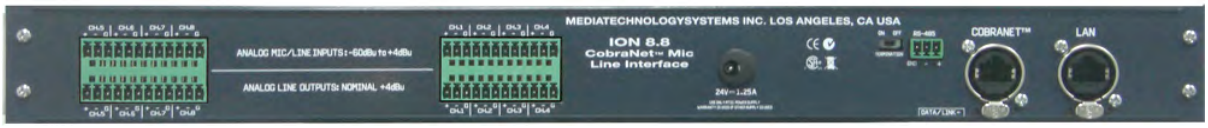
MEDIATECHNOLOGYSYSTEMS INC.



PROGRAMMING MANUAL

ION4.4 & ION8.8
CobraNet™ Interfaces

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.

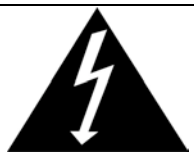
CAUTION: ANY CHANGES OR MODIFICATIONS MADE WITHOUT THE EXPRESS APPROVAL AND PERMISSION OF MANUFACTURER, VOID RESPONSIBILITY OF MANUFACTURER FOR COMPLAINCE.

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 DESIGEND 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. SMPS/PFC CARRY POTENTIALLY LETHAL VOLTAGES.

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 with the 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.
- Do not defeat the safety purpose of the polarized 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 is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. 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 moisture, does not operate normally, or has been dropped.

2 Overview

The ION 4.4 (ION8.8) is a CobraNet™ interface with 4 (8) analog Mic/line input channels and 4 (8) line level output channels. Any of the 4 (8) analog and 16 CobraNet™ inputs can be routed to any of the 4 (8) analog and 16 CobraNet™ outputs. See Figure 2-1 for details of the internal block diagram.

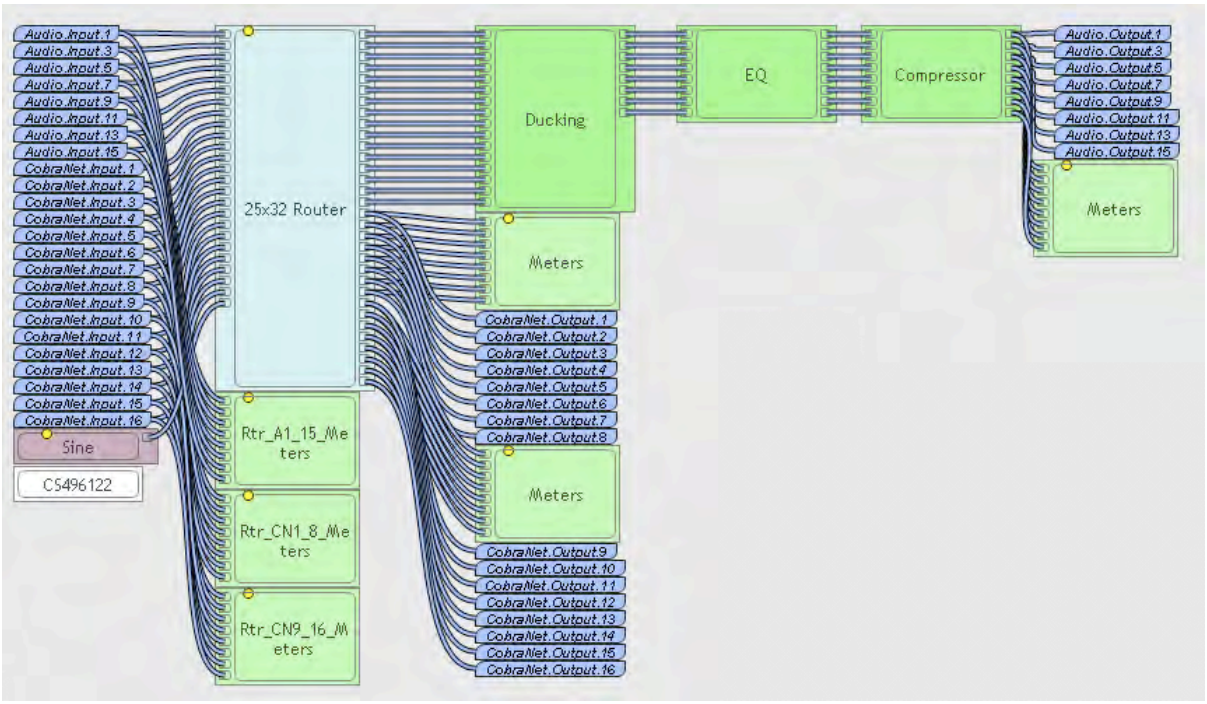


Figure 2-1: Block diagram showing the internal routing of the ION4.4/ION8.8

Both ION4.4 and ION8.8 have simple front panel adjustable phantom power and gain on the mic/line inputs.

The rear panel serial (RS485) port is primarily intended for Serial Bridging in Cirrus firmware 2.11.10 and earlier (Contact Cirrus logic for more information).

There are 2 network ports on the rear panel and these function as follows (Note: the second network port is an Ethernet control port and NOT a redundant CobraNet™ port)…

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

  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

- Ethernet port: The Ethernet port provides control & monitoring capability of all DSP and CobraNet™ parameters using a simple TELNET based protocol.

  In smaller systems, it is likely that the CobraNet™ port will be used for both audio transport and control & monitoring. For larger systems, where the audio transport is on a separate VLAN (to control bandwidth), the TELNET port will provide access to separate control & monitoring port that can be added to the general AV/BMS system.

  Note: The control & monitoring is either/or, ie TELNET or SNMP, but not both simultaneously.

- Additional RS485 Port: The additional RS485 port provides a serial connection, so that 3rd party serial data can be bridged on to the CobraNet™ network for communications between CobraNet™ nodes.

- DSP: The DSP is based on the CS496122 chipset and provides >100MIPS of processing power.

In general, the MTS GUI will be used for basic configuration of the interface and saving of preset values and Stardraw control (see below) will be used for User Control and Monitoring.

In addition, 3rd party control systems (such as AMX and Crestron) can be used to provide Control and Monitoring capabilities.

3 CobraNet™ Port

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

MTS uses a custom implementation of the CobraNet™ firmware and the latest MTS_x_xx_xx.bin file (MTS_2_11_9.bin as of July 2009) is available as a download from the MTS website. Do NOT use the Cirrus Logic binary file, otherwise the DSP and Amplifier control and monitoring extensions will be missing and more importantly, audio transport will stop.

The CobraNet™ port also provides control and monitoring of all parameters using SNMP. There are two sets of controls, CobraNet™ protocol parameters & DSP parameters.

Notes: 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.

3.1 CobraNet™ OID's

These are detailed in the Cirrus Logic programmers manual (current version PM25) and covered in the standard Cirrus CIRRUSLOGIC-CNDSP-MIB file.

3.2 DSP extensions

The DSP control and monitoring parameters are available via SNMP OID's. As these OID's are 32 bit registers with non-intuitive numbers (eg, +12dB of gain on a mixer is represented by the 32 bit value 534330399), it is recommended that the MTS version of Stardraw Control (SDC) is used for control and monitoring application. Both MTS SDC application and programmers manual are available as a download from the MTS website.

For those intrepid explorers who wish to create a custom driver or script for the ION4.4 or ION8.8, the information on how to access and use the OID's are given in below

3.3 Interpreting the OID's.

All SNMP variables are referenced by the object identifier (OID). An OID is a dot-separated string of integers representing the path from the root of the SNMP management information base (MIB) to the variable. Firmware supporting DSP Conductor features a dspExtensions SNMP extension agent rooted at…

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).peakAudio(2680).cobraNet(1).dspExtensions(4).control(2).

Then a signature is added. The signature is used to generate a 6 digit section of the OID string and ensures that the version of the DSP schematic is valid and true. Any change to the schematic (but not individual parameter values) will generate a new signature. The signature for the ION4.4/ION8.8 series is "16.40.43.29.44.2" and shown as follows…

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).peakAudio(2680).cobraNet(1).dspExtensions(4).control(2).signature(16.40.43.29.44.2).

DSP Conductor parameters under this extension are separated into two tables of 32-bit integers. The first table, rooted at…

dspExtensions(4).control(2).signature(16.40.43.29.44.2).controlRWTable(2)

…holds read-write parameters. The second table, rooted at…

dspExtensions(4).control(2).signature(16.40.43.29.44.2).controlROTable(4)

…holds read-only parameters.

Note that access to SNMP tables is achieved using 1-based indices. The word offsets specified in the configuration header file are 0 based.

To construct an OID for a read/write variable, append the parameter's word offset (wo) plus one to the OID for the controlRWTable values:

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).peakAudio(2680).cobraNet(1).dspExtensions(4).control(2).signature(16.40.43.29.44.2).controlRWTable(2).controlRWEntry(1).controlRWValue(2).wordoffset+1(wo+1)

For example, the OID for a read/write parameter with word offset 5 is…

1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.2.1.2.6

To construct an OID for a read-only variable, append the parameter's word offset (wo) plus one to the OID for the controlROTable values:

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).peakAudio(2680).cobraNet(1).dspExtensions(4).control(2).signature(16.40.43.29.44.2).controlROTable(4).controlROEntry(1).controlROValue(2).wordoffset+1(wo+1)

For example, the OID for a read-only parameter with word offset 13 is…

1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.4.1.2.14

The full list of SNMP OID's for the ION4.4 and ION8.8 are given in Section 3.5 below. The OID's represent a table of 32 bit registers in the memory map of the Cobranet chipset. Each 32 bit register provides either a read only (RO) register for monitoring DSP values (usually signal or status information), or a read/write (RW) register for controlling DSP values (gain, threshold, delay, etc).

Although 6.3 is an intimidating list of possible parameters, much of the information will be irrelevant to the needs of a particular application and can be ignored.

There are 830 possible read/write control parameters and 450 possible read only monitoring parameters, but only a small number will be used for configuration and a much smaller number (~20-30) used for day to day control and monitoring.

3.4 Crunch Values

All OID's are 32-bit values. How the value is interpreted depends on the parameter. The way values are interpreted can be discerned by examining the Crunch Functions section in the element's implementation XML file. For details on the implementation XML file refer to Cirrus application note AN277, "Creating DSP Conductor Primitives".

Note: A doubling of level is 6dB. 1 bit in the digital domain doubles a value (ie shifting a number 1 bit to the left is the same as multiplying by 2). Thus having (for example) a signed 29 bit fractional value, allows the use of the 32nd bit for sign, the 31st and 30th bits for +12dB of gain and the 29th to 0th bits for greater than -100dB of attenuation.

An example of how this interprets to Mixer gain is given in Figure 3-1 below.

Mixer NxM Input gain (dB)	Non-inverted OID value 2^29	Inverted OID value 2^29
24	8508830537	-8508830537
12	2137321597	-2137321597
0	536870912	-536870912
-12	134855876	-134855876
-24	33874264	-33874264
-36	8508831	-8508831
-48	2137322	-2137322
-64	338743	-338743
-100	5369	-5369
Mute	0	0

Figure 3-1: Example of Mixer Gain OID values

The algorithm used above is POWER(10, (Target dB value)/20)*2^29. This will give the needed OID value.

Integer values (eg Bypass and Router) are usually defined as fractional bits = 0. These values are simple, as they are represented by a conventional integer, as shown in Figure 3-2 and Figure 3-3 below.

Bypass	OID value
OFF	0

Figure 3-2: Bypass OID value

Router (OUT)	OID value
OFF/MUTE	0
IN 1 to OUT	1
IN 2 to OUT	2
IN 3 to OUT	3
IN 4 to OUT	4
…	…
Inn to OUT	n

Figure 3-3: Router OID value

Simple timing values are defined by using the sample rate divided by the block size. The Hold Time shown in Figure 3-4 is calculated by the algorithm HT = (Desired Time in Seconds)*48000/16, where the sample rate is usually 48kHz and the block size is 16.

Hold time (S)	OID value Sample/Block
10	30000
1	3000
0.1	300

Figure 3-4: Hold time OID

Other dB values (eg, Threshold, Depth and Knee) are calculated by the algorithm (Target dB value)*2^23. See Figure 3-5 for example values.

Threshold/ Depth/Knee (dB)	OID value = dB x 2^23
24	201326592
12	100663296
0	0
-12	-100663296
-24	-201326592
-36	-301989888
-48	-402653184
-64	-536870912
-100	-838860800

Figure 3-5: Depth, Threshold & Knee OID values

Other values are calculated from the Sample rate. For example the Frequency of a sine wave generator is calculated by F = 2*(Desired Frequency in Hertz)/48000 and then the result multiplied by 2^31 to get a 2 bit value – see Figure 3-6 below

Sine wave Freq	2*F/Sample Rate OID value 2^31
20	1789570
100	8947849
500	44739243
1000	89478485
10000	894784853
20000	1789569707

Figure 3-6: Frequency OID values

While the sign (sg) and fraction bits (fb) attributes give some indication of how the DSP might interpret the values (as shown in the examples above), it is the specifics of the DSP implementation that determine exactly how values are interpreted. The full suite of crunch values are found in the DSP Conductor folder shown below. DSP conductor can be downloaded from the Cirrus Logic website.

C:\Program Files\Cirrus Logic\DSPConductor\plugins\coyote\devices

The "imp" xml file contains details of the crunch functions. These can be opened in the xml editor embedded in Internet Explorer. For example the crunch functions for a sine wave generator are found in the file "generator_sine_wave.imp.xml". The file contains the text for a crunch function written in python, as shown below…

```
scale_factor = float( property[ "scale_factor" ] )
sample_rate = float( property[ "sample_rate" ] ) * scale_factor
block_size = float( property[ "block_size" ] ) * scale_factor
ramp_time_constant = float( property[ "ramp_time_constant" ] )

block_rate = sample_rate / block_size
ramp = 1 - math.exp( -1 / ( ramp_time_constant * block_rate ) )

omega = 2 * frequency / sample_rate;
gain = -math.pow( 10, ( level - 20 ) / 20 ) / 16

if mute :
gain = 0
```

The crunch function can easily be converted to C# or C++ code for use in other applications.

3.5 OID List for the ION2.0 and ION0.2

The MTS_AMP.xml file on the CDROM has a complete list of all the OID's and offsets for the amplifier read/write and red only values, where the devices relate to the schematic in Figure 2-1.

4 Ethernet Port

The Ethernet port uses the TELNET protocol for communication. To launch a simple TELNET command in Windows XP, do the following…

- Click Start, then select Run
- Type "TELNET"
- Press enter
- Type “Open “ followed by the IP address of the Amplifier Ethernet port.
- Type “h” to see the help instructions

A command window similar to Figure 4-1 will open.

In Windows VISTA, the TELNET client is not loaded by default. To load, use the following procedure…

- Click Start then select Control Panel.
- Select Programs and Features.
- Select Turn Windows features on or off.
- Select the TELNET Client option.
- Click OK.
- A dialog box will appear to confirm installation. The TELNET command should now be available.

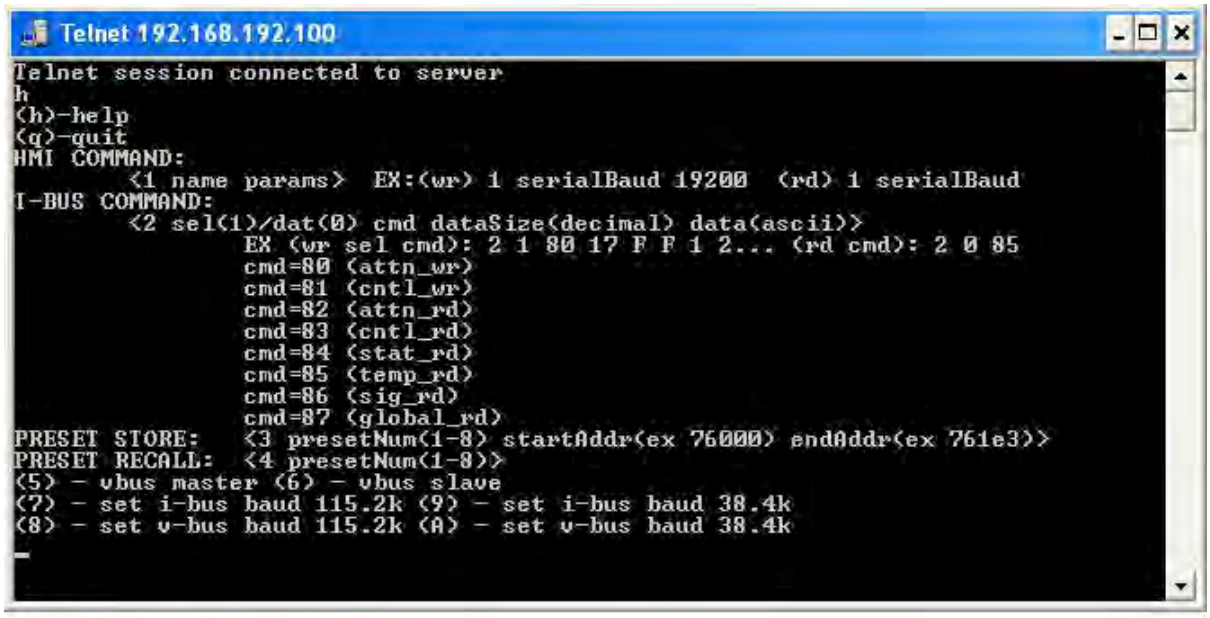


Figure 4-1: Screen shot of TELNET session and instructions.

The instruction set is as follows:-

- h – help (displays menu as Figure 3.3 above)
- q – quit
- 1 <Name> < Parameters> - (hmi command where Name is Name from

CobraNet™ Programmer's Reference PM25)

- 2 <cmd type> <cmd> <data size> <data> - This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored.
- 3 <preset number 1-8 in decimal> - (store preset) The 0x76000 start address is where the DSP RW variables are stored. The end address is the start address plus the length of the controlRWValue map. Presets are usually programmed by the MTS GUI and inexperienced users should not try to do this via TELNET
- 4 <preset number 1-8 in decimal> (recall preset)
- 5 – set unit as V-Bus master. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored
- 6 – set unit as V-Bus slave. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored
- 7 – set I-Bus baud rate to 115.2k. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored
- 8 – set V-Bus baud rate to 115.2k. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored
- 9 – set I-Bus baud rate to 38.4k. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored
- A – set V-Bus baud rate to 38.4k. This is for the MTS amplifier and does not apply to the ION4.4 or ION8.8 and should be ignored

NOTE: only DSP settings can be saved via TELNET. This command is intended to cater to customized DSP configurations. The MTS GUI should be used for the standard configuration.

The screenshot in Figure 4-2 shows an example of setting CobraNet™ bundle addresses, where the instruction sequence is "1" for an HMI (CobraNet™) command, "rxBundle" is the Bundle receiver command given in Cirrus Logic's programmers manual (PM25) "2" represents the receiver number (Note: all HMI commands are "0" referenced, therefore receiver bundle 1 is address 0, bundle 2 is address 1, etc; so rxBundle 2 is actually Receiver Bundle 3).

Figure 4-2 shows reading the value of Bundle 3 (rxBundle 2) as 666, then Bundle 3 is set to 111 and then reading the value confirms the setting as 111.

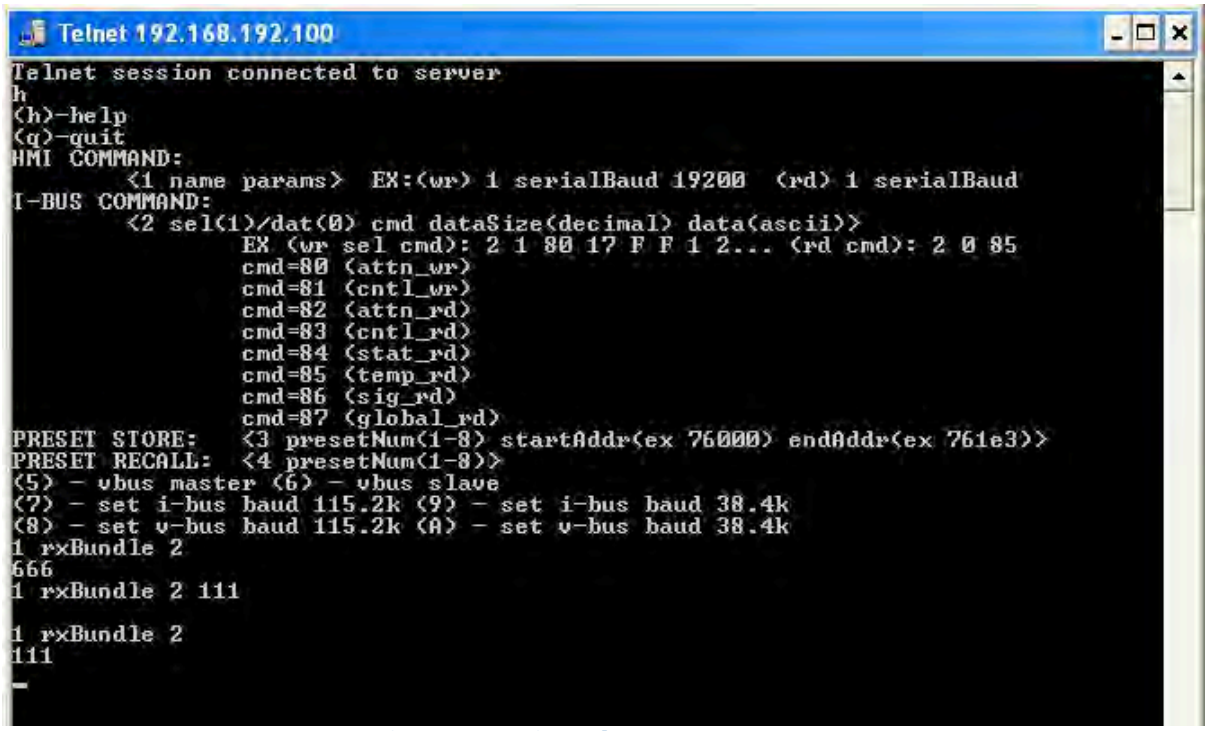


Figure 4-2: Setting CobraNet™ Parameters

Similarly, Figure 4-3 below shows the setting of DSP parameters.

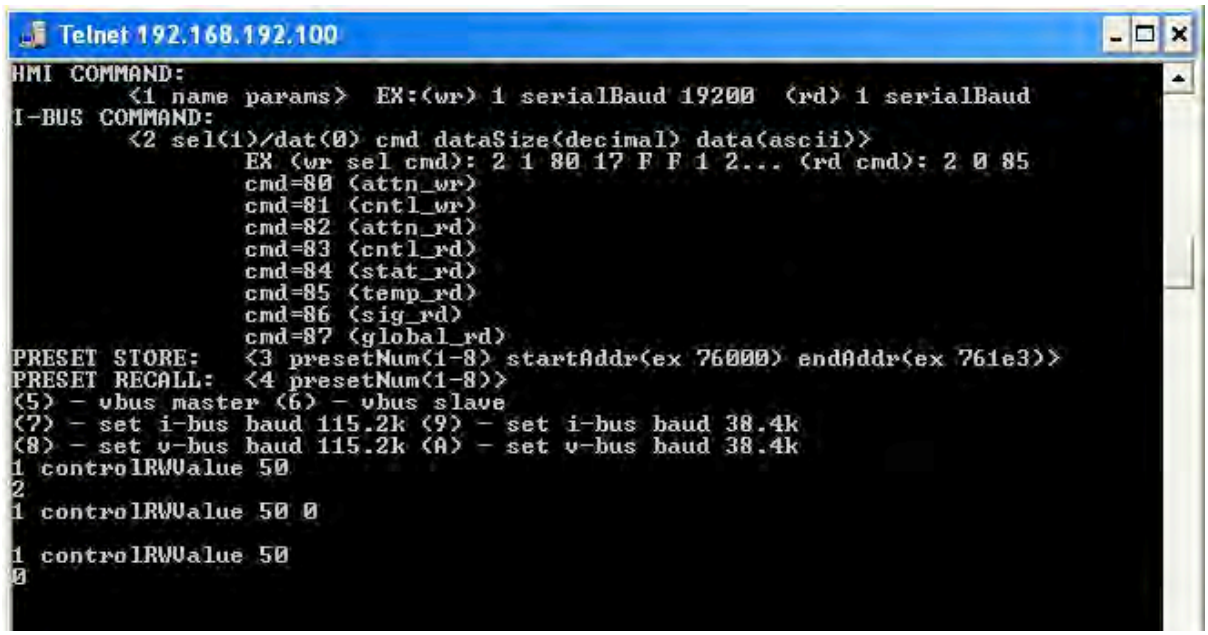


Figure 4-3: Setting CobraNet™ DSP parameters

The instruction sequence is “1” for an HMI (CobraNet™) command, “controlRWValue” is the DSP read/write command instruction “50” represents the DSP offset (see section 3.2.2 above) for router output channel 1 (see Figure 4-4 below). The Router output channel 1 (Offset 50) is initially read set at input channel 2 and is then set to input channel 0 (ie mute).

```
  </device>
- <device id="7" title="25x32 Router" type="router_NxM_basic" path="25x32 Router">
    <coefficient name="output_select_1" offset="50" mode="RW" signed="1" fract_bits="0"
      oid="1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.2.1.2.51" />
    <coefficient name="output_select_10" offset="59" mode="RW" signed="1" fract_bits="0"
      oid="1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.2.1.2.60" />
    <coefficient name="output_select_11" offset="60" mode="RW" signed="1" fract_bits="0"
      oid="1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.2.1.2.61" />
    <coefficient name="output_select_12" offset="61" mode="RW" signed="1" fract_bits="0"
      oid="1.3.6.1.4.1.2680.1.4.2.16.40.43.29.44.2.2.1.2.62" />
```

Figure 4-4: XML output showing Router "output_select 1" is offset number 50

5 Control & Monitoring software

There are two software applications from MTS…

- MTS GUI, which is a simple configuration application, intended to set up the power up and other presets
- MTS Control, which is a stripped down version of Stardraw Control 2010. In many installations, there will be 3rd party control systems (such as AMX and Crestron) and these will be used to provide control and monitoring functionality for the MTS products, as described in Sections 3 & 4 above. MTS Control is intended for those installations, where there is no 3rd party control system.

The full version of Stardraw Control is a licensed software-based universal control platform designed to create custom User Interfaces that can control any remotely-controlled or monitored hardware. See website below for full details.

http://www.stardraw.com/products/stardrawcontrol/

The MTS Control version is provided by MTS at no cost, but is subject to the same copyright and intellectual property rights as the main Stardraw Control. The primary difference is that MTS Control will ONLY control and monitor MTS products. If the user would like to expand the capability of the application, then a full license can be purchased from Stardraw Control.

The MTS Control software is included in the CDROM, along with this manual

MTS Control is a 19.8Meg download and requires .net3.5. If .net3.5 is not present on the host computer, then it will attempt to download from the internet and install it automatically.

The full download of MTS2010 is a 256Mb as it includes .net 3.5 and SQL Server CE and will install and run as a native 64 bit application as well as 32bit.

Once the application has been downloaded and executed, the MTS Control icon should appear on the desktop – see Figure 5-1 below.

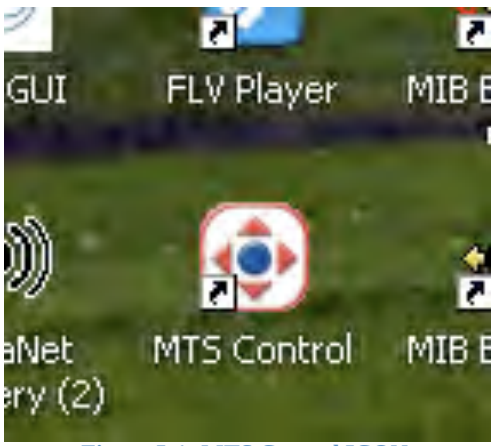


Figure 5-1: MTS Control ICON

Launching MTS Control will show the following splash screen and then the initial opening menu – see Figure 5-2

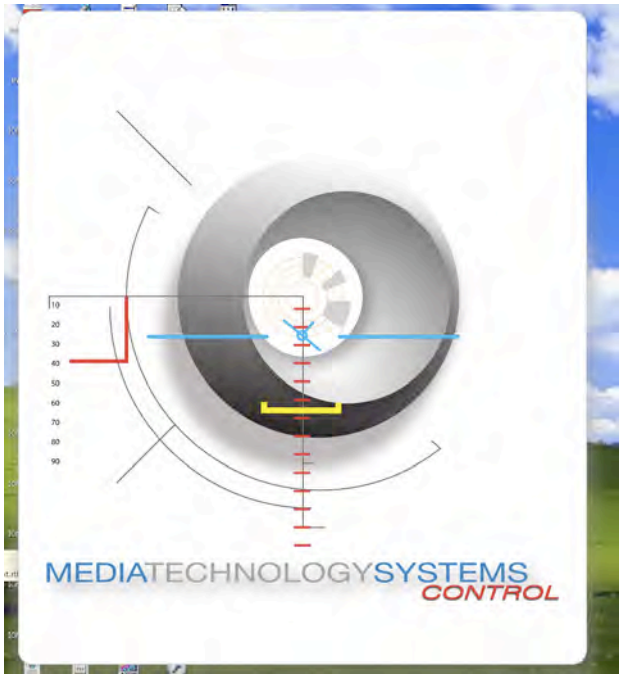


Figure 5-2: Opening menu

At this point a new user should choose "View Tutorials", as it is beyond the scope of this manual to provide in depth training on either Stardraw Control or C# (the language underpinning Stardraw Control). However, some basic movies in /swf format have been included on the CDROM.

A new project will show the opening Topology View screen given in Figure 5-3 below. Topology View shows the default Computer and allows the user to select the devices in the system.

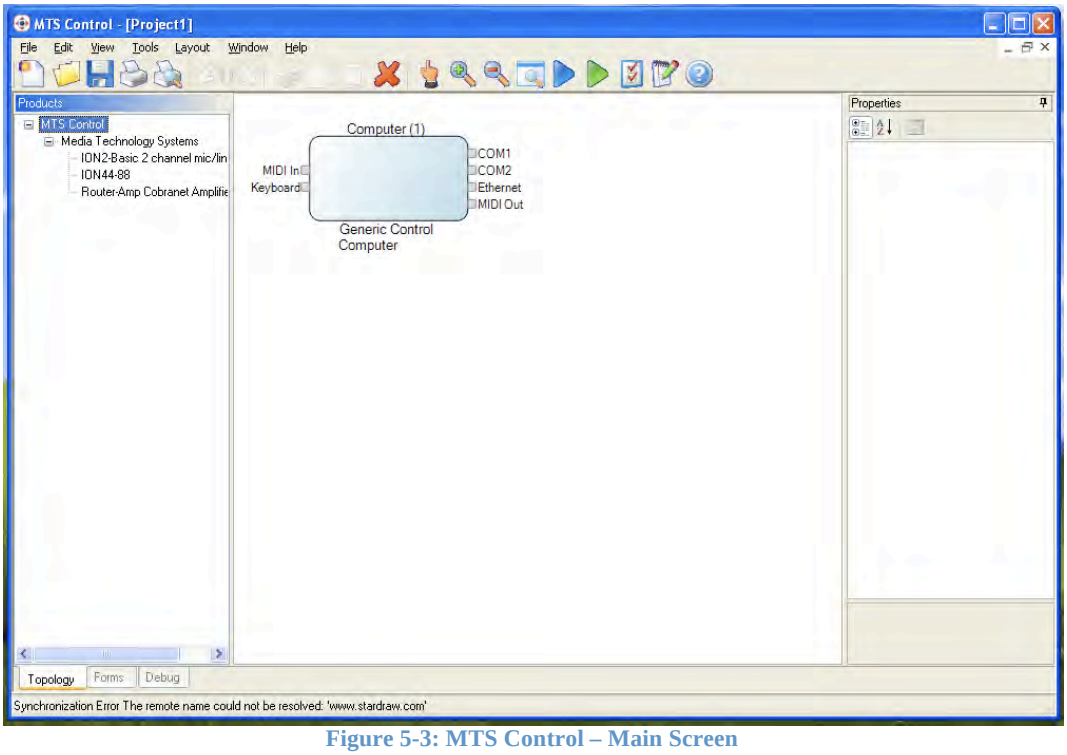


Figure 5-3: MTS Control – Main Screen

The devices in MTS Control are the Serial and Network Amplifiers, as well as the ION interfaces. This manual covers the ION4.4 and ION8.8, but the techniques are equally applicable to all devices. Adding a device is simple, drag the ION4.4/ION8.8 icon across to the main panel and then drag a wire from the Ethernet port of the Computer to the Cobranet port of the ION4.4/ION8.8 – see Figure 5-4 below.

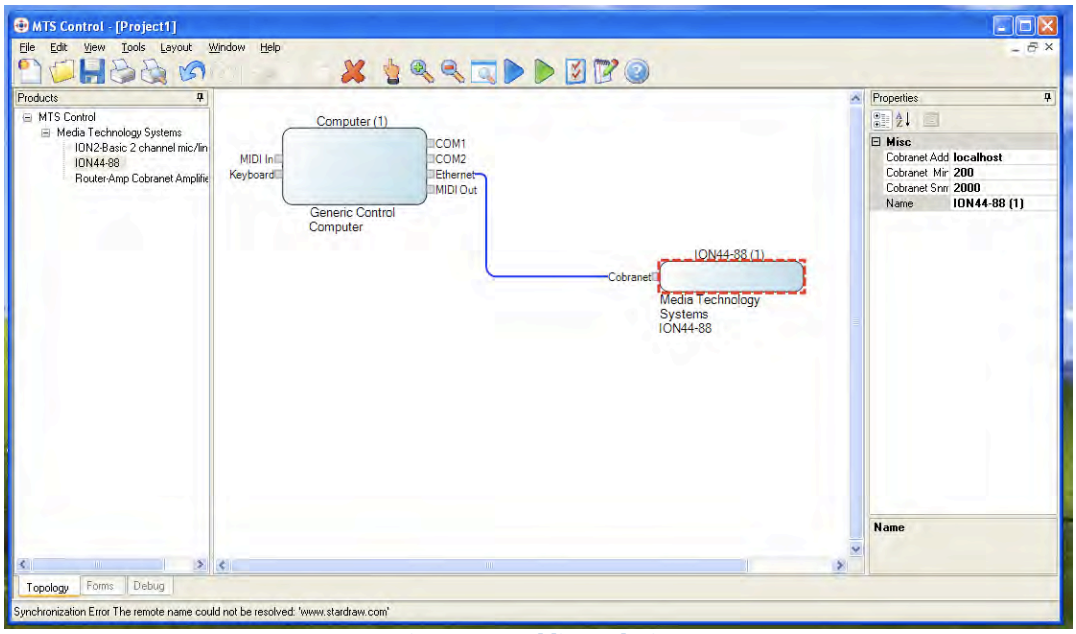


Figure 5-4: Adding a device

As many devices as needed can be added to the panel and connected to the Ethernet port of the Computer.

Double clicking on the ION4.4/ION8.8 device will open a properties menu as shown in Figure 5-5 below.

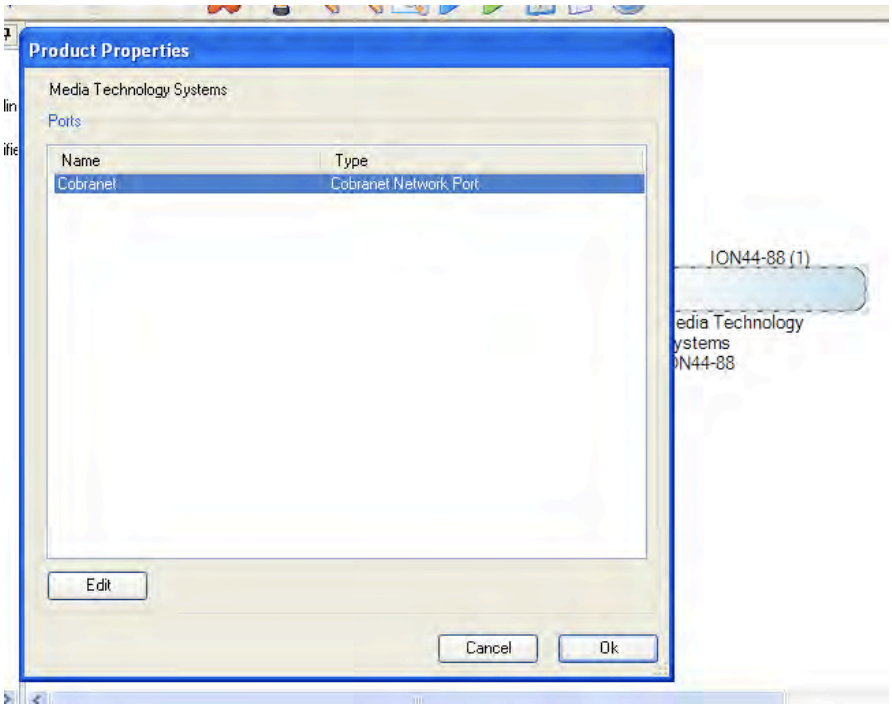


Figure 5-5: Properties menu

Highlight the Cobranet port and clicking "Edit" will bring up the port properties menu in Figure 5-6 below and clicking edit again will bring up the Control Variables available for that port see Figure 5-7 below.

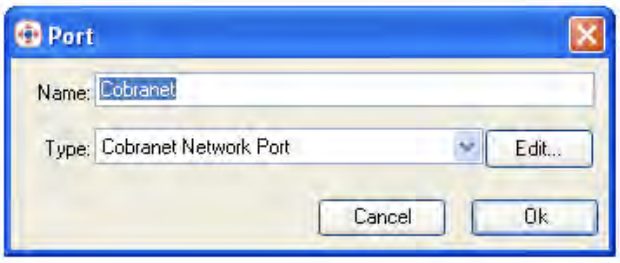


Figure 5-6: Port Properties

There are over 800 read/write and 400 read only DSP control variables, plus the base Cobranet variables. This is an unwieldy amount of potential control and usually only a fraction is needed. The Port control variables in Figure 5-7 below, show a tick box for "All Groups". Unchecking this box will remove all the Group controls. Each group control represents one DSP device, or one section of the Cobranet control/monitoring protocol.

Once "All Groups" has been unchecked, then the tick boxes of those few Groups required by the user can be manually checked and enabled.

For example, Figure 5-7 shows the contents of the 25x32 router Group, ie a list of "output_select_x" variables, where "x" is the router output channel number. As the

router is 25x32, there are 32 output select channels, where the value range of each output will range from 0-25 and 0 = off (Mute) and 1-25 will be the input channel routed to that output channel.

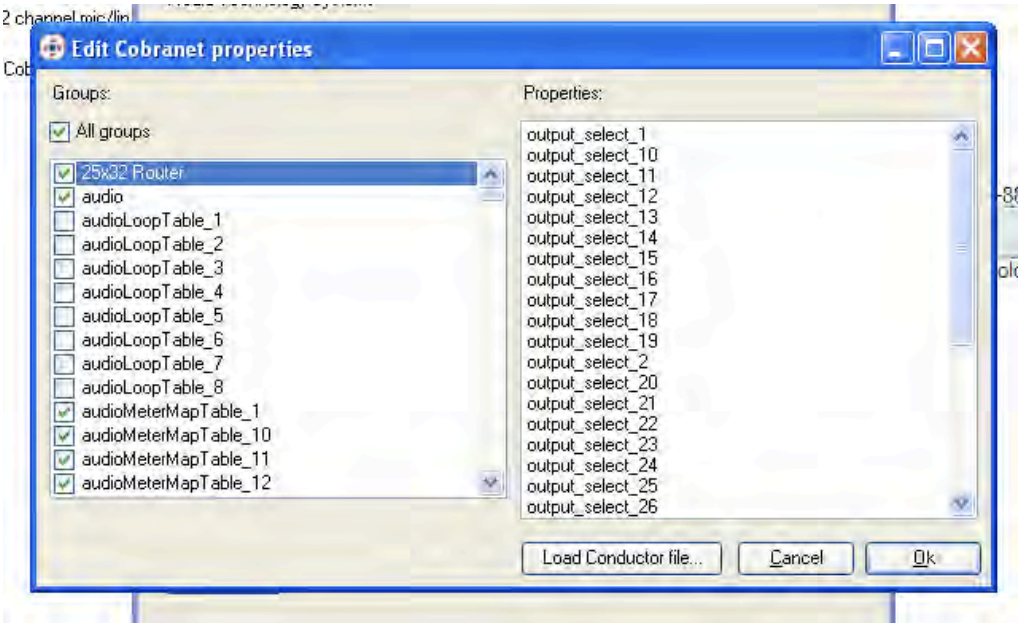


Figure 5-7: Port Control Variables

The other Groups operate in a similar fashion, where (say) an Equalizer group would contain all the controls for that Equalizer device.

Once the devices and control variables are chosen, the User selects the Forms View (see Figure 5-8 below) and can start programming the Graphical User Interface.

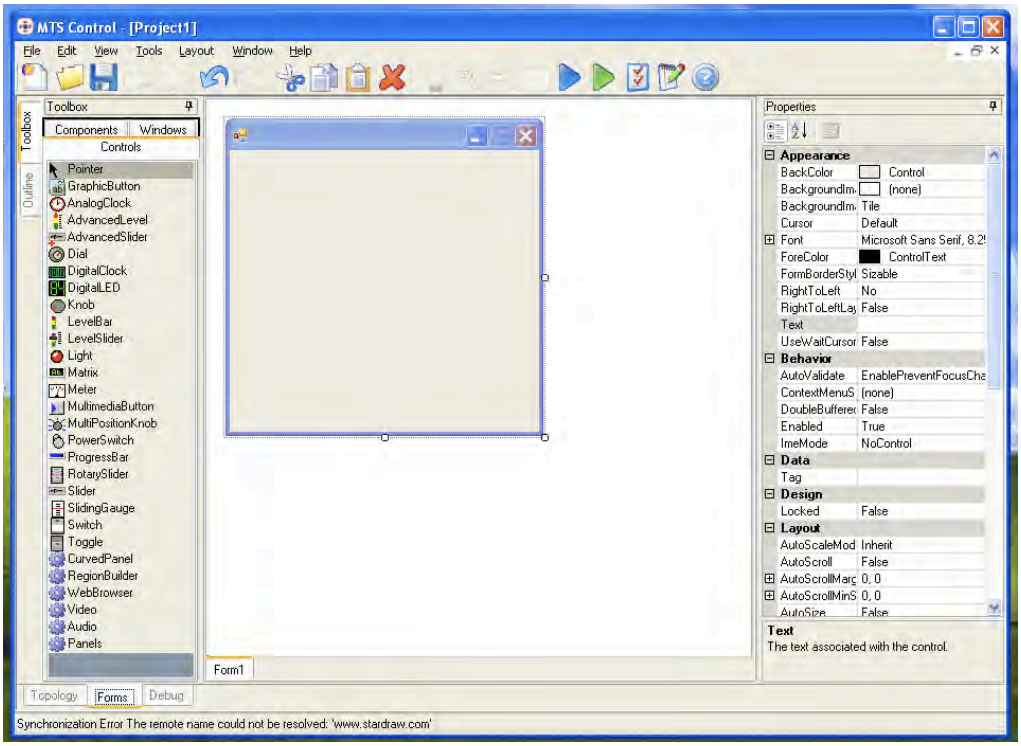


Figure 5-8: Forms View

NOTE: the Port control properties available in the Topology view (Figure 5-7)are the raw SNMP OID's and have been made available to enable selection of the desired control Groups. For example, the High Pass Filter Group in Figure 5-9 below contains the raw BiQuad filter parameters (a, b, c, k), which are unusable from an audio perspective. However, the Forms view will show the 'real world' audio variables (see Figure 5-10) derived from the BiQuad filters.

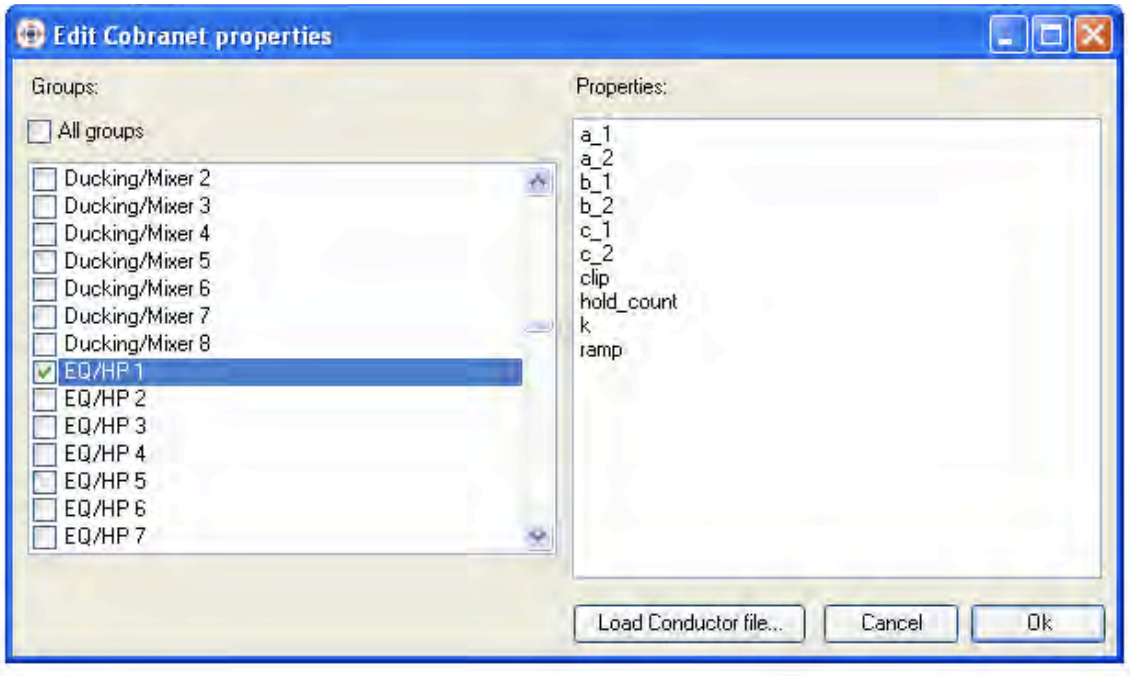


Figure 5-9 : Raw SNMP filter variables

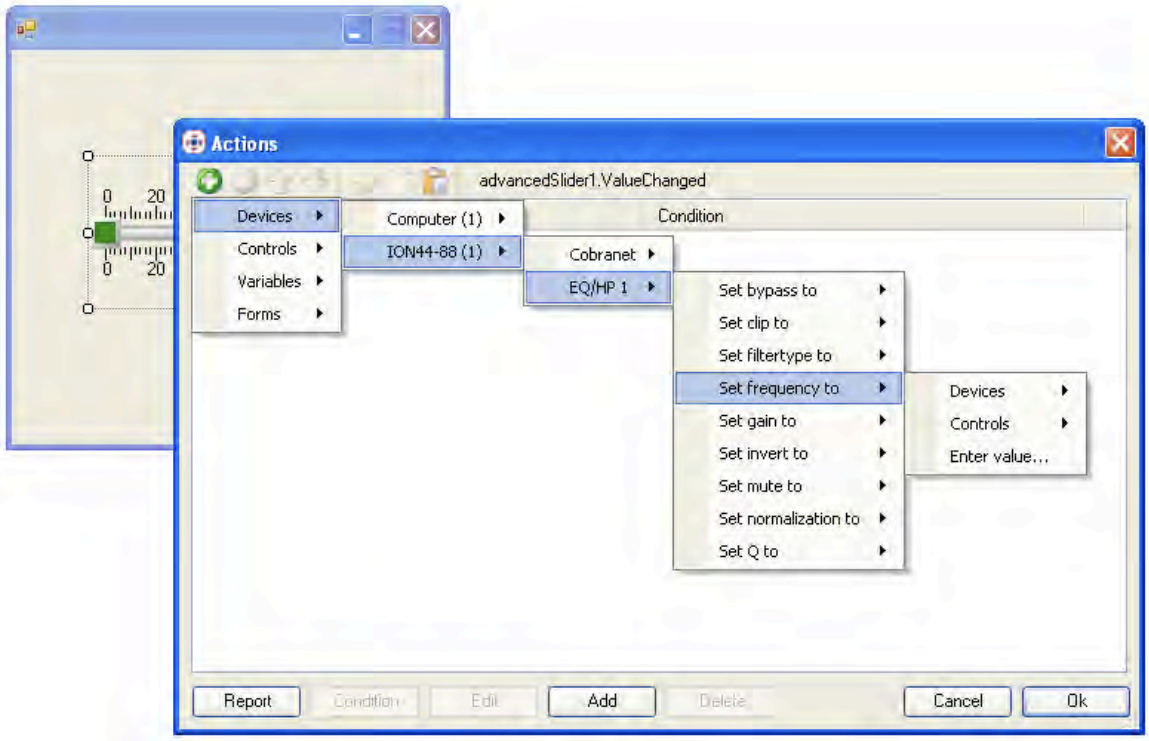


Figure 5-10: 'Interpreted' SNMP values

6 Firmware upgrading

6.1 CobraNet™ Firmware

The CobraNet™ firmware is upgraded using the CobraNet™ port and the Cirrus Logic CobraNet™ Discovery application (CNDISCO). CNDISCO is a free download from the Cirrus Logic website. The current revision is 3.4.5.

http://www.cobranet.info/dispatch/forms/sup/boardreg/breg/BregController.jpf

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 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.

Now save the MTS CobraNet™ binary file “MTS_2_11_6.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..

6.2 ION Firmware

The MTS firmware is uploaded using a free TFTP (trivial file transfer protocol) tool such as TFTP32 from the url www.tftpd32.jounin.net/

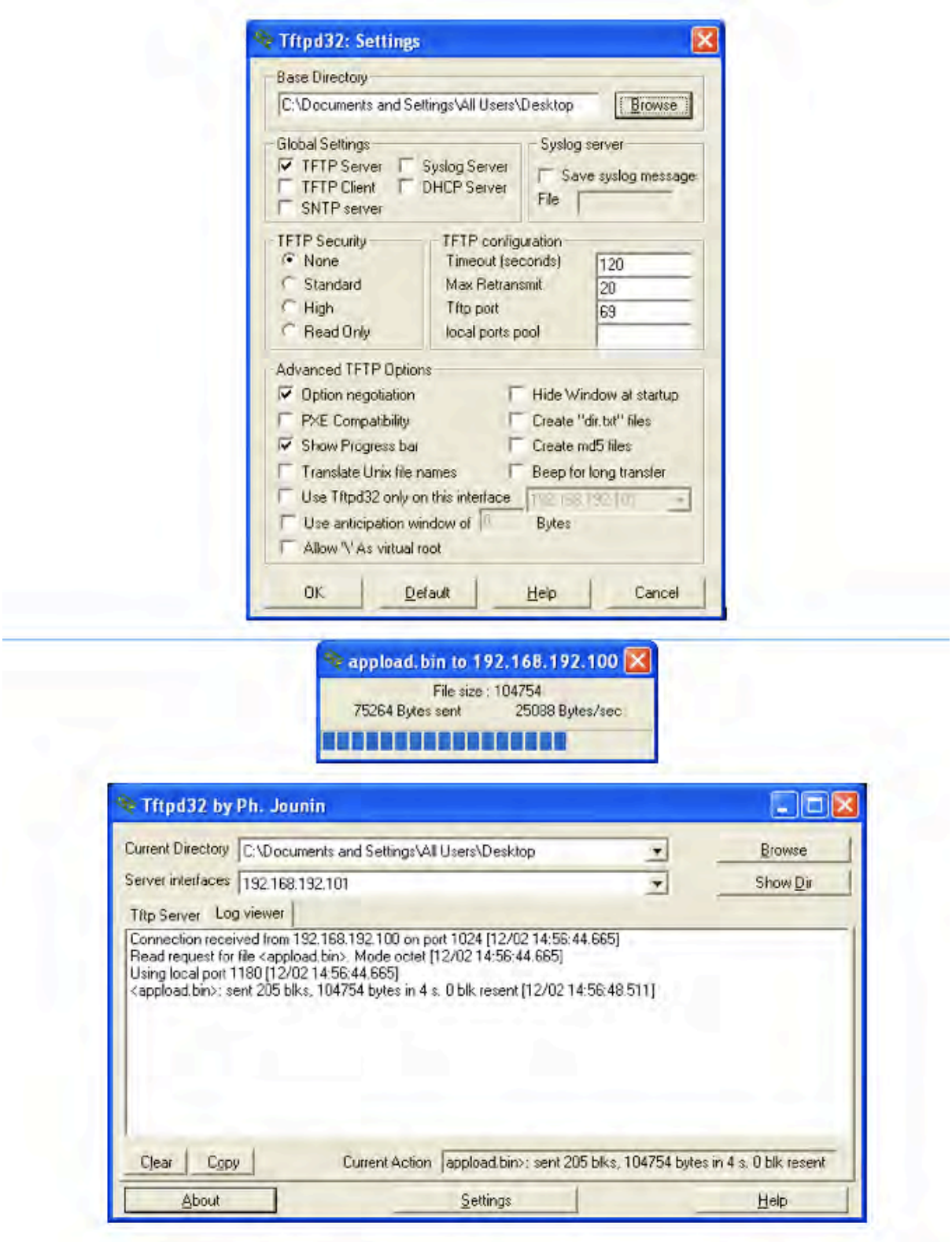


Figure 6-1: TFTP settings

Load instructions are as follows...

- Set laptop IP address to 192.168.192.101
- Confirm Amplifier Ethernet IP address is in the same domain , say 192.168.192.100
- Copy MTS_1_2_1.bin file to desktop directory.
- Copy tftpd32.exe to desktop directory and start application.
- Set the "Current Directory" in the TFTP window to the desktop directory.
- Click on the Settings button. In the Settings window – ensure the following:
    - Base Directory set to desktop directory
    - ONLY TFTP Server checked in Global Settings
    - TFTP Security set to None
    - In TFTP configuration – Timeout = 120, Max Retransmit = 20, and Tftp port = 69
    - In Advanced TFTP Options – Option negotiation and Show Progress bar checked

Power up the ION and wait till see "MTS_1_2_1.bin to 192.168.192.100" window appear on programming computer displaying progress of download. NOTE: if programming doesn't complete 1st time than may have to cycle power to the amplifier chassis to try again. See Figure 6-1 above for details.

Note: Since the firmware bootloader does not contain a DHCP client, it uses the following algorithm to determine its IP address.

- Check for static IP address. If it exists, initiate TFTP on this address ELSE…
- Check for last-assigned DHCP address. If it exists, TFTP on this address ELSE…
- Use default 192.168.192.100

The implication is that new amplifiers without a static IP address or DHCP IP address will all issue a momentary IP address of 192.168.192.100 during the powerup TFTP search. This can cause IP conflict errors if multiple new amplifiers are connected to a Managed switch.

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