DESIGN AND
MANUFACTURE OF
INNOVATIVE AUDIO
DEVICES AND
MULTIMEDIA
APPLICATIONS

TR2000

# Network Audio Matrix

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TR2000 network audio matrix，the new generation network audio system of DigiSpider, achieves the seamless integration of the CobraNet audio transmit and audio DSP technologies. Each audio input channel has a customized digital audio signal processing block. The new generation TR2000 device is designed to operate under the DigiSpider's NSP-100 net platform. With the NSP-100 software, the user could design, test and deploy professional audio reinforcement and distribution systems ranging in size from one to hundreds of channels. Through NSP-100 software, the TR2000, TR1200 and CNP devices could be linked together and controlled by the same software interface.

TR2000 Block Diagram
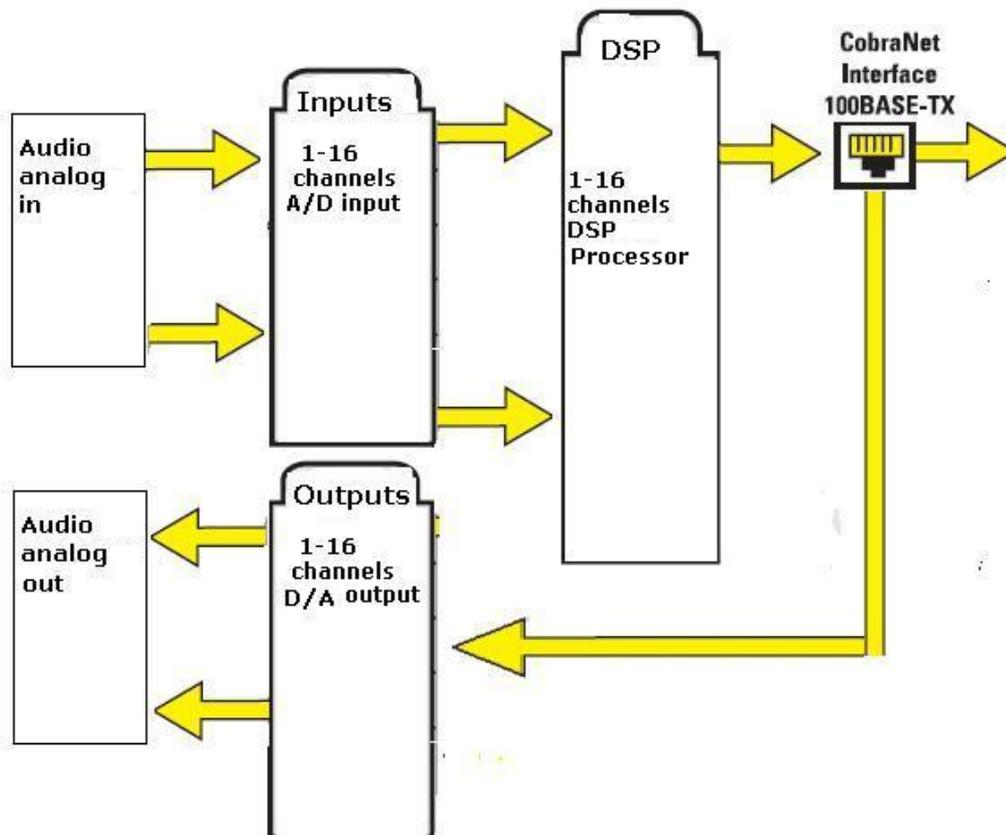
Features:

- Maximum 16 CobraNet receive channels

- Maximum 16 CobraNet transmit channels

- Flexible Module structure, have eight I/O board slots

- Configurable DSP function for each audio input channel

- Ethernet controllable

- High quality audio transmission

TR2000 series network audio matrix device use 24bit/48KHz signal processing without compression throughout the signal path to guarantee the high quality audio.

- Redundant design

TR2000 series network audio matrix device has 2 RJ-45 connecters or fiber optic interfaces that may be used simultaneously.

And a redundant power module could be customized so that if the main power module failed, the secondary power module would take over automatically.
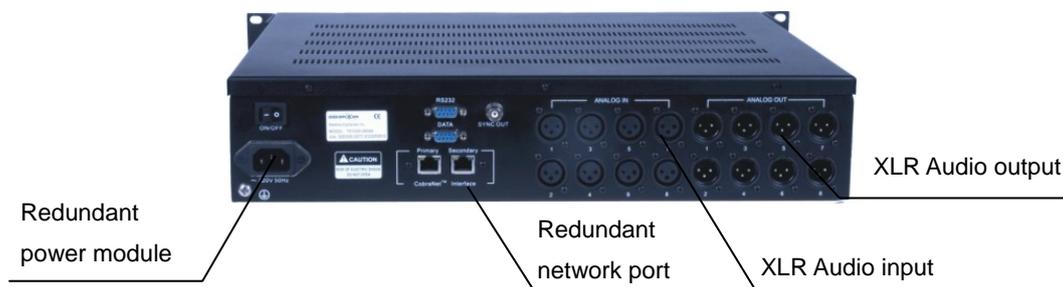

DSP function for input channel:

- ■ Filters (Bessel or Butterworth or Linkwitz-Riley type)
  All pass, Low pass, High pass
  Low shelving, High shelving
  Parametric EQ
- ■ Dynamic
  Compressor/limiter
  Noise gate
- ■ Mixer
  Maximum 32x32 Matrix
  Customized mix rule
- ■ Router

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Maximum 32x32 Matrix
- Others
Gain
Meters
Generators (sine wave, white/pink noise)

NSP-100 Software

NSP-100 software running under the Windows system, is used to create designs (routing information and DSP settings), download and solidify it to the ROM of TR2000 or other devices. NSP-100 uses CAD technology allowing the user to construct digital audio processes in block diagram. The combination of the "drag and drag" software and the modular hardware offers a great flexibility and creativity when executing design concepts.
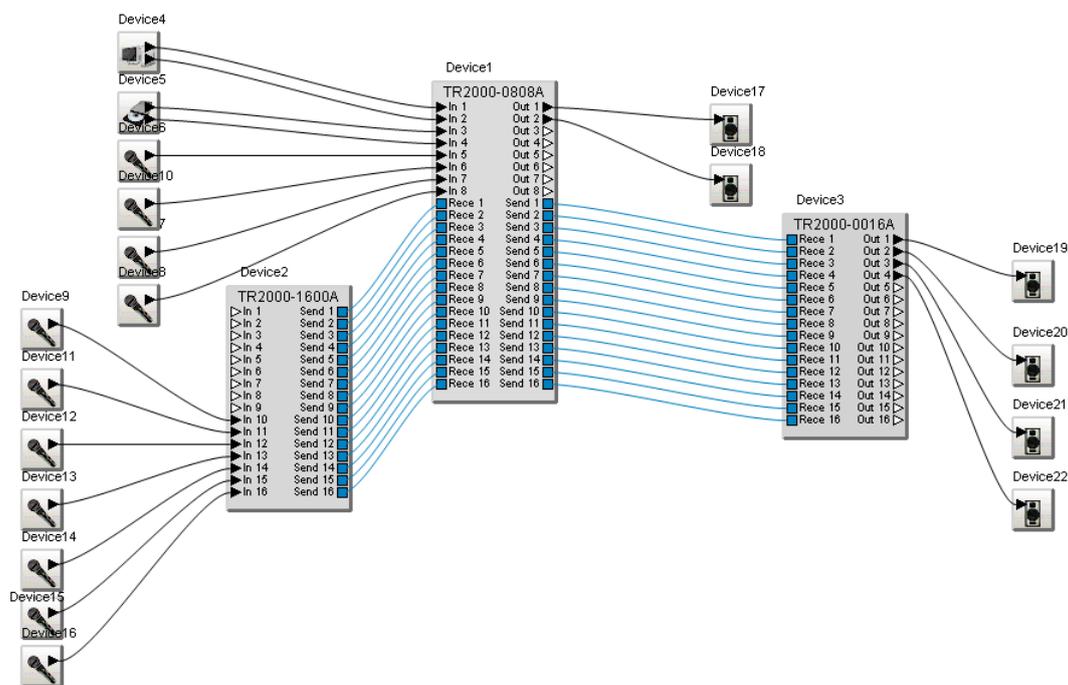
Design files could be quickly downloaded to the hardware by a single button. Once this is done, parameter changes such as MIC gain can be made in real time from NSP-100 software. Once the design has been downloaded and solidified into the hardware memory, the PC can be disconnected and not required any more.

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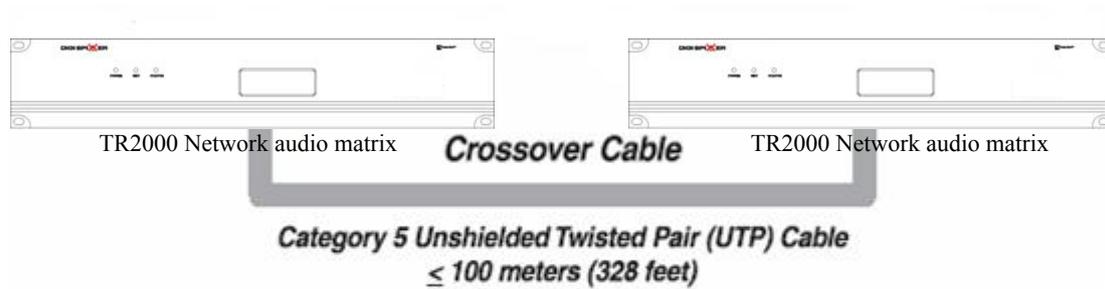MULTIMEDIA
APPLICATIONS
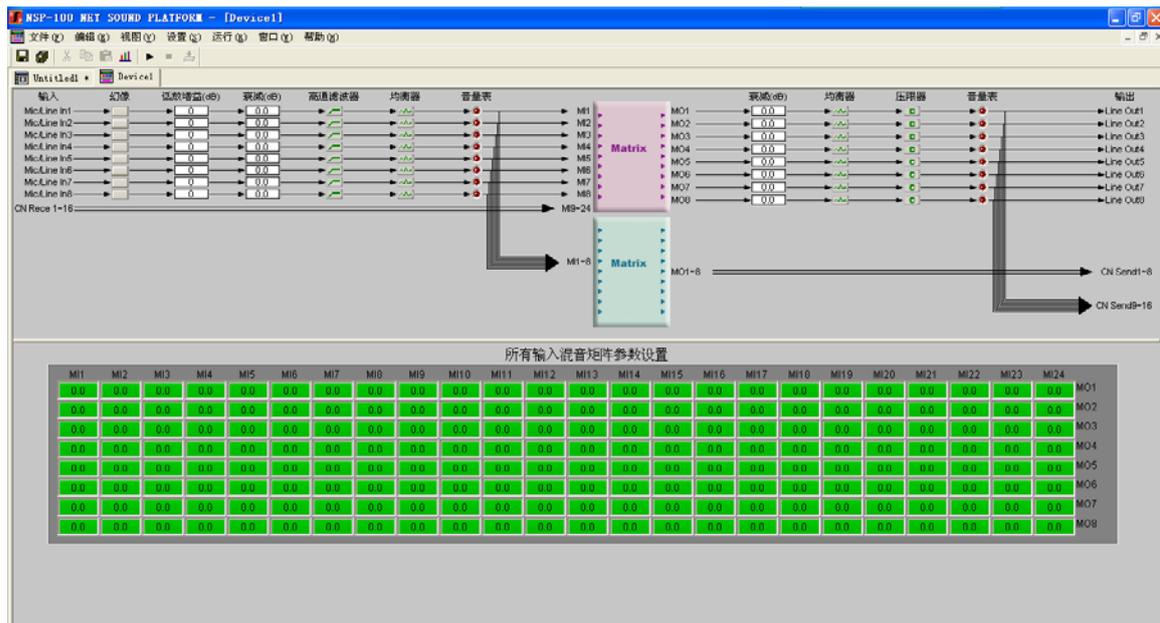
Network Design

There are different ways to configure the TR2000 audio network device. The number of the TR2000 units in the system, where they are located, and the future expansion plans will determine which net topology would be best. The same techniques that used in designing a conventional 100-Mbps Fast Ethernet network system will assist you to design a TR2000 audio network system.

NETWORK TOPOLOGY EXAMPLES

a) Two nodes with a direct cable connection

Advantages: very low cost; very high reliability; easy to implement

Disadvantages: the cable length is limited not longer than 100 meters (328 feet); no expandability; uses crossover cable, not the standard CAT-5 Ethernet cable.

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TR2000 Network audio matrix   **Crossover Cable**   TR2000 Network audio matrix

Category 5 Unshielded Twisted Pair (UTP) Cable
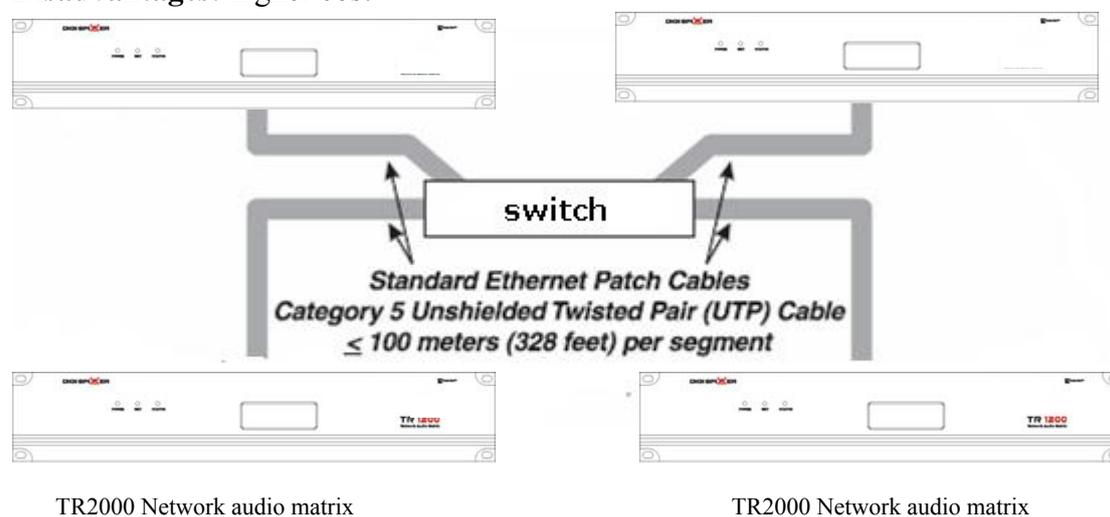≤ 100 meters (328 feet)

The simple TR2000 network system comprises two TR2000 units connected by a single crossover cable. This network has only one segment, so the 100-meter length limit applies to the segment and thus to the entire network. There are no other hardware costs except the TR2000 units and the cable for the interconnection.

b) Star topology

Advantages: large network system—up to 200 meters length (656 feet); high reliability; expandable; uses standard Ethernet cables

Disadvantages: higher cost

switch

Standard Ethernet Patch Cables
Category 5 Unshielded Twisted Pair (UTP) Cable
≤ 100 meters (328 feet) per segment

TR2000 Network audio matrix   TR2000 Network audio matrix

It could easily expand the network by connecting additional nodes to the switch. Intelligent observers and those who have read the manual ahead would notice that this network configuration is really just a star topology with many nodes.

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c) Distributed star topology

Advantages: greater network system; high reliability; easily expandable; uses standard Ethernet cables

Disadvantages: higher cost

What would you do when you have more TR2000 units than the available switch's ports? Add more switch, of course. Most fast Ethernet switch now is stackable, either through an uplink port to connect an additional switch, or through a backplane connection. This network topology is called as distributed star, because it is made up of multiple interconnected stars. The maximum UTP cable length from switch to switch, or from switch to TR2000 unit, is 100 meters (328 feet).

d) Longer distance through fiber

Sometimes a network system may span long distances without any practical switches distributed along the way. The new TR2000 F series products are designed to meet the requirement of long distance transmission and large scale Ethernet network application. TR2000 F series use fiber-optic cables as the transmission media with the maximum effective connecting distance of 80KM.

Example of application

Conference Center

This conference center includes 20 meeting rooms. A control room is centrally located between the north and south meeting room corridors.

Ten meeting rooms are 300 feet far away from the control room. The other ten meeting rooms are 500 feet far away from the control room. Each meeting room has a panel with eight microphone inputs, two line inputs, and two line outputs.

In the traditional analog solution, a large number of cables should be used for the long distant transmit, and every meeting room need an eight channels mixer for the microphone.

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In the TR2000 network system, every meeting room only need to place a TR2000 device to provide the functions such as CobraNet audio signal transmission, microphone signal mix. In the control room, the meeting administrator can use a TR2000-0016A to receive the audio signal from ten meeting rooms and record it. All the meeting room can be connected together by using the network.
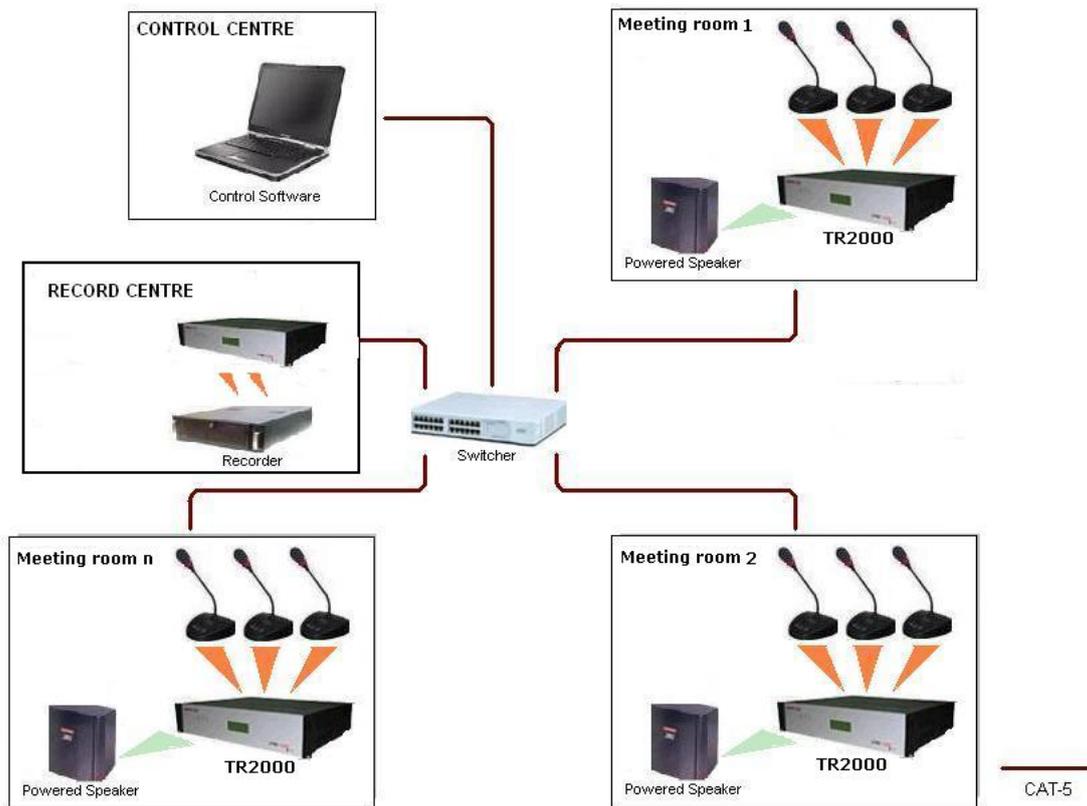
Conference center

TR2000 Types and I/O Configuration

Type	Input channel	Output channel
Multi-Channel		
TR2000-1600A	16ch(Mic/Line)	
TR2000-0016A		16ch(Line)
TR2000-0808A	8ch(Mic/Line)	8ch(Line)
TR2000-1402A	14ch(Mic/Line)	2ch(Line)
TR2000-0214A	2ch(Mic/Line)	14ch(Line)
TR2000-0808D	8ch(AES-3)	8ch(AES-3)
TR2000-1600D	16ch(AES-3)	
TR2000-0016D		16ch(AES-3)
Dual-Channel		
TR2000-02A		2(Line)
TR2000-22A	2(Mic/Line)	2(Line)

TR2000 Specifications

Frequency response (20Hz to 20KHz):	±0.2dB
THD+N(20Hz to 20KHz ,4dBu):	<0.005% (Line) <0.01%(Mic)
Dynamic range (20Hz to 20KHz):	110dB typical
Input impedance (balanced):	> 20 kΩ(Line) >7.5 kΩ(Mic)
Output impedance (balanced):	110Ω
Max output level (balanced):	+21dBu
Maximum gain (Mic):	66dB
Phantom power (Mic):	+48V DC(10 mA)
Sampling rate:	48 kHz
Quantization:	24 bit
Power consumption:	100~240 V AC 50/60 Hz, <45W