

TR2000 Network Audio Matrix

Product manual

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TR2000 Series
Mar. 2009

P/N:

Version: 1.0

Thanks for your purchasing TR2000 series Audio Transmitter developed by our company. Human and high-tech essences are fused in our products. TR2000 series will give you one brand-new application experiences.

Please follow the steps to protect your products, work area and personal safety, in order to avoid the potential danger of damage.

When you are using TR2000 equipments:

Please follow the steps when you are using TR2000 equipments,



Warning: Don't operate TR2000 equipments when you demount the covers (including cover, front panel, and back panel and so on).

- Please make sure the **Voltage of the TR2000** according to local AC voltage standard, in order to avoid to damage TR2000 equipments.

--There are 115V/60Hz in most of countries and districts in South America, North America and Far East, e.g. Japan, Korea and Taiwan.

--There are 230V/50Hz in most of countries in Europe, Middle East and Far East.

- Please make sure the electrical outlet is unplugged before interior setup of TR2000 equipments, in order to avoid to damage main board of TR2000 equipments. Some main boards are electrified still when the equipment is plugged.
- Installation and servicing should be performed by qualified and experienced personnel.
- Please make sure all the cables of TR2000 equipments and peripheral equipment are connected to the correct ground electrical outlets, in order to avoid electrical shock. All the cables are equipped three-phrase plug to ensure they are grounded correctly. Don't use the unidirectional plug and don't remove the pins from the cable. Please use three-phrase cable with correct ground electrical outlet if you need to use extension cords.
- Don't use TR2000 equipments in thunderstorm, in order to avoid the potential risk of electrical shock.
- Don't connect or disconnect any cable and don't repair or reconfigure the product in thunderstorm, in order to avoid the potential risk of electrical shock.
- Please make sure the connection of TR2000 equipments and electrical outlet is severed before cleaning.
- Make sure that TR2000 equipment's power is off when you clean it. Clean your TR2000 equipment exterior casing regularly with a soft and dry cloth or a fluff brush. Do not use liquid or aerosol cleaners which maybe include caustic or flammable substance.
- Wait for a period about ten seconds before severing the connection of peripheral equipment and TR2000 equipment, in order to avoid damage to the system board.
- Pull out the cable from the network adapter which is on the back of TR2000 equipment first and then pull out the cable from the network hole, in order to avoid short circuit when you sever the connection. Plug the cable into network hole first and then plug the cable into network adapter when you

reconnect the products.

- Please use surge protective device, circuitry adjuster and UPS, in order to avoid instantaneous high or low voltage damage to TR2000 equipment.
- Make sure there are no goods exert pressure on cables. Do not make cables exposure, which will cause trample and stumble.
- Never push objects of any kind through openings of TR2000 equipment as that may cause interior short circuit and result in fire, electric shock, or other hazards.
- Do not use TR2000 equipment near a source of heat and don't jam the refrigeration vent. Don't make paper underlie TR2000 equipment. Use TR2000 equipment in ventilated area and don't locate TR2000 equipment on bed, sofa or carpet.
- Never spill food or liquid of any kind on the TR2000 equipment.
- Do not use the TR2000 near water or other liquids, or in rainy/moist situations. If liquid gets into your TR2000, turn it off and take it to your dealer for inspection.
- Water and/or Moisture Do not use this equipment near water or in contact with water.

Technical instructions



Warning: Perhaps there are some mistakes of description and printing in technical instructions

- With the rapid technical development, our products keep on improving and renewing, so there are may some demoded or useless specifications about some standards in this manual.
- We are very conscientious for reorganizing this manual, but we do not guarantee there is no negligence or mistake in this manual, and we can't exclude the possibility that this manual will be renewed again. If there are any revises, we will not give notice any more.
- If there is any revises in this manual, it will be promulgated in Digispider Website: <http://www.digispider.net>

Do not tear up any label



Warning: Please do not voluntarily tear up any label on TR2000 equipment; otherwise it will affect to recognize the standard of product maintenance deadline.

- All labels on TR2000 equipment show information when the products are manufactured and sold, these labels are very important for technology recognition and maintenance of products.
- All labels on TR2000 equipment are belonged to recognized standard of product maintenance deadline. If you voluntarily tear up them, it will affect to recognize the standard of product maintenance deadline.

Looking for help



Warning: Do not attempt to repair this equipment yourself, or it will damage your equipment and result in serious results, e.g. personal injury.

- All TR2000 products are manufactured by DigiSpider Inc., All maintenance should be performed only by authorized Units.
- Do not attempt to repair this equipment yourself. Refer all repairs to qualified service personnel.
- If there is any question, please contact the dealer you purchased TR2000 equipments from, you also can call Digispider customer service, ask for help.

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ABOUT THIS GUIDE

This manual will help you to be acquainted with the products and functions of TR2000 Series Network Audio Matrix, by presenting the methods of installation, configuration, operations and maintenance. If you encounter any problem, or it is the first time for you to use Digispider's TR2000 Series, please read this manual first for relevant information and technical supports. As for its upgrades and updates, some descriptions and illustrations in the manual may be different with your hardware. Please visit <http://www.digispider.net> from time to time for the latest documentation.

HOW TO USE THIS MANUAL

Read it in any order you like.

You may begin with any page and skip to the desired one. It will surely provide you with a complete flowchart if you read it from the beginning to the end.

There are Table of Content and Index in the manual, providing different research methods for various reading habits.

If you encounter any unknown words or expressions, please refer to the attached "Glossary".

For the person who use the system for the first times:

We recommend you read all the content of the manual, especially the information with words of "Note, Caution and Warning". You are required to operate strictly according to the prospectuses in the manual.

During the installation of hardware, frequently read the "Safety Guidelines" section of the manual.

For ordinary users

As for system administrator and operator, they may read the necessary information at their own choice. Please refer to the "General description" section of the manual for specific description. If the manual can't solve the problem, please contact the technical support personnel and trained & qualified engineers for the solution.

For experienced and qualified engineers:

For the reason that our products keep on upgrading and updating, please make attention to the update information of the manual. The specific update information is easily accessible at the all time on our service and support website, which will be incorporated into the last version of manual.

ANNOUNCEMENT AND PROVISIONS

The manual prepared by Digispider Inc. does not provide any form of guarantee, clear or implied, including but not limited to, implied guarantees or a special-purpose commercial reasonableness. In some areas of specific transactions is a clear or implied guarantees, therefore, this statement may not apply to you.

The manual may contain technical inaccuracies or typographical errors terminology. Identify changes and updating information regularly updated content will be updated to version. Digispider Inc may make improvement or updates for the products and procedures described in this document, at any time as it sees fit.

The manual applies to TR2000 Network Audio Matrix configured with different channels.

For more technical information, please consult your Digispider Inc sales representative and retailers.

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CHAPTER 1 TR2000 SYNOPSIS

The TR2000 is a CobraNet device. It achieves the seamless integration of the CobraNet audio transmit and audio DSP technologies. The audible delay is less than 5-millisecond. The TR2000 can carry and utilize control and monitor data such as Simple Network Management Protocol(SNMP) through the same network connection as the audio.

The TR2000 can be used in Ethernet mode. In Ethernet mode, some TR2000 and control PC are interconnected by Ethernet switches. The maximum cable length is 100 meters for CAT-5 type wire. The TR2000 can be used in stand alone mode. In stand alone mode, the TR2000 can be used as a matrix mix controlled by the NSP-100 software.

The TR2000 consists of 4 part, mother board, CMD CobraNet module board, I/O boards and power supply board. The block diagram is as figure 1.

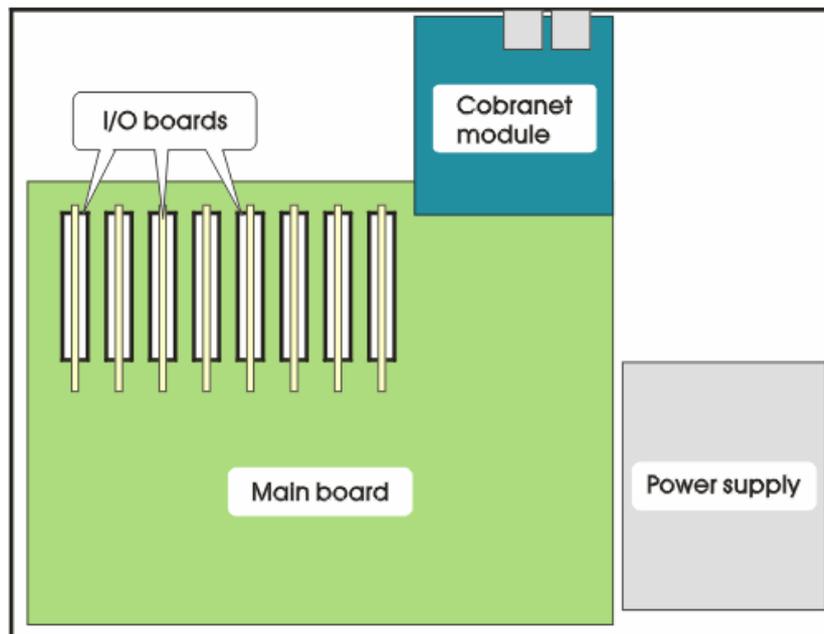


Fig1. TR2000 Block Diagram

The CMD CobraNet module providing a CobraNet compliant interface is the digital engine of TR2000.

The mother board contains the control hardware and software for interface to the CMD CobraNet module, control of the Analog to Digital (A/D) converters, the Digital to Analog (D/A) converters. The mother board also scans commands coming from network or RS232 port.

I/O board may be a Analog audio in(ADC) board or a Analog audio out(DAC) board. The ADC's gain is adjustable. A mother board contains 8 I/O slots each can be used as ADC or DAC, and they can be used in mixed manner also. The recommended configurations are: TR2000-0808A (8 channels analog in and 8 channels analog out), TR2000-0016A (16 channels analog out), TR2000-1600A (16 channels analog in).

The power board provides +5VDC, +15VDC, -15VDC.

1 THE TR2000 FEATURES

- Realize audio transmission in real time on CobraNet Ethernet network
- DSP function inside
- Gain from 0dB up to +66dB (12 steps) and 48V phantom power individually selectable for each Mic/Line input.
- Maximum 16 channels analog balanced input
- Maximum 16 channels analog balanced output
- Configured and controlled by the NSP-100 software which for Windows 2000/XP.
- Show the audio signal state in the LCD screen.
- Independent MCU control
- All TR2000 setup parameters can be stored in the flash memory.
- Software updatable via RS232 port
- Network transmission redundantly

2 THE TR2000 DSP FUNCTIONS

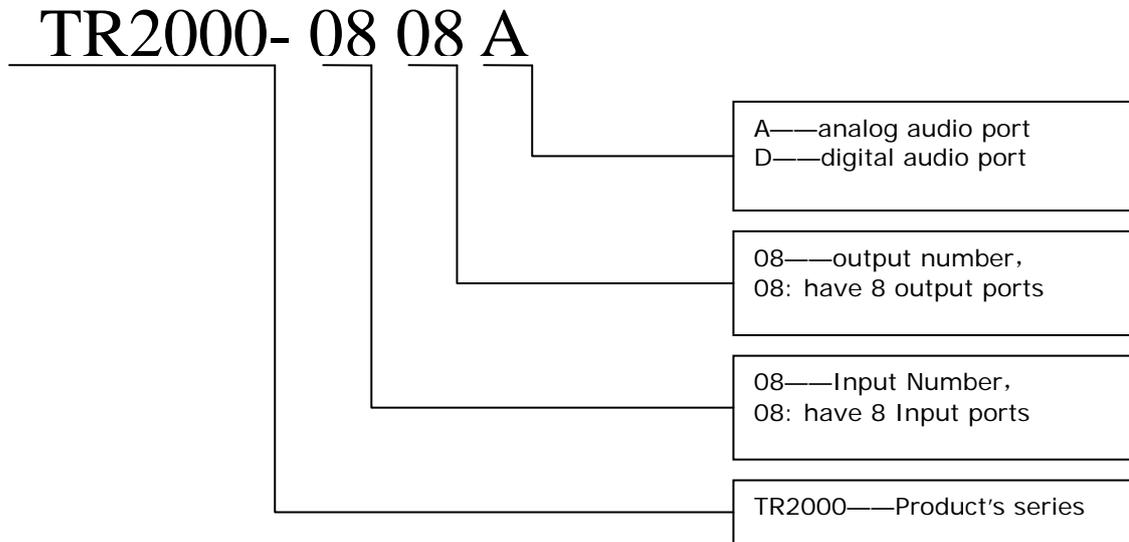
Input channel:

- Level control,
- 3 band parameter EQ,
- high pass filter
- Mixer: 4x4, 8x8, 12x12, 16x16, 20x12, 24x8, 28x4.
- Meter

Output channel:

- Level control,
- 3 band parameter EQ,
- Compressor
- Limiter
- Meter

3 MODEL DESCRIPTION



Type list

Type	Input channel	Output channel
TR2000-1600A	16ch(Line/Mic)	/
TR2000-0016A	/	16ch(Line)
TR2000-0808A	8ch(Line/Mic)	8ch(Line)
TR2000-1204A	12ch(Line/Mic)	4ch(Line)
TR2000-0412A	4ch(Line/Mic)	12ch(Line)
TR2000-02A	/	2ch(Line)
TR2000-22A	2ch(Line/Mic)	2ch(Line)

3 FRONT PANEL

The front panel's map is as figure 2

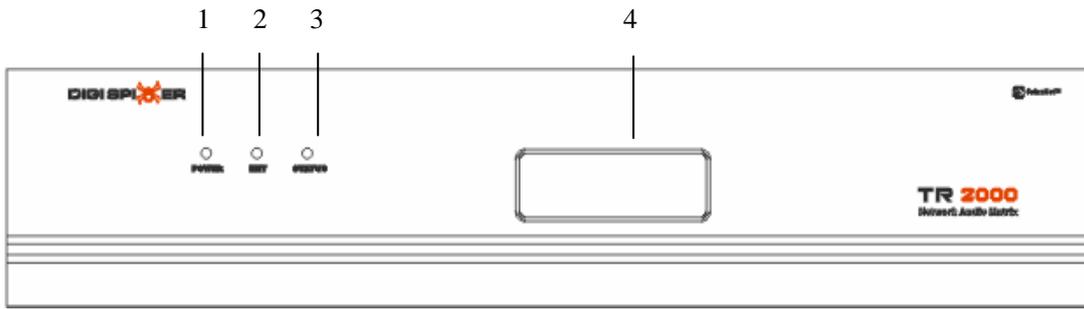


Fig.2 Front Panel

1—POWER

power status indicator LED (RED)

2—NET

network status indicator LED (GREEN). If the TR2000 connects with the network normally, the LED is on all the time, otherwise the LED is off.

3—STATUS

TR2000 work status indicator LED (YELLOW). If the TR2000 works normally, the LED is on all the time, otherwise the LED is off.

4—LCD

- After initializing ,if the TR2000 is configured as TR2000-0808A, the LCD menu is as figure 4

I:	1	3	5	7	O:	1	3	5	7
	■	□	■	□		■	□	■	□
I:	2	4	6	8	O:	2	4	6	8
	■	□	■	□		■	□	■	□

Fig.4 TR2000-0808A LCD Menu

Note 1:

The "I ","O" represents IN channel and Output channel

I: "1,2,3,4,..."represents the input number.

O: "1,2,3,4,..."represents the output number.

Symbols " □ ■ "represent analog signals ,symbol "□" represents the volume is under the threshold(-40dBu), " ■"represents the volume is above the threshold.

4 REAR PANEL

The rear panel's map is as figure 8

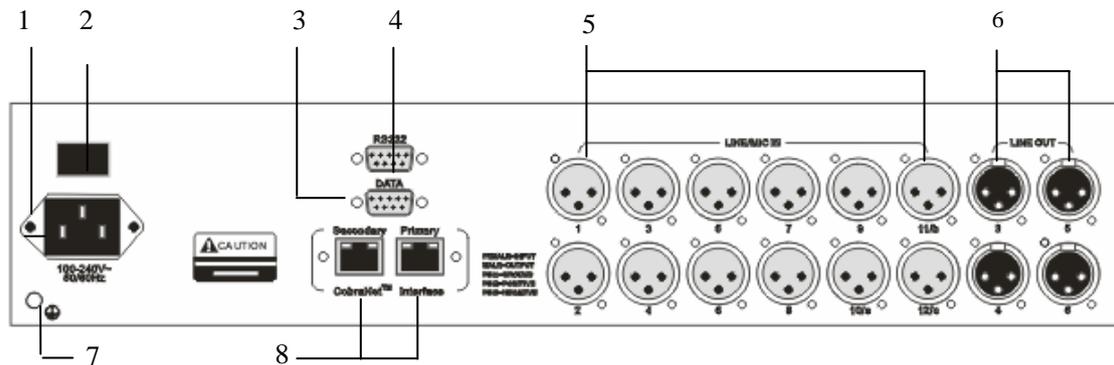
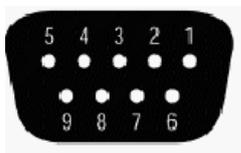


Fig.8 Rear Panel

- 1— Power socket
- 2— Power switch
- 3— Data port(reserved)
- 4— RS232 port

A connection for a control PC or AMX/Crestron type panel. This port works at 9600bps. The serial prot control protocol is opened for the user. Please refer to the appendix "TR2000 RS232 control protocol.doc".



- PIN#2—TXD
- PIN#3—RXD
- PIN#5—GND
- PIN#1, 4, 6, 7, 8, 9—NC

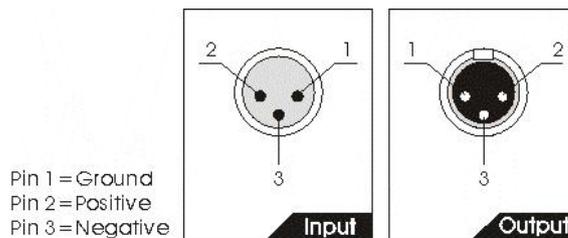
- 5—Input audio XLR jack

Line/Mic input port: it can provide ODB-66DB mic gain, 48V phantom power. All of the operation can be controlled via software "NSP-100"

Note: the pin 2 and pin 3 should not be connected to the pin1 when the 48V phantom power is open, otherwise the input port will be destroyed.

- 6—Output audio XLR jack

Line output port, with maximum level of 24dBu and can connect to external equipments such as power magnifier, active loudspeaker and recording device etc.



7—Earth GND

8—Redundant CobraNet interface

CobraNet interface connects to 100M switches with using CAT-5 cable, and allows receiving net audio signals and sending net audio signals while it is controlled by NSP-100 control software.



The CobraNet interface also is a Ethernet interface for transmitting control data.

The primary port is active when both of the ports are connected. The secondary port will be a backup for the primary port.

Chapter 2 BASIC OPERATION

According to different application situation, it can be divided into two modes: stand alone mode and network mode.

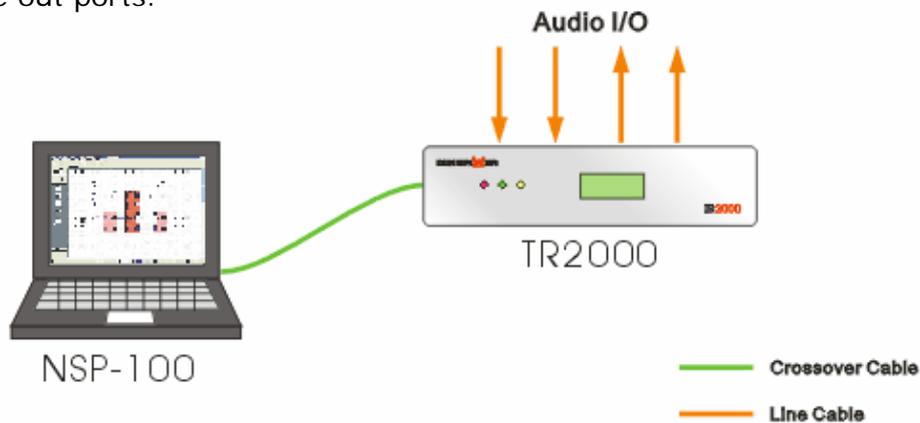
Stand alone mode

TR2000 can work in stand alone mode, controlled by NSP-100 software. Recommend to use this mode in a small audio mix system.

In stand alone, connect the computer network card to the TR2000 using a cross-over cable, whose functions are controlled via NSP-100 software. The operation is listed below.

Step 1

Connect the computer network card to the TR2000 with **crossover cable**, audio input to the Line/Mic in ports at the rear panel and output equipment to the line out ports.



Step 2

Startup TR2000, and wait for TR2000 start to work in normal status with all LCD and indicator lights turn on.

Step 3

Add the TR2000 into the NSP-100 software in a right way, please refer the NSP-100 user's manual or NSP-100 quick start.

Step 4

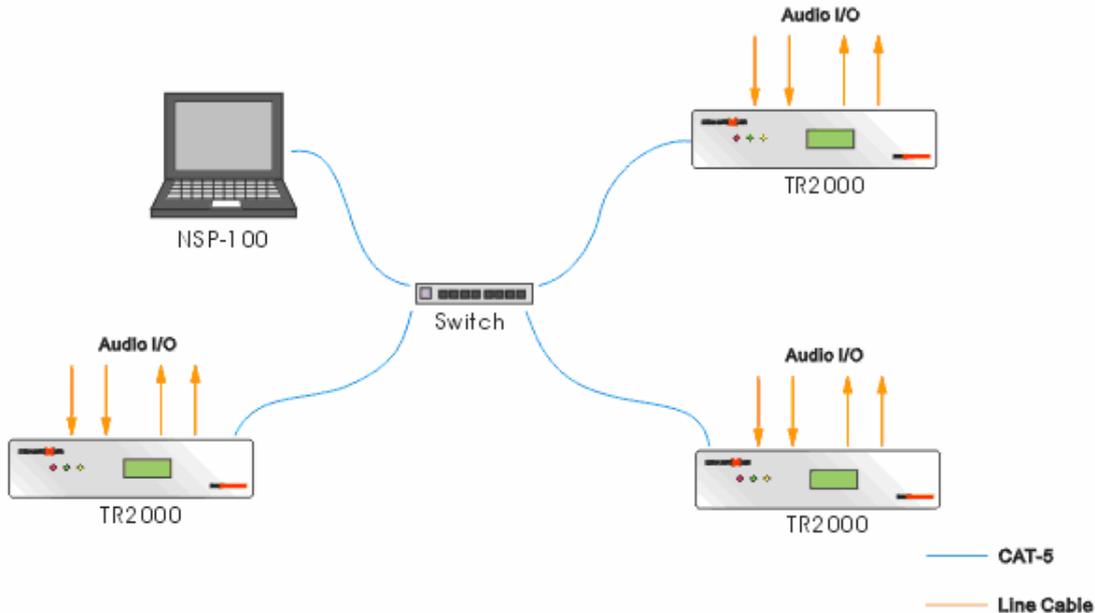
According to the situation, it is possible to adjust the DSP function of the TR2000 via the software.

Step 5

Users can confirm the previous parameter after the confirm operation is done in the NSP-100 software and next time can use TR2000 independently without computers.

Network mode

To meet the demands of large network audio system, the TR2000 can be used in the network mode.



Step 1

Using the straight cable to connect the several TR2000 devices and control PC together with the 100Mb switch. But please note that the length of every single net cable is no more than 100m as far as possible.

Step 2

Connect input audio with TR2000'S input XRL. Connect TR2000'S output XRL with output audio devices.

Step 3

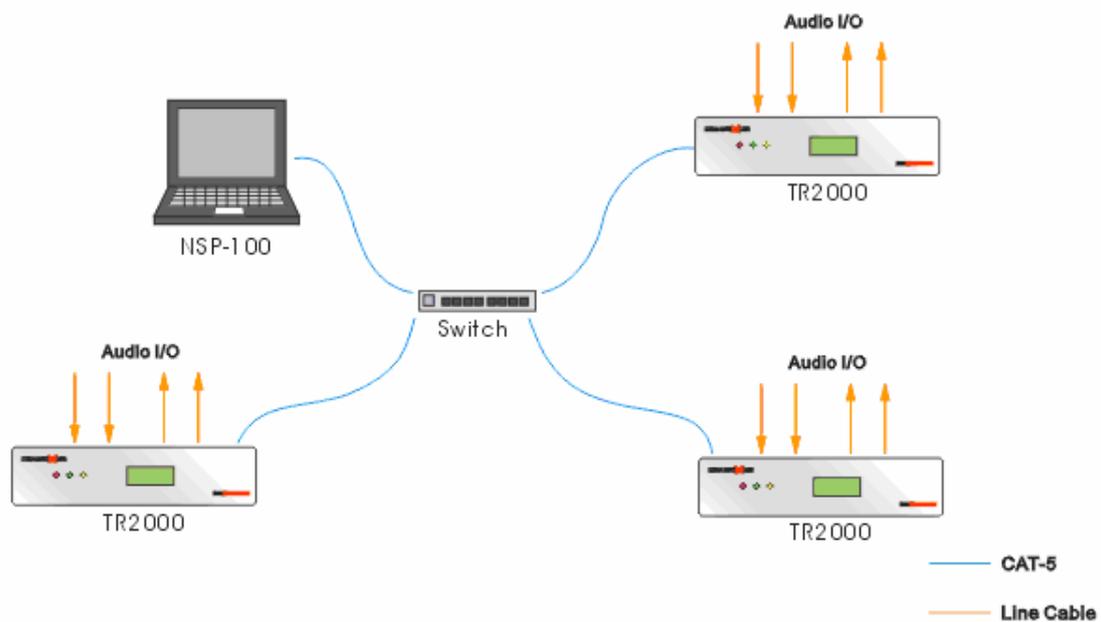
Startup TR2000 device, and add every equipment into the NSP-100 software system. Then, set up the receiving/sending relation among them. Please refer to the NSP-100 software user's manual or CNP quick start.

Step 4

According to the situation. The audio route and DSP function of the TR2000 can be controlled by the NSP-100 PC software. Please refer to the NSP-100 software user's manual or CNP quick start.

CHAPTER 3 NSP-100 QUICK START FOR TR2000

The system structure is as follows:



Step 1 install the software

1) Install the cnot and winpcap software.

CNOT and WinPcap software must be installed in advance before the setup of NSP-100.

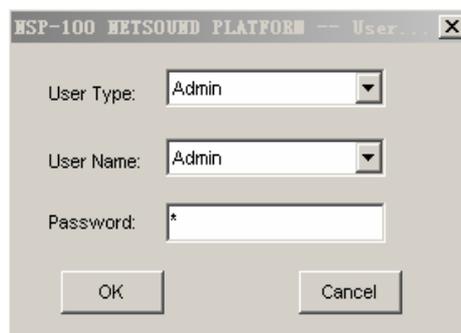
If your PC has installed cobranet discovery software before, you do not need to install the CNOT tools again. But the winpcap software must be installed a head of time.

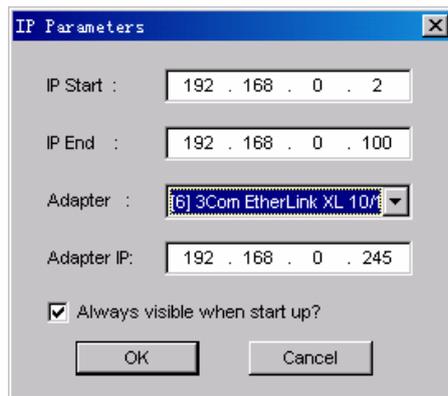
2) Install the NSP-100 software.

Step 2 Launch the NSP-100 software

Double click on the NSP-100 icon on the desktop.

When the NSP-100 software is launched, a dialog window would display, requesting you to enter the password for the user. The initial password is "1"





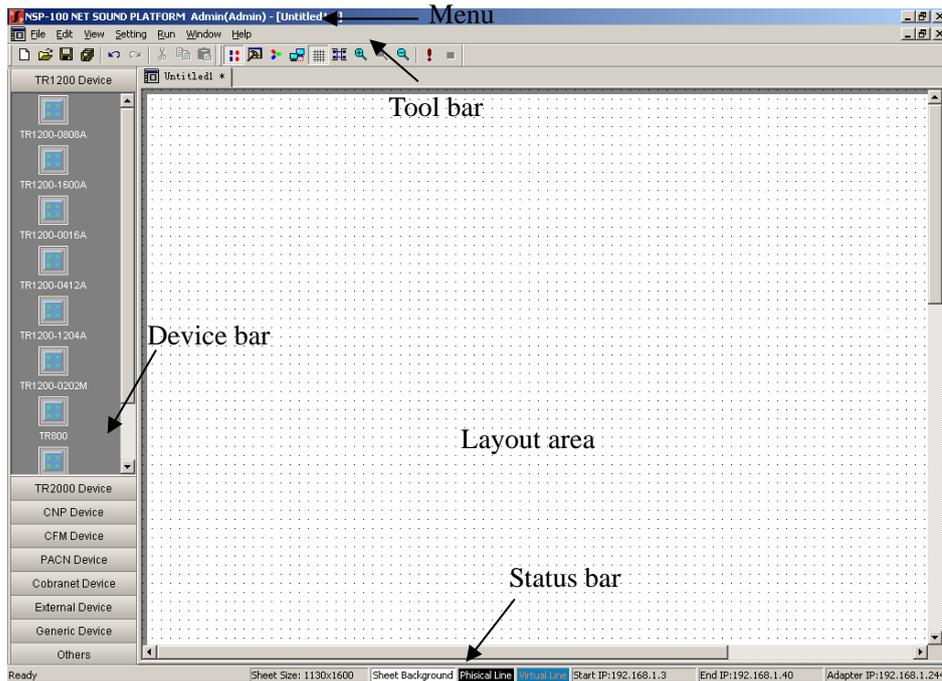
Make sure the beginning IP and the end IP are configured within the IP range, of which the first 3 portions of IP address are identical to that of the adapter, otherwise the NSP-100 will not be started normally. After the all configure is done. The NSP-100 could be launched normally.

Step 3 Create a new project for the test system

Click the  button to create a new project.

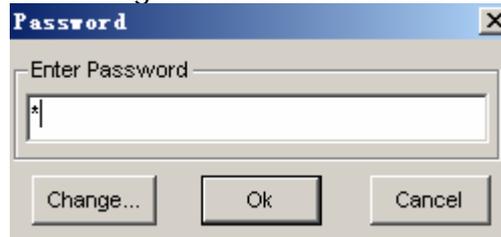


The main interface of NSP-100 when creating a new project.



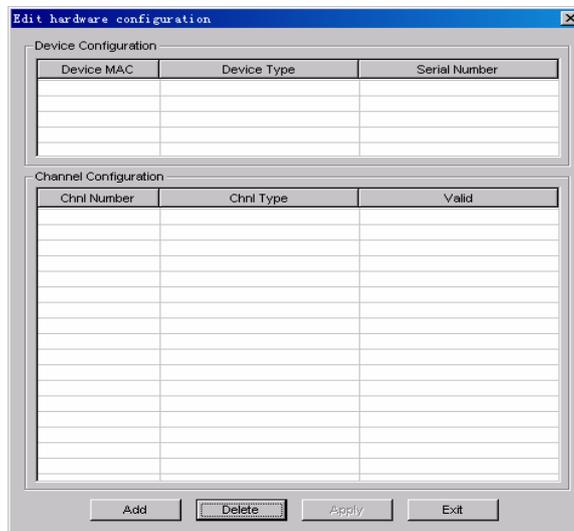
Step 4 Add the TR2000 to the NSP-100 device library

Click "Settings->Device Setting"

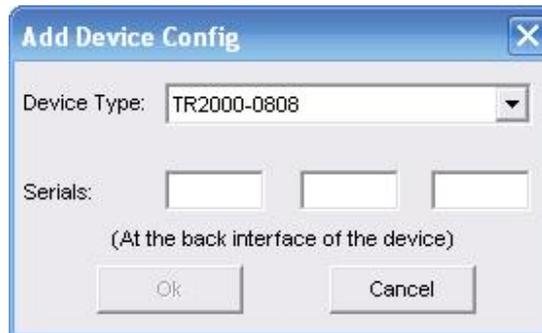


Access To The Hardware Configuration Requires Password Authentication. The Initial Password Is "1". Please Be Careful to Modify and Safe to keep The Password.

Enter the NSP-100 device library.



Clicks "Add" to add TR2000 device.



Enter the serial number of TR2000 device and select the correct device type (the serial number is labeled on the rear panel of the TR2000 device). Click "OK" to add the configuration.

Describe the serial number: the serial number is composed of three segments.

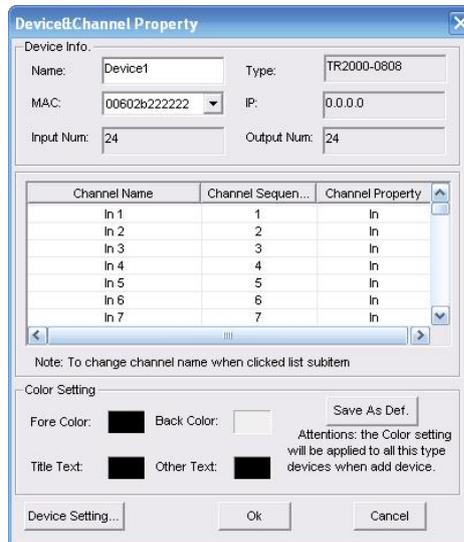
Segment 1: six characters, means the MAC address (last six characters, the prefix-six characters are fixed "00602b") of the CobraNet device.

Segment 2: four characters, means the TX1 bundle number (must be hex. for example txbundle1=(500)decimal=(01F4)H)of the CobraNet device. Note: TX2=TX1+1

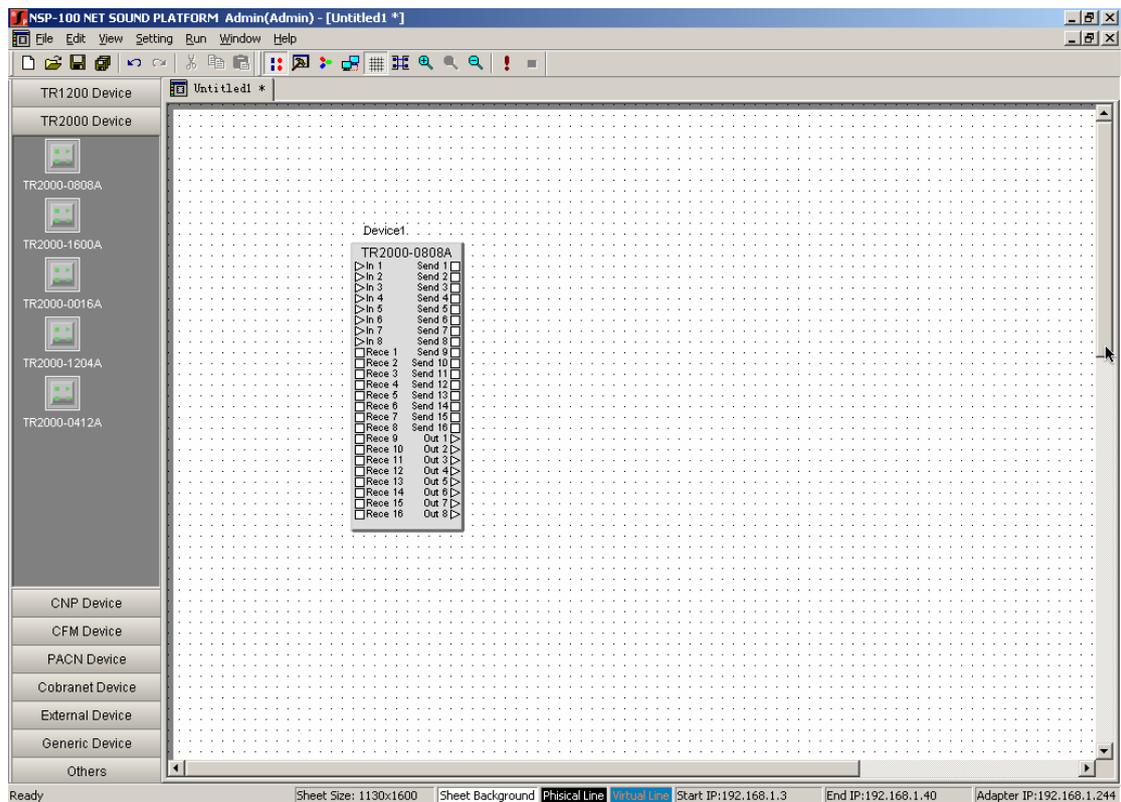
Segment 3: Eight characters, serial number of that device.

Step 6 Configure the serial number for TR2000 device.

Right click on the device, click the "Property" and select the right MAC for TR2000 device and then click "OK"

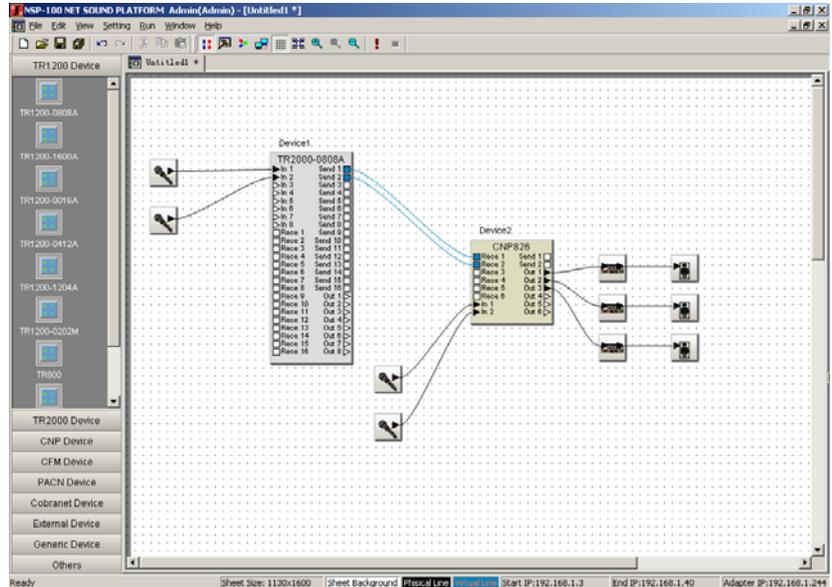


After allocated the MAC address of the CobraNet device, the port of the device will be valid



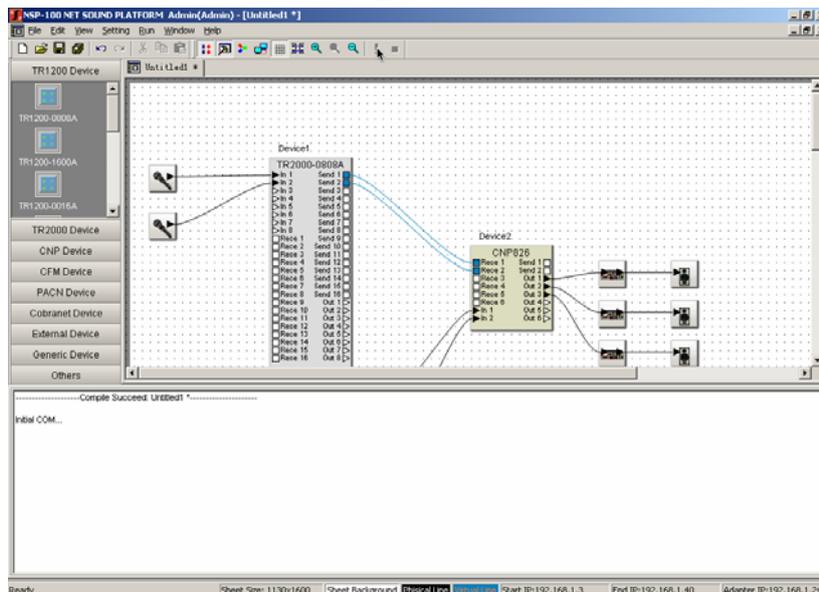
Step 7 Establish virtual connection

It must be clarified that CobraNet device has 2 types of ports: triangle for physical port (other non-CobraNet devices belong to this type) and square for network ports. The user could connect the network ports for the virtual connection.



Step 8 Compile

After establishing Virtual connection. The user can click the  button on the toolbar to download the existing active routing document to the corresponding CobraNet device.

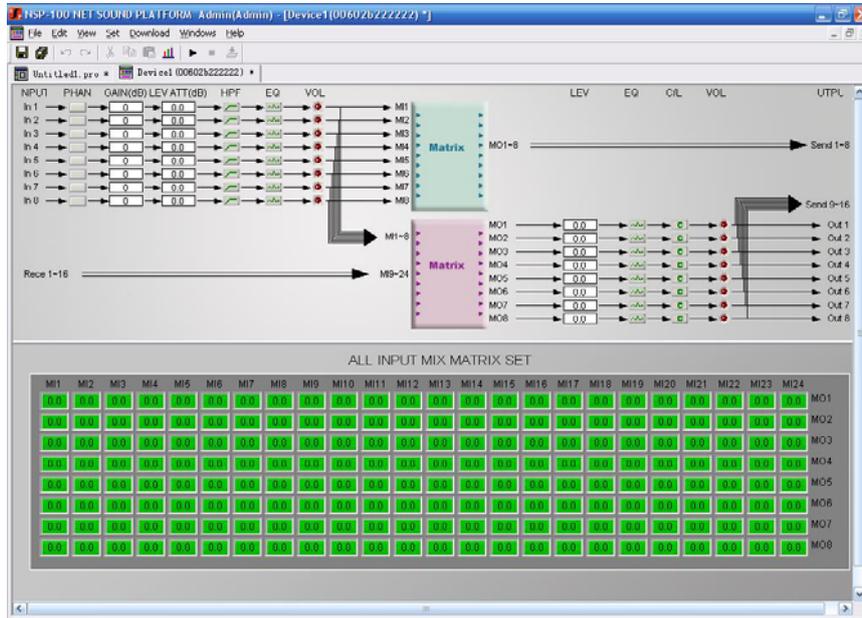


After compile, the TR2000 can receive the audio signal from other TR2000 device.

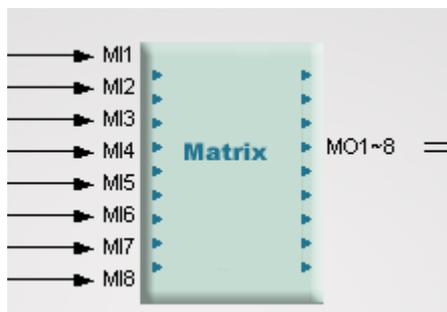
Step 9 Configure the TR2000 DSP parameters.

Double click on TR2000 icon, open its DSP control interface.

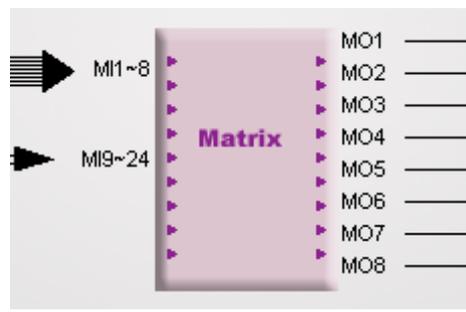
Take TR2000-0808A for example



As show above, there are two different matrix mixers in the TR2000-0808A DSP configure interface. One is 8X8 mixer and another is 24X8 mixer.



8X8 mixer



24X8 mixer

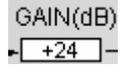
The input channel setting include: phantom power ON/OFF, Mic gain adjustment, input channel level adjustment, highpass filter, 3 band EQ and audio meters.

PHAN button

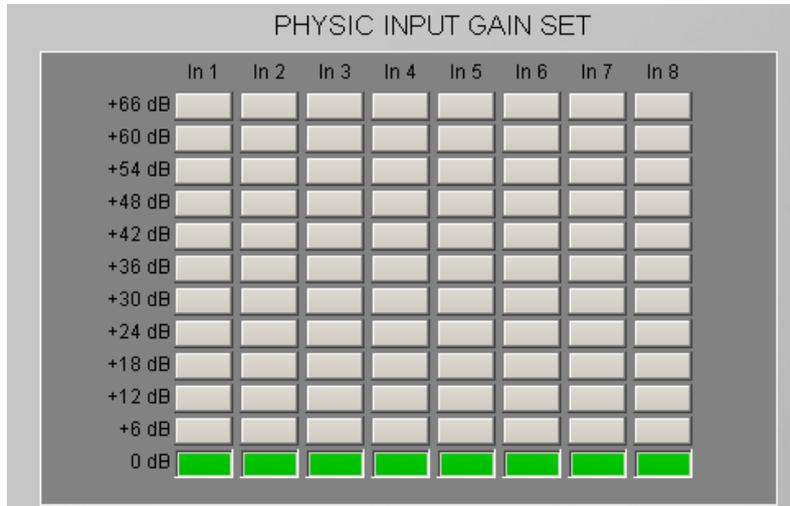


The PHAN (Phantom Power) button toggles phantom power on and off. Phantom power is an auxiliary power source used to power certain types of microphones. Phantom power voltage is 48VDC. The default is off (green LED).

Gain (dB)



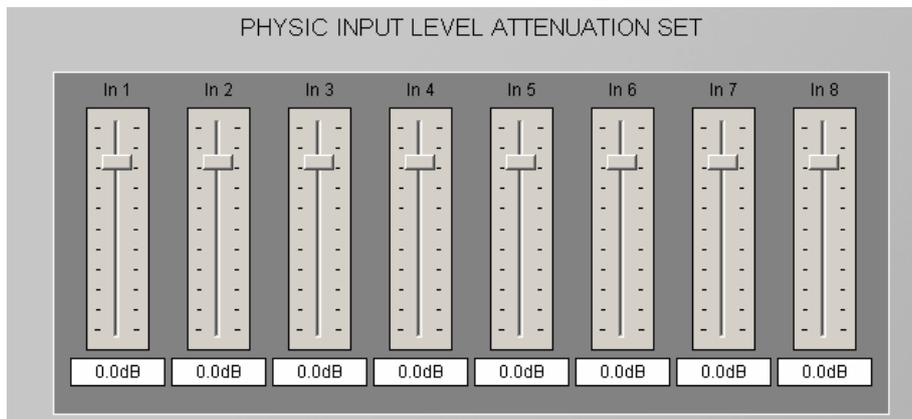
Pressing the gain button to bring up the setting tab as below:



LEVEL (dB)



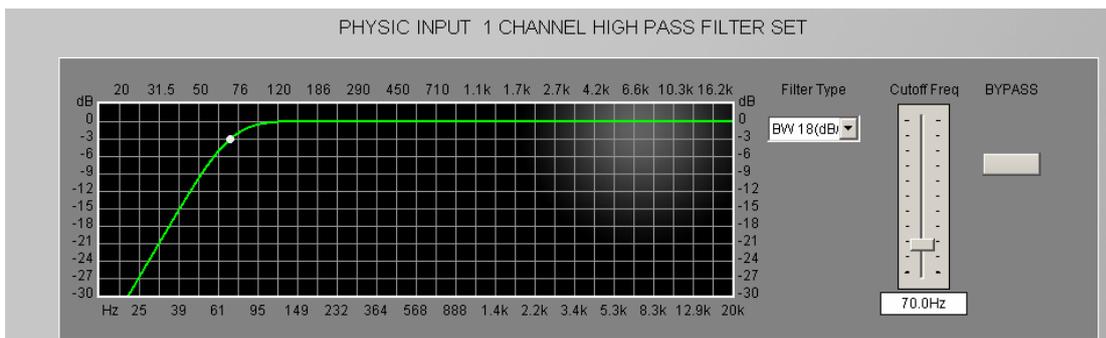
Pressing the LEVEL button to bring up the setting tab as below:



HPF High Pass filter



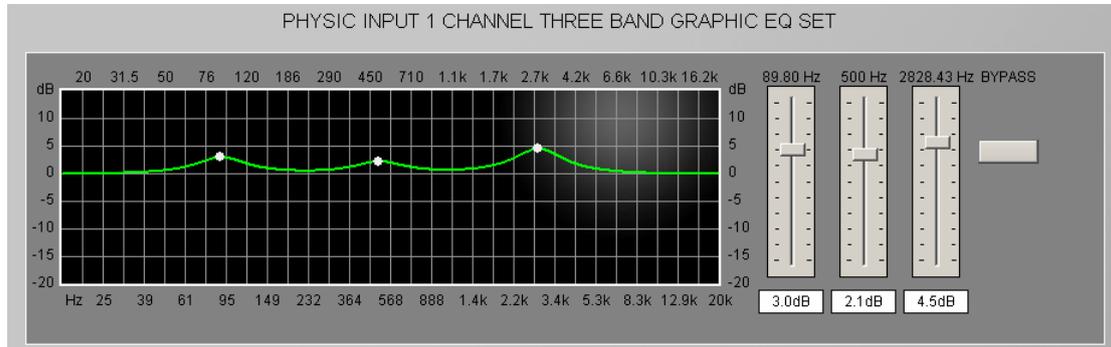
Pressing the HPF button to bring up the setting tab as below:



EQ



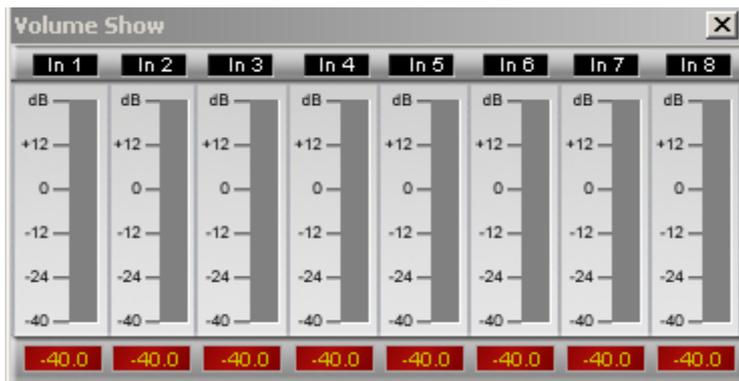
Pressing the EQ button to bring up the setting tab as below:



Volume show



Click to display the volume.

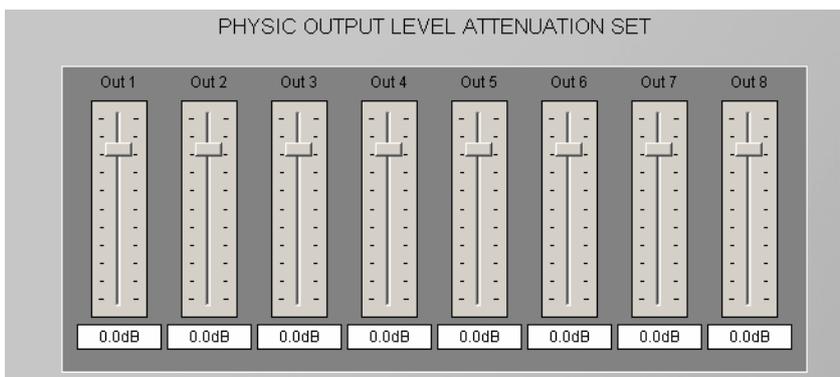


The output channel setting include: output channel level adjustment, 3 band EQ, compressor and audio meters.

LEVEL (dB)



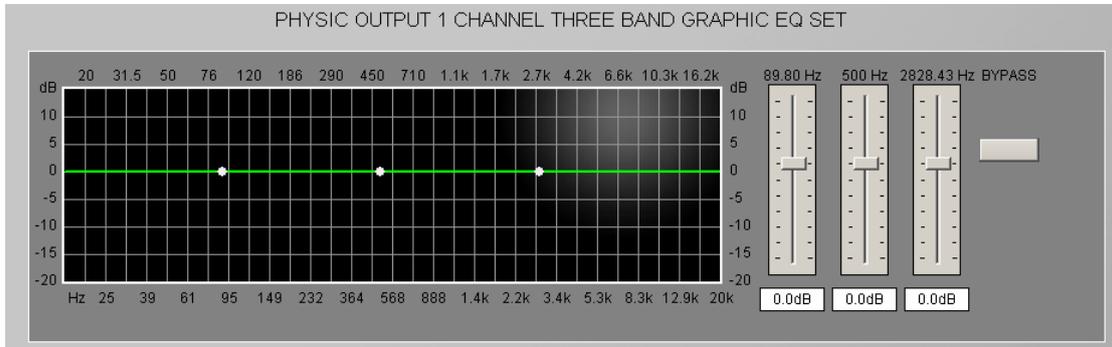
Pressing the LEVEL button to bring up the setting tab as below:



EQ



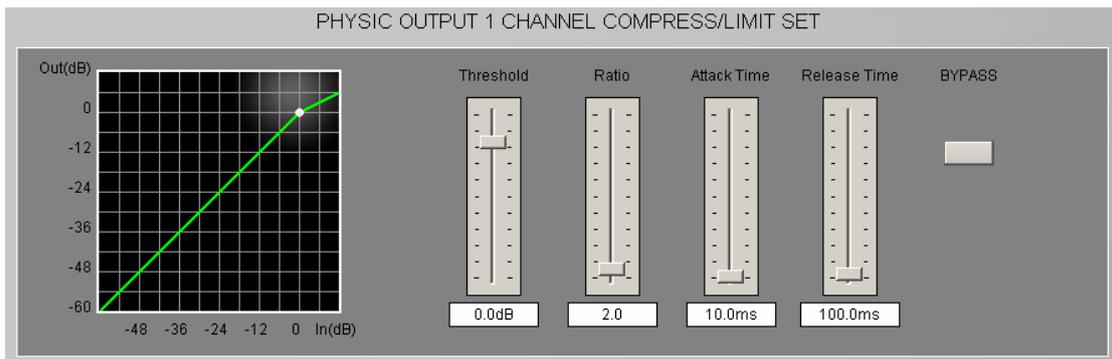
Pressing the EQ button to bring up the setting tab as below:



Compressor/Limiter



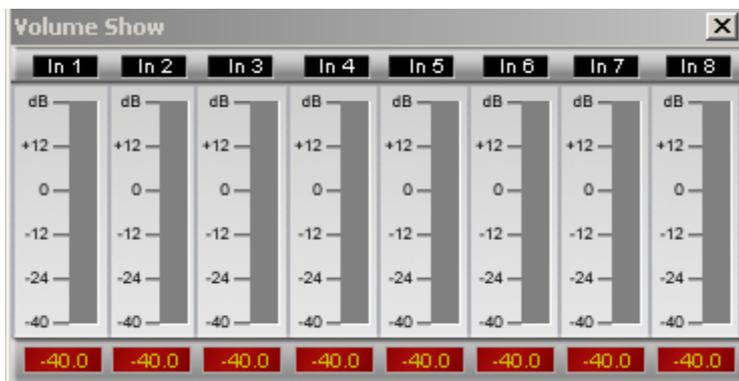
Pressing the C button to bring up the setting tab as below:



Volume show



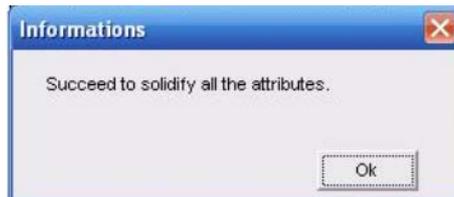
Click to display the volume.



Click the “start to download” button; you can download the all DSP parameters to the TR2000 device and adjust the DSP parameters online.

Step 10 Complete and confirmation

User can make a network audio system based on the above instruction. If the users need to maintain the current setting after restart TR2000 device, you can adopt confirmation function. Click “download” button in NSP-100 menu, and there will be a choice named “solidify Attri..”, user can click it, wait until the below dialogue window pops-up, it means the confirmation is successful.



TR2000 confirmation successful dialogue window

The confirm operation will be failed if the DSP document has not saved before.

CHAPTER 4 TECHNICAL SPECIFICATIONS

1 ANALOG AUDIO INPUT SPECIFICATION

- 2,4,6,8,10,12,14,16 channels input configurable
- Analog input converted to 24-bit ,48khz digital audio
- Maximum gain: +66 dB, 12 steps
- Phantom power: +48VDC(10mA /input)
- Frequency response +/-0.2dB, 20Hz~20kHz
- THD plus noise : <0.01% @4dBu 1KHz
- Dynamic range : 103dBA, 101dB
- Maximum input level: +24dBu,balanced differential
- Input impedance: 6.3kOhms

2 ANALOG AUDIO OUTPUT SPECIFICATION

- 2,4,6,8,10,12,14,16 channels output configurable
- 24-bit ,48khz digital audio converted to analog output
- frequency response +/-0.2dB, 20Hz~20kHz
- THD plus noise : <0.01% @4dBu 1KHz
- Dynamic range : 103dBA, 101dB
- Maximum output level: +24dBu,balanced differential
- Output impedance: 100 Ohms designed to drive a minimum load of 600 Ohms

3 INTERFACE SPECIFICATION

- Two RJ45 network interface
- One RS232 interface (9-pin D-type)

4 OTHER SPECIFICATION

- Power supply: 100-240VAC, frequency: 40-60hz
- Power consumption: less than 30W
- Device dimension(L×W×H): 482×338×89 (unit: mm)
- Surrounding temperature : +5-40°C
- Surrounding humidity: 5-85%

CHAPTER 5 FAQs

1. Can the TR2000 remember its DSP parameters when restart the device?

Yes, it can. The user can achieve this function by the confirm operation in the NSP-100 software.

2. Does Digispider Inc. recommend any specific Ethernet switches for TR2000 device?

No, but you must use 100BaseT Ethernet switches.

3. Is TR2000 compatible with other companies' Cobranet devices?

Yes, TR2000 is compatible with and integrated by other companies' devices with Cobranet interfaces since Cobranet is a standard protocol.

4. Is TR2000 must be connected to a switch?

No, the TR2000 can be used in the stand alone mode via a crossover cable.

5. Must NSP-100 software and TR2000 device be connected all around the time?

No, it is not necessary. Every TR2000 device has memory unit. The system setup data is downloaded and burned into rewriteable memory in each TR2000. After the parameter is configured and confirmed, it operates independently with no further need for a computer.

CHAPTER 6 GLOSSARY

CobraNet:

Developed by Peak Audio, CobraNet technology allows real-time uncompressed digital audio distribution over industry standard 100Base-T Ethernet networks. Up to 128 channels, 64 in each direction, can be carried simultaneously over a switched 100Base-T network (64 channels on repeater networks). CobraNet currently supports a 48 kHz sampling rate with 16, 20, or 24-bit resolution. CobraNet devices can happily coexist with networked computers, printers, etc., on a switched 100Base-T Ethernet network, however, a dedicated network infrastructure is strongly recommended.

CobraNet audio channel:

In CobraNet terminology, an audio channel is one 48 kHz digital audio signal with a 16, 20, or 24-bit resolution.

CobraNet primary/secondary ports:

CobraNet interfaces feature built-in redundancy, with primary and secondary ports for connection to primary and secondary networks. If an unrecoverable fault should occur on the primary network, CobraNet automatically switches to the secondary network, providing uninterrupted operation. Both ports are transformer isolated and fully comply with the IEEE 802.3 standard.

Conductor:

The device on a CobraNet network that acts as wordclock master and network arbitrator. Only one device can be Conductor at any one time. If that device is unplugged or fails, another device automatically takes over as Conductor. The conductor ensures that only one device transmits data in each bundle at any one time. See also Performer.

LAN (Local Area Network):

A **local area network (LAN)** is a computer network that connects computers and devices in a limited geographical area such as home, school, computer laboratory or office building. CobraNet is a LAN technology. See also WAN.

RS-232:

A serial interface for connecting serial devices, offering a transmission distance of approximately 15 meters, typically using 9-pin or 25-pin D-sub connectors.

Switch:

Switch knows the network address of each device on the network and automatically route network traffic accordingly, so each device receives only data addressed to it.

COBRANET device

A device is designed according to COBRANET technology to receive and transmit audio data.