First Steps With Digital Audio Networking

Dante™ by Audinate

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SESSION TOPICS

- Digital Audio Becomes Reality
- Computers Enter the Music Industry
- Audio Networking History
- Present Day Audio Technology

Real World Applications:

- Bar Band – Part Time “Weekend Warriors”
- Home Project Studio
- House of Worship

Digital Audio Becomes Reality

DIGITAL AUDIO – A BRIEF HISTORY

Digital audio became reality for professionals and consumers alike in the early 1980's

Some early digital recorders are celebrating their 40th anniversary this year.

The digital mixing console will be turning 30!

DIGITAL AUDIO – A BRIEF HISTORY

The adoption of digital audio was not widespread in all facets of the audio industry.

- Recording studios were the first to use the technology
- The Compact Disc and CD players quickly became the format of choice for consumers.

DIGITAL AUDIO – PRODUCT TIMELINE

Late 1970's: Research & Development on the Compact Disc begins by Sony and Philips.

1978 / 1981: PCM-F10 & PCM-F1 digital recorders released.

1982: The first commercial compact disc was produced.

COMPACT disc DIGITAL AUDIO

1982: Digital Audio Stationary Head (DASH) tape format & recorders for recording studios

1980 1990 2000 2010 2020

TIMELINE

DIGITAL AUDIO – PRODUCT TIMELINE

1987: Yamaha ships the DMP7 digital mixer. Digital Audio Tape (DAT) Recorders appear.

1988: TOA develops the SAORI, the first DSP for installed audio systems.

The software DAW, or Digital Audio Workstation revolution begins during the 80's.

Digital reverbs and effects became common place in both pro and home studios as well.

1980 1990 2000 2010 2020

TIMELINE

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DIGITAL AUDIO – PRODUCT TIMELINE

1992: The Alesis ADAT begins shipping

1994: The Fraunhofer Society released the first software MP3 encoder

1996: Audio networking begins with CobraNet, developed by Boulder, Colorado-based Peak Audio.

1997:

- Microsoft incorporates MP3 support into Windows Media Player.
- Pro Tools reached 24-bit, 48 tracks.

1980 1990 2000 2010 2020

TIMELINE

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DIGITAL AUDIO – PRODUCT TIMELINE

2006:
USB & Firewire audio interfaces become the “go-to” interfaces, as laptop computers begin replacing the traditional desktop computer and soundcard

2003:
Audinate is formed in Sydney, AU and begins development on Dante.

Dante™

2001:

- Yamaha introduces the PM1D digital live sound console.
- Apple introduces the iPod

1980 1990 2000 2010 2020

TIMELINE

DIGITAL AUDIO – PRODUCT TIMELINE

1000!

2017:
Over 1000 audio devices are available with Dante audio networking.

2012:
Yamaha introduces the CL series mixing consoles using Dante for the audio transport

1999 - 2011:
Other audio networking protocols are introduced through the years.

1980 1990 2000 2010 2020

TIMELINE

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DIGITAL AUDIO BECOMES REALITY

Digital audio has been around for awhile

- Digital audio networks: Only for the second half
- What is the differences between digital audio and a digital audio network?
- Let’s take a closer look.

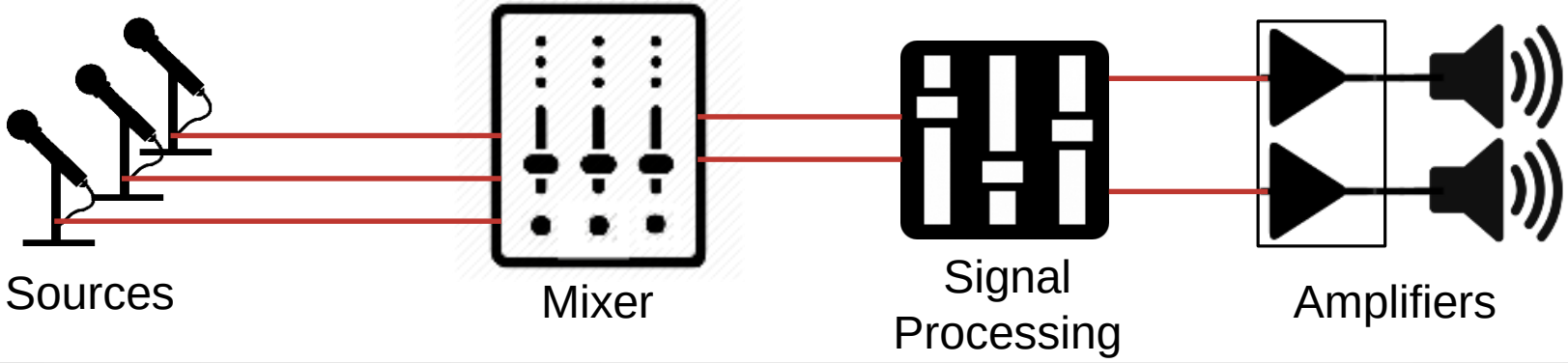
DIGITAL AUDIO – “POINT-TO-POINT”

Until the existence of audio networking, digital audio connections between devices where “point-to-point”.

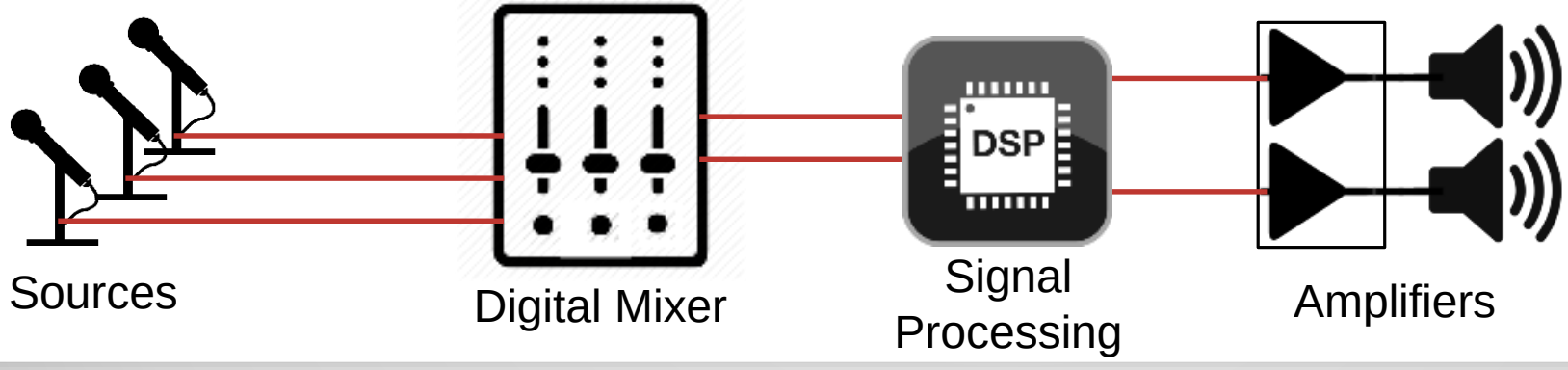
In many ways, similar to analog connections.

Distribution of signals required extra hardware.

DIGITAL AUDIO – "POINT-TO-POINT"

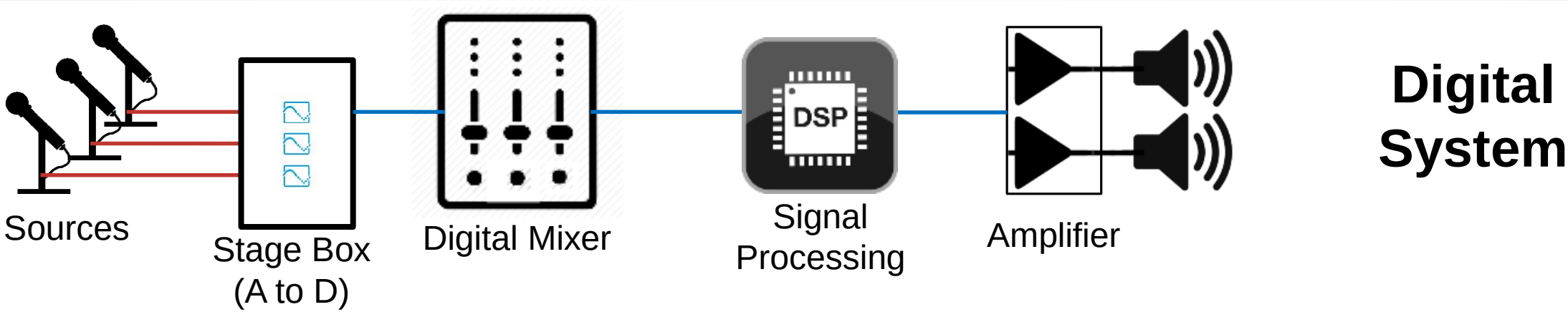


Analog System



Hybrid System
(Digital devices with analog interconnectivity)

DIGITAL AUDIO – "POINT-TO-POINT"



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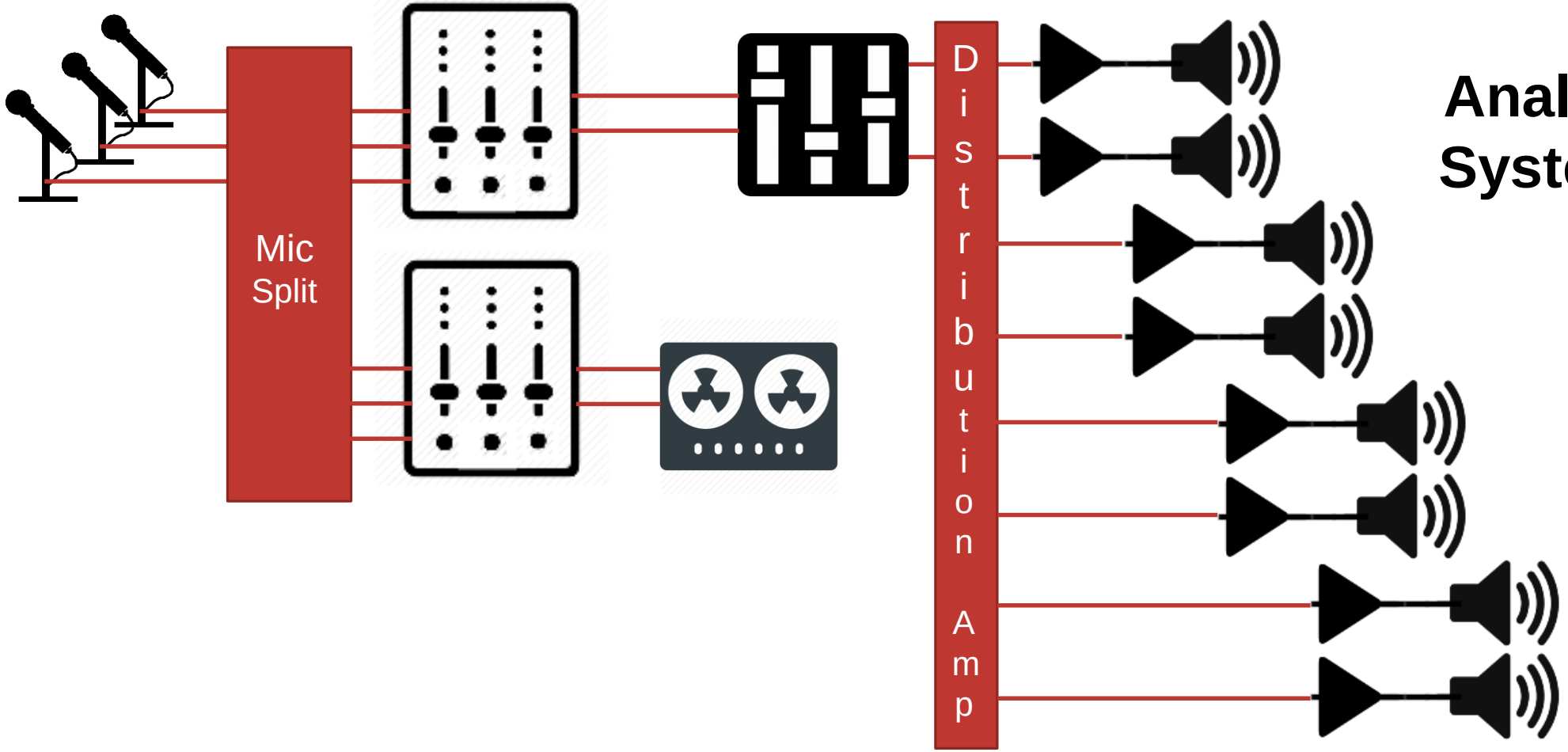
DIGITAL AUDIO – "POINT-TO-POINT"



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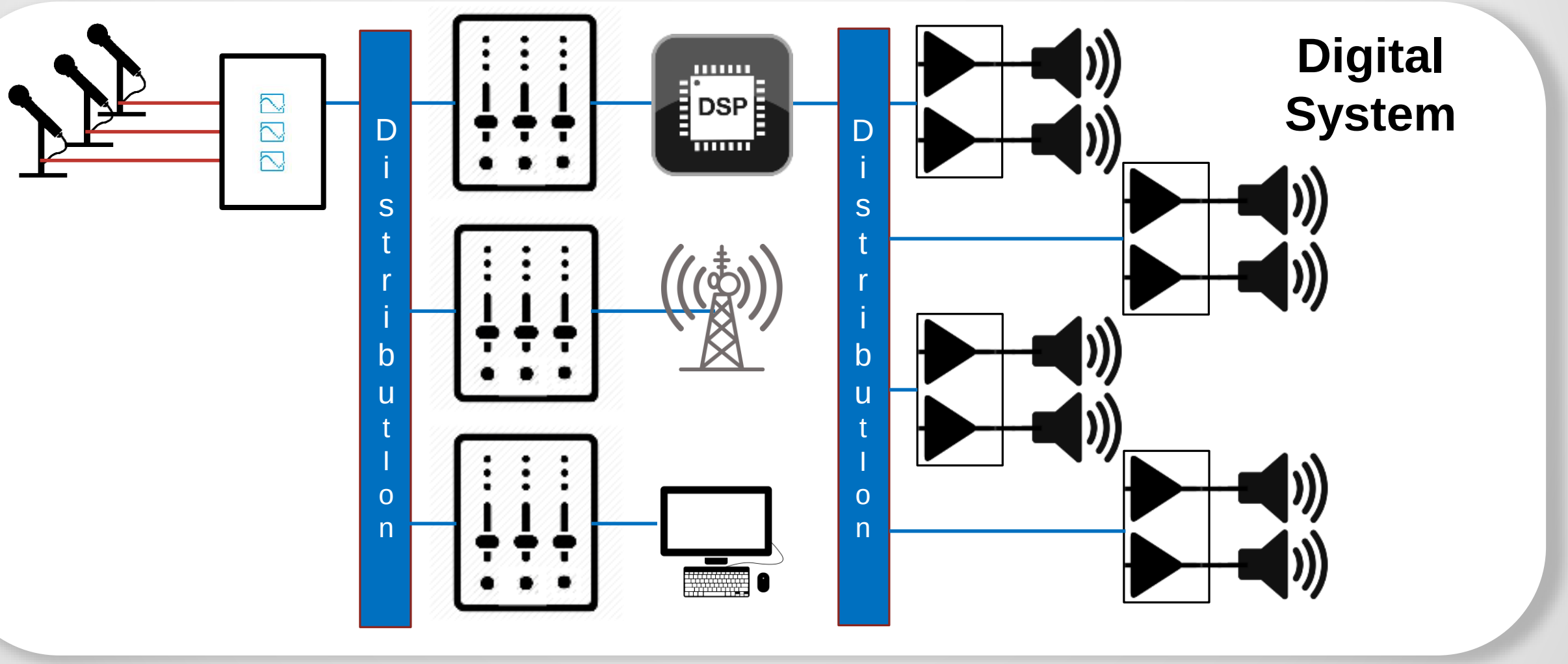

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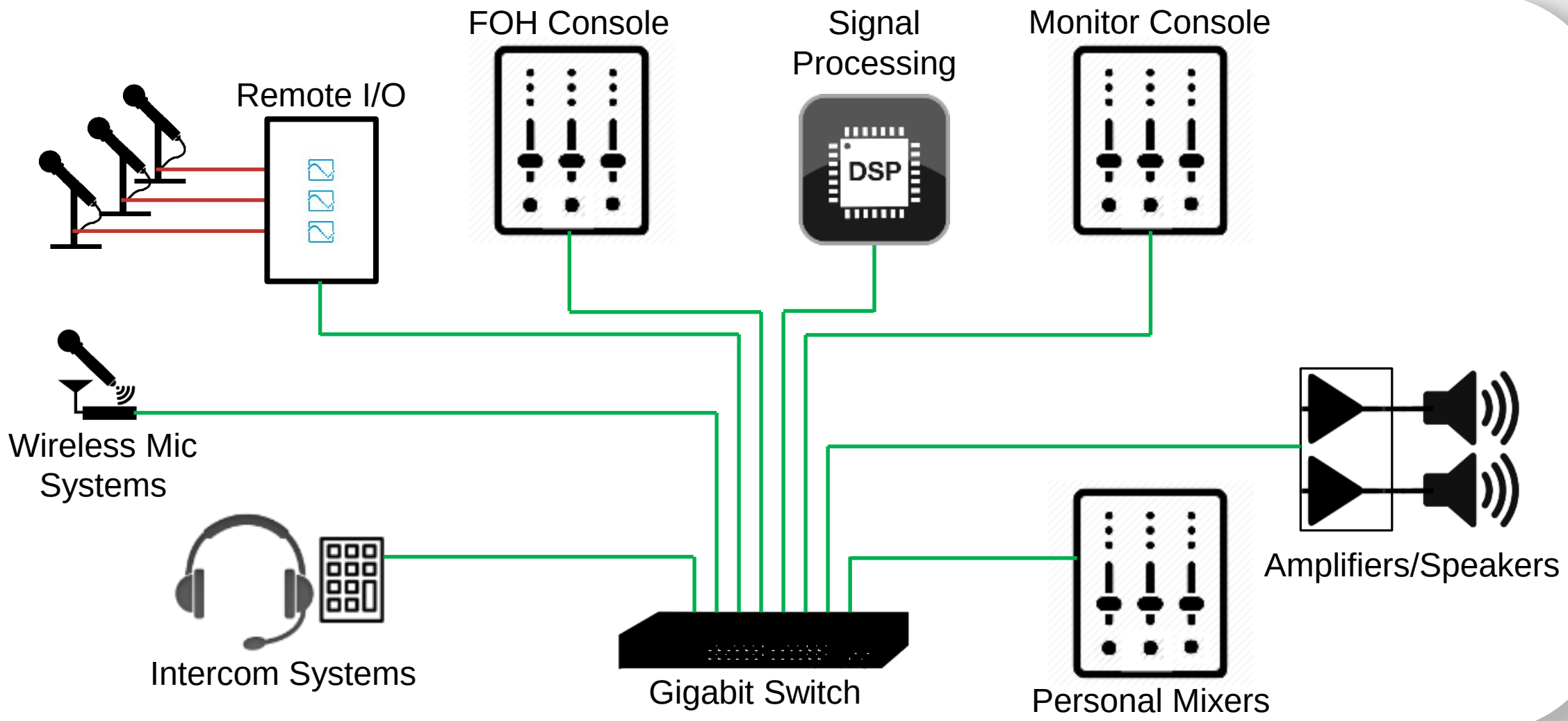
DIGITAL AUDIO NETWORK – DISTRIBUTION



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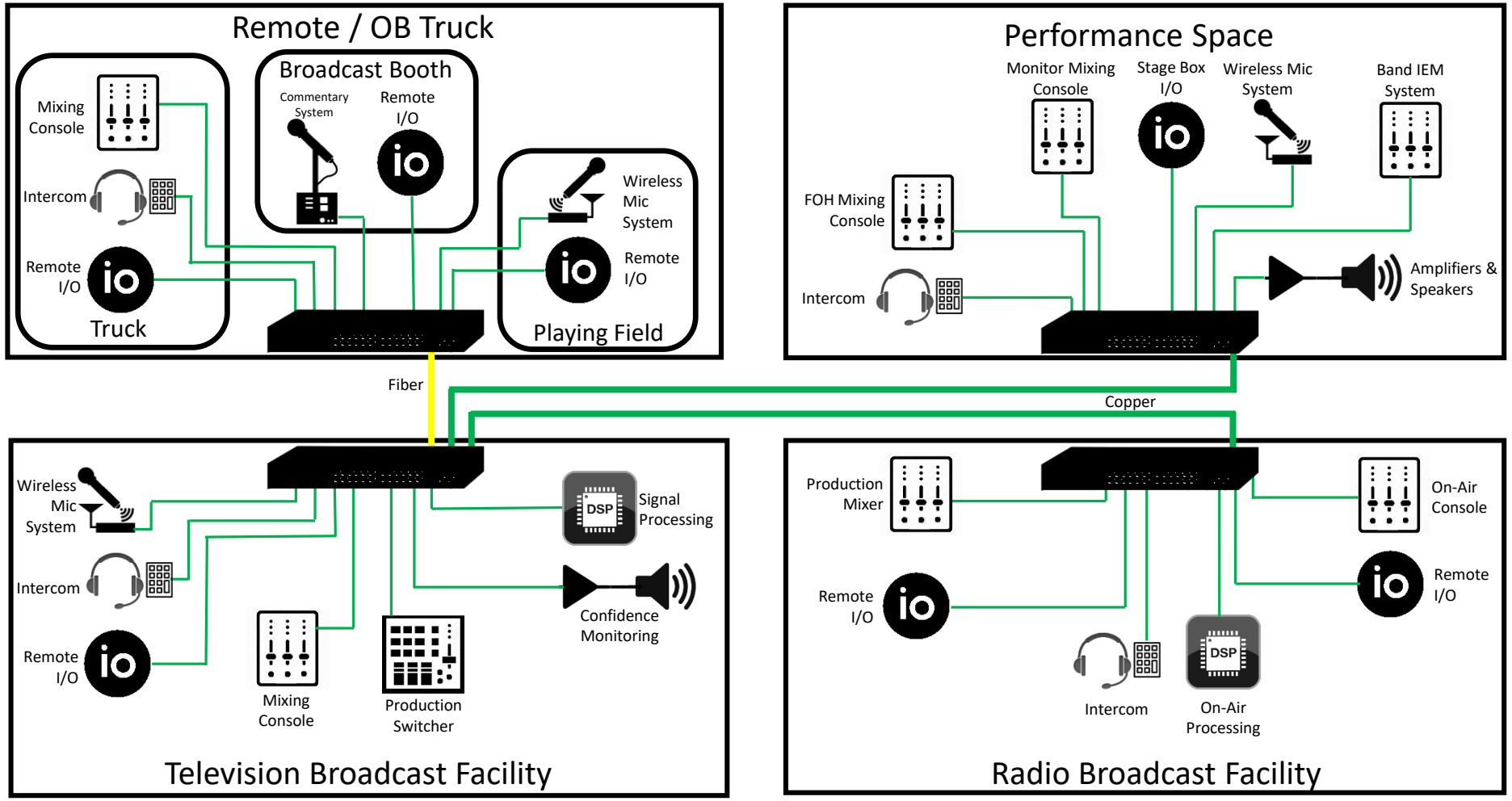
DIGITAL AUDIO NETWORK – SCALABLE



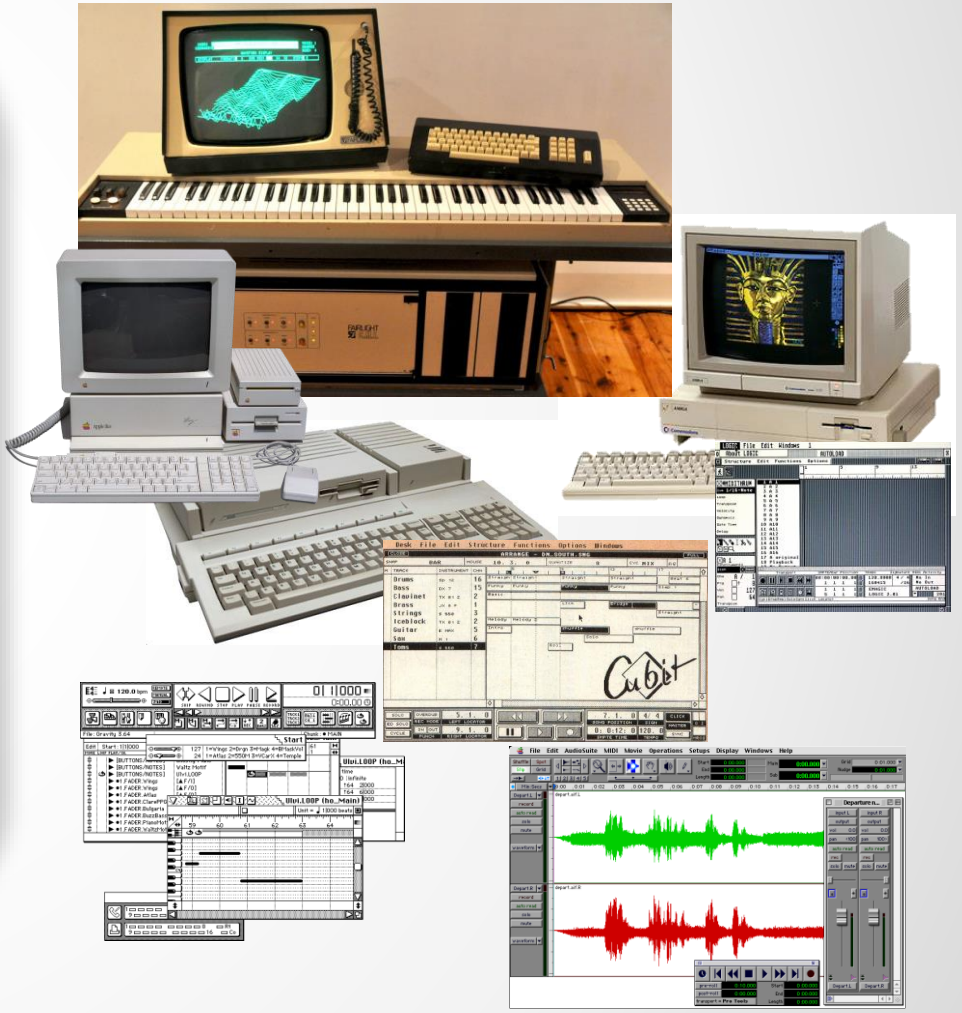
Computers Enter The Music Industry

COMPUTERS – FROM OFFICE TO STUDIO

They began the transition from front office business management devices to content creation and recording tools.

In 1979 Fairlight developed the “Computer Musical Instrument”

Through the 80’s and 90’s what we now know as a DAW took shape.



COMPUTERS – Audio Interfaces

Dedicated soundcards were the first computer audio interfaces.

- Technological advances in external computer interfaces allow for the creation of new audio interfaces.
- The soundcard is largely replaced with Firewire, USB, and Thunderbolt interfaces

COMPUTER AUDIO INTERFACES

Pros

Inexpensive

Portable

Offer excellent audio quality

Cons

Latency (for use in live performances)

Major distance limitations

Point-to-point only

COMPUTER BASED AUDIO: SUMMARY

Computers played a huge part in the development of digital audio

And are the dominant method for recording and playback of multichannel audio.

Computers networks themselves, and the standards they are built on (Ethernet, TCP/IP) have allowed for the creation of Digital Audio Networking

Audio Networking History

AUDIO NETWORKING – BRIEF HISTORY

In the beginning there was…

- MediaLink by a company called Lone Wolf
- Proprietary protocol
- Several manufacturers signed on including: Rane, QSC, & Bose
- Soon abandoned by the manufacturers in favor of Ethernet based networking.

1989 - 1995

AUDIO NETWORKING – BRIEF HISTORY

CobraNet was introduced in ‘96

- Developed by Peak Audio in Boulder, CO
- Initially was a point-to-point network with limited channel capacity
- Upgraded to “fast-Ethernet” (100Mbps)
- Was the first widely adopted audio networking protocol.

CobraNet®

1996 - ????

AUDIO NETWORKING – BRIEF HISTORY

EtherSound was introduced in 2001

- Developed by Digigram in France
- A maker of high-performance computer sound cards.
- Much lower latency than CobraNet
- It is not full duplex (It can only send signals in one direction).

2001 - ????

AUDIO NETWORKING – BRIEF HISTORY

Dante was introduced in 2006

Developed by Audinate in Australia

Considered a second-generation audio network with many advantages of CobraNet and EtherSound.

Over 300 OEM Dante licensees

Over 1,000 Dante-enabled products available

Dante™

2006 - ????

Present Day Digital Audio Technology

PRESENT DAY – DIGITAL AUDIO

The most widely used AES Digital audio standards:

- AES3: 2 channels
- MADI: 56 or 64 channels

“DIGITAL SNAKE” vs AUDIO NETWORKING

Know that “digital snakes” are point-to-point connections.

The distribution of these signals requires extra hardware.

An audio network allows you to distribute signals to any devices on the network.

DIGITAL AUDIO NETWORKING - BENEFITS

Lower cabling costs

-

Well designed network provides enhanced flexibility for future changes to the system

-

Audio routing can be changed on the fly, and does not require any rewiring

-

Glitch free redundancy

-

Audio quality

BENIFITS OF DANTE AUDIO NETWORKING

Vast ecosystem of Dante-enabled products allows for maximum choice of products across the entire audio signal chain.

- Amplifiers
- Audio Embedders & De-Embedders
- Audio Monitors
- Audio Routing Matrix Switchers
- Commentary Systems
- Conference Systems
- Dante Interface Cards
- DAW Systems
- Digital Recorders & Players
- Media Servers
- Video Recorders & Players
- DSP's
- I/O Interfaces
- Wall Plates
- Intercoms
- Microphone Preamps
- Microphones
- Mixers
- Personal Mixing & Monitoring
- Soundcards – physical/virtual
- Speaker Management Processors
- Speakers
- Stageboxes

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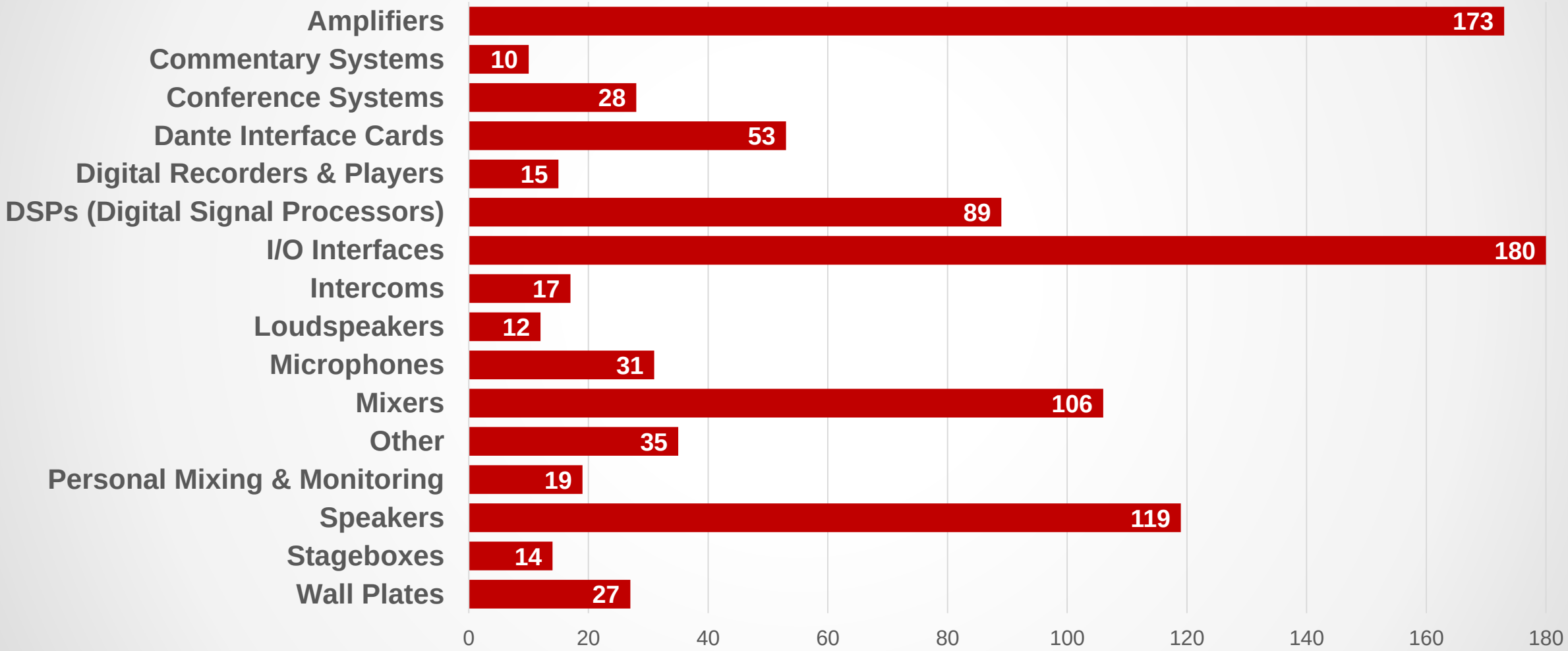
OVER 1,000 DANTE-ENABLED PRODUCTS



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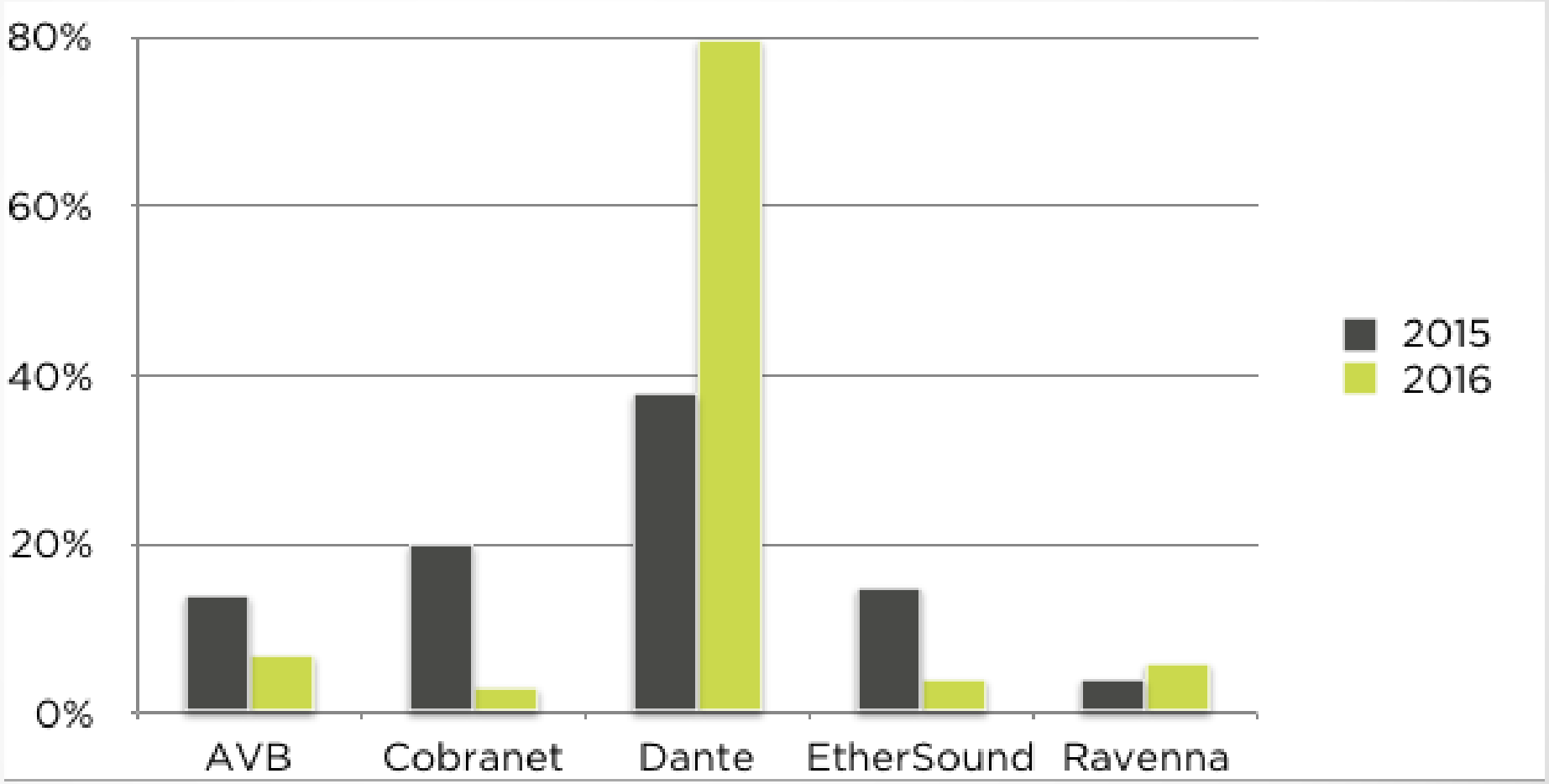
WHICH PROTOCOLS ARE USED IN PROJECTS?

79% of networked audio projects using Dante in 2016

Actual number of Dante projects up 400% over 2015 total



Source: RH Consulting, Audio Networking Survey 2016

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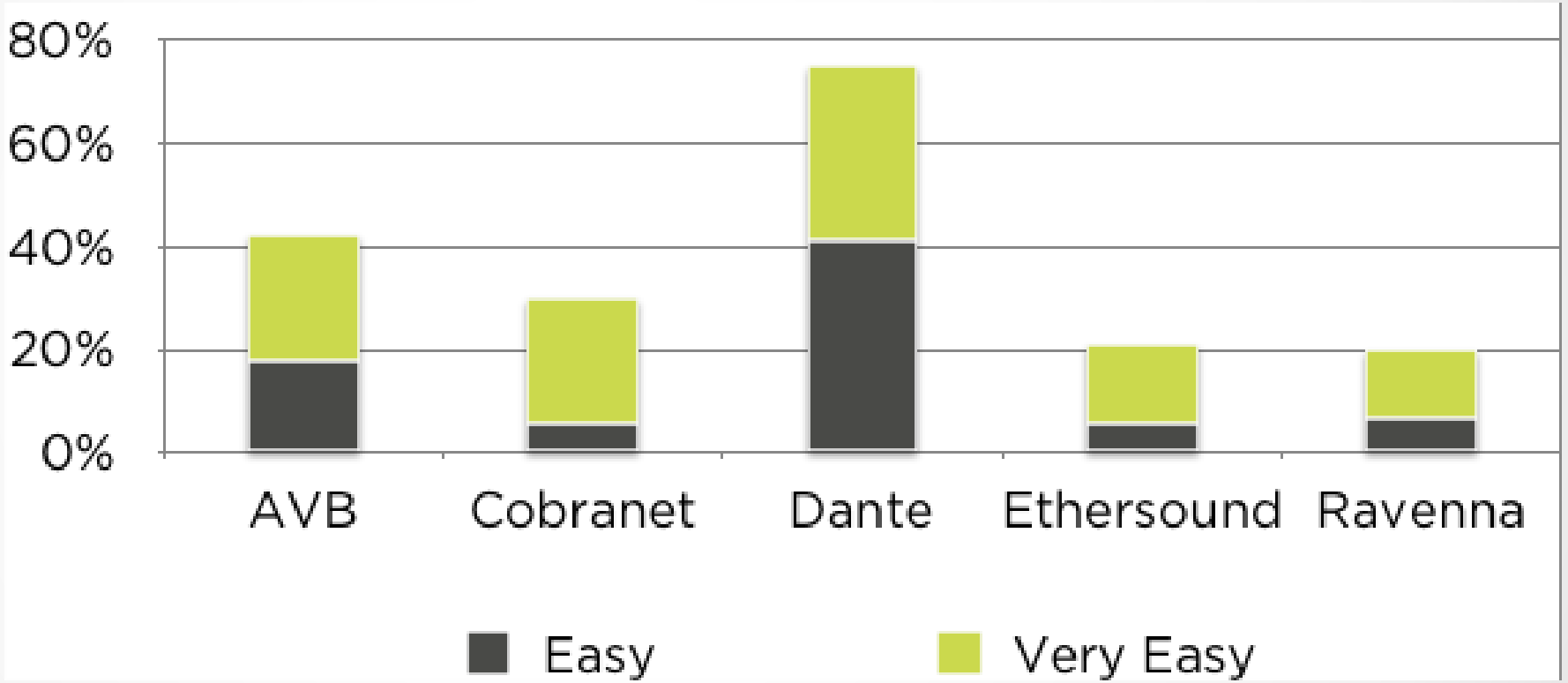
HOW EASY IS IT TO USE EACH PROTOCOL?

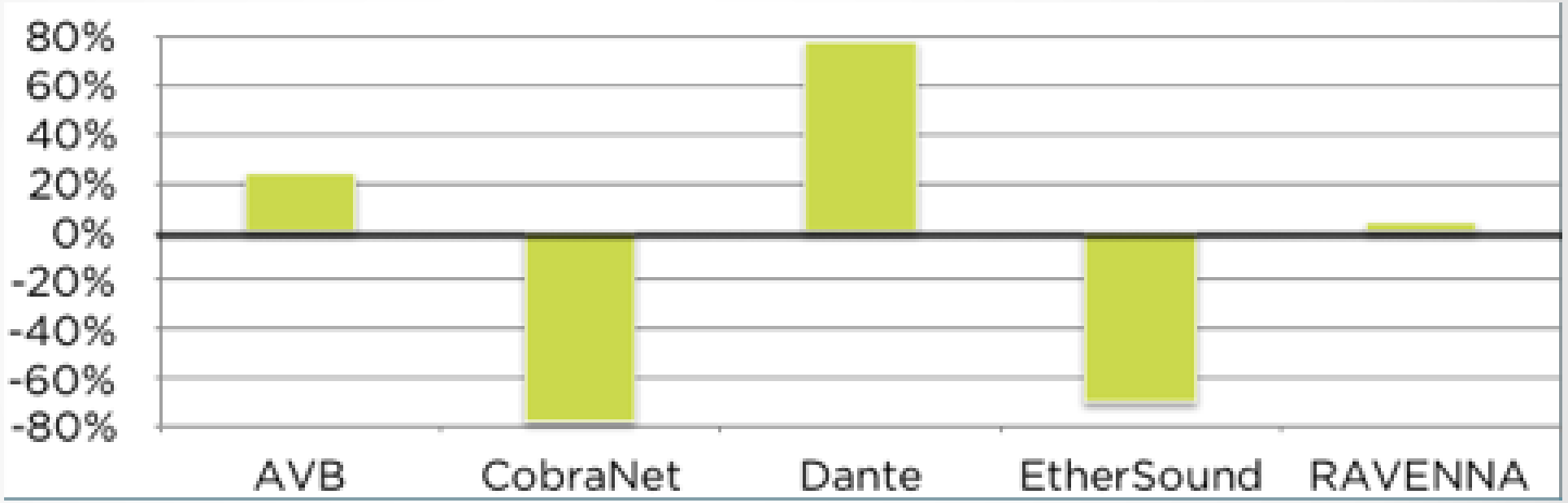
About 75% of respondents reported Dante as “Easy” or “Very easy” to use



Source: RH Consulting, Audio Networking Survey 2016

WHICH PROTOCOL WILL DOMINATE IN 2021?

Dante usage is seen as the most-likely protocol to increase over the next 5 years.



Net difference of % of respondents who predicted increase vs decrease in use of each protocol.

Source: RH Consulting, Audio Networking Survey 2016

AUDIO NETWORKING: KEY TAKEAWAYS

Understand the difference between a Digital Audio Snake and a Digital Audio Distribution System

- Know that networked audio systems are extremely easy to configure
- That they can scale easily to extremely sophisticated designs
- Glitch-free redundancy is available for mission-critical systems
- The “price-of-entry” keeps getting lower for Dante-enabled equipment

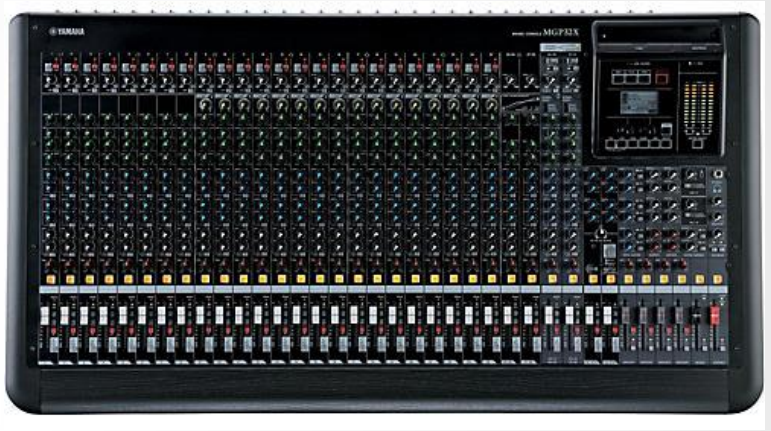
Real World Applications

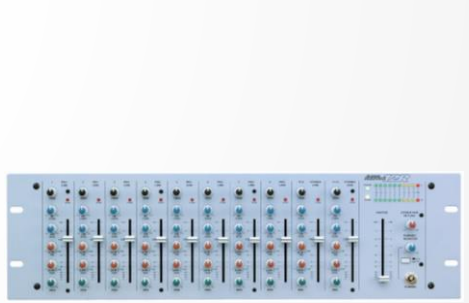
1. BAR BAND – PART TIME “WEEKEND WARRIORS”
2. HOME/PROJECT STUDIO
3. HOUSE OF WORSHIP

APPLICATION 1 – BAR BAND SYSTEM

You'll need…

- A mixing console (at least one)
- A single large mixer for both mains and monitors
- Or could be made up of several smaller mixers (keyboard sub-mixer, drums, etc.)





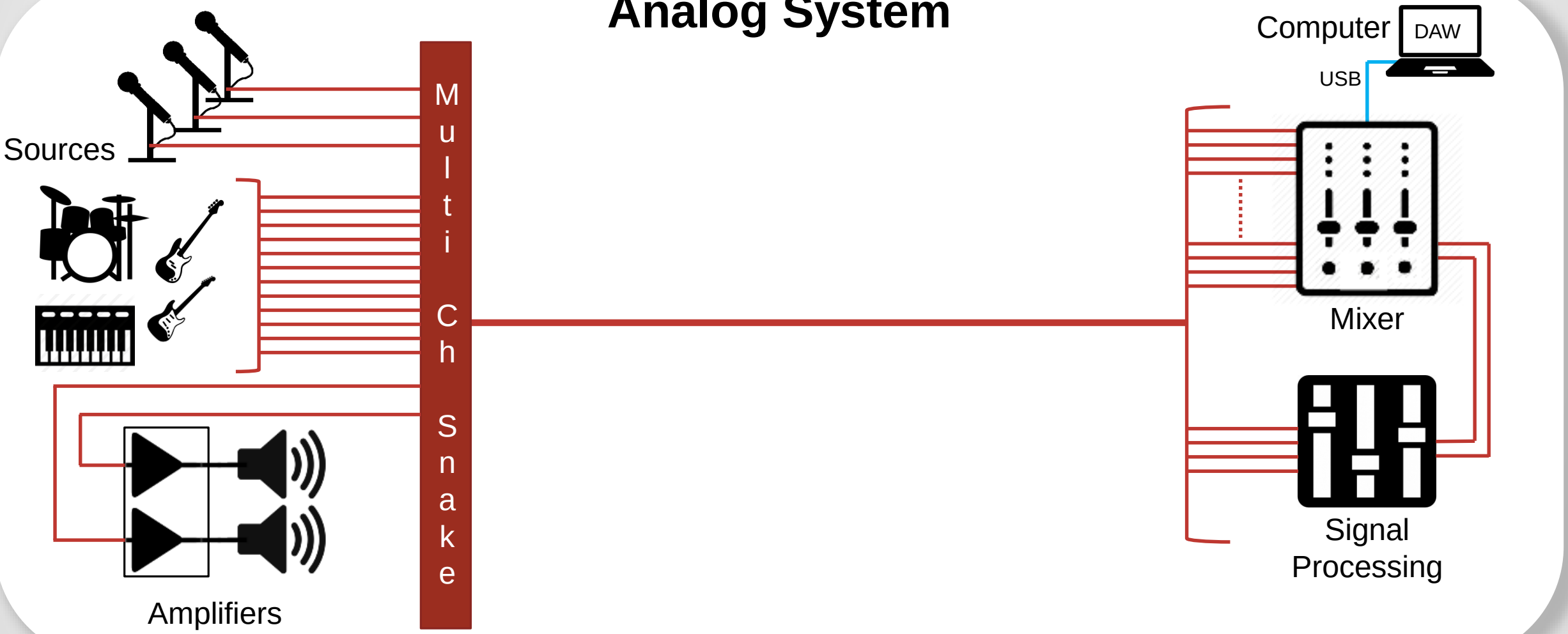
APPLICATION 1 – BAR BAND SYSTEM

Snakes!

- At least one or more snakes and fan-out cables
- To connect the sources on-stage to the mixing console(s)
- Heavy and expensive

APPLICATION 1 – BAR BAND

Analog System



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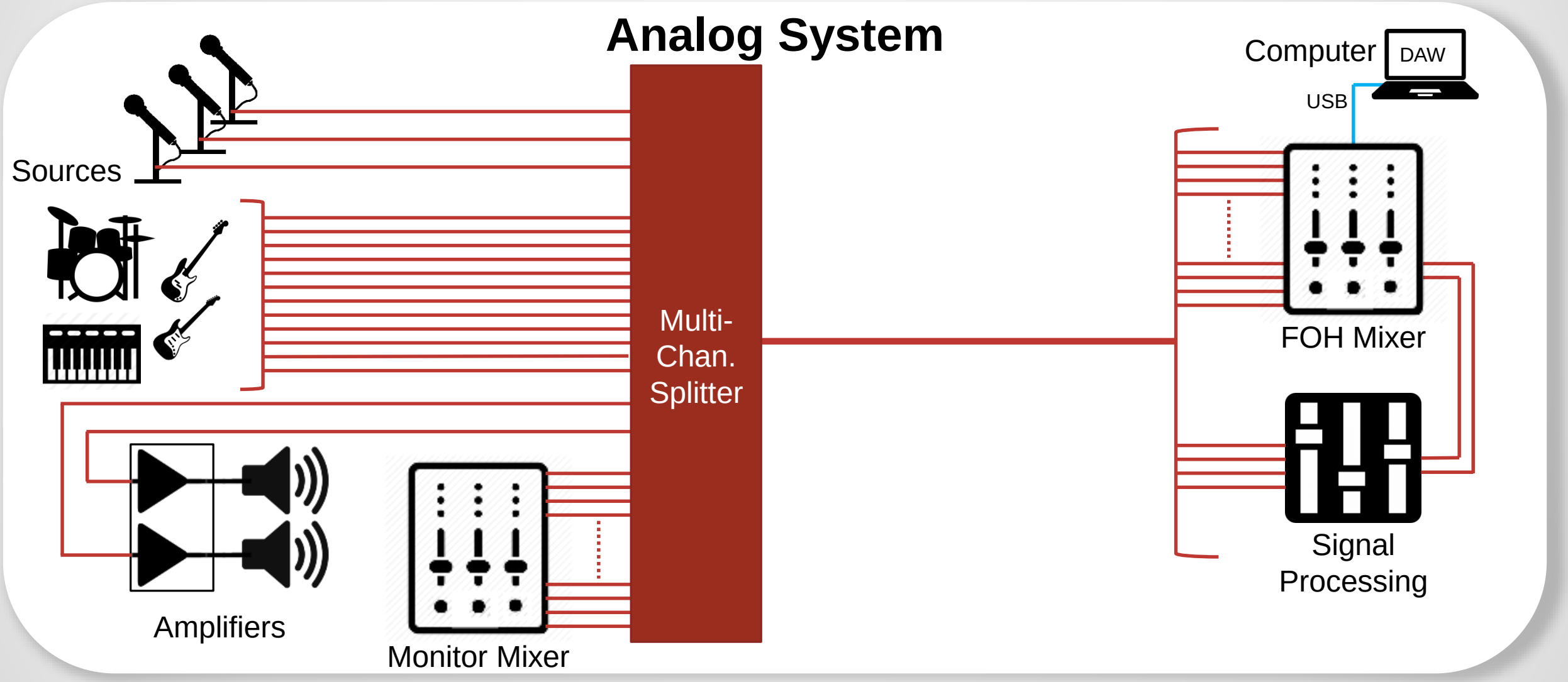

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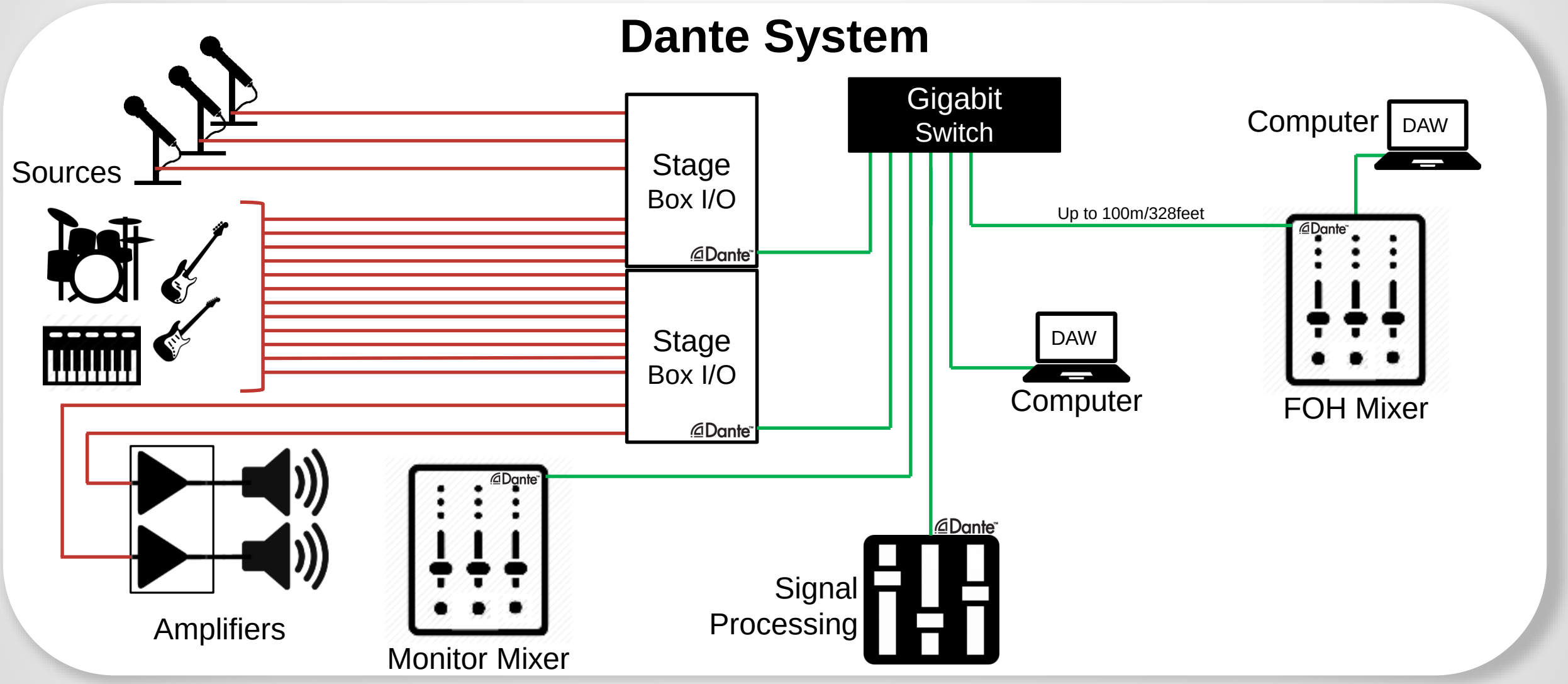


APPLICATION 2 – HOME/PROJECT STUDIO

What defines a home/project studio can vary greatly amongst individuals

- If your studio consists of a computer, a single audio interface, and some form of controller…
- Audio networking may not do much for you.

APPLICATION 2 – HOME/PROJECT STUDIO

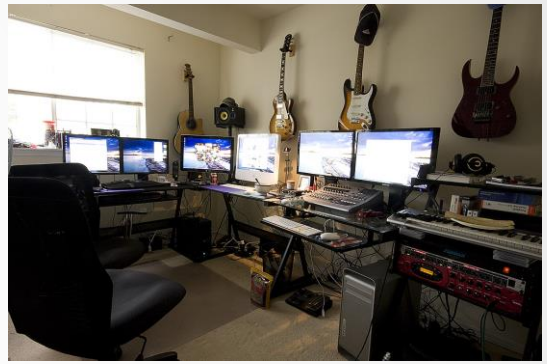
But if your studio is larger in both size and equipment…

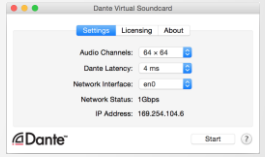
-

And some of the gear does double-duty as part of your live setup

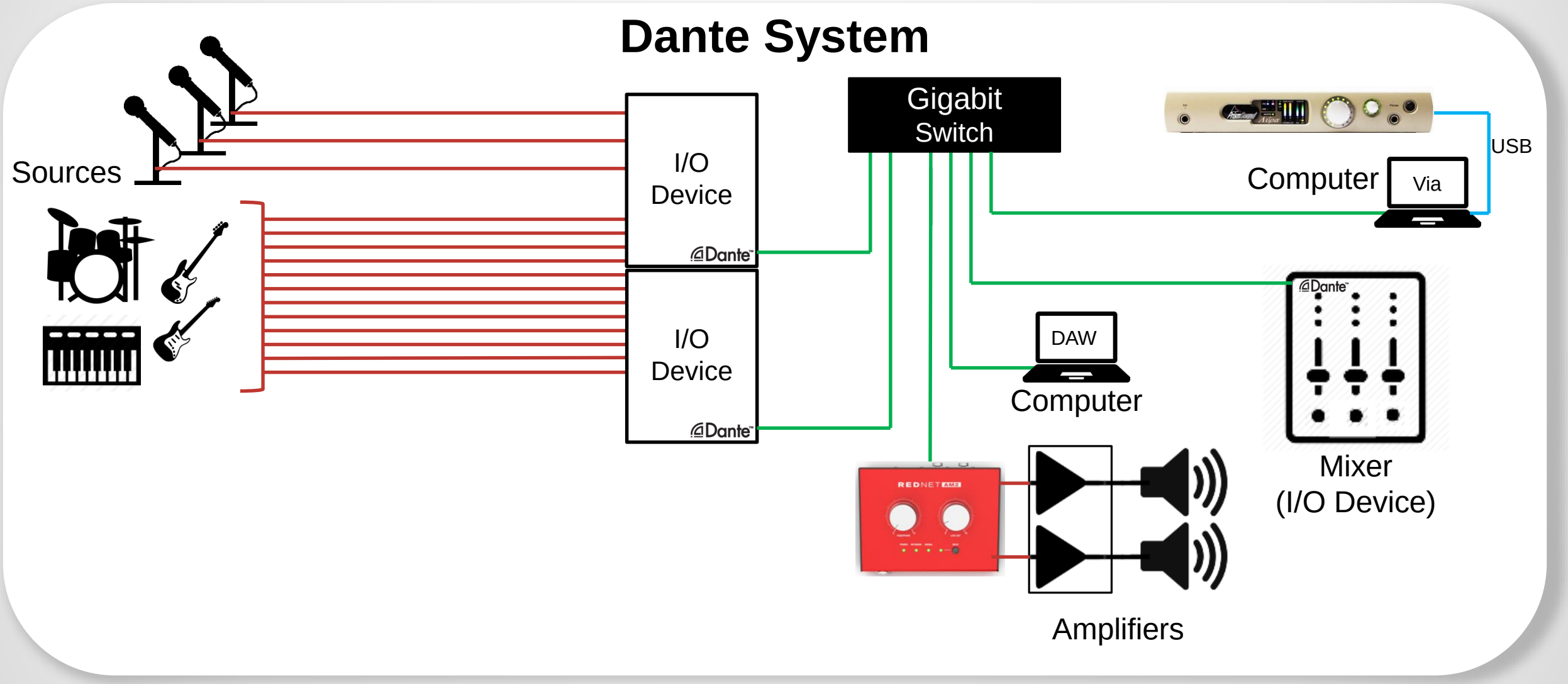
-

Then audio networking can offer you some real advantages.





APPLICATION 2 – HOME/PROJECT STUDIO



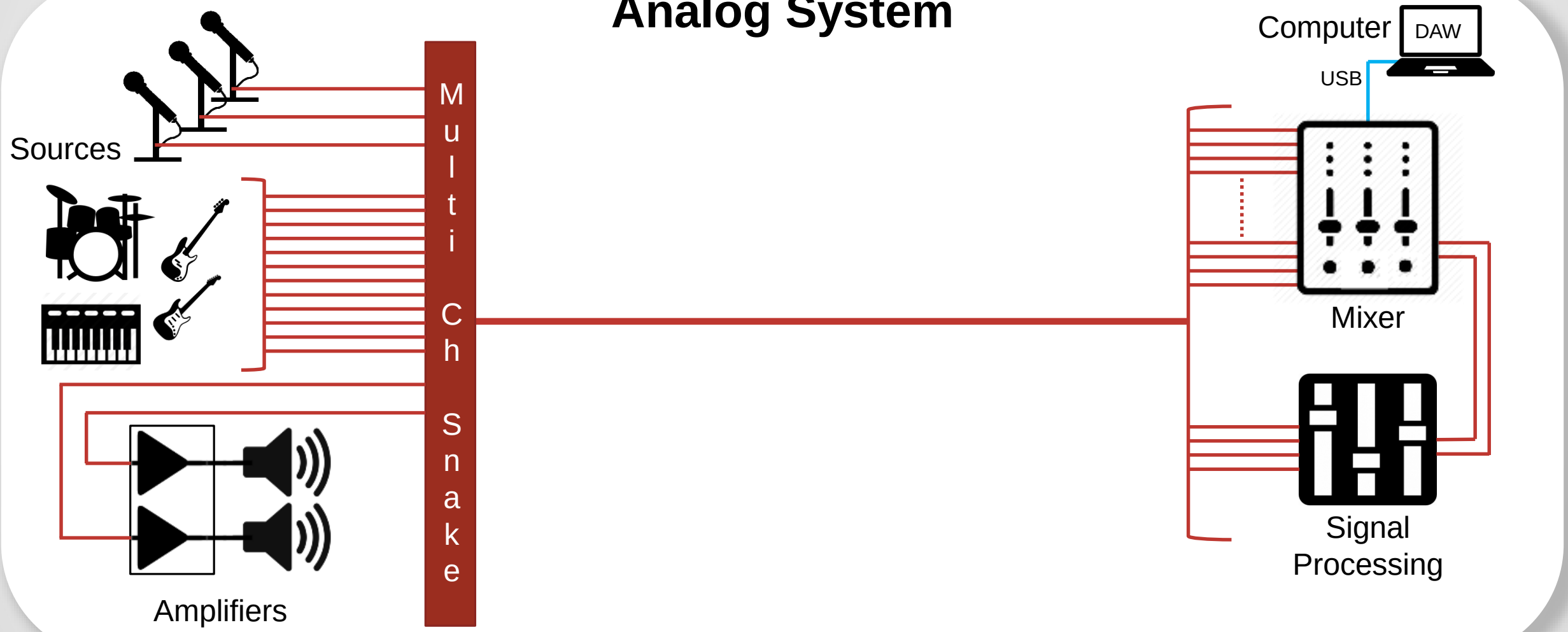
APPLICATION 2 – HOME/PROJECT STUDIO

Dante-enabled devices easily go from stage to studio

- Mixers, stage-boxes, etc., can become I/O devices into your DAW
- Dante Virtual Soundcard allows for up to 64x64 channels of audio for recording and playback from your favorite DAW.
- Dante Via running on a second computer can bring in to the network any existing USB, Firewire, or Thunderbolt audio devices you may have.

APPLICATION 3 – HOUSE OF WORSHIP

Analog System



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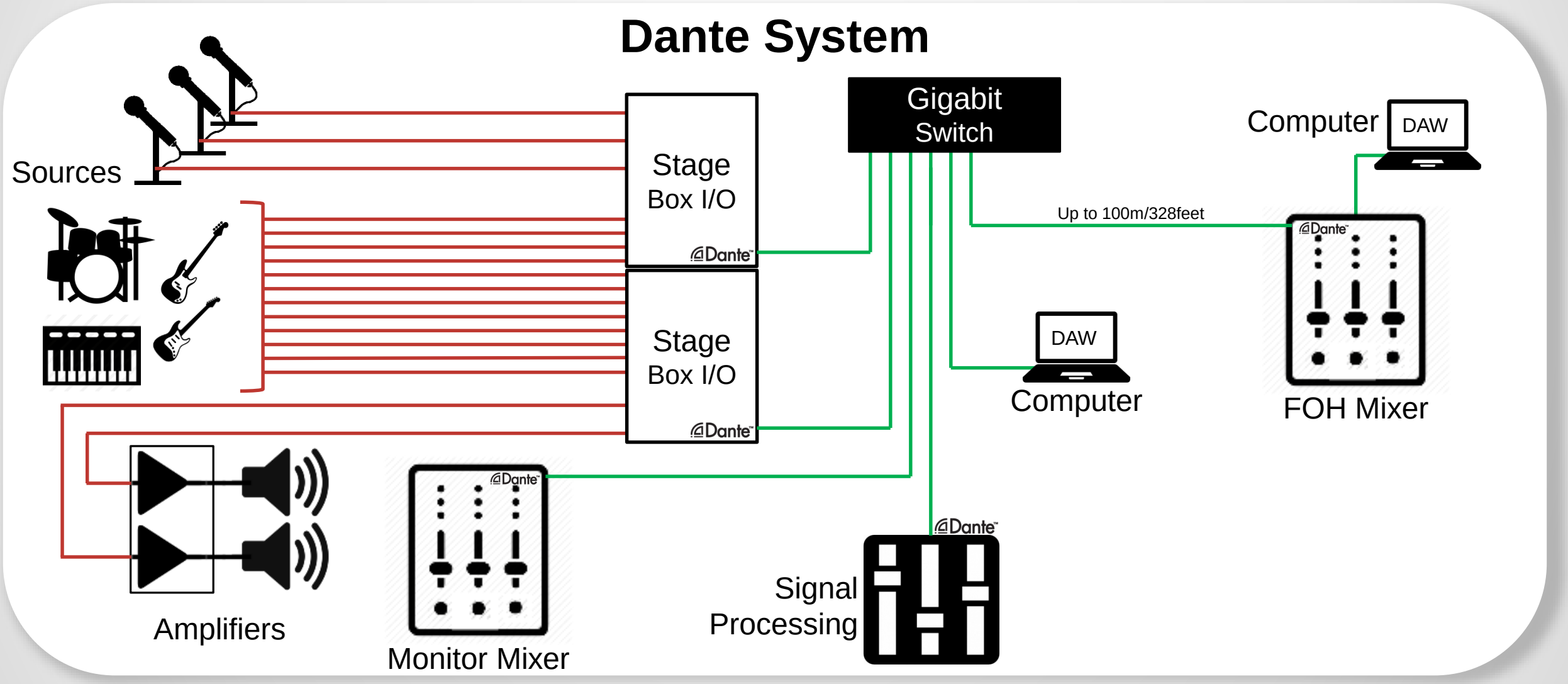

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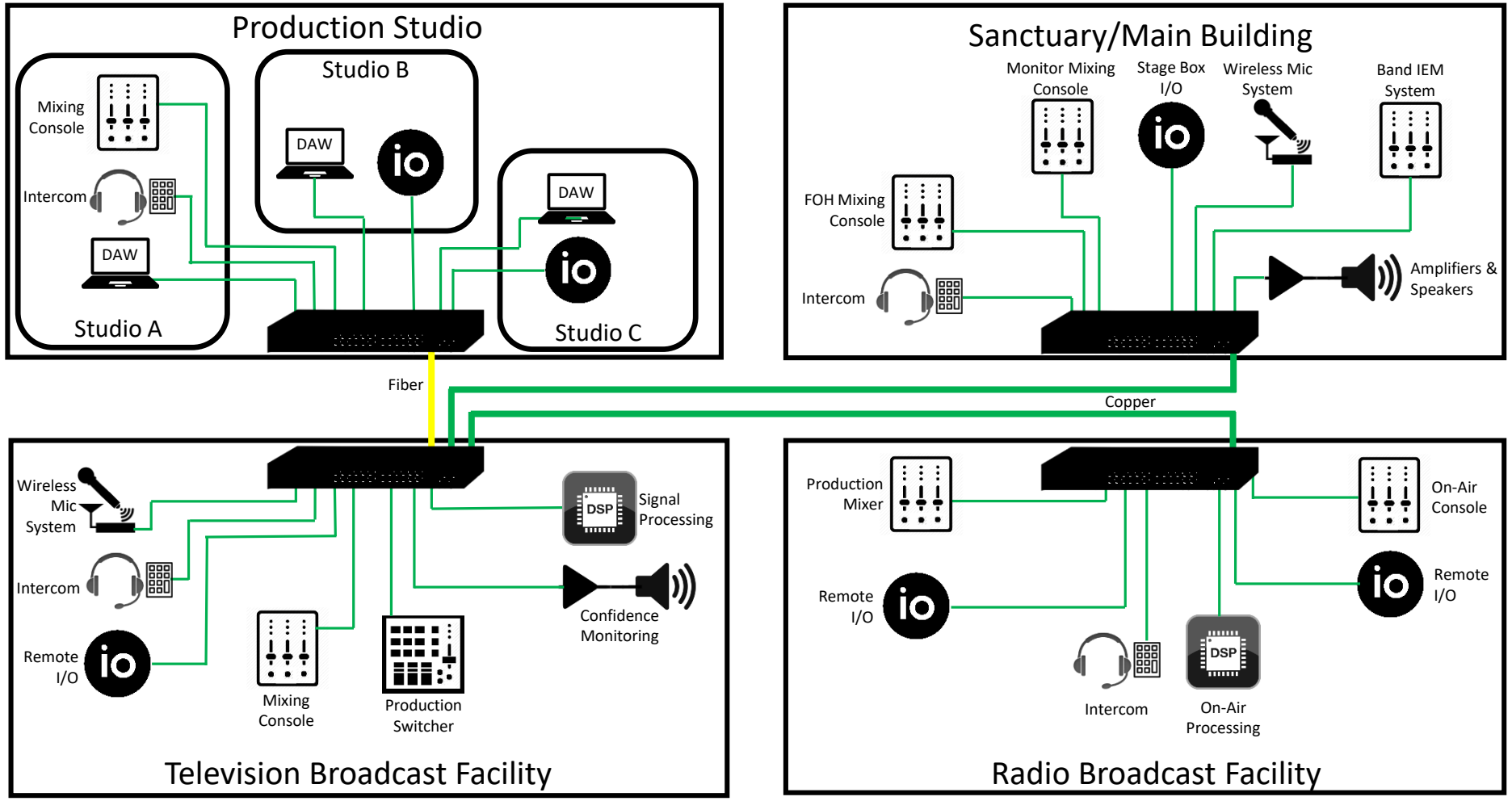

APPLICATION: SUMMARY

Analog signal distribution may be initially less expensive, but as system channel count and complexity increases

•

But as system channel count and complexity increases, the equipment costs well exceed a digital audio network solution.

•

Any manufactures' Dante-enabled products can share audio with any other manufactures' Dante products.

•

Any source can go to any (or multiple) destinations.

Questions & Answers

THANK YOU