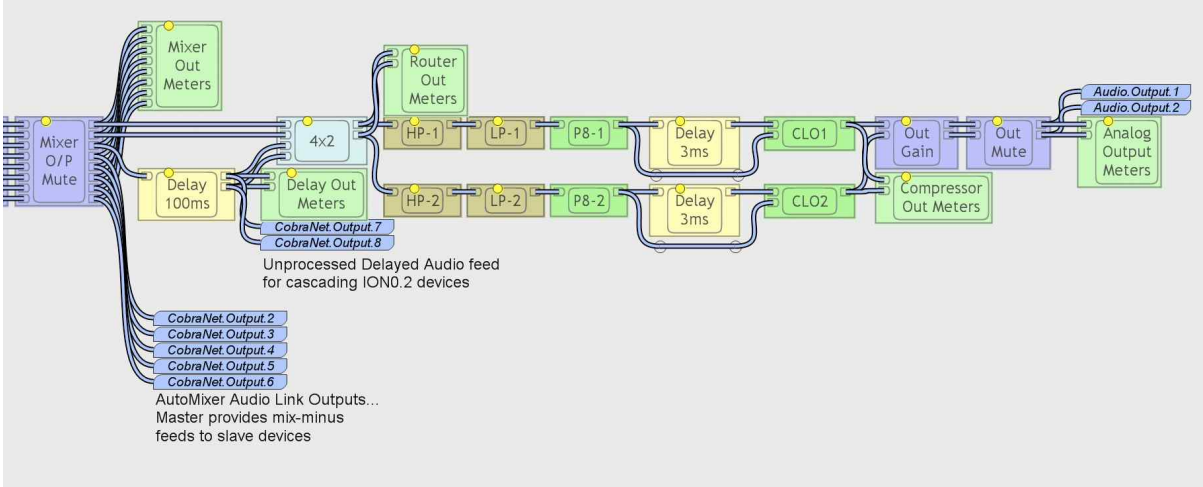


Figure 4-8: Output section DSP of the AMX0.2CN

5 Simple Configuration (No DSP)

In some applications, the AMX0.2CN will be used as a simple 2 channel Cobranet interface, providing local analog outputs (respectively) and connecting to a central DSP processor. In that situation, the DSP will not be used. This Section covers the use of the ION2.0/0.2 as a simple 2 channel interface and Section 6 cover the more complex DSP configuration and control

The standard CobraNet™ tools, including CobraNet™ Discovery (CNDISCO) and CobraCAD are available for use with the MTS CobraNet™ enabled IONs. These tools are available as a free download from the Cirrus Logic Website.

The utility CNDISCO is the simplest method of configuring the AMX0.2CN interfaces. Simply download from the Cirrus Logic website and run the exe file on the PC or laptop.

5.1 CNDISCO - Setup

To use CNDISCO, the host PC or laptop must be set to the default IP subnet in order to talk to the ION. Figure 5-1 below shows the method of setting up a Windows computer.

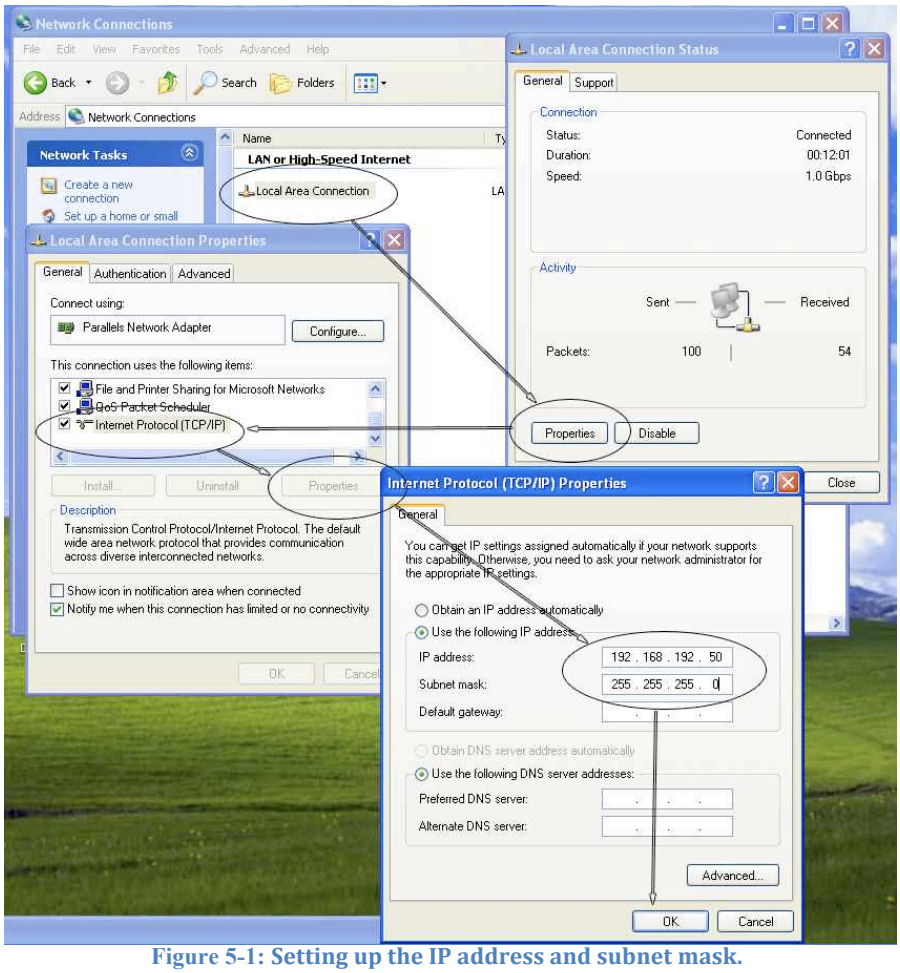


Figure 5-1: Setting up the IP address and subnet mask.

- 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.

5.2 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.

5.3 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 ION product is the ability to set up to 4 CobraNet™ audio transmitters (ION2.0) and 8 CobraNet™ receivers (ION0.2). 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 5-2). 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

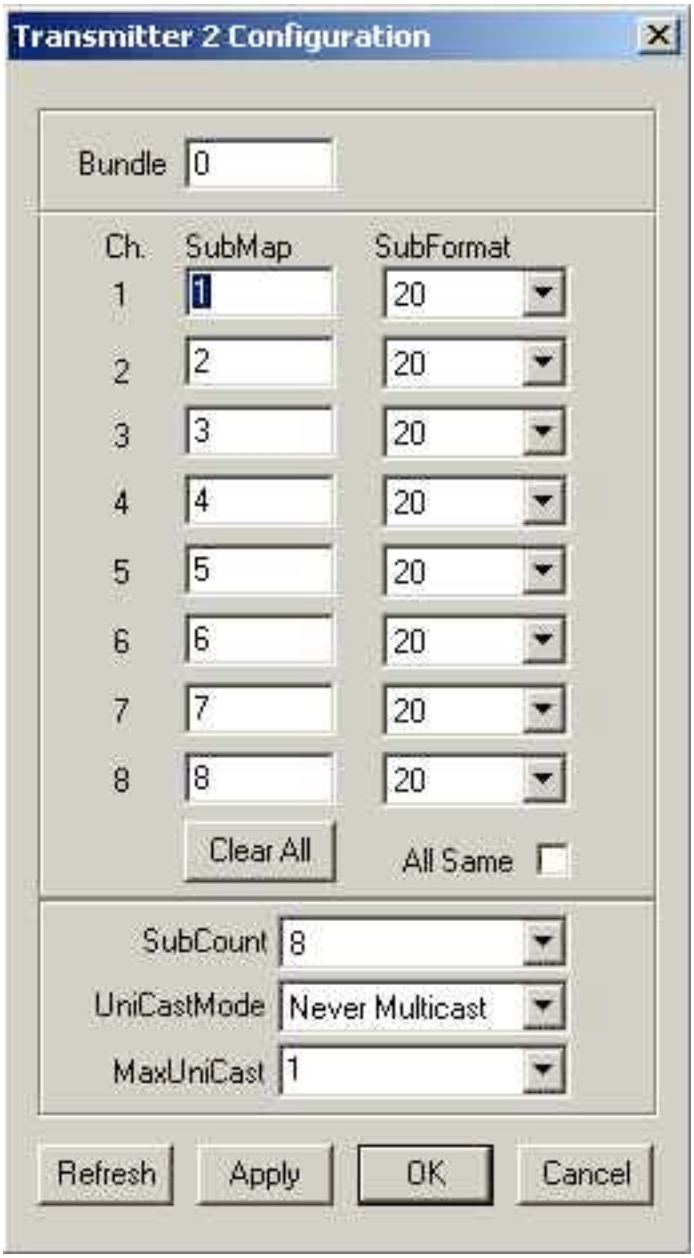


Figure 5-2: CobraNet™ Transmitter settings page

- Receiver setup: This section covers the CobraNet™ receivers (see Figure 5-3). 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

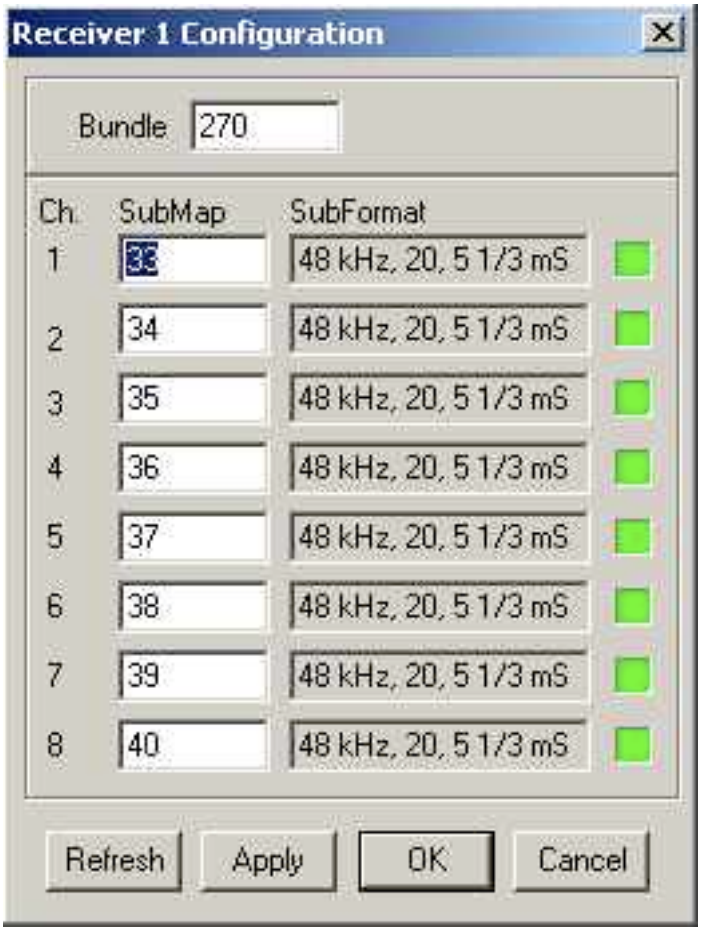


Figure 5-3: CobraNet™ Receiver settings page

- 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 5-4). These are explained in detail in the CNDISCO manual, but 2 are of particular importance to the ION series interfaces, ie…
    - Persistance: The AMX0.2CN 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.

- The persistence only applies to Cobranet settings and not the DSP settings. DSP settings will need to be stored using MTS Control and a Preset device (see **Error! Reference source not found.**).
- 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 ION 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 ION2.0 or ION0.2 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.

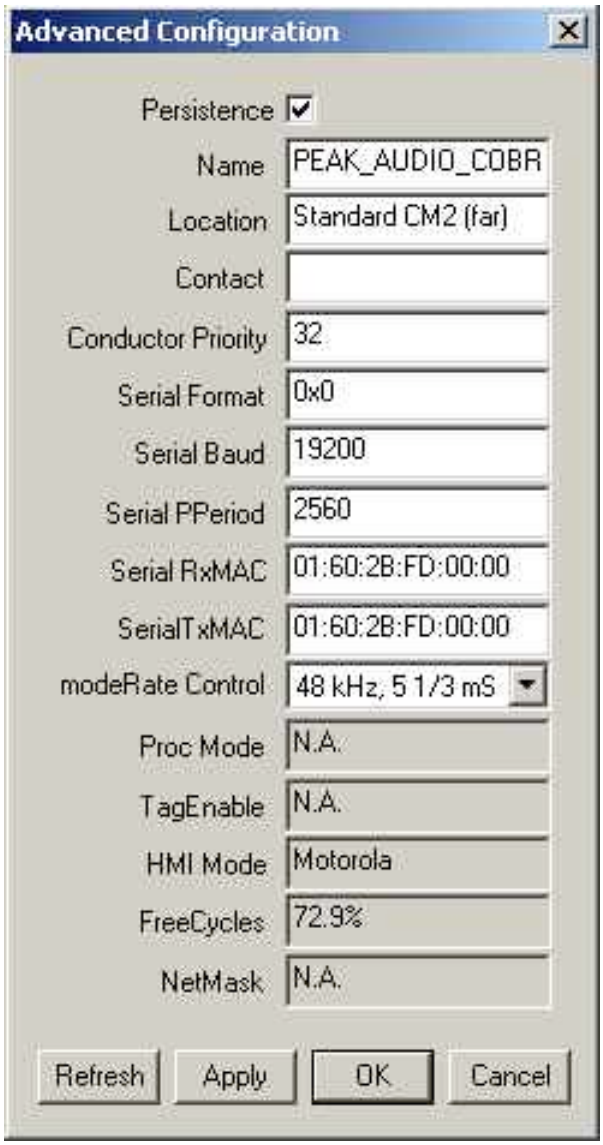


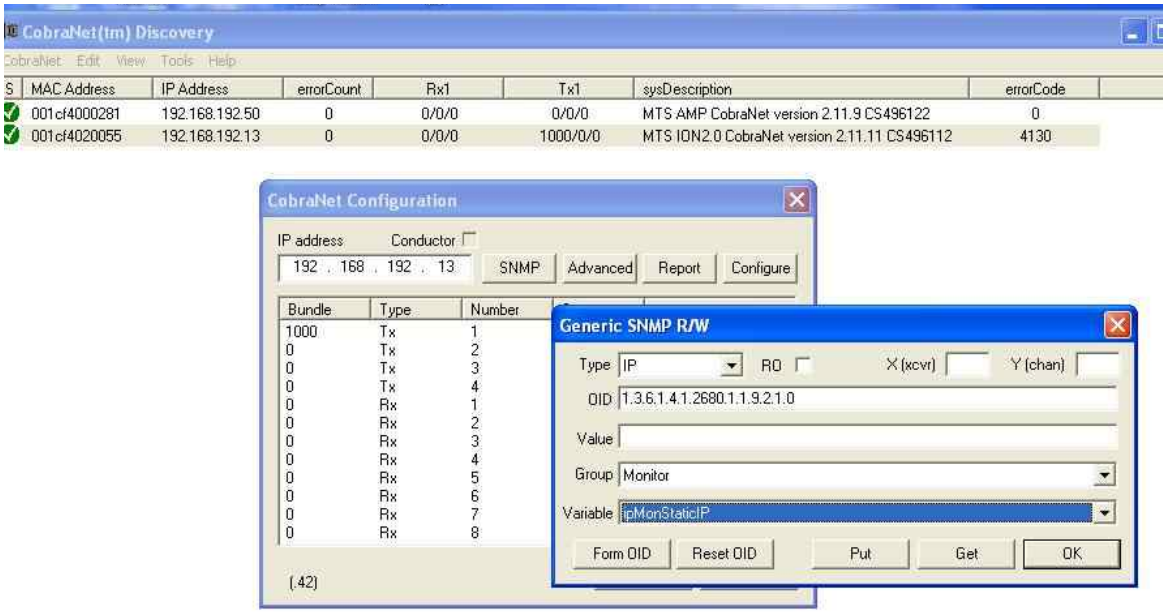
Figure 5-4: Global Interface settings

5.4 Presets

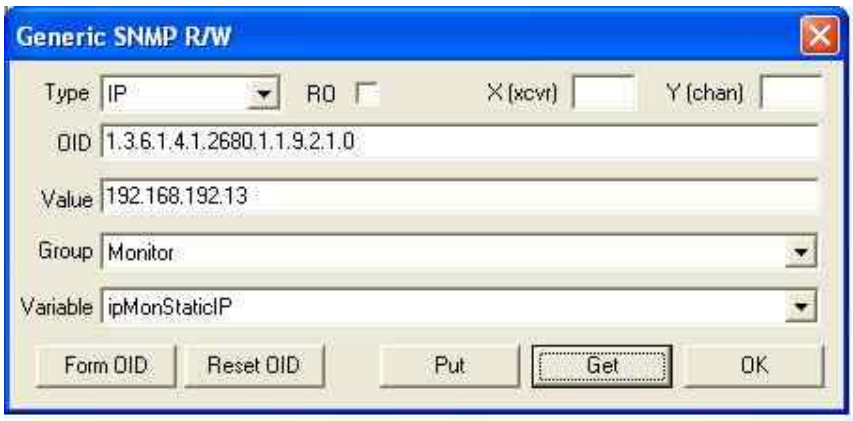
The AMX0.2CN are simple devices and do not contain a host processor and no access to multiple preset functionality. However, the Cobranet flash can be used to save Cobranet interface settings via “persistence” (see previous section and Figure 5-4). If the persistence option is enabled, then the last 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.

5.5 Setting a static IP address

First set persistence on (See Advanced in Section 5.3). 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.



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