COEX Control System Solution

Backup Instruction Manual

Change History

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1 Backup Solution Overview

1.1 Redundant Backup

The COEX control system employs a dual-system hot backup solution for output redundancy. Whether it's the controllers, fiber, or Ethernet cables, any single point of failure will trigger an automatic switch to the backup system without the need for manual intervention, ensuring uninterrupted display, accompanied by an alert signal via the VMP.

- If any controller fails, the system will perform a hot backup switch, preventing the LED screen from going black.
- In case of a fiber failure on any channel, the system will perform a hot backup switch, maintaining a functioning LED screen.
- If any Ethernet cable malfunctions, the system will perform a hot backup switch, ensuring continuous display on the LED screen.
- When using modular-design controllers, a failure in any output card will trigger a hot backup switch, keeping the LED screen operational.

Note

- In all backup scenarios, devices operating in backup mode cannot set parameters independently and can only receive signals from the primary device, Ethernet port, or OPT port.
- If the primary device disconnects, the backup device will be incapable of generating any commands, and system instructions cannot be transmitted through the backup device via VMP.

1.2 Backup Verification

After configuring the backup settings, you can monitor Ethernet port changes via the LCD panel on the device or through the VMP interface for real-time monitoring of Ethernet port connectivity. As illustrated in the figure below, successful backup configuration will be indicated by a yellow triangle in the upper right corner of the backup Ethernet port, optical port, or output card.

Figure 1-1 Monitoring backup status - VMP

2 Ethernet Port Backup for a Single Controller (Using MX40 Pro as an Example)

2.1 Ethernet Port Output

This section illustrates how to configure Ethernet port backup using the MX40 Pro as an example.

2.1.1 Hardware Overview

The MX40 Pro is a versatile all-in-one LED display controller with 20 Ethernet ports, integrating both video processing and control functionalities. It offers a variety of video input interfaces (HDMI 2.0, DP 1.2, 12G-SDI) and supports 20x Ethernet port outputs along with 4x 10G optical fiber interfaces.

For optical port outputs, you can set the output mode to either 20 ports mode or 40 ports mode.

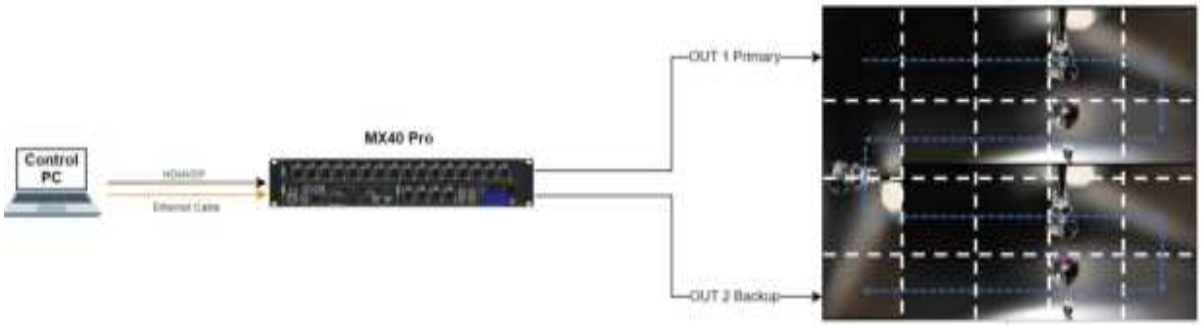
- 20 ports mode:
  - OPT 1 transmits the data of Ethernet ports 1 to 10. OPT 3 is the copy channel of OPT 1.
  - OPT 2 transmits the data of Ethernet ports 11 to 20. OPT 4 is the copy channel of OPT 2.
- 40 ports mode:
  - OPT 1 transmits the data of Ethernet ports 1 to 10.
  - OPT 2 transmits the data of Ethernet ports 11 to 20.
  - OPT 3 transmits the data of Ethernet ports 21 to 30.
  - OPT 4 transmits the data of Ethernet ports 31 to 40.

Figure 2-1 MX40 Pro - rear panel

Figure 2-2 MX40 Pro - front panel

2.1.2 Hardware Connection

Connect the backup Ethernet cable to the corresponding Ethernet port. The hardware connection of the system should be configured as shown in the diagram below:



2.1.3 VMP Settings

Step 1 Open VMP and select .

Step 2 On the **Layout** page, configure the screen parameters and ensure that all Ethernet ports are properly loaded and the LED screen display is functioning correctly.

Step 3 Click to access the backup settings page.

Step 4 In the **Backup Settings** section, select **Ethernet Backup** from the dropdown menu.

- In Mode 1 (Split Backup), port 11 will back up port 1, port 12 will back up port 2, and so on.

- In Mode 2 (Sequential Backup), port 2 will back up port 1, port 4 will back up port 3, and so on.

- In Custom Mode, you can manually drag and drop the Ethernet ports to create any primary-backup relationships between two ports, as shown in the figure below.

2.1.4 Important Notes

- It is recommended to connect the backup Ethernet cable before configuring all parameters (such as controller, cabinet, screen configuration, brightness settings, and backup information).
- The relationships between backup Ethernet ports can be freely assigned. For instance, port 4 can back up port 1, and port 2 can back up port 3, but ensure that the Ethernet cables are connected correctly.

2.2 Optical Port Output (20 Ports Mode)

2.2.1 Hardware Overview

In this setup, one MX40 Pro will be used in conjunction with two CVT10 / CVT10 Pro fiber converters.

MX40 Pro

Refer to 2.1.1 Hardware Overview for detailed information.

CVT10 / CVT10 Pro

You can opt for the CVT10 Pro with Neutrik Ethernet ports or the standard CVT10 with regular Ethernet ports.

- The CVT10 Pro model is available in two variants: CVT10 Pro-S (single-mode) and CVT10 Pro-M (multi-mode).
- 2x optical ports with hot-swappable optical modules installed at the factory, bandwidth of each up to 10 Gbit/s.
- 10x Gigabit Ethernet ports, bandwidth of each up to 1 Gbit/s
- Highly water-resistant and capable of withstanding complete immersion.

Figure 2-3 CVT10 Pro – rear panel

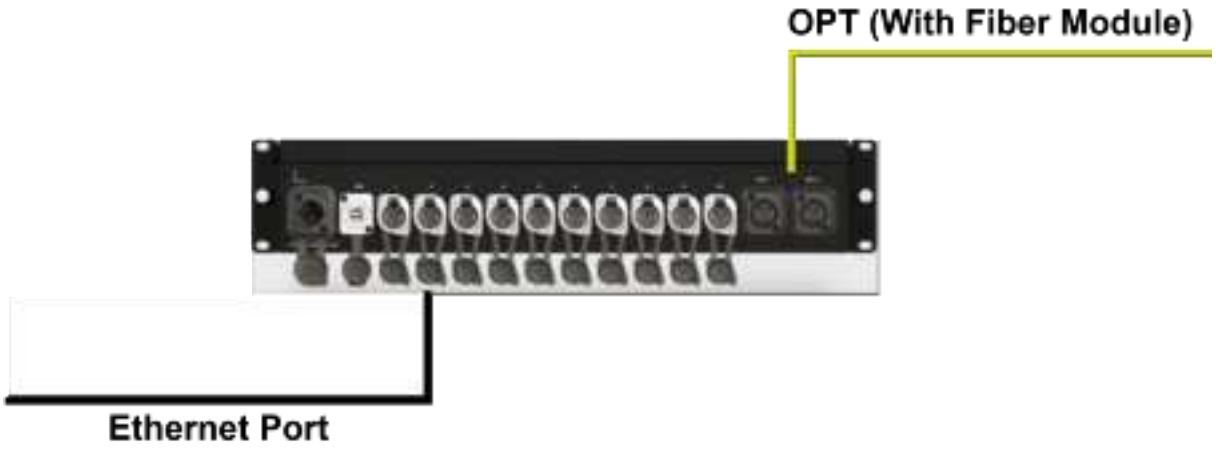


Figure 2-4 CVT10 - rear panel

2.2.2 Hardware Connection

Connect the primary and backup optical fibers to their respective fiber converters and then connect them to the corresponding Ethernet ports using Ethernet cables.

The hardware connection of the system should be configured as shown in the diagram below:

2.2.3 VMP Settings

The VMP setup for a single controller with two fiber converters for backup operates the same way as the backup setup for a single controller's Ethernet port output. For detailed instructions, please refer to 2.1.3 VMP Settings.

2.2.4 Important Notes

- It is recommended to connect the backup Ethernet cable before configuring all parameters (such as controller, cabinet, screen configuration, brightness settings, and backup information).
- The relationships between backup Ethernet ports can be freely assigned. For instance, port 4 can back up port 1, and port 2 can back up port 3, but ensure that the Ethernet cables are connected correctly.

2.3 Optical Port Output (40 Ports Mode)

2.3.1 Hardware Overview

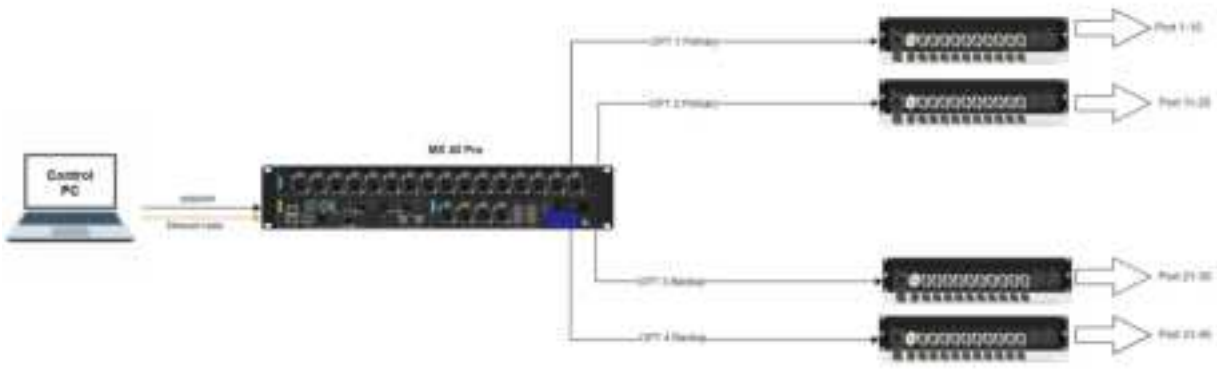
In this setup, one MX40 Pro will be used in conjunction with four CVT10 / CVT10 Pro fiber converters.

Refer to 2.1.1 Hardware Overview for detailed information about MX40 Pro, and refer to 2.2.1 Hardware Overview for detailed information about CVT10 / CVT10 Pro.

2.3.2 Hardware Connection

Connect the primary and backup optical fibers to their respective fiber converters and then connect them to the corresponding Ethernet ports using Ethernet cables.

The hardware connection of the system should be configured as shown in the diagram below:



2.3.3 VMP Settings

Step 1 Open VMP and select .

Step 2 On the **Layout** page, configure the screen parameters and ensure that all Ethernet ports are properly loaded and the LED screen display is functioning correctly.

Step 3 In the **OPT Settings** section on the right side of the interface, select **40 Ports Mode**.

Step 4 Click to access the backup settings page.

Step 5 In the **Backup Settings** section, select **Ethernet Backup** from the dropdown menu.

- In Mode 1 (Split Backup), port 21 will back up port 1, port 22 will back up port 2, and so on.

- In Mode 2 (Sequential Backup), port 2 will back up port 1, port 4 will back up port 3, and so on.

- In Custom Mode, you can manually drag and drop the Ethernet ports to create any primary-backup relationships between two ports, as shown in the figure below.

2.3.4 Important Notes

- It is recommended to connect the backup Ethernet cable before configuring all parameters (such as controller, cabinet, screen configuration, brightness settings, and backup information).
- The relationships between backup Ethernet ports can be freely assigned. For instance, port 4 can back up port 1, and port 2 can back up port 3, but ensure that the Ethernet cables are connected correctly.

3 Output Card Backup (Using MX2000 Pro as an Example)

3.1 2×1G Output Card Backup (Installing Two 4×10G Fiber Output Cards)

3.1.1 Hardware Overview

To use a 1G output bandwidth control system with output card backup, you can install two 4×10G fiber output cards. These will be paired with CVT10 / CVT10 Pro fiber converters and Armor series receiving cards such as A10s Pro.

MX2000 Pro

The MX2000 Pro is a large professional 8K LED display controller that supports up to 8 types of 8K, 4K, and VoIP input cards. If card backup is required, you can choose to install either two 4×10G fiber output cards or two 1×40G fiber output cards. Each optical port on the two output cards has a one-to-one backup relationship.

- OPT 1 of output card 1 transmits the data of Ethernet ports 1 to 10. OPT 1 of output card 2 is the copy channel of OPT 1 of output card 1.
- OPT 2 of output card 1 transmits the data of Ethernet ports 11 to 20. OPT 2 of output card 2 is the copy channel of OPT 2 of output card 1.
- OPT 3 of output card 1 transmits the data of Ethernet ports 21 to 30. OPT 3 of output card 2 is the copy channel of OPT 3 of output card 1.
- OPT 4 of output card 1 transmits the data of Ethernet ports 31 to 40. OPT 4 of output card 2 is the copy channel of OPT 4 of output card 1.

Figure 3-1 MX2000 Pro – rear panel

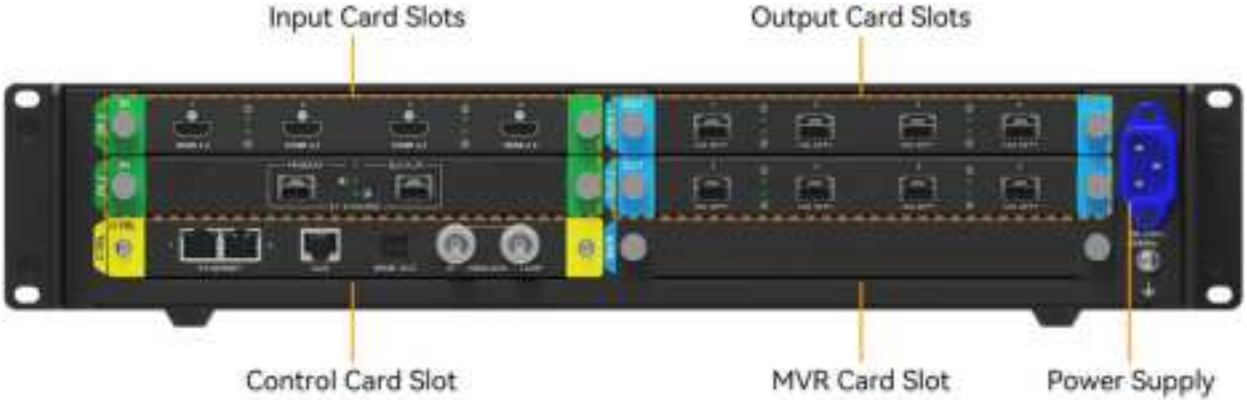
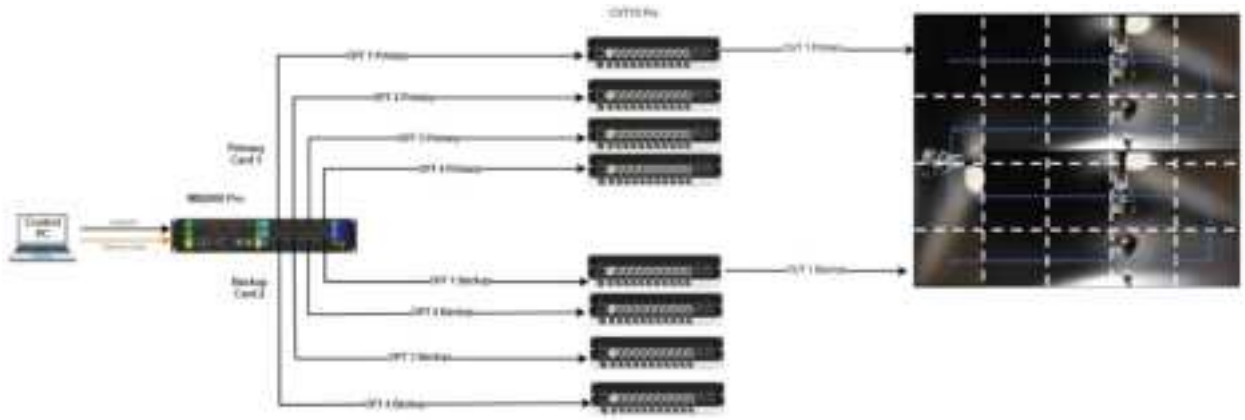


Figure 3-2 MX2000 Pro – front panel

CVT10 / CVT10 Pro

Refer to 2.2.1 Hardware Overview for detailed information.

3.1.2 Hardware Connection



3.1.3 VMP Settings

Step 1 Select MX2000 Pro from the project list and then click to access the backup settings page.

Step 2 In the **Backup Settings** section, select **Card Backup** from the dropdown menu.

Step 3 Select OUT 2 as the backup to OUT 1.

In this setup, output card 2 will back up output card 1, meaning port 1 of OUT 2 will back up port 1 of OUT 1, port 2 of OUT 2 will back up port 2 of OUT 1, and so on.

3.1.4 Important Notes

- The primary and backup output cards must ensure that their firmware versions are identical.
- The relationships between backup cards can be freely assigned. For instance, OUT 2 can back up OUT 1, and OUT 1 can also back up OUT 2.

3.2 2×5G Output Card Backup (Installing Two 1×40G Fiber Output Cards)

3.2.1 Hardware Overview

To use a 5G output bandwidth control system with output card backup, you can install two 1×40G fiber output cards. These will be paired with CVT8-5G fiber converter and 5G receiving cards such as CA50E or XA50 Pro.

MX2000 Pro

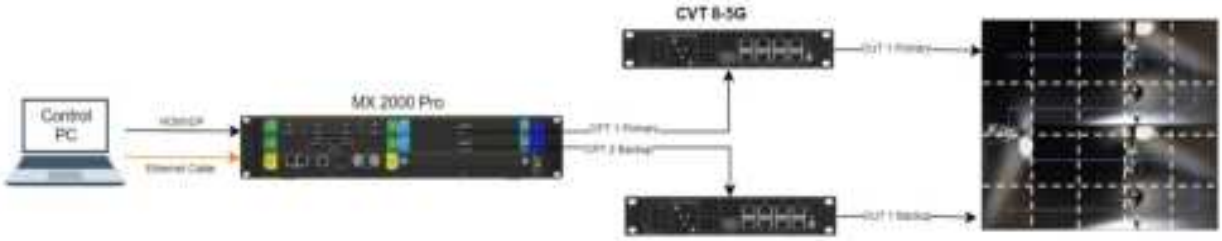
Refer to 3.1.1 Hardware Overview for detailed information.

CVT8-5G

- The CVT8-5G model is available in two variants: CVT8-5GS (single-mode) and CVT8-5GM (multi-mode).
- 1x optical port with hot-swappable optical module installed at the factory, bandwidth of a single port up to 40 Gbit/s.
- 8x 5G BaseT Ethernet ports, bandwidth of each up to 5 Gbit/s.

Figure 3-3 CVT8-5G - rear panel

3.2.2 Hardware Connection



3.2.3 VMP Settings

The VMP operations are the same as the backup setup for 1G output cards. For detailed instructions, please refer to 3.1.3 VMP Settings.

3.2.4 Important Notes

- The primary and backup output cards must ensure that their firmware versions are identical.
- The relationships between backup cards can be freely assigned. For instance, OUT 2 can back up OUT 1, and OUT 1 can also back up OUT 2.

4 Backup Between Controllers (Using MX40 Pro Ethernet Port Output as an Example)

4.1 Hardware Overview

In this setup, two MX40 Pro controllers will be used. Refer to 2.1.1 Hardware Overview for detailed information about MX40 Pro.

4.2 Hardware Connection

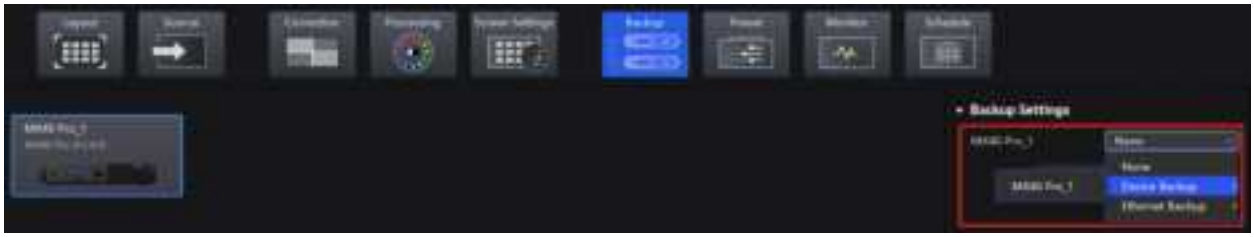
Connect the Ethernet cables of the primary and backup controllers to their respective Ethernet ports.

The hardware connection of the system should be configured as shown in the diagram below:

4.3 VMP Settings

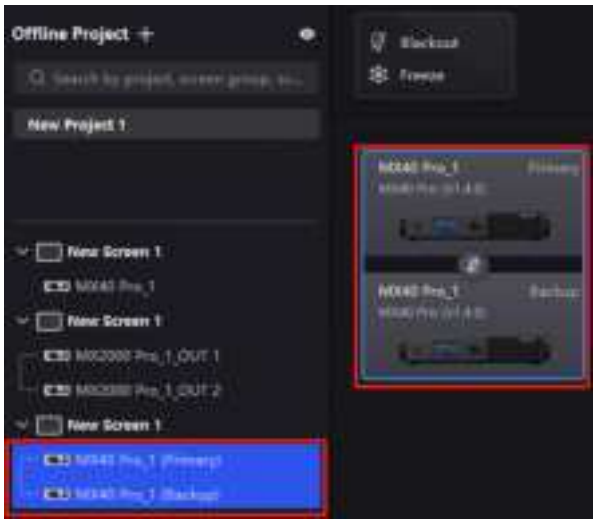
Step 1 Select MX40 Pro from the project list and then click to access the backup settings page.

Step 2 In the **Backup Settings** section, select **Device Backup** from the dropdown menu.



Step 3 In the pop-up window, verify that the information for both the primary and backup controllers is correct.

Step 4 Click **OK** to complete the setup. You can view the backup status of the controllers in the project list on the left side.



4.4 Important Notes

- When performing controller backup, ensure that the model, version, and connection status of both controllers are completely identical. For modular-design controllers (MX6000 Pro or MX2000 Pro), also ensure that the number, slots, model, and firmware versions of the output cards are consistent.
- It is recommended to connect the backup Ethernet cable before configuring all parameters (such as controller, cabinet, screen configuration, brightness settings, and backup information).
- The relationships between backup Ethernet ports can be freely assigned. For instance, port 4 can back up port 1, and port 2 can back up port 3, but ensure that the Ethernet cables are connected correctly.
- For backup between controllers, connect the primary and backup controllers via serial cable before testing.

5 Receiving Card Loop Backup (Using MX40 Pro Ethernet Port Output as an Example)

5.1 Hardware Overview

- Dual receiving card backup: This involves two complete control systems, doubling the number of controllers and receiving cards.

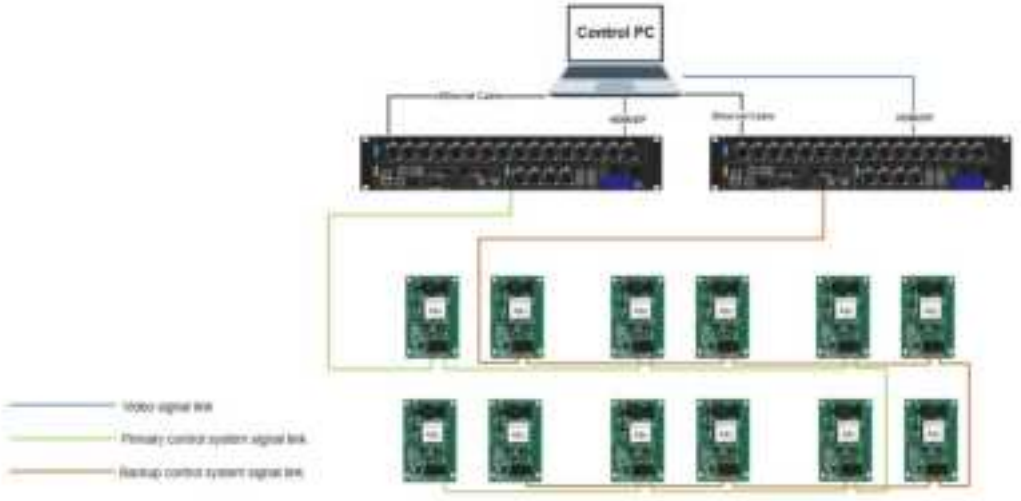
- Dual loop backup for receiving cards and controllers: This requires four controllers, with the number of receiving cards doubled.

Refer to 2.1.1 Hardware Overview for detailed information about MX40 Pro.

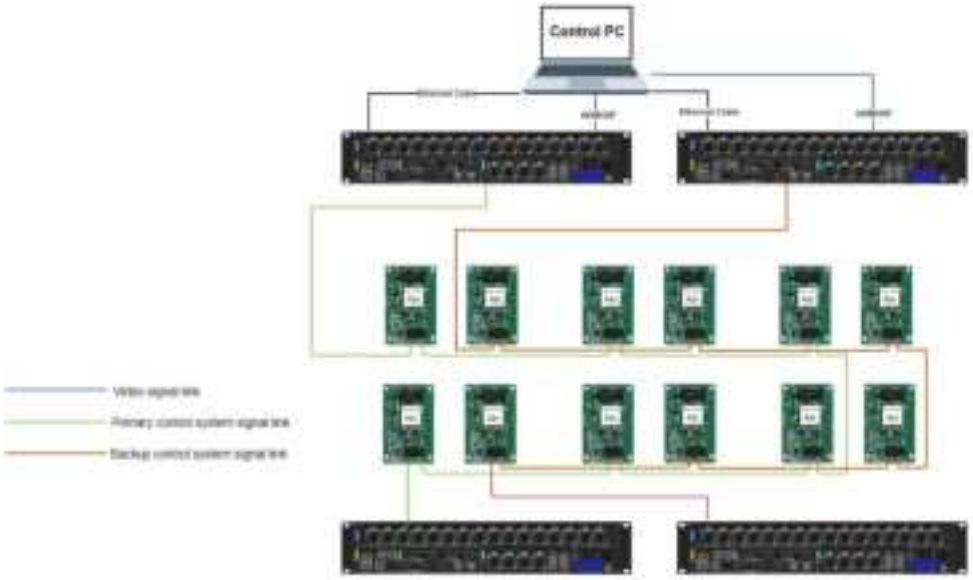
5.2 Hardware Connection

The signal source comes from one controller, and each cabinet contains two receiving cards, which form a loop with the primary and backup receiving cards.

- Solution 1: Dual receiving card backup



- Solution 2: Dual loop backup for receiving cards and controllers



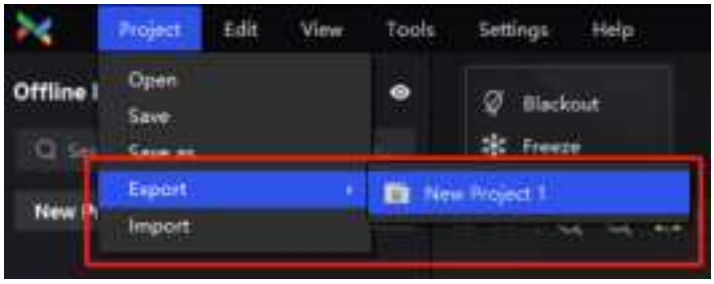
5.3 VMP Settings

For dual receiving card backup, you need to configure two devices with identical screen topology. You can first configure one device, export and save the project file, and then import it onto the second device.

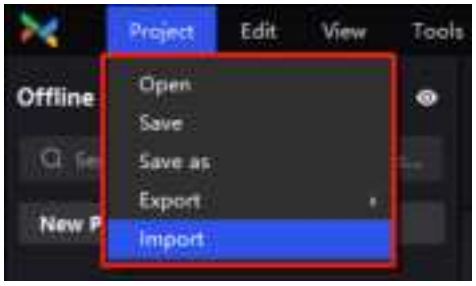
Step 1 Open VMP and select .

Step 2 On the **Layout** page, configure the screen parameters and ensure that all Ethernet ports are properly loaded and the LED screen display is functioning correctly.

Step 3 From the menu bar, select **Project** > **Export** to export the configured project, which includes all cabinet topology information.



Step 4 Switch to the second device, and select **Project** > **Import** from the menu bar to import the previously saved project file.



Step 5 Once both devices are configured, refer to section 5.2 to complete the hardware connection.

5.4 Important Notes

- The essence of the dual receiving card backup is to back up the entire control system.
- It is recommended that all parameters of the backup setup (such as controller, cabinet, screen configurations, brightness settings, and backup information) match those of the primary setup completely.
- For dual receiving card backup, make sure to create two screens with identical topology.

6 Power Supply Backup (Only Supported by MX6000 Pro)

The MX6000 Pro supports dual power backup, enhancing the system's stability.

The MX6000 Pro supports up to 8 types of 8K, 4K, and VoIP input cards. In terms of output, it supports 2 types of output cards: 4×10G and 1×40G fiber output cards. You can easily configure the input and output cards to meet the control system's 1G or 5G bandwidth requirements, catering to different needs.

Figure 6-1 MX6000 Pro – rear panel

Figure 6-2 MX6000 Pro – front panel

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