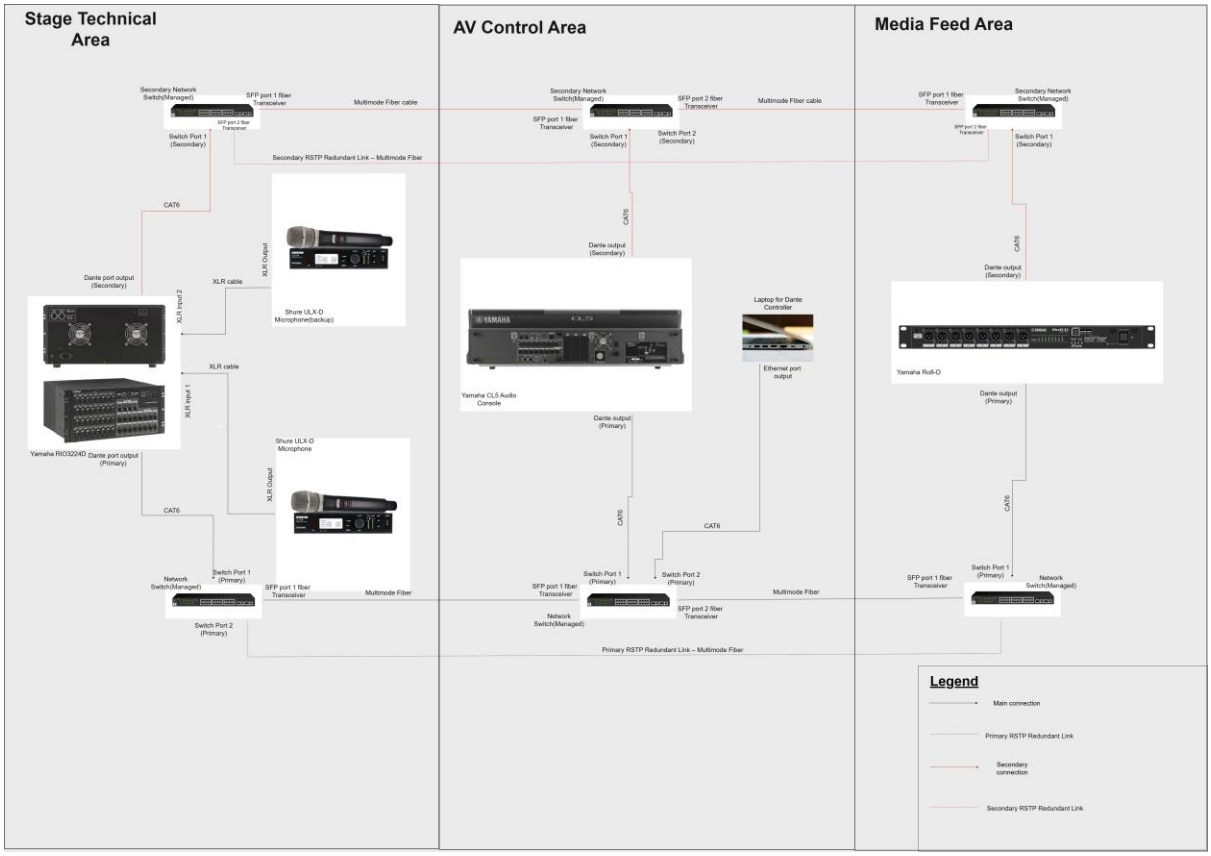
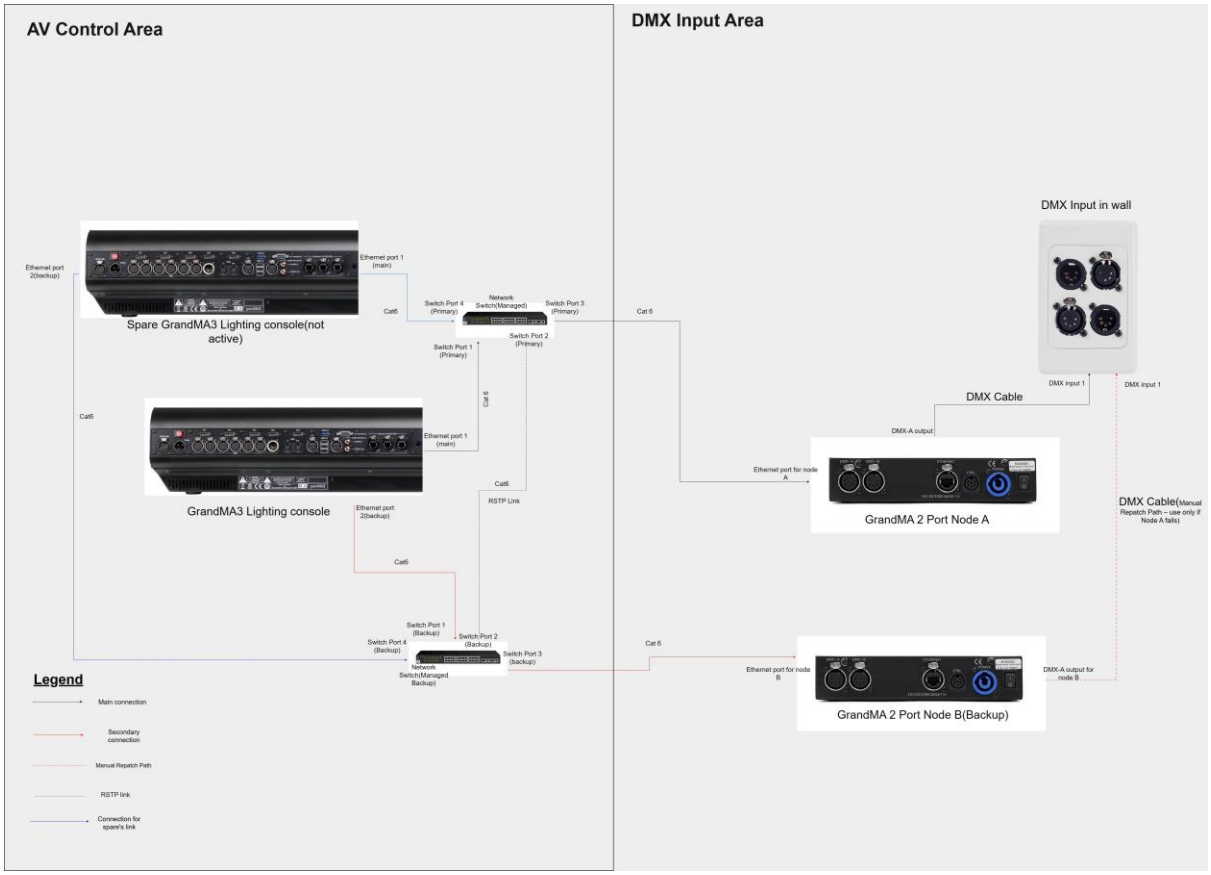
Q1. Audio system



Q2 Justification for audio system.

Since the technical production focuses on AV over IP. All audio devices that use Dante, like the Yamaha CL5 console, RIO3224-D stage box, Ro8-D media interface, and the Dante Controller laptop, are linked together through a network. This uses managed switches with a system called Rapid Spanning Tree Protocol (RSTP). Each area like the Stage Technical, AV Control, and Media Feed has two switches (Primary and Secondary) that connect with multimode fiber cables, creating complete fiber optic loops for strong and flexible connections. To keep things working well with any device, cable, and switch, we use extra Dante ports on all important devices. Each device is connected to both switches nearby. If a connection or switch fails, RSTP quickly finds another way for the traffic to go without stopping the audio. This helps avoid the problems from Incident 1, where a broken fiber optic line stopped the show from running. The setup makes sure that the network will not fail in just one place. To avoid Incident 2 from happening again, each AV department (audio, lighting, video) will have its own separate switching system, so they will not depend on the same switch anymore. Also, each switch gets power from separate, safe sources, so if there is a problem in one system, it will not affect the others due to them connecting to only one power source. A spare wireless microphone system has been added and is connected through a different input channel on the RIO3224-D to make sure that if the main handheld microphone stops working, it will not disrupt the speaker so that there will be as less interruptions as possible.

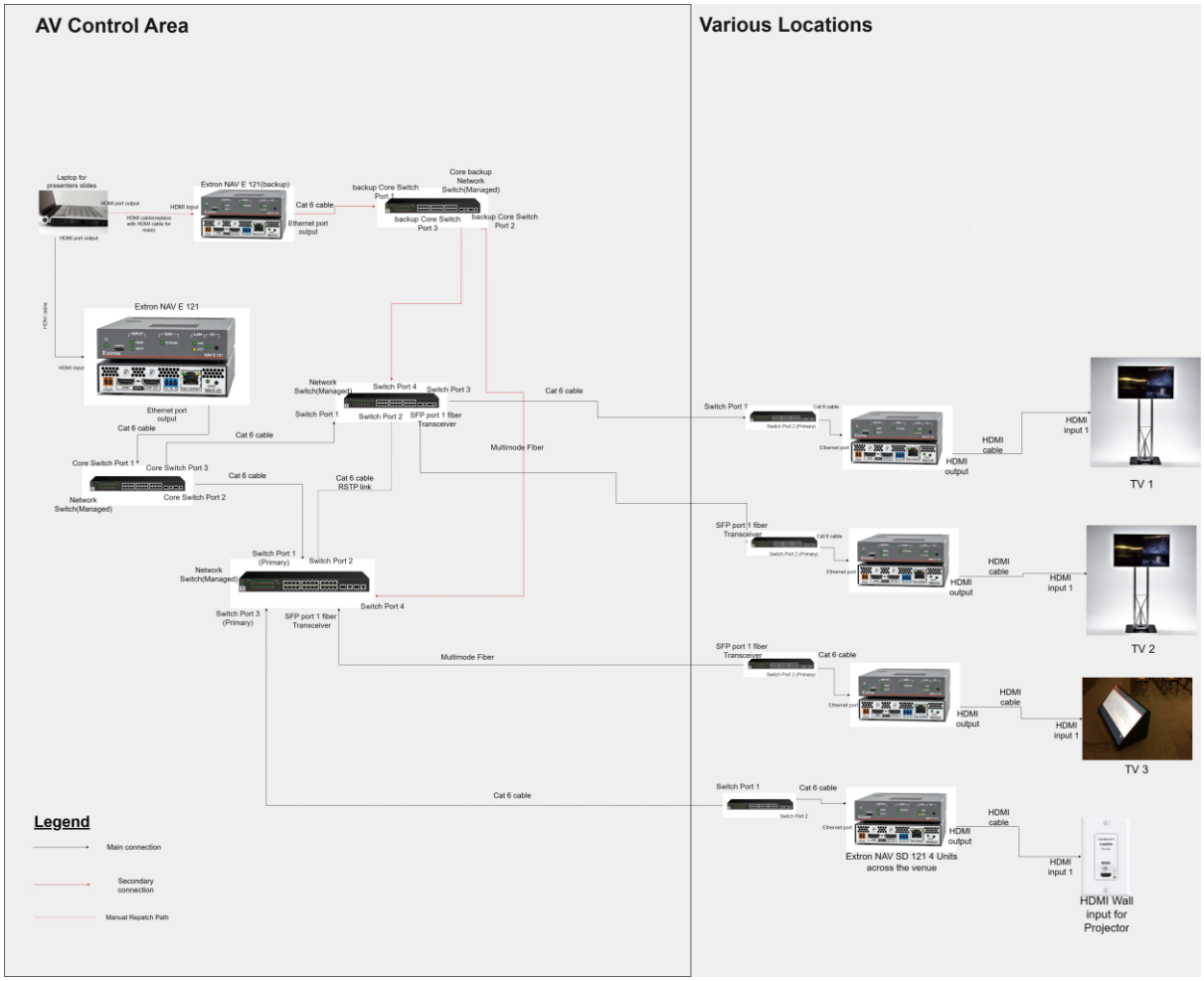
Q3. Lighting system



Q4. Justification for lighting system

In the AV Control Area, the GrandMA3 console is linked to two network switches (the main switch and backup switch) using two Ethernet cables so that they can connect to each other through their secondary ports to set up the RSTP link (Rapid Spanning Tree Protocol). This setup helps stop network loops and allows for automatic switching if one of the switches (main or backup) fails, the other one takes over quickly and the GrandMA2 can still work thanks to the second switch, avoiding incident 2. Each switch is linked to its own MA 2 Port Node at the DMX Input Area where one MA2 will connect to the wall while the other remains unplugged and tucked neatly to avoid cable breakage. This method deals directly with Incident #1, where a fiber cable got caught and caused a major problem. The DMX patching is done using one cable because it is stated that there can only be one DMX universe connected to the wall in the brief. So, if node port A does not work a manual port switching would be needed. By sharing network connections between two switches with RSTP, the system a single point of failure from happening since there is a redundancy. If there is any physical damage to one connection, the switches with RSTP will automatically fix it. An extra MA3 console was added in case the main lighting desk stops working and can be quickly swapped to avoid long downtime.

Q5. Visual System



Q6. Justification for visual system

This system starts with a laptop connected to a main device using an HDMI cable. Which then sends information to a main network switch in the AV control room. The main switch will then send signals to two other switches(we'll call them Switch A and B) that is directly connect to the core switch, creating a RSTP(Rapid Spanning Tree Protocol) to automatically redirect network traffic if a switch or link fails, so video transmission keeps running smoothly. Switch A is linked to Switch C and D(the switches that are connected to Switch A). These switches send signals to the NAV decoders for TV1 using Cat6 cables, which are close to the AV Control Area and TV2 using multi-fiber because there is a lot of foot traffic at the entry and exit points. Switch B is connected to Switch E and F(the switches that are connected to Switch B). These switches are used for TV3, which uses fiber because it is the furthest at the stage area, and for the HDMI wall input, which uses Cat6 cable. Distributing the decoders like this helps local network switches work better and lowers the chances of problems from using central cables. This directly solves Issue 1, which happened because of fiber damage in a busy area. If another incident like Incident 2 happens again, the system has an extra encoder and a backup core switch. If the main encoder or core switch stops working, it can be quickly switched to a backup

manually, and everything will still work without interrupting the signal to any endpoint. This separation stops problems from happening all at once. AV, audio, and lighting systems should each have their own switches and VLANs when possible.