

grandMA Case Study

Copenhagen Opera House



■ grandMA – total control

Operaen Copenhagen

1,200 conventional and
636 "non-dim" channels
controlled by grandMA



State-of-art opera house – the Operaen

When the curtain went up on the recently built Copenhagen Opera House named "Operaen" one of the finest lighting systems in the history of theatre technology came to life.

The idea

The planning phase of the lighting system was split right from the beginning. For dimming, electrical power engineering and power distribution to the various connections and outlets John Whitaker of "Theatreplan LLP" in London was responsible. The "more artistic" elements such as the lighting control system and the various spotlights and automated fixtures were under the control of Søren Nylin of the lighting department of "Kongelige Teater" in Copenhagen. He maintained a direct influence of the theatre staff to the design and layout of the control.



Three MA NSPs incl. backup are providing the necessary processing speed for the 4,000 control channels

Requirements

The Operaen's main stage installation needed more than 1,200 conventional dimmer channels of 5kVA, followed by 636 "non-dim" channels and approximately 200 moving lights remotely controlled luminaires, colour changers and other non "conventional" fixtures. Additionally the audience room was illuminated by 1,100 LED fixtures including the possibility to control them via the stage lighting network directly. For this demanding task the grandMA console range was chosen.

Realisation

The lighting on the main stage of the Operaen is controlled by a single grandMA full-size, supported by three MA NSPs (Network Signal Processors) who are just providing the necessary processing "steam" for more than 4,000 control channels, with some spare capacity to act as backup. A grandMA replay-unit runs in parallel to the main console and stays live and "on-line" even when the main system is powered down. One of the main ideas of the Kongelige Teater's crew under the supervision of Nylin was to allow the lighting technicians on stage to dial up their own channels for focussing without keeping the main board operator busy all the time. So as a unique feature the grandMA replay-unit provides access to the lighting system through a series of four handheld Pocket PCs featuring grandMA remote software, enabling the lighting technicians on stage to call and focus fixtures without using the main console or even if the consoles are turned off. These Pocket PCs are linked to the main network via a large wireless LAN comprising



The audience room is illuminated by 1,100 LED fixtures which can be controlled directly by the stage lighting network

eight access points, distributed throughout the building and performing a "roaming" facility to each remote control similar to cellular mobile phone networks.

For more sophisticated control two additional touch panel PCs with grandMA onPC software are used on stage. Another console, a grandMA light, is used as portable rehearsal desk and resides as additional backup in the control room during performances. But that's still not all for backup: an additional server PC located in the control rack runs grandMA onPC software and features a FTP server in parallel as global secure data storage for all consoles' show data.

The lighting network at the Operaen included not less than 120 network nodes running on ETCNet2 Ethernet protocol to supply localised DMX512 output where needed – placed in designated production light boxes. Also all the dimmer cabinets had to be controlled by direct Ethernet input (as well controlled by ETCNet2) which was planned to be used as remote configuration and feedback protocol, too. Supplied by two different manufactures – MA Lighting and ETC – both ends were using their own propriety network protocol, DMX seemed to be the only way both could communicate with each other. The challenge for MA Lighting was to adopt the ETCNet2 protocol which already had been put in place to avoid the use of a DMX bottleneck solution. As all the dimmers were already listening to ETCNet2 via Ethernet it was the most reliable solution to add this protocol to the grandMA software's multi-protocol stack. The console speaks different protocols at the same time. Fully implemented are: MA-Net, ETC-Net2, Art-Net, Pathport and Portall. This gives the user the needed flexibility to expand and upgrade a networked system with ease.



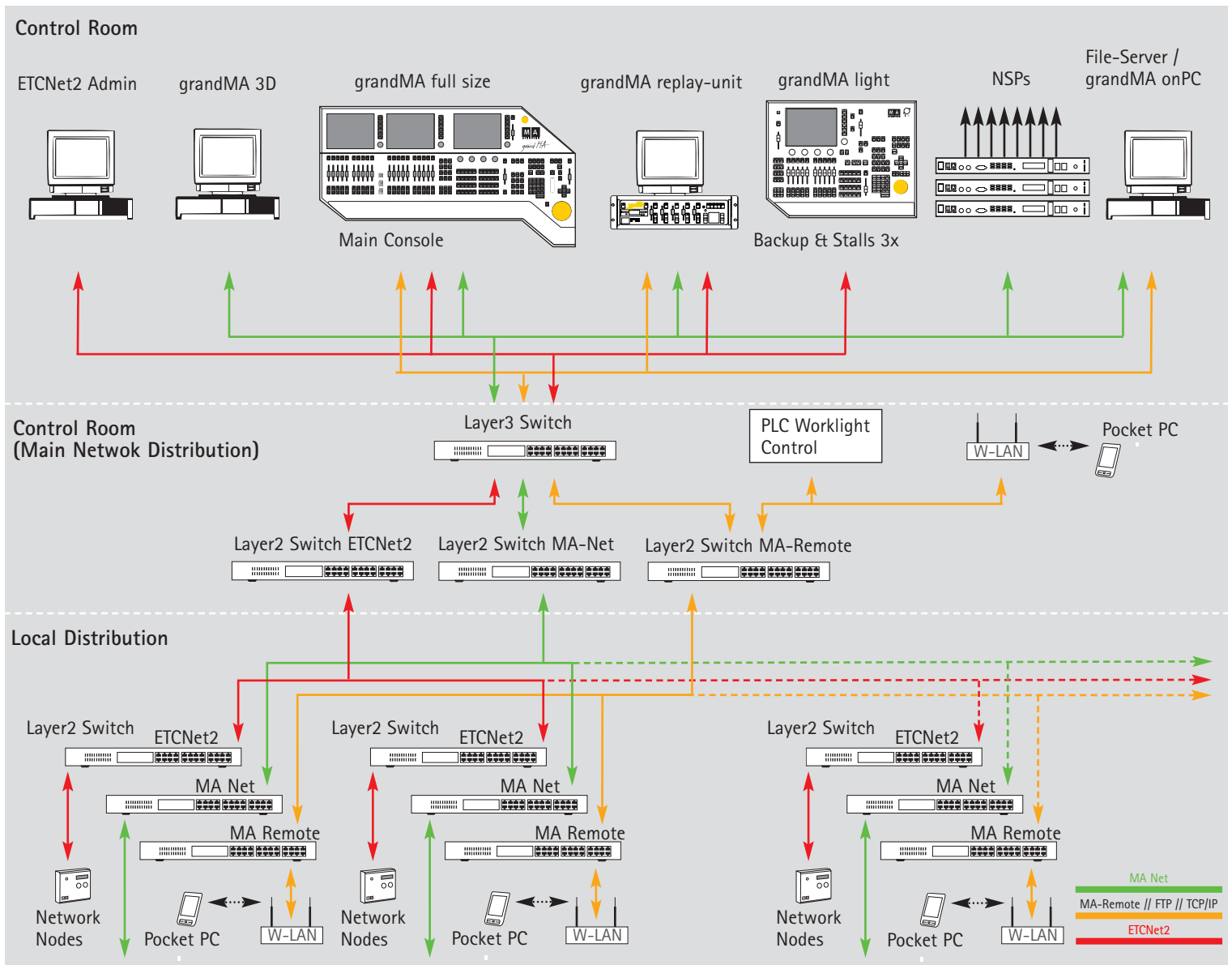
Eight access points provide a W-LAN signal for the Pocket PCs to control the lighting throughout the whole building

So after some weeks of development the first grandMA software was finally talking ETCNet2 to the Operaen's network nodes as well as the installed sensor dimmers.

The grandMA system was installed and commissioned by MA's local representative in Denmark Gobo Lighting with the help from Ulrich Kunkel of E³ Engineering for setting up the network and building the lighting control racks.

Project team

Engineering office:	Theatreplan LLP
Project manager:	John Whitaker for Theatreplan LLP
Key consultant:	Søren Nylin
Consoles & technical support:	Gobo Lighting
Network supervisor:	Ulrich Kunkel



Schematic Network Diagram – ©E³ Dipl.-Ing. Ulrich Kunkel

Company Profile

■ MA Lighting International, based in Paderborn, Germany, is the dedicated sales, support and service entity for the renowned grandMA control systems, digital dimming systems, networking tools and media servers of MA Lighting Technology, based near Wuerzburg (GER). The product range offers cutting-edge solutions for control and dimming and contains the award-winning grandMA consoles, the renowned Light- & Scancommander, but also the reliable digital dimmer racks and packs. With its media server grandMA video MA bridges the lighting and video worlds and integrates media servers like a fixture into lighting control.

Today, MA Lighting is well known for its technical know-how and has achieved a unique international reputation for its operational philosophy. The company looks back with 25 years experience. MA Lighting strictly follows a professional user-centric approach and is getting as close as possible to the market via its own international offices as well as competence and support centres in the UK, North America, Latin America, the Middle East/India and Asia Pacific – supported by a world-wide distribution and service network.



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All technical specifications are subject to change without notification.

We do not assume liability for any incorrect information in this case study.