



# **CobraNet™ CO<sup>2</sup> Demonstration Utility User's Guide**

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## **I – Computer Requirements**

- Windows 2000 or higher
- SNMP services installed and enabled

## **II – Installation**

All installation files are included on the CD packaged with the C0<sup>2</sup> system. To install the software on your machine, unzip all the files from CO2Installer.zip into a directory and run setup.exe.

The installation will create a program group and shortcut to the program. This is located under the Start Menu—All Programs—CobraNet CO2—CO2 Demonstration Utility.

## **III – Hardware Setup**

The software requires the presence of at least one CobraNet device to operate and two to have full functionality. First it is a good idea to create an independent network for demonstrating the C0<sup>2</sup> devices. Connect your computer to a 10/100 Fast Ethernet switch and assign your network adapter a static IP address. This is done in the Network Properties control panel application under TCP/IP settings.

Next, power up each C0<sup>2</sup> and connect them using straight thru CAT-5 cables. Launch the CO2 Demonstration utility software and make sure that the network adapter connected to the CobraNet network is selected. The software will now automatically detect and assign IP addresses for each device. Select a unique device in each “IP Address” drop down box and select the corresponding “Find” button. The device names and attributes should appear and then the software can be used to control each device.

The hardware setup is fully outlined in the C0<sup>2</sup> Quick Start Guide.

## **IV – Software Interface**

When the C0<sup>2</sup> demonstration system is connected in the Advanced Setup users have the ability to control each device by using the included C0<sup>2</sup> Demonstration Utility software. Software control is implemented by the use of SNMP (Simple Network Management Protocol)<sup>1</sup> requests.

The C0<sup>2</sup> Demonstration Utility software is divided into four logical sections.

- Audio signal routing
- Bundle routing
- Serial bridge
- Discovery options

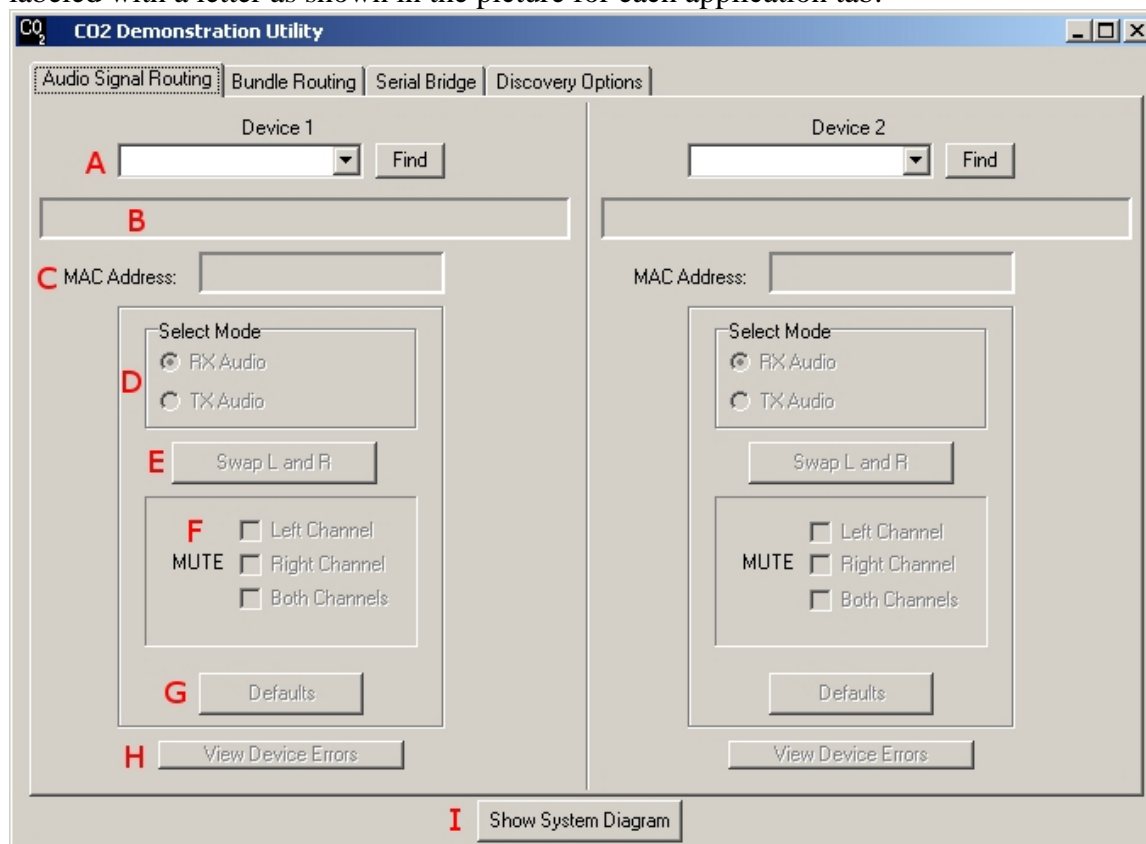
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<sup>1</sup> For more information on SNMP and its implementation for CobraNet consult the Peak Audio website [www.peakaudio.com](http://www.peakaudio.com)

## Audio Signal Routing

This tab in the application handles the majority of the device monitoring and control. This page is divided vertically into two sections of identical controls. This allows the user to monitor and control each C0<sup>2</sup> (or other CobraNet devices) simultaneously.

Below is a listing of each control and its function. Each control or control section is labeled with a letter as shown in the picture for each application tab.



### A – IP Drop Down Box / Find Button

CobraNet devices are automatically discovered and assigned IP addresses by the application. Once a device has been discovered it is added to the list for each drop down box. By selecting a device from the list and pressing the corresponding “Find” button, the device information is gathered and populates the controls. It is important to note that most of the controls in the application are disabled until a valid C0<sup>2</sup> device is loaded.

### B – Description Box

This is a read only field that displays the device name

### C- MAC Address

Displays the MAC address for the currently selected device

### D – Select Mode

This allows the user to specify how the device is currently connected in the system. In RX mode the device is receiving audio from the network and connected to an audio output source. In TX mode, the device is transmitting audio to the CobraNet network and an audio source is connected to the device. The System Diagram is helpful in determining how your system should be set up.

### E – Swap L and R

This is an audio routing function and issues a command to the CO<sup>2</sup> device to swap the L and R channels.

### F – Mute Section

Audio channels can be muted by checking each channel's corresponding checkbox.

### G – Defaults

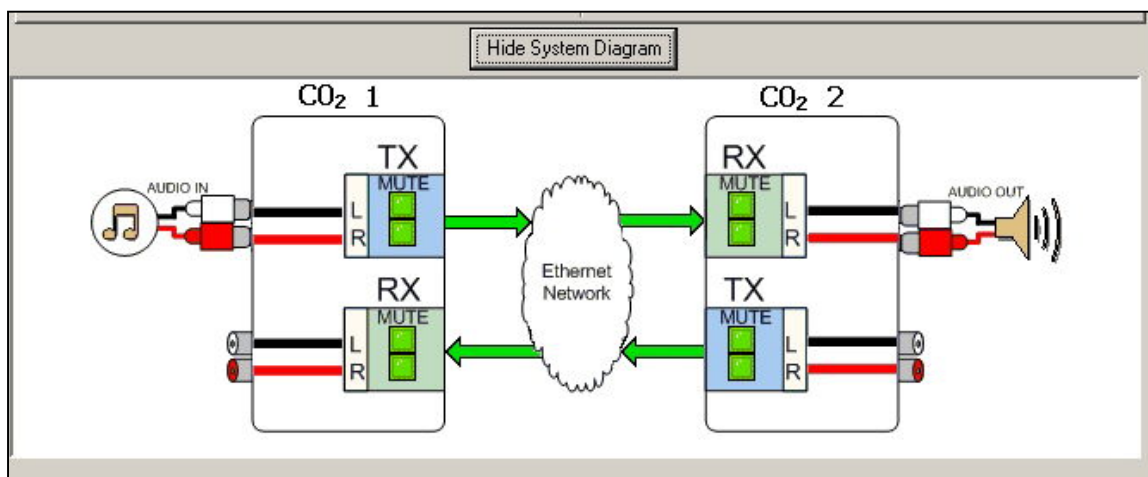
This button loads in the default factory settings preloaded in each CO<sup>2</sup>. This is useful if your device has become unstable. This function also resets the software interface, if for example, the connection to the device was lost and parameters were changed in the software without updating the device.

### H – View Device Errors

This button opens a new window that displays the Error Count and last Error Code. This is useful for troubleshooting a device or monitoring the performance of a device on the current network setup.

### I – Show/Hide System Diagram

A graphical depiction of the current CO<sup>2</sup> system is displayed and updated in the System Diagram. This is a helpful tool in demonstrating the relationship between the software, hardware and CobraNet capabilities. Pressing the Show/Hide button allows the user to display or hide this diagram.



## Bundle Routing

The previous page dealt with routing audio signals on the CobraNet network. This cannot be accomplished without first designating bundle assignments. Each CobraNet device transmits audio channels in bundles over the network. Each bundle is capable of transmitting up to 8 channels. The CobraNet processor used in the device determines the total number of channels. In order for transmission to occur a transmitter must have a matching receiver. In the case of the C0<sup>2</sup>, the devices are capable of only stereo audio therefore audio is only transmitted in the first TX / RX bundle TX1/RX1.

Bundles can be assigned numbers from 0 through 65535. There are however designations for certain ranges.

Bundle Number	Designation	Usage
0	Null	Disables transmission
1-255	Multicast	One to many transmission, not recommended for most applications as it will add high network traffic
256-65279	Unicast	Typical mode for transmission, 1 receiver for each transmitter
65280-65535	Private	Unique to a transmitters MAC address

It is recommended that the user should set all bundles within the unicast range and assign each transmitter and matching receiver a unique number within this range.

#### **A – IP Address Box**

Displays the current IP address of the device being monitored.

#### **B – Bundle Assignment Edit Boxes**

Bundles numbers are assigned in these edit boxes. The numbers indicate the current bundle assignments for the labeled box.

#### **C – Copy Buttons**

These buttons provide an easy way to populate each bundle assignment box by copying the bundle assignments of one device into the assignment boxes for the other device.

#### **D – Set Button**

Changing a bundle assignment does not take effect until the Set button is pressed. When pressed it assigns the value of each box to the corresponding device.

#### **E – Advanced**

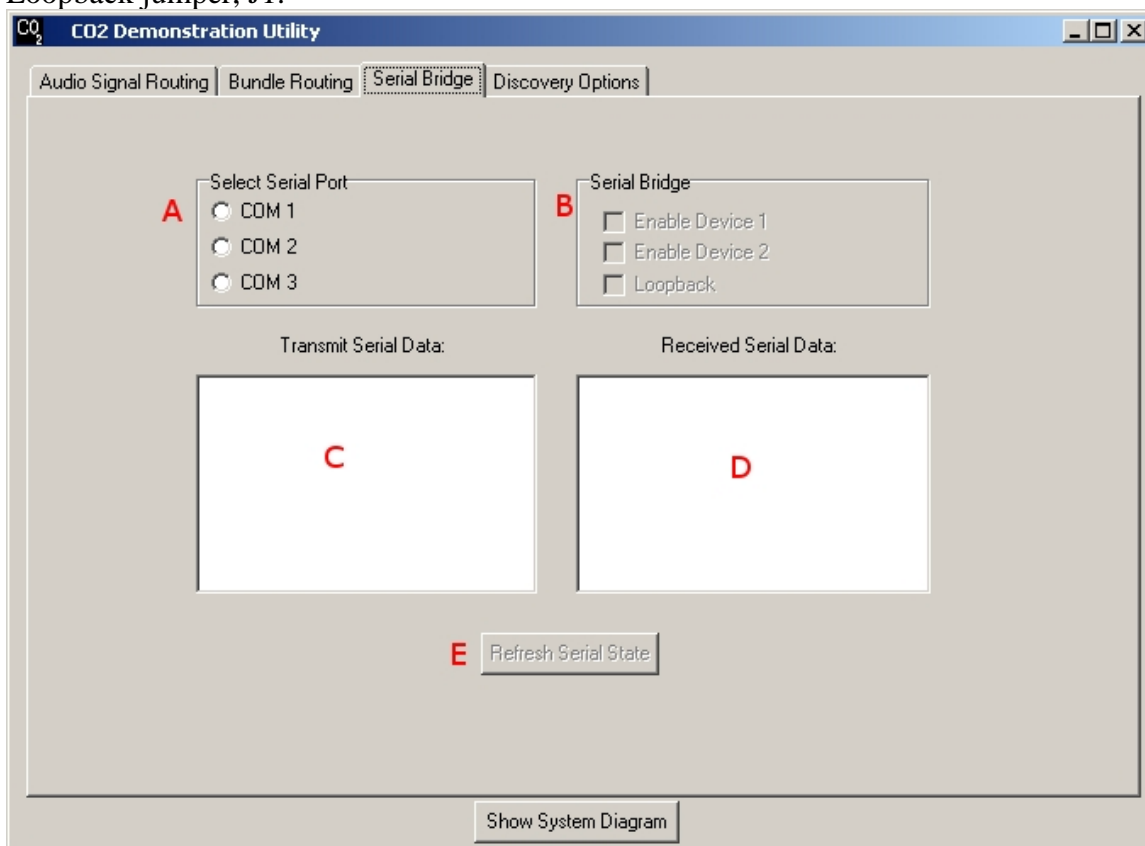
As discussed earlier, the C0<sup>2</sup> only contains audio signal in the first transmitter. However, other devices can have up to 4 transmitters and receivers. By clicking on the advanced checkbox the other bundle assignment edit boxes are enabled in the event that the software is controlling a device other than a C0<sup>2</sup>.

#### **F – Refresh Button**

This is used to read the current status of each bundle for both devices. Use this button if the bundles assignment boxes were edited but not assigned by pressing the Set button.

## Serial Bridge

This page is used to demonstrate the serial bridging capability of the CobraNet technology. Users must connect the DB9 serial cable to the serial port of their computer and to the DB9 connector on one C0<sub>2</sub>. On the opposite C0<sub>2</sub> place a jumper the Serial Loopback jumper, J1.



### A – Serial Port Selection

Users select the serial COM port for their machine by clicking the appropriate selection

### B – Serial Bridge

By checking the Enable boxes in this section the user is enabling the serial bridge capabilities of each C0<sup>2</sup>. Both Enable boxes must be checked for the demonstration to function properly. The Loopback box is useful for testing the serial transmission between the computer and the C0<sup>2</sup> directly connected to the computer.

### C – Transmit Serial Data

When the user types characters into this memo box the data is transmitted from the computer's serial port through the connected device and to the network. The serial information is then received by the other C0<sup>2</sup> device and echoed back to the computer by means of the Serial Loopback jumper J1. The looped back data is then displayed in the Received Serial Data memo box. By manually removing the jumper across J1 the user

can demonstrate the ability to send serial data over the CobraNet network by means of the serial packet bridge feature.

**D – Received Serial State**

Characters received on the serial port are displayed in this memo box.

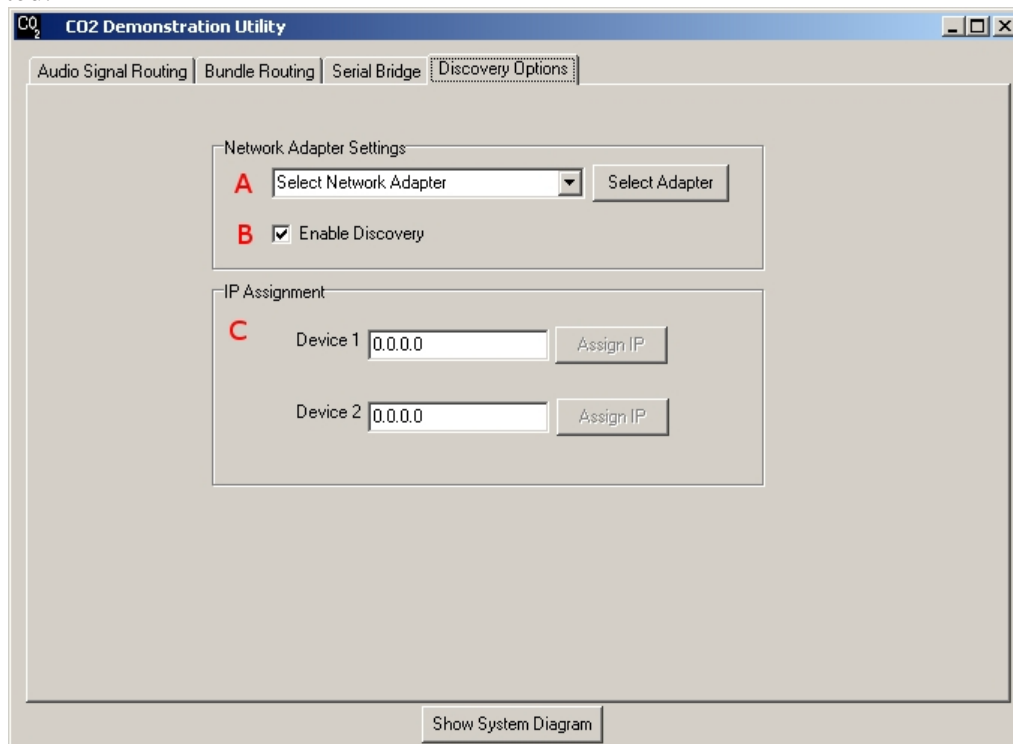
**E – Refresh Serial State**

Updates the user interface to reflect the current state of the serial mode on the device, this feature is much like the Refresh feature on the Bundle Routing page and should only be necessary if a device has inadvertently been disconnected and reconnected to the network.



## Discovery Options

Devices are automatically discovered by the application; however, the appropriate network adapter must be selected for this to work properly. The software defaults to the first adapter found. If this is not the appropriate Ethernet adapter then no devices will be found. For example, many laptops have both wired and wireless network adapters. If the first adapter enumerated on the system is the wireless adapter, the adapter will not see the CobraNet devices. The adapter connected to the CobraNet network must be selected.



### A – Network Adapter Settings

Select the appropriate Ethernet adapter from this list. Selection is not active until the Select Adapter button is pressed. If the wrong adapter is selected, CobraNet devices will not be discovered.

### B – Enable Discovery

This checkbox allows the user to stop the discovery of devices in the software. This is only troubleshooting feature and should be left enabled. By disabling this feature devices are not added or removed from the drop down lists.

### C – Static IP Assignment

If there is an instance where a unique IP address needs to be assigned to a device, the user can do this here. This is useful if there are other devices on your network using static IP addresses within the range of addresses allowed by auto-assignment. Enter the desired IP address (within the subnet of your adapter and other CobraNet devices) and click Assign IP.

## **Appendix A: CD-ROM Contents**

1. CO<sup>2</sup> Demonstration Utility Installer
2. CO<sup>2</sup> User's Guide
3. CO<sup>2</sup> Quick Start Guide
4. CO<sup>2</sup> Product Brief
5. CO<sup>2</sup> Demo Kit Contents List

## **Appendix B: CobraNet System Notes**

Building a robust CobraNet system is a straightforward task, but several issues must be kept in mind. This appendix will identify two key issues and offer insights into sensible ways to address them.

- Robust implementations always start with a solid CobraNet PCB design. One of the requirements for a design to be certified as robust is that it must pass CobraNet packets without error over a 100m CAT-5 cable for 24 hours. Since the CobraNet protocol does not have any error correction/detection/retry capability (thus keeping latency low and determinate), the physical implementation of the Ethernet connection must be sound. In some cases this can be done on a two layer PCB, but may require a multi-layer board. It is imperative that the design rules outlined in the DM9000 MAC/PHY datasheet be followed closely to insure a robust Ethernet connection.
- The selection of a suitable Ethernet switch is also critical to assuring a robust system design. Although most 10/100/1000 switches will move packets from one port to another, not all are created equal for a CobraNet system. Very low cost switches are more likely to have problems when the CAT-5 cable runs are greater than a few meters. Selecting a multi-port managed switch in the \$250-\$400 range will generally give error-free performance with cable runs up to the 100m limit of the Ethernet specification. In addition, the network information available from a managed switch can be invaluable when troubleshooting a CobraNet system or implementation. Attero Tech uses the D-Link DES3226L 24-port managed switch for all our system testing, but other switches with similar specifications are available. The cost of a good quality switch is usually a small fraction of the total equipment cost for an installation, so there is no reason to not to select one.

## **Appendix C: CobraNet CO<sup>2</sup> Hardware Notes**

### **A/D Input Attenuation:**

When using the CO<sup>2</sup> demo kit with analog input and output signals, there is a 6dB attenuation through the system. This is a result of a passive voltage divider ahead of the A/D converters. The maximum input range of the A/D converters is 1V<sub>rms</sub>, but maximum output signals from many consumer audio sources is 2V<sub>rms</sub>. 6dB of

attenuation is introduced to avoid clipping (overranging) the A/D converters with these signals.

### CO<sup>2</sup> Audio Expansion Header:

The CO2 demo board uses the CS496112, which provides up to 8 channels of digital input and output. The on board stereo A/D and D/A converters use 2 of these channels, but the other 6 are made available on the 16 pin header J14. The diagram below shows the pinout of the header.

