

XD2, XC2, XS2 MIXING, ROUTING AND I/O SYSTEM



XC2 CORE AND XD2 CORE SYSTEM

The specialised and rock-solid hardware of the XC2 and XD2 Cores consumes very little power. Integration with DHD's highly efficient external power supplies considerably reduces the operating costs compared to products of other manufacturers. To ensure that your audio network keeps running at all times, the XC2 and XD2 Cores provide extensive redundancy features.



The XC2 Core is DHD's CPU for small or medium-sized mixing consoles supporting up to 44 faders. It also supports routers of up to 3716 x 3076 matrix size. The XC2 Core occupies only half the width of a 19" 1U rack slot.



The XD2 Core is our high-performance device for all routing and mixing tasks, fitting in only 1U. Supporting up to four DSP modules, the XD2 Core is powerful enough for the most demanding applications. The system can be used to process up to 64 faders or to set up an audio router with a matrix size of 8704 x 7424.

DESIGNED TO CREATE DISTRIBUTED SYSTEMS

The XC2 and XD2 Cores and XC2 Concentrator provide common RJ45 ports for the connection of control modules and I/O boxes. Here, standard CAT cables are used, carrying audio, power and control signals in the same cable – DHD's APC technology.

Your setup benefits from the advantages of common CAT

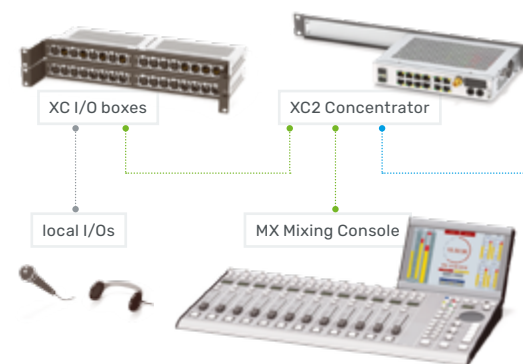
cabling infrastructure which allows you to place I/O boxes and control modules anywhere you need them.

All Gigabit Audio and data connections between cores and concentrators are based on standard fibre-optic cables for Gigabit Ethernet – DHD's GA technology.

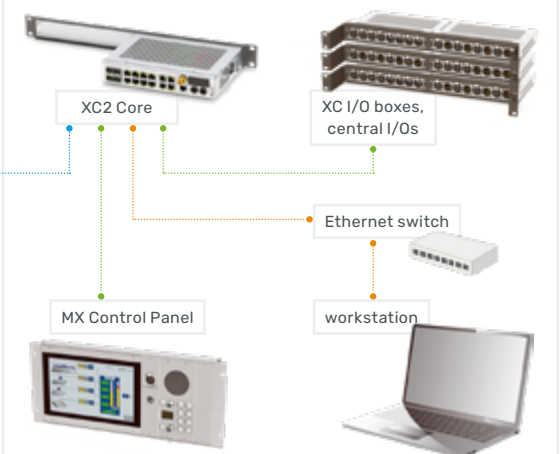
The XC2 Concentrator is always dedicated to one core and acts as APC port extension unit.

This design principle allows you to create true distributed installations – every part of the system is right where it should be. Using standard data cables and structured cabling for the interconnection of DHD modules can dramatically reduce overall system installation costs.

STUDIO



MACHINE ROOM



THE PROCESSING ENGINE

The XC2 and XD2 Cores are the basis for all mixing console surfaces of the Series 52 product line. They can support, for example, a small 4-fader TX touch mixer, a compact 10-fader SX2 console, a medium-sized 18-fader RX2 system or a large 32-fader MX console with layers.

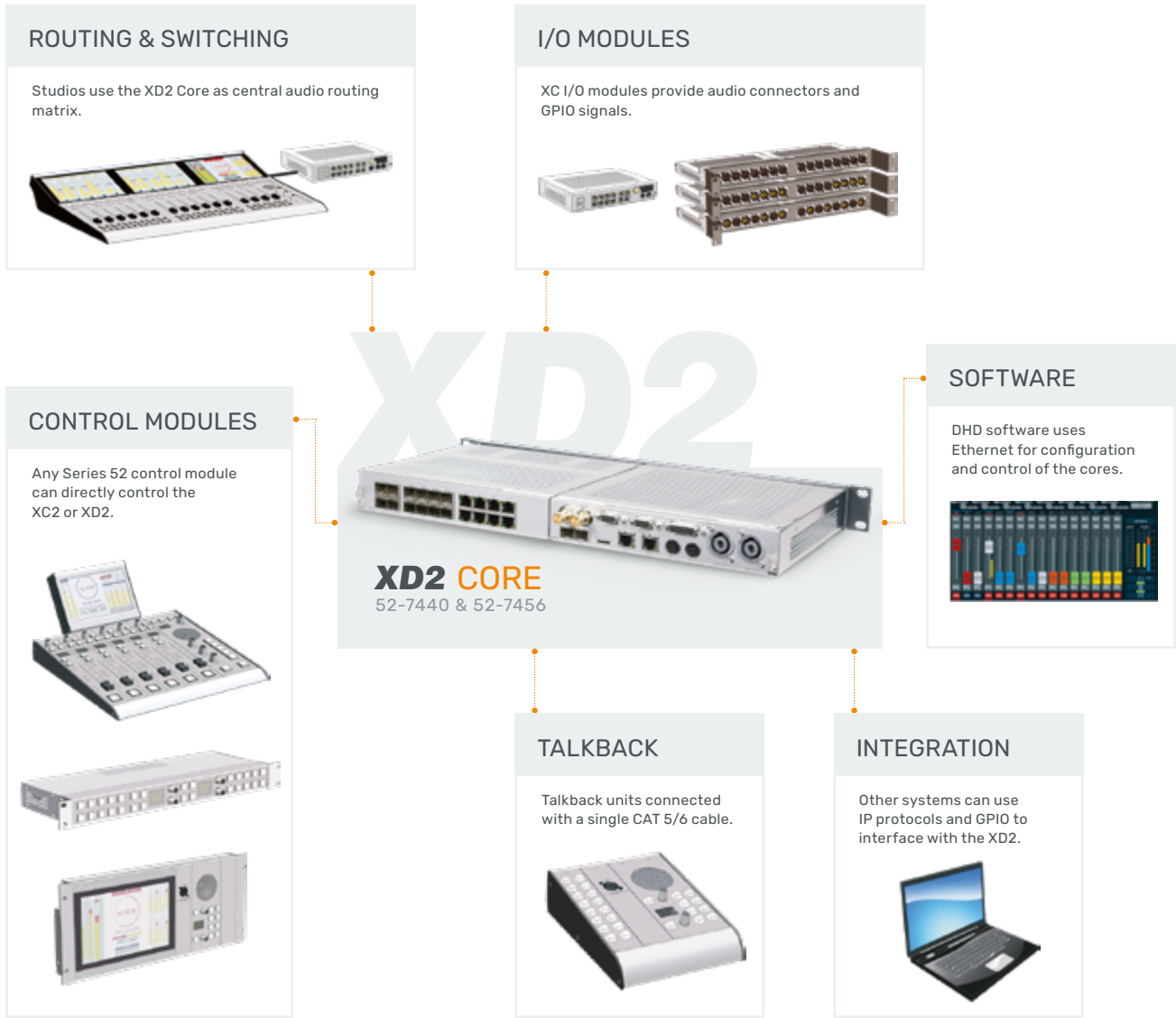
All XC input and output modules and XC2 Concentrators are compatible with the XC2 and XD2 Cores. You can also use our XS2 series I/O modules and cores.

Used as routing matrix, the cores are not only able to switch audio signal, but can also fade those in and out and even apply DSP processing (gain, EQ or dynamics). You can also create complex on-air switching systems as well as talkback systems.

For direct control, combine the XC2 or XD2 Cores with a great variety of DHD control modules, including faders, router control panels and TFT touch displays. All control modules and TFT touch displays use standard CAT cables for communication with the cores.

DHD provides special PC software for remote control, routing, scheduling and monitoring. Third-party systems, too, can interface via Ethernet using Ember+ or the open DHD External Control Protocol. Or just connect via GPIO or to a serial port.

The flexibility of the XC2 and XD2 Cores is mainly based on the Toolbox9 configuration software. All your ideas and requirements for certain functions will be defined during a configuration process typically done by DHD or by your system integrator. If you need to change it later, just use the Toolbox9 software again.



DHD AUDIO NETWORKING

DHD cores provide high-quality digital audio networking using a unique ultra-low latency technology which needs only one audio sample for the synchronous data transmission of your digital audio signal. IP-based transfer of control data packets takes place simultaneously to the ,MADI-like' audio data transmission.



DHD GA

DHD GA Gigabit Audio uses standard Gigabit Ethernet data transmission based on fibre-optic cables. This allows simultaneous transfer of 512 input channels and 512 output channels per port plus IP-based control data packets.

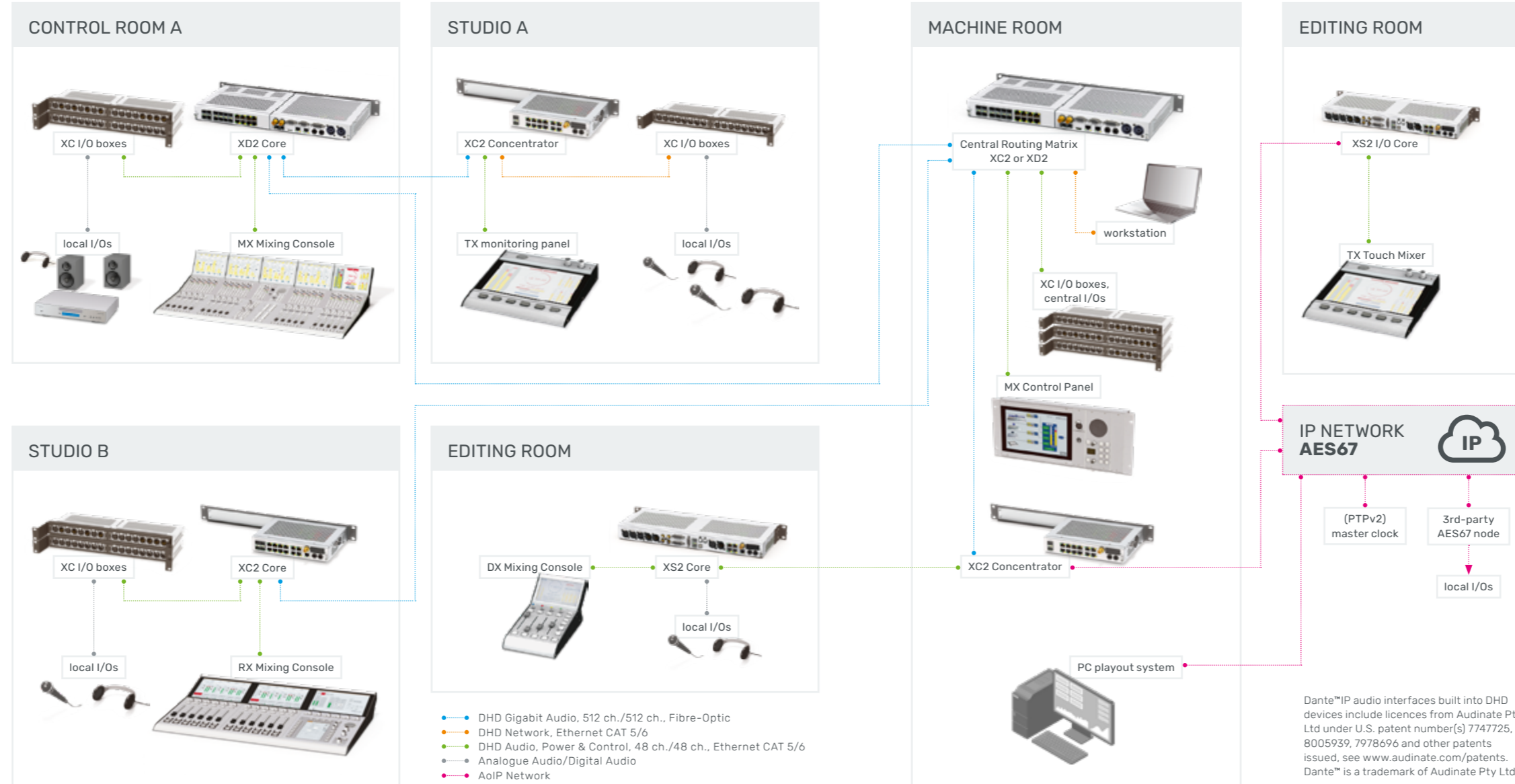
Use DHD GA for powerful core-to-core interlinks or for the connection of I/O boxes and control modules to the core via concentrators. DHD GA supports link lengths of up to 500 m via multi-mode fibre-optic cables or up to 40 km via single-mode cables.

DHD APC

DHD APC ,Audio, Power & Control' uses standard Ethernet data transmission based on CAT cables. This allows the simultaneous transfer of 48 input channels and 48 output channels per port plus IP-based control data packets.

Use DHD APC for core-to-core interlinks or for the connection of I/O boxes and control modules. DHD APC supports link lengths of up to 100 m using standard CAT cables.

DHD APC will also provide the 48 V power for devices like I/O boxes or control modules.



AUDIO-OVER-IP NETWORKING

For advanced flexibility in connecting thirdparty devices, each DHD Series 52 core and concentrator can be equipped with an XC2 AES67 RAVENNA Interface (52-7067A). A Dante Audio-over-IP interface (52-7080A) is also available.

With those modules you can use up to 128 channels of uncompressed bidirectional audio to connect to almost any other Audio-over-IP device like codecs or signal processors via a standard Ethernet network.

The DHD Audio-over-IP interfaces distribute the audio signals from the console to any other AES67-enabled DHD device, third-party device, PC or Mac. This allows monitoring, talkback and connection of remote facilities to the studio via the network.

The realtime AoIP network might comprise:

- DHD consoles with built-in AES67 RAVENNA interface
- DHD router with built-in AES67 RAVENNA interface
- PC or Mac with virtual soundcards compliant with RAVENNA or AES67
- AES67-enabled audio devices from other manufacturers
- Dante devices with enabled AES67 mode
- ST2110-enabled video devices from other manufacturers

And by the way: All XC2 and XS2 cores already include a 4 channel in and 4 channel out Dante interface. This is very handy for smaller networking applications to easily connect to a recording PC, a codec or any other Dante-enabled device.

I/O OPTIONS



XC DIGITAL I/O MODULE

52-7112

- AES3/EBU/SPDIF inputs, 24 bit, input sample rate converters
- 4 AES3/EBU/SPDIF outputs, 24 bit, output sample rate converters
- 4 general-purpose inputs, isolated
- 4 general-purpose outputs, isolated



XC ANALOGUE I/O MODULE

52-7224

- 4 analogue line inputs, 18 dBu/24 dBu maximum, electronically balanced, 24 bit
- 4 analogue line outputs, 18 dBu/24 dBu maximum, electronically balanced, 24 bit
- 4 general-purpose inputs, isolated
- 4 general-purpose outputs, isolated



XC ANALOGUE 8-OUT MODULE

52-7228

- 8 analogue line outputs, 18 dBu/24 dBu maximum, electronically balanced, 24 bit
- 4 general-purpose inputs, isolated
- 4 general-purpose outputs, isolated



XC EMBEDDER/DE-EMBEDDER

52-7172

- 2x 3G/HD/SD SDI de-embedders and 2x 3G/HD/SD SDI embedders, each with:
 - in, 2x loop through, out (BNC connectors)
 - 2 selectable audio groups (1/2 or 3/4),
- 8 channels, SRCs
- 4 general-purpose inputs, isolated



XC MIC/HEADPHONE MODULE

52-7235

- 4 mic/line inputs with remote preamp 0...63 dB, 18 dBu maximum
- 48 V phantom power, switchable
- 4 stereo headphone amp outputs
- 4 general-purpose inputs, isolated
- 8 general-purpose outputs, isolated
- 4 analogue control inputs



XC 8-MIC/LINE MODULE

52-7238

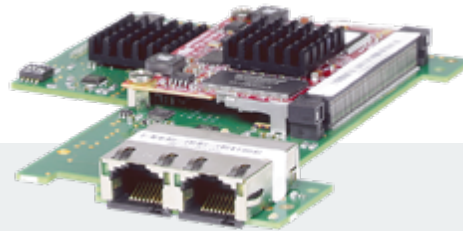
- 8 mic/line inputs with remote preamp 0...63 dB, 18 dBu maximum
- 48 V phantom power, switchable
- 8 general-purpose inputs, isolated
- 8 general-purpose outputs, isolated



XC MIC/LINE MODULE

52-7255

- 8 mic/line inputs with remote preamp 0...65 dB, 26 dBu maximum
- isolated input stages
- 48 V phantom power, switchable
- 4 general-purpose inputs, isolated
- 4 general-purpose outputs, isolated
- recommended for usage in OB-vans



XC2 DANTE IP AUDIO INTERFACE

52-7080

- internal module for XC2 and XS2 Cores
- compatible with Dante-enabled devices or PCs with Dante Virtual Soundcards
- 64 in and 64 out, sample rate converters
- Gigabit Ethernet for Dante connection
- enabled for AES67



XC2 CONCENTRATOR

52-7310

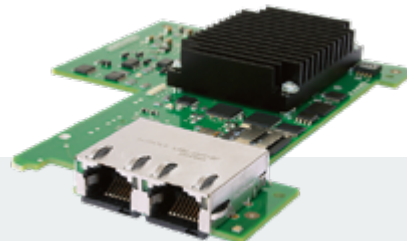
- for connecting I/O and control modules
- 12 DHD APC ports
- 2 DHD Gigabit Audio network ports
- includes 2 SFP modules for connection to XC2/XD2 Cores with LC connector, multi-mode
- extension slot, for AoIP Interface 52-7067/52-7080
- redundant power inputs



XS MULTI I/O MODULE

52-1335

- 2 mic/line inputs, preamp, 48 V
- 2 stereo headphone outputs
- 8 analogue line inputs, 24 dBu maximum, electronically balanced
- 8 analogue line outputs, 24 dBu maximum, electronically balanced
- 3 AES3/EBU inputs, 1 SPDIF input
- 2 AES3/EBU outputs, 1 SPDIF output
- 2 USB audio IF, 10 GPI, 10 GPO, 2 ACI



XC2 AES67 RAVENNA INTERFACE

52-7067

- internal module for XC2 and XS2 Cores
- compatible with devices or virtual soundcards that are enabled for AES67 and RAVENNA
- 64 channels in/out (32 streams in/out)
- software options for:
 - Seamless Protection Switching (SPS) or channel/stream extension (128 ch/64 streams) – 52-8541
 - multicast GPIOs – 52-8542
 - NMOS – 52-8543
 - SNMP – 52-8591



XC GIGABIT AUDIO PORT

52-7391 multi-mode
52-7395 single-mode

- bidirectional audio exchange of 512 channels between two XC2/XD2/XS2 Cores
- DHD-licensed SFP module with LC connector

XC CORE AUDIO NETWORK LICENSE

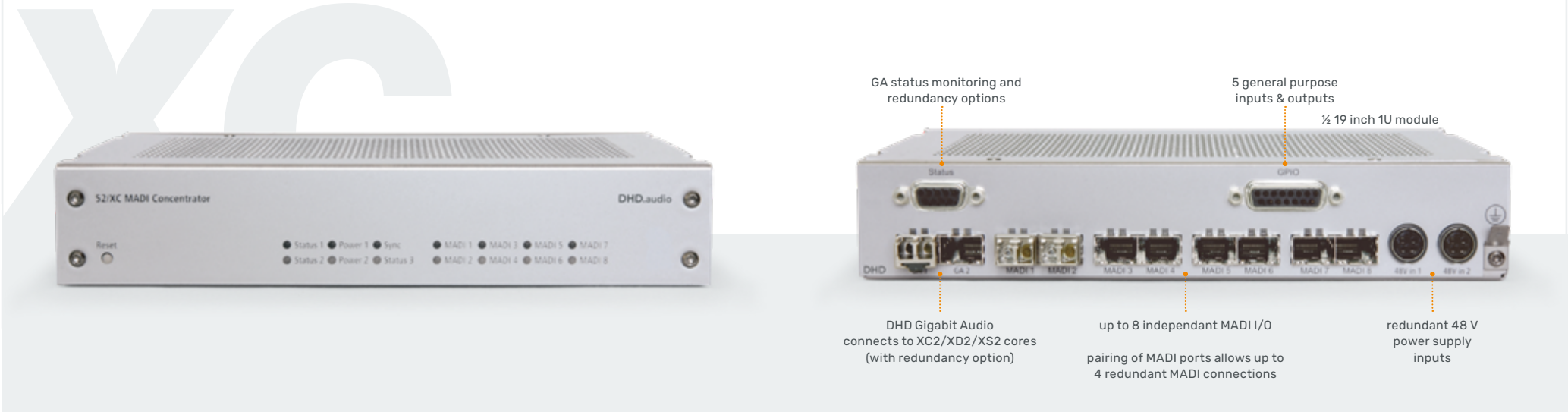
52-8582

- bidirectional audio exchange of 48 channels between two XC2/XD2/XS2 Cores
- multiple links are possible
- direct connection via standard CAT cables
- hardware-related license code

I/O OPTIONS

XC MADI CONCENTRATOR

52-7320



GA status monitoring and redundancy options

5 general purpose inputs & outputs

1/2 19 inch 1U module

DHD Gigabit Audio connects to XC2/XD2/XS2 cores (with redundancy option)

up to 8 independent MADI I/O pairing of MADI ports allows up to 4 redundant MADI connections

redundant 48 V power supply inputs

The XC MADI Concentrator provides an additional option for multi-channel connections to your broadcast system. It can be used with all XC2/XD2/XS2 Cores and Series 52 mixing consoles.

Up to 8 MADI interfaces can be used on each MADI concentrator to extend your XC2/XD2 Core to be a powerful MADI Router.

MADI interface signal are concentrated on one fibre-optical cable (DHD Gigabit Audio) and connected to a DSP core. The ports conform to AES10 and run with 56 or 64 channels. The first MADI port contains an asynchronous sample rate converter.

By linking 12 MADI concentrators to a central XD2 Router, you can build an impressive audio routing system with up to 96 MADI ports – which is a matrix size of 6144 x 6144 channels.

The XC MADI Concentrator features a redundant MADI-port operation mode. A doubled fibre-optic MADI link can be created by pairing two MADI ports.

Another redundancy option is the MADI concentrator redundancy. Using this mode, two MADI concentrators are connected to one XC2/XD2 Core and the paired MADI links connected to both MADI concentrators will act with automatic failover.

XC MADI PORTS

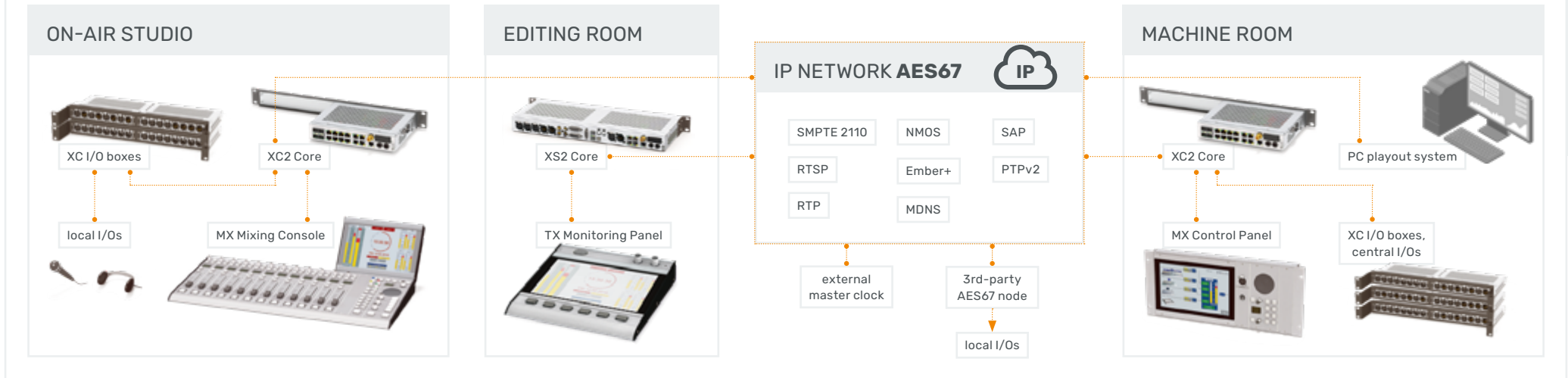
52-7321 multi-mode
52-7325 single-mode



- 56 or 64 input channels and 56 or 64 output channels, AES10 MADI, LC connector
- for XC2/XD2/XS2 Cores, XC2 Concentrators and XC MADI Concentrators

XC2 AES67 RAVENNA INTERFACE

52-7067



BUILT-IN AUDIO-OVER-IP INTEROPERABILITY

The XC2 AES67 RAVENNA Interface boosts the Audio-over-IP capabilities of all DHD systems. Developing our own AES67 implementation for this interface allows a maximum of interoperability with RAVENNA/AES67-enabled devices or virtual soundcards.

With this interface you can send and receive up to 64 AES67/RAVENNA-compliant AoIP streams, with a maximum of 128 mono transmit channels and 128 mono receive channels.

The AES67/RAVENNA module can be used on the internal extension slot of all XC2 Cores, XS2 Cores and XC2 Concentrators. A sample rate converter for inputs and outputs eliminates the need to synchronise the mixer to the AES67 network.

CONFIGURATION OPTIONS

An easy-to-use web interface and powerful discovery mechanisms for the audio streams allow fast integration into your AoIP infrastructure. It offers a simple configuration mode for fast setup using DHD default parameter sets and linked Toolbox9 configuration data.

An advanced configuration mode is available, in which network parameters for input and output streams and synchronisation (PTPv2) parameters can be set to SMPTE-based defaults or to user-defined values.

With full Ember+ integration, configuration and monitoring of the XC2 AES67 RAVENNA interface are also possible via Ember+-compliant software.



web interface for configuration

CORE OPTIONS

XC2 CORE

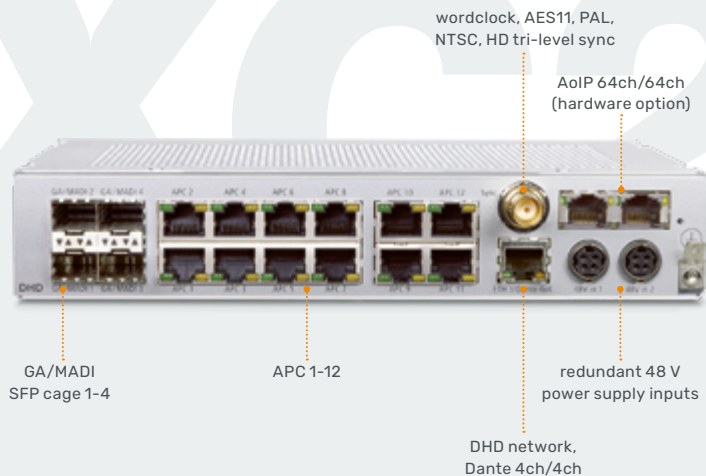
52-7420

The XC2 Core can manage any task in your broadcast studio, ranging from small DJ-operated studios with 12 faders to large control room desks in a complex studio environment with up to 44 faders.

By adding software licenses, you can, for example, increase the number of logic

functions and peak meters or add channel delay. With an additional DSP card you can get more power for fader processing or additional loudness meters.

Its small size (only 1 rack unit) and low power consumption (only 15 W) also makes it perfect for use in OB vans and SNGs.



XS2 I/O CORE

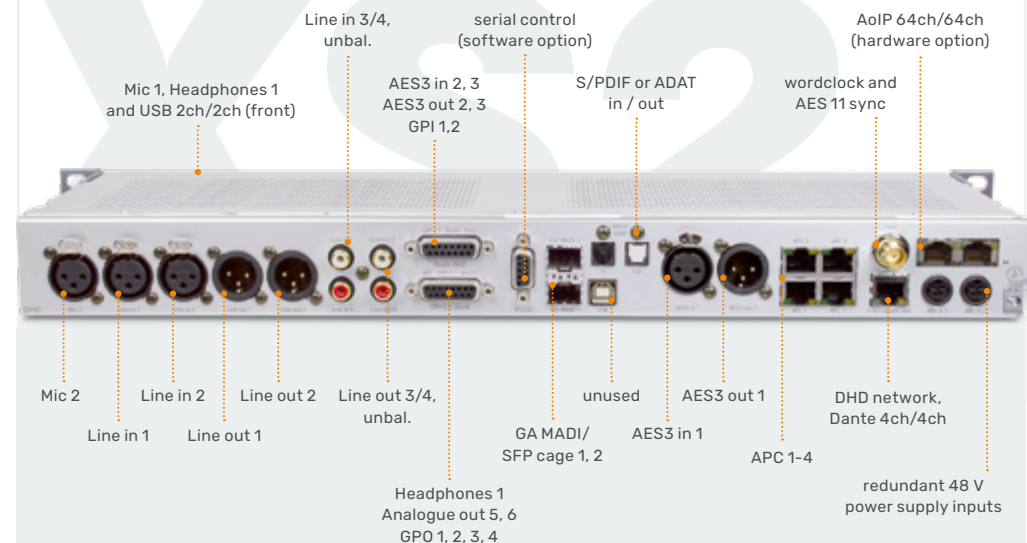
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The XS2 I/O Core combines I/O interfaces and DSP processing for up to 16 faders in one housing. It has all the audio interfaces that are required for journalist desks or edit booths. You can mount it underneath your desk or into a rack, using only 1 RU.

Easy connectivity is the strong point of the XS2 I/O Core. Microphones, headphones, line and AES3 signals can be connected to XLR ports. USB audio, Toslink connectors for ADAT or S/PDIF and a 4ch/4ch Dante

interface are also included. Multi-channel options for MADI, Gigabit Audio and AES67 are available.

Our smallest SX2 bundle (52-1988) is a budget-friendly package which includes this versatile I/O core and the SX2 central module with 4 faders (52-5614). It is perfect for a podcast production studio or as starting point for adding more modules from our product range for a bigger and more customised system.



64 FADERS
stereo

XD2 CORE
(52-7440 + 52-7456)
4 DSPs

48 summing busses
(PGM, AUX, N-1, PFL)
30 mix-minus busses
64x64 talkback matrix included

LARGE ROUTER AND
CONSOLE WITH
NUMEROUS I/OS

44 FADERS
stereo

XC2 CORE
(52-7420)
2 DSPs

40 summing busses
(PGM, AUX, N-1, PFL)
24 mix-minus busses
48 level meters

CONTROL-ROOM
CONSOLE
AND SMALL ROUTER

24 FADERS
stereo

XC2 CORE
(52-7420)
1 DSP

32 summing busses
(PGM, AUX, N-1, PFL)
16 mix-minus busses
4 virtual mixers

MEDIUM-SIZED CONSOLE
AND SMALL ROUTER

16 FADERS
stereo

XC2 CORE
(52-7423)
1 DSP

16 summing busses
(PGM, AUX, N-1, PFL)
6 mix-minus busses
automix included

STANDARD CONSOLE

16 FADERS
stereo

XS2 I/O CORE
(52-1830)
1 DSP

11 (16*) summing busses
(PGM, AUX, N-1, PFL)
6 mix-minus busses
incl. XLR I/O interfaces

PRICE-OPTIMISED
CONSOLE

All faders, busses and level meters are stereo, configurable as mono. All values are maximum values in firmware version 9.0 or higher. Availability depends on number and type of used features.

* 52-1950 Extended Feature Upgrade Licence required

XD2 8K CORE
52-7440B

XD2 CONTROLLER
52-7456



DHD Gigabit Audio
networking (hardware option)

APC 1-8

sync
(wordclock, AES11,
PAL, NTSC, HD tri-level)

serial control
RS232 or RS422
(software option)

status port for
redundancy mode

MADI
(hardware option)

DHD network,
TCP/IP
external control,
maintenance

replication
port
(hardware
option)

redundant 48 V
power supply
inputs

redundant 48 V
power supply inputs

DHD.AUDIO SOFTWARE

DHD's software products are perfect partners for your DHD hardware. They allow you to configure, monitor and control your complete broadcast system.

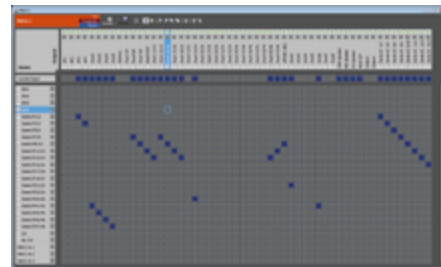
With studio environments becoming more and more automated and centrally controlled by software, the Views app provides a highly intuitive user interface. You can build your virtual console with touch-based faders, buttons and meters in whatever size and colour scheme you choose.

Apart from creating a mixer copy in the browser, you can also design specialised views to be shown on large studio information screens. This supports your daily studio workflow, giving you an instant overview of incoming calls, audio levels and useful features such as a studio clock. Screens can be individually configured, for instance to sport your station colours and logo. As the Views App is HTML5-based, you can arrange it together with other web-based content such as news pages or traffic information, in just one browser window.



TOOLBOX9

Toolbox9 configuration software defines the system structure and all main functions. You can assign functions to buttons, potentiometers and TFT touch displays. Even complex logic systems can be realised. Usually a DHD expert will do the configuration. If you need to change it later, just use the Toolbox9 software yourself.



ROUTING & SCHEDULING SOFTWARE

The Routing & Scheduling Software gives you full control over your routing matrices. You can switch cross points live or in preselection mode, change signal labels and create, manage and monitor complex switching schedules.



VIEWS APP

The Views App shows complete audio mixer controls in web browsers like Chrome, Firefox or Safari. This approach allows device-independent monitoring and control of an audio mixer for any kind of touchscreen-based broadcast application.

MORE DHD SOFTWARE FOR:

- monitoring
- DSP control
- remote assistance
- snapshot management
- MIDI support
- SNMP support
- user management