CHRISTIE®

MICROTILES™

Service Manual

020-100332-09

CHRISTIE®

FCC
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
FCC/IC RF Radiation Exposure Statement:
This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada
이 기기는 업무용 (A 급) 으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며 , 가정 외의 지역에서 사용하는 것을 목적으로 합니다
당해 무선설비기기는 운용 중 전파혼신가능성이 있음 .
Contains FCC ID: XU6-CRMX100
Contains IC: 8691A-CRMX100

CE

NOTICES
Manufacturing facility is ISO 9001 and 14001 certified. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. The equipment is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of this equipment appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in.

WARRANTY
MicroTiles are a versatile product and can be used in a wide variety of creative customer applications. However, MicroTiles have some limitations which need to be considered to avoid inappropriate uses of the product. The MicroTiles warranty does not cover inappropriate uses of the product. For complete information about Christie's limited warranty, please contact your Christie Dealer. In addition to the other limitations that may be specified in Christie's limited warranty, the warranty does not cover:
(a) Damage occurring during shipment, in either direction.
(b) MicroTiles are lightweight and relatively easy to move and install. However, wear and tear may occur if the product is repeatedly assembled and disassembled, especially if excessive force is used with the removal of screens and installation of vertical screws.
(c) Problems caused by combination of the equipment with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the equipment with any non-Christie interface device.
(d) Damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake or other natural disaster.
(e) Damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized service provider.
(f) Failure due to normal wear and tear.
(g) Damage due to operating beyond the products specified environment. This product is designed to operate in an environment of 5°C to 40°C (41°F to 104°F) and a relative humidity between 35% to 85% non-condensing.
(h) MicroTiles are ideal for indoor, high ambient light environments. Avoid setting up the arrays in environments where the module temperature exceeds 50°C (122°F). This is especially true when exposing the screens to direct sunlight. Layers of the screen assembly will delaminate if exposed to environments where this temperature is exceeded. Prolonged exposure to UV radiation, including direct sunlight, may result in degradation of screen performance over time.
(i) MicroTiles are not weatherproof, and should only be used outdoors if contained in an environmentally controlled enclosure that meets the operating requirements of the product.

PREVENTATIVE MAINTENANCE
Preventative maintenance is an important part of the continued and proper operation of your Christie® MicroTiles™. Please see the Maintenance section of the User Manual for specific maintenance items. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

Table of Contents

Introduction

⚠WARNING To prevent physical injury or equipment damage read *Maintenance* on page 20 in its entirety before performing any service procedure.

This manual is intended for service technicians who service and repair Christie® MicroTiles™. The information in this document is applicable to all Christie MicroTiles and Electronic Control Units (ECUs) with firmware version 4325 or newer.

Safety precautions and warnings

To avoid personal injury or damage to the MicroTiles, it is imperative that you understand and follow these precautions:

When the screen is removed, directly viewing the beam with an optical instrument, such as an eye loupe, magnifier or microscope from a distance of less than 100mm (3.94”) may pose an eye hazard. MicroTiles are a class 1M source of visible and invisible LED radiation with a maximum power rating of 3.61mW @ 400-700nM.

⚠DANGER

- Up to 9 tiles may be connected per daisy chain when hooking up the power supply. This is the maximum power carrying capability of the power cord.
- Always power down and disconnect all power sources to the MicroTiles before servicing or cleaning.
- Do not modify MicroTile circuitry.

⚠CAUTION

- Adhere to appropriate static protocols when servicing the MicroTiles.
- Double pole/neutral fusing. Disconnect power before servicing or replacing fuses.

NOTICE MicroTiles must be operated in an environment that meets the operating range specification. This product is designed to operate in an environment of 5° C to 40° C (41° F to 104° F) and a relative humidity between 35 to 85% non-condensing.

Parts and Module Replacement

Ordering Parts

When ordering replacement parts provide the following information found on the product license label, located on the back of each tile.

- Serial number*
- Manufacture date
- Model number

* The serial number is also printed on the front chassis.

Index of Parts and Modules

All replacement parts and accessories are listed in the following table. For details, see *Exploded Views on page 26*.

Exploded View Label	Part Number / Description	Christie Part #	Procedure Starts on Page
1	Light Engine	003-101217-xx	10
2	Front Right Duct Cover	/	/
3	Front Lower Duct Cover	/	/
4	Front Upper Duct Cover	/	/
5	Screen Assembly	123-102104-xx 123-119102-xx 123-124108-xx 123-128102-xx	8
6	Low Voltage Power Supply (LVPS)	003-101207-xx	15 and 16
7	Fan Module	003-101665-xx	13 and 14
8	Rear Cover	/	/
/	External Control Unit (ECU)	123-101103-xx 123-129103-xx	19

Servicing

⚠WARNING

- All servicing must be performed by Christie service personnel or a Christie authorized service provider. Use replacement parts that are manufacturer-approved only. Use of any other part other than the ones specified by the manufacturer can result in fire, electric shock or risk of personal injury and irreparable equipment damage.
- Do not service the MicroTiles while they are still connected. There are exposed voltages that could cause severe physical injuries and possibly death.

If any of the following conditions exist, immediately disconnect the MicroTiles from the power outlet and consult a Christie accredited service technician.

- The power cord is damaged.
- The internal cooling fans do not turn ON when the tiles are first powered up.
- Liquid is spilled into the tiles.
- The tiles are exposed to excessive moisture.
- The tiles are not operating normally or performance has significantly deteriorated in a short period
- The tile has been dropped or the shipping case (if applicable) is badly damaged.

Service Guidelines

- Always power down and disconnect power sources prior to servicing.
- Follow all service safety guidelines. See *Safety precautions and warnings* on page 5.
- To locate each module within the tile, see *Exploded Views on page 26*.
- When re-installing a module, follow the removal instructions in reverse unless otherwise indicated.
- When re-connecting harnesses, see *Interconnections on page 28*.

Repair Cautions

- Do not operate with heat sinks removed.
- Ensure the tile(s) is disconnected from AC power before testing, removing, or installing modules.
- Do not operate the tile(s) with any internal part removed.
- To avoid damaging the screen always remove it when transporting the tile.

Tools Required

- Phillips™ screwdrivers #1 *(100mm and 300mm lengths)*
- 4mm Hex Ball Driver
- Screen Removal Tool *(supplied with User Kit)*
- Electrostatic protective strap and pad

Replacement Procedures

The mechanical housing of the MicroTiles is designed in such a way that each individual tile within a large array can be easily serviced without needing to disassemble the entire array. Depending on the installation, the service technician may only have access to either the front or the rear of the array. Therefore, MicroTiles have been designed to be repairable from either end; however, rear service is limited to the fans and the power supply. All other components are only serviceable from the front.

Screen Assembly Replacement

Unpack Screens

NOTICE

- Do not touch inside the screen.
- Always handle the screen from the sides.
- Remove all jewelry and watches from your hands and wrists before handling.
- Never use gloves that are dirty or have a rough texture as they can leave marks on the screen.
- Never handle the screen without gloves once it has been removed from the plastic bag.
- Avoid placing the screen on a hard surface.
- Never set the screen on its corner or edge as they are fragile and can be easily damaged.

1. Open the box and, without removing it, examine the screen to ensure it has not been damaged during shipping.
2. Place one hand under the screen's frame, between the front two foam corners.
3. Carefully lift the frame and screen until the front two foam corners are clear of the box.
4. Remove the front two foam corners.
5. Carefully lower the frame and screen back into the box.
6. With two hands, grasp the sides of the frame and lift the frame and screen together out of the box.
7. If the work surface is hard (for example, a table top), have another person close the lid of the box and place the screen on the lid. Otherwise, place the screen on the work surface.
8. Remove the remaining two foam corners.

9. Put on clean gloves.
10. Place one hand lightly on the screen and pull open the plastic bag.
11. Grip the bottom of the bag with one hand and the frame with the other and pull the screen out of the bag.
12. If you have lifted the screen and bag up while performing step 11, place the screen back on the work surface or box.

Replace the Screen Assembly

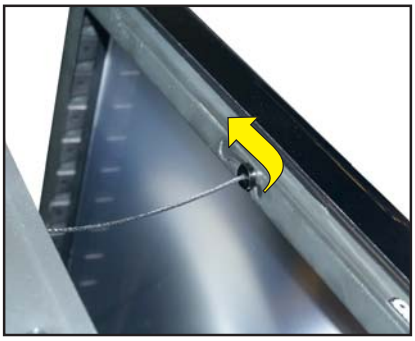
NOTICE Do not touch inside the screen. Always handle from the sides. Remove all jewelry and watches from your hands and wrists before handling the screens. When replacing the screens always work from the bottom of the array to the top

Estimated Replacement Time: 1 minute

1. Open the screen removal tool and gently place it in the center/top portion of the screen.
2. Close the handle tool to apply suction.
3. Pull the screen forward.
4. Slide the screen tether out of the locking latch before completely removing the screen. Place the screen in a safe location to avoid damaging the surface.

NOTICE If the screen is removed for a prolonged period replace the lens guard and dust cap.





5. If necessary, remove the lens guard and dust cap. Slide the screen tether into the locking latch on the back of the screen.

NOTICE The screen tether must be secured before installing the screen. The tether ensures the screen does not fall if the array is subjected to excessive force/vibrations.

6. Align the two screen mounting holes with the two guide pins on the MicroTile housing and move the screen forward until the magnets on the housing hold it securely.

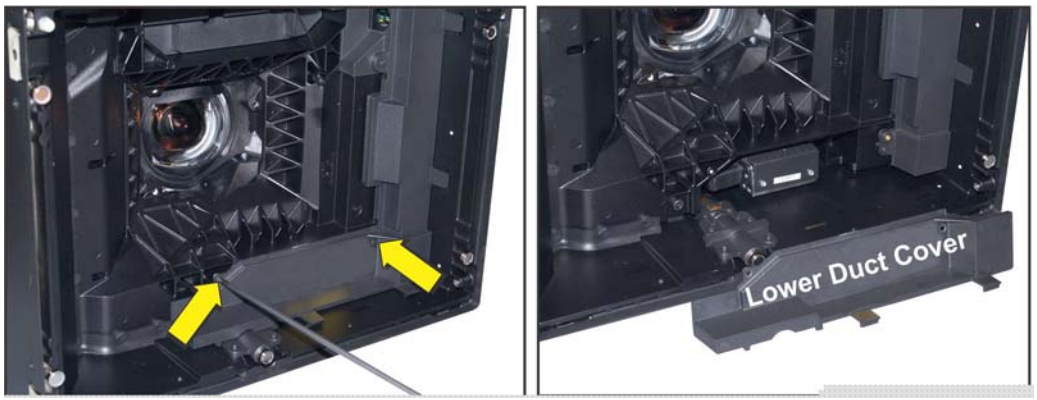
Front Access Light Engine Replacement

⚠CAUTION Shock Hazard! AC may be live when servicing the display from the front.

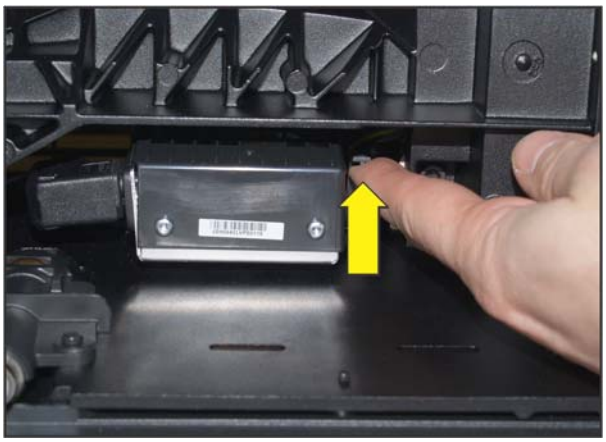
NOTICE The images found in this section contain the thermal actuator, which may have been removed from you tile(s). For details, see the *Actuator Removal Instruction Sheet (P/N: 020-100729-xx)*.

Estimated Replacement Time: 15 minutes

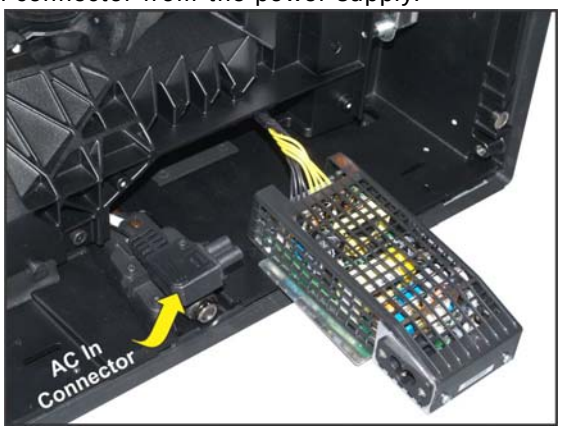
1. Remove the screen. See *Screen Assembly Replacement on page 8*.
2. Remove the 2 screws securing the lower duct cover with a #1 Phillips™ screwdriver.



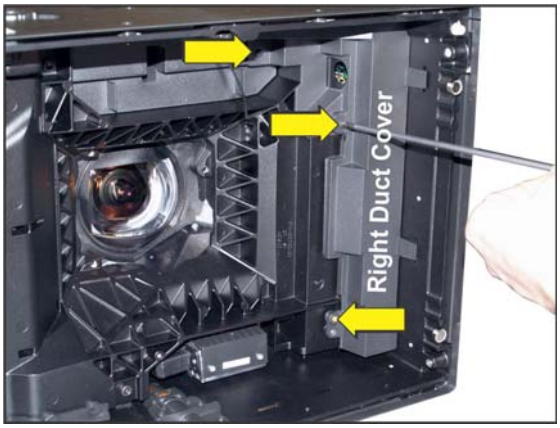
3. Push the LVPS lever up and forward until the power supply plug is visible.



4. Disconnect the AC In connector from the power supply.



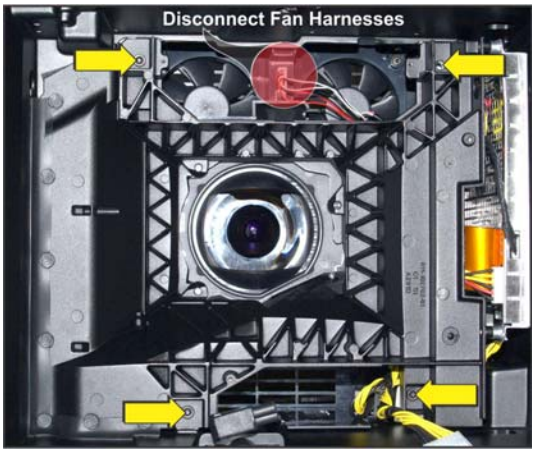
5. Remove the 3 screws securing the right duct cover with a #1 Phillips™ screwdriver.



6. Remove the 2 screws securing the upper duct cover with a #1 Phillips™ screwdriver.

7. Disconnect the fan harnesses.

8. Remove the 4 M5 screws from the light engine bracket with a hex key.



9. Pull the light engine out of the housing.

10. Disconnect the DC harness from the light engine. The harness is located on the bottom of the light engine near the Front End Formatter Board (FEFB).
11. Disconnect the two display port cables.

NOTICE When removing the light engine from the display unit ensure the display port cables have approximately 4 to 6" of slack so they can be disconnected from the light engine. When you disconnect the port cables ensure they do not fall through the back of the array.

12. Connect the display port cables and the DC harness.
13. Slide the light engine into the housing, ensuring the pins on the engine bracket are aligned with the hole and slot on the housing.
14. Fasten the light engine bracket to the housing with the four M5 screws.
15. Connect the fan harnesses.
16. Connect the LVPS.
17. Install each of the duct covers.
18. Install the screen.

See *Screen Assembly Replacement on page 8*.

Front Access Fan Assembly Replacement

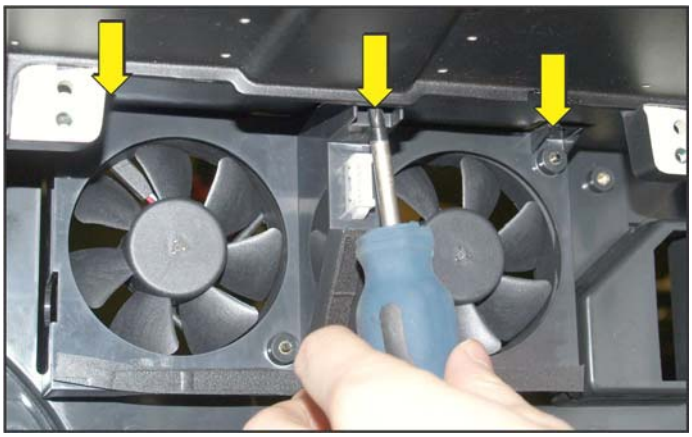
⚠CAUTION Shock Hazard! AC may be live when servicing the display from the front.

For information on rear serviceability, see *Rear Access Fan Assembly Replacement* on page 14.

Estimated Replacement Time: 20 minutes

1. Remove the screen. See *Screen Assembly Replacement on page 8*.
2. Remove the 2 screws securing the upper duct cover with a #1 Phillips™ screwdriver.

3. Remove the light engine. See *Screen Assembly Replacement on page 8*.
4. Remove the 3 screws securing the fan assembly to the top chassis with a #1 Phillips™ screwdriver.



5. Pull the fan assembly out and disconnect the fan harnesses.
6. Remove the fan assembly.

Rear Access Fan Assembly Replacement

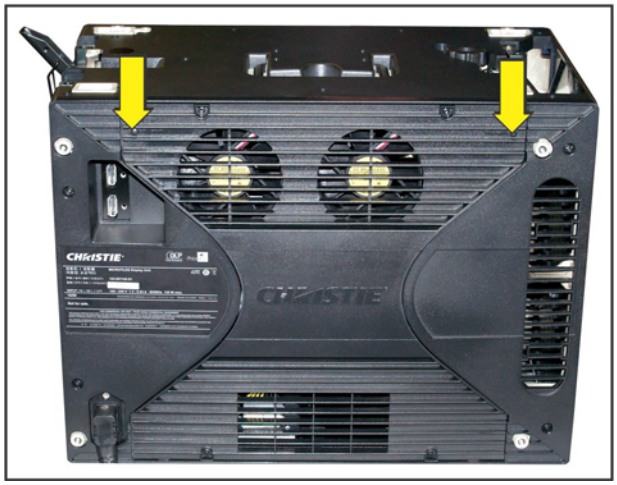
For information on front serviceability, see *Front Access Fan Assembly Replacement on page 13*.

Estimated Replacement Time: 5 minutes

When replacing the fans from the rear of the display unit it is not necessary to replace the entire fan assembly, instead the 2 individual fans can be swapped. The replacement fan kit it is shipped as a complete assembly; therefore, the fans will need to be removed from the assembly and installed separately.

When replacing individual fans ensure the fan label is facing outwards for correct orientation

1. Remove the 2 screws from the back cover with a #1 Phillips™ screwdriver.



2. Move the back cover down as you disengage it from the tabs to remove it. Set the cover aside.
3. Remove the 2 screws securing each of the fans with a #1 Phillips™ screwdriver. Pull the fans out and disconnect the harnesses.
4. Remove the fans from the fan assembly.

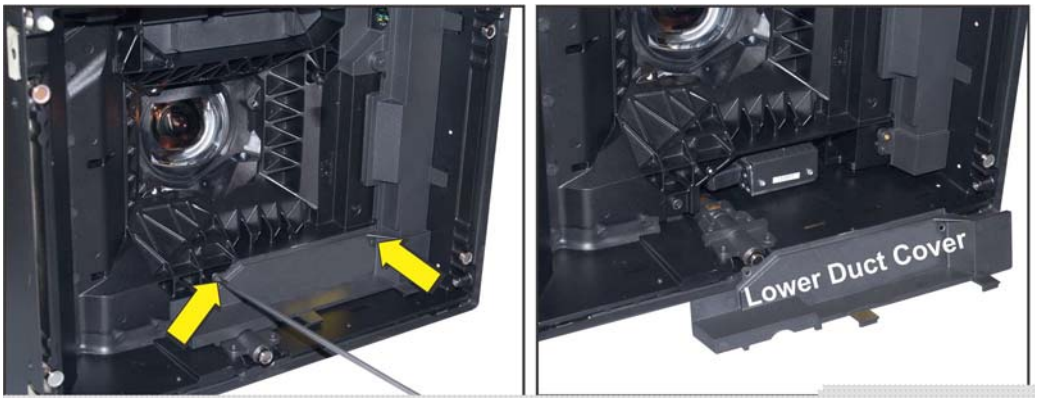
Front Access Low Voltage Power Supply (LVPS) Replacement

NOTICE The images found in this section contain the thermal actuator, which may have been removed from you tile(s). For details, see the Actuator Removal Instruction Sheet (P/N: 020-100729-xx).

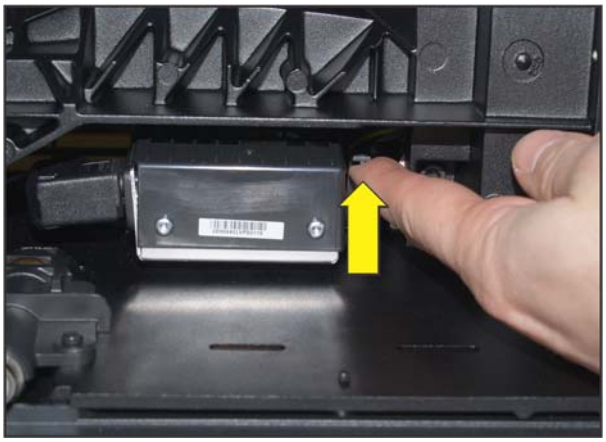
For information on rear serviceability, see *Front Access Low Voltage Power Supply (LVPS) Replacement on page 15*.

Estimated Replacement Time: 5 minutes

1. Remove the screen. See *Screen Assembly Replacement on page 8*.
2. Remove the two screws securing the lower duct cover with a #1 Phillips™ screwdriver.

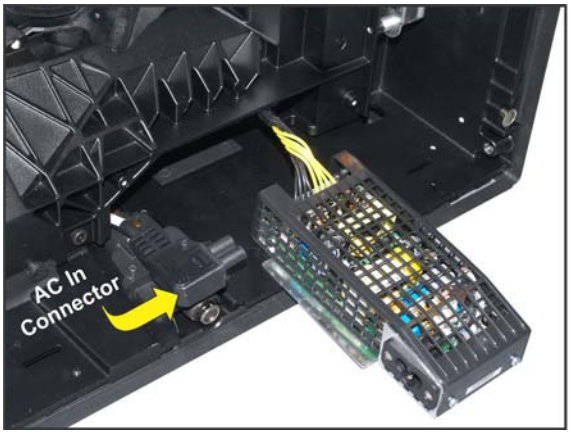


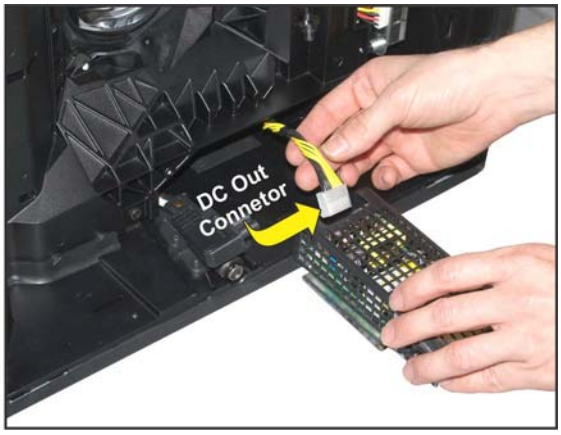
3. Push the LVPS lever up and forward until the power supply plug is visible.



4. Disconnect the AC In connector.
5. Pull the LVPS forward until the DC Out connector is visible.

6. Disconnect the DC Out connector and remove the LVPS.





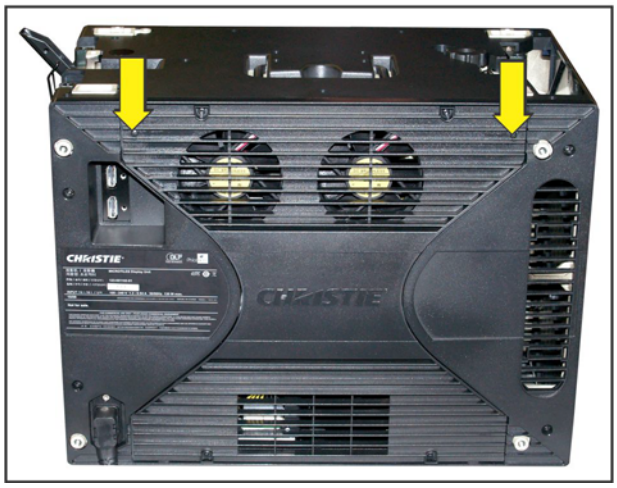
7. Connect the DC Out connector to the LVPS. Ensure the connector is properly aligned.
8. Align the LVPS with the guide rails on the housing and slide it in until you can connect the AC In cable. **NOTICE:** *Ensure the DC OUT cable is not pinched between the power supply and light engine bracket.*
9. Connect the AC In cable and slide the LVPS along the guide rails until the lever engages.
10. Install the lower duct cover.
11. Install the screen. See *Screen Assembly Replacement on page 8*.

Rear Access Low Voltage Power Supply (LVPS) Replacement

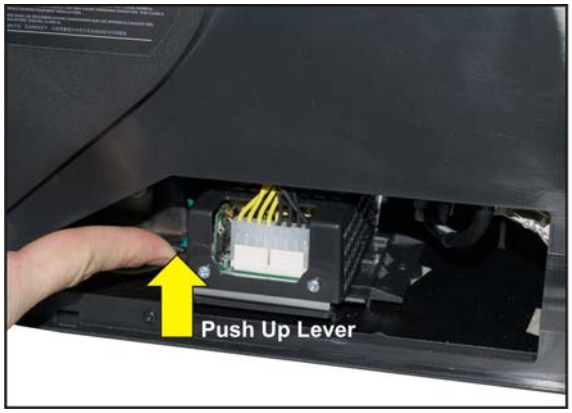
For information on front serviceability for the LVPS, see *Front Access Low Voltage Power Supply (LVPS) Replacement on page 15*.

Estimated Replacement Time: 5 minutes

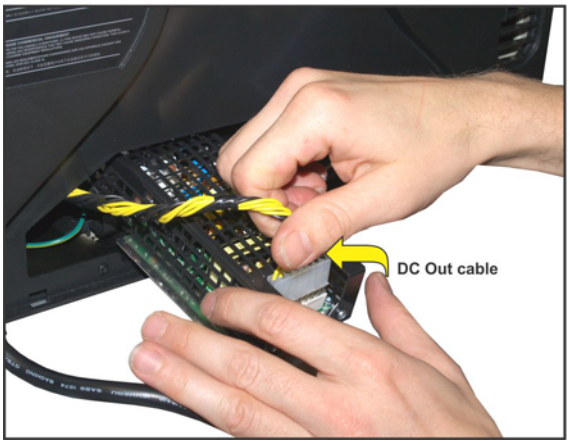
1. Remove the 2 screws from the back cover with a #1 Phillips™ screwdriver.



2. Move the back cover down as you disengage it from the tabs to remove it. Set the cover aside.
3. Push the LVPS lever up and slide the LVPS forward until the DC Out cable is accessible.



4. Disconnect the DC Out cable.
5. Pull the LVPS forward until the AC In cable is accessible.
6. Disconnect the AC In cable and remove the LVPS.



7. Connect the DC Out cable to the power supply. Ensure the connector is properly aligned.
8. Align the LVPS with the guide rails on the housing and slide it in until you can connect the AC In cable.

NOTICE Ensure the DC Out cable is not pinched between the power supply and light engine bracket.

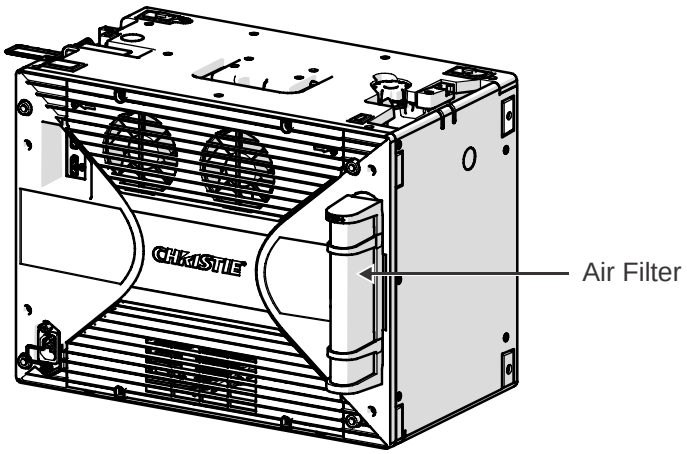
9. Connect the AC In cable and slide the LVPS along the guide rails until the LVPS lever is engaged.
10. Replace the lower duct cover.
11. Replace the back cover.

Clean the Air Filter

Estimated Time: 5 minutes

Slide the air filter out and replace, vacuum, or wash the filter with mild soap and water. If you wash the filter, dry it thoroughly before you reinstall it.

For a more detailed view of the part, see *Exploded Views on page 26* (number 9).



Replace the ECU Battery

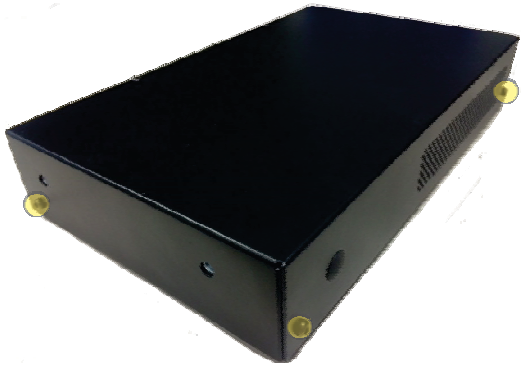
NOTICE Ensure the correct battery type is used and that it is installed correctly. Dispose of used batteries according to local safety regulations.

Estimated Replacement Time: 10 minutes

1. Remove the 8 screws securing the ECU with a T10 torx driver.

ECU - Front View

ECU - Back View



2. Remove the ECU cover and set it aside.
3. Remove the CR2032 (3V lithium) battery.
4. Install the new battery with the label facing up.

5. Install the ECU cover.

Maintenance

Read this section in its entirety before performing maintenance activities.

Maintaining Proper Cooling

⚠CAUTION

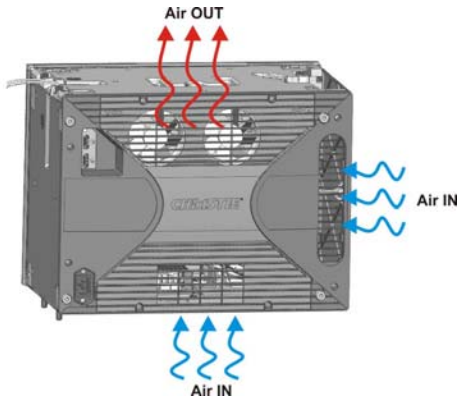
The volume air directly behind each tile must not exceed the maximum operating temperature of the tile, which is 40° C (104° F). A minimum 2" (50 mm) gap must be left at the back of each tile to ensure proper air flow and cooling. Each tile has a maximum cooling load of 110W (375 BTUs/hr) per tile, when operating with brightness and color matching disabled (each LED operating at maximum drive level). For more detailed information on airflow requirements, see the *Christie® MicroTiles™ Specification and Application Guide (P/N: 020-100334-xx)*.

NOTICE

- The air circulating through the MicroTiles must be free of excessive dirt, dust, and particulate matter. Failure to follow this recommendation may void the warranty.
- Do not place MicroTiles on a radiator or heat register.
- Do not place the MicroTiles into an enclosure without adequate ventilation.
- Do not obstruct the ventilation openings of the MicroTiles.
- Do not spill liquids onto the MicroTiles. If a spill occurs, immediately disconnect from power and have it serviced by a Christie accredited service technician.

Tiles are cooled from the back. 99% of the heat generated by the MicroTiles is exhausted out the back and should be accounted for at the rear of the array.

If the array is installed in an enclosed area, additional cooling may be required to comply with local safety regulations. The inlet air cannot exceed the maximum operating temperature of the tile. See *General Specifications* on page 23 (Operation section of the table). If proper air flow is not provided the tiles continue to operate for a limited time. When the operational temperature is exceeded for an extended period tiles dim and then turn off.



Cleaning

⚠WARNING Electrical Shock Hazard! Disconnect from AC when servicing.

NOTICE When cleaning with compressed air, use 30 psi. Only use compressed air with appropriate guarding and protective equipment.

Maintaining the cleanliness of all internal components during any service procedure is critical. This table provides instructions for cleaning MicroTile components.

Components	Preventative Measures	Cleaning Technique
Fresnel	Typically, dirt on the back of the Fresnel appears as a defect on the screen.	Use a soft, low lint cloth to remove dust and debris from the back of the Fresnel.
S100 Screen and S300 Screen	Avoid touching the surface of the screen. Always handle from the sides. Remove all jewelry from your hands before handling the screen.	Spray Windex™ or an equivalent window cleaner onto a clean cloth and gently wipe the screen surface. Use a dry, clean, soft cloth to remove streaks. DO NOT spray cleaner directly onto the screen surface. If absolutely necessary, use clean, filtered compressed air to remove loose particles.
S200 Screen	Avoid touching the surface of the screen. Always handle from the sides. Remove all jewelry from your hands before handling the screen.	**NOTICE:** *Window cleaning sprays, kitchen scouring compounds, solvents such as acetone, gasoline, benzene, alcohol, carbon tetrachloride, or lacquer thinner can scratch and deteriorate the screen surface.* To remove light dust from the front surface of the S200 screen, use a feather duster or soft-bristled paintbrush. For heavier dirt wash the surface with a mild soap solution in lukewarm water, using a clean, soft, low lint cloth. Use a dry, clean, soft cloth to remove streaks.
Air Filter	In dusty environments check the filters monthly, otherwise check them every 3 to 4 months.	Remove dust with filtered, compressed air.
Lens	The projection lens should never need to be cleaned.	If necessary, use compressed air to remove loose particles.
Light Engine Heat Sinks	**NOTICE:** *If airflow to the heatsinks is restricted they will begin to overheat. Software is designed to reduce the brightness of the tile(s) when this occurs to keep the temperature level. If they continue to overheat the software eventually turns the LEDS OFF to prevent damage.* In dusty environments check the heat sinks regularly to ensure airflow is not restricted.	Remove dust with filtered, compressed air.

Update MicroTile Software

Periodically upgrades to the main software are posted to www.christiedigital.com. Typically, software upgrades include new features and improvements to existing ones. For a complete overview of how to upgrade the main firmware, see the *Christie® MicroTiles™ User Manual (P/N: 020-100329-xx)*.

Hardware Setups

It is recommended that the FPGA hardware upgrade be performed at the same time as a firmware upgrade. For a complete overview of how to perform an FPGA hardware upgrade, see the *Christie® MicroTiles™ User Manual (P/N: 020-100329-xx)*.

Specifications

Due to continuing research, specifications are subject to change without notice.

General Specifications

Specification		Value
Model numbers	Display unit	D100
	Screen	S300
	External Control Unit (ECU)	E100
Display unit dimensions	Height	306 mm (12.05 in.)
	Width	408 mm (16.06 in.)
	Depth	260 mm (10.24 in.)
	Weight with S300 screen	9.2 kg (20.3 lbs)
	Weight without S300 screen	8.0 kg (18.7 lbs)
ECU dimensions	Height	50 mm (1.97 in.)
	Width:	259 mm (10.20 in.)
	Depth	191 mm (7.52 in.)
	Weight	1.6 kg (3.5 lbs)
Display	Screen size (diagonal)	510 mm (20 in.)
	Native resolution per tile	720 x 540
	Pixel pitch	0.567 mm x 0.567 mm
	Maximum calibrated brightness:	600 Nits (cd/m2)
	LED lifespan (50% brightness):	65,000 hours
	Peak white color temperature:	6500K
	Adjustable gamma	Yes
	Color space (CIE 1931)	115%
	Optical system	DLP® 0.55” SVGA

Specification		Value
Processing and control	Input signal compatibility	Single-link DVI
	Processor bit rate	165M pixels per second
	Data link bit rate	5 Gbps
	Maximum video bandwidth	165M pixels per second
	Color depth	24 bits per pixel
	Color processing	13 bits
	Refresh rate	47-63Hz frame-locked
	Control interface:	Ethernet, USB 2.0, Serial
Power	Christie MicroTiles Display Unit D100 input rated	100-220V, 50/60Hz
	Maximum 9 Christie MicroTiles on a single circuit (10A total)	
	Power consumption per tile	70W typical
	Heat load per tile	239 BTUs/hr typical
	ECU power consumption	8.5W typical/11.5W maximum
Operation	Operating temperature with S300 screen:	5°C to 40°C (50°F to 122°F)
	Relative humidity with S300 screen	35-85% non-condensing
	Minimum clearance for ventilation	50mm (2 in.)
	Altitude	0ft (0m) to 10,000ft (4000m)
	Vibration/motion limit	0.5G
	Sound pressure per tile:	35 dB at 25°C (77°F) ambient typical
	Runtime	24/7
Accessories	Mounting brackets with each tile above 5 rows high (optional)	
	Base feet for leveling the bottom row (optional)	
Regulatory approvals	Directives (EC) 2002/95/EC (RoHS); 2002/96/EC (WEEE); Regulation (EC) No. 1907/2006 (REACH)	
	CAN/CSA C22.2 No. 60950-1-03 2nd Edition	
	UL 60950-1, 2nd Edition	
	IEC 60950-1:2001, 2nd Edition	
	FCC, Part 15, Subpart B, Class A	
	EN55022/CISPR22 Class A	
	EN55024/CISPR24	
Limited Warranty	Two years parts and labor. Contact an authorized Christie representative for full details.	

Screen Specifications

Specification	S300	S100 (Discontinued)	S200 (Discontinued)
Weight	1.2 kg	1.2 kg	1.2 kg
Maximum calibrated brightness	600 Nits	800 Nits	400 Nits
Operating temperature	5°C (41°F) minimum 40°C (104°F) maximum	5°C (41°F) minimum 40°C (104°F) maximum	17°C (63°F) minimum 31°C (89°F) maximum
Non-operating temperature	2°C (36°F) minimum 50°C (122°F) maximum	2°C (36°F) minimum 50°C (122°F) maximum	2°C (36°F) minimum 31°C (89°F) maximum
Operating relative humidity	35 – 80% non-condensing	35 – 80% non-condensing	40 – 60% non-condensing
Shipping (boxed) temperature	-20°C (-4°F) minimum 50°C (122°F) maximum	-20°C (-4°F) minimum 50°C (122°F) maximum	-20°C (-4°F) minimum 31°C (89°F) maximum

Advanced Specifications

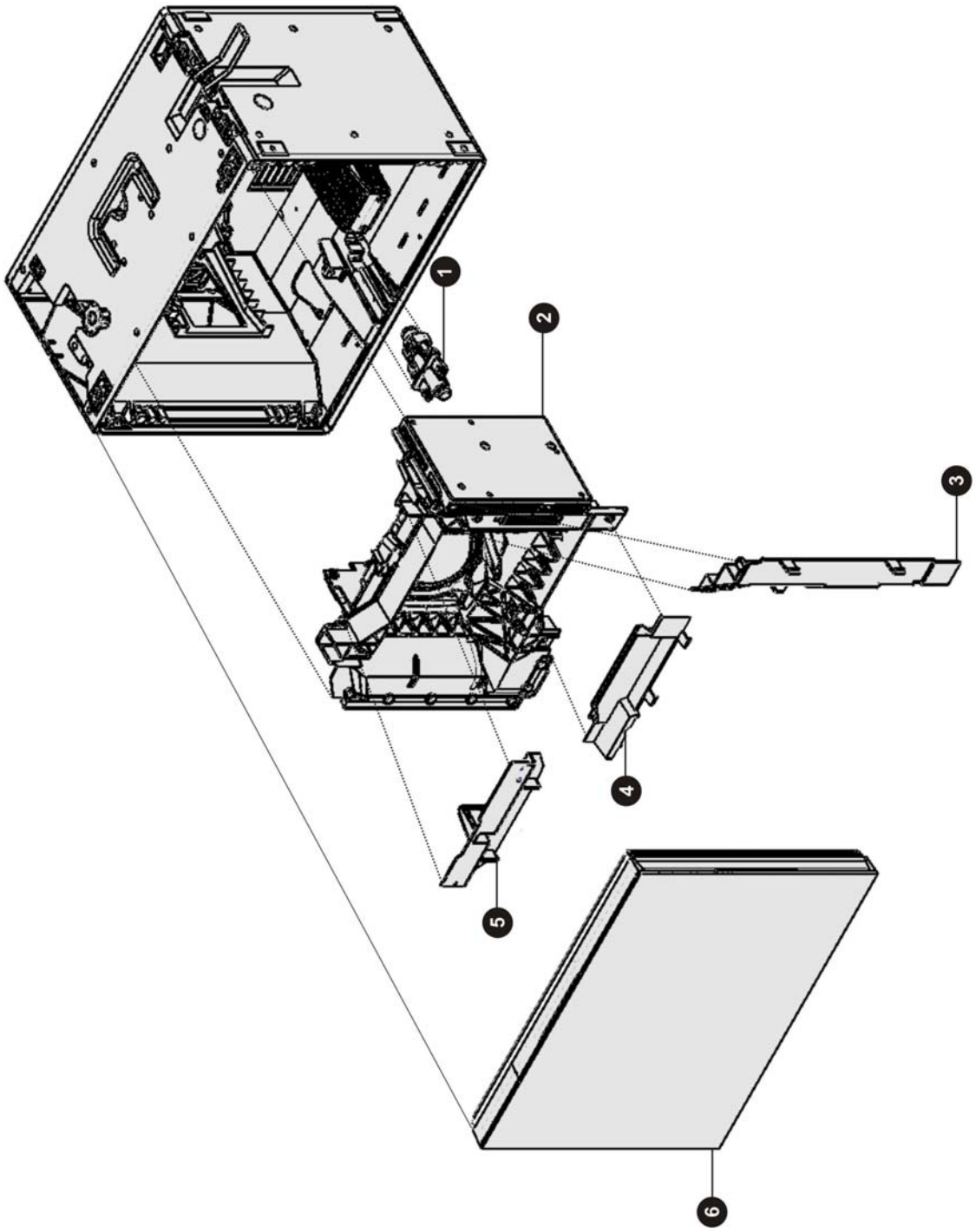
In *General Specifications* on page 23, specifications are based on a typical canvas of tiles operating at maximum brightness with color and brightness matching enabled. This is regarded as the default or typical operating condition for a MicroTiles canvas. The following table provides additional specifications under a broader range of operating conditions. Maximum power (110W) is the maximum power of a tile with all LEDs manually driven to the maximum levels (for example, no color matching).

Operating Condition	Item	Specification
Typical: At maximum brightness with color and brightness matched.	Power Consumption per Tile	70W
	Heat Load per Tile	239 BTUs/hr
	Sound Pressure per Tile	35 dB at 25°C (77°F) ambient
Maximum: At maximum brightness, with every LED at maximum drive level, sacrificing color and brightness matching between tiles.*	Power Consumption per Tile	110W
	Heat Load per Tile	375 BTUs/hr
	Sound Pressure per Tile	45 dB at 25°C (77°F) ambient

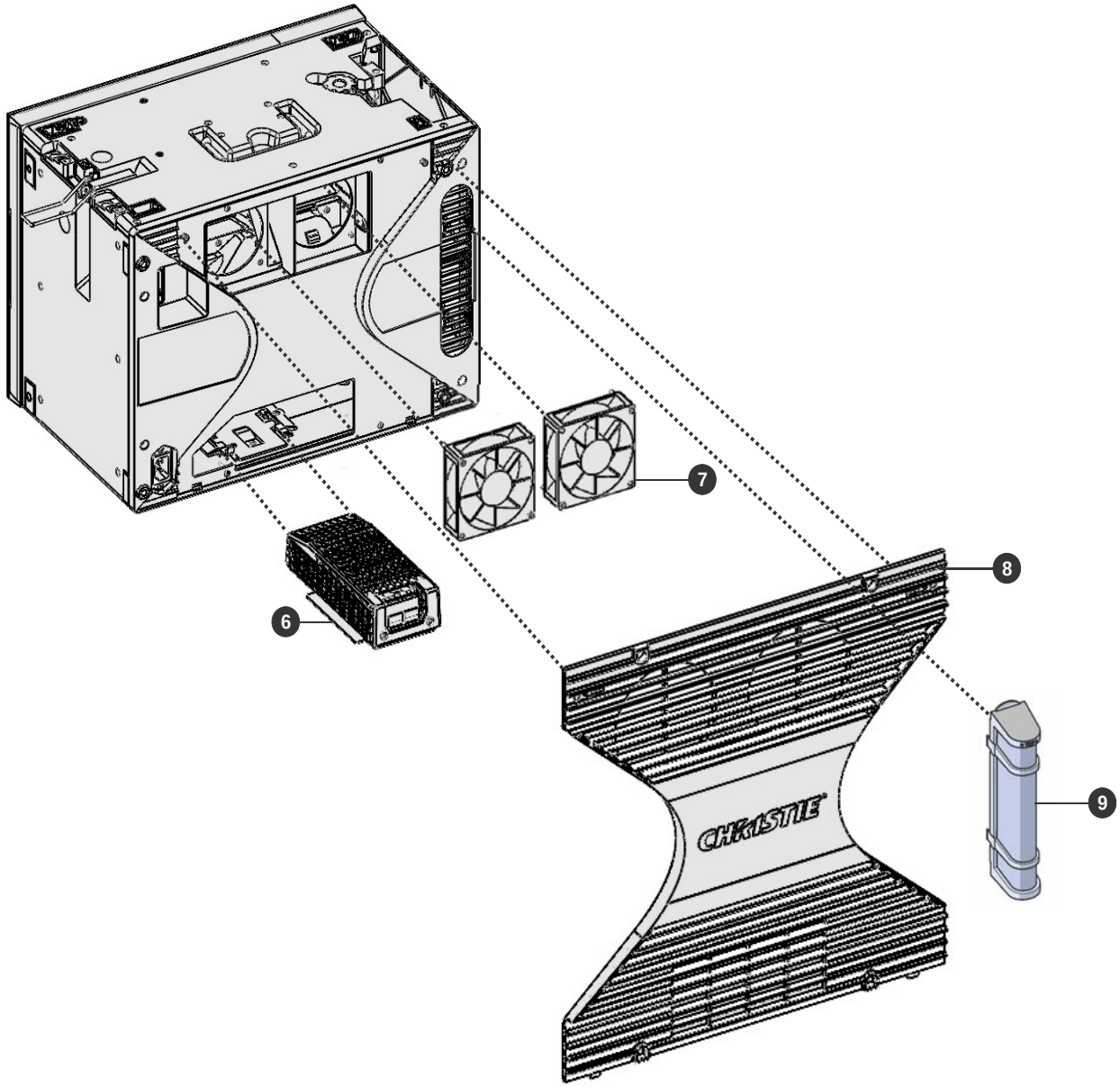
*A MicroTiles canvas is designed to achieve color and brightness matching between tiles by adjusting the drive levels of each LED in the canvas. Through this continuous process, the maximum brightness and color space of a complete canvas is lower than that of an individual tile. Operating a MicroTiles canvas without color and brightness matching enabled is not recommended.

Exploded Views

Exploded View - Front

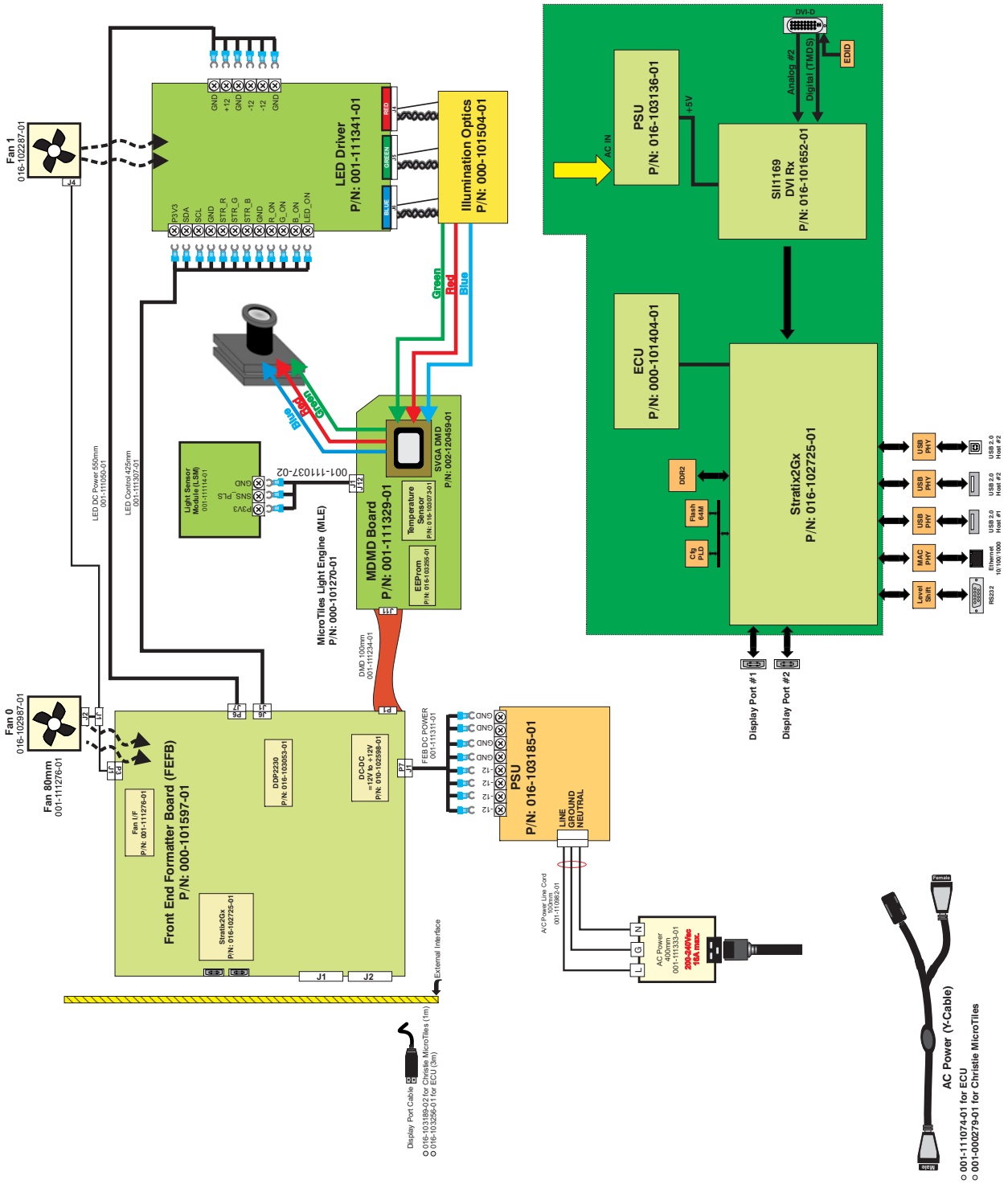


Exploded View - Back



Interconnections

The following diagram illustrates the path of electrical connections between modules.



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