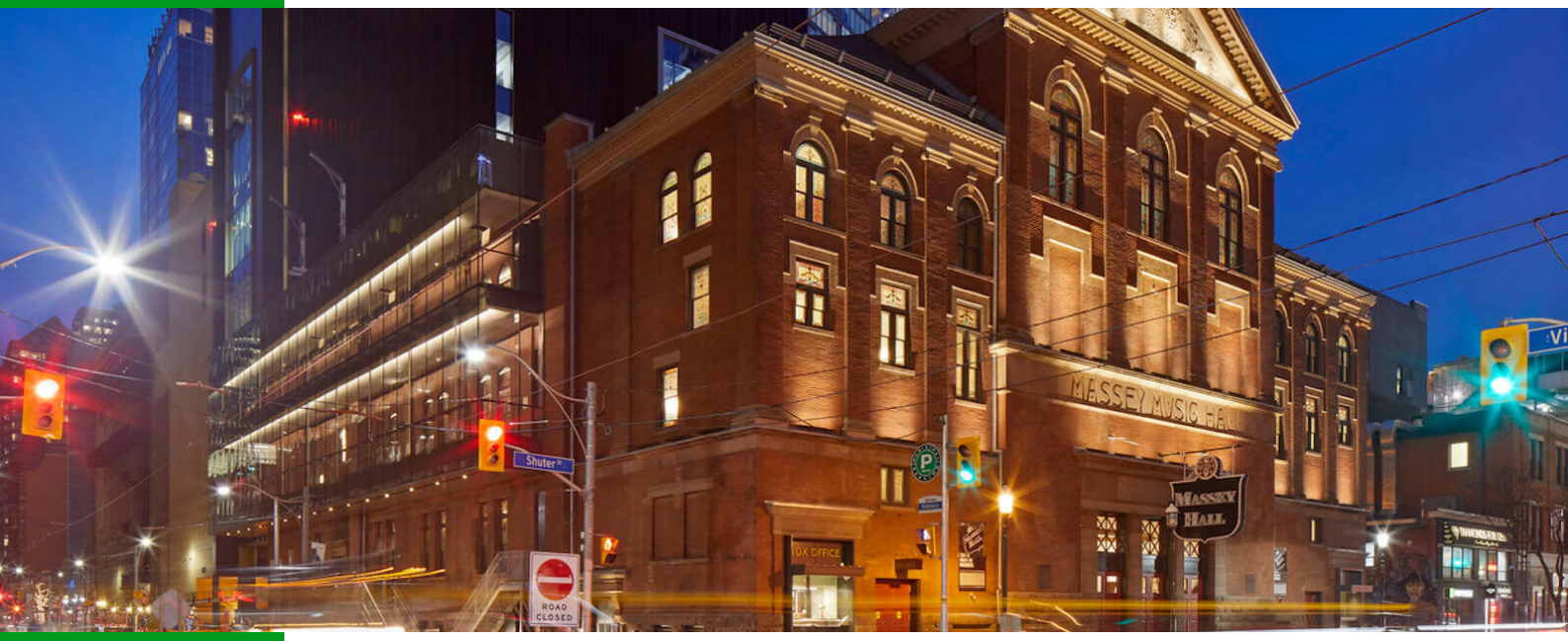
Case Study
Installation



Massey Hall – Toronto, Ontario, Canada

Opened in 1894 by industrial baron Hart Massey (1823-1896), the "grande dame of music halls" was his personal gift to the city. It was immediately embraced as he had hoped, becoming internationally-renowned as Canada's most important venue for concerts, lectures, public rallies, sporting events and a variety of educational and community based events. The Hall, revered for its intimacy (even at 2800 seats) and its acoustics, has been sensitively updated to meet current standards. The alterations incorporate the full upgrade of audio systems and lighting technology. OPTOCORE networks were previously installed for both Massey Hall and Roy Thomson Hall in 2016 as the distribution system for the PA. This original build-out at Massey Hall, 1U X6R- FX-8AE/8LI (eight channels AES/eight line out) and X6R-FX-8LI/8LO provided the main I/O for the console interface.

SYSTEM REQUIREMENTS:

- Small form factor 1RU
- Decentralized network
- Lowest System Latency
- Easy connection between venues and studio
- Flexible redundant star topology

"Utilizing a synchronous network like Optocore is the only professional way to transport quality audio and have it locked to a precise and stable Word Clock. The result is exceptionally pristine audio with the ability to route any signal to any location with zero latency and no signal degradation."

Martin Van Dijk, A/V Consultant – Engineering Harmonics

sales-pro@optocore.com

SOLUTION

During the renovation between 2018 and 2021 the system was upgraded and expanded to 15 devices inputting and outputting analog, AES, or MADI to 14 nodes around the building. This involved updating the existing Main Hall system with added connectivity to new production areas, such as the Basement Bar, a new performance space on level four, plus a production studio on level five with tie lines reaching all levels of the building. Further upgrades saw the redundant point-to-point "ring" topology changed to a redundant "star" topology similar to a central patch design by adding one of OPTOCORE's Autorouters – a format-agnostic fiber router that uniquely supports all varieties of networks and standards, including OPTOCORE (and DiGiCo), Yamaha TWINLANe, and Avid AVB.

The Autorouter actively monitors all of its fiber ports – if a node/device is added or removed at one of the various patch locations, it instantly reconfigures the network matrix to maintain redundancy, so there is always full connectivity throughout. Some of the OPTOCORE units are in fixed racks in numerous locations while several units are in portable I/O racks that can be creatively and quickly deployed for each different production requirement.

The main hall's system retains much of the workflow of the original system, centered around PA distribution for the amp rooms. FOH has been upgraded with increased connectivity and support of numerous different formats. As Massey Hall is very much a roadhouse and any act that fills the auditorium could be using any make and models of mixing console, the choice was made to support industry-standard formats so anyone could patch into the system.

An OPTOCORE M8 MADI Router is the main console interface for the new Avid S6L. The M8 has four MADI BNC inputs and four MADI BNC outputs, each capable of 64 channels at 48K. The main PA audio mixes are also sent via MADI to the network for distribution to the amp rooms. An additional X6R- FX-16AE/ SRC provides 16 channels of AES that sample rate convert the incoming audio to the master word clock for the network, ensuring there are no sync issues or need for guest consoles to lock to the house's clock. The X6R-FX-8AE/8LI still lives here for an additional eight AES I/O and eight line inputs for local I/O and patching.

The attic space and the stage right amp room each have an X6R-FX-16AE in them as the main amplifier feed for AES and network control. The stage left amp room/main equipment room, however, has been upgraded to a DD32R-FX, which offers 32 pairs of AES/EBU on (four) D-Sub25 connectors. These ports can be programmed in groups of eight and set as either inputs or outputs, giving the unit flexibility when configuring what I/O is needed in the space, allowing for the main PA mix to be sent to a system processor, and then loaded back onto OPTOCORE to be distributed to the other amp rooms. he renovated Basement Bar and the new level four feature a similar deployment: M8s allow for local MADI I/O to be sent to the network from both house and guest consoles. For the level four club to serve as a full venue, an X6R-FX-16AE/ SRC and FX-8LI/8LO were also included in the FOH case to offer MADI, AES, and analog I/O in a format similar to the main hall's systems.

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OPTOCORE GMBH
Alte Allee 28 · 81245 München · Germany
Phone +49 (0)89-89 99 64-0
www.optocore.com

The amplifiers in these venues are fed program material in the form of AES3; level four has a DD32R unit to interface with the local processor and amplifiers while the Basement Bar has been equipped with the X6R-FX-16AE that came out of the main hall. The VLAN connections on the X6Rs and DD32Rs link different device locations allowing amplifier and system control from anywhere throughout Massey Hall.

All of the Massey Hall/Allied Music Centre venues connect to the new content capture production/recording studio on level five, meeting the necessity to record and archive any performances/events.

An OPTOCORE M12 in the studio offers both MADI on BNC and optical connections. The M12 MADI router is the larger version of the M8 with eight pairs of MADI ports instead of just four. MADI streams from the main hall, Centuries, and level four are all sent there automatically as the audio streams off the consoles. Entire 64-channel MADI streams can be routed to the studio, or the M12 can compose new MADI streams from individual channels from multiple network sources to maximize the network channel count. Advanced features built into the M12 firmware like pre-recorded routing Macros and MADI Mirroring give the team at Massey unlimited flexibility to change and deploy production and recording setups as acts with different demands book the venue.

KEY ADVANTAGES:

1. One backbone system for all venues with all audio channels available in any system node
2. AES Sample Rate Converters for guest consoles
3. Easy integration with Digico providing additional analog and digital I/O
4. Flexibility with Automatic System Routing for Star Topology

Device	ID Number	Location	Functions
MAIN SYSTEM			
AutoRouter	1	Main Machine Room	OPTOCORE loop management
X6R-FX-16AE/SRC	2	Massey Hall FOH	AES inputs with SRC to PA and Recording
M8-BNC	3	Massey Hall FOH	MADI inputs to PA and Recording
X6R-FX-8AE/LI	4	Massey Hall FOH	AES w/SRC and analog inputs to PA and Recording
DD32R-FX	5	Main Hall Stage Left	AES and control to local amps
X6R-FX-16AE	6	Main Hall Attic	AES and control to local amps
X6R-FX-16AE	7	Main Hall Stage Right	AES and control to local amps
M12-OPT/BNC	8	Studio	MADI inputs and outputs for recording and broadcast
X6R-FX-16AE	9	Century Room Machine Room	AES and control to local amps
M8-BNC	10	Century Room FOH	MADI inputs from console to PA and recording
M8-BNC	11	L4 FOH	MADI inputs from console to PA and recording
X6R-FX-16AE/SRC	12	L4 FOH	AES inputs with SRC to PA and Recording
X6R-FX-8LI/8LO	13	L4 FOH	Analog inputs and outputs for local needs
DD32R-FX	14	L4 Machine Room	AES from/to processor to local amps
M8-BNC	15	MPS-001	MADI input and output interconnect

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MASSEY HALL
REVITALIZATION

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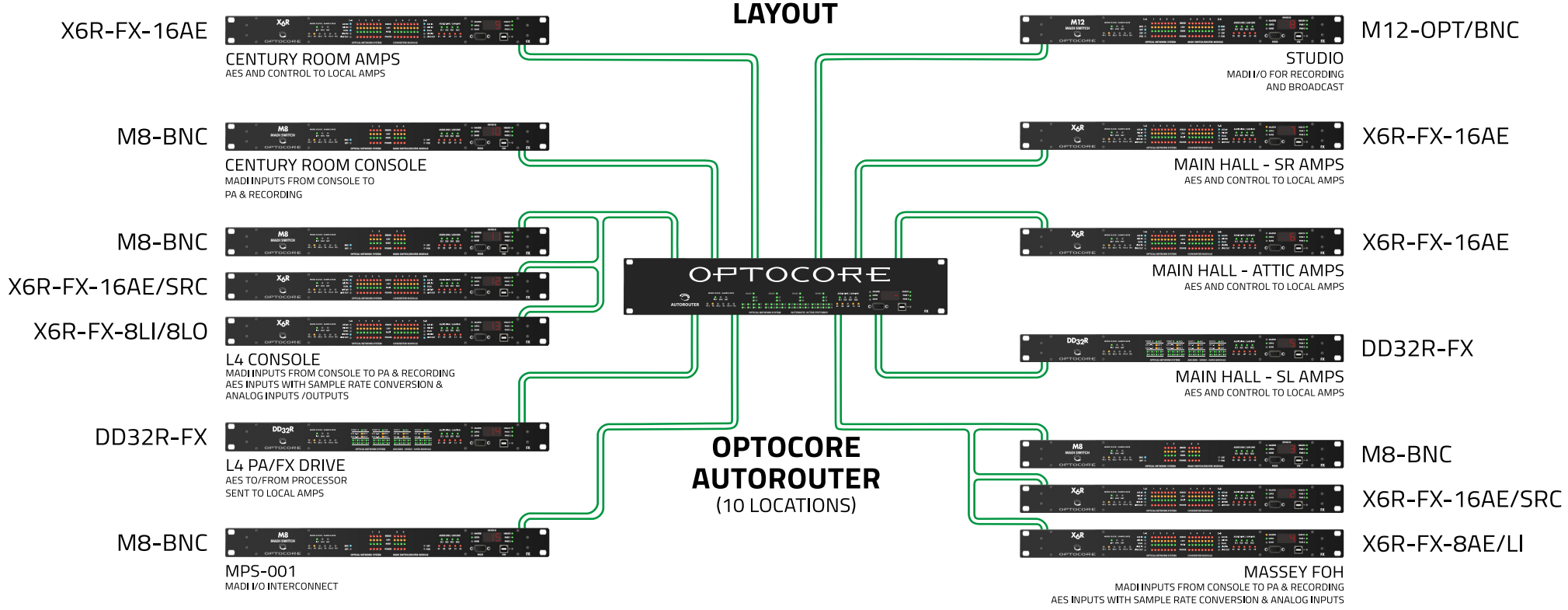
LAYOUT



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